

**World Heritage Convention
Natural Heritage · China**

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

Annex 3: Management Plan

**National Forestry and Grassland
Administration of the People's Republic of
China**

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1 Introduction to Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China

1.1 A brief introduction to the world properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I)

The World Heritage sites of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) are located in the world's largest intertidal flats, consisting of the North and South Yancheng Migratory Bird Sanctuaries. The total area of the World Heritage sites is 188,643 ha, and the total area of the buffer zones is 800,056 ha.

This serial property meets Criterion (x). It is a vital habitat for 50 million EAAF waterbirds belonging to more than 250 waterbird species and is used as an important site by many birds to stop over, molt, refuel, winter, feed, and breed during their long-distance migration. Thus, this serial property is of global importance to biodiversity conservation. Besides, the World Heritage site has an extremely rich biodiversity. Some 680 species of vertebrates have been recorded, including 415 species of birds, 26 species of mammals, 9 species of amphibians, 14 species of reptiles, 216 species of fish, and 165 species of zoobenthos. The tidal flats

of the World Heritage sites are of particular importance to the protection of migratory birds in the world. It provides seasonal habitats for more than 10% of EAAF birds, including two of the world's rarest migratory birds, namely Spoon-billed Sandpiper (*Calidris pygmeus*) and Nordmann's Greenshank (*Tringa guttifer*). These habitats are also crucial for the survival of other threatened bird species, including Black-faced Spoonbill (*Platalea minor*), Oriental Stork (*Ciconia boyciana*), Red-crowned Crane (*Grus japonensis*), and Great Knot (*Calidris tenuirostris*).

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) were inscribed on the *World Heritage List* on July 5th, 2019. According to the resolution of the World Heritage Committee, Phase II should include all other components as a single nomination so as to reflect the natural attributes and biodiversity of the Yellow Sea Ecoregion to meet the integrity requirements.

1.2 Introduction to the components of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) consists of parts of Liaoning, Hebei, Shandong, and Shanghai. Extending from the Yalujiang Estuary in the north to the

Yangtze River Estuary in the south, it covers the most important intertidal zones and coastal marsh wetlands of the Yellow Sea-Bohai Gulf region. Moreover, this region is also the most important migratory bird transit node in the Yellow Sea Ecoregion within the EAAF. During the northward migration, 40% of the shorebirds would stop over in this region. Taking this region as Phase II Serial Nomination is necessary for protecting the integrity of the most important migratory bird habitat in the Yellow Sea Ecoregion.

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China Heritage Serial Nomination (Phase II) are distributed within 14 district and county-level administrative units in 4 provinces (or centrally administered municipality), namely, Shanghai, Shandong, Hebei and Liaoning. Including Chongming District of Shanghai, Hekou District of Dongying City, Kenli District of Dongying City, Lijin County of Dongying City, Nandagang Industrial Park of Bohai New District of Cangzhou City, Luannan County of Tangshan City, Beidaihe New District of Qinhuangdao City, Beidaihe District of Qinhuangdao City, Qinhuangdao City Shanhaiguan District, Panshan County of Panjin City, Dawa District of Panjin City, Lushunkou District of Dalian City, Donggang City of Dandong City and Changhai County of Dalian City, see Table 1 for details.

Table 1 The composition and location of the Nominated World Heritage Site for the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

ID No. of Component Parts	Name of the area	Province/Centrally Administered Municipality	District/County
YS-3	Migratory Bird Habitat at Chongming Dongtan, Shanghai	Shanghai Municipality	Chongming District
YS-4	Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province	Shandong Province	Hekou District, Kenli District, and Lijin County of Dongying City
YS-4-1	Old Course of Yellow River Estuary	Shandong Province	Hekou District and Lijin County, Dongying city
YS-4-2	North Part of the Yellow River Estuary	Shandong Province	Kenli District, Dongying city
YS-4-3	South Part of the Yellow River Estuary	Shandong Province	Kenli District, Dongying city
YS-4-4	Dawenliu	Shandong Province	Kenli District, Dongying city
YS-5	Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province	Hebei Province	Nandagang Industrial Park, Cangzhou Bohai New Area
YS-6	Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province	Hebei Province	Luannan County, Tangshan City
YS-7	Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province	Hebei Province	Beidaihe New District, Qinhuangdao City
YS-8	Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province	Hebei Province	Beidaihe District, Qinhuangdao City
YS-9	Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province	Hebei Province	Shanhaiguan District, Qinhuangdao City
YS-10	Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province	Liaoning Province	Panshan County, Dawa District, Panjin City
YS-10-1	West Part of Liao River Estuary	Liaoning Province	Panshan County, Panjin city

ID No. of Component Parts	Name of the area	Province/ Centrally Administered Municipality	District/ County
YS-10-2	East Part of Liao River Estuary	Liaoning Province	Dawa District, Panjin city
YS-11	Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province	Liaoning Province	Lushunkou District, Dalian City
YS-11-1	Jiutou Hill	Liaoning Province	Lushunkou District, Dalian City
YS-11-2	Snake Island	Liaoning Province	Lushunkou District, Dalian City
YS-12	Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province	Liaoning Province	Donggang City, Dandong City
YS-12-1	Dayang River	Liaoning Province	Donggang City, Dandong City
YS-12-2	Erdaogou	Liaoning Province	Donggang City, Dandong City
YS-13	Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province	Liaoning Province	Changhai County, Dalian City
YS-13-1	Fantuozi Islet of Guanglu Island	Liaoning Province	Changhai County, Dalian City
YS-13-2	Ertuozi Islet of Gexian Island	Liaoning Province	Changhai County, Dalian City
YS-13-3	Dacaotuozi of Guapi Island	Liaoning Province	Changhai County, Dalian City
	Xiaocaotuozi of Guapi Island	Liaoning Province	Changhai County, Dalian City
	Nandajiao of Guapi Island	Liaoning Province	Changhai County, Dalian City
YS-13-4	Wuhushi of Haxian Island	Liaoning Province	Changhai County, Dalian City
YS-13-5	Wushi of Dahaozi Island	Liaoning Province	Changhai County, Dalian City
	Dabanshi of Dahaozi Island	Liaoning Province	Changhai County, Dalian City
YS-13-6	Xicaotuozi of Dachangshan Island	Liaoning Province	Changhai County, Dalian City
YS-13-7	Beituozi Islet of Dachangshan Island	Liaoning Province	Changhai County, Dalian City

ID No. of Component Parts	Name of the area	Province/ Centrally Administered Municipality	District/ County
YS-13-8	Bashao Island Lithoherm Belt	Liaoning Province	Changhai County, Dalian City

The boundaries of the component and buffer zone are all within the range of China's existing protected areas and are protected by China's existing laws. The protection objects of these protected areas are the biodiversity and habitats of various species such as migratory birds, fish, shellfish, and mammals. The boundaries of the component and buffer zone covers the main or critical resting areas, wintering grounds or breeding areas of migratory birds in existing protected areas, so the boundaries of the component and buffer zone is not completely consistent with that of protected areas. The scientific protection of the above-mentioned migratory bird habitat is a key step for the overall protection of the above-mentioned migratory bird in the migration area.

The components of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) and the Phase I heritage sites, which have been inscribed on the World Heritage List, are located in different estuary deltas - natural geographic unites formed in different modern or historical periods. The scope covers main river estuaries in China's Changbai Mountains, Northeast Plain, North Plain, Middle and Lower Yangtze Plain, and Yellow Sea-Bohai Gulf areas.

2 The Outstanding Universal Value of nominated property

2.1 Brief synthesis

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is a series of World Natural Heritage that China has nominated to the UNESCO World Heritage Committee in two Phases. The Phase I of the World Heritage Site is located in Yancheng, Jiangsu Province, and was successfully listed in the World Heritage in 2019. The Phase II of the World Heritage Nomination includes 29 components in 4 provinces and municipality of Liaoning, Hebei, Shandong and Shanghai. Phase II is located between N 31°27'28"-N 40°53'45", E 117°26'48"-E 124°05'38", the total area of nominated property is 104,741.70 ha, and the total area of buffer zone is 47,072.28 ha.

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is located in the Yellow Sea Ecoregion. It has the ecosystems such as major estuaries, silt beaches, saltwater freshwater swamps, bedrock coasts, islands, etc. in the Yellow Sea and Bohai Sea which are one of the most biologically diverse in the world. The nominated property is an irreplaceable and indispensable hub for birds migrating along the East Asian-Australasian Flyway, which spans some 22 countries across two

hemispheres from the Arctic to South-East Asia and Australasia. Most of the protected areas on which the Phase II nominated property are based, fully or partially overlap with the Ramsar Site Network, Man and Biosphere Programme (MAB), East Asian-Australasian Flyway Partnership (EAAFP), Important Bird Areas (IBA) and Key Bird Areas (KBA). This highlights the global importance of the nominated property. Phase II significantly enhances the Outstanding Universal Value of the serial heritage, strengthens its conservation and management, and provides a new approach for the systematic conservation of important habitats for migratory birds in flyway areas.

The intertidal wetlands of the Yellow Sea Ecoregion span three countries: China, Democratic People's Republic of Korea and Republic of Korea. In each country, the wetlands support crucial habitats for birds migrating along the EAAF.

After the two components of the Phase I in Yancheng, Jiangsu, were listed in the *World Heritage List*, China fulfills its commitments that is to submit a single-Phase II nomination that includes all the additional components of the proposed serial listing as a whole, in order to reflect the full range of natural characteristics and biodiversity of the ecoregion and to meet integrity requirements. Getbol, Korea Tidal Flats was listed as a

World Heritage Site, which also strengthen the Outstanding Universal Value of the habitats of EAAF.

2.2 Justification for Criteria

According to the criteria for World Heritage set out in the *Operational Guidelines for the Implementation of the Convention Concerning the Protection of the World Cultural and Natural Heritage*, Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are nominated under Criterion (x):

(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.

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are key areas of global interest, for containing threatened bird species and their habitats, and are of globally outstanding value in terms of conservation and scientific research. The serial property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China is within the EAAF, which is home to much more threatened waterbird species than the other eight main flyways in the world.

Eleven components of Phase II, together with Phase I (two World Heritage sites in Yancheng), are situated in the south of the Yellow Sea Ecoregion (203), which is listed in WWF Global Ecoregion 200 by WWF, and have a wide variety of habitat types, providing a diverse range of breeding areas, stopover, and wintering areas. Most of the protected areas on which the Phase II nominated property are based, have been included in the Ramsar Site Network, Man and Biosphere Programme (MAB), East Asian-Australasian Flyway Partnership (EAAFP), Important Bird Areas (IBA) and Key Bird Areas (KBA). The serial property boasts a rich ecosystem diversity and biodiversity, and is essential for migratory waterbirds, raptors, and seabirds in the EAAF, providing vital stopover, breeding and wintering areas for migratory birds.

In recent years, the population trends of EAAF migratory birds have been negatively correlated with their reliance on the Yellow Sea; in other words, the long-term population changes of these species are more reliant on the Yellow Sea region's role as a refueling site.

2.3 Statement of Outstanding Universal Value

Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) provides important stopover, moulting, refueling, wintering, feeding, breeding sites for migratory birds. The serial property

covers a wide range of space, covering 10° of latitude and 7° of longitude. The covered natural geographical regions have different landscape and ecological characteristics, which provide an extremely diverse habitat environment for different migratory birds in different seasons. For example, during the migration season each year, shorebirds such as the Great Knot, Bar-tailed Godwit (*Limosa lapponica*), and Red Knot stop and feed in Yalujiang Estuary (YS-12) and Nanpu (YS-6). In winter, Oriental Stork, Red-crowned Crane and Relict Gull fly to the Yellow River Delta (YS-4) to overwinter. Chongming Dongtan (YS-3) is a key staging site for shorebirds in spring and autumn, and in winter, it becomes a wintering area for Hooded Crane (*Grus monachal*) in the lower reaches of the Yangtze River. Based on the differences in the natural geographical characteristics of habitats and the particularity of birds' habitat selection, the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China should include the habitat of migratory birds that has the potential to satisfy the criteria of Outstanding Universal Value (OUV) and integrity in the Yellow Sea Ecoregion; moreover, they should be included in a single nomination, so that various kinds of EAAF migratory birds and their life history can be more systematically and completely protected and presented.

Table 2 The Contribution to Outstanding Universal Value of the Serial Property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

No.	Name	Contribution to Outstanding Universal Value
YS-3	Migratory Bird Habitat at Chongming Dongtan, Shanghai	1. A maximum of 129 (12.9% of the national population) Hooded Cranes (VU) is recorded in the component; 2. A maximum of 97 (4.85%) Black-faced Spoonbills (EN) is recorded in the component; 3. As an important staging site for shorebirds in northward migration in the EAAF, the mudflats in the component are vital for shorebirds to refuel, with a maximum of 3,051 Great Knot (EN) recorded; 4. It is a necessary route for the migration of rare fish such as Chinese Sturgeon (<i>Acipenser sinensis</i>), Chinese Tapertail Anchovy (<i>Coilia nasus</i>), and Osbeck's Grenadier Anchovy (<i>Coilia mystus</i>), as well as their nursing and foraging sites.
YS-4	Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province	1. It is a key habitat, stopover and breeding area for cranes and storks. It is an important breeding site for Oriental Stork (EN), with a maximum of 120 nests and 324 juveniles recorded here between 2013 and 2021. Among 9 crane species in Asia, 7 of them occur in the component; 2,356 Siberian Cranes (CR, 67.31%), 220 White-naped Cranes (VU, 22%), 137 Red-crowned Cranes (EN, 34.25%*), 183 Hooded Cranes (VU, 18.3%), and 4,449 Common Cranes (29.66%*) have been recorded; 2. It is an important habitat and stopover for shorebirds and has recorded 7,314 Eastern Curlews (EN, 20.89%); Whimbrel 2,886 (4.44%*); Little Curlew 4,944 (4.49%*); Black-tailed Godwit 15,389 (9.62%*); Eurasian Curlew 7,925 (7.93 %*); 3. It is one of the three largest breeding areas of Saunders's Gull (VU) in China, with a breeding population of 10,294 (2021 record).
YS-5	Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province	1. It is an important staging site for Baer's Pochard (CR) whose largest individual count recorded here is 13 (2.6 %). It is an important migration hub for the Oriental Stork (EN); 2. It is an important wintering and staging area for White-naped Crane (VU) whose largest individual count wintering here is 44 (4.4%), and largest count during migration is 130 individuals (4.4%).
YS-6	Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province	1. It is one of the most important wintering areas for Relict Gull (VU) whose highest single-day individual count recorded here is 11,100, which is 92.5% of its total flyway population; 2. It is the most important staging site in the flyway for Red Knot and Curlew Sandpiper whose highest individual counts recorded here accounted for 60.45 %* and 68.77 %*, respectively, of their total EAAF populations; 3. It is an important stopover for Black-tailed Godwit whose highest individual count recorded here is 17,480 (10.93 %*), and it is also an important habitat of the <i>bohaili</i> subspecies of Black-tailed Godwit discovered in 2020; 4. It is a stopover for over half of Spotted Redshank population with the highest

No.	Name	Contribution to Outstanding Universal Value
		count recorded here being 13,480 (53.92 %*).
YS-7	Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province	1. It provides habitats for all species of cranes that can be recorded in the flyway in East China, including Siberian Crane (CR), Red-crowned Crane (EN), White-naped Crane (VU), Hooded Crane (VU), and Common Crane. The individual count of Red-crowned Crane roosting here increases year by year (The count in the spring of 2021 is more than 20% of the Red-crowned Crane population wintering along the coast of the Yellow Sea-Bohai Gulf of China).
YS-8	Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province	1. It is an essential stopover for migratory birds such as cranes and storks. In recent years, more than 1,000 Siberian Cranes (CR), over 3,000 Oriental Storks (EN), and 400-500 Red-crowned Cranes (EN) migrate via Dachaoping and Yingjiao in autumn.
YS-9	Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province	1. It is an important stepping stone for Red-crowned Crane (EN), Siberian Crane (CR), and Oriental Stork (EN) when they migrate between the Liao River Estuary and the Yellow River Estuary; 2. It is a key breeding area for some summer migratory birds such as shorebirds, Laridae and Anatidae.
YS-10	Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province	1. It is the southernmost breeding area and northernmost wintering area for the wild Red-crowned Crane (EN) population, and is the most important stopover for the mainland population of Red-crowned Crane, with around 500 individuals migrating across this area each year; 2. The component has the world's most largest breeding population of Saunders's Gull (VU). The monitoring results in 2019 have shown a maximum population of 15,864 Saunders's Gull in the component.; 3. It is one of the most important refueling sites for shorebirds. Over 400,000 species of EAAF shorebirds stop over here to roost and feed. The highest single-day individual count of the Great Knot recorded here is over 80,000; 4. It is the southernmost region among 8 Western Pacific Spotted Seal's habitats where Spotted Seals breed and is also their important moulting area.
YS-11	Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province	1. The Jiutou Hill is the only gathering and stopover site for raptors in the EAAF, including threatened species such as Cinereous Vulture (NT), Steppe Eagle (EN), Saker Falcon (EN), Imperial Eagle (VU), Steller's Sea Eagle (VU), and Greater Spotted Eagle (VU); 2. The Snake Island region is an important breeding area for Chinese Egret (VU), with 400 breeding individuals recorded between 2020 and 2021; 3. The Snake Island is the only habitat for over 20,000 Chinese Pit Vipers (<i>Gloydius shedaoensis</i>), an endemic species in China.

No.	Name	Contribution to Outstanding Universal Value
YS-12	Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province	1. It is home to the world's largest population of Bar-tailed Godwit, with recorded count of 111,446 (34.29%*) in 2013; 2. It is one of the most important migration refueling sites in the world for Eastern Curlew (EN) whose population stopping over in this area each spring reaches 6,818 (19.48%); 3. It is one of the most important refueling sites for Great Knots (EN) during their northwards migration, and the highest population of Great Knot stopping over in the area reached 96,850 (22.79%); 4. It is an important habitat for Nordmann's Greenshank (CR) whose highest individual count recorded here is 40 (8.0%).
YS-13	Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province	1. It is an important breeding area for the Chinese Egret (VU), with 517 monitored in 2017, accounting for 14.77% of its global population; 2. It is the largest known breeding island and wintering area of the Pelagic Cormorant in China, with 983 monitored, accounting for 3.93% of its global population.

Note: Numbers with * are the proportion of the EAAF population for that species

3 Current Status of Conservation and Management

3.1 Conservation and Management Conditions

3.1.1 Overview of conservation status

Since the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) was included in the *World Heritage List*, organizations such as Yancheng Administration Center of Wetland and World Natural Heritage Conservation and Yellow Sea Wetland Institute have been established, creating a government-industry-university integrated research system. The National Forestry and Grassland Administration and the World Heritage authority of Yancheng City have organized some training programs for managers of the 11 nominated properties of Phase II, sharing the conservation and management experience of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I).

The 11 nominated properties of Phase II are state-managed reserves. A multi-level management system has been established from the state to the local areas, forming a system for collaborative protection participated by government management agencies and communities, social organizations and research institutions, with staffing and funding

guaranteed. Under the strict protection of relevant national and local laws and regulations, the intactness of coastal wetlands is effectively preserved in the nominated properties through cooperation among stakeholders, so that to provide stopover sites for migratory birds and to ensure the survival and reproduction of species.

The majority of reserves on which the nominated properties of Phase II are based have been included in the Man and Biosphere Programme (MAB), List of Ramsar Sites, East Asian-Australasian Flyway Partnership (EAAFP), Important Bird Area (IBA) and/or Key Bird Area (KBA). They have the best-preserved native coastal wetlands in the Yellow Sea Ecoregion of China that are most frequently utilized by migratory birds.

Both national and provincial governments pay close attention to the conservation and management of World Natural Heritage sites. At the national level, the National Forestry and Grassland Administration has undertaken the tasks related to nomination and protection management of the World Natural Heritage. The local governments of Shanghai, Shandong, Hebei and Liaoning think highly of the conservation and management of the nominated properties, and have approved the establishment of the leading groups and offices for World Heritage nomination, and assigned full-time personnel to play a leading role on the conservation and management of nominated properties. For the 11 nominated properties, specific management agencies and protection teams have been established,

and specific management regulations and measures have been enacted. The management agencies are responsible for ensuring the implement of the sound scientific and effective management system, which involves law enforcement and supervision, resource management and protection, safety and security, scientific research and techniques, science popularization and education, tourism services, etc.

There is a long history of human activities in the eastern coastal areas of China. Coastal residents, who strongly rely on coastal wetlands to live, carry out activities such as marine fishing, aquaculture, and cultivation of farmland. In order to fully protect the coastal wetlands and migratory bird habitats, China has promulgated a series of policies, including the *Notice of the State Council on Strengthening the Protection of Coastal Wetlands and Strictly Controlling Land Reclamation from Sea* (G.F. [2018] No.24), the *Notice of the General Office of the State Council on Issuing the Scheme of Wetland Protection and Restoration System* (G.B.F. [2016] No.89), and the *Guiding Opinions on Establishing a Nature Reserve System with National Parks as the Main Component*. Laws and regulations such as *Wetland Protection Law*, which is expected to be promulgated soon. The country has completely prohibited land reclamation and actively advanced the restoration of tidal flat ecosystems in some damaged areas, representing a change from "seeking resources from nature" to "living in harmony with nature".

Sustainable economic and industrial development is an important guarantee for community participation. As per the requirements of the conservation and management plans, local residents are permitted to continue the primary activities like sustainable marine fishing, aquaculture and ecological planting in the buffer zones of the nominated properties. Heritage protection should be integrated with ecotourism, and the presentation of utilization activities should only be carried out in the designated areas. Residents are encouraged to get deeply involved in the conservation and promotion of the nominated properties and nature reserves.

At present, conservation and management plans have been developed for the 11 components. In the future, the monitoring and scientific research on value elements of natural heritage, including landscape and biological elements, will be enhanced, for adaptive management based on zoning and classification. Further, the monitoring and scientific research on threats will be conducted specifically, and targeted response and control measures will be taken. Other measures include (1) establishing a model of consultation and joint construction to incorporate business entities and residents in the nominated properties and buffer zones into the actions of management, monitoring and public education; (2) further enhancing the social influence of heritage through science popularization and education, and increasing the public interests and the degree of the participation in

heritage conservation; (3) intensifying the construction of the heritage presentation and utilization system, controlling the number of tourists, ramping up the ecological conservation education of tourists, regulating the traffic to the tourism areas, tightening regulation and minimizing the impact of tourism and traffic on the value of natural heritage.

From 2020 to 2025, China's nature reserves will continue to be integrated for better conservation. The operation of nature reserves where the 11 nominated properties lie will be more strictly demarcated and confirmed. The management agencies will be specified and effective management methods will be taken to better manage the nominated properties and buffer zones. The World Heritage Nomination Expert Group of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), local functional departments, monitoring agencies, research institutions and universities can provide technical support for the monitoring, scientific conservation and management of nominated properties.

3.1.2 Conservation and management agencies at the national level

The National Forestry and Grassland Administration is responsible for supervising the nomination, conservation and management affairs.

Together with the World Heritage authority of Yancheng City, it has organized training programs for managers of the 11 nominated properties to enhance the unified management of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China.

3.1.3 Conservation and management agencies at the provincial level

Shanghai Municipality: Shanghai Municipal Government has established a leading group for the nomination of World Natural Heritage, under which an office has been set up at the Wildlife Conservation Division, Shanghai Forestry Bureau, directly under the World Heritage administration division of the National Forestry and Grassland Administration, is charged with nominating World Natural Heritage.

Shandong Province: Department of Natural Resources of Shandong Province (Provincial Forestry Administration) is the principal administration of nature reserves in Shandong Province, under which there is a nature reserve managed division (called Wildlife Conservation Division) responsible for nominating World Natural Heritage.

Liaoning Province: The Forestry and Grassland Bureau of Liaoning Province has established a leading group and office for the nomination of World Heritage, with an office located in the Nature Reserve Administration Division of the Provincial Forestry and Grassland Bureau,

which is responsible for the tasks related to World Natural Heritage.

Hebei Province: The Provincial CPC Committee, People's Government, and Forestry and Grassland Bureau of Hebei Province attach great importance to wetland conservation. A leading group for World Heritage nomination has been established, responsible for the tasks related to World Natural Heritage.

3.1.4 Conservation and management agencies at the local level

YS-3: Administration Affairs Center of Shanghai Chongming Dongtan National Nature Reserve, as the management agency of the nature reserve where the nominated property lies, directly manages the nominated property on behalf of Shanghai Municipal People's Government, with specific responsibilities for monitoring resources and environment, managing the protection and law enforcement team, and implementing laws and regulations. Moreover, the monitoring and management centers, and management and protection stations have been set up to intensify the scientific protection and management of the nominated property.

YS-4 : The nominated property is directly managed by the management agency of the nature reserve, namely the Administration Committee of Shandong Yellow River Delta National Nature Reserve. According to the actual management, the Shandong Yellow River Delta National Nature Reserve is subject to a three-level management system of

"Administration Committee - Conservation and Management Station - Conservation and Management Point (Checkpoint)", in order to clear management responsibilities, personnel and scope of posts.

YS-5: The nominated property is the principal part of the Hebei Nandagang Wetland and Provincial Bird Nature Reserve managed by the Administration Office, which is a section-level public institution adopting a two-level management system composed of divisions and stations. The Nandagang Industrial Park of Natural Resources and Planning Bureau of Cangzhou Bohai New District plays an important role in the routine protection and management of the nature reserve.

YS-6: Hebei Luannan Nanpu Zuidong Provincial Wetland Park, where the nominated property is situated, is directly managed by the Natural Resources and Planning Bureau of Luannan County, Tangshan City, Hebei Province. Both the nominated property and buffer zone are within the boundaries of the Provincial Wetland Park, and are under effective management as per relevant laws and regulations.

YS-7: The nominated property lies within the core protected area of Hebei Changli Golden Coast National Nature Reserve, which is managed by the Administration Center of Changli Golden Coast National Nature Reserve. It is also included in the Golden Coast Scenic Area in the Qinhuangdao Beidaihe Scenic Area. Its land area is fully in the first-level protection of the Golden Coast Scenic Area, but its water area, namely the

lagoon, lies within the first-level and second-level protection area of the Golden Coast Scenic Area. The nominated property is entirely situated within the marine ecological red line in Qinhuangdao.

YS-8: The nominated property is situated at the conservation area of Hebei Beidaihe National Wetland Park, with a small portion in the promotion and education zone. The nominated property is also the core scenic area within Beidaihe Scenic Area, in which Forestry Bureau of Beidaihe District is responsible for specific protection and management.

YS-9: The nominated property lies in the Shanhaiguan Scenic Area within Qinhuangdao Beidaihe Scenic Area. It is managed by Shanhaiguan Service Center for Beidaihe Scenic Area, under which an office has been established charged with routine management of the area.

YS-10: Both the nominated property and the buffer zone are situated in the Liaoning Liao River Estuary National Nature Reserve and the Panjin Liao River Estuary Provincial Nature Reserve. Currently, the nominated property is directly managed by the Bureau of Forestry and Wetland Conservation and Management of Panjin (Administration Bureau of Liaoning Liao River Estuary National Nature Reserve).

YS-11: The nominated property is located within the Liaoning Snake Island - Laotieshan National Nature Reserve and composed of two parts: island (Snake Island) and land (Jutou Hill, Nantian Hill, Laohuwei). The nominated property is currently under the direct management by the Snake

Island - Laotieshan Reserve Administration Bureau. Bureau of Natural Resources of Dalian has established the Forest Resource Conservation Division to undertake the tasks related to the two nominated properties for World Natural Heritage - Snake Island-Laotieshan, Changshan Archipelago.

YS-12: Both the nominated property and the buffer zone are situated within the Dandong Yalujiang Estuary Wetland National Nature Reserve. The Nature Reserve Administration Center adopts specific management measures pursuant to the relevant regulations of the nature reserve. At present, Dandong Yalujiang Estuary Wetland National Nature Reserve is directly managed by the Service Center for the Development of Forestry and Grassland of Dandong City.

YS-13: The nominated property involves three nature reserves - Dalian Changshan Archipelago National Marine Park, Dalian Changshan Archipelago National Island Forest Park, and Dalian Changshan Archipelago Precious Marine Life Nature Reserve. The Service Center for Natural Resources Affairs of Changhai County has been set up under the Changhai County Natural Resources Bureau, and is charged with the tasks related to World Natural Heritage. Bureau of Natural Resources of Dalian has established the Forest Resource Conservation Division to undertake the tasks related to the two nominated properties for World Natural Heritage - Snake Island-Laotieshan, Changshan Archipelago.

3.1.5 Participation of social organizations

Over years, distinctive social participation models have been built for the conservation of the nominated property. Under these models, management agencies of the nature reserves play the biggest role, and domestic and overseas social organizations, research institutions and the public are encouraged to participate in efforts. They have consultations on affairs, make joint efforts to protect the environment, and share the benefits. The specifics are set forth below:

3.1.5.1 Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

The nominated property has carried out cooperation projects and extensive exchanges through personnel visits, seminars, training programs, meetings, and scientific research with numerous environmental organizations and professional institutions at home and abroad, such as World Wide Fund for Nature (WWF), Global Environment Fund (GEF), Nature Conservancy (TNC), Wetlands International (WI), Australian Waterfowl Research Group (AWSG), Taiwan Wader Study Group (TWSG), International Crane Foundation(ICF), Shanghai Green Oasis Ecological Conservation and Communication Center, and Shangri-la Institute for Sustainable Communities (SISC). In 2008, the nature reserve established

the "East China Migratory Waterbird Sister Nature Reserve Network" with the participation of 10 nature reserves, the "Middle and Lower Yangtze River Wetland Reserve Network" composed of 35 nature reserves, and the East China Nature Reserve Ecological Conservation Alliance to enhance exchanges. The service and reception capabilities of the nature reserve significantly improved, and the management agencies of some 50 nature reserves sent experts to Chongming Dongtan for visits and exchanges. In April 2019, the "Chongming Dongtan Bird Science Base Project" jointly launched by the nature reserve and Alashan SEE Foundation, a mainland China NGO focusing on environmental protection, built a cooperative environmental protection network of "government-enterprises-universities-the public" centered on the issues of renovating one passage and four themed pavilions, clean wetland project, and natural education system. The extensive cooperation and exchanges with domestic and international organizations have led to the significant improvements of the nature reserve's overall management competencies and capacity.

3.1.5.2 Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

As required and guided by Dongying Municipal CPC Committee, Shandong Yellow River Delta National Nature Reserve steadily carries out a tree planting program themed "Planting Young Forest, Greening Mother

River", organizes hundreds of Chinese and foreign university students travel to the Yellow River Estuary, and organizes high-level activities such as "Actions to Protect Mother River -- 'Same River' Artist Activity", to motivate young people to participate in the protection of mother river, and constantly enhance their awareness of green civilization, ecology and environmental protection. By getting the support of the Central Committee and Provincial Committee of the Youth League, the nature reserve has gained funding for the project themed "Protection of Mother River -- Endless Love Forest (Shandong)". In recent years, the Youth League committee of the nature reserve has organized over 60 activities of Mother River protection, tree planting and protection, and eco-environmental protection, with the participation of nearly 120,000 youths. The nature reserve has also organized programs themed "Wetland Cultural Festival", "Bird Loving Week" and "Environment Day". Each year, approximately 100,000 community residents participate in such events.

3.1.5.3 Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

The nominated property collaborates with universities and scientific research institutions like Hebei Normal University and Cangzhou Normal University for joint research, with fruitful achievements in wetland ecosystem services as well as bird distribution and migration patterns. In

response to the conservation and management work, residents actively rescue wild animals to the nature reserve for treatment and immediately report the poaching of wild animals to local public security, forestry and nature reserve management agencies.

3.1.5.4 Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

Over the years, Nanpu Zuidong Wetland has attracted the attention of many social organizations because of its important ecological value. Among them, non-governmental agencies such as World Wild Fund for Nature (WWF) and Paulson Institute (PI) have already been deeply involving into the conservation and management of Nanpu. As early as 2003, international and domestic research institutions conducted the ecology and conservation biology studies in Nanpu (YS-6), given the importance of the coastal area of Luannan in the migration of Red Knot. In 2014, Beijing Normal University and WWF jointly submitted a proposal on the establishment of Luannan Migratory Bird Habitat to the local government. In 2015, Luannan Migratory Bird Habitat was designated as one of the wetlands of the highest protection level in China. In 2019, after Luannan County Government finally decided to establish a wetland park instead of a nature reserve as planned, WWF and PI decided to set up a special leading group charged with the work related to the building of

Nanpu Wetland Park.

3.1.5.5 Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are areas of global concern where many threatened bird species and their habitats are found. Qinhuangdao Bird Watching Society has been conducting bird surveys and monitoring in Qilihai Lagoon (YS-7) at least once a month since 2006. Qinhuangdao Bird Watching Society actively carries out scientific research, academic exchanges and science popularization activities related to birds, and raises funding from society, providing assistance to the conservation and management of local birds. Dynamic monitoring, ecological restoration are organized for dunes, lagoons, sea areas and other protected objects in the nominated property, followed by the enhanced supervision.

3.1.5.6 Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

Dachaoping (YS-8) is the earliest migratory bird habitat along the Coast of Yellow Sea-Bohai Gulf of China that ornithological researchers and birdwatchers at home and abroad pay attention to and monitor. From 2006, Qinhuangdao Bird Watching Society regularly conducts special

surveys and monitoring at Dachaoping and organizes promotion and education activities. Beijing Entrepreneur Environmental Protection Foundation carries out the "Let Birds Fly" project to enhance scientific research, monitoring, conservation and management of local bird species.

3.1.5.7 Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

Shihenandao (YS-9) has been included in the list of 16 migratory bird habitats set out in the nomination text for Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I), given that it has attracted the interests of protection organizations (the bird protection organization Qinhuangdao Bird Watching Society and the largest environmental protection foundation Beijing Entrepreneur Environmental Protection Foundation/"Let Birds Fly" project, etc.) and research institutions (Institute of Geographic Sciences and Natural Resources Research of CAS, etc.). Since 2006, Qinhuangdao Bird Watching Society has regularly conducted special bird surveys and monitoring at Shihenandao while actively participating in local bird protection campaigns. Beijing Entrepreneur Environmental Protection Foundation organizes the "Let Birds Fly" project, providing support for the local program "Bird Study and Patrol" and scientific basis for local bird scientific research, monitoring, conservation and management. Meanwhile,

more bird lovers are involved in the joint actions, playing an important role in bird protection.

3.1.5.8 Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

The management agency of the protected area has been collaborating with relevant domestic institutions such as the Liaoning Bird Protection Center, Institute of Applied Ecology under the Chinese Academy of Sciences, Academy of Inventory and Planning, National Forestry and Grassland Administration, and has completed three research projects at the provincial and ministerial level together with these institutions. Also, the management agency of the protected area has carried out investigations and researches on Red-crowned Crane, Saunders's Gull, and shorebirds and has achieved fruitful results together with the World Wide Fund for Nature (Hong Kong), the International Crane Foundation, and other related organizations in Australia, Japan, South Korea. The management agency has conducted scientific research on wetlands in cooperation with Shenyang Agricultural University, Liaoning University, Dalian University of Technology, Northeast Institute of Geography and Agroecology, turning the protected area into a practice base for relevant universities and research institutes. Furthermore, the management agency has worked with Wetland International, International Crane Foundation and other international

organizations on bird migration surveys in the Bohai Rim ecological zone and surveys on the migration populations of cranes and storks in Northeast and North China, becoming an important role engaging in wetland and bird monitoring events.

Five conservation organizations have been established for the area, including the Panjin Wetland Conservation Society, Saunders's Gull Conservation Society, Wildlife Conservation Association. Two wetland schools, i.e., Dongguo School of Panshan County, and Xinglong No.1 Primary School, have been established. Three wetland conservation volunteer teams at Zhaoquanhe Middle School, Liaodongwan Experimental Primary School have been developed. Creative "Wetland Lectures" have been launched. Since November 2019, 28 "Wetland Lectures" have been delivered at enterprises, government agencies, communities, and schools. In December 2020, the Municipal Officer Lecture & the 28th Wetland Lecture were held, where Professor Zhang Mingxiang, a wetland conservation expert from Beijing Forestry University, was invited to give a lecture to over 640 officers of the city, to fully improve their wetland conservation awareness. The program called "A Day of Forest and Wetland Protector" was created. Knowledge about forestry, wetland, wild animal protection was intensively disseminated via media channels such as WeChat and Douyin on important days, e.g., World Wetlands Day, World Wildlife Day, and Birds-loving Week. The

management agency has worked with CCTV, People's Daily, and other media agencies on wetland publicity events in Panjin. In 2020 alone, 58 special reports were released, and over 600 pieces of news reports were published on websites, WeChat official accounts, and newspapers, significantly improving people's understanding of Panjin Wetland and allowing the public to truly take part in and benefit from ecological protection.

3.1.5.9 Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

Extensive international collaborative scientific research has been carried out since the establishment of the nature reserve where the nominated property lies. The nature reserve has conducted Asian Waterbird Census in collaboration with International Waterfowl and Wetlands Research Bureau (IWRB); long-term migratory bird banding with the National Bird Banding Center of China; "Research on the Behaviors of Chinese Pit Vipers in the Snake Island" with the University of Sydney; survey and study on mercury pollution on the coast of Dalian with Japan Water Research Center; annual waterbird census in the Yellow Sea-Bohai Gulf with Wetlands International. Their achievements and outcomes have not only provided the references for the monitoring, conservation and management of endangered rare birds, but also helped enhance the

scientific management of the nature reserve.

3.1.5.10 Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

In recent years, universities and NGOs at home and abroad, such as Fudan University, Nanjing Normal University, Beijing Forestry University, Massey University, WWF, YSLME Project Management Office, and Alashan SEE Foundation, have implemented many scientific research and conservation programs, including researches on distribution and migration patterns of migratory birds, shorebird migration and roosting ecology, wetland ecological restoration, and bird habitat protection through bird-watching activities, etc., laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

3.1.5.11 Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

Local residents, who live on fishery, take straightforward protective actions.

For the purposes of science popularization, education and scientific research, the nature reserve has long-term cooperative relationships with schools, institutes and media over the years, and they have together made

remarkable achievements.

The natural resource department of Dalian and the People's Government of Changhai County jointly organize the Bird Loving Week to raise public awareness of bird protection and ecological environmental protection.

The non-governmental environmental protection organizations in Dalian also carry out surveys and exchange knowledge about waterbirds in Changhai County.

3.1.6 Achievements in conservation

The protection of nominated property of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) has yielded significant achievements on the basis of the nature reserve administration system of China.

1. Administration mechanism

Each nominated property has an administration mechanism under the nature reserve administration system of China. Some of them also have formulated legal regulations and nature reserve management plans (YS-3, YS-11, YS-12).

2. Ecological restoration

In the face of various threats and pressures, the nominated properties have implemented wetland protection and ecological restoration projects.

YS-3 and YS-6 have conducted projects to control the invasive species *Spartina alterniflora* Loisel. YS-4 and YS-5 have carried out wetland water replenishment projects to restore natural wetlands. YS-10 carries out the wetland ecological protection and restoration project to improve the wetland ecological environment. YS-5, YS-7, YS-10 and YS-12 have implemented ecological restoration projects to restore farmlands and aquafarms to wetlands and mudflats.

3. Environmental improvement

The nominated properties have launched projects to improve the environmental conditions of the migratory bird habitats. YS-6 focuses on tackling the environmental issues caused by local entities. YS-10 works on a mine rectification project and gradually restores reed wetlands and water conditions. YS-10 and YS-12 emphasize the "Blue Bay" rectification project to improve seawater quality and maintain biodiversity. YS-13 attaches importance to the island protection and coastline rectification projects.

4. Biological protection

The nominated properties have effectively improved the migratory bird habitats through ecological restoration and environmental improvement projects, and have established the bird rescue and disease prevention system. Some of them have also adopted special biological protections to cope with their respective problems. YS-4 has commenced

a special program to protect bird breeding sites; and YS-12 provides birds with shellfish and snails to help them overwinter.

The specific achievements of each nominated property are detailed below:

3.1.6.1 Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

1. Management system

In 2003, Shanghai Municipal Government promulgated the *Measures for the Administration of Shanghai Chongming Dongtan National Nature Reserve*, according to which the former Shanghai Agriculture and Forestry Bureau formulated the *Measures for the Administration of Bird Nature Reserve Pass Certificate at Chongming Dongtan, Shanghai* to facilitate the lawful management of the nature reserve.

2. Protection of coastal tidal wetlands

To address the further invasion of the alien species *Spartina alterniflora* Loisel., the nominated property has implemented the *Spartina alterniflora* Loisel. Control and Bird Habitat Optimization Project, with a total input of RMB 1.16 billion, and covering an area of 24.2 km². Through the specific measures including microtopography building on natural tidal flats, food area creation, water regulation, and vegetation management, significant achievements have been made in the control of *Spartina*

alterniflora Loisel., optimization of bird habitat, and restoration of native plants.

3. Biological protection

The nominated property is dedicated to biological protection. The ecological restoration project launched in 2013 has substantially improved and enhanced wetland ecosystem services. Results of ongoing monitoring over 2017, 2018, 2019 and 2020 show that the bird populations coming and leaving the ecological restoration area have significantly increased. Over a dozen endangered rare bird species, such as Oriental Stork, Tundra Swan, Swan Goose, Common Pochard, Saunders's Gull, and Black-faced Spoonbill, roost in the restoration area. In particular, the number of overwintering Tundra Swans increases from 60 in 2016 to a new high of 623 in early 2021.

3.1.6.2 Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

1. Wetland protection and restoration

In recent years, the administration committee of the nature reserve has taken a series of wetland protection and restoration actions, including restoration of freshwater swamp, recovery of artificially destructed and disturbed coastal mudflat, forestry tending and restoration project, and construction of wave-resistant dam in the north of Yiqianer Management

Station.

2. Improvement of bird habitats

In recent years, Administration Committee of Shandong Yellow River Delta National Nature Reserve where the nominated property lies has implemented several bird habitat improvement projects, including Oriental Stork Breeding Area Protection Project, Saunders's Gull Breeding Area Protection Project, and Crane Overwintering Area Protection Project.

3.1.6.3 Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

1. Wetland protection

Cangzhou City has conducted wetland resource surveys, and made plans for wetland protection and wetland ecosystem greening. Water storage and replenishment have been carried out for the wetland for consecutive years, improving the water replenishment mechanism. Isolation ring ditches around the wetland have been dredged and widened. Fire watchtowers, wildlife rescue stations, bird feeding spots, and management and protection stations have been constructed to enhance protection.

2. Environmental governance

Special agencies have been set up to centrally remove 103 "scattered, disorderly and polluting" companies around the wetland and

restore the landform. Construction land of over 2,200 *mu* has been repossessed.

3. Biological protection

The National Epidemic Source & Disease Monitoring Station of Nandagang Wetland and Provincial Bird Nature Reserve has been founded to rescue birds like White-naped Crane, Little Egret and Golden Eagle, and strengthen wild animal protection. The number of bird species on the wetland increased from 262 in 2014 to today's 268.

3.1.6.4 Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

1. Sustainable administration mechanism

The competent authority took actions to improve the quality of high-tide habitat of shorebirds, control the spread of the invasive alien species *Spartina alterniflora* Loisel. on intertidal flats and collaborate with local companies in preventing the existing primary activities from negatively affecting the migratory bird habitat.

2. Biological protection

Nanpu Zuidong Wetland has been under continuously enhanced protection, with the number of representative threatened bird species remaining stable. This region in recent years has seen signs of recovery in the breeding population of some threatened bird species such as Saunders's

Gull. The nominated property has carried out bird surveys and monitoring more than ten times each year since 2003. The number of waterbirds roosting here during their migratory season fluctuated annually but remained fairly stable, with the maximum count recording in spring and autumn each year ranging from 50,000 to 100,000.

3.1.6.5 Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

1. Administration mechanism

In 1990, the State Council approved the establishment of Hebei Changli Golden Coast National Nature Reserve under national laws and regulations. A municipal leading group for wetland conservation and management has been created to coordinate and promptly solve the problems concerning wetland conservation and management.

2. Wetland protection

From 2016 to 2020, Qilihai (YS-7) implemented a project to restore aquafarms to wetland, and recovered the natural lagoon area of 2.2 km² and optimized the hydrological and ecological processes of the lagoon based on scientific research and analysis. As a result, Qilihai Lagoon has become an important stopover site in the migratory routes of Laridae, Anatidae and Gruidae species.

3. Biological monitoring

Since 2006, bird species at the nominated property have been regularly surveyed and monitored by Qinhuangdao Bird Watching Society. Moreover, the Administration Center of Hebei Changli Golden Coast National Nature Reserve commenced bird monitoring at Qilihai Lagoon in the second half of 2020.

3.1.6.6 Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

1. Administration mechanism

In 1982, the State approved the Qinhuangdao Beidaihe Scenic Area. In 2000, the Beidaihe Coastal Wetland was incorporated in the *China Action Plan for Wetland Protection: List of Important Wetlands in China*. In 2015, Hebei Beidaihe National Wetland Park was officially established.

2. Wetland protection

The boundaries of the Wetland Park Conservation Area (excluding the boundaries of shallow sea area) have been enclosed by tall steel wire fences made of composite materials, to prohibit visitors from entering the nominated property without permission. The project of diverting Daihe River into Xinhe River has already been completed and the wetland treatment project of Xinhe River have been initiated by the People's Government of Beidaihe District to enhance monitoring and the management of water environment.

3. Biological monitoring

Since 2006, bird species at the nominated property have been regularly surveyed and monitored by Qinhuangdao Bird Watching Society. Furthermore, Qinhuangdao conducted a six-year (2009-2014) bird survey covering the nominated property.

3.1.6.7 Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

1. Administration mechanism

In 1982, the State approved the Qinhuangdao Beidaihe Scenic Area. Located within the reach of protection with the status of nature reserve, YS-9 is under effective conservation and management by the corresponding management authority and protection following national laws and regulations.

2. Wetland protection

In the nominated property, the dredging and desilting project has been carried out on both sides of Shihenandao to dredge the blocked estuary and maintain a smooth flow of fresh and salt water. Diversion pipelines have been installed at Shihe River channels in Gunshui Dam on the north side of Shihenandao to replenish freshwater and groundwater by diverting water from the Shihe River.

3. Biological monitoring

Since 2006, bird species at the nominated property have been regularly surveyed and monitored by Qinhuangdao Bird Watching Society. Furthermore, Qinhuangdao conducted a six-year (2009-2014) bird survey covering the nominated property.

3.1.6.8 Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

1. Establishment of nature reserve

In 1985, Panjin Liao River Estuary Municipal Waterbird Nature Reserve, was established. In 1987 and 1988, it was upgraded to Provincial Nature Reserve and National Nature Reserve, respectively. In 2007, it was designated by the former State Forestry Administration as one of the 51 demonstration nature reserves in China. In 2015, it was renamed Liaoning Liao River Estuary National Nature Reserve.

2. Mine rectification project

In 2011, 2012 and 2013, Panjin Municipal Land & Resources Bureau submitted applications for the geological environment improvement project of Panjin Liao River Oilfield Mine in three phases, with the municipal government as the applicant. This project was granted special funding of RMB 26,000. Its key works included dredging and reinforcement of existing river courses and drainage trenches, irrigation of reed beds with seawater, eradication of *Typha angustifolia* Linn., and

irrigation regulation of reed beds.

3. Wetland ecosystem protection and restoration projects

Since 2014, the National Forestry and Grassland Administration and the Ministry of Finance have designated the Liao River Estuary Wetland as a pilot ecological compensation area seven times. A total of RMB 165.5 million was allocated to compensate households for basic farmland and 77,011 *mu* of cultivated land within the scope of the second round of land contracting within 1 km of the protected area and surrounding areas, benefiting 4,759 rural households.

4. Project of restoring aquafarms to wetlands

Panjin City started the "restoring aquafarms to wetland" project first in 2015, restoring 23,000 *mu* of coastal wetland the very year. The "Panjin Blue Bay Restoration Action" project was approved in 2016. Since August 2018, 85,900 *mu* of aquatic ponds from reclamation have been restored to wetlands and 17.6 kilometers of natural coastline was created, which is the largest single project of "restoring aquafarms to wetlands" in Northeast Asia.

5. Bay restoration project at Liao River Estuary

Oceans and Fisheries Bureau of Panjin launched the bay restoration project at Liao River Estuary from 2016 to 2019, including west coast mudflat restoration, marine park restoration, Yuanyang Island conservation, Liao River Estuary restoration and reconstruction, as well as scientific

research, monitoring, promotion and education.

3.1.6.9 Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

1. Establishment of nature reserve

In 1980, Liaoning Snake Island-Laotieshan Nature Reserve was created. In 2003, 2005 and 2009, the range of the reserve and the functional zoning were adjusted. In 2013, Snake Island-Laotieshan Reserve was included in the World Network of Man and Biosphere (MAB) Reserve of UNESCO.

2. Protection and administration planning

The nominated property has formulated a conservation and management plan, demarcated boundaries, and established a corresponding monitoring system. It drafted the technical documents for protection, such as *Master Plan for Liaoning Snake Island-Laotieshan National Nature Reserve (2009-2015)*.

3. Biological protection

During the bird migratory period, the nominated property has launched the joint law enforcement \ with local public security, border defense, forestry, business and other departments to curb poaching and other illegal acts. Also, a bird protection group has been organized for all-day bird protection.

3.1.6.10 Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

1. Establishment of the nature reserve

In 1996, Yalujiang Estuary Coastal Provincial Wetland Nature Reserve was established. In 1997, it was upgraded to Dandong Yalujiang Estuary Wetland National Nature Reserve. In 1999, Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve was established.

2. Administration mechanism

Dandong Municipal People's Government issued the *Regulations for the Administration of Yalujiang Estuary Wetland National Nature Reserve* in 2018. The nature reserve formulated the *Master Plan for Yalujiang Estuary Wetland National Nature Reserve (2011-2020)*. The concrete contents of the plan include protection and management, scientific research and monitoring, promotion and education, international cooperation, community shared management, etc.

3. Wetland protection

In 2015, with the support from the Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve, Liaoning Rilin Industrial Group paid for the transformation of over 4,000 ha of artificial aquafarms within the Gushan Core Area of Dayang River of Yalujiang

Estuary Wetland and implemented the project of restoring farmlands and aquafarms to wetlands, thus steadily restoring the wetland ecosystem.

4. Environmental improvement

In 2019, a campaign called "Blue Bay" was initiated by Dandong, Liaoning Province to clean and restore a shallow sea area of 1,500 ha along the Dalu Island, with the focus on clearing sediments such as shells accumulated in surface sediments of the sea area, restoring silty bottom sediments in tidal flats and shallow sea, addressing compaction and hardening of bottom sediments, and gradually recovering biodiversity in the sea area.

3.1.6.11 Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

1. Establishment of nature reserve

Dalian Changshan Archipelago Precious Marine Life Nature Reserve was created in 2004. In 2021, it was integrated into the Service Center for Natural Resources Affairs of Changhai County, and also assumed the responsibilities of the Land Resources Management Station of Changhai County and Nature Reserve Management Station of Changhai County, acting as the principal management agency.

2. Island protection and coastline restoration project

The island restoration and protection project, ecological restoration

project of Changshan Archipelago and ecological restoration project of Guanglu Island, the Zhangzi Island and Matuozi Island Development and Utilization Demonstration Project, and the Guanglu Island Ecological Island Reef Construction Project have been carried out in recent years. The investment has totaled RMB 472 million, and the beaches of 52,000 square meters were restored in Shajianzi of Guanglu Island. The debris dam of 420 meters was built in Shajianzi of Guanglu Island and 1,150 meters was built at Shajianzi of Guanglu Island, with shoreline of 1,644 meters restored.

3.2 Factors Affecting the Nominated property

According to the IUCN's assessment results on World Heritage sites across the globe and the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I), the recent years' changes in the protections and policies for China's coastal areas, as well as field investigations, data and analyses concerning the nominated property, the following common threats faced by the nominated serial property Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) have been identified, mainly including development pressures, environmental pressures, natural disaster pressures, and tourism pressures. For details, see Table 3.

Table 3 Factors Affecting Nominated Properties of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Factor		ID No. of Nominated Property
Development pressures	Aquacultural pressures	YS-6, YS-7
	Industrial pressures	YS-6
	Production and construction pressures	YS-10, YS-11, YS-12, YS-13
Environmental pressures	Climate change	YS-3, YS-4, YS-5, YS-6, YS-7, YS-8, YS-9, YS-10, YS-11, YS-12, YS-13
	Invasive alien species	YS-3, YS-4, YS-6
	Freshwater resources and sedimentation process	YS-3, YS-4, YS-5, YS-7, YS-8, YS-9, YS-10, YS-12
Natural disaster pressures	Meteorological disasters	YS-3, YS-4, YS-5, YS-6, YS-7, YS-8, YS-9, YS-10, YS-11, YS-12, YS-13
	Marine ecological disasters	YS-7, YS-8, YS-9
	Biological disasters	YS-3, YS-4, YS-5, YS-11, YS-13
	Geological disasters	YS-3, YS-5, YS-7, YS-10
	Fire	YS-5, YS-11
Tourism pressures	/	/

3.2.1 Development pressures

Since all the nominated properties are located in nature reserves or wetland parks, they are under few development pressures internally. But there are various development pressures outside the nominated properties, including aquacultural pressures, industrial pressures, and production and construction pressures.

3.2.1.1 Aquacultural pressures

Nanpu zuidong (YS-6) and Qilihai Lagoon (YS-7) are affected by the aquacultural pressures.

The intertidal flat in the buffer zone of Nanpu zuidong (YS-6) is the traditional shellfish farming and harvesting area of Beibao Community outside the buffer zone. In addition, there are shrimp farms in Beibao Village outside the northern boundary of the buffer zone. The shrimp ponds have made the natural habitat of birds smaller. A large number of migratory birds feeding in the shrimp ponds can cause human-bird conflicts sometimes.

In the buffer zone of Qilihai Lagoon (YS-7), fishponds have occupied some sections of land suitable for the habitation of various organisms, such as tidal flats, lagoons and saline swamps, hence changing the composition and structure of bird communities.

3.2.1.2 Industrial pressures

Nanpu zuidong (YS-6) is under industrial pressures primarily from salt pond production and oil exploitation. The industrial activities inside and outside the nominated property have no significant impact on local migratory birds at present.

3.2.1.3 Production and construction pressures

The nominated properties under production and construction pressures are Liao River Estuary (YS-10), Snake Island - Laotieshan (YS-11), Yalujiang Estuary (YS-12), and Changshan Archipelago (YS-13).

Oilfield production activities have been constructed in the breeding area for Saunders's Gull to the northwest of YS-10, and they can cause disturbance.

The surrounding area of Snake Island - Laotieshan (YS-11) has many villages with a large population, and the daily activities of the villagers can bring human disturbance.

At Yalujiang Estuary (YS-12), fishery and aquaculture activities can be seen in the buffer zone. Moreover, Dadong Port to the east of YS-12 is an important trading port in Northeast China. The port activities can place certain pressure on the migratory bird habitat.

The sea area around Changshan Archipelago (YS-13) is a traditional production area for the island's residents. It is still impossible to completely restrict the passage of aquaculture vessels through the core area. The possible pressure of fishery production activities in this sea area should be cautiously evaluated.

3.2.2 Environmental pressures

Climate change is a common environmental pressure for the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). Some of the nominated properties are under the pressures from the invasive species *Spartina alterniflora* Loisel. For some of the nominated properties at estuaries, the upstream water conservancy facilities can affect the freshwater and the sediment transport there, also leading to potential pressures.

3.2.2.1 Climate change

The nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are all located in the areas highly exposed to climate change. Storm tides or cold waves have increased in frequency and intensity due to global warming, becoming the common pressure for migratory bird habitats in the coastal areas.

3.2.2.2 Invasive species

In the Yellow Sea-Bohai Gulf, *Spartina alterniflora* Loisel. mainly encroaches on salt marshes where the native plants are *Suaeda glauca* and saltwater reeds, or intertidal mudflats or silty flats. The *Suaeda glauca* salt swamps and flats are the most important habitats for threatened shorebirds

such as Saunders's Gull and Relict Gull, and threatened large birds such as Red-crowned Crane on the coast of Yellow Sea-Bohai Gulf. None of these birds can use the land covered with *Spartina alterniflora* Loisel.

Among the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), *Spartina alterniflora* Loisel. can be found at Chongming Dongtan (YS-3), Yellow River Estuary (YS-4), and Nanpu Zuidong (YS-6). In recent years, *Spartina alterniflora* Loisel. control projects have been carried out in the regions, and some achievements have been made (in YS-3, YS-6, etc.). However, the prevention and control of the plant species is a long-term task due to its wide coverage, numerous seeds, and strong ability to spread via wind and waves.

3.2.2.3 Freshwater resources and sedimentation process

Water conservancy facilities have been built on rivers in East China to regulate the water inflow into the sea and reduce the amount of sediment carried to sea. Therefore, nominated properties located at estuaries are in the hydrological and sedimentary processes of freshwater different from the natural state. Generally, they lack freshwater resources in good water quality seasonally, or suffer from local land subsidence, and coastline erosion (YS-3, YS-4, YS-5, YS-7, YS-8, YS-9, YS-10, and YS-12).

3.2.3 Natural disaster pressures

Meteorological disaster is a common risk to the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), including typhoon (storm tide), cold wave, sea ice, hail, rainstorm, drought and flood. Since the nominated properties extend over thousands of kilometers from north to south, meteorological disasters vary from site to site. For example, the southern part of Yellow Sea is prone to typhoon, while the northern area of Bohai Gulf is vulnerable to sea ice. Moreover, marine ecological disasters, biological disasters, geological disasters, fires and human activities are also common types of disaster risks at some nominated properties.

3.2.3.1 Meteorological disasters

Meteorological disaster is a common disaster risk type faced by the nominated properties, primarily including storm tide, cold wave and flood.

3.2.3.2 Marine ecological disasters

Marine ecological disasters often happen in the Qinhuangdao region, including red tide and green tide, involving Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7), Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

and Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9).

3.2.3.3 Biological disasters

Some of the nominated properties are exposed to biological disaster risks. Specifically, Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3) is confronted with the risks of pest, wild animal-borne disease, and recurrence of *Spartina alterniflora* Loisel; Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4) faces the risk of diseases and insect pest on forestland and grassland and invasion of *Spartina alterniflora* Loisel. Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5) faces the risks of locust, diseases and insect pest and invasion of alien species. Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11) is exposed to the risks of invasion of alien species and infrequent occurrence of plant pest. Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13) faces the risks of diseases, pests and rodents.

3.2.3.4 Geological disasters

The following nominated properties are vulnerable to the geological disaster risks:

Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3): Chongming Dongtan, located to the east of the Pacific Ocean with active plate movements, is frequently impacted by earthquakes in the surrounding areas. For example, a tsunami, caused by an earthquake (magnitude ≥ 8) in Japan on July 9th, 1498, hit Chongming.

Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5): Occasional earthquakes with high magnitude of impact.

Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7): Marine geological disasters often occur in the area.

Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10): In history, Panjin experienced no violent earthquakes, but it could be affected by those occurring in the neighboring areas. The nominated property, situated at the lower part of Liaohe Plain, is vulnerable to the risk of sand liquefaction. Within the Liao River Estuary National Nature Reserve, the terrain is low-lying and flat with many tidal wetlands and undergoing sand liquefaction. Thus, key facilities should be solidified.

3.2.3.5 Fire

The following nominated properties are exposed to the risk of fire:

Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5): Reeds pose the risk of fire which is incidental with high magnitude of impact.

Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11): Jiutou Hill (YS-11-1) and Snake Island (YS-11-2), both having a forest coverage of over 35%, face the risk of forest fire.

3.2.4 Tourism pressures

A majority of the nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are not open to tourists. A few nominated properties available to tourists develop tourism in the form of environmental education and nature experience, with little impact on their OUV. Therefore, the nominated properties are under no pressure from tourism activities. However, actions should be taken to make sure that the tourism operations at the nominated properties and surrounding areas will not adversely affect the OUV of migratory bird habitats.

4 General Rules of Planning

4.1 Principles of Planning

4.1.1 Conservation first principle

World Heritage sites are nature's most precious gifts to humanity. Only through maintaining the authenticity and integrity of heritage resources can people preserve their value and realize their multiple functions regarding ecology, research, education, presentation, etc. Therefore priority must be given to conservation in heritage management.

4.1.2 Scientific management principle

Research and monitoring are important methods for heritage conservation. A complete research and monitoring system and mechanism should be established as the basis of management, to make heritage conservation more scientific and raise the level of conservation and management.

4.1.3 Coordinated implementation principle

For the management of the nominated property, a systemic approach should be adopted according to actual situation, taking into account the needs of heritage conservation, economic and social development,

production activities, and lifestyle of residents, scientific research, presentation, education, etc. The management of the nominated property must be site-specific and supported by both internal and external forces, with clear priorities, equal emphasis on upper and lower levels, and respect for history and nature. It should be done in a unified manner and include actions to address both issues and root causes. The aim is to ensure effective management and sustainable development of the nominated property.

4.1.4 Long-term and short-term work combination principle

The Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) series of World Natural Heritage properties are treasures for the Chinese people and for humankind. Its management plan should be made with a lofty sense of historical responsibility, at the height of historical development, and based on high standards and strict requirements. It should scientifically handle the relationship between short- and long-term work implemented step by step for sustainable conservation of the property.

4.2 Planning References

4.2.1 International Conventions and Guidelines

Table 4 Issuing Years and Authorities of International Conventions and Guidelines

Name	Issuing Year	Issuing authority
<i>Convention Concerning the Protection of World Cultural and Natural Heritage</i>	1972	UNESCO
<i>Operational Guidelines for the Implementation of the Convention Concerning the Protection of World Cultural and Natural Heritage</i>	2019	UNESCO
<i>Management Planning for Natural World Heritage Properties</i>	2008	International Union for Conservation of Nature
<i>Preparing World Heritage Nominations</i>	2011	UNESCO
<i>Convention on Biological Diversity</i>	1992	United Nations Conference on Environment and Development
<i>Guidelines for Management Planning of Protected Areas</i>	2003	International Union for Conservation of Nature
<i>Convention on Wetlands of International Importance especially as Waterfowl Habitat</i>	1971	RAMSAR

4.2.2 Chinese laws, regulations and regulatory documents

Table 5 Issuing Years and Authorities of Chinese Laws, Regulations and Regulatory Documents

Name	Issuing Year	Issuing authority
<i>Constitution of the People's Republic of China</i>	1982	National People's Congress
<i>Criminal Law of the People's Republic of China</i>	1997	National People's Congress
<i>Water Law of the People's Republic of China</i>	2002	Standing Committee of the National People's Congress
<i>Marine Environment Protection Law of the People's Republic of China</i>	1999	Standing Committee of the National People's Congress

Name	Issuing Year	Issuing authority
<i>Environmental Protection Law of the People's Republic of China</i>	2014	Standing Committee of the National People's Congress
<i>Wild Animal Conservation Law of the People's Republic of China</i>	2016	Standing Committee of the National People's Congress
<i>Urban and Rural Planning Law of the People's Republic of China</i>	2007	Standing Committee of the National People's Congress
<i>Regulations of the People's Republic of China on the Protection of Terrestrial Wild Animals</i>	1992	State Council
<i>Circular of the State Council on Issuing the Outline of National Ecological Environmental Protection</i>	2000	State Council
<i>Circular of the General Office of the State Council on Strengthening the Wetland Conservation and Management</i>	2004	General Office of the State Council
<i>Circular of the General Office of the State Council on Issuing the Wetland Conservation and Restoration System Plan</i>	2016	General Office of the State Council
<i>Circular of the State Council on Strengthening the Protection of Coastal Wetlands and Strictly Controlling Land Reclamation from Sea</i>	2018	State Council

4.2.3 Department regulations and regulatory documents

Table 6 Issuing Years and Authorities of Departmental Rules and Regulatory Documents

Name	Issuing Year	Issuing authority
<i>Measures for the Administration of Nomination and Conservation of World Natural Heritage and World Natural and Cultural Heritage (Trial)</i>	2015	Ministry of Housing and Urban-Rural Development
<i>Wetland Conservation and Management Regulations</i>	2013	National Forestry and Grassland Administration
<i>Guiding Opinions on Strengthening the Management and Control of Red Lines for Resources, Environment and Ecology</i>	2016	National Development and Reform Commission, etc.
<i>Measures for the Administration of National Wetland Parks</i>	2017	National Forestry and Grassland Administration

4.2.4 Local regulations, plans and documents

Table 7 Issuing Years and Authorities of Local Regulations, Plans and Documents

Name	Issuing Year	Issuing authority
<i>Regulations of Shanghai Municipality on Administration of Tidal Flats</i>	1997	Shanghai Municipal People's Government
<i>Regulations of Shanghai Municipality on Environmental Protection</i>	1994	Shanghai Municipal People's Government
<i>Urban Master Plan of Shanghai Municipality</i>	2017	Shanghai Municipal People's Government
<i>Measures for the Administration of Shanghai Chongming Dongtan National Nature Reserve</i>	2018	Shanghai Municipal People's Government
<i>14th Five-Year Plan for Economic and Social Development of Shanghai Municipality</i>	2021	Shanghai Municipal People's Government
<i>14th Five-Year Plan of Shanghai Municipality for Economic and Social Development and the Long-Range Objectives Through the Year 2035</i>	2021	Shandong Provincial People's Government
<i>Circular of Shandong Province on Issuing the Implementation Plan for the Control of <i>Spartina alterniflora</i> Loisel.</i>	2020	Department of Natural Resources, Department of Science and Technology, Finance Department, Department of Ecology and Environment, and Oceanic Bureau of Shandong Province
<i>Regulations of Shandong Province on Administration of Yellow River Courses</i>	2018	Standing Committee of Shandong Provincial People's Congress
<i>Regulations of Shandong Province on Marine Environment Protection</i>	2016	Standing Committee of Shandong Provincial People's Congress
<i>Measures of Shandong Province for the Conservation of Wetlands</i>	2012	Shandong Provincial People's Government
<i>Regulations of Shandong Province on Environmental Protection</i>	2018	Standing Committee of Shandong Provincial People's Congress
<i>Ecological Protection and Construction Plan of Shandong Province (2014-2020)</i>	2016	Shandong Development and Reform Commission, Department of Natural Resources of Shandong Province (Provincial Forestry Administration), Department

Name	Issuing Year	Issuing authority
		of Ecology and Environment of Shandong Province
<i>Biodiversity Protection Strategy and Action Plan of Shandong Province (2011-2030)</i>	2014	Department of Ecology and Environment of Shandong Province
<i>Ecological Red Lines Plan of Shandong Province (2016-2020)</i>	2016	Department of Ecology and Environment of Shandong Province
<i>Wetland Protection Project Implementation Plan of Shandong Province (2016-2020)</i>	2016	Department of Natural Resources of Shandong Province(Provincial Forestry Administration)
<i>Marine Ecological Environment Protection Plan of Shandong Province (2018-2020)</i>	2019	Department of Ecology and Environment of Shandong Province
<i>Medium and Long-term Plan on Comprehensive Utilization of Water Resources in Shandong Province</i>	2016	Shandong Development and Reform Commission, Water Resources Department of Shandong Province
<i>Detailed Plan for Shandong Yellow River Delta National Nature Reserve (2014-2020)</i>	2014	Administration Committee of Shandong Yellow River Delta National Nature Reserve
<i>Regulations of Dongying Municipality on Wetland Protection</i>	2018	Standing Committee of Shandong Provincial People's Congress
<i>Regulations of Shandong Yellow River Delta National Nature Reserve</i>	2017	Dongying Municipality People's Government
<i>Regulations of Hebei Province on the Protection of Terrestrial Wild Animals</i>	2016	Standing Committee of Hebei Provincial People's Congress
<i>Regulations of Hebei Province on Wetland Protection</i>	2016	Standing Committee of Hebei Provincial People's Congress
<i>Measures of Hebei Province on the Protection of Aquatic Wild Animals</i>	1995	Hebei Provincial People's Government
<i>13th Five-Year Plan for Ecological Environment Protection of Hebei Province (J.ZH.Z. [2017] No. 10)</i>	2017	Hebei Provincial People's Government
<i>14th Five-Year Plan of Hebei Province for Economic and Social Development and the Long-Range Objectives Through the Year 2035</i>	2021	Hebei Provincial People's Government

Name	Issuing Year	Issuing authority
<i>Main Marine Functional Zone Plan of Hebei Province (J.ZH.Z. [2018] No. 11)</i>	2018	Hebei Provincial People's Government
<i>Marine Functional Zoning of Hebei Province (2011-2020)</i>	2012	Hebei Provincial People's Government
<i>Plan of Hebei Province for Developing Coastal Areas (F.G.D.Q. [2011] No. 2592)</i>	2011	National Development and Reform Commission
<i>Ecological Red Lines of Hebei Province (J.ZH.Z. [2018] No. 23)</i>	2018	Hebei Provincial People's Government
<i>Plan of Hebei Province for Developing Leisure Tourism Industry Belt Around Beijing and Tianjin (2008-2020)</i>	2008	Hebei Provincial People's Government
<i>Plan for Governance, Restoration and Protection of Sea Areas, Islands and Coastal Areas of Hebei Province (2014-2020)</i>	2014	Hebei Oceanic Bureau
<i>Provisions of Cangzhou Municipality on Responsibility for Ecological Environment Protection (Provisional)</i>		Cangzhou Municipal People's Government
<i>Marine Functional Zoning Plan of Tangshan Municipality (2013-2020)</i>	2014	Tangshan Municipal People's Government
<i>Master Plan for Hebei Luannan Nanpu Zuidong Provincial Wetland Park (2021-2025)</i>	-	-
<i>Master Plan of Zuidong Economic Development Zone in Luannan County (2018-2030)</i>	2018	Administration Committee of Luannan Economic Development Zone
<i>14th Five-Year Plan of Qinhuangdao Municipality for Economic and Social Development and the Long-Range Objectives Through the Year 2035 (Draft for Discussion)</i>	2021	Qinhuangdao Municipal People's Government
<i>Master Plan of Qinhuangdao Municipality for Territorial Space (2020-2035)</i>	2021	-
<i>Cooperation Framework Agreement on Tourism among Port Cities in the Bohai Rim</i>	-	-
<i>Implementation Plan of Qinhuangdao Municipality for Leisure Vacation and Tourism Industry (2009-2020)</i>	-	-
<i>Master Plan of Qinhuangdao Municipality for Beidaihe Scenic Area (2011-2030)</i>	-	-
<i>Master Plan for Hebei Beidaihe National Wetland Park</i>	2009	-
<i>Wetland Protection Plan of Qinhuangdao</i>	2018	Qinhuangdao Municipal

Name	Issuing Year	Issuing authority
<i>Municipality (2018-2025)</i>		People's Government
<i>Flood Control Plan of Qinhuangdao Municipality</i>	-	-
<i>Special Plan for Changli Golden Coast National Nature Reserve (2018-2035)</i>	-	-
<i>Master Plan for Changli Golden Coast National Nature Reserve (2016-2035)</i>	2017	Administration Office of Hebei Changli Golden Coast National Nature Reserve
<i>Shihenandao Conservation and Utilization Plan of Shanhaiguan District, Qinhuangdao Municipality</i>	2015	Shanhaiguan District Branch of Qinhuangdao Municipal Land & Resources Bureau
<i>Shihenandao Conservation and Development Plan</i>	2017	Shanhaiguan District Government
<i>14th Five-Year Plan for Economic and Social Development of Liaoning Province</i>	2021	Liaoning Provincial People's Government
<i>Regulations of Liaoning Province on Wetland Protection</i>	2007	Liaoning Provincial People's Government
<i>Plan of Liaoning Province for Wetland Protection (Trial)</i>	2016	Forestry Department, Department of Environmental Protection, Department of Water Resources, Department of Ocean and Fisheries of Liaoning Province
<i>Regulations of Liaoning Province on Environmental Protection</i>	2017	Standing Committee of Liaoning Provincial People's Congress
<i>Marine Ecological Environment Protection Plan of Liaoning Province (2016-2020)</i>	2015	Department of Ocean and Fisheries of Liaoning Province
<i>Measures of Liaoning Province for Marine Ecological Environment Protection</i>	2019	Liaoning Provincial People's Government
<i>Regulations of Liaoning Province on Protection of Wild Animal Resources</i>	1982	Standing Committee of Liaoning Provincial People's Congress
<i>Regulations of Liaoning Province on Tourism</i>	2005	Standing Committee of Liaoning Provincial People's Congress
<i>Measures of Liaoning Province for Administration of the Use of Sea Areas</i>	2005	Standing Committee of Liaoning Provincial People's Congress

Name	Issuing Year	Issuing authority
<i>Action Plan of Liaoning Province for Pollution Prevention and Control, Ecological Construction and Protection (2017-2020)</i>	2017	Liaoning Provincial People's Government
<i>Ecological Protection and Construction Plan of Liaoning Province (2014-2020)</i>	2016	Liaoning Provincial Development and Reform Commission
<i>Implementation Rules of Liaoning Province on Administration of Forest and Wild Animal Reserves</i>	1987	Forestry and Grassland Bureau of Liaoning Province
<i>Aquaculture Water Area and Tidal Flat Plan of Panjin Municipality(2018-2030)</i>	2019	Panjin Municipal People's Government
<i>Master Plan of Panjin Municipality for Wetland Protection (2019-2025)</i>	2019	Panjin Municipal People's Government
<i>14th Five-Year Plan for Economic and Social Development of Panjin Municipality</i>	2021	Panjin Municipal People's Government
<i>Regulations of Dalian Municipality on Marine Environment Protection</i>	2021	Standing Committee of Dalian Municipal People's Congress
<i>Measures of Dalian Municipality for Administration of Wild Animal Protection</i>	2008	Dalian Municipal People's Government
<i>14th Five-Year Plan for Economic and Social Development of Dandong Municipality</i>	2021	Dandong Municipal People's Government
<i>Regulations on Administration of Dandong Yalujiang Estuary Wetland National Nature Reserve</i>	2018	Dandong Municipal People's Government
<i>Master Plan for Dandong Yalujiang Estuary Wetland National Nature Reserve (2011-2020)</i>	2010	Environmental Protection Bureau of Dandong City
<i>Opinions of Changhai County on Management of Intertidal Zones</i>	2020	Changhai County Natural Resources Bureau

4.3 Planning Term

The planning term is from 2021 - 2050, including short term: 2021-2025, mid-term: 2026-2035, and long term: 2036-2050.

4.4 Planning Goals

4.4.1 General goal

The plan aims to, in line with the requirements of the *Convention Concerning the Protection of World Cultural and Natural Heritage*, protect representative wild animals and plants, ecological systems and natural landscape features; strengthen exchanges and cooperation with the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I) - Migratory Bird Habitat in Yancheng, Jiangsu Province. The ultimate goal is to allow the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), together with the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I), to become World Natural Heritage sites with well-preserved heritage value, under effective and scientific management, generating significant social benefit, and featuring harmony between of humankind and nature; as well as world-renowned scientific research bases, science popularization and education bases, and models of well-protected and well-managed coastal wetlands in the world.

4.4.2 Sub-goals

4.4.2.1 Goal of heritage value protection

The plan aims to, in line with the requirements of the *Convention Concerning the Protection of World Cultural and Natural Heritage*, protect representative wild animals and plants and rare bird species such as Hooded Crane (*Grus monacha*), Oriental Stork (*Ciconia boyciana*), Great Knot (*Calidris tenuirostris*), Hooded Crane (*Aythya baeri*), White-naped Crane (*Grus vipio*), Red Knot (*Calidris canutus*), Curlew Sandpiper (*Calidris ferruginea*), Saunders's Gull (*Saundersilarus saundersi*), Relict Gull (*Ichthyaelus relictus*), Siberian Crane (*Grus leucogeranus*), Common Crane (*Grus grus*), Great Bustard (*Otis tarda*), Golden Eagle (*Aquila chrysaetos*), Chinese Egret (*Egretta eulophotes*), Pelagic Cormorant (*Phalacrocorax pelagicus*), Black-faced Spoonbill (*Platalea minor*), various Anatidae species and shorebirds, as well as ecosystems like coastal wetland and their natural features, protect the integrity of migratory bird habitats, and provide feeding and breeding sites for rare birds to replenish sufficient energy for long-distance migration. The ultimate goal is to allow the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) to become World Natural Heritage sites with well-preserved heritage value, under effective and scientific management, generating significant social benefit, and featuring harmony

between of humankind and nature, as well as models of well-protected and well-managed coastal wetlands in the world.

4.4.2.2 Goal of heritage presentation and education

The aim is to well present the value of the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), gradually deepen the understanding of heritage values by the public including tourists, and adequately instill the concept of heritage conservation in local communities so that it can be reflected in their production and living activities. It also aims to enable local governments to realize the importance of heritage presentation and education, based on which proper methods are adopted to integrate heritage presentation and education with the development of culture and tourism.

4.4.2.3 Goal of community participation and development

The aim is to encourage local communities to actively participate in heritage management activities, resource conservation and tourism development, as sound interactions can boost resource conservation and raise living standards of residents. As a result, the interests of local communities can be adequately protected during heritage conservation and management.

4.4.2.4 Goal of management system and capability building

The aim is to build a sound management system, thereby establishing a professional management team with great competence in monitoring, promotion and scientific research, internal department systems, robust management coordination system and legal system so as to respond to various threats to the Outstanding Universal Value (OUV) of the World Heritage sites. Meanwhile, a stable mechanism will be established to facilitate participation of specialized social organizations, research institutes and volunteers in the conservation of the World Heritage sites.

4.5 Summary of content of the plan

The conservation and management plan for the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) is outlined below:

Chapter 5 sets out the control requirements respectively for the nominated properties and buffer zones based on the characteristics of the various habitats in nominated properties and buffer zones, the utilization of each type of habitat by bird species, and the use of each type of land by human beings.

Chapter 6 sets forth the status quo of the OUV elements protection at nominated property, the measures for the classified protection of OUV, and

targeted protection and management requirements for migratory birds and habitats.

Chapter 7 specifies measures to address major threats and pressures, including development pressure, environment pressure, natural disaster risks, and tourism pressure.

Chapter 8 expounds on the current status of presentation and education of the nominated property, specifies the target of presentation and utilization modes, makes detailed plans for themed content and routes of presentation and interpretation, reasonably plans travel and traffic routes, sets forth specific measures for managing number of visitors, behaviors and safety, and finally proposes environmental education measures for managers and residents.

Chapter 9 gives an introduction to the current monitoring status of the nominated property, specifies the content and methods of subsequent monitoring, monitoring indicator system, distribution of monitoring stations and establishment of a thorough monitoring system, and finally makes detailed plans for the evaluation workflow and content of management effectiveness.

Chapter 10 summarizes the achievements in scientific research on the nominated property while pointing out scientific problems that urgently need to be solved. It sets out subsequent scientific research plan for the nominated property, including research directions and content, form of

research organization, and management content.

Chapter 11 analyzes the current status of communities within the nominated property, and sets forth specific measures for sustainable development and community participation based on long- and short-term goals.

Chapter 12 reviews the current status of the management systems for the nominated property, establishes reasonably structured management systems and functionally sound management organizations, and improves the capacity of these organizations across the board.

Chapter 13 summarizes the action plan and makes investment calculations for the projects involved.

Chapter 14 sets out the safeguard measures to be taken for the successful implementation of the measures.

5 Area-specific Protection of OUV

In accordance with the *Operational Guidelines for the Implementation of the Convention Concerning the Protection of the World Cultural and Natural Heritage*, buffer zones have been set up around the nominated properties. Zoning aims to fully protect the OUV elements (mainly referring to migratory waterbirds here), so as to meet the utilization demand for different types of habitats and sustainable development of communities where the nominated properties are located.

5.1 Nominated Property Management

5.1.1 Land types of nominated property

According to the official land survey data, with reference to the *Current Land Use Classification* (GBT 21010-2017) issued and implemented on November 1, 2017, the nominated properties currently have 11 land types, some containing sea areas. The land types in the nominated properties are mainly land for waters and water conservancy facilities, woodland, and sea areas. Due to different geographical units, natural and socio-economic environments, there are also other land types like grassland and transportation land. Some nominated properties contain a small area of commercial service land, cultivated land, garden plots, residential land, public management and service land, and other lands. In

particular, the land for waters and water conservancy facilities in the nominated properties is mainly coastal mudflats, pond waters, river waters, and hydraulic facility construction land. Some nominated properties contain lake waters, reservoir waters, inland tidal flats, swamps, ditches, etc. Such land for waters and water conservancy facilities constitutes a key component of wetlands within the nominated properties.

Land use at the nominated properties is shown in the table below.

Table 8 Land Types of Nominated Property (Unit: ha)

Land Type		YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Woodland	Arbor forest land					224.78				766.214		123.28
	Shrub land					17.42		1.38		0.952		
	Other forestland					25.82		19.16		24.173		29.5
Grassland	Other grassland		272.15	0.23		34.3		17.34		6.477	229.27	6.692
Land for waters and conservancy facilities	River water	5559.35	261.85			1.32			97.36		163.65	
	Lake water					264.56						
	Reservoir water									7.336		
	Pond water		10.14		0.01	176.31		37.8		7.062	2.88	
	Coastal mudflat		21494.67		1772.94	0.03	95.01	46.03	150.02	9.262	13275.28	55.356
	Inland tidal flat	1335.63	14638.9								6.77	

Land Type		YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
	Ditch		12.53							0.321	57.53	
	Swamp			2915.16								
	Hydraulic facility construction land		26.21	6.85	2.21					0.182		
Transportation land			20.02 (Road land, rural road)			2.77 (Road land, rural road)		6.54 (Road land)		2.14 (Rural road, road land)	19.11 (Road land, rural road)	0.299 (Road land, rural road)
Commercial service land										0.179 (Land for commercial service facilities, land for logistics and warehousing)		

Land Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Industrial and mining storage land		2.97 (Mining land)	0.67 (Mining land)	124.35 (Salt pan)							
Farmlands					6.34 (Paddy field)				4.151 (Irrigated land, dry land)	46.57 (Paddy field, dry land)	0.10 (Dry land)
Garden plot									5.962 (Orchard)		
Residential land									0.642 (Rural home land)	7.27 (Rural road, press & publication land)	
Land for public management and public service									0.032 (Land for public facilities)		

Land Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Other land		9.23 (Saline-alkali land)			296.58 (Agricultural facility land, sandy land)				0.762 (Agricultural facility land, bare soil land)	13.04 (Agricultural facility land, bare land)	
Sea area*	609.73	5578.5		2058.78		2.52		27952.03	234.390	3423.3	0.81

5.1.2 Management requirements for nominated properties

(1) The tidal wetland ecosystem and habitats of migratory birds should be strictly protected. Construction activities such as land reclamation, oil and gas exploitation, wind and photovoltaic power projects, agricultural development, urban and rural construction, and port construction that damage the ecosystem and landscapes should be strictly prohibited within nominated properties. The migratory bird habitats should be protected in situ, and unapproved modifications and constructions are not permitted. The critical stopover, forage, breeding and wintering sites of threatened species should be strictly protected;

(2) The marine ecological environment of the nominated properties should be strictly protected. Activities such as land reclamation, oil and gas exploration, wind and photovoltaic power projects, and port construction are prohibited within the nominated properties. The construction of artificial facilities that have the potential to adversely affect the coastline and intertidal terrain is prohibited. Marine pollution should be reduced, and marine garbage should be controlled to protect seawater quality. During bird migration seasons, the number of ships and relevant activities in the sea areas of the nominated properties should be restricted;

(3) The introduction of alien species is prohibited. For existing alien species, reasonable measures should be taken to restore the ecological

environment on the basis of investigation and evaluation;

(4) Bird hunting is prohibited, and wild animals should be adequately protected.

(5) Expansion of resource harvesting, aquaculture, and animal farming in the nominated properties is prohibited.

(6) Human activities in the nominated properties should be strictly controlled. No entities or individuals are allowed to enter the nominated properties without permission. For scientific researches, observations and investigations in nominated properties, prior approval from the authorized departments should be gained. Patrols in nominated properties should be in line with the prescribed routes and methods;

(7) Facility construction in the nominated properties should be strictly controlled. No new facilities should be built in nominated properties in principle, except for the facilities necessary for heritage protection and presentation. For the construction of facilities that are really necessary for heritage protection and presentation, such as artificial wetland maintenance projects to supplement food and water for birds, scientific analysis and environmental impact assessment should be conducted before construction, and the original environment must not be damaged. Facility construction should avoid the migratory and breeding seasons of birds;

(8) Monitoring and restoration activities conducive to the ecosystem and environmental improvement can be carried out in the nominated

properties. However, these activities should comply with the protection plans for protected areas and be approved by relevant departments in advance. Special attention should be paid to the dynamic changes in wetlands, to create suitable habitats for different migratory birds;

(9) Appropriate and necessary heritage value interpretation and presentation activities can be carried out in the nominated properties. However, these activities should comply with the protection plans for protected areas and heritage value presentation plans, and be approved by relevant departments in advance.

5.2 Management of the Buffer Zone

5.2.1 Land use status of the buffer zone

The buffer zone of Phase II currently has 12 land types, some containing sea areas. Currently, land is mainly used for or as waters and water conservancy facilities, woodland and sea areas. Based on their geographical units and natural and socio-economic environments, the buffer zone also has grassland, transportation, and industrial and mining storage land. Some components also have commercial service land, cultivated land, garden plot, residential land, public management and public service land, special land, and other land types. In particular, the land for waters and water conservancy facilities in the buffer zone is mainly

coastal mudflats, pond waters, river waters, and hydraulic facility construction land. Some nominated properties contain lake waters, inland tidal flats, swamps, ditches, etc. Such land constitutes a key component of wetlands within the buffer zone. Land use at the buffer zone s is shown in the table below.

Table 9 Land Types of Buffer Zone (Unit: ha)

Land Type		YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Woodland	Arbor forest land					182.19	0.06			153.25	17.89	62.16
	Shrub land		579.74			28.25				3.47		
	Other forestland					30.63					2.93	9.82
Grassland	Other grassland		3.15			6.99				9.973	336.45	3.10
Land for waters and water conservancy facilities	River water	624.75	326.55			0.71		27.10	50.94		559.74	
	Lake water					14.24						
	Pond water		3.94+16.33		126.21	139.94			16.73	4.40	3.06	
	Coastal mudflat	90.94	4250.17		239.74		8.34	12.72	133.37	11.09	6728.24	
	Inland tidal flat	3869.33	5229.95	17.20							14.01	
	Ditch		17.62							0.93	171.80	
	Swamp			871.83								
	Hydraulic facility	74.78	17.99	2.19	4.27						8.01	

Land Type		YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
	construction land											
Transportation land		1.78 (Rural road)	6.13 (Road land, rural road)			2.44 (Road land, rural road)		0.13 (Road land)	0.0004 (Land for transportation service sites)	5.11 (Road land, rural road, urban and village road land, port and terminal land)	20.17 (Rural road, road land)	1.98 (Road land, rural road, urban and village road land)
Commercial service land		0.06 (Land for commercial service facilities)								0.27 (Land for commercial service facilities, land for logistics and warehousing)		0.19 (Other commercial service land)
Industrial and mining storage land			3.84 (Mining land, salt pan)		306.60 (Salt pan)	0.38 (Land for logistics and warehousing)				0.22 (Industrial land)	241.30 (Salt pan)	
Farmlands						6.75				22.29	83.35 (Paddy	7.63 (Dry

Land Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
					(Paddy field, dry land)				(Irrigated land, dry land)	field, dry land)	land)
Garden plot									46.696 (Orchard)		
Residential land									1.74 (Rural home land)	15.90 (Rural home land)	5.61 Rural home land, press & publication land)
Land for public management and public service	0.76 (Land for science, education, culture and health)										
Land for special purposes	0.28								0.34	0.18	0.28
Other land		3.31 (Saline-alkali land)			58.60 (Agricultural facility land, sandy land)				0.95 (Agricultural facility land, bare soil land)	15.36 (Agricultural facility land, bare land)	0.27 (Agricultural facility land)

Land Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Sea area*	6608.65	3275.57		546.70		2.71		8717.64	467.43	561.23	694.07

5.2.2 Management requirements for the buffer zone

(1) Land reclamation, oil exploitation, wind power generation facilities, photovoltaic power facilities, high-voltage transmission lines, polluting industries, hunting, and destruction of animal habitats are prohibited in buffer zones;

(2) In principle, no more land for agricultural, urban and rural construction purposes may be added in buffer zones. If such land use patches conflict with heritage protection, they should be converted into ecological land use type in a phased manner;

(3) Reasonable and sustainable eco-agriculture, eco-fishery, etc. can be carried out in the buffer zones, provided that such activities conform to the existing protection and management requirements for the protected areas. For existing land used for agricultural, fishery, and other purposes, reasonable and feasible eco-environmental improvement measures should be set out according to relevant national requirements, protection and management plans, and the actual regional social and economic development, and on the basis of ongoing monitoring and scientific evaluation. Pesticides, fertilizers, feeds, etc. that pose threats to birds, water quality, soil, and atmosphere must not be used or produced in the existing production and living activities;

(4) Scientific research, observation, and investigation can be carried

out in the buffer zones as long as they are approved by relevant departments in advance;

(5) Appropriate heritage value presentation, science education for teenagers, sightseeing, and other activities are allowed in buffer zones as long as they meet the environmental carrying capacity and behavior control requirements;

(6) The construction of infrastructure and service facilities in buffer zones should conform to the protection requirements for protected areas and be approved by relevant departments accordingly;

(7) The specific protection and management measures for buffer zones should suit local conditions, and be fully integrated with plans for surrounding areas, to play the leading exemplary role in ecological protection and community sustainable development.

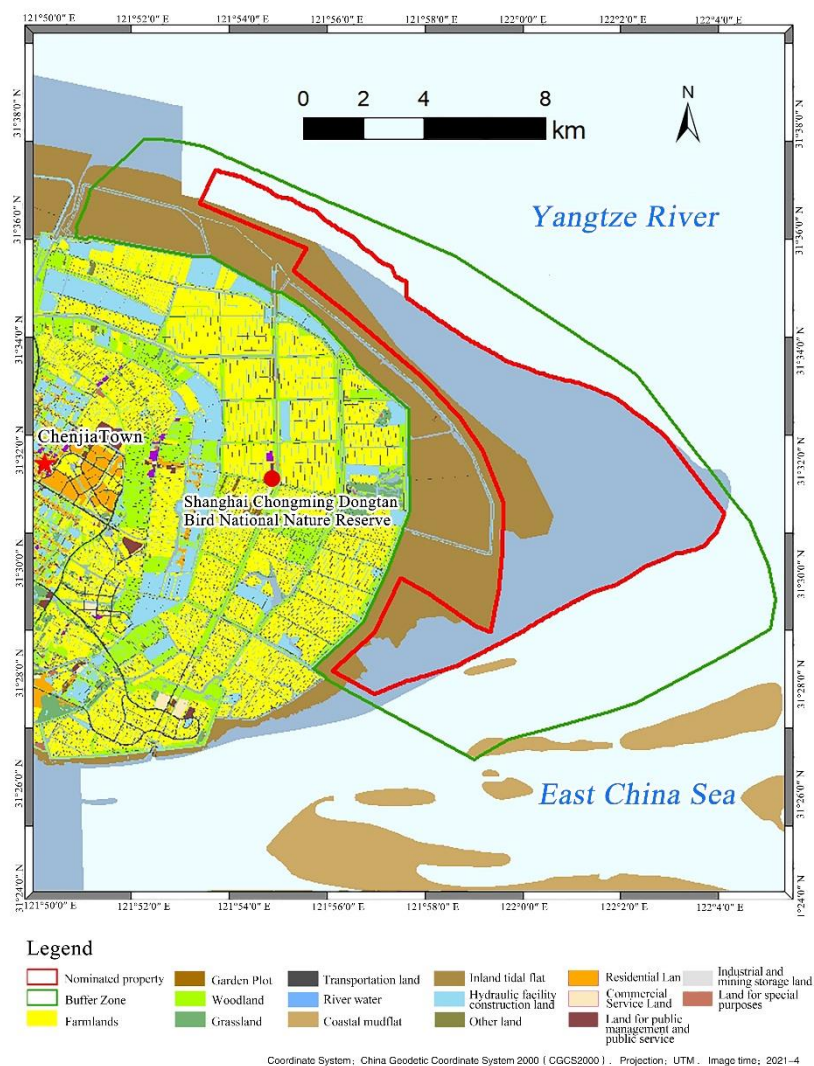


Figure 1 Land Uses of YS-3 Nominated Property, Buffer Zone and Surrounding Areas

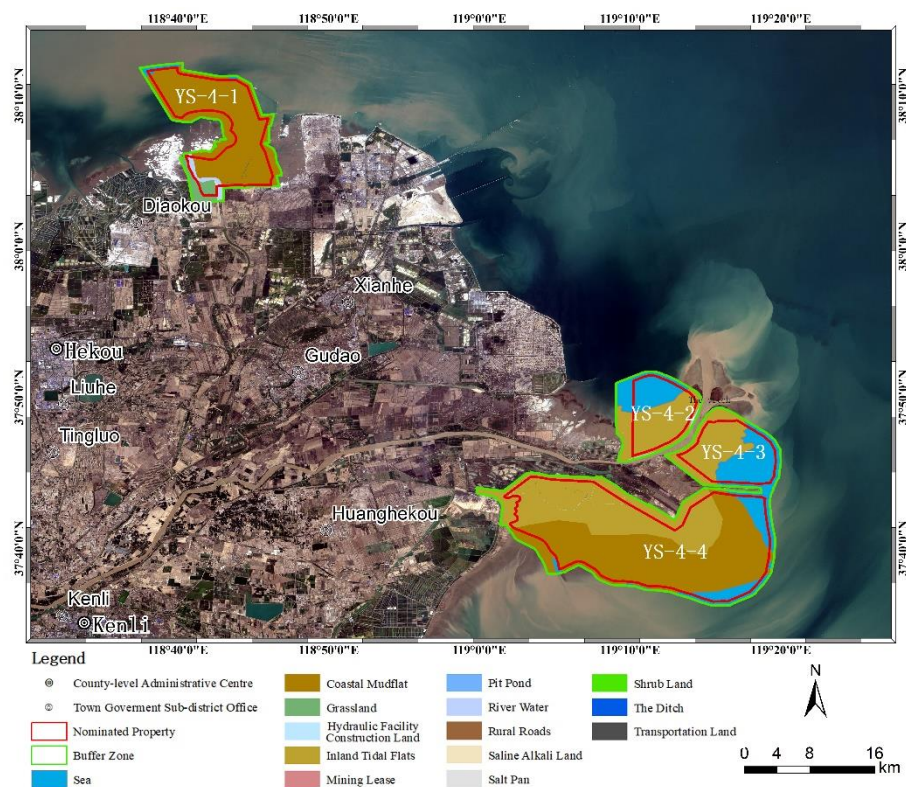


Figure 2 Land Uses of YS-4 Nominated Property, Buffer Zone and Surrounding Areas

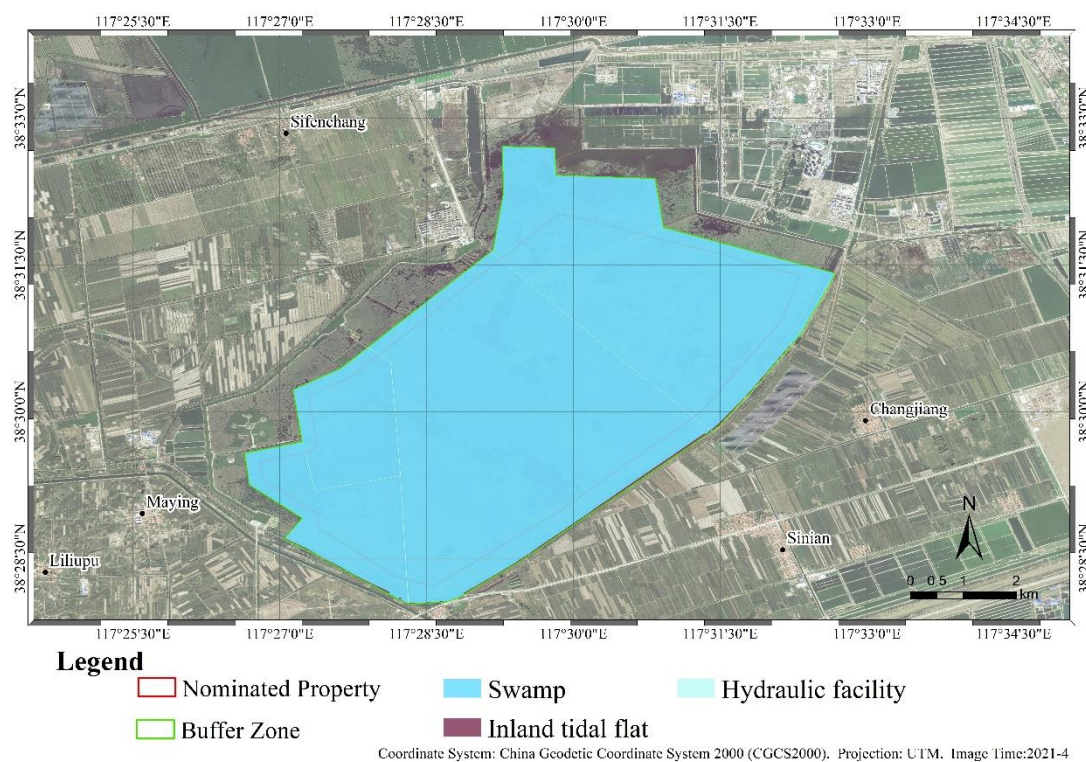


Figure 3 Land Uses of YS-5 Nominated Property and Buffer Zone

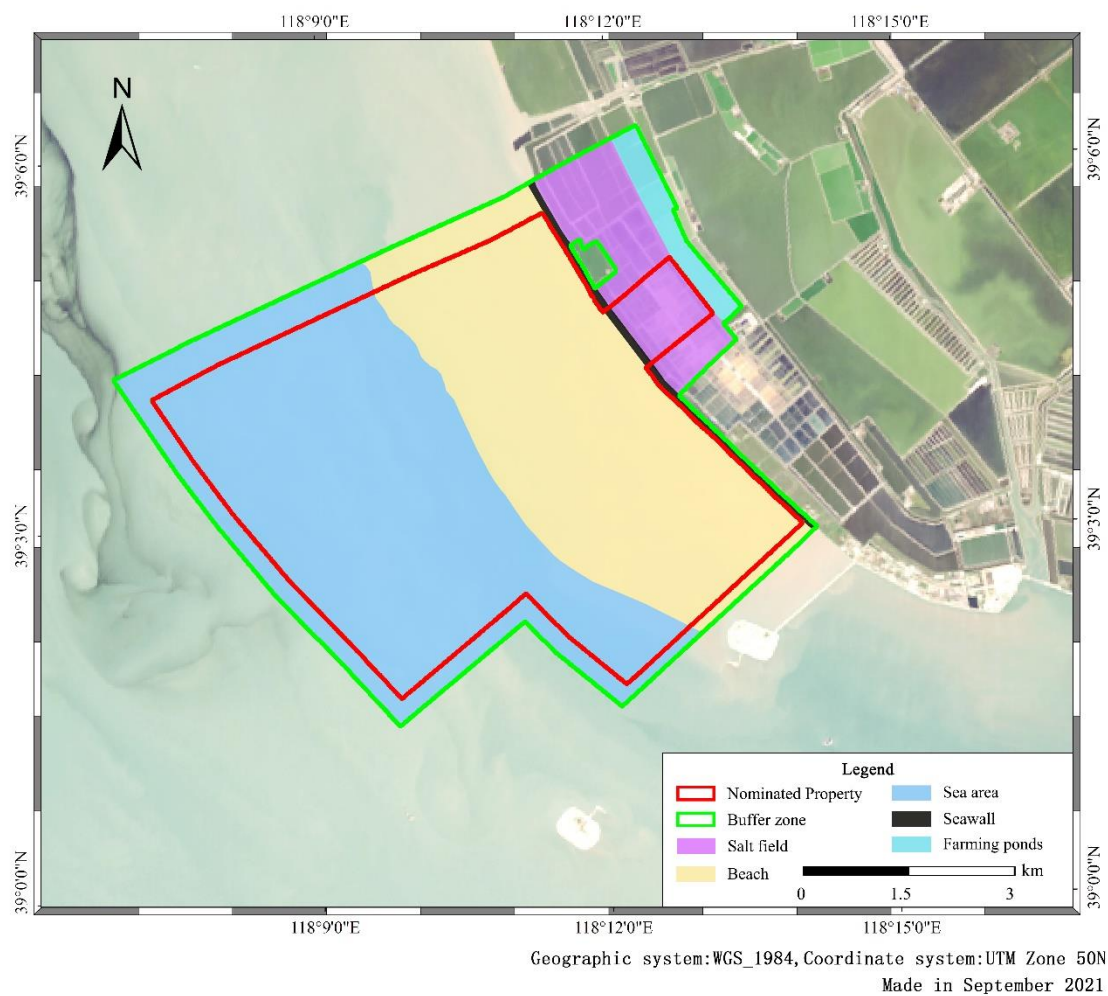


Figure 4 Land Uses of YS-6 Nominated Property, Buffer Zone and Surrounding Areas

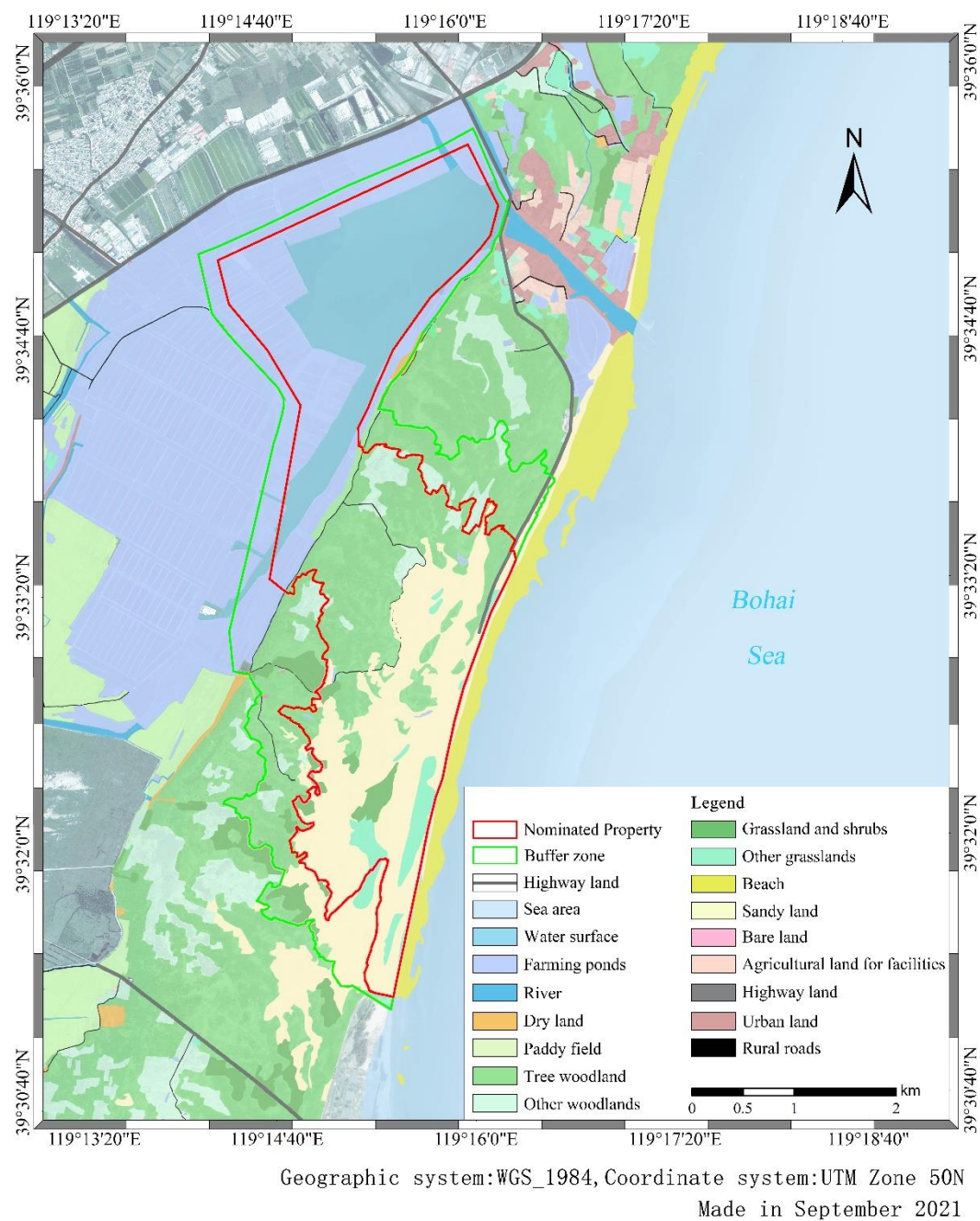


Figure 5 Land Uses of YS-7 Nominated Property, Buffer Zone and Surrounding Areas

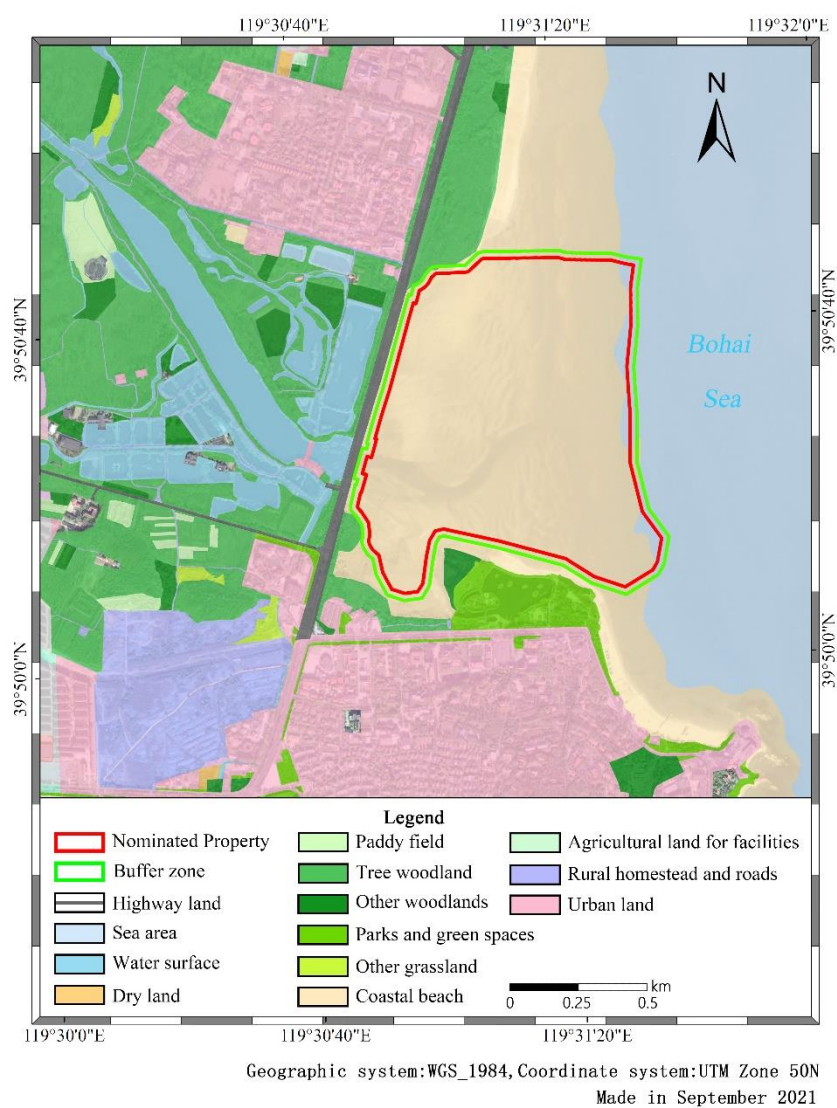


Figure 6 Land Uses of YS-8 Nominated Property, Buffer Zone and Surrounding Areas

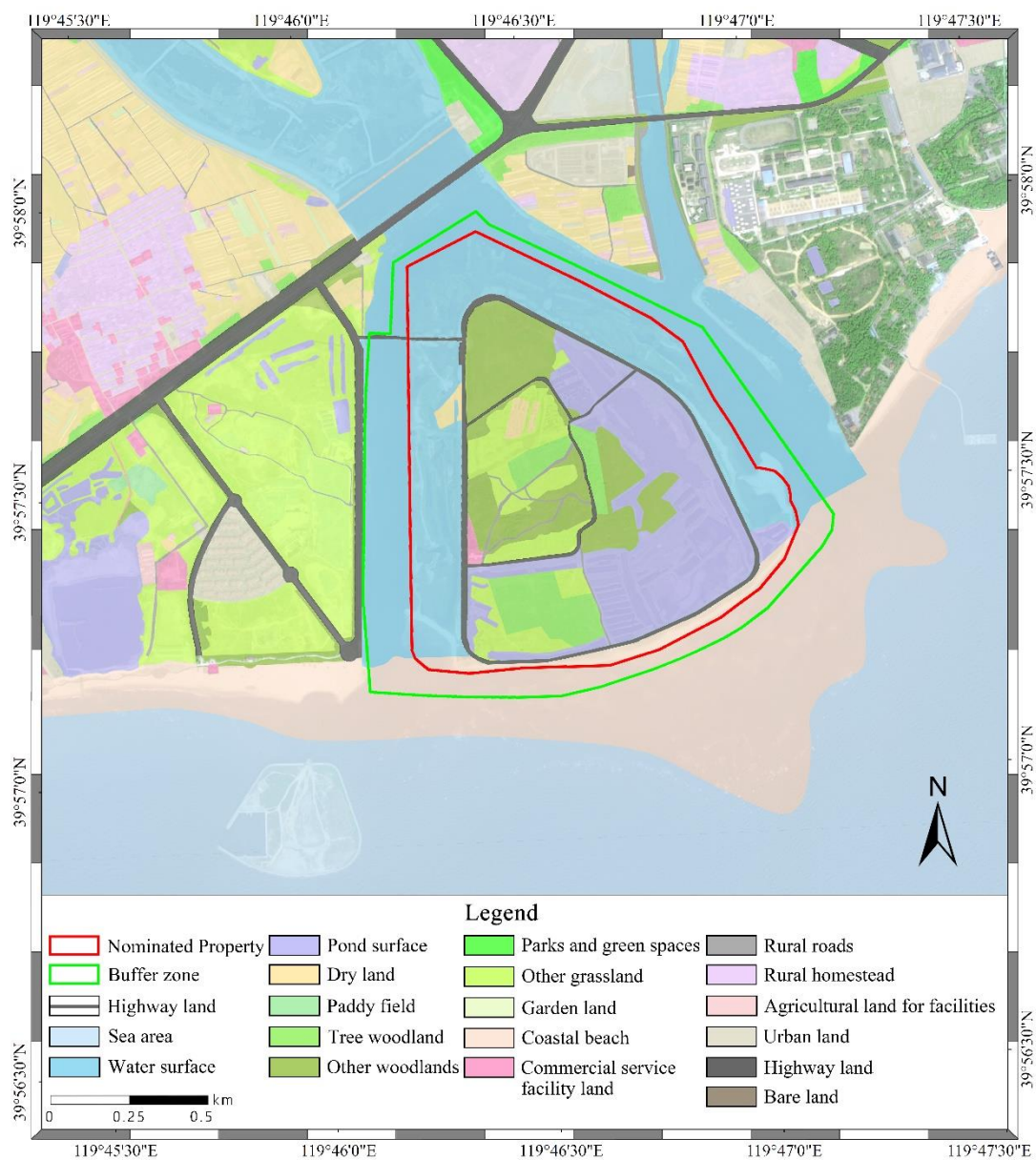


Figure 7 Land Uses of YS-9 Nominated Property, Buffer Zone and Surrounding Areas

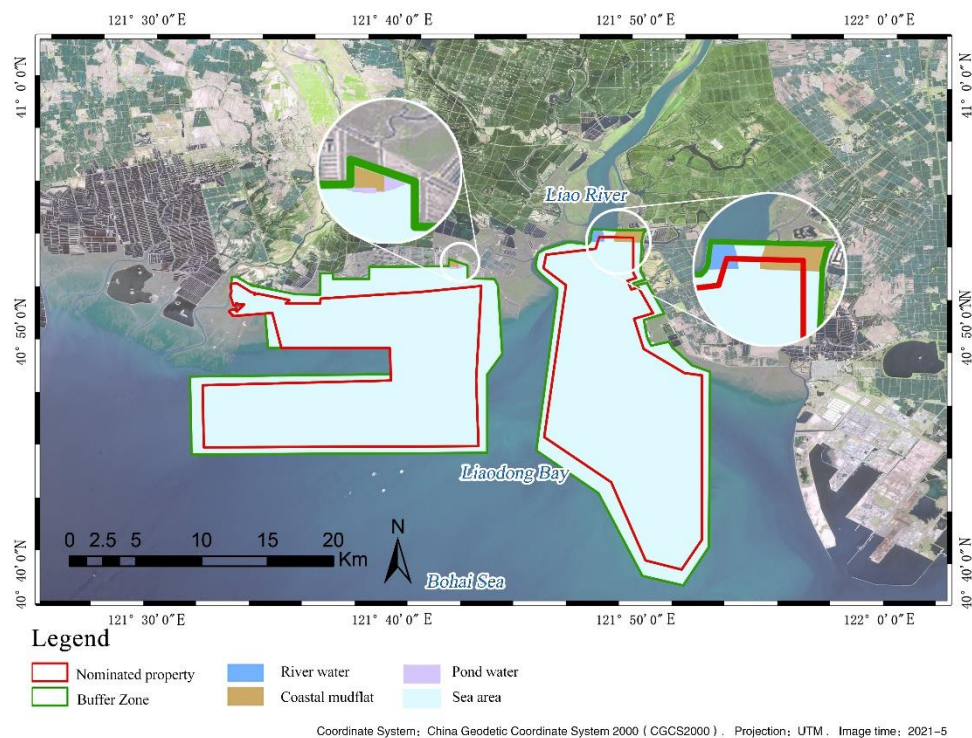
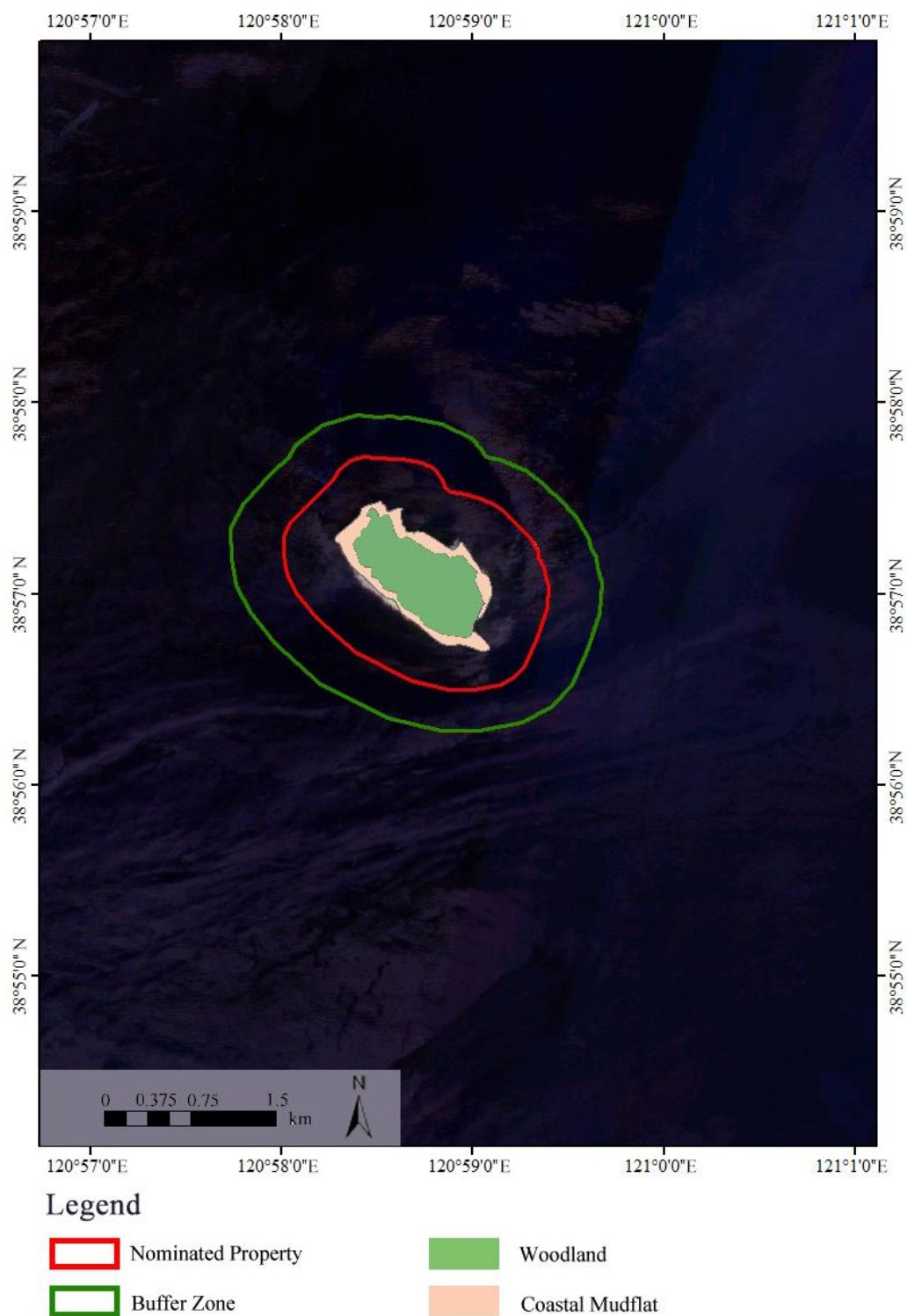


Figure 8 Land Uses of YS-10 Nominated Property, Buffer Zone and Surrounding Areas



Figure 9 Land Uses of YS-11-1 Nominated Property, Buffer Zone and Surrounding Areas



Coordinate System: China Geodetic Coordinate System 2000(CGCS 2000). Projection: UTM. Image time: 2021-4

Figure 10 Land Uses of YS-11-2 Nominated Property, Buffer Zone and Surrounding Areas

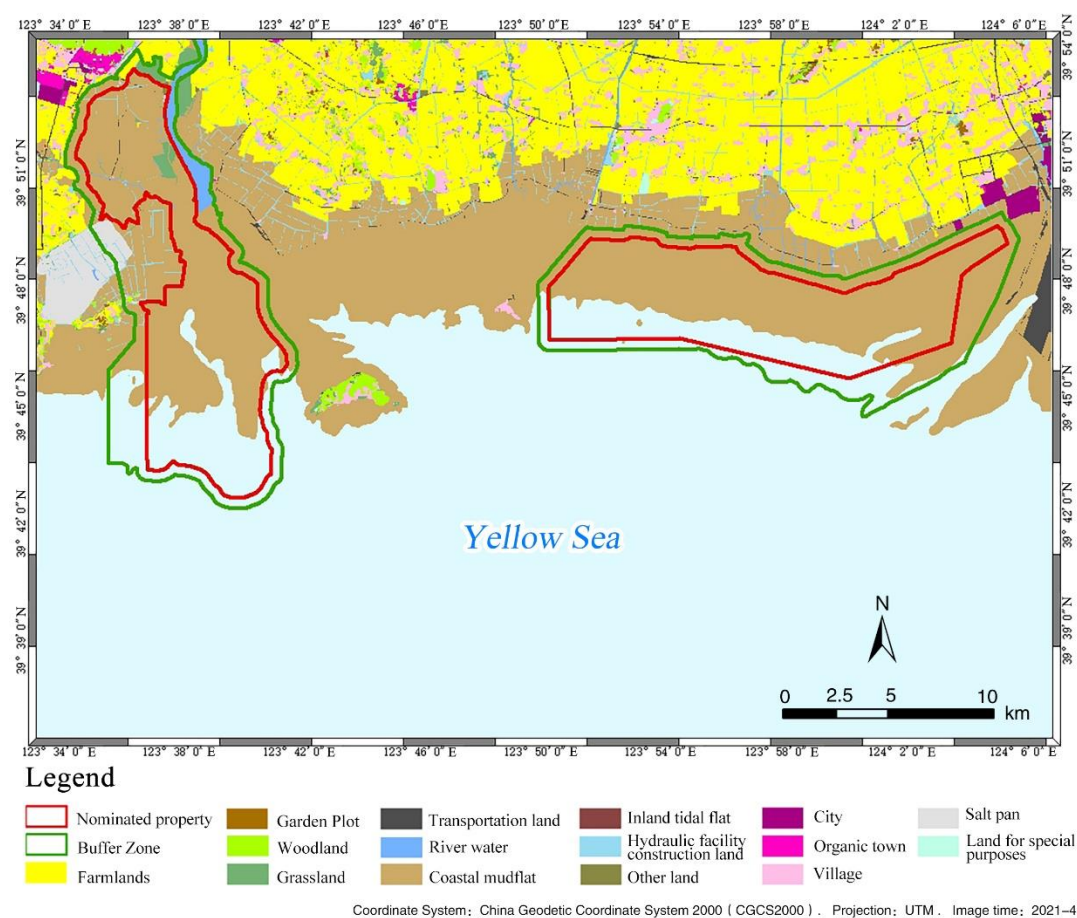


Figure 11 Land Uses of YS-12 Nominated Property, Buffer Zone and Surrounding Areas

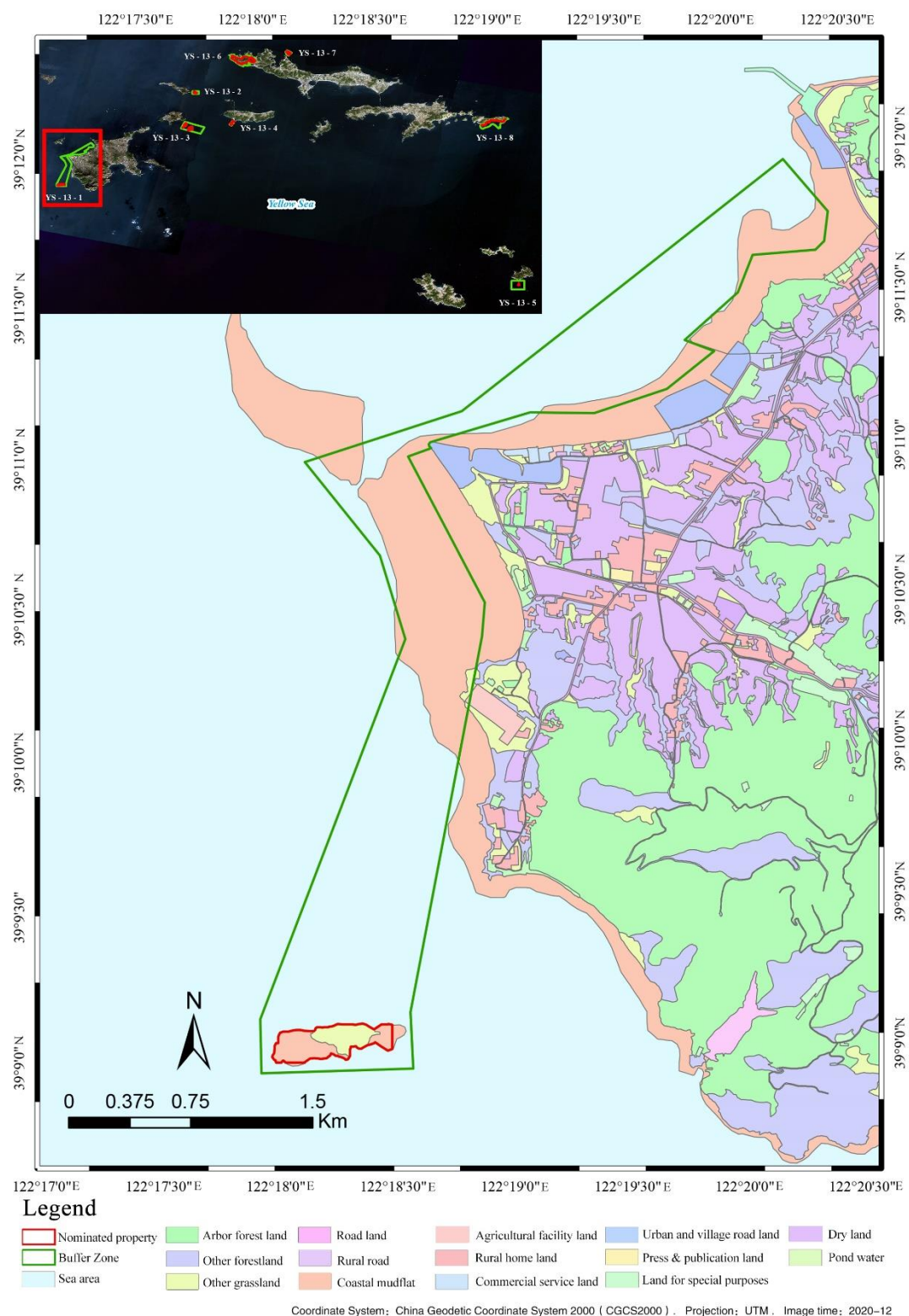


Figure 12 Land Uses of YS-13-1 Nominated Property, Buffer Zone and Surrounding Areas

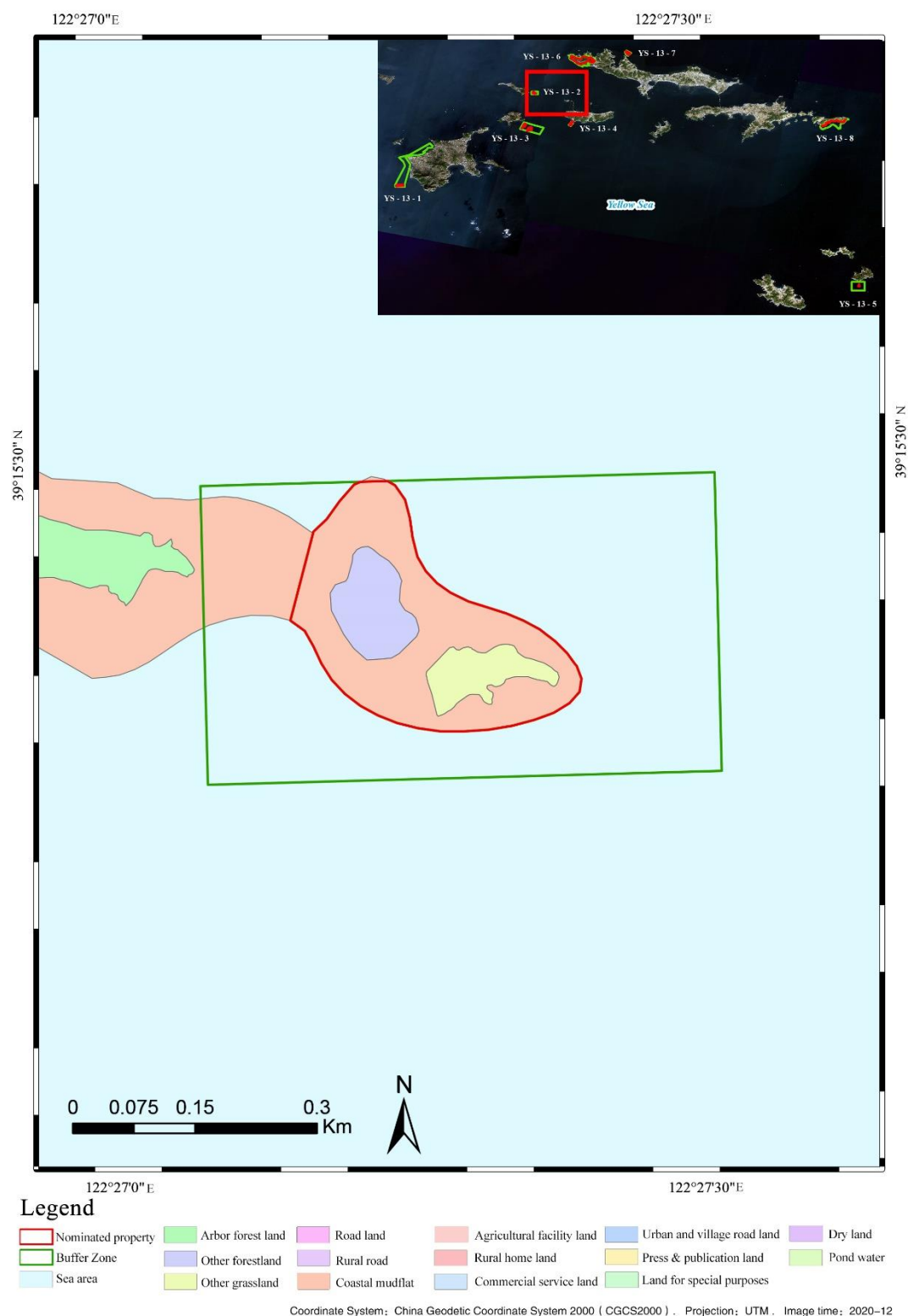


Figure 13 Land Uses of YS-13-2 Nominated Property, Buffer Zone and Surrounding Areas

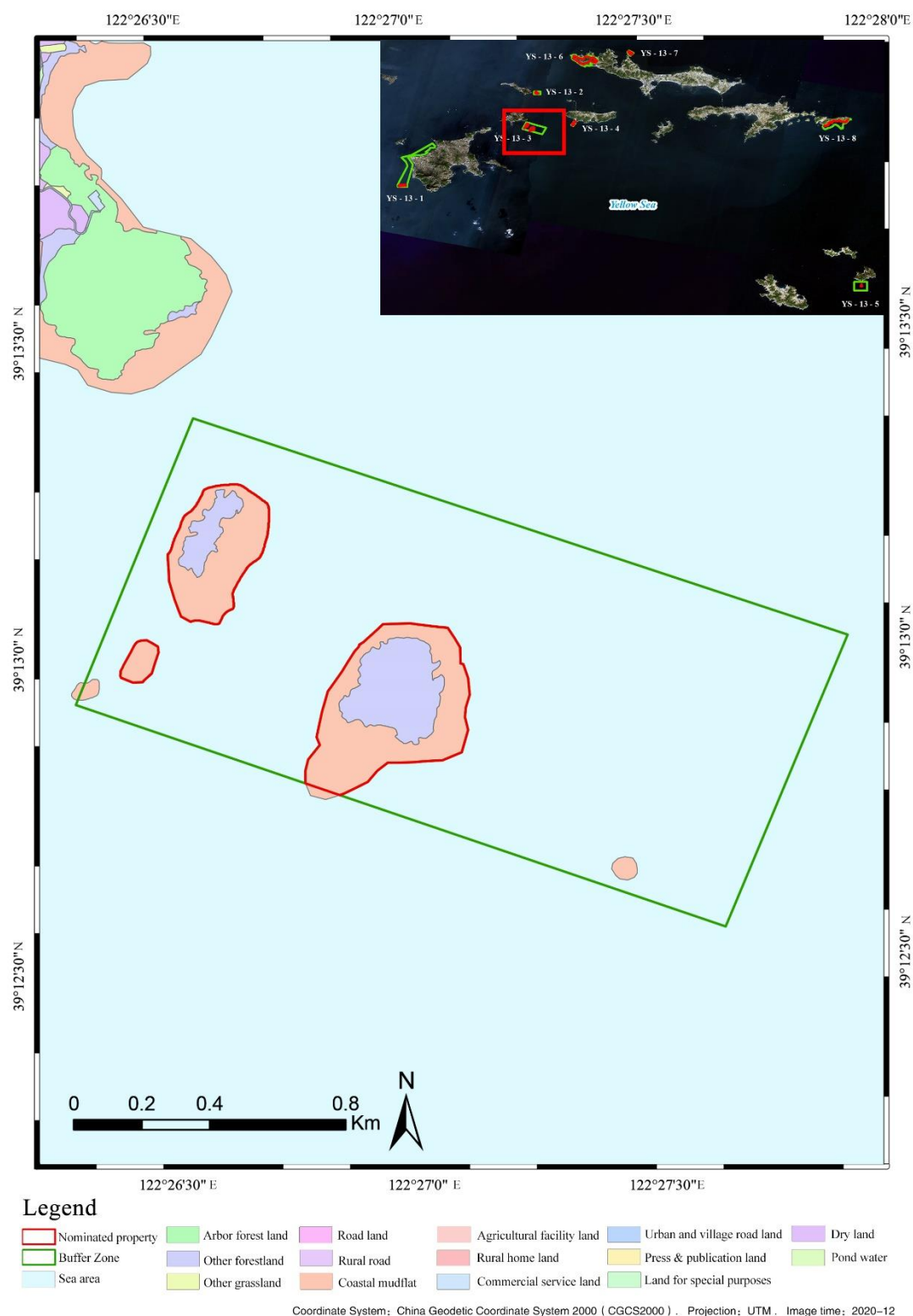


Figure 14 Land Uses of YS-13-3 Nominated Property, Buffer Zone and Surrounding Areas

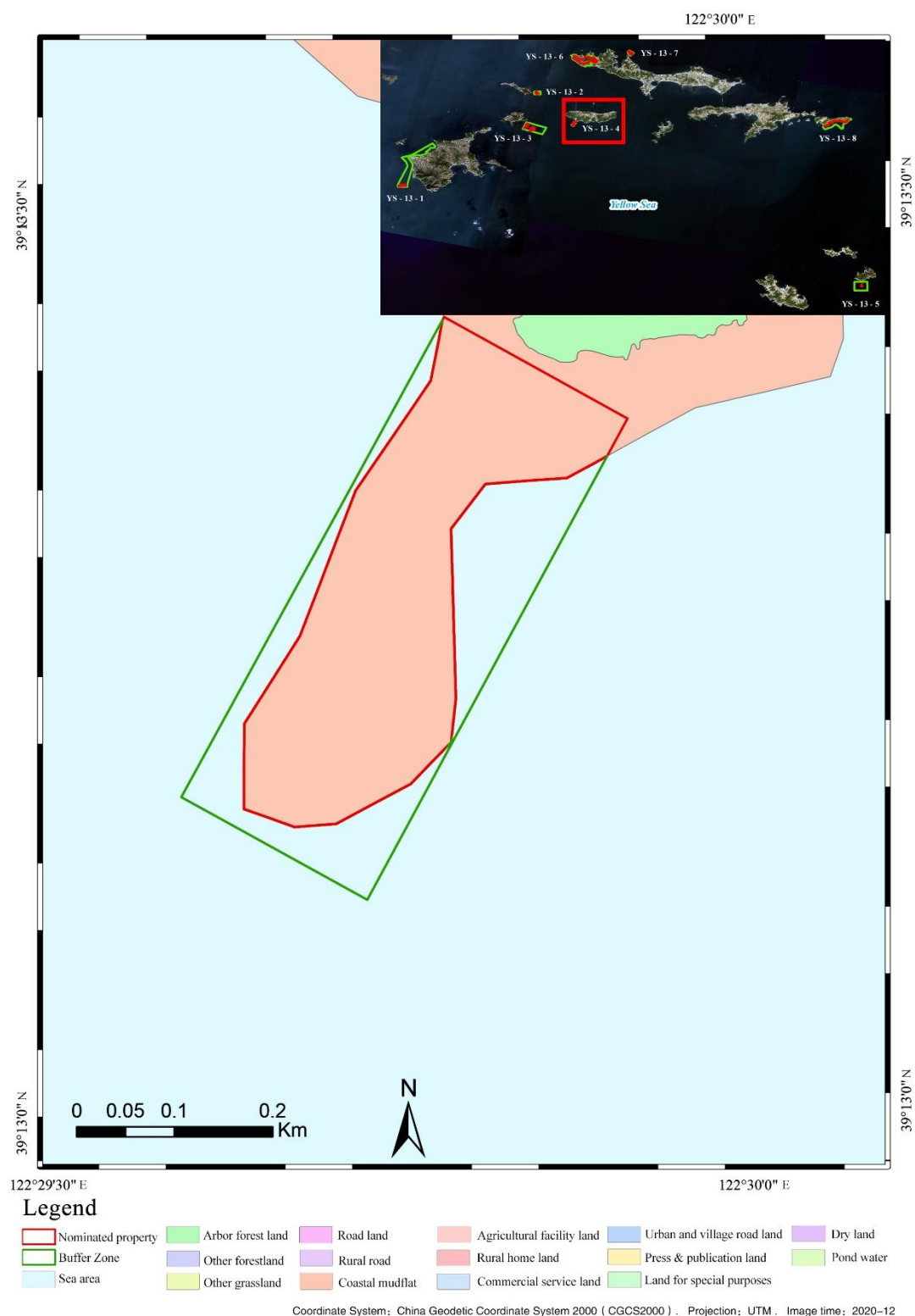


Figure 15 Land Uses of YS-13-4 Nominated Property, Buffer Zone and Surrounding Areas

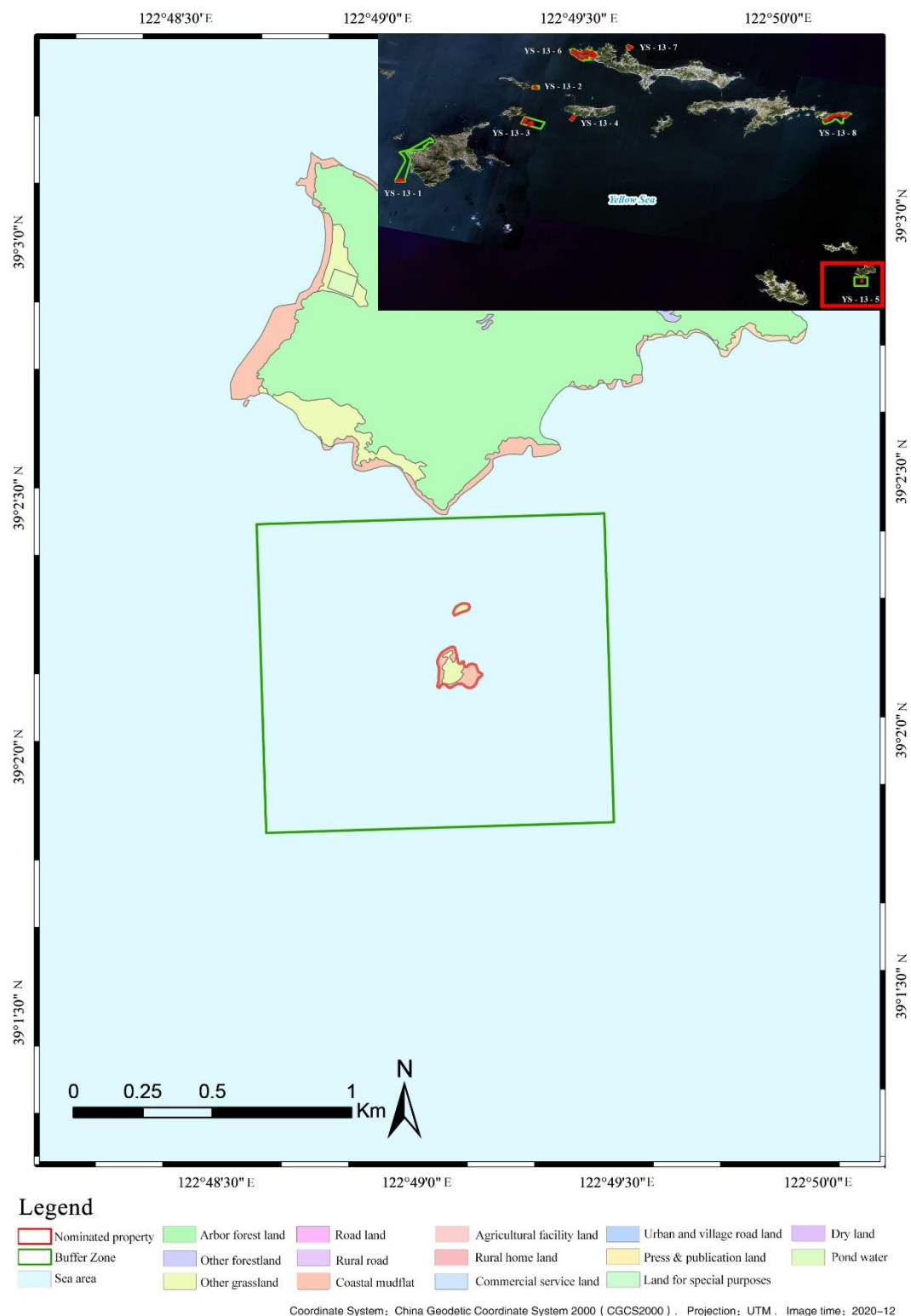


Figure 16 Land Uses of YS-13-5 Nominated Property, Buffer Zone and Surrounding Areas

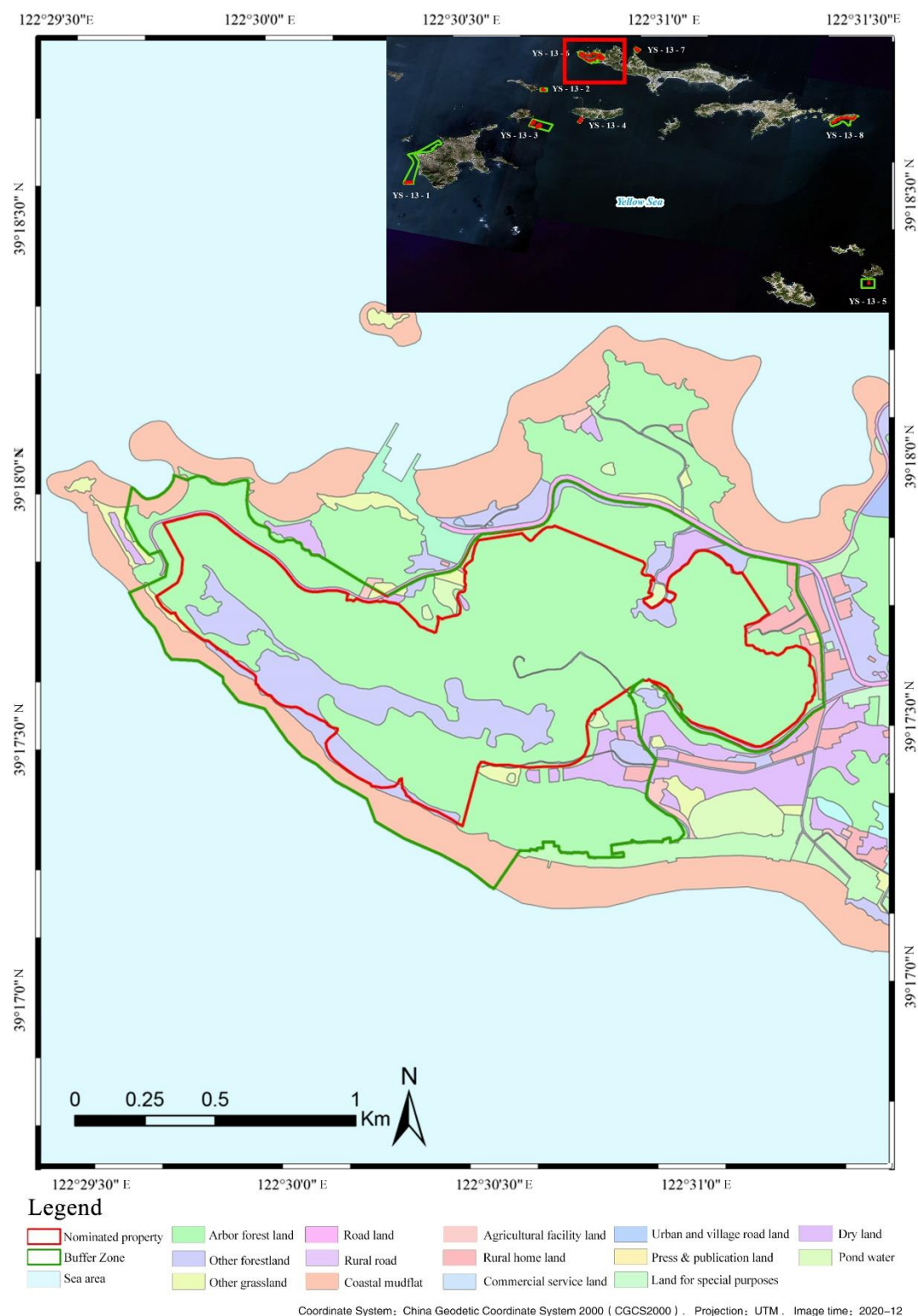


Figure 17 Land Uses of YS-13-6 Nominated Property, Buffer Zone and Surrounding Areas

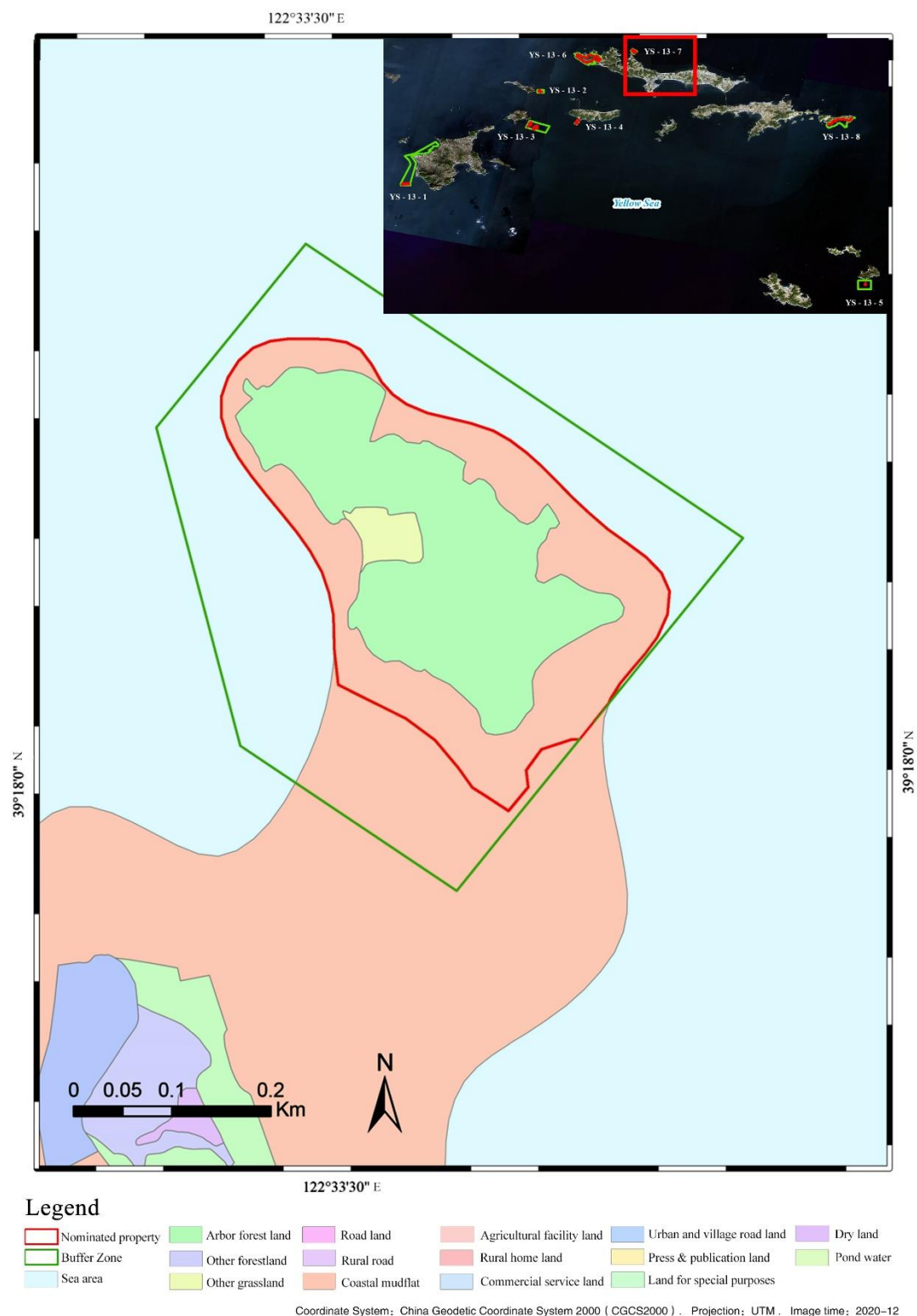


Figure 18 Land Uses of YS-13-7 Nominated Property, Buffer Zone and Surrounding Areas

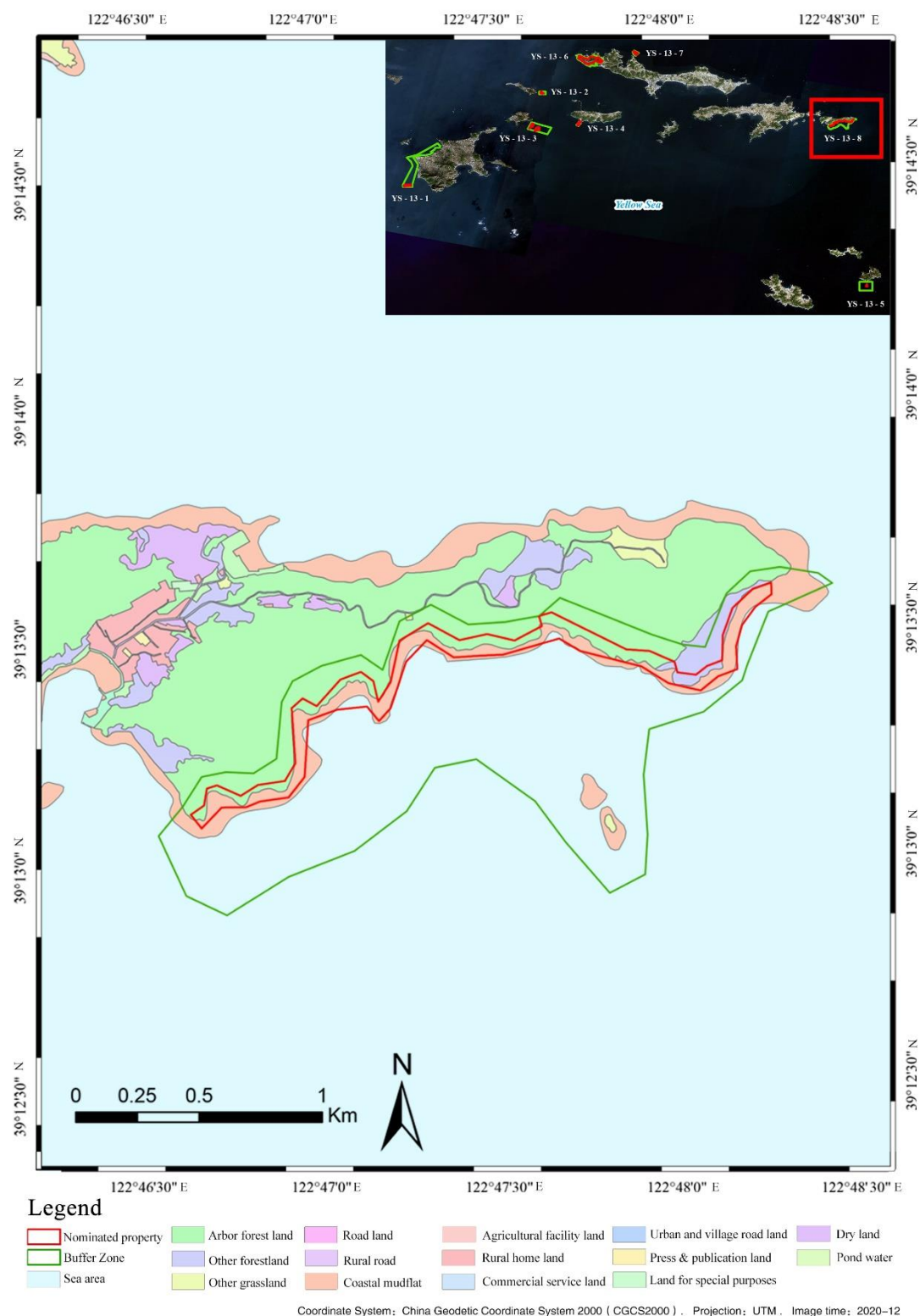


Figure 19 Land Uses of YS-13-8 Nominated Property, Buffer Zone and Surrounding Areas

6 Classified protection of OUV

6.1 OUV Elements of Migratory Bird Sanctuaries Along the Coast of Yellow Sea-Bohai Gulf of China

6.1.1 Migratory birds

The nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) provide key stopover, wintering and breeding sites for 45 threatened bird species on IUCN Red List, including five CR species, 12 EN species, and 28 VU species. As key areas of the EAAF, the nominated properties cover some crucial migratory bottleneck-type corridors (e.g., the coast of Bohai Gulf) or stepping stones, offering important seasonal habitats and migratory corridors to migratory birds including threatened species. Large populations of raptors gather at Snake Island - Laotieshan every autumn to cross the Bohai Strait. These populations can also be deemed as OUV elements of Migratory Bird Sanctuaries Along the Coast of Yellow Sea-Bohai Gulf of China.

The bird species of OUV include geese and ducks (Baer's Pochard, Whooper Swan, etc.), seabirds (Pelagic Cormorant, etc.), gulls (Relict Gull, Saunders's Gull, etc.), cranes (Siberian Crane, Red-crowned Crane, Hooded Crane), storks (Oriental Stork), shorebirds (Spoon-billed Sandpiper, Nordmann's Greenshank, Great Knot, Eastern Curlew, Red Knot, Curlew Sandpiper, Bar-tailed Godwit, Black-tailed Godwit, etc.),

Black-faced Spoonbill, Chinese Egret, and raptors (Golden Eagle, Osprey, White-tailed Sea Eagle, Bearded Vulture, Saker Falcon, Peregrine Falcon, Common Kestrel, etc.). The table below gives a brief summary of the OUV elements of the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). See Table 22 in the nomination text for details.

Table 10 OUV Elements of Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Classification of OUV Elements	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13
Cranes (Siberian Crane, Red-crowned Crane, Hooded Crane, etc.)	√	√	√		√	√	√	√			
Stork (Oriental Stork)		√	√			√	√				
Shorebirds	√	√		√			√	√		√	
Gulls (Relict Gull, Saunders's Gull, etc.)		√		√			√	√			
Geese and Ducks (Baer's Pochard, Whooper Swan, etc.)			√								
Chinese Egret									√		√
Black-faced Spoonbill	√										
Pelagic Cormorant											√
Raptors									√		

6.1.2 Habitat

The 11 nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), together with Phase I (two World Heritage sites in Yancheng), provide a diverse range of breeding, stopover and wintering sites for birds. Statistics show 13 land types within the nominated properties and buffer zones. Key components of all the nominated properties are water (freshwater/saltwater) areas, sea areas, and land for water conservancy facilities, including river waters, lake waters, reservoir waters, pond waters, coastal mudflats, inland tidal flats, ditches, and hydraulic facility construction land (see Chapter 5 for details). Among the foregoing land types, typical habitat types suitable for migratory birds include tidal flats (coastal mudflats/inland tidal flats), artificial waters (pond waters/reservoir waters/ditches), natural waters (lake waters/river waters), green spaces (grasslands/woodlands/garden plots), cultivated land, sea areas, and other types (reefs). The table below gives a brief summary of migratory bird habitat types at nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). See Chapter 5 Area-specific Protection of OUV Elements for detail.

Table 11 Migratory Bird Habitat Types at the Nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Habitat Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13	Remark
Tidal flats (coastal mudflats/inland tidal flats)	√	√		√	√	√	√	√	√	√	√	Tidal flats with their rich benthos resources provide energy sources for shorebirds, gulls, Chinese Egret, Black-faced Spoonbill, and some geese and ducks
Artificial waters (pond waters/reservoir waters/ditches)		√	√	√	√		√	√	√	√	√	Salt pans and shrimp ponds provide high-tide habitats for shorebirds, and stopover and feeding sites for gulls, geese and ducks; reservoir waters provide stopover and feeding sites for large waterfowls during their migration
Natural waters (pond waters/river waters)	√	√			√		√	√		√		Qilihai Lagoon provides stopover and feeding sites for large waterfowls during their migration, such as cranes, Oriental Stork, and geese and ducks; river waters provide roosting and feeding sites for gulls, geese and ducks
Green spaces (grasslands/woodlands/garden plots)		√			√	√	√		√	√	√	They provide roosting and feeding sites for raptors and other birds such as passerine birds
Farmlands					√		√		√	√	√	Farmland becomes a feeding area for cranes and geese after the autumn harvest
Sea areas	√	√		√		√		√	√	√		Sea areas continuously supply benthos to

Habitat Type	YS-3	YS-4	YS-5	YS-6	YS-7	YS-8	YS-9	YS-10	YS-11	YS-12	YS-13	Remark
												coastal mudflats as a crucial refueling site for birds using mudflats during their migration.
Others (reefs)												They are an important breeding area for Black-faced Spoonbill, Chinese Egret, and other sea birds

6.2 Area-specific Protection of OUV Elements

6.2.1 Migratory birds conservation

6.2.1.1 General conservation measures

The following general measures on the conservation of migratory birds should be implemented in all the nominated properties and buffer zones throughout the year:

1. It is strictly prohibited to hunt birds, destroy bird nests, collect bird eggs, catch birds, eat birds, or engage in bird trading, etc. in any way.

2. During the migratory seasons of birds, daily patrols should be intensified, and efforts should be made to control the quantity and intensity of human activities in accordance with laws and regulations to create a foraging and roosting environment for birds with the least disturbance.

3. During a bird breeding season, only personnel engaged in specific activities such as patrol, scientific research and monitoring, and environmental education are allowed in the breeding area. Such personnel should gain approval from the management agency to enter the area with staff from the management agency, and should guarantee not causing any negative impact on breeding birds in the area.

4. Scientific research, observation, and surveys on birds should be carried out, and scientific evaluation on the protection and management

effectiveness should be conducted; protection and management measures should be formulated and implemented to ensure that scientific research and monitoring activities cause no adverse effects on migratory birds. For example, the number of scientific researchers and monitors at Qilihai Lagoon (YS-7) should be no more than 20 each time. The approval of the local management agency is required for scientific research and monitoring and other activities in the nominated properties. And scientific research and monitoring plans and results should be submitted on time as the basis for sustainable management of the nominated properties..

5. The wild animal rescue mechanism should be improved. The facilities and capacity for bird rescue and epidemic source and disease monitoring should be built. Wild animal disease prevention and control should be performed.

6.2.1.2 Targeted conservation measures for migratory birds

6.2.1.2.1 Conservation measures for cranes

1. Special actions should be taken to protect the wintering areas and important stopover sites of cranes. For instance, crane wintering site protection project has been carried out at Yellow River Estuary (YS-4). During the wintering period of cranes in the Yellow River Delta from October each year to March next year, suitable farmland habitat for cranes should be expanded, food source areas for birds in winter should be

established, and habitat management should be enhanced. In the future, the protection and monitoring of other crane habitats (YS-3, YS-5, YS-7, YS-8, YS-9, YS-10, etc.) should also be strengthened.

2. Special science promotion and education should be intensified. For instance, as an important breeding area for cranes, Liao River Estuary (YS-10) has a small wetland museum for presenting the breeding process of cranes and disseminating the general scientific knowledge about wetland, with the aim of raising public awareness of conservation.

6.2.1.2.2 Conservation measures for storks (Oriental Stork)

Habitation conditions at breeding areas should be improved. For instance, a breeding area protection project for Oriental Stork has been carried out at Yellow River Estuary (YS-4). Artificial nests for Oriental Storks have been built, and conservation signs have been erected near their breeding area. In the future, similar actions should also be taken, if possible, for other habitats (YS-5, YS-8, YS-9, etc.).

Feeding conditions at stopover sites and wintering areas should be optimized. For instance, regular monitoring of benthos and water quality should be performed at Qilihai Lagoon (YS-7), while maintaining eco-aquaculture in existing shrimp ponds. For Shihenandao (YS-9), it is necessary to maintain complete aquatic life communities, and optimize the water level to ensure appropriate water depth as a habitat and feeding area for storks and that it will not dry up.

6.2.1.2.3 Conservation measures for shorebirds

1. Water level management of high-tide habitats should be improved to create ideal stopover and feeding conditions. For example, Nanpu (YS-6) will carry out micro topographical transformation to shrimp ponds and salt pans according to the habitat requirements of waterbirds, creating habitats with irregular gentle slopes and shallow beaches, manually cutting reed and weeds, and developing corresponding water level regulation programs.

2. Protection and sustainable use management of tidal flats as feeding sites should be strengthened, and close attention should be paid to the prevention of invasion of *Spartina alterniflora* Loisel. For instance, Nanpu (YS-6) should perpetuate the intensity of tidal flat aquaculture and harvesting of bivalves at or below the current level. Moreover, harvesting should not be carried at the area where shorebirds are feeding. Benthos such as snails, shellfish, and clam seeds should be appropriately thrown in to supplement food sources for in-transit migratory waterbirds.

See section 6.2.2.2 for details about conservation measures for above shorebirds habitats. In the future, the actions set out above should also be taken, if possible, for other habitats (YS-3, YS-4, YS-9, YS-10, YS-12, etc.) on an ongoing basis.

6.2.1.2.4 Conservation measures for gulls

1. Conditions for habitation in breeding areas should be optimized.

For instance, Yellow River Estuary (YS-4) should carry out a breeding area protection project for Saunders's Gull. A separating dam, diversion gate and connecting gate should be established at the north of the Yiqianer Management Station at Old Course (YS-4-1). A breeding island should be constructed, and the dam should be filled with water from the Yellow River to increase the cover degree of *Suaeda glauca*. Daming and associated construction should be carried out for the breeding area of Saunders's Gull at Dawenliu (YS-4-4).

2. Protection and sustainable use and management of tidal flats as feeding sites should be strengthened. The measures should be the same as those for shorebirds.

In the future, the actions set forth above should also be taken, if possible, for other habitats (YS-6, YS-10, etc.) on an ongoing basis.

6.2.1.2.5 Conservation measures for geese and ducks

1. Conditions for habitation in wintering areas should be optimized. For instance, Yellow River Estuary (YS-4) has established food source areas for birds and enhanced the management of swan habitats.

2. Habitation conditions in breeding areas should be improved. For instance, Nandagang (YS-5) should conduct wetland ecological restoration projects such as reed cutting. Reed swamps as bird habitats should be restored through reasonable harvesting and treatment of reed resources.

In the future, similar actions should be taken, if possible, for other

habitats.

6.2.1.2.6 Conservation measures for Chinese Egret, Black-faced Spoonbill, and Pelagic Cormorant

1. The entry of extraneous persons into the breeding reefs of Chinese Egret, Black-faced Spoonbill, and Pelagic Cormorant is strictly prohibited. In other words, entry into the nominated properties and buffer zones is strictly prohibited.

2. The protection of feeding areas should be stepped up to ensure the sufficiency and quality of feeding areas. For instance, Changshan Archipelago (YS-13) should enhance the conservation of feeding areas of rare bird species such as Chinese Egret, to ensure the sufficiency of feeding areas. Chemicals such as pesticides and fertilizers that can cause massive fish and shrimp deaths are strictly prohibited in the area.

3. Conservation work such as ecological restoration and scientific research and monitoring should be done. For instance, Chongming Dongtan (YS-3) has carried out habitat restoration projects and performs ongoing monitoring.

In the future, similar actions should be taken, if possible, for other habitats.

6.2.1.2.7 Conservation measures for raptors

Patrol and monitoring should be strengthened. Snake Island - Laotieshan (YS-11) has established a complete system for combating

illegal hunting and protecting patrol, consistently carried out regular patrols, and launched joint law enforcement with relevant departments, to curb poaching and other illegal acts. In the future, similar actions should be taken, if possible, for other habitats that serve as stopover sites for raptors.

6.2.2 Habitat conservation

6.2.2.1 General conservation measures

The following general measures on the conservation of bird habitats should be implemented in all the nominated properties and buffer zones throughout the year:

1. The area and quality of various types of critical bird habitat within the nominated properties and buffer zones should remain stable or be increased.

2. It is strictly prohibited to arbitrarily harvest resources as food of rare and endangered birds, and benthos, fish, shellfish and other aquatic resources that waterbirds depend on. Administrative enforcement of laws and supervision and management should be carried out to crack down on illegal fishing.

3. Scientific research, observation and survey activities on bird habitat should be carried out, and scientific evaluation of the protection and

management effectiveness should be conducted. Efforts should be made to maintain the biodiversity, protect flora and benthos, and carry out biodiversity monitoring and scientific research programs.

4. Routine patrols and key patrols of critical bird habitats within each nominated property should be conducted along the prescribed routes and in the established ways, and illegal activities should be curbed in time.

5. Bird habitat protection should be ramped up, and degraded habitats should be restored. Scientific measures should be implemented to assess and repair ecological environment with degraded ecosystem that is unfavorable to bird inhabitation. Restoration of degraded habitats should be mainly based on natural restoration and supplemented by artificial restoration.

6. In the nominated properties, ecotourism activities can be carried out with the approval of competent departments, but the number of tourists should be restricted and the activities of tourists should be well-controlled.

7. Infrastructure should be built and improved for the purpose of bird and habitat protection, including constructing management and protection facilities, installing patrol and monitoring equipment, and developing related digitalization and information system. Scientific analysis and environmental impact assessment should be conducted before commencing any necessary construction projects, the original environment should not be damaged, and the migratory and breeding seasons of birds

should be avoided.

8. If farming activities exist in the nominated properties, buffer zones, or surrounding areas, owners should be encouraged and guided to carry out ecological farming, and are not permitted to engage in polluting industries, illegal exploitation of natural resources. Ecological compensation mechanism should be improved.

9. Projects on restoring aquafarms and farmlands to mudflats and wetlands should be fully implemented for the protected areas where the nominated properties are located, in accordance with the law and regulations. Scientific evaluation and restoration should be conducted in these areas.

10. No unreasonable renovation or construction projects are permitted within the nominated properties. Construction activities such as artificial land reclamation, oil and gas exploitation, wind and photovoltaic power generation projects, agricultural development, urban and rural construction, and port construction that can harm the ecosystem and landscape are strictly prohibited within nominated properties. Illegal buildings should be banned and demolished in accordance with relevant laws and regulations.

11. Discharge of pollutants in and around nominated properties and buffer zones is strictly prohibited.

12. The demarcation and delimitation project should be improved, including boundary pillars, signage, warning signs, and promotional signs.

13. In addition, tourist protection and management measures that suit the local conditions should be formulated according to the utilization status by migratory birds in different areas and habitats in each nominated property, as well as the attributes and management requirements of natural protected areas where the nominated properties are located. For example, at Nanpu (YS-6), tourists and vehicles are not allowed in the high-tide habitats on the north side of the salt pan area during the bird migration season; traffic checkpoints should be set up on the seawall to control access of personnel and minimize human interference; at the same time, it should be stipulated that the tourist density of bird watching or bird filming on the seawall should not exceed 0.3 person/meter, which is 300 people. At Qilihai Lagoon (YS-7), during the migratory seasons of spring and autumn (March 1st to May 31st, August 15th to November 15th), cars on the Binhai New Road section on the north side of the nominated property and the motor vehicle road section on the east side are not allowed to honk.

6.2.2.2 Targeted Conservation Measures for Habitats

6.2.2.2.1 Conservation measures for tidal flats (coastal mudflats/inland tidal flats)

1. The open landscapes of tidal flats should be maintained. *Spartina alterniflora* Loisel. should be monitored and eradicated in time (See section 7.2.2 for control measures), after which ecological restoration and

optimization projects should be implemented.

2. For the tidal flats within the nominated properties, the existing traditional practices and resource utilization intensity should be strictly maintained, and the ceiling of harvesting volume at tidal flats should be set. For example, at Nanpu (YS-6), the number of persons harvesting on tidal flats in a single day should not exceed 30. In addition, harvesting should not be carried out at the area where shorebirds are feeding, to ensure that the number of shorebirds stays at 50,000-100,000 during their spring and autumn transient peaks and that the population of wintering Relict Gull does not decrease. At Shihenandao (YS-9), shellfish harvesting on tidal flats should be effectively managed, Shellfish harvesting is prohibited during the closed fishing season and in spring (March to May) and autumn (August to November) of each year, and the harvest volume should not exceed the current volume allowed.

3. Enclosed fences should be installed in nominated properties that are small in size but particularly important for stopover of migratory birds. For instance, the boundaries of the nominated property and buffer zone of Dachaoping have been enclosed by 5.2-km-long fences to prohibit visitors from entering the nominated property.

4. Benthos should be appropriately thrown in to supplement food sources for in-transit migratory waterbirds. For the tidal flats where the number of benthos has fluctuated greatly in recent years, partial wetland

restoration project should be implemented with increase in the siltation area and the number of shellfish, clams and crabs at them. For instance, Liao River Estuary (YS-10) has carried out a wetland restoration project.

6.2.2.2.2 Conservation measures for artificial waters (pond waters/reservoir waters/ditches)

1. Salt pans provide high-tide habitats, feeding sites or breeding sites for some migratory birds. Microtopographical transformation or water level control of existing salt ponds should be carried out based on the habitat requirements of waterbirds.

For example, the following measures should be taken for the landform transformation and salt pan water level adjustment at Nanpu (YS-6): (1) Landform transformation: The landform of the key bird nesting area in the regulating pond of salt pan should be transformed to create a suitable breeding area for shorebirds. The steep water bank should be transformed into a gentle slope at an angle below 1:10 and a width no less than 30 m. The area of island in waters above normal water level should at least be 1,000 m², with a gentle slope on revetment below 1:10. The area of island above the flood level in this nesting area should be at least 200 m². (2) Adjustment of salt pan water level: The salt pan water level should be adjusted using sluice, to control the fast-rising water level in the rainy season, protect the nesting area of breeding birds, keep the water in this area at a depth of no more than 20cm, and provide a high-tide habitat for

shorebirds during their migratory season. Personnel should be assigned to be responsible for water level regulation in bird breeding and migratory seasons and rainy seasons. In particular, in migratory seasons (from late March to early June, and early August to late September, especially early May to early June for Red Knot), the water depth of 20% of the salt pan should be kept below 10cm.

2. Ecological aquaculture should be practiced in reservoirs to reserve a certain portion of feeding areas in shallow waters for migrating and overwintering birds.

3. Breeding ponds should retain a reasonable breeding density and the water level should be controlled for the foraging of migratory birds during the migratory seasons. Water-level regulation measures should be the same as salt pans.

4. Pond waters should be always be dominated by freshwater, with intact aquatic organism communities.

6.2.2.2.3 Conservation measures for natural waters (pond waters/reservoir waters/ditches)

1. The water quality in the upper reaches of rivers and lakes should be monitored. Sewage and agricultural wastewater should be treated to meet the standards before discharging into rivers. The complete aquatic communities of rivers the smooth water flow should be protected. Good and continuous water sources should be guaranteed for the nominated

properties. Various comprehensive measures should be taken to ensure that the surface water entering the nominated properties meets local and national standards.

2. Water quality at estuaries should be monitored, and dredging and desilting works should be done. It is forbidden to further narrow the tidal channel of an estuary, or build transverse barrages that hinder water exchange above or below the water surface in the tidal channel.

3. Fishing vessels are not permitted to pass the natural waters within the nominated properties and buffer zones during the closed fishing season, and vessels for other used should not be allowed to traverse these waters. For example, no boats are permitted at Shihenandao except for boats for heritage presentation and fishing of the surrounding villages. Fishing boats are not allowed in this area during the closed fishing season.

4. For the wetland, where freshwater must be maintained within the nominated properties and buffer zones to protect specific birds, water recharge and diversion projects can be implemented. For instance, diversion pipelines have been installed at Shihenandao (YS-9) to divert fresh water to the freshwater wetland on the island.

5. The existing vegetation, geographic features of wetland and shallow water depth of swamps should be perpetuated. For example, at Shihenandao (YS-9), it is necessary to maintain the existing lower-than-0.5m water areas of the shallow-water wetlands to provide habitats for

shorebirds, cranes, etc., and ensure that the wetlands will not dry up.

6. Benthos in natural waters are an important food source for migratory birds, so scientific measures should be implemented to ensure sufficient and stable benthos biomass. For example, at Qilihai Lagoon (YS-7), regular monitoring of benthos and water quality of the lagoon is required, especially at the junction of the tidal channel at the nascent estuary and the lagoon. Emergency management measures, such as releasing baby benthos in time, should be adopted when the biomass has dropped notably.

7. For waters within the nominated properties and buffer zones that must be restored to open surface and natural tidal dynamics to protect specific birds and maintain habitat landscapes, natural ecological restoration should be done as per laws and regulations by gradually restoring artificial waters (e.g. breeding ponds) to natural habitats. For instance, the comprehensive environmental governance project has been carried out at Qilihai Lagoon (YS-7) to restore the ecological process in the lagoon and recover the natural lagoon area totaling 2.2 km², expanding the habitat for rare and endangered birds. The existing lagoons and lakeshore flats that have been restored must not be turned into shrimp ponds. The area of the existing waters should be enlarged, and the existing shrimp ponds should be restored to lagoons. No more woody plants should be planted in the lagoon, the seedlings of woody plants in the area should

be cleared, and the current open and gentle slope flats should be perpetuated.

6.2.2.2.4 Conservation measures for green spaces (grasslands/woodlands/garden plots)

1. Chemicals with shorter residual time should be used for pest control in green spaces. The use of biological control should be actively promoted to avoid and reduce water pollution.

2. Patrols should be carried out to prevent fires during fire-prone seasons such as fall and winter (see section 7.3.5 for specific risk management measures).

3. The natural state of understory in forest should be perpetuated. Tending and cutting weak trees in planted protective forests should be conducted regularly. For example, at Shihenandao (YS-9), the quality of arbor forests should be assessed, and weak plants with DBH less than 5cm should be cut down and not be planted again. The natural state of woodland should be maintained, and litter and sprouting seedlings under the forest should not be cleared.

4. Open habitats in grasslands should be perpetuated. Herbaceous plants in grasslands should be kept dominant.

6.2.2.2.5 Conservation measures for farmlands

The farming area in existing basic farmlands and general farmlands should be maintained. Part of crops should be reserved for birds during

migratory seasons and in winter, and food may be manually provided for birds if necessary.

6.2.2.2.6 Conservation measures for sea areas

1. Sea areas continuously provide benthos to coastal mudflats as crucial refueling areas for birds using mudflats during their migration. Trawling is not permitted, and the intensity of mariculture should be perpetuated or gradually reduced.

2. During bird migration seasons, the number of ships in the sea areas of the nominated properties should be controlled.

3. The sea areas of the nominated properties should be patrolled along the designated route within the specified period, in a manner that causes as little negative impact as possible on the protected objects.

4. The discharge of pollutants and waste into the sea should be controlled strictly. Plans responding to emergency pollution events should be prepared.

5. For possible marine ecological disasters, environmental monitoring capacity should be built and early warning mechanism should be established. For example, for Qilihai Lagoon (YS-7), Dachaoping (YS-8), and Shihenandao (YS-9), an ecological environment monitoring system for Qinhuangdao coastal waters should be established, and environmental monitoring capacity should be built (see section 7.3.2).

6.2.2.2.7 Conservation measures for other habitats (reefs)

Reefs are important breeding sites for seabirds, and any unauthorized entry of people is strictly prohibited. For the conservation measures in the sea areas around reefs, see the preceding section.

7 Solutions to Main Threats and Pressures

7.1 Solutions to Development Pressures

There are no development pressures within the scope of the nominated properties. Activities such as agriculture, aquaculture, construction, etc. exist around the nominated properties, and have caused no significant adverse effects and obvious threats to the existing migratory bird habitats. But is necessary for the protection and management agencies of the nominated properties to conduct monitoring and hold regular meetings with constructors regarding the above-mentioned activities to eliminate potential threats in time. Nanpu (YS-6) and Qilihai Lagoon (YS-7) are facing pressures from external aquaculture and/or industrial development. Liao River Estuary (YS-10), Snake Island-Laotieshan (YS-11), Yalujiang Estuary (YS-12), and Changshan Archipelago (YS-13) are under pressures from external production and construction activities. Solutions to the foregoing pressures are set out below.

7.1.1 Solutions to aquacultural pressures

The nominated properties experiencing pressures from aquaculture are Nanpu (YS-6) and Qilihai Lagoon (YS-7). The conditions of the nominated properties and specific solutions are set out below:

Traditional clam harvesting has not yet been able to notably affect the

migratory birds in Nanpu (YS-6). In the future, if the demand for seafood in the local market increases in line with the increase in the popularity of the nominated property as well as local social and economic development, there will be still a critical need to strictly preserve the existing traditional ways of exploiting shellfish resources on the tidal flat without hurting migratory birds. The specific solutions include (1) strictly maintaining the existing traditional model and utilization intensity; (2) setting the upper control limit based on the existing harvesting volume to make sure that the future utilization intensity does not exceed the current level. The current harvesting volume at the nominated property and buffer zone: 30 persons/day, average 180 kilograms/person/day. Besides, the operation time at tidal flat should not be the peak time of migration. For the aquaculture in the nominated properties and buffer zones, sustainable aquaculture certification can be adopted to increase the per-unit income for communities, or management agencies and owners can sign co-management agreements to achieve a win-win situation for both humans and birds.

Ponds for shrimp farming at Qilihai Lagoon (YS-7) are habitats for rare and endangered birds. The specific solutions are as follows. The existing lagoons and lakeshore flats that have been restored should not be turned into shrimp ponds in the future. For existing shrimp ponds, eco-aquaculture should be adopted, and the use of anti-biological agents should

be diminished. Ecological compensation should be applied to ecological shrimp ponds.

7.1.2 Solutions to industrial pressures

The nominated property experiencing pressures from industry is Nanpu (YS-6). The conditions of the nominated property and the specific solutions are set out below:

Industrial pressures faced by Nanpu (YS-6) primarily come from salt pond production and oil exploitation. The industrial activities inside and outside the nominated property have no significant impact on local migratory birds at present. Solutions to the potential threats to migratory birds caused by salt pond production and oil exploitation in the future include: (1) strengthening communication and exchanges with relevant production units regarding ecological protection, enhancing and effectively implementing production safety accountability measures, and formulating emergency plans to cope with emergencies; (2) urging producers to shoulder their corporate social responsibilities in heritage protection, and improving procedures for safe operation and environmentally-friendly production and operation; (3) ramping up bird monitoring in production areas, to gain information on the species and numbers of birds that breed, migrate, or overwinter in the surrounding areas, and designing scientific research projects and monitoring projects on breeding birds and their nests

in the production areas, and including these projects in the annual budget.

7.1.3 Solutions to pressures from production and construction activities

Nominated properties facing pressures from production and construction activities are Liao River Estuary (YS-10), Snake Island - Laotieshan (YS-11), Yalujiang Estuary (YS-12), and Changshan Archipelago (YS-13). The conditions of each nominated property and the specific solutions are set out below:

There are potential disturbances from oil pipelines at the Liao River Estuary (YS-10). The solutions include: (1) preparing conservation and management plans for the nominated property and buffer zone and enhancing the supervision over implementation thereof; (2) Determining the areas, scales and methods for sustainable oil exploitation, assessing environmental impact, and carrying out sustainable oil exploitation without affecting the ecological system of the nominated property.

For the possible future threats caused by agricultural production and housing construction at Snake Island - Laotieshan (YS-11), the solutions include: (1) formulating plans for community development and construction at the buffer zone; clarifying the land boundaries for community construction; managing village construction activities in strict accordance with statutory plans; relocating residents at the buffer zone and

diminishing the utilization intensity of land there through land transfer and production subsidy, etc. (2) developing a sound community involvement system; urging residents to love and protect birds; encouraging the communities to get involved in heritage protection; (3) guiding community-based industries toward sustainable development; spurring the development of ecological agriculture and ecotourism; prohibiting polluting industries and the use of hazardous pesticides and fertilizers; ensuring that production activities meet pollution and noise control standards of Dalian City; rejecting the access of industries that fail to meet the standards; (4) evaluating the impact of existing planting and breeding approaches on bird activities, and improving the ecological compensation mechanism.

Main solutions to the pressures from production and construction activities at Yalujiang Estuary (YS-12) include: (1) Preparing conservation and management plans for the nominated property and buffer zone and strengthening supervision over implementation thereof; (2) developing eco-aquaculture in the buffer zone and reducing pollution caused by aquaculture; (3) properly managing port planning and construction and prohibiting port construction and expansion inside the nominated property and buffer zone.

The sea area of Changshan Archipelago (YS-13) is a traditional production area for island residents, and it is still impossible to completely

restrict the access of aquaculture vessels to the nominated property. It is necessary to carefully assess the pressure that fishery activities in the sea around the nominated property may exert on the nominated property. In this regard, the effects of the aquaculture waters and fishing boats in the buffer zone on bird habitats and the ecological environment should be scientifically evaluated. On the one hand, it is necessary to strike a balance between tourism and scientific research and protection in the nature reserve by controlling illegal aquaculture and the development and utilization of marine energy, and to strictly control tourism in islands pursuant to relevant laws and regulations. On the other hand, partitioned management should be exercised, with priority to nominated property protection, and moderate eco-aquaculture and fishery in the buffer zone are allowed.

7.2 Solutions to Environmental Pressures

The nominated properties are principally faced with such environmental pressures as climate change, invasive alien species, freshwater resources and sedimentary process. Climate change and invasive alien species are common environmental pressures for the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). The upstream water conservancy facilities can affect the freshwater and the sediment transport of the coastal nominated properties, which would lead to potential environmental

pressures. Solutions to the foregoing pressures are set out below.

7.2.1 Solutions to climate change

The nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are all located in the areas highly exposed to climate change. Storm tides or cold waves increase in frequency and intensity due to global warming. This is the common pressure for migratory bird habitats in the coastal areas. The **general solutions** applicable to all nominated properties **include**: improving the eco-environmental monitoring system; carrying out routine monitoring; consulting local managers and experts at nominated properties; collecting meteorological data for analysis; developing emergency plans to give early warnings of meteorological disasters and put forward targeted mitigation measures. Please refer to section 7.1 for management measures of different meteorological disasters caused by climate change.

Based on the special conditions of Nanpu (YS-6), Snake Island - Laotieshan (YS-11), Yalujiang Estuary (YS-12), and Changshan Archipelago (YS-13), the following **specific solutions are** additionally set out:

Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6): The major impact of storm tides on the OUV of the nominated property is manifested as reducing the survival rate of the

first brood of young birds. It is late in the season when the second brood of young birds was born, and their survival rate drops accordingly. The solutions include improving water level regulation mechanism for habitat, optimizing the microtopography of breeding area, providing safe nesting area for breeding birds, and giving the birds shelter during the rainy season when water level rises. When the population of benthos and other animals as bird food decreases sharply due to extreme climate events, as revealed by monitoring results, the young of such animals can be released into suitable waters to supply diverse food to breeding birds and improve the survival rate of the first brood of young birds.

Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11) and Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13): Due to global climate change and sea level rise, the low-lying lands and tidal flats will be gradually submerged by sea water, while the intensity of seawater intrusion will increase to aggravate coastal erosion. To address this threat, ecological restoration efforts should be made in the buffer zone. The ecological restoration plan for the buffer zone is based on the *Convention on Biological Diversity*, *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, *Wild Animal Conservation Law of the People's Republic of China*, *Regulations of the People's Republic of China on Nature Reserves*, *Wetland Conservation and Restoration System Plan*,

Overall Plan for Ecological Civilization Construction, and other conventions, laws, regulations and documents. The plan should conform to the basic principles of ecological civilization construction (i.e., respecting nature, following its ways and restoring it), in a bid to perpetuate the stability of rare bird populations and protect wetland ecosystem. The aim is to develop bird habitats and bird food resources, with a focus on restoring the evolutionary tide/tidal creeks at the coastal wetlands.

Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12): The solutions include (1) carrying out ecological restoration projects, especially for reed swamps in the Dayang River Area, to maintain the stability of rare bird population and to protect the wetland ecosystem; (2) conducting ongoing monitoring of migratory bird habitats, bioecological monitoring and natural disaster monitoring; (3) taking actions to ensure sufficient food for wintering birds, such as preventing massive death of benthos due to extreme cold weather.

7.2.2 Solutions to invasive alien species

The invasive alien species at the nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are dominated by *Spartina alterniflora* Loisel. Since the introduction of *Spartina alterniflora* Loisel. into the Yangtze River Delta in 1979, it has colonized China's coastal areas from Liaoning to Hainan. The general

solutions to the threat posed by *Spartina alterniflora* Loisel. **that are** applicable to all nominated properties include (1) strengthening bird habitat restoration and improvement projects with a focus on controlling *Spartina alterniflora* Loisel.; eliminating the *Spartina alterniflora* Loisel. communities using chemical control (such as haloxyfop - R - methyl) and physical control to prevent the risk of recurrence and the degradation of ecosystem function. (2) studying the long-term control techniques and mechanisms of *Spartina alterniflora* Loisel., and conducting ongoing monitoring and research on the impact of water quality change and ecosystem change as a result of the decrease in benthonic organisms after project construction. (3) strengthening cooperation with other parties in *Spartina alterniflora* Loisel. control, to achieve the goal of threat elimination through systematic ecological restoration efforts.

The foregoing solutions are completely applicable to Chongming Dongtan (YS-3). For Yellow River Estuary (YS-4) and Nanpu (YS-6), the specific solutions to the threat posed by *Spartina alterniflora* Loisel. are set out on the basis of their **specific conditions**:

Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4): On top of the *Spartina alterniflora* Loisel. control efforts of the administration committee of the nature reserve, cutting and damming in key areas will be continuously performed to control the invasive species in North Part of the Yellow River Estuary (YS-

4-2) and South Part of the Yellow River Estuary (YS-4-3). A plan has been developed to control 300 ha of *Spartina alterniflora* Loisel.

In the area where *Suaeda glauca* is to be restored, ecological restoration will be carried out through micro microtopography shaping, plowing, ridge supporting, ditch shaping, biological grille, and mudflat lowering and other technologies. The harvested seeds or seed products of *Suaeda glauca* will be sown within the microtopography. When the external environment conditions become favorable, local species, such as *Suaeda glauca*, will be effectively restored. A plan has been developed to restore 4,000 ha of *Suaeda glauca* at nominated property, and it will be implemented in five years.



Figure 20 Semi- and Fully-Enclosure Techniques for *Spartina alterniflora* Loisel. Control
(Source: Feasibility Study Report on Comprehensive Coastal Wetland Restoration Project of Shandong Yellow River Delta National Nature Reserve)

Hebei Province (YS-6): Thanks to two consecutive years of ecological restoration through chemical control (such as haloxyfop - R - methyl) and physical control, *Spartina alterniflora* Loisel. in their original growing areas has almost disappeared. However, the risk of reoccurrence exists, which requires that long-term and sustained prevention and control measures. The solutions are as follows. The control of the invasive *Spartina alterniflora* Loisel. should be performed within 20m from the offshore side of the seawall. Physical control should be primarily adopted, while the herbicide (effective ingredient: haloxyfop-R-methyl) produced by Dow Agrosiences should be used as a supplementary method. If specific control measures include a large-scale mechanical operation plan, it is necessary to consult experts in related fields or authoritative technical assessment agencies first. Only when it is concluded that the project implementation has little or no impact on the property's OUV can the measures be implemented.

7.2.3 Solutions to pressures from freshwater resources and sedimentary process

Due to the construction of water conservancy facilities in the upper reaches of the river, the hydrological and sedimentary processes of freshwater at the nominated properties are different from the natural state. The nominated properties lack freshwater resources because of seasonal

factors or poor water quality, or suffer from local land subsidence or coastline erosion (YS-3, YS-4, YS-7, YS-8, YS-9, YS-10, and YS-12). For the pressures from freshwater resources and sedimentary process, **the general solutions** applicable to all nominated properties **include (1)** carrying out real-time water monitoring; (2) implementing water diversion project to alleviate regional water shortage; (3) supporting and guiding ecological aquaculture, reducing water environmental pollution, conducting centralized treatment of production wastewater before discharge to protect the aquatic ecosystem.

Based on the special conditions of Chongming Dongtan (YS-3), Yellow River Estuary (YS-4), Nandagang (YS-5), Qilihai Lagoon (YS-7), Dachaoping (YS-8), Shihenandao (YS-9), and Liao River Estuary (YS-10), **the specific solutions are** set out below:

Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3): Attention should be paid to any changes in the tidal flat. Once the migratory bird habitat changes, the scopes of the nominated property and buffer zone should be modified accordingly.

Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4): It is facing pressures of coastal erosion and water yield reduction. Solutions to coastal erosion: (1) There is a plan to construct an oyster reef coastline of 500 ha at Old Course (YS-4-1) and Dawenliu (YS-4-4) that are undergoing severe coastal erosion, and it will

be implemented in 15 years. (2) There is a plan to maintain and upgrade the damaged parts of the two dams on the north side of Old Course (YS-4-1) and the southeast side of Dawenliu (YS-4-4) in three years, with a total length of 27.2 km, to curb the further expansion of coastal erosion and protect the neonatal wetland ecosystem.

Solutions to water yield reduction: There is a plan to implement a water replenishment project at Old Course (YS-4-1) and Dawenliu (YS-4-4), with an annual water supply of 3 million m³, covering a wetland area of about 600 ha. Based on the experience of wetland conservation in the Yellow River Delta, 1.6 million m³ of water will be supplied from April to June and 1.4 million m³ from July to October.

Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5): (1) Water system dredging: On the basis of the existing resources, hydrological conditions, geomorphic features of the World Heritage Site, the original water channel will be connected with the new water system through water system dredging, new wetland water system will be constructed, and various water environments will be created such as water channel, water surface and swamp. Combined with microtopography created by the excavated earthwork, it can meet the growth conditions of different wetland plants. (2) Water diversion project: Upon the completion of construction of the wetland water system, it is necessary to conduct water diversion project and introduce enough

ecological water to create aquatic environments of varying depths, to ensure the smooth implementation of subsequent wetland vegetation restoration projects, facilitate the formation of wetland ecosystems and form diverse bird habitats.

Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7): The solutions include prohibiting actions to further narrow the tidal channel of new estuary, and prohibiting building of transverse barrages that hinder water exchange in the tidal channel and above or below the water surface. Freshwater diversion measures should be implemented to alleviate the regional issue of freshwater shortage, and centralized wastewater treatment should be carried out in centralized construction area before discharge.

Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8): Regional water diversion should be carried out to alleviate regional water shortage. The People's Government of Beidaihe District has completed the project on diverting Daihe River into Xinhe River and launched the project of Xinhe River Wetland treatment. Centralized wastewater treatment should be carried out in centralized construction areas before discharge. Centralized treatment of production wastewater should be performed in agricultural areas before discharge. Efforts should be stepped up to improve water ecosystem inside and

outside the wetland park in the upper reaches of the river at Dachaoping, and the water security of Dachaoping should be guaranteed by ecological means. In addition, the impact of rubber dam on the sedimentary process should be studied, and the height of the dam should be reduced in combination with flood discharge needs to allow more sediments to occur at Dachaoping.

Migratory Bird Habitat at Shiheandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9): Regional water diversion should be carried out to alleviate regional water shortage. The water diversion pipelines should be installed to divert water from the upstream Shihe River to Shiheandao to replenish freshwater at the nominated property. Hydraulic facilities and artificial islands built around the nominated property and the buffer zone may cause accumulation of mud at Shihe River Estuary, which will affect the convergence of brackish and fresh water at the estuary over time. Therefore, it is necessary to regularly remove the estuarine mud accumulating as a result of the construction of hydraulic facilities and artificial islands.

Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10): The solutions include (1) conducting environmental monitoring of the nominated property and buffer zone; (2) encouraging residents to develop eco-aquaculture and reduce environmental pollution; (3) restoring and expanding the bird habitats.

7.3 Measures to Address Natural Disaster Risks

It has been learned through consultation with local regulators and experts and collection of meteorological data for analysis that the nominated properties suffer from natural disasters arising out of meteorological conditions, such as typhoons (storm tides), cold waves, sea ice, hails, rainstorms, droughts and floods. Since the nominated properties extend over thousands of kilometers from north to south, meteorological disasters vary from site to site. For example, the southern part of Yellow Sea is prone to typhoon, while the northern area of Bohai Gulf is vulnerable to sea ice. In addition, some nominated properties are affected by marine ecological disasters like red tides and green tides.

Besides climate changes, biological disasters (primarily invasive alien species, followed by insect pests, locusts and rodents) are prevailing environmental risks in the nominated properties of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). Moreover, geological hazards and fires are also common types of disaster risks in some nominated properties.

For different types of disaster risks, management measures have been put in place to address the adverse effects of disaster risks on the OUV of the nominated properties.

Table 12 Statistics of Disaster Risks in the Nominated Properties

Nominated Property	Meteorological disasters	Marine ecological disasters	Biological disasters	Geological disasters	Fire
YS-3	√		√	√	
YS-4	√		√		
YS-5	√		√	√	√
YS-6	√				
YS-7	√	√		√	
YS-8	√	√			
YS-9	√	√			
YS-10	√			√	
YS-11	√		√		√
YS-12	√				
YS-13	√		√		

7.3.1 Meteorological disasters

The nominated property is located in the areas of high exposure to climate change. Under the pressure of climate change, meteorological disaster is a common disaster risk type faced by the nominated properties, primarily including storm tide (involving all components), cold wave (involving YS-3, YS-5, YS-10, YS-12, YS-13), and severe floods and droughts (involving YS-5, YS-9, YS-10, YS-11, YS-12, YS-13), etc. To address the pressure of meteorological disasters, the proposed general solutions applicable to all nominated properties include: improving the ecological and environmental monitoring system; carrying out routine monitoring; consulting with local managers and experts at nominated properties; collecting meteorological data for analysis; formulating emergency plans to give early warnings of meteorological disasters and put

forward targeted mitigation measures.

More detailed solutions are set out for different types of disasters:

Solutions to storm tides (typhoons)/cold waves:

(1) Disastrous weather monitoring and forecast organizations should be set up together with meteorological administration, responsible for monitoring the development dynamics of disastrous weathers.

(2) With a clear understanding of the wetland protection and restoration facilities within the nominated property that could be impacted, the heritage management agency should put in place response measures.

(3) Strong facilities with sufficient life supplies and necessary emergency supplies should be built.

(4) The nominated property should be managed together with the environmental protection department. Each nominated property should have an emergency response plan according to its actual situations, which should specify area-specific management, the responsible persons, emergency personnel, and management scope and responsibilities. The responsible agencies should exercise effective leadership, allocate adequate personnel, make meticulous arrangements, provide reliable and feasible guarantees, and build sturdy and complete facilities, so that life safety can be guaranteed and property losses can be minimized in the event of disasters.

Measures to deal with major floods and droughts:

(1) Organizations should be set up responsible for ongoing monitoring of major floods and droughts as well as monitoring of water and weather conditions.

(2) Effective emergency measures should be taken against various major floods and droughts.

(3) Ecological water replenishment or drainage measures should be initiated.

(4) Cooperation should be established with relevant departments.

7.3.2 Marine ecological disasters

Qinhuangdao is prone to marine ecological disasters, including red tides and green tides, and such disasters involve Qilihai Lagoon (YS-7), Dachaoping (YS-8), and Shihenandao (YS-9). **Measures to deal with marine ecological disasters are:**

(1) An eco-environmental monitoring system for coastal waters should be set up to enhance environmental monitoring. Environmental monitoring buoys should be placed at the river estuary and in the offshore areas; base stations should be set up at the river estuary; shoreline oil pollution should be prevented and controlled; red tide/green tide monitoring and emergency elimination should be carried out; and beach profiles should be established for ongoing monitoring.

(2) A disaster warning and emergency command management

system should be established to enhance emergency response capabilities.

(3) Domestic sewage discharged from the area in the upper reaches of the river of the nominated property and buffer zone should be collected and treated by the sewage treatment plant before being discharged in compliance with the Grade A standard of effluent quality.

(4) Based on the scientific assessment of ecological status, marine ecological protection and restoration projects should be launched to restore marine ecological functions and enhance the ecological stability of offshore coastal zones.

7.3.3 Biological disasters

The nominated properties are vulnerable to varying types of biological disasters, including invasive alien species (YS-3, YS-4, YS-6), insect pests (YS-3, YS-4, YS-5, YS-13), rat plagues (YS-13), wild animal diseases (YS-3), etc. **The general solutions** to deal with biological disasters applicable to all nominated properties **include**:

(1) Corresponding disaster emergency plans and prevention measures should be formulated;

(2) Daily monitoring and management work should be carried out, and the monitoring of key areas should be strengthened;

(3) When the disaster occurs, immediate response should be taken to minimize the scope of impact;

(4) In terms of insect pests, the prevention and control of plant diseases and insect pests, and maintenance supervision of wetland plants should be strengthened. Prevention, control and early warning of large-scale plant diseases in the area should be carried out. Ecological methods are encouraged for plant diseases and insect pests control;

(5) For locust plagues, rodents, and wild animal diseases, timely communication with forestry authorities for joint prevention and control should be conducted while ensuring routine monitoring; post-disaster investigation should be conducted in a timely manner to analyze damage and make countermeasures.

7.3.4 Geological disasters

The nominated properties are vulnerable to varying types of biological disasters, including earthquake (YS-3, YS-5, YS-10), marine geological disasters that is coastal erosion (YS-7). **The general solutions** to deal with geological disasters applicable to all nominated properties **include:**

(1) A geological disaster prevention and control system should be established to mitigate the occurrences and impact and minimize related losses.

(2) Earthquake emergency response plan should be made, and the management and residents should be provided with training in earthquake

response by experts.

(3) In response to coastal erosion and seawater invasion, the key eroded coasts should be treated. The actions include the Coast Restoration Project of Qinhuangdao, the Ecological Restoration Project of Qilihai Lagoon Wetland, and the Marine Ecological and Environmental Monitoring Project.

7.3.5 Fire

The nominated properties substantially exposed to fire risk are: Nandagang (YS-5), and Snake Island - Laotieshan (YS-11). **The general solutions** to deal with fire applicable to all nominated properties **include**:

(1) A sound organization should be set up for fire prevention, and the management agency of the nominated property must comply with relevant State laws and regulations on safety and fire. A strong fire brigade should be built for rapid response to fire.

(2) Adequate fire facilities and equipment should be available; a fire prevention period should be specified; a fire prevention zone should be delineated; no-fire signs in prominent locations should be set up; Fire prevention and fighting work plan should be formulated; a biological fire prevention forest belt to prevent the occurrence and spread of fire should be built in the area with potential fire hazards;

(3) Fire emergency response plans should be formulated, monitoring

should be enhanced, and fire alerts and forecasts should be released promptly;

(4) Joint prevention and control mechanism should be established in collaboration with local government and communities to effectively prevent and control fire;

(5) Fire prevention measures should be properly taken to secure site presentation and education events; presentation facilities and vehicles should have fire fighting equipment; and forest fire prevention should be incorporated in visitor education.

7.4 Responsible Visitation at Nominated Sites

At present, the nominated properties are not under pressure from tourism activities. However, visitation requirements should be specified in order to ensure that tourism in and around the nominated properties will not produce negative effects on the OUV of migratory bird habitats and that appropriate ecotourism can benefit local communities. Such requirements include:

(1) The resource development potential should be scientifically assessed, and sustainable or ecotourism should be planned with an emphasis on natural heritage conservation and value demonstration;

(2) For ecotourism, the number of visitors should be controlled at a level not detrimental to the OUV of nominated properties;

(3) The functional areas should be reasonably demarcated, and presentation routes should be reasonably planned. The development of ecotourism should be controlled within a certain area, and the visitors should be kept from entering non-public areas.

8 Presentation and Education

8.1 Principles

The presentation and education areas of each nominated property should be set up, and the nature reserve should be protected by subareas based on the degree of human disturbance. On the premise of ensuring that the specific objects are adequately protected, the promotion and education about the value of the nominated properties should be fully conducted. For the nominated properties, presentation and education measures should be taken based on the following principles:

1. Principle of ecological protection first, wise use and sustainable development;
2. Principle of unified planning, ecological protection and heritage presentation;
3. Principle of rational layout, features highlighting and creation of a boutique presentation area.

8.2 Status Quo

8.2.1 Status quo of presentation and education methods

Promotion and education facilities have been constructed at all components based on their respective resources. Both traditional and

modern media means are adopted for heritage promotion and education.

1. Promotion and education centers in protected areas

Chongming Dongtan (YS-3), Yellow River Estuary (YS-4), Nandagang (YS-5), and Yalujiang Estuary (YS-12) have promotion and education centers and facilities, while the other seven components also have promotion and education centers in their presentation areas to present their rich wetland biodiversity.

2. Outdoor presentation signs

To guide the public to engage more extensively in nature protection, better and faster advance nature education, and ensure the sustainability of wetlands, the management agencies of all components have built outdoor presentation facilities such as promotional and educational boards and signs in the presentation areas, and have held various promotion and education activities according to their characteristics.

3. Promotion and education by media means

The management agencies of nominated property extensively promote and present the outstanding natural features and important scientific and aesthetic values through local television, radio, Internet, news release and other means to enhance the public awareness of nature protection. The promotional videos with well-designed pictures and texts can effectively present the beauty of the wetlands and animals at the World Heritage sites.

The status quos of presentation and education methods for each nominated property are as follows:

8.2.1.1 Status quo of presentation and education at Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

2. National Science Promotion and Education Base at Shanghai Chongming Dongtan National Nature Reserve

Completed and opened in 2011, the science promotion and education base contain one passage and four themed pavilions, with a gross floor area of around 3,600 square meters. Its 1,000-meter-long wooden trestle is designed for public visits, environmental education and study, science promotion activities, and volunteer services. The facility collects, makes, stores and presents all kinds of specimens of species found in the nature reserve. The four distinctive pavilions provide convenient service facilities and present effective eco-environmental protection to visitors.

2. Dongtan Wetland Research and Education Center

The center was commenced in 2013 and completed in 2019 as part of the *Spartina alterniflora* Loisel. Control and Bird Habitat Optimization Project. As an important work platform for scientific research and monitoring, bird banding, management and protection law enforcement, and science promotion and education, the facility focuses on promoting and presenting the concept of eco-environmental protection as well as

exchanges and cooperation. The center is a research and academic exchange base established after wetland restoration. It shows the history of Dongtan reverse and the process of *Spartina alterniflora* Loisel. governance, highlighting the harmonious symbiosis among human, wetland and birds through the *Spartina alterniflora* Loisel. Control and Bird Habitat Optimization Project.

3. Presentation activities

At every World Migratory Bird Day, and World Wetlands Day, the outstanding natural features and important scientific and aesthetic values of the nature reserves are promoted and presented via television, radio, Internet, news release and other means to enhance public awareness of nature protection. At Chongming Dongtan, science education activities, Bird-loving Week, and wintering migratory bird knowledge sessions are launched in collaboration with Shanghai primary and secondary schools. Official website of Chongming Dongtan, official Weibo account of the Administration Office, and official WeChat account have been created, along with several promotional videos and brochures.

8.2.1.2 Status quo of presentation and education at Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

In recent years, to deliver the magnificent landscape of confluence of

river and sea for tourists at any time, the management agency of the nature reserve has organized and implemented Beicha River dredging project and No.401 oil field wharf reuse project. The road in Ecological Hardening BirdWatching Science Park is 15km long, equipped with facilities such as bird watching houses and shelters, providing a multi-angle ecological birding space. Key promotion and education or supporting facilities have also been built, including Tourist Service Center, Smart Scenic Area, Ecological Parking Lot, Bird Museum, 3A Tourist Toilet, Bird Science Park, and sign guidance system.

In order to guide the public to engage more extensively in nature protection, better and faster promote nature education, and ensure the sustainability of wetlands, Shandong Yellow River Delta National Nature Reserve has been involved in the construction of the Yellow River Estuary Ecotourism Area. Ecotourism and science education are also primary approaches to present and educate about the value of the nominated property.

8.2.1.3 Status quo of presentation and education at Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

In recent years, the administration office of the nature reserve has built a 15-km-long greenway in the area for restoration of farmland to wetland as part of ecological and nature education. The greenway system mainly

includes a sightseeing battery car lane, a leisure walkway, a viewing sidewalk, afforestation on both sides of tourist routes and around scenic spots and service facilities, as well as one animal and plant science promotion corridor, two sightseeing platforms and two birding platforms along the greenway. The greenway does not overlap the two migratory routes of migratory birds. The tourist areas are upgraded in the northwestern and southeastern parts of the nature reserve.

8.2.1.4 Status quo of presentation and education at Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

The nominated property only has popular science signs on the seawall giving a brief introduction to the rare and endangered birds that inhabit here.

Currently, there is no dedicated but only temporary promotion and education facilities at the site. In the future, they will not be able to meet the demand for necessary heritage presentation and education.

8.2.1.5 Status quo of presentation and education at Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province

Qilihai Lagoon has a science promotion and education hall.

Every year, on special days like Earth Day, Oceans Day, and Bird-loving Week, the nature reserve holds special events. Its Science Promotion

& Education Hall and Specimen Museum are open to the public for free all year round, receiving over 1,000 teachers, students, experts, scholars and colleagues annually. After the institutional reform, the administration center of the nature reserve, under the requirements of the *Notice of the National Forestry and Grassland Administration on Serving the Social Functions of Various Nature Reserves and Vigorously Providing Nature Education*, actively organizes nature education events. The two birding education events held in 2019 have received positive feedback and have been acclaimed by parents.

8.2.1.6 Status quo of presentation and education at Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

There are two information boards near Dachaoping for presentation, promotion and education and warning purposes.

8.2.1.7 Status quo of presentation and education at Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

Shihenandao is used as an extracurricular base by primary and secondary schools in Shanhaiguan District. On the west of Shihenandao stands two information boards, giving the introduction to the base and

development plans of surrounding areas, respectively.

8.2.1.8 Status quo of presentation and education at Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

A small Wetland Museum serves as the presentation facility for the Liao River Estuary National Nature Reserve. It includes Zhaoquanhe Exhibition Hall, with a gross floor area of 1,100 square meters, which primarily presents wild animals and plants in the wetland through 112 animal specimens and 160 plant specimens. Another hall is Dongguo Exhibition Hall, with a gross floor area of 466 square meters, and it is mainly used to display wild insects in the wetland through 24 groups of insect specimens. There is also a crane breeding base with a gross floor of 306 square meters, principally used for multimedia display of the breeding process of red-crowned cranes through 78 animal specimens. The Wetland Museum is open to the public free of charge all year round, mostly receiving local residents and students of local primary and secondary schools. It promotes the general scientific knowledge about wetland to around 27,000 tourists each year.

Presentation facilities such as signs have been erected to present natural landscapes, ecosystems and biological knowledge, as part of enhanced efforts to promote the value and awareness of protection of the nominated property.

Besides, the nominated property's outstanding natural features and important scientific and aesthetic values are extensively promoted and presented by television, radio, Internet, news release, media and other means to enhance public awareness.

8.2.1.9 Status quo of presentation and education at Migratory Bird

Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

1. Snake Island - Laotieshan Nature Museum

Established in 1990 and with a gross floor area of 1,341 m², the museum has received a total of 620,000 tourists. It has become a window for presentation of the nominated property and a base for science popularization. It is also the first professional museum that focuses on displaying snakes and birds in China's nature reserves. Through advanced sound, light, electrical technologies and simulation techniques, the museum scientifically and effectively presents the landscapes of Snake Island - Laotieshan, the migration patterns of migratory birds in Laotieshan and Northeast Asia, and the biological evolution at the nature reserve.

Snake Island - Laotieshan Nature Museum consists of five exhibition halls, namely Snake Island Hall, Tieshan Hall, Biodiversity Exhibition Hall, Snake Specimen Exhibition Hall, and Science Popularization and Education Gallery. Its functional sections include the film and video

section, sand table section, specimen section, popular science section, and photography section. More than 1,300 specimens are exhibited in the museum, including the specimens of more than 160 snake species, nearly 100 bird species, over 50 fish species, more than 100 coastal invertebrate species, more than 200 insect species, and over 350 plant species. Additionally, there are more than 50 snake bone specimens.

2. Signs

In addition to buildings for presentation and promotion, signs have been erected along the tourist routes.

8.2.1.10 Status quo of presentation and education at Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

1. Yalujiang Estuary Wetland Exhibition Center

Located in the experimental zone of the nature reserve as well as the peripheral area of the nominated property and buffer zone, the exhibition center covers a area of around 3.33 ha, and has one floor above the ground, and has a building height of 11.3 meters. The exhibition center is dedicated to presenting basic information on the nature reserve, and knowledge about swimming birds such as their basic information, migratory routes and threats.

2. Signs

A total of 150 boundary pillars and stones have been erected at the

boundaries of the nature reserve, buffer zones and core areas, and warning signs at the entrance of Gushan Core Area.

8.2.1.11 Status quo of presentation and education at Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

Currently, both traditional and modern media means are adopted to promote and present the nominated property. First, a presentation venue for the World Heritage site at Guanglu Island has been constructed. Second, Changhai County Natural Resources Bureau and other agencies have produced multimedia materials to promote the value of the natural heritage, including promotional videos on the Migratory Bird Habitat at Changshan Archipelago and creatures like Finless Porpoise and Fat Greenling.

8.2.2 Existing problems and deficiencies

1. The presentation methods are limited. For example, there is a lack of effective presentation facilities and tools such as models, specimens, real objects and multimedia resources, as well as equipment and system for interpretation;

2. The distribution of presentation venues in some nominated properties is scattered, posing challenges such as poor traffic accessibility and difficulty in route design;

3. The promotion and education venues and equipment in some nominated properties are outdated. However, content design and layout in such venues are being updated. In terms of promotion by multimedia means, the related websites need to be upgraded urgently;

4. Some nominated properties have not dedicated but only temporary promotion and education facilities. In the future, they will not be able to meet the demand for necessary heritage presentation and education.

8.3 Objectives

The presentation of nominated properties aims to, on the premise of protecting heritage integrity, accurately, comprehensively and deeply explain the heritage value by effective, rich and diverse ways and means, present their unique geological features and biological resources, arouse public awareness of environmental protection, establish a meaningful connection between the public and the heritage sites, and promote the public understanding and respect for the natural heritage sites.

The utilization of nominated properties should follow the inherent pattern of wetland ecosystem evolution, with nature protection at the core. During the utilization, it is necessary to maintain the ecosystem habitats, protect the habitats of birds and other mammals in nominated properties, and realize the sustainable development of nominated properties on the premise of meeting the protection requirements.

1. To fully enhance and use the heritage value, establish a sound interpretation system including proper themes, content and facilities, promote tourists' full knowledge and understanding of the heritage value, and arouse public awareness of nature protection.

2. To make full use of heritage presentation activities without damaging the heritage value to ensure funding for local heritage protection and management.

3. To effectively manage tourist activities to minimize the impact on the natural environment while ensuring the safety of tourists.

8.4 Presentation and Interpretation

8.4.1 Presentation themes

The nominated properties should be presented to the public according to their natural resource conditions, to enhance their awareness and understanding of natural heritage value protection. The presentation themes should include the following:

- (1) Migratory bird habitat landscape resources presentation;
- (2) Key protected birds on migratory bird habitat presentation;
- (3) Migratory bird habitat monitoring and protection achievements presentation;
- (4) Migratory bird habitat geology and landform presentation;

(5) Sustainable industries in the nominated property presentation.

Table 13 Main Presentation Themes for the Nominated Properties

ID of Nominated Property	Main Presentation Theme
YS-3	Unique biological resources and geomorphic features at Chongming Dongtan Estuary
YS-4	Value and protection of neonatal wetlands in the Yellow River Delta; wetland biodiversity
YS-5	Unique natural scenery and biological resources at Nandagang Wetland, Cangzhou, Hebei Province; Presentation of wetland birds represented by Oriental Stork and Baer's Pochard as well as wetland ecosystem;
YS-6	Presentation of migratory birds; Presentation of breeding birds; Presentation of overwintering birds; Salt production
YS-7	Lagoon - dune coast landform
YS-8	Presentation of bird habitat;
YS-9	Presentation of bird habitat;
YS-10	Unique natural scenery and biological resources at Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province
YS-11	Unique natural scenery and biological resources in Laotieshan, Snake Island, Liaoning Province
YS-12	Wetland swimming birds represented by shorebirds and Anseriformes species; Yalujiang Estuary Wetland
YS-13	Unique natural scenery and biological resources in Changshan Archipelago; Rare birds such as Chinese Egret, Yellow-breasted Bunting, Japanese Cormorant, Pelagic Cormorant and Black-tailed Gull and their habitats; Species, habitats and ecological functions of migratory birds in transit as well as migratory process and significance of migratory birds; Island and reef ecosystems

8.4.2 Presentation methods

Presentation methods include the following:

(1) Presentation via science promotion and education facilities:
including indoor interpretation and presentation through text, pictures,

videos, and models.

(2) Planning of presentation routes: It is necessary to rationally plan the presentation routes, set up heritage presentation points on presentation routes, install presentation facilities, and provide interpretation.

(3) Immersive presentation activities and science promotion activities: Primary and secondary school students can be provided with thematic exploration activities, short-term research routes, etc. to enhance their personal experience of the ecological environment and understand the scientific value of natural heritage sites. Scientific research enthusiasts can be provided with academic exchange activities, wetland experience tours, etc. to get involved in ecological governance technology research.

(4) Festive events: Special events such as Bird-loving Week and International Birding Festival can be organized to enhance the public awareness of habitat value protection;

(5) The network presentation system can be used for interactive presentation to allow the public to gain knowledge about migration of migratory birds in the heritage nominated properties online and to understand the close connection between human and nature.

Presentation methods for all the nominated properties are set out in the table below.

Table 14 Presentation Methods for Nominated Property

ID of Nominated Property	Heritage Presentation Method
YS-3	Presentation via science promotion and education facilities; Planning of presentation routes; Interactive presentation; Immersive presentation activities
YS-4	Ecotourism; Science education
YS-5	Presentation via indoor science promotion facilities and indoor interpretation; Outdoor field presentation; Interactive sessions;
YS-6	Presentation via science promotion and education facilities in exhibition center; Planning of presentation routes; Interactive presentation;
YS-7	
YS-8	
YS-9	
YS-10	Science promotion and education facilities in exhibition center; Planning of presentation routes (tour experience); Organization of teenager science promotion activities and heritage education; Holding of theme festivals; establishment of network presentation system and provision of interactive sessions
YS-11	
YS-12	
YS-13	

8.4.3 Presentation routes and content

8.4.3.1 Presentation route and content of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

The presentation area of the nominated property encompasses the International Science Promotion & Education Base, the Scientific Research and Promotion Center and the Experience and Education Base within the buffer zone, as well as the Chongming Dongtan Wetland Park and the Training and Education Base outside the buffer zone.

Sightseeing at Chongming Dongtan Wetland Park can be made by walking, bicycle and electric tour bus. The site has two entrances in the

west and south. Within the park is a ring road that connects main scenic spots such as Wetland Square, Wetland Conservation Area, Three Stores Forest, Wetland Habitat Restoration Area, Egret Observation Platform, Sparrow Area, Grassland, Sea-watching Building Jetty, Sightseeing Platform, Rainwater Collection Area, Bird Science Pavilion, and Wetland Scientific Research Museum.

With wood walkway as its main route for tourists, the International Science Promotion & Education Base has an ecological trail built based on the existing wood walkway and venues. Tourists can enter from the Landmark Stone Square at the entrance and pass through the Birding Pavilion to reach the four core exhibition halls: Source of Life, Stage of Life, Journey of Life, and Image of Life.

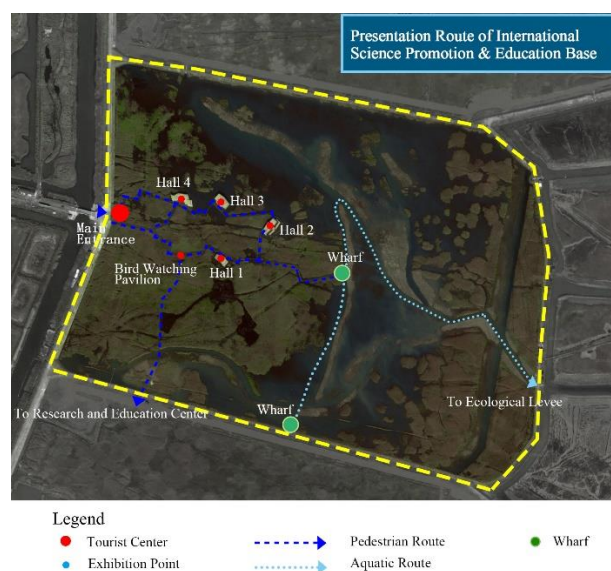


Figure 21 Important Presentation Points and Route of Chongming Dongtan International Science Promotion & Education Base

With wood walkway as its primary tour route, Chongming Dongtan

Scientific Research and Promotion Center connects the main hall and four branch halls. To reach the Birding Corridor, tourists can enter from the south entrance, get off the bus at the main hall, pass through the four branch halls along the wood walkway; or directly pass through the main hall from the north entrance of the walkway. Tourists can return to the south entrance by tour bus or walk.

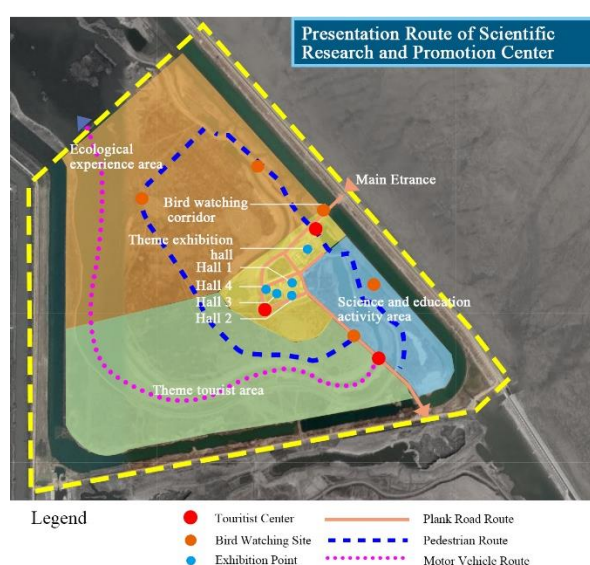


Figure 22 Important Presentation Points and Route of Chongming Dongtan Scientific Research and Education Center

After the inscription of the nominated property on the World Heritage List, the Experience and Education Base will welcome tourists of all ages, especially, it will attract many primary and secondary school students, researchers and bird lovers. This would raise more requirements for multi-directional presentation of the nominated property. The existing presentation space is mainly for static presentation purpose. Based on the international science promotion function of the nominated property, an experience and exploration base will be additionally built near the north

exit of the buffer zone to enhance tourist experience.

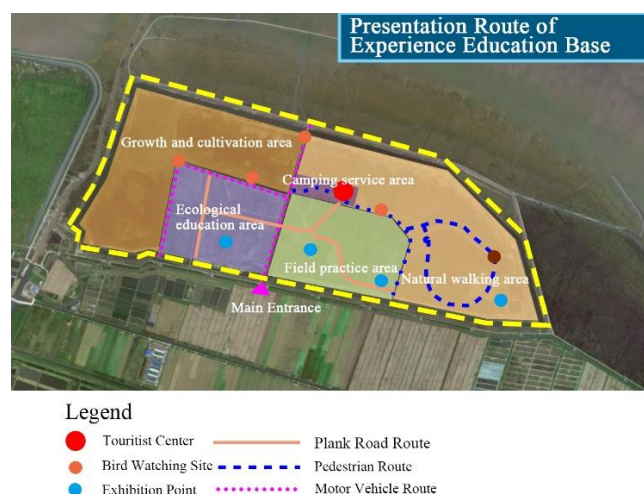


Figure 23 Important Presentation Points and Route of Chongming Dongtan Experience and Education Base



Figure 24 Presentation Route of Chongming Dontan

8.4.3.2 Presentation route and content of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

On the basis of fully leveraging the existing presentation and education facilities in the Yellow River Estuary Ecotourism Area, three presentation points will be set up at the Heritage Presentation Area.

1. The presentation points of Bird Science Service Center are positioned at the Natural Willow Forest, Goose Lake Boardwalk, and Bird Science Service Center at Old Course of Yellow River, on the 2.8-km-long presentation route. They are mainly used to present wild birds with OUV such as Oriental Stork, Saunders's Gull, Red-crowned Crane and Siberian Crane as well as the formation and value of the natural willow forest.

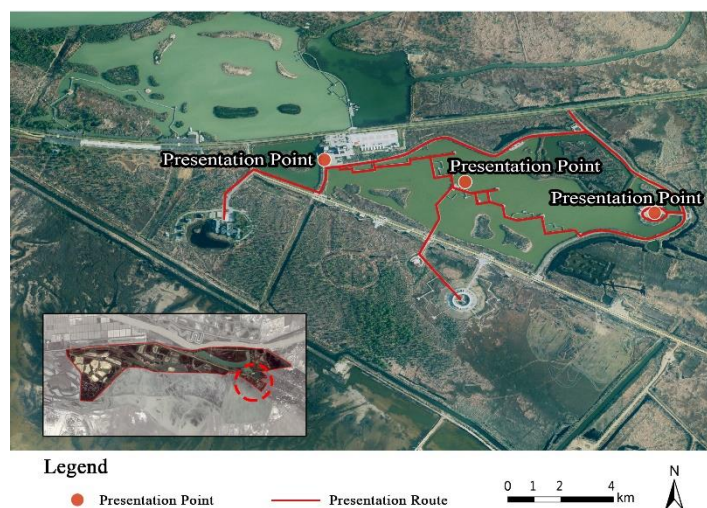


Figure 25 Presentation Points and Route of Bird Science Service Center at Yellow River Estuary (YS-4)

2. The presentation points of Oriental Stork Watching Area are in the north of the Heritage Presentation Area and south of Nanshunhe Road, on a 1.6-km-long presentation route. They are mainly used to present the

characteristics, living environment, population size and other information of Oriental Stork, cranes and Anatidae species.

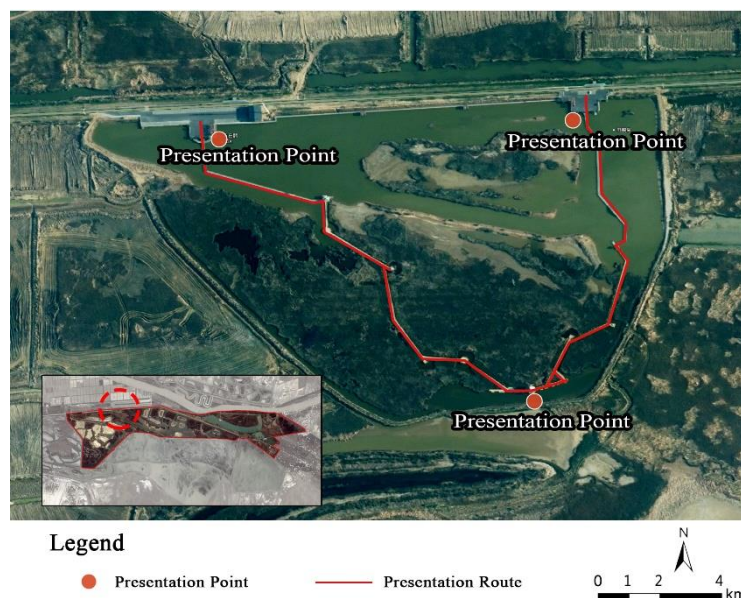


Figure 26 Presentation Points and Route of Oriental Stork Watching Area at Yellow River Estuary

(3) The wild bird presentation points at Yiqianer are within the Yiqianer Management Station, and they are primarily used to present the basic information on wetland at the Old Course of Yellow River Estuary, habitat restoration and life history of Saunders's Gull, as well as status quo and migration of other birds.

8.4.3.3 Presentation route and content of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

Based on the existing Bird Watching facilities, four new concealed bird-watching houses will be set up to connect the northern part of the

experimental zone of the nature reserve with the western part through the walking trail. In particular, each birding house will be provided with a high-power telescope.

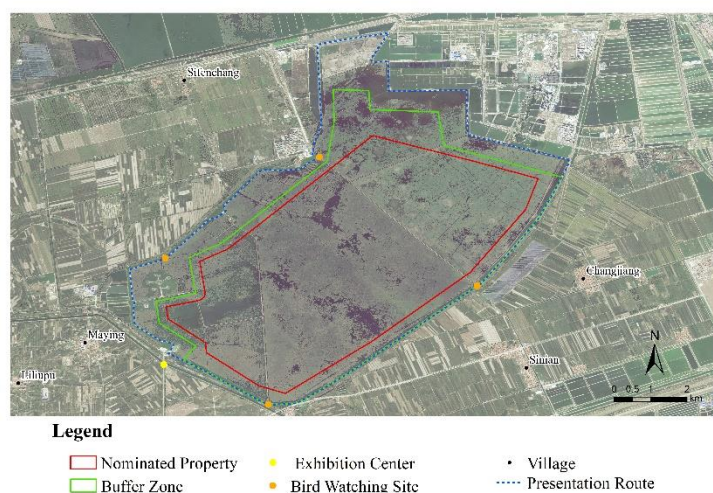


Figure 27 Presentation Route of the Heritage Presentation Area at Nandagang (YS-5)

8.4.3.4 Presentation route and content of Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

There are three heritage presentation points at the nominated property and buffer zone, and the science museum at the entrance presents the relationship between salt production and bird protection to tourists. The nominated property has a breeding bird presentation point to present how breeding birds make use of salt pans. In the north of buffer zone is a wintering bird presentation point to display how wintering birds utilize salt pans. In the middle of buffer zone stands a migratory bird presentation point to display how migratory birds use tidal flats. The presentation point at the entrance includes a science promotion station that provides indoor

interpretation. Of the other three presentation points each has a birding house, providing tourists with birding equipment and tour guides.

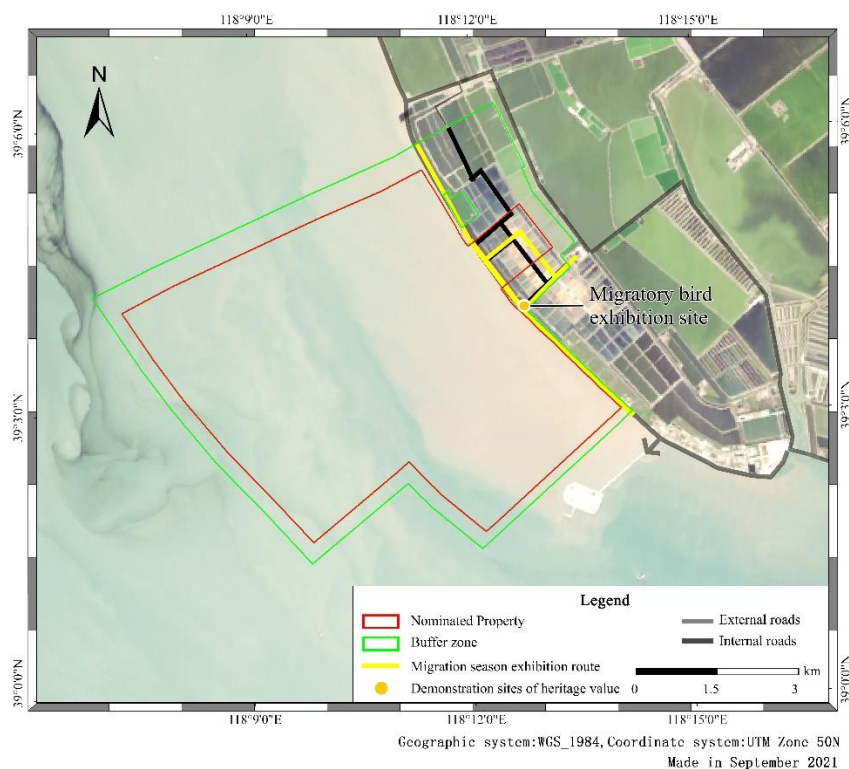


Figure 28 Distribution of Heritage Presentation Value Points of Nanpu (YS-6)

The nominated property has four routes for presenting migratory birds, breeding birds, wintering birds, and salt production, respectively.

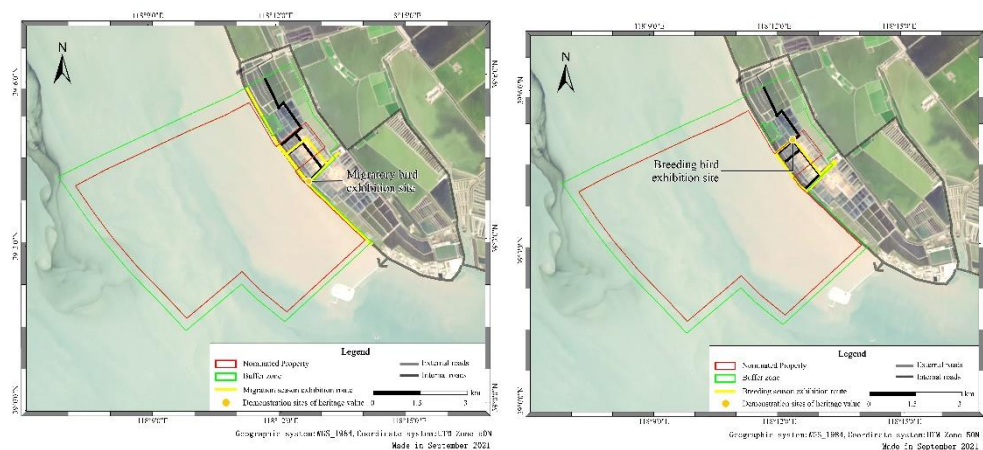


Figure 29 Heritage Presentation Route for Migratory Season Figure 30 Heritage Presentation Route for Breeding Season

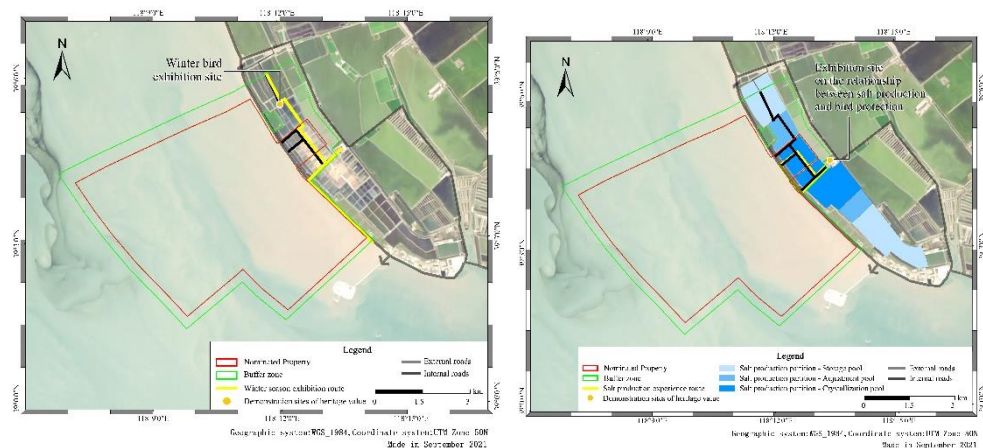


Figure 31 Heritage Presentation Route for Wintering Season Figure 32 Salt Production Experience Presentation Route

8.4.3.5 Presentation route and content of Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

The roads on the north and east of the nominated property and buffer zone constitute a birding and tour route, having small birding venues, birding houses and birding facilities. The existing venues of the Administration Center of Hebei Changli Golden Coast National Nature Reserve, together with necessary software and hardware for presenting world heritage-related knowledge, offer tourists services like natural

science education, bird watching guide, and natural ecosystem science education. The supporting tourist centers offer tourists basic tour information inquiry, safety training, tour guide, and interpretation services.

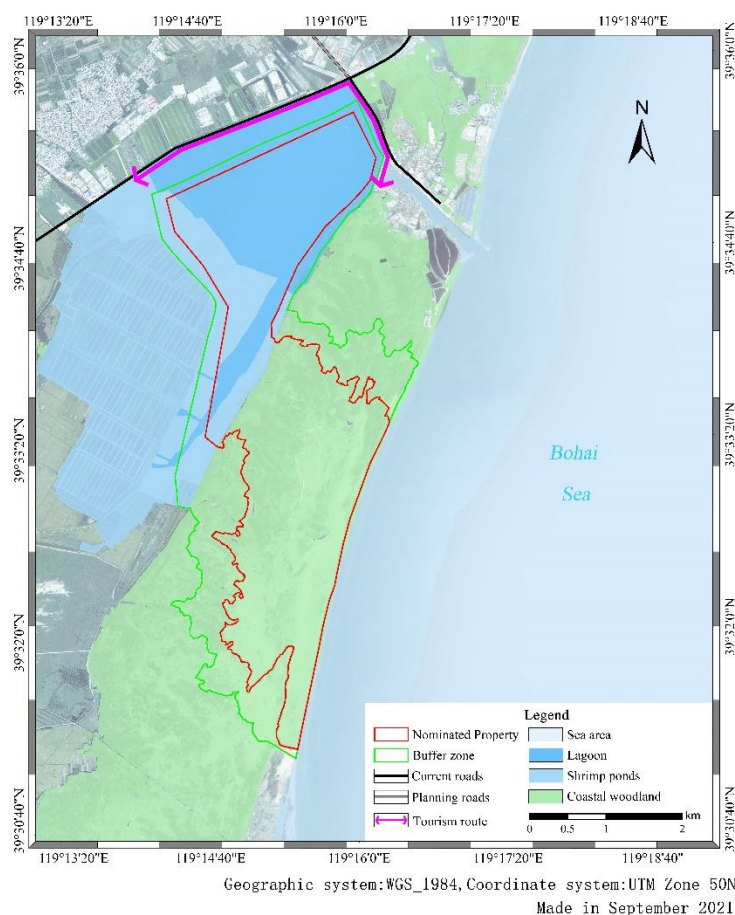


Figure 33 Important Presentation Points and Route of Qilihai Lagoon (YS-7)

8.4.3.6 Presentation route and content of Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

The peripheral walkway of the buffer zone forms the presentation route of Dachaoping. The route has one landscape pavilion, two guardhouses and two wooden platforms, providing visitors with panoramic

sightseeing experience. They mainly present all kinds of birds stopping at Chaochaoping during their migration and the characteristics and natural beauty of Dachaoping as bird habitat that is representative of mudflat in the Yellow Sea-Bohai Gulf.

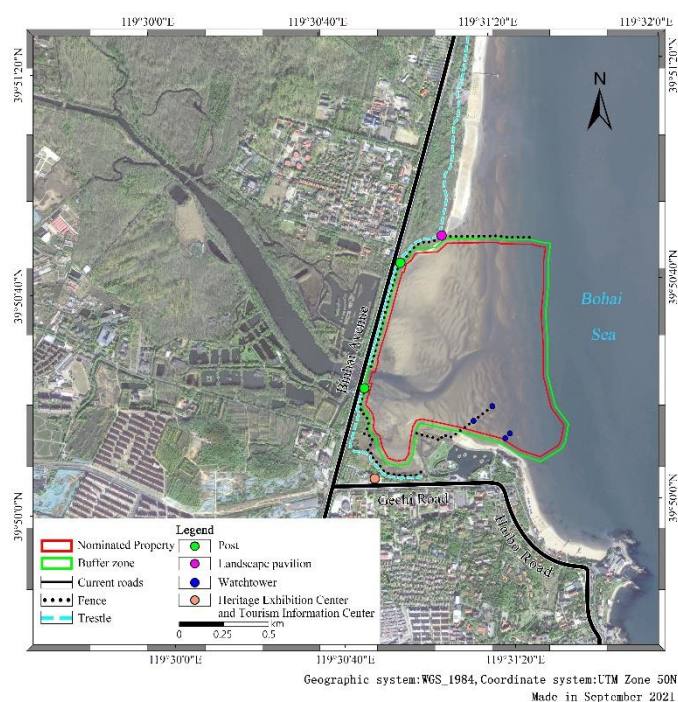


Figure 34 Important Presentation Points and Route of Dachaoping (YS-8)

8.4.3.7 Presentation route and content of Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

The Shihenandao presentation includes a total of 4 routes. The exhibition routes for general tourists are limited to the A and B routes. The A route is the route for the exhibition of the bird during the breeding season, and the B route is the route for the exhibition of the bird during non-breeding season. The environmental education exhibition routes explained by bird guide professionals are A and C. During the bird breeding season,

the environmental education route is restricted to the A route, and during the non-breeding season, the environmental education route is restricted to the C route. The route only for scientific research and monitoring personnel is on the D route. It mainly displays the diverse bird habitats on Shihehedao and the various birds that migrate here and their characteristics.

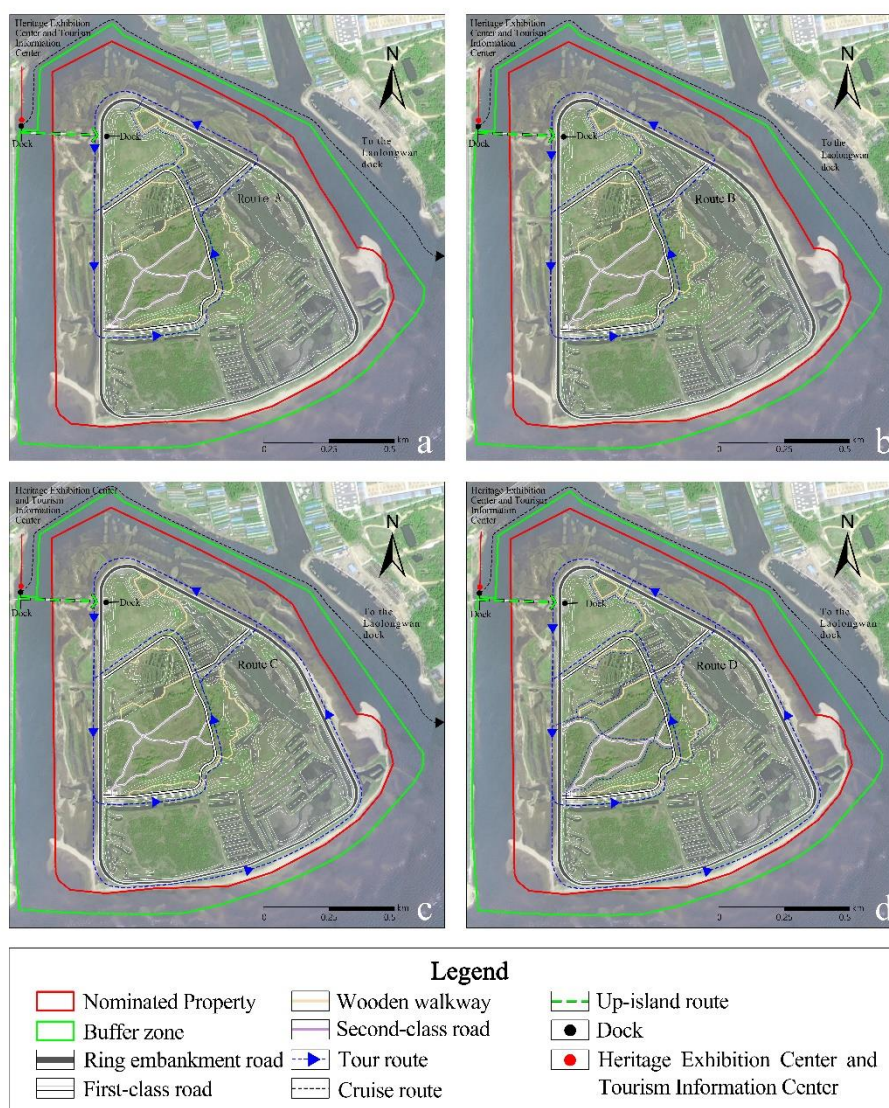


Figure 35 Important Presentation 25Points and Route of Shihehedao (YS-9)

8.4.3.8 Presentation route and content of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

In light of the characteristics of Liao River Estuary (YS-10), Heritage Presentation Areas are not set up within the nominated property, but in the adjacent buffer area. There are two Heritage Presentation Areas at the West Part of Liao River Estuary and the East Part of Liao River Estuary, with an area of 803.3 ha and 739.8 ha, respectively.

The Heritage Presentation Area at the West Part of Liao River Estuary is mainly for land tour. Tourists can take a tour bus to reach from Kudang Ditch the Birding Site 1 at the West Part of Liao River Estuary; and can take a northward detour to reach Birding Site 2 at Nanxiao River.

The Heritage Presentation Area at the East Part of Liao River Estuary is mainly for land tour, with a cruise ship terminal that provides water activities. Tourists can take a tour bus for full or half journey upon entry from the Tourist Center at the northern presentation area. There are stops at main points such as Walkway Birding Point, Dream Bridge, and Cruise Terminal. Tourists can appreciate the beautiful scenery along the Scenic Corridor by tour bus or walk.

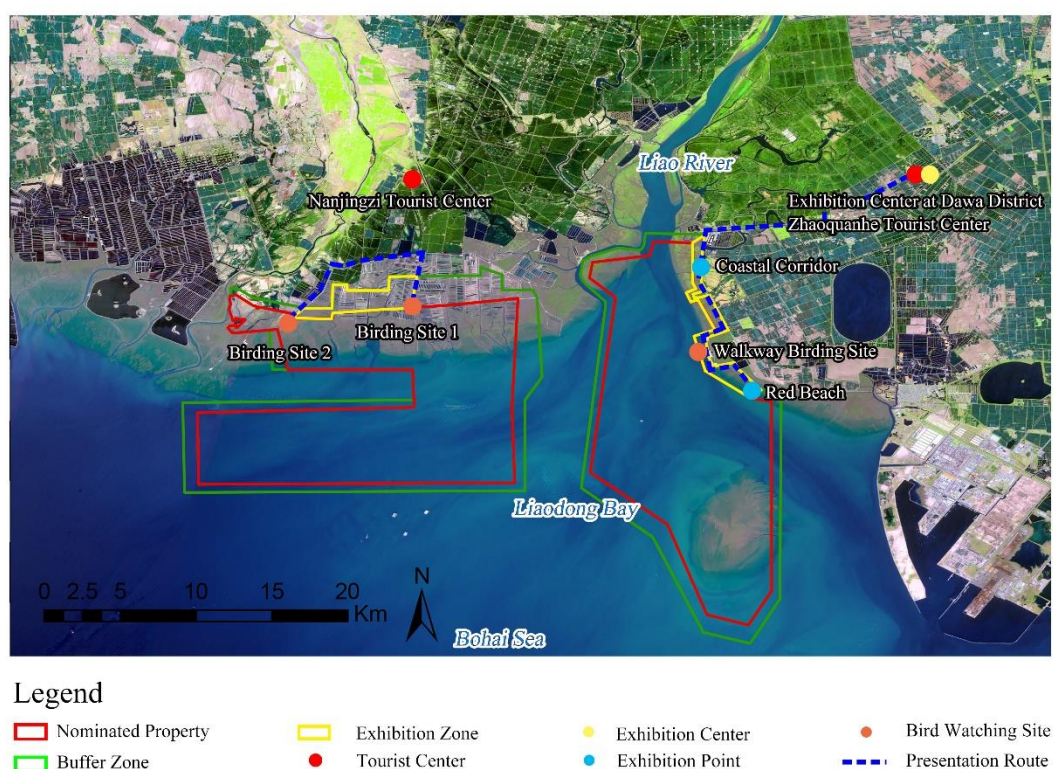


Figure 36 Route of Presentation Area at Liao River Estuary (YS-10)

8.4.3.9 Presentation route and content of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

In light of the characteristics of Snake Island - Laotieshan (YS-11), the Heritage Presentation Areas are not positioned within the nominated property but in the adjacent buffer zone.

Snake Island - Laotieshan (YS-11) has a Heritage Presentation Area, a maritime presentation route, and a forest presentation route. In particular, the Presentation and Education Area is within the Jiutou Hill area, and the marine presentation route extends from Aizikou Terminal to seawaters in the buffer zone of Snake Island.

1. Presentation route 1 - maritime theme

The maritime route includes two sections, i.e., coast and cruise.

Island theme: The cruise route, designed for tourists, starts from the Tourist Service Center. By taking a boat from Aizikou Terminal westward to Bohai Gulf, tourists can enjoy a counterclockwise tour around Snake Island from its southeast. Aizikou Terminal has facilities such as science promotion boards, popular science e-screens, and audio guides. The second deck of the cruise ship serves as a sightseeing corridor, with six fixed-point telescopes to offer visitors unique experience of watching birds and the beautiful island scenery.

Coast theme: The coast route is mainly for scientific research and protection personnel, providing them with fixed-point observation sites and equipment. Along the route there are three birding sites with promotional boards and emergency facilities.

2. Presentation route 2 - forest theme

This route is for researchers, providing service support for their scientific research activities at Jiutou Hill. The route begins at the Guanjiadonggou transfer center, extends to Tieshanjia Reservoir along the forest trail, and ends at Jiutou Hill Hotel. Along the route there are three birding sites with promotional boards and emergency facilities for scientific researchers.

3. BirdWatching sites

Snake Island and Jiutou Hill have six birding sites. They respectively stand at Jiutou Hill forest area, Tieshanjia Reservoir, Laohuwei Beach, Jiutou Hill Watchtower, and along the presentation route. They cover different habitats to better meet the birding demand in different seasons and environments. All Bird Watching sites are equipped with telescopes and service facilities for medical first aid and fire emergency, with a reserved activity space around.

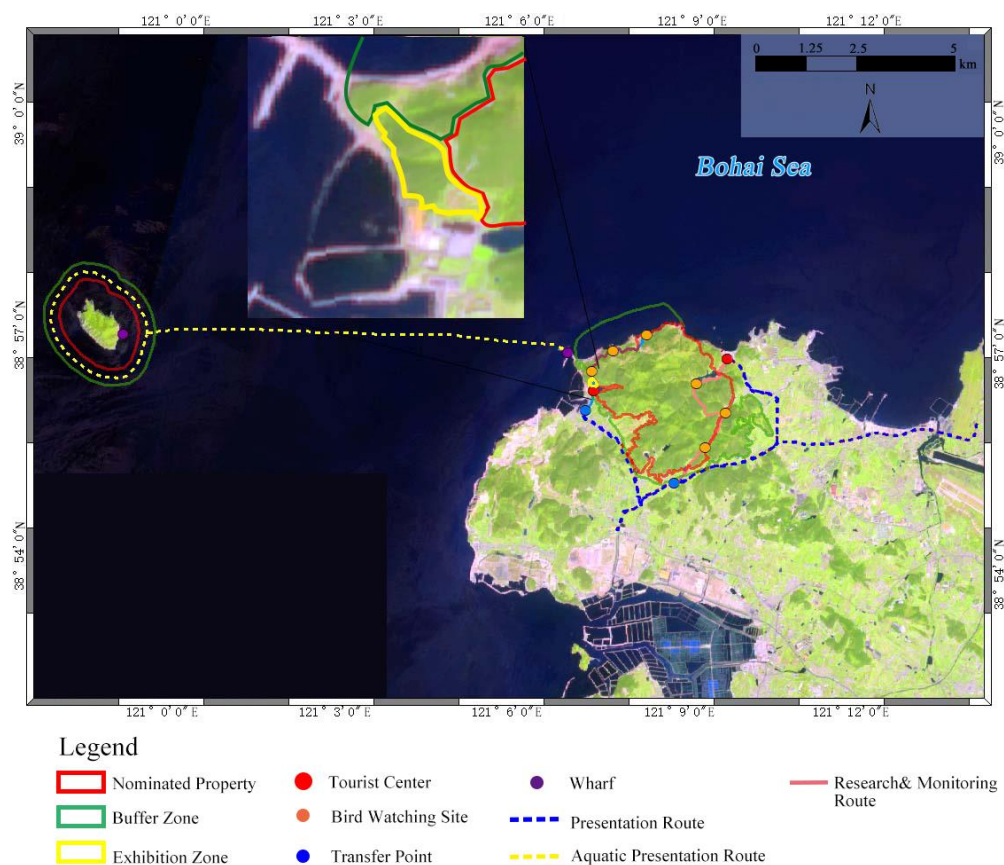


Figure 37 Presentation and Utilization Map of Snake Island - Laotieshan (YS-11)

8.4.3.10 Presentation route and content of Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

In light of the location characteristics of Dayang River (YS-12-1) and Erdaogou (YS-12-2), the protected range of Dandong Yalujiang Estuary Wetland National Nature Reserve, and the actual conditions of coastlines in Dandong, the presentation route of the nominated property has been mapped out along the coastal highway (G228) to connect one center and three presentation areas (Yalujiang Estuary Wetland Exhibition Center, Ecological Restoration Exhibition Hall of Gushan Management Station, Waterbird Research and Science Education Exhibition Hall of Changshan Monitoring Station, Wetland Protection Exhibition Hall of Daludao Management Station) and 15 birding sites. Birding Sites 2 and 2A are located at the coastal tidal flat in northeastern Erdaogou for observation of migratory shorebirds; Bird Watching Site 3 stands at the Yalujiang Estuary Wetland Exhibition Center, as an auxiliary facility of the Tourist Center, for observation of migratory shorebirds; Birding Site 11A lies at the eastern estuary at Dayang River for observation of migratory Anatidae species.

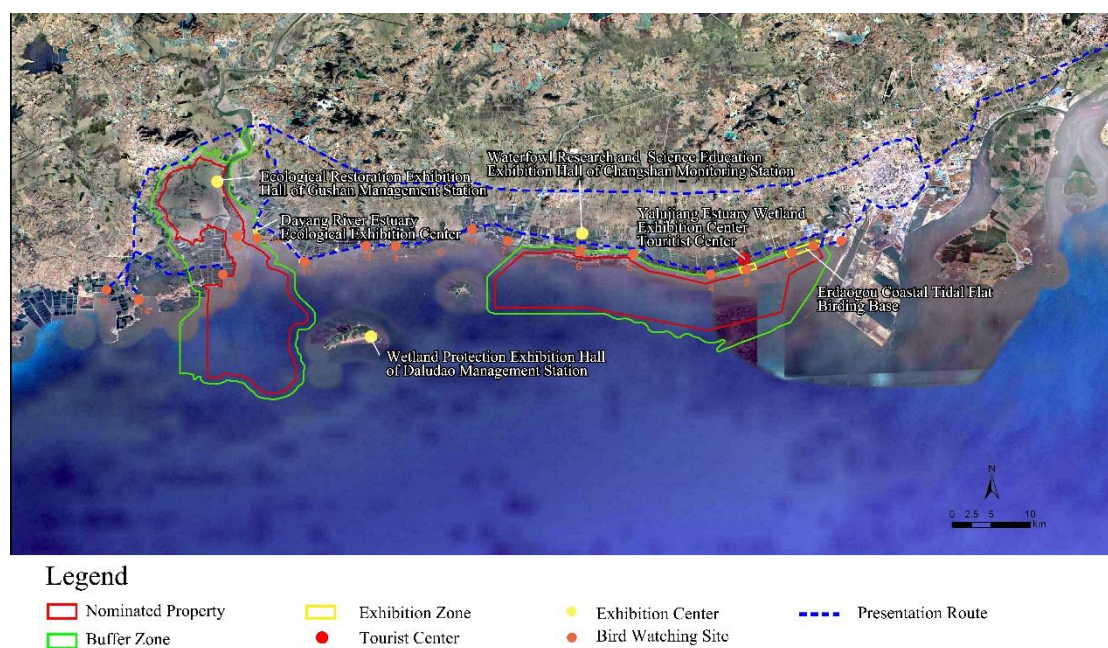


Figure 38 Presentation Route of Yalujiang Estuary (YS-12)

8.4.3.11 Presentation routes and content of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

Changshan Archipelago (YS-13) has land and marine presentation routes.

The land presentation route includes Guanglu Island Exhibition Center, Guanglu Island Birding Area, Zhangzi Island Presentation Area, and Haxian Island Presentation Area, whereas the marine presentation route provides birding projects on cruise ships around Gexian Island, Guapi Island, Haxian Island, Dahaozi Island, and Bashao Island.

Guanglu Island Exhibition Center is for general presentation of the nominated property, and it disseminates knowledge about heritage value,

heritage protection and eco-environmental protection. Guanglu Island Birding Area allows tourists to observe rare birds such as Chinese Egret at Fantuozi Islet (YS-13-1). Tourists in Dalian can arrive at Duoluomu Terminal of Guanglu Island by taking a boat at Xingshugang, and they can reach Guanglu Island Exhibition Center by bus for sightseeing. Upon completing sightseeing, tourists can head for Danantouzi Bird Watching Area of Guanglu Island by bus. The Bird Watching area is mainly for walking tour. Along the trail, there are science promotion boards for explanation. The Bird Watching sites and sightseeing platforms provide telescopes and other devices for Bird Watching and photography.

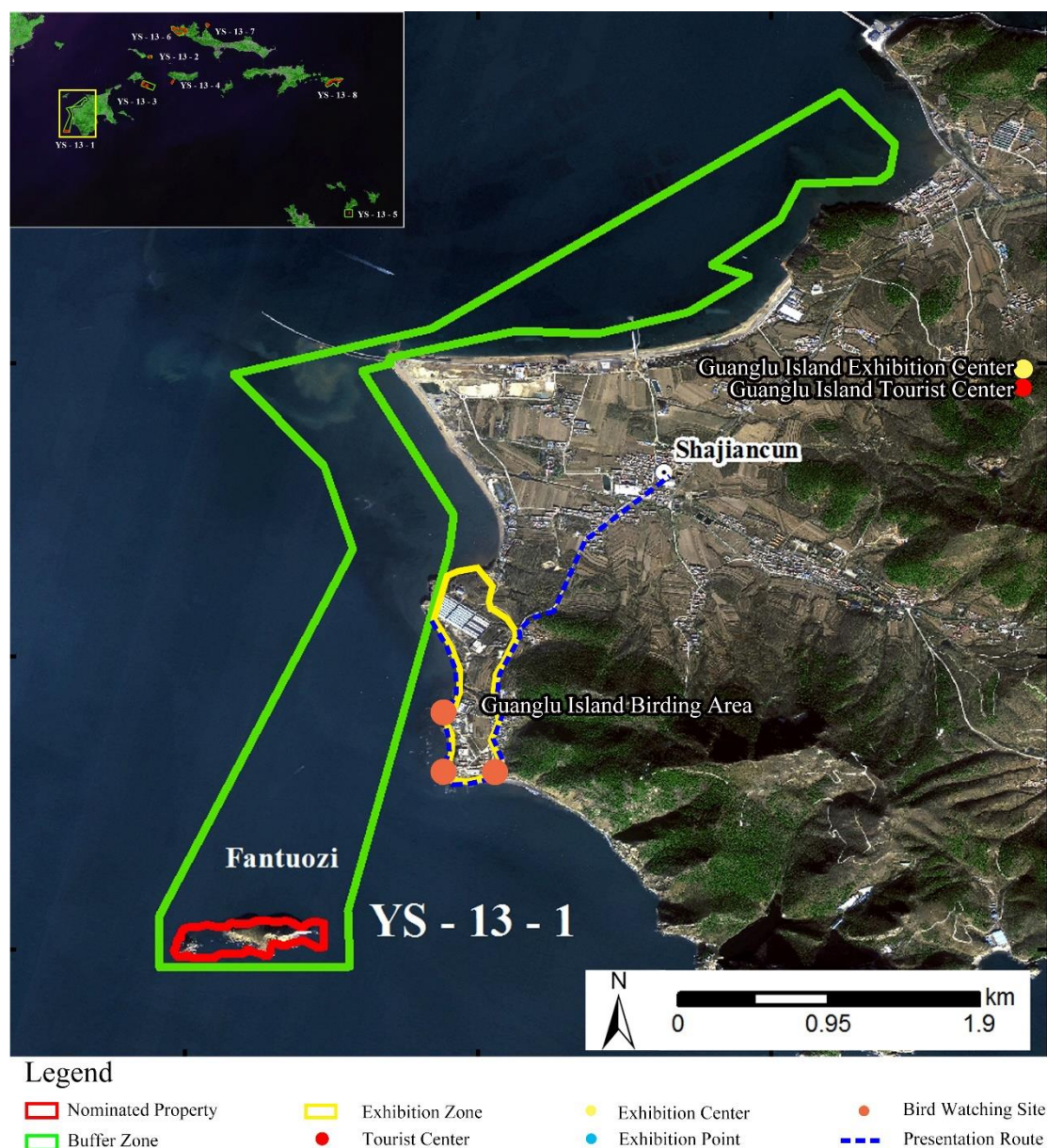


Figure 39 Presentation Route of Guanglu Island Exhibition Center and Bird Watching Area

Zhangzi Island Presentation Area focuses on presenting rare birds represented by Pelagic Cormorant and the distinctive coastal scenery of Changshan Archipelago. Tourists can arrive at Zhangzi Island from Shabao Terminal and then reach Zhangzi Island Presentation Area by bus. The presentation area mainly supports a tour by walking or tour bus. There are bird watching and sightseeing platforms along the route, with equipments

such as telescopes.

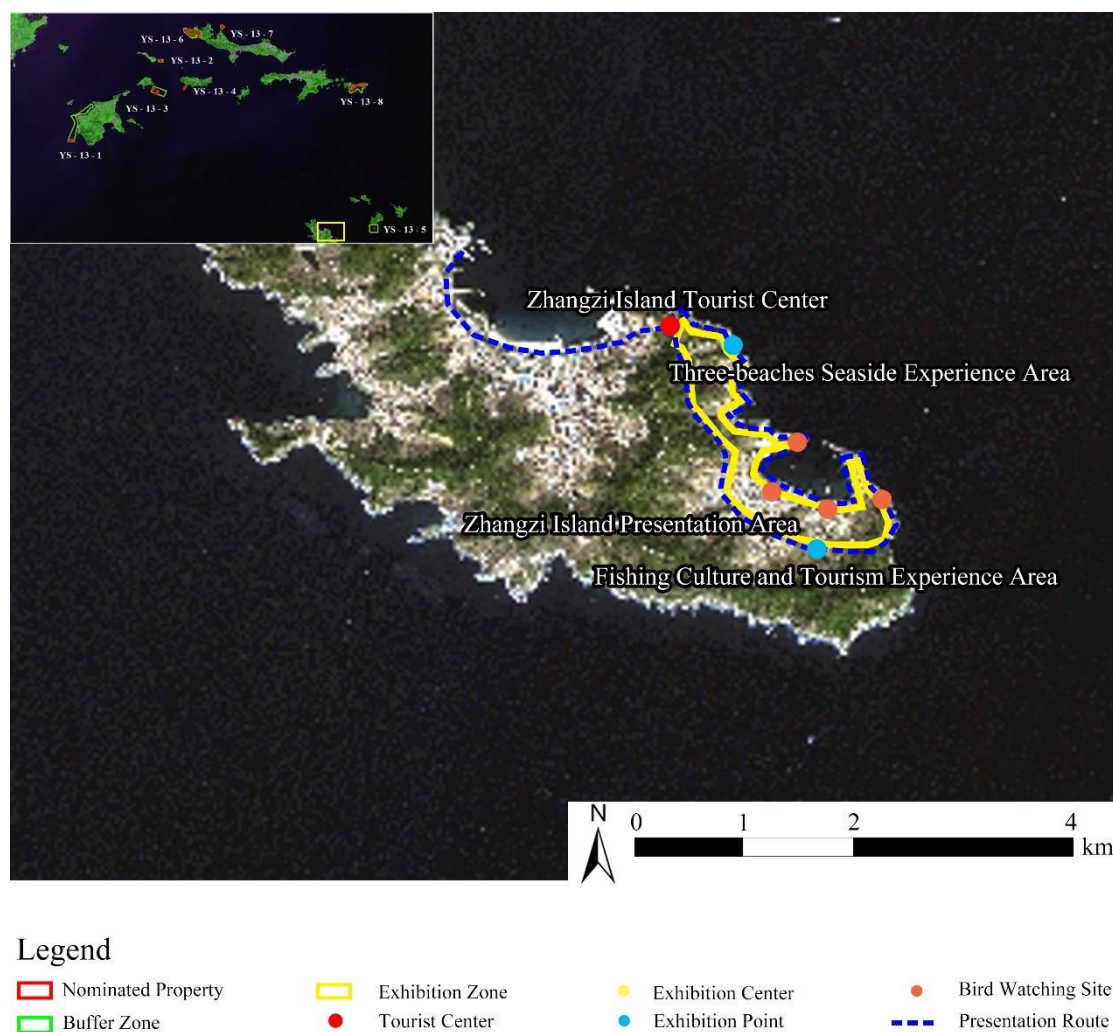


Figure 40 Presentation Route of Zhangzi Island Presentation Area

Haxian Island Presentation Area is a tourist resort that allows for observing rare birds at Haxian Island (YS-13-4). Tourists can arrive at Haxian Island from Haxian Island Terminal and then go to the presentation area by bus. The presentation area mainly supports a tour by walking or tour bus. There are bird watching and sightseeing platforms along the route, with equipments such as telescopes.

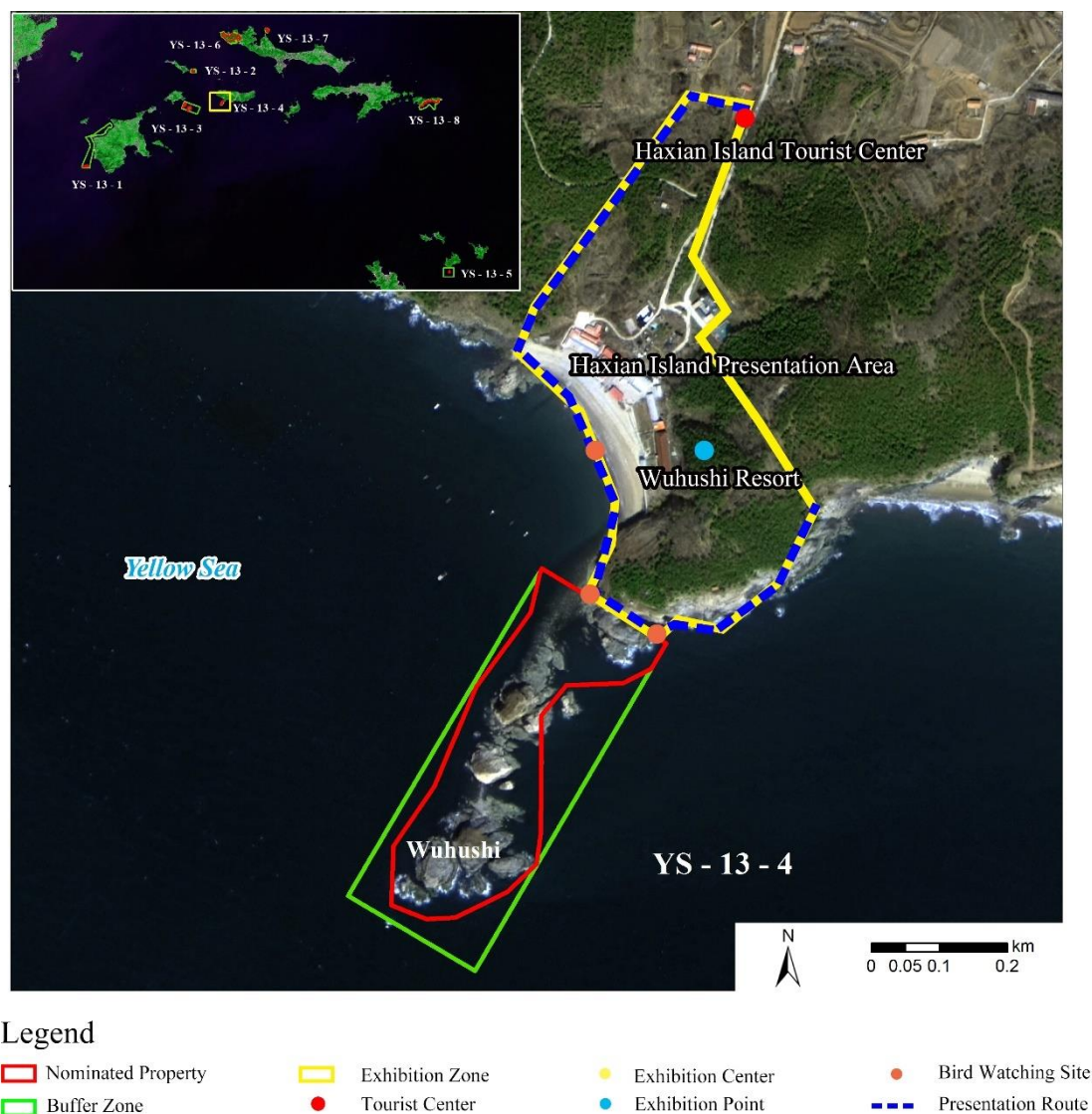


Figure 41 Presentation Route of Haxian Island Presentation Area

The marine cruise enables tourists to enjoy the beautiful island scenery and observe birds on the scattered islands. The route runs through Gexian Island, Guapi Island, Haxian Island, Dahaozi Island, and Bashao Island. Since there are passenger terminals on the foregoing islands, researchers can reach the islands through them for scientific research and monitoring. Cruise ships will be operated to satisfy the need of marine birding around the islands.

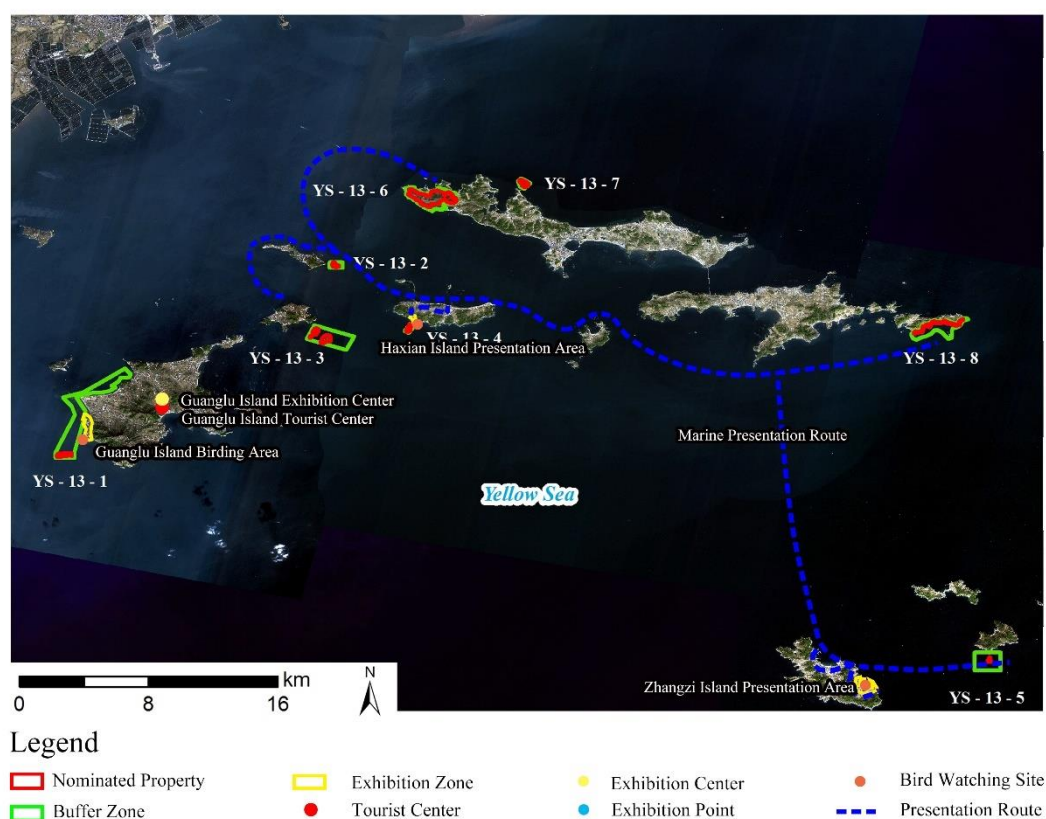


Figure 42 Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province

8.5 Presentation and Interpretation Service Facilities

8.5.1 Presentation centers

A value interpretation system with high cognition for nominated properties should be established, and presentation centers of migratory bird habitats at 11 nominated properties should be set up with themes developed according to heritage value and characteristics of the constituent elements.

8.5.1.1 Presentation centers of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

The Presentation and Education Area has Chongming Dongtan Bird Science Base and Chongming Dongtan Wetland Exhibition Center, with featured halls created for special purposes. The exhibition halls present different themes, e.g., migratory birds, estuary wetland ecosystem, estuary landform.

8.5.1.2 Presentation centers of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

1. Bird Museum at the Yellow River Delta

The museum is situated in 3# Building at the east gate of Yellow River Estuary Ecological Tourism Area in Dongying. With a presentation area of some 3,000 m², it exhibits over 1,400 plant and animal specimens and serves the functions of collection, presentation, promotion, education, scientific research and leisure. As the largest theme museum of wild birds in China, it is open to the public free of charge.

2. Science Popularization Center of Birds at the Yellow River Delta National Nature Reserve

To the south of Willow Grove Walkway and Wetland Experience Area, the science popularization center covers an area of about 90 ha. It is

primarily built with bird domestication and rescue center, fly square, bird garden, riverside trail, human-bird harmony garden, and bird island.

8.5.1.3 Presentation center of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

In the south of the experimental zone of the Nandagang Wetland Nature Reserve stands a new wetland nature museum with a gross floor area of 5,000 m², which contains a reading room, an information room (archives room), a specimen hall, a reporting hall, and a video hall. The museum is equipped with science education devices, including four LED screens, two sets of video recording equipment plus editing system, four sets of knowledge inquiry, display and information transmission equipment, two sets of archives preservation equipment, three computers, four sets of video playback equipment, 100 information boards, and 50 signboards.

8.5.1.4 Presentation center of Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

Located at the entrance and close to the salt farm section, the exhibition center primarily presents intertidal ecosystem of the Yellow Sea-Bohai Gulf, including natural landscape, biological communities, and the relationship between biology and environment. The exhibition center also introduces the important role of the artificial wetland - salt farms in bird

breeding, migration and wintering, the relationship between salt production and bird habitation, and the close connection between human and nature. Interpretation takes the forms of texts, pictures, videos, models, etc.

8.5.1.5 Presentation center of Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

The existing venues of the Administration Center of Hebei Changli Golden Coast National Nature Reserve, together with necessary software and hardware for presenting world heritage-related knowledge, should serve as the presentation center of Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province.

The exhibition center is designed to present the intertidal ecosystem of the Yellow Sea-Bohai Gulf in Qilihai such as Lagoon ecosystem, coastal forest ecosystem and Daxuding dune ecosystem, including biological communities, and the relationship between biology and environment. The relationship between various birds such as migratory birds, breeding birds and wintering birds and habitats in Qilihai is also presented.

8.5.1.6 Presentation center of Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

There is an exhibition center based on Qinhuangdao Bird Museum in the promotion and education zone of Beidaihe National Wetland Park.

It presents intertidal ecosystem of the Yellow Sea-Bohai Gulf, including natural landscape, biological communities, and the relationship between biology and environment. The important role of habitats at Dachaoping in bird migration is also presented.

8.5.1.7 Presentation center of Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

The exhibition center is situated at the western cruise terminal as shown in Figure 35.

It primarily presents intertidal ecosystem of the Yellow Sea-Bohai Gulf, including natural landscape, biological communities, and the relationship between biology and environment. The important role of habitats at Shihenandao in bird breeding, migration and wintering is also presented.

8.5.1.8 Presentation center of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

The exhibition center in Dawa District is for general presentation of the nominated property; it focuses on disseminating scientific knowledge about heritage value, heritage protection, and eco-environmental protection through texts, pictures, multimedia and objects.

8.5.1.9 Presentation centers of Migratory Bird Habitat at Snake

Island - Laotieshan, Dalian, Liaoning Province (YS-11)

1. Dalian Wetland Heritage Exhibition Center, sitting in downtown Dalian, is used for general presentation of the nominated property.

2. There is a secondary heritage exhibition center in Jiutou Hill Heritage Presentation Area, for presenting Chinese Egret, the island, and bedrock coast.

3. There is a secondary exhibition center in Laotieshan Nature Museum at Snake Island located in the downtown Lushunkou District, for specially presenting the main section of Snake Island.

These exhibition centers share scientific knowledge about heritage value, heritage protection, and eco-environmental protection through texts, pictures, multimedia and objects.

8.5.1.10 Presentation centers of Migratory Bird Habitat at Yalujiang

Estuary, Dandong, Liaoning Province (YS-12)

1. Yalujiang Estuary Wetland Exhibition Center will be upgraded to an exhibition center of the nominated property based on its existing facilities.

2. An ecological restoration exhibition hall will be additionally built at Dayang River Estuary.

3. Waterbird research base and science education exhibition hall will be set up at Erdaogou (YS-12-2).

4. Dalu Island Management Station Wetland Protection Exhibition Hall will be built on Dalu Island.

These exhibition centers should have adequate presentation and interpretation facilities to disseminate scientific knowledge about heritage value, heritage protection, and eco-environmental protection through texts, pictures, multimedia and objects. They should be able to present the complete sign system along the touring route and at birding sites, including promotional and presentation signs.

8.5.1.11 Presentation center of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

An exhibition center for Changshan Archipelago (YS-13) will be built on Guanglu Island for general presentation of the nominated property. Geological exploration and feasibility study have been completed, and hall construction, presentation content design, layout, etc. will be commenced soon. The exhibition center will focus on spreading scientific knowledge about heritage value, heritage protection, and eco-environmental protection through texts, pictures, multimedia and objects.

8.5.2 Tourist centers

8.5.2.1 Tourist centers of Migratory Bird Habitat at Chongming

Dongtan, Shanghai (YS-3)

Chongming Dongtan Wetland Tourist Service Base is planned near downtown Shanghai and the major transport hub in Chongming District to coordinate tourism services, transport, catering and accommodation, souvenirs, etc. in all presentation areas of the nominated property;

A secondary tourist center sits at the entrance of Chongming Dongtan National Nature Reserve, serving the tourist needs in all presentation areas. It can interact with Chongming Dongtan Bird Science Base to realize different functions through building layering;

Inside each presentation area, small service stations are reasonably arranged, including route guide, scenic spot information boards, public toilet, etc.

8.5.2.2 Tourist centers of Migratory Bird Habitat at Yellow River

Estuary, Dongying, Shandong Province (YS-4)

1. Yellow River Estuary World Natural Heritage Tourist Service Center

The key part of Yellow River Estuary World Natural Heritage Tourist Service Center is the tourist center at the south entrance of Yellow River

Estuary Ecotourism Area. The tourist center was brought into operation in 2015. The Yellow River Estuary World Natural Heritage Tourist Service Center is composed of three parallel functional areas with a total area of 12,000 m². It has reception hall, catering and accommodation facilities, office, conference, and exhibition halls.

2. Yuanwanglou Tourist Service Center

Yuanwanglou Tourist Service Center is located on the south bank of the Yellow River in Xintan Floating Bridge, only 300 m east of the Heritage Presentation Area, which consists of Yuanwanglou and the Yellow River cruise ship terminal. Formerly known as "Ecological Box in Dongying", Yuanwanglou is the main building of the cruise ship terminal in the Yellow River Estuary Ecotourism Area, which was completed in October 2010.

8.5.2.3 Tourist center of Migratory Bird Habitat at Nandagang

Wetland, Cangzhou, Hebei Province (YS-5)

Nandagang (YS-5) lies within the core area of the protected area and buffer zone, so its presentation is mainly carried out in the experimental zone of the protected area. There is tourist service center as an auxiliary facility of Nandagang Wetland Nature Museum. With an ecological parking lot covering an area of 500 m², , the tourist center covers a gross floor area of 500 m²has. Inside the experimental zone of the protected area, small service stations are reasonably arranged in consideration of the

birding sites, and they have supporting service facilities such as route guides, scenic spot information boards, public toilets, mini sales points, and interpretation system.

8.5.2.4 Tourist center of Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

Located at the entrance and close to the salt farm section, the tourist center provides parking, basic tour information inquiry, safety training, tour guide and interpretation services, battery car, catering, ticketing and accommodation booking services.

8.5.2.5 Tourist center of Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

The existing venues of the Administration Center of Hebei Changli Golden Coast National Nature Reserve will be used to set up a visitor center. It will be used as a tourist center of Qilihai Lagoon. It mainly provides parking, basic tour information inquiry, safety training, tour guide and interpretation services, battery car, catering, and ticketing services.

8.5.2.6 Tourist center of Migratory Bird Habitat at Dachaoqing of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

There is a tourist center based on Qinhuangdao Bird Museum in the

promotion zone of Beidaihe National Wetland Park. It provides basic tour information inquiry, safety training, tour guide and interpretation services, and ticketing services.

8.5.2.7 Tourist center of Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

The tourist center is located at the western cruise ship terminal. It provides basic tour information inquiry, safety training, tour guide and interpretation services, and ticketing services.

8.5.2.8 Tourist centers of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

1. A tourist center of Liao River Estuary (YS-10) is planned near the major transport hub in downtown Panjin to coordinate tourism services, transport, catering and accommodation, souvenirs, etc. in all presentation areas of the nominated property.

2. Two secondary tourist centers respectively are planned in the Heritage Presentation Areas of the East Part of Liao River Estuary and the East Part of Liao River Estuary, and they are mainly used to satisfy tourist needs, and are connected with Zhaoquanhe Management Station, Nanjingzi Monitoring Station. Parking lots are constructed near the secondary tourist centers to facilitate transfer to internal tour bus for

sightseeing.

Inside each presentation area, small service stations are reasonably arranged, including route guide, scenic spot information boards, public toilet, hot water room, mini sales point, etc.

8.5.2.9 Tourist centers of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

1. A tourist center of Snake Island - Laotieshan (YS-11) is planned near the major transport hub in downtown Dalian, to coordinate tourism services, transport, catering and accommodation, souvenirs, etc. in all presentation areas of the nominated property.

2. A secondary tourist service center is designed based on the existing facilities at Jiutou Hill resort to provide catering, accommodation, souvenir, transport and other services in-situ.

Inside each presentation area, considering birding sites, small service stations are reasonably arranged, including route guide, scenic spot information boards, public toilet, mini sales point, etc.

8.5.2.10 Tourist centers of Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

1. A tourist service center of Yalujiang Estuary (YS-12) is planned near the major transport hub in downtown Dandong to coordinate tourism

services, transport, catering and accommodation, cultural creative products, etc. in all presentation areas of the nominated property.

2. A tourist center is planned in the north of Dandong Yalujiang Estuary Wetland Exhibition Center. The existing tourist center will be upgraded by adding facilities such as presentation of heritage with OUV, sales of cultural and creative products, and interactive tourist experience, in order to mainly satisfy tourist needs in all presentation areas.

3. Small service stations include scenic spot information boards, public toilets, hot water room, mini sales points, etc.

8.5.2.11 Presentation centers of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

1. A tourist center of Changshan Archipelago is planned near the Guanglu Island Exhibition Center to coordinate tourism services, transport, catering and accommodation, souvenirs, etc. in all presentation areas of the nominated property. The tourist center distributes tourists a tour manual that gives basic information on the nominated property, including historical development, scale and type, location, catering and accommodation, special landscapes such as islands and forests, and shows and explains the areas and routes that tourists can visit and use.

2. Inside all presentation areas including Zhangzi Island Presentation Area and Haxian Island Presentation Area, small service stations are

reasonably arranged, including route guide, scenic spot information boards, public toilet, hot water room, mini sales point, etc.

8.5.3 Science promotion and education facilities

Science promotion and education facilities at nominated properties include three categories:

(1) Presentation centers and facilities: sand table, three-dimensional panoramic pictures, physical specimens, presentation stands, projectors, digital cameras, computers, LCD screens, specimen presentation cabinets, touch screens, LCD TVs, etc.

(2) Interpretation and facilities in tourist centers: Multimedia promotional facilities, information brochures, interactive multimedia facilities, smartphone and interpretation devices. The promotion hall should be equipped with supporting facilities such as projectors, LCD screens and public presentation platforms.

(3) Outdoor science promotion facilities: wood walkways, concealed birding rooms, birding sites, sign system, etc.

Table 15 Science Promotion and Education Facilities at Nominated Properties

ID of Nominated Property	Science Promotion and Education Facilities
YS-3	Sand table, three-dimensional panoramic pictures, physical specimens, presentation stands, projectors, digital cameras, computers, LCD screens,

ID of Nominated Property	Science Promotion and Education Facilities
	specimen presentation cabinets, touch screens, LCD TVs
YS-4	20 information signs, 20 warning signs, 20 promotional signs; multimedia promotional facilities, projectors, LCD screens, public presentation platforms
YS-5	Ecological walkway, concealed birding rooms, route guide
YS-6	Sand table, three-dimensional panoramic pictures, physical specimens, presentation stands, projectors, digital cameras, computers, LCD screens, specimen presentation cabinets, touch screens, LCD TVs, interactive multimedia, interpretation device, etc.
YS-7	
YS-8	
YS-9	
YS-10	Sand table, three-dimensional panoramic pictures, physical specimens, presentation stands, projectors, digital cameras, computers, LCD screens, specimen presentation cabinets, touch screens, LCD TVs, interactive multimedia, interpretation device, etc.
YS-11	
YS-12	
YS-13	Multimedia promotional facilities, information brochures, interactive multimedia, interpretation extender for smartphone and interpretation device Explanatory signs at birding sites

8.5.4 Tourist service facilities

To protect biodiversity of the nominated properties, reception facilities such as large hotels cannot be constructed within the nominated properties. However, the surrounding transport hubs, hotels and inns in urban areas can enhance the reception capacity of the nominated properties.

(1) Accommodation: established hotels and inns in urban areas.

(2) Catering: tourist service centers, small service stations in the Heritage Presentation Areas, tourist centers, etc. within the nominated properties.

(3) Theme events: regular holding of ecological events in the

nominated properties.

(4) Tour activities: heritage presentation routes and related presentation themes of the nominated properties.

Table 16 Tourist Service Facilities of the Nominated Properties

ID of Nominated Property	Tourist Service Facilities
YS-3	A tourist service center stands near downtown Shanghai and the major transport hub in Chongming District, and the reception capacity is enhanced through surrounding hotels; a secondary tourist center lies at the entrance of Chongming Dongtan National Nature Reserve to serve the tourist needs in all presentation areas, and it can interact with Chongming Dongtan Bird Science Base to realize different functions through building layering;
YS-4	The tourist center at the south entrance of Yellow River Estuary Ecotourism Area is the key tourist center, which includes reception hall, catering, accommodation, office, and conference space.
YS-5	Country Garden lies in the north of Nandagang, enhancing the reception capacity; and small service stations and sales points are reasonably arranged in the tourist center in southern experimental zone.
YS-6	Reception is provided through Blue Ocean Hotel in Luannan County; a tourist center is designed based on the salt farm division;
YS-7	Reception is provided through Changli Golden Coast resort hotels; the tourist center is within Qilihai Lagoon in the northeast of the nominated property.
YS-8	The reception capacity is enhanced through existing hotels in Qinhuangdao and Beidaihe;
YS-9	The reception capacity is enhanced through existing hotels in Shanhaiguan District and Laolongtou Scenic Area;
YS-10	Reception is provided through Panjin Red Beach resort hotels; the tourist service center stands near the Zhaoquanhe Management Station
YS-11	A tourist center of Snake Island - Laotieshan (YS-11) sits near the major transport hub in downtown Dalian; reception is provided mainly through hotels in downtown Dalian;
YS-12	Reception is provided through hotels in downtown Dandong; the tourist service center lies near the main transport hub in Dandong.
YS-13	Reception is provided through hotels in downtown Dalian; the tourist service center sits near Guanglu Island Exhibition Center.

8.6 Transport Planning for Presentation and Education

8.6.1 External transport

8.6.1.1 External transport of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

Shanghai has a three-dimensional transport network composed of expressway, railway, airport, maritime transport and inland water transport. Upon arrival in Shanghai, tourists can reach Chongming Dongtan (YS-3) by public transport or self-driving.

8.6.1.2 External transport of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

Dongying has a well-developed transport network including highway, railway and airport to reach any part of China. During the 14th Five-Year Plan Period, Dongying will be integrated into the network of three southward and two northward high-speed railways to enhance its transport capacity.

Currently, tourists reach the Yellow River Estuary World Heritage Presentation Area mainly through Provincial Expressway S228 and Binhai Avenue. Dongying is operating two shuttle bus lines to ensure accessibility

between downtown Dongying and the Yellow River Estuary World Heritage Presentation Area. Dongying plans to launch shuttle bus lines from urban area, airport, railway station and bus station, and include Yellow River Estuary (YS-4) in the city's tour route as an important scenic spot to make the World Heritage site known to more people.

8.6.1.3 External transport of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

The transport network inside Nandagang Industrial Park in which the nominated property lies connects Haifang Highway and Coastal Expressway in the east; Expressway G205, Tianjin-Shantou Expressway, and Huanghua-Wanjia Railway in the west; Nanpaihe-Tengzhuangzi Highway, Expressway G307, Shijiazhuang-Huanghua Expressway and Shuozhou-Huanghua Railway in the south; Expressway G337 and Quyang-Huanghua Expressway in the north. The external transport advantage is quite superior. Shijiazhuang-Hengshui-Cangzhou-Huanghua Terminal Intercity Railway and Second Line of the Beijing-Shanghai High-speed Railway (Tianjin-Weifang High-speed Railway) are under construction. In the future, a higher-speed railway network will be formed.

8.6.1.4 External transport of Migratory Bird Habitat at Nanpu

Zuidong Wetland, Luannan, Hebei Province (YS-6)

Zuidong Economic Development Zone, Luannan County can be reached mainly through a highway and an expressway. A heritage tour is provided for sightseeing in the nominated property and buffer zone.

8.6.1.5 External transport of Migratory Bird Habitat at Qilihai

Lagoon, Qinhuangdao, Hebei Province (YS-7), Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8), and Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

Expressway G228 runs through the north of Qilihai Lagoon (YS-7), Dachaoping (YS-8) and Shihenandao (YS-9) as the main land transport route to these three nominated properties. Beidaihe Railway Station is the nearest railway station to Qilihai Lagoon (YS-7) and Dachaoping (YS-8); Shanhaiguan Railway Station is the nearest railway station to Shihenandao (YS-9); Qinhuangdao Beidaihe Airport is the nearest airport to the above three nominated properties. After arrival, tourists can reach the three nominated properties via G228 for sightseeing.

8.6.1.6 External transport of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

Panjin has a well-developed transport network composed of highway, railway, maritime transport and inland river transport. Tourists reach Panjin mainly via railway and highway.

It takes about 100 minutes and 80 minutes to drive from Panjin Station to the Heritage Presentation Area of the West Part of Liao River Estuary and the Heritage Presentation Area of the East Part of Liao River Estuary, respectively. According to the passenger need in the nominated property, BRT lines are operated from the tourist service center in downtown Panjin to the Heritage Presentation Areas of the West and East Parts of Liao River Estuary.

8.6.1.7 External transport of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

The nominated property can be reached by taking a long-distance bus from Lushun Bus Station to Da'aizikou Village. Tourists can take a bus from Lushun Bus Station or Victory Tower (Taiyanggou) to Dongtuozi Terminal, and then make a transfer to Snake Island by yacht.

There are two self-driving routes: G228-Shuanggang Road-Daaizikou Village; G202-Xinghai Road-Jiutou Hill Resort.

8.6.1.8 External transport of Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

Dandong has a well-developed transport network composed of expressway, railway, airport and maritime transport. It only takes 1.5 hours and 2.5 hours to arrive in Shenyang and Dalian by high-speed railways, respectively.

It takes about 0.5 hours to drive along G228 from Dandong to the coastal tidal flat in the northeast of Erdaogou (YS-12-2) and the Heritage Presentation Area of National Wetland Bird Watching Park, and about 1.5 hours to reach the estuary of Dayang River (YS-12-1). Tourists can also choose G201 to return to Dandong.

8.6.1.9 External transport of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

1. External transport of Changhai County

Changhai has a three-dimensional transport network including aviation and maritime transport. Dachangshan Island Airport has been built at Dachangshan Island. There is a daily round-trip flight to Dalian Zhoushuizi Airport in the morning and afternoon, with a one-way flight taking approximately 30 minutes. The main way of transport for tourists to Changhai is passenger ship. In Dalian, Pikou Terminal and Xingshutun

Terminal have opened ship routes to Changhai. Tourists can enter Changshan Archipelago through Yuanyang Terminal of Dachangshan Island, Jinchan Terminal of Dachangshan Island, Duoluomu Terminal of Guanglu Island, and Zhangzi Island Terminal.

2. External transport of the nominated property

After landing on Guanglu Island, tourists can drive or take a taxi to the Heritage Presentation Area, birding sites or exhibition center. According to the passenger need in the nominated property, BRT lines would be operated from the tourist service center to the Heritage Presentation Area as a priority mode of transport.

In terms of transport between islands, Changshan Bridge connects Dachangshan Island and Xiaochangshan Island, which can be directly accessed by driving. Zhangzi Island and Haxian Island can be reached by boat at Shabao Terminal or Haxian Island Terminal.

8.6.2 Internal transport

8.6.2.1 Internal transport of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

The internal transport of the nominated property is dominated by commuter buses. Tourists who arrive by external vehicles can make a transfer on the shuttle bus at the tourist center. The hop-on hop-off shuttle

bus passes through the bird science base, exhibition center, education base and birding sites. There are temporary parking lots at all the stations.

8.6.2.2 Internal transport of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

Sitting entirely within the Yellow River Estuary Ecotourism Area, the Yellow River Estuary World Heritage Presentation Area can be accessed through both eastern and western roads. In the west of the presentation area stands the south gate of the Yellow River Estuary Ecotourism Area, and in the east is an internal road of it. One primary entrance and one secondary will be constructed as planned.

8.6.2.3 Internal transport of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

There is a 35 km long and 5 m wide patrol cement road outside the nominated property; and a 16 m long and 5 m wide cement concrete road (including 8 km at the entrance of the protected area) and a 20m long and 5 m wide dirt road inside the nominated property, and they can basically satisfy normal patrol, management and material transportation needs.

8.6.2.4 Internal transport of Migratory Bird Habitat at Nanpu

Zuidong Wetland, Luannan, Hebei Province (YS-6)

Except for two primary roads and two secondary roads, other internal roads are for salt production and not open to tourists, and warning roadblocks are erected at intersections.

8.6.2.5 Internal transport of Migratory Bird Habitat at Qilihai

Lagoon, Qinhuangdao, Hebei Province (YS-7), Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8), and Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

There is no tourist transport route inside Qilihai Lagoon (YS-7), and the planned tour route runs along the roads on the north and east of the nominated property and buffer zone, being entirely within the buffer zone;

The internal transport of Dachaoping (YS-8) is the 1.6 km long walkway outside the buffer zone;

Shihenandao (YS-9) can be reached after passing through two cruise ship terminals by boat. Internal roads on Shihenandao include circle levee, primary and secondary roads.

8.6.2.6 Internal transport of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

The internal transport of Liao River Estuary (YS-10) is dominated by the hop-on hop-off tour bus which passes through birding sites and stops at temporary stops. Within the presentation area of the West Part of Liao River Estuary, Expressway G228 connects the two birding sites. Within the presentation area of the East Part of Liao River Estuary, Binhai Avenue serves as the main road, and tourists are encouraged to do sightseeing along the walkway.

8.6.2.7 Internal transport of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

The internal transport of Snake Island - Laotieshan (YS-11) is mainly the hop-on hop-off tour bus which passes through birding sites and stops at temporary stops. Tourists can also do sightseeing by walking.

Though Snake Island (YS-11-2) has no Heritage Presentation Area, certain observation sites can be established. Ordinary tourists are prohibited to enter the nominated property, shuttle ships can be arranged for tourists to do maritime birding around the islands.

8.6.2.8 Internal transport of Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

The internal transport of Yalujiang Estuary Wetland Exhibition Center, Erdaogou Coastal Tidal Flat Birding Base and Dayang River Ecological Exhibition Center can be mainly reached by walking and shared bikes, and they have walkways.

8.6.2.9 Internal transport of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

The internal transport of both Heritage Presentation Areas is mainly the hop-on hop-off tour bus which passes through landscape areas and birding sites, and stops at temporary stops. There are also walkways for tourists to do a tour by walking.

The islands have passenger terminals for tourists to do island sightseeing and observe rare birds far away. Tourists are prohibited to enter the nominated property, and shuttle ships can be arranged for tourists to do maritime birding around the islands.

Islands and ferry terminals of nominated properties are shown below. All the islands have already had ferry terminals, and additional trips can be arranged according to the tourist reception capacity.

Table 17 List of Terminals at the Islands of Changshan Archipelago

ID of Nominated Property	Name	Island	Terminal
YS-13-1	Fantuozi Islet of Guanglu Island	Guanglu Island	Duoluomu Terminal Liutiaowan Terminal
YS-13-2	Ertuozi Islet of Gexian Island	Gexian Island	Gexian Island Terminal
YS-13-3	Datuozi and Xiaotuozi of Guapi Island	Guapi Island	Guapi Island Terminal
YS-13-4	Wuhushi of Haxian Island	Haxian Island	Haxian Island Terminal
YS-13-5	Wushi Islet of Dahaozi Island	Dahaozi Island	Dahaozi Island Terminal
YS-13-6	Xicaotuozi of Dachangshan Island	Dachangshan Island	Yuanyang Terminal, Jinchan Terminal
YS-13-7	Beituozi Islet of Dachangshan Island	Dachangshan Island	Yuanyang Terminal, Jinchan Terminal
YS-13-8	Southern Bashao Island	Bashao Island	Bashao Island Terminal

8.7 Tourist Management

8.7.1 Tourist quantity control

The number of tourists acceptable in a Heritage Presentation Area should be determined based on the principle of low intervention, ecological capacity zoning, regional tourist safety and infrastructure capacity;

The utilization of a Heritage Presentation Area must be strictly managed according to the determined number of tourists, and must not exceed the reasonable capacity;

The number of tourist should be forecast and monitored. When the quantity reaches the reasonable capacity, the information should be

published in advance and handled by a specific person. It is strictly forbidden to exceed the maximum acceptable number of tourists.

According to the *Technical Regulations for the Nature Reserve Ecotourism Plan* (GB/T20416-2006), ecotourism environmental carrying capacity refers to the number of tourists or tourism activities that an eco-tourism destination can withstand in a specific period of time, on the premise of ensuring sustainable development of the tourism resources and local environment and guaranteeing local ecological integrity and cultural continuity. Based on the characteristics of the Nominated Properties of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), the environmental carrying capacity is calculated based on the area and route, using the following formula:

$$C=A/ a\times D$$

In the formula, "C" is the daily environmental carrying capacity; "A" is the area that can be visited/the length of the tourism route; "a" is the reasonable area occupied by a tourist/the reasonable length of the tour occupied by a tourist; "D" is the turnover rate; $D = \frac{\text{the opening time of the scenic spot}}{\text{the time needed to finish visiting the scenic spot}}$.

The annual environmental carrying capacity is calculated based on the specific conditions of a nominated property, with the daily environmental carrying capacity being multiplied by the corresponding number of days.

Upon calculation, the daily and annual environmental carrying

capacities of nominated properties are shown below:

Table 18 Environmental Carrying Capacities of Nominated Properties

ID of Nominated Property	Daily Environmental Carrying Capacity/Quantity	Annual Environmental Carrying Capacity/10,000 Tourists
YS-3	9,000	123
YS-4	9,000	123
YS-5	900	23
YS-6	900	23
YS-7	1,400	26
YS-8	900	23
YS-9	2,000	54
YS-10	20,000	318
YS-11	600	11
YS-12	20,000	318
YS-13	5,000	80

* The data are calculated based on the presentation areas and routes specified in 8.4.3, including the presentation outside the buffer zone.

8.7.2 Tourist behavior management

External vehicles and large sightseeing buses of tour groups should be prohibited from entering any nominated property. Tourists shall make a transfer by customized transport means at the primary service center before entering the Heritage Presentation Area.

Clean-energy medium-sized tourist buses should be used and stops should be planned based on the existing road system;

In order to protect the ecology and ensure tourist safety, all activities in the Heritage Presentation Area must be controlled within a reasonable

scope. Tours in the presentation area should be carried out in strict accordance with the tour routes, and isolation facilities and warning signs should be erected along the routes to prohibit tourists from entering the not-for-tourist areas.

8.7.3 Tourist safety protection

To enhance public security management, each nominated property should have police station or public security handling station, as well as a safety supervision brigade in charge of routine patrol;

It is necessary to provide safety training for tourists in the tourist center and allow tourists to do sightseeing after they have watched the safety training video.

Seasonal visiting route maps should be provided for tourists to facilitate their sightseeing. Each nominated property should have vending machines, battery car sites, fire hydrants, toilets and other facilities at presentation venues to help tourists choose a suitable sightseeing way.

A medical service station should be established at each conservation and management station, and it should have medicines and equipments for treating common symptoms or meeting the urgent medical needs of tourists, in addition to tourist safety emergency facilities such as lifebuoys and fire hydrants.

Each nominated property should have a sound system for medical

cooperation with hospitals in the city and county where it is located, and a two-level medical service system with hospitals as the core and supplemented by medical service stations within the nominated property.

8.8 Public Education

8.8.1 Manager education

It is necessary to provide the managerial personnel with environmental education to enhance their understanding and knowledge about heritage value and protection, eco-environmental protection, etc.;

The management agency of each nominated property should train and assess its managerial personnel on business, legal, scientific and cultural knowledge related to environment management and protection;

The management agency of each nominated property should assign elite managerial personnel and scientific researchers to participate in important wetland protection training at home and abroad, such as relevant legal knowledge sessions, management plan preparation training, ecological monitoring training, environmental monitoring training, wild animal epidemic source and disease monitoring training, endangered animal protection learning, etc.;

The management agency of each nominated property should invite experts and scholars at home and abroad to carry out relevant scientific

research on the geology, geomorphology, ecosystem and biodiversity, to explain the latest research progress in various fields to its managerial personnel, and to provide technical guidance for its protection and management.

8.8.2 Resident education

It is necessary to popularize the knowledge about heritage elements such as wetland ecosystem, protected rare species and the Yellow Sea intertidal zone to local residents, so that they can understand the significance and principles of heritage protection and recognize the relationship between natural heritage and environmental protection;

The public should be encouraged to pay attention to issues relating to ecological protection, discuss its status quo, and participate in eco-environmental protection activities related to the nominated property;

It is necessary to provide necessary eco-environmental protection knowledge education and skills training for residents or community organizations that may engage in heritage protection management or whose daily life or work may concern heritage elements, to ensure that their actions will not adversely affect the heritage value and the natural environment of the nominated property;

It is necessary to focus on providing environmental education for residents, especially for teenagers, cooperate with the school education in

the city, county and township (town) where the nominated property is located, make educational materials to publicize and explain the harmony between human and nature, and encourage teenagers to participate in related extracurricular activities to get closer to nature.

8.8.3 Online education

It is necessary to establish and improve the nominated property's presentation website by adding the heritage column based on the current website or the feasibility of creating a website to publicize the outstanding natural features and important scientific and aesthetic values of the nominated property, as well as the scientific knowledge on heritage value, heritage protection, ecological environment protection, etc., through texts, pictures, videos and other means;

Social platforms such as WeChat and Weibo should be used to promote the nominated properties, and this can strengthen interaction with the public through comments, Q&A, and messages.

9 Monitoring and Management Effectiveness Evaluation

9.1 Status Quo

In terms of the monitoring system, 11 nominated properties have clearly demarcated the scope of protection. In terms of wetland resource protection, conservation and management agencies and management stations have been established, full-time patrol and security staff have been employed and equipped with patrol vehicles, and surveillance cameras have been set up. Monitoring systems have been established for long-term dynamic monitoring within nominated properties on the biodiversity, habitats, ecological processes of the ecosystem, biological communities, environmental quality, natural disasters, and visitors.

A number of natural monitoring projects on the ecological environment have been carried out in 11 nominated properties in cooperation with relevant scientific research institutions, universities and colleges, and social organizations. The long-term research and monitoring projects focus on wetland land-use changes, biodiversity conservation, and bird breeding biology. Substantial scientific research and monitoring data have been accumulated, laying a solid foundation for ongoing conservation management of the nominated properties.

9.1.1 Status monitoring systems

The nominated properties have established sound monitoring systems by building scientific research and monitoring centers, management stations, monitoring points and patrol roads, as well as monitoring line transects, belt transects and surveillance camera system. The monitoring programmes mainly include the following.

(1) Ecological environment monitoring: It focuses on meteorological conditions, air environment, sound environment, surface water and groundwater quality, hydrology and soil environment of nominated properties

(2) Biodiversity monitoring: It mainly includes species surveys, waterbird banding, and food web research on biological communities such as higher vegetation, large benthos, waterbird populations, zooplanktons, and fishes.

(3) Natural resources monitoring: It focuses on wetland resources and topographic changes of coastal zone at nominated properties.

The status monitoring systems of the nominated properties are set out below.

Table 19 Status Monitoring Systems of the Nominated Property

ID of Nominated Property	Monitoring Item	Monitoring Station
YS-3	Ecological environment monitoring; biodiversity monitoring, natural resources monitoring	Epidemic source & disease monitoring system (four national monitoring stations and a total of 43 control points); management, protection and patrol system (five management and protection stations, and eight routes); video surveillance system
YS-4	Ecological environment monitoring; biodiversity monitoring, natural resources monitoring	Thirteen monitoring patrol roads and four monitoring centers; over 40 monitoring points
YS-5	Biological monitoring, environmental monitoring, threat factors monitoring, and local community activities monitoring	Eleven management and conservation stations; one national epidemic source and disease monitoring station.
YS-6	Biological monitoring, environmental monitoring, and threat factors monitoring	The new nature reserve has no monitoring facility currently
YS-7	Sea area ecological environment monitoring, land area coastal dune monitoring, and bird community monitoring	Currently, it has no monitoring station and related equipment
YS-8	Ecological environment monitoring system of coastal waters of Qinhuangdao; monitoring of Hebei Beidaihe National Wetland Park; bird community monitoring; plant community monitoring	Two hydrology and water quality monitoring points; 12 plant sample plots
YS-9	Ecological environment monitoring system of coastal waters of Qinhuangdao; bird monitoring; benthos monitoring	One monitoring station, which lacks the necessary equipment
YS-10	Wetland bird monitoring; wetland ecosystem meteorological monitoring	Three existing management stations, i.e., Dongguo Management Station, Zhaoquanhe Management Station, and Nanxiaohe Management Station
YS-11	Baseline monitoring of natural resources	Three management stations, i.e., Snake Island Management Station, Aizikou Management Station, and Laotieshan Management Station

ID of Nominated Property	Monitoring Item	Monitoring Station
YS-12	Baseline monitoring of natural resources	Three management stations, i.e., Gushan Management Station, Changshan Supervision Station, and Dalu Island Management Station; 14 waterbirds monitoring stations
YS-13	Environmental monitoring	The ecological environment monitoring station is equipped with related devices for water monitoring, atmosphere monitoring and soil monitoring

9.1.2 Assessment of monitoring results and problems

To better protect and manage the nominated properties, the management agencies have worked with universities and research institutions to carry out many monitoring tasks, e.g., natural resource surveys, environmental monitoring, and biodiversity monitoring. There are monitoring reports, scientific research reports, and resource survey reports regarding the nominated properties.

Currently, the monitoring of the nominated properties needs to be improved in the following aspects:

(1) Scientific research monitoring stations should be improved, as some nominated properties (YS-7, YS-8, YS-9) lack monitoring stations that cover the heritage elements that need to be monitored, and there are special monitoring requirements for some nominated properties, e.g., YS-13, which requires offshore monitoring boats and floating-bridge terminals;

(2) Dynamic monitoring should be intensified, data should be updated in real time, and a time-sensitive monitoring system should be put in place;

(3) Systematic and comprehensive monitoring should be strengthened, and traditional monitoring methods should be refined to provide a basis for fine land management at the land scale.

The specific monitoring results and existing problems about each nominated property are set out as follows.

9.1.2.1 Monitoring results and existing problems of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

Monitoring results: The nominated property has explored ways to strengthen connections with research and education institutions and conservation organizations at home and abroad. It has now become an important base for universities and research institutions in Shanghai and surrounding areas to study the formation, development and evolution of the estuary wetland ecosystem and various organisms within the ecosystem, and has established the "Fudan University Yangtze River Estuary Wetland Ecosystem Field Station". The nominated property carries out many scientific research and monitoring projects each year on its unique resources and values, including species surveys, waterbird bandings, and food web research on biological communities including higher vegetation, large benthos, waterbird populations, zooplanktons, and fishes, providing

basis for conservation and management of biological resources.

Existing problems: However, the scientific research and monitoring of the nominated property are mostly carried out in collaboration with external research resources and external institutions due to the limited management staff over a long time. Hence, it still needs to enhance the talent training, optimize the research management model and improve research and monitoring facilities.

9.1.2.2 Monitoring results and existing problems of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

Monitoring results: Shandong Yellow River Delta National Nature Reserve monitor birds, plants, wetland environment, wetland fisheries, and benthos in the nature reserve on a regular basis, and cooperate with colleges and research institutions such as Yantai Institute of Coastal Zone Research of Chinese Academy of Sciences, Beijing Normal University and Liaoning University to prepare the *Annual Monitoring Report on Shandong Yellow River Delta National Nature Reserve* for many years.

Existing problems: The nature reserve has not carried out monitoring on the nominated property. Therefore, a dynamic monitoring network should be planned for Yellow River Estuary (YS-4) to meet requirements for the World Heritage nomination.

9.1.2.3 Monitoring results and existing problems of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

Monitoring results: The management agency has, since 2005, in collaboration with universities such as Hebei Normal University and scientific research institutions, conducted many scientific research and monitoring projects on the nominated property's unique resources, including species surveys, ecological surveys, and food web research on biological communities including mammals, birds, amphibians and reptiles, fishes, benthos, and plants, providing the basis for its conservation management and scientific decision-making. And *Scientific Investigation Report on Nandagang Wetland and Provincial Bird Nature Reserve* has been completed.

Existing problems: The monitoring of the nominated property still uses a traditional approach, which is time-consuming and inefficient, and cannot provide real-time data updates. The traditional monitoring approach has also failed to provide precise spatial information on species, and the basis for fine land management implemented at the land scale.

9.1.2.4 Monitoring results and existing problems of Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

Monitoring results: The management agency has carried out plenty of

scientific research and monitoring projects on the nominated property's unique resources and elements, including species surveys, ecological surveys, and food web research on biological groups such as migratory birds (especially shorebirds), mammals, amphibians and reptiles, fishes, benthos, and plants, providing the basis for its conservation and management of biological resources.

Existing problems: Due to the late establishment of the nature reserve system for the nominated property, the preliminary monitoring is mainly oriented by scientific research only, and is not systematic and comprehensive enough. Property elements that need to be monitored are not covered due to the lack of monitoring stations. The scientific research monitoring cannot provide precise spatial information on species, and the basis for fine land management at the land scale.

9.1.2.5 Monitoring results and existing problems of Migratory Bird Habitats in Qilihai Lagoon, Qinhuangdao, Hebei (YS-7)

Monitoring results: The management agency has carried out many scientific research and monitoring projects on the nominated property's unique resources and elements.

Existing problems: Property elements that need to be monitored are not covered due to the lack of monitoring stations. The nominated property is to be placed under systematic and comprehensive monitoring.

9.1.2.6 Monitoring results and existing problems of Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

Monitoring results: The management agency has conducted many scientific research and monitoring projects on unique resources and elements of the nominated property.

Existing problems: The management agency has not implemented systematic and comprehensive monitoring. Property elements that need to be monitored are not covered due to the lack of monitoring stations.

9.1.2.7 Monitoring results and existing problems of Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

Monitoring results: The management agency has carried out many scientific research and monitoring projects on unique resources and elements of the nominated property. Existing problems: The management agency has not carried out systematic and comprehensive monitoring. Property elements that need to be monitored are not covered due to the lack of monitoring stations.

9.1.2.8 Monitoring results and existing problems of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

The management agency of the nominated property has carried out bird monitoring programs. Since 2010, it has been monitoring the breeding populations of waterbirds and Saunders's Gull in the reserve, has jointly monitored the migration populations of cranes and storks in the Yellow Sea Ecoregion, Northeast China, and North China together with the Wetland International-China Project Office and the International Crane Foundation, and prepared annual reports on bird monitoring at Liaoning Liao River Estuary National Nature Reserve. In addition, it has established a wetland ecosystem monitoring station, collaborated with Shenyang Agricultural University on wetland ecosystem monitoring, provided scientific basis for wetland protection and ecological restoration, and prepared *Annual Report on Panjin Wetland Ecosystem Monitoring*; and has been engaged in the research on insects, fishes and plant resources. The *Report on Insect Resources Survey at Liaoning Liao River Estuary National Nature Reserve*, *Report on Fish Resources Survey at Liaoning Liao River Estuary National Nature Reserve*, and *Report on Plant Resources Survey at Liaoning Liao River Estuary National Nature Reserve* have been prepared.

Existing problems: The rapid evolution and succession of the wetland ecosystem and the various human factors disturbing the reserve wetland

need to be addressed by establishing an effective and time-efficient monitoring system.

9.1.2.9 Monitoring results and existing problems of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

Monitoring results: The management agency performed monitoring on the natural resources of the Nature Reserve from 2010 to 2016, and completed *Report on Coastal Animals at Liaoning Snake Island-Laotieshan National Nature Reserve*, *Report on Plants at Liaoning Snake Island-Laotieshan National Nature Reserve*, *Report on Birds at Liaoning Snake Island-Laotieshan National Nature Reserve*, and *Report on Insects at Liaoning Snake Island-Laotieshan National Nature Reserve*.

Existing problems: The monitoring results achieved so far are not comprehensive and outdated, with the latest bird monitoring report completed five years ago, and the latest scientific research report made 12 years ago. A timely and improved monitoring system is urgently needed.

9.1.2.10 Monitoring results and existing problems of Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

Monitoring results: The management agency has carried out a large amount of scientific research and monitoring projects on the nominated

property's unique resources and values, including species surveys, ecological surveys, and food web research on biological groups such as mammals, birds, amphibians and reptiles, fishes, benthos, and plants, providing the basis for its conservation and management of biological resources.

Existing problems: The traditional monitoring approach cannot provide precise spatial information on species, and the basis for fine land management at the land scale.

9.1.2.11 Monitoring results and existing problems of Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

Monitoring results: The monitoring data of the nominated property are quite comprehensive, including monitoring data on drinking water sources from 2012 to present, atmosphere from 2013 to present, soil from 2018 to present, and coastal waters from 2018to present. The biodiversity surveys on Fantuozi Islet (YS-13-1) and Dahaozi Island (YS-13-5) are comprehensive and detailed, and survey reports are produced. The surveys and monitoring on other islands are in progress.

Existing problems: The biodiversity survey on Fantuozi Islet (YS-13-1) and Dahaozi Island (YS-13-5) is completed. But as the nominated property involves numerous islands, the surveys and monitoring on other

islands should be improved as soon as possible. Moreover, offshore monitoring boat and related equipment need to be put in place, and the construction of the dock for the monitoring boat needs to be intensified, to effectively carry out offshore monitoring of Changshan Archipelago.

9.2 Objectives

The management agencies should conduct in-depth baseline resource surveys, *in situ* monitoring and scientific research to provide the scientific research basis for the management, protection and rational utilization of natural resources of the nominated properties, and provide practical techniques for the local people in the nominated properties to promote the local economic development, for the sake of regional sustainable development.

(1) The baseline resources of each nominated property, such as wetland resources, biological resources, plant resources and water resources, should be further investigated based on the scientific investigation results achieved.

(2) Biological research on breeding, overwintering and migration patterns of birds should be conducted to understand birds' habitat requirements, overwintering patterns and breeding processes, providing basic materials for conservation.

(3) Ecological *in situ* monitoring should be carried out to grasp the

structure and functions of estuarine wetland ecosystem and its evolution pattern, and the pattern of interaction between ecosystem and natural environment.

(4) Scientific research should be conducted based on the protection of existing genetic biodiversity to continuously reproduce and expand the populations of rare and endangered animals and plants at gene level.

(5) Research should be conducted on the sustainable use and development of wetland resources, to explore new models for the rational use of wetlands to provide new ideas and new techniques for local sustainable development.

(6) Monitoring and research on natural environmental factors, meteorological and hydrological studies should be carried out to provide basic materials for the conservation of wetland ecosystem and rare and endangered birds.

(7) Research should be conducted on wetland restoration mechanism, wetland value assessment, wetland ecological compensation, rare and endangered species conservation mechanism, habitat protection and restoration, and sustainable development model to provide a basis for decision-making on conservation.

9.3 Monitoring Items and Method

The management agencies should monitor bio-ecology,

environmental conditions and factors affecting the nominated properties:

1. Bio-ecological monitoring: Regular monitoring should be carried out on 1) the distribution and quantity of typical vegetation communities at wetlands within the nominated properties; 2) the range of population and activity key species of migratory birds

2. Environmental conditions monitoring: It should focus on meteorological conditions, air environment, sound environment, surface water and groundwater quality, hydrology and soil environment of the nominated properties.

3. Monitoring of factors affecting the nominated properties: Regular monitoring should be performed on the geology and geomorphology, earthquake activity, tourism activities, illegal activities, and community status in the nominated properties.

9.4 Monitoring Indicator System

The monitoring items of each nominated property mainly cover the bio-ecology, environmental conditions, geology and geomorphology, earthquake, tourism activities, illegal activities, community status and forest fire. Simultaneous monitoring and unified coordination of all components should be carried out. The monitoring of each area of the nominated properties is carried out by the conservation and management stations based on a monitoring indicator system.

1. Bio-ecological monitoring: Line transect sampling, direct counting and tracking are employed to regularly monitor the species, distribution, quantity, threatened status, habitat and its quality, as well as the epidemiological status of migratory birds plus breeding and wintering birds within the nominated properties, especially endangered migratory bird species such as Oriental Stork (*Ciconia boyciana*), Relict Gull (*Ichthyaetus relictus*), Eastern Curlew (*Numenius madagascariensis*), and Nordmann's Greenshank (*Tringa guttifer*).

2. Environmental monitoring: *in situ* monitoring is employed to monitor the meteorological and hydrological status, atmospheric environment (air pollutant indicators), water environment (surface water quality and quantity and groundwater quality and level), soil physical and chemical properties, acoustic environment and other aspects of environmental status within the nominated properties;

3. Geological and geomorphological monitoring: *in situ* monitoring method is utilized to regularly monitor the layer-wise benchmark, bedrock benchmark, GPS mark stone, and ground fractures in regions of major geological features;

4. Earthquake activity monitoring: *in situ* monitoring method is used to monitor in real time the precursor activity, seismic activity and post-earthquake activity in key seismic zones;

5. Tourism activities monitoring: The data of tourist center is

employed to monitor the number of visitors, road traffic conditions, visitor safety, tourism services, facilities quality, and other aspects within nominated properties;

6. Illegal activities monitoring: Patrol and remote sensing are utilized to monitor illegal fishing and hunting, illegal wastewater discharge, illegal construction, and occupation of wetlands within nominated properties;

7. Community status monitoring: Manual investigation is utilized to monitor the production and living conditions, construction and related socio-economic indicators of local residents;

8. Forest fire monitoring: Fire in forest land and grassland habitats within the nominated properties (YS-7, YS-8, YS-9, YS-11) is monitored manually and using equipment.

See the below table for monitoring indicators for the nominated properties:

Table 20 List of Monitoring Indicators for Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Indicator	Frequency	Data Holder
1. Bio-ecological monitoring		YS-3: National Terrestrial Wild Animal Epidemic Disease Monitoring Station. YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve, National Bird Banding Center of China. YS-5: Administration Office of Nandagang Wetland and Provincial Bird Nature Reserve, Cangzhou Normal University, Hebei Normal University.
1.1 Bird species	Half monthly during migration and monthly not during migration	
1.2 Bird distribution		
1.3 Bird quantity		
1.4 Threatened status of birds		
1.5 Bird habitat and its quality	Quarterly	

Indicator	Frequency	Data Holder
1.6 Epidemiological status of birds	Quarterly	YS-6: Beijing Normal University, Global Flyway Network (GFN). YS-7: Hebei Normal University, Qinhuangdao Bird Watching Society, Qinhuangdao Ecology and Environment Bureau. YS-8: Hebei Normal University, Qinhuangdao Bird Watching Society. YS-9: Hebei Normal University, Qinhuangdao Bird Watching Society. YS-10: Administration Office of Liaoning Liao River Estuary National Nature Reserve. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Service Center for the Development of Forestry and Grassland at Dandong City. YS-13: Service Center for Natural Resources Affairs of Changhai County
1.7 Distribution and quantity of habitat vegetation community	Quarterly	
1.8 Monitoring of invasive species	Quarterly	
2. Environmental monitoring		YS-3: Shanghai Municipal Bureau of Ecology and Environment. YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve. YS-5: Cangzhou Bohai New District Meteorological Bureau. YS-6: Meteorological Bureau of Luannan County, Luannan County Environmental Protection Bureau. YS-7: Qinhuangdao Meteorological Bureau, Qinhuangdao Ecology and Environment Bureau, Changli Golden Coast National Nature Reserve. YS-8: Qinhuangdao Ecology and Environment Bureau, Administration Office of Beidaihe National Wetland Park. YS-9: Qinhuangdao Meteorological Bureau, Qinhuangdao Ecology and Environment Bureau, Water Affairs Bureau of Shanhaiguan District, Qinhuangdao. YS-10: Panjin Meteorological Bureau, Panjin Ecology and Environment Bureau.
2.1 Meteorological status	Daily	
2.2 Atmospheric environment	Daily	
2.3 Water environment	Monthly	
2.4 Physical and chemical properties of soil	Monthly	
2.5 Acoustic environment	Monthly	

Indicator	Frequency	Data Holder
		YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Meteorological Bureau of Dandong, Bureau of Ecology and Environment of Dandong, Water Affairs Bureau of Dandong, Natural Resources Bureau of Dandong, Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve. YS-13: Service Center for Natural Resources Affairs of Changhai County
3. Geological and geomorphological monitoring		YS-3: Shanghai Municipal Planning and Natural Resources Bureau. YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve.
3.1 Geological status	Yearly	YS-5: Natural Resources and Planning Bureau of Nandagang. YS-6: Natural Resources and Planning Bureau of Luannan County. YS-7: Nanjing University, Changli Golden Coast National Nature Reserve. YS-8: Nanjing University. YS-9: Nanjing University.
3.2 Coastlines and geomorphology monitoring	Yearly	YS-10: Natural Resources Bureau of Panjin. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Natural Resources Bureau of Dandong. YS-13: Service Center for Natural Resources Affairs of Changhai County
4. Earthquake activity monitoring		YS-3: Shanghai Earthquake Agency. YS-4: Earthquake Monitoring Center, Dongying Emergency Management Bureau. YS-5: Cangzhou Seismological Bureau.
4.1 Precursor activity	Real-time	YS-6: Tangzhou Seismological Bureau. YS-7: Qinhuangdao Seismological Bureau. YS-8: Qinhuangdao Seismological Bureau. YS-9: Qinhuangdao Seismological Bureau.

Indicator	Frequency	Data Holder
4.2. Earthquake activity	Real-time	YS-10: Panjin Housing and Urban-Rural Construction Bureau. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Dandong Housing and Urban-Rural Construction Bureau. YS-13: Service Center for Natural Resources Affairs of Changhai County
5. Tourism activities monitoring		YS-3: Shanghai Municipal Administration of Culture and Tourism, People's Government of Chongming District
5.1 Tourist quantity	Daily	YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve.
5.2 Traffic	Daily	YS-5: Administration of Culture and Tourism of Nandagang Industrial Park. YS-6: Luannan Culture, Radio, Television and Tourism Bureau.
5.3 Tourist safety	Daily	YS-7: Administration Committee of Beidaihe New Area, Qinhuangdao.
5.4 Quality of tourist service facilities	Yearly	YS-8: Administration Office of Beidaihe National Wetland Park, Forestry Bureau of Beidaihe District. YS-9: Shanhaiguan Service Center for Beidaihe Scenic Area. YS-10: Administration Office of Liaoning Liao River Estuary National Nature Reserve. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Donggang Municipal People's Government, Transportation Bureau of Dandong, Culture, Tourism, Radio and Television Bureau of Dandong, Statistics Bureau of Dandong, Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve. YS-13: Service Center for Natural Resources Affairs of Changhai County

Indicator	Frequency	Data Holder
6. Illegal activity monitoring		YS-3: Shanghai Forestry Bureau, Affairs Administration Center of Chongming Dongtan Nature Reserve, Shanghai. YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve.
6.1 Illegal fishing and hunting	Daily	YS-5: Administration Office of Nandagang Wetland and Provincial Bird Nature Reserve. YS-6: Natural Resources and Planning Bureau of Luannan County. YS-7: Qinhuangdao Forestry Bureau, Qinhuangdao Ecology and Environment Bureau.
6.2 Illegal wastewater discharge	Daily	YS-8: Qinhuangdao Forestry Bureau, Qinhuangdao Ecology and Environment Bureau. YS-9: Qinhuangdao Forestry Bureau, Qinhuangdao Ecology and Environment Bureau. YS-10: Natural Resources Bureau of Panjin. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Donggang Municipal People's Government, Forestry and Grassland Bureau of Dandong. YS-13: Service Center for Natural Resources Affairs of Changhai County
7. Community status monitoring		YS-3: People's Government of Chongming District, Chenjia Township People's Government. YS-4: Administration Committee of Shandong Yellow River Delta National Nature Reserve.
7.1 Community production and living conditions	Yearly	YS-5: Administration Committee of Nandagang Industrial Park. YS-6: Luannan County People's

Indicator	Frequency	Data Holder
7.2 Community construction	Yearly	Government. YS-7: Administration Committee of Qinhuangdao Beidaihe New Area YS-8: Administration Committee of Beidaihe New Area, Qinhuangdao. YS-9: Shanhaiguan District Government, Qinhuangdao. YS-10: Panjin Housing and Urban-Rural Construction Bureau. YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve. YS-12: Donggang Municipal People's Government, Statistics Bureau of Dandong YS-13: Service Center for Natural Resources Affairs of Changhai County
8. Forest fire monitoring (YS-7, YS-8, YS-9, YS-11)	Real-time	YS-7, YS-8, YS-9: Qinhuangdao Forestry Bureau. Dandong City Statistics Bureau. YS-11: Lushunkou Branch of Bureau of Natural Resources, Dalian, China.

9.5 Distribution of Monitoring Stations

9.5.1 Monitoring station

9.5.1.1 Distribution of monitoring stations of Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

Based on the monitoring stations and management and conservation stations of Shanghai Chongming Dongtan National Bird Nature Reserve, the nominated property has Beibaxiao Monitoring Station, Dongwangsha

Monitoring Station, Buyugang Monitoring Station, and Baigang Monitoring Station.

Table 21 List of Monitoring Stations of Chongming Dongtan (YS-3)

Monitoring Station	Monitoring Type	Indicator	Remark
Beibaxiao Monitoring Station	Bio-ecological monitoring Environmental monitoring Tourism activities monitoring Illegal activities monitoring	Distribution and quantity of typical vegetation communities at the wetland, the population and activity range of key species of migratory birds, meteorological conditions, air environment, hydrology and water quality, number of visitors, tourism services, facilities quality, and illegal fishing	Existing
Dongwangsha Monitoring Station	Bio-ecological monitoring Environmental monitoring	The population and activity range of key species of migratory birds, benthos diversity, hydrology and water quality	Existing
Buyugang Monitoring Station	Bio-ecological monitoring Environmental monitoring	Distribution and quantity of typical vegetation communities at the wetland and the population and activity range of key species of migratory birds	Existing
Baigang Monitoring Station	Bio-ecological monitoring Environmental monitoring	Distribution and quantity of typical vegetation communities at the wetland, the population and activity range of key species of migratory birds, benthos diversity, plankton and fish diversity, air environment, hydrology and water quality, and soil environment quality	Existing
Tuanjiesha Monitoring Station	Bio-ecological monitoring Environmental monitoring Tourism activities monitoring	Distribution and quantity of typical vegetation communities at the wetland, the population and activity range of key species of migratory birds, meteorological conditions, air environment, hydrology and water quality, the number of visitors, tourism services, and facilities quality	Existing
Bird Banding Station	Bird banding monitoring	Bird banding status	Existing

Monitoring Station	Monitoring Type	Indicator	Remark
Tourist Center Monitoring Point	Tourism activities monitoring	Number of visitors, road traffic conditions, visitor safety, tourism services, and facilities quality	To be established



Figure 43 Plan Drawing of Monitoring Stations of Chongming Dongtan (YS-3)

9.5.1.2 Distribution of monitoring stations of Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

Eight monitoring stations are planned to be set up in the peripheral area of the nominated property (the experimental zone of the Nature Reserve) based on existing scientific research centers, management stations, and monitoring stations.

Table 22 List of Monitoring Stations of Yellow River Estuary (YS-4)

Name	Monitoring Station	Location Description	Monitoring Item
Old Course of Yellow River Estuary YS-4-1	Sanhe Monitoring Point	Southwest of Yiqianer Tourism Zone, east part of Sanhe, north side of Zhuangcheng Road	(1) Plant community characteristics (2) Plant community biomass (3) Net primary productivity of plant communities
	Monitoring Point at Yiqianer Management Station	Inside Yiqianer Management Station	(1) Wetland microclimate monitoring (2) Water quality monitoring (3) Monitoring of soil and wild animal habitat
	Donggang Monitoring Point	Easternmost part of Yiqianer Area	(1) Key groups of bird species (2) Key bird habitats (3) Bird epidemic source and diseases (4) Natural disasters (5) Socio-economic factors
North Part of Yellow River Estuary (YS-4-2)	Kendongwu Monitoring Point	South of Kendong Oilfield, west of the north part of the Yellow River Estuary Area	(1) Plant community characteristics (2) Plant community biomass (3) Net primary productivity of plant communities (4) Key groups of bird species (5) Key bird habitats (6) Bird epidemic source and diseases
	Scientific Research Center Monitoring Point of Yellow River Estuary (YS-4-2)	North of North Shunhe Road, northwest of Kendong Liuquan	(1) Wetland microclimate monitoring (2) Water quality monitoring (3) Monitoring of soil and wild animal habitat (4) Natural disasters

Name	Monitoring Station	Location Description	Monitoring Item
			(5) Socio-economic factors
South Part of Yellow River Estuary (YS-4-3)	Yuanwanglou Monitoring Point	Inside Yuanwanglou Visitor Service Center	(1) Wetland environment monitoring (2) Wetland plant resources monitoring (3) Wetland animal resources monitoring
Dawenliu YS-4-4	Monitoring point of Dawenliu Management Station	Northeast of Dawenliu Management Station	(1) Plant community characteristics (2) Plant community biomass (3) Net primary productivity of plant communities
	Monitoring Point at Dawenliu Bird Watching Tower	North side of Dawenliu buffer zone	(1) Key groups of bird species (2) Key bird habitats (3) Bird epidemic source and diseases



Figure 44 Layout Plan of Monitoring Stations of Yellow River Estuary (YS-4)

9.5.1.3 Distribution of monitoring stations of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

Nine new monitoring points (watchtowers) will be established along the existing patrol roads based on existing facilities, five of which will be

within the nominated property.

The locations of monitoring facilities of Nandagang (YS-5) are set out in the figure below.

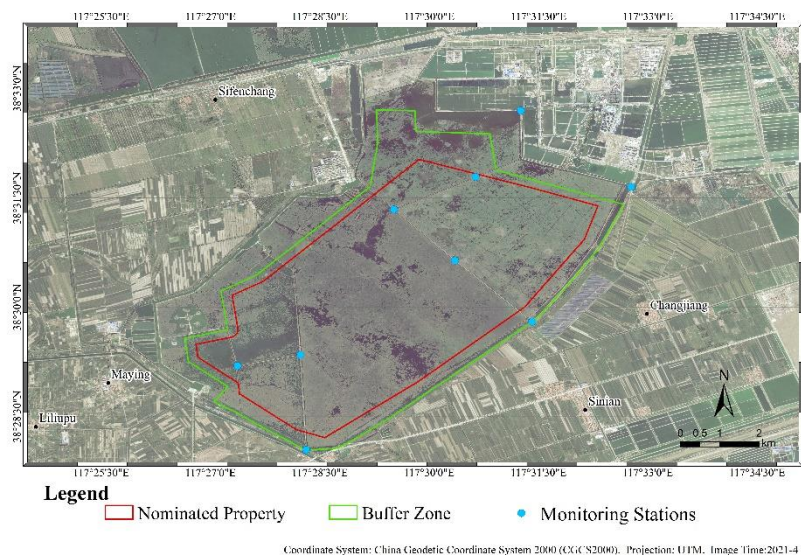


Figure 45 Plan Drawing of Monitoring Stations of Nandagang (YS-5)

9.5.1.4 Distribution of monitoring stations of Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

Monitoring stations have been established in the southeast of salt farms in the nominated property based on existing stations. The distribution is shown in the below figure.



Figure 46 Plan Drawing of Monitoring Stations of Nanpu (YS-6)

9.5.1.5 Distribution of monitoring stations of Migratory Bird

Habitats in Qilihai Lagoon, Qinhuangdao, Hebei (YS-7)

Three conservation and management stations, i.e., Tuanlin Management Station, Lagoon Management Station, and Lindi Management Station, are set up within the nominated property and surrounding areas based on existing management facilities.

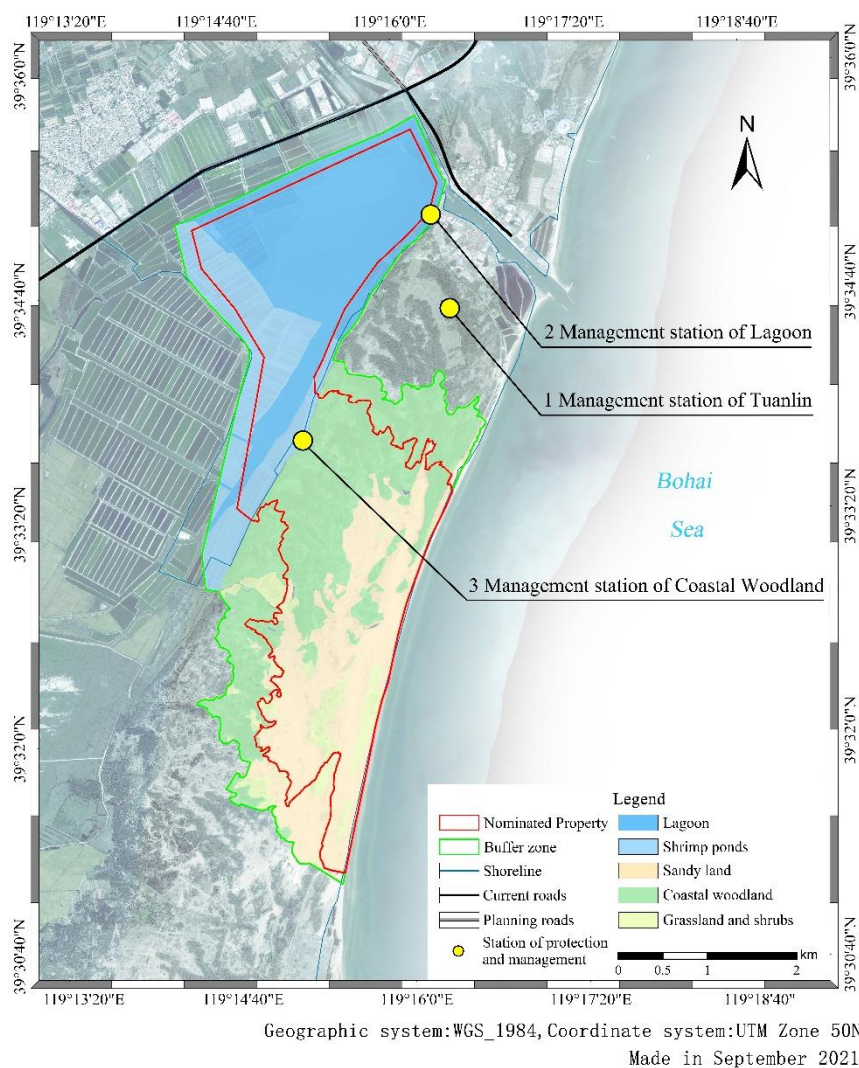


Figure 47 Plan Drawing of Monitoring Stations of Qilihai Lagoon (YS-7)

9.5.1.6 Distribution of monitoring stations of Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

The existing monitoring stations are fully used to handle the daily monitoring of the nominated property.

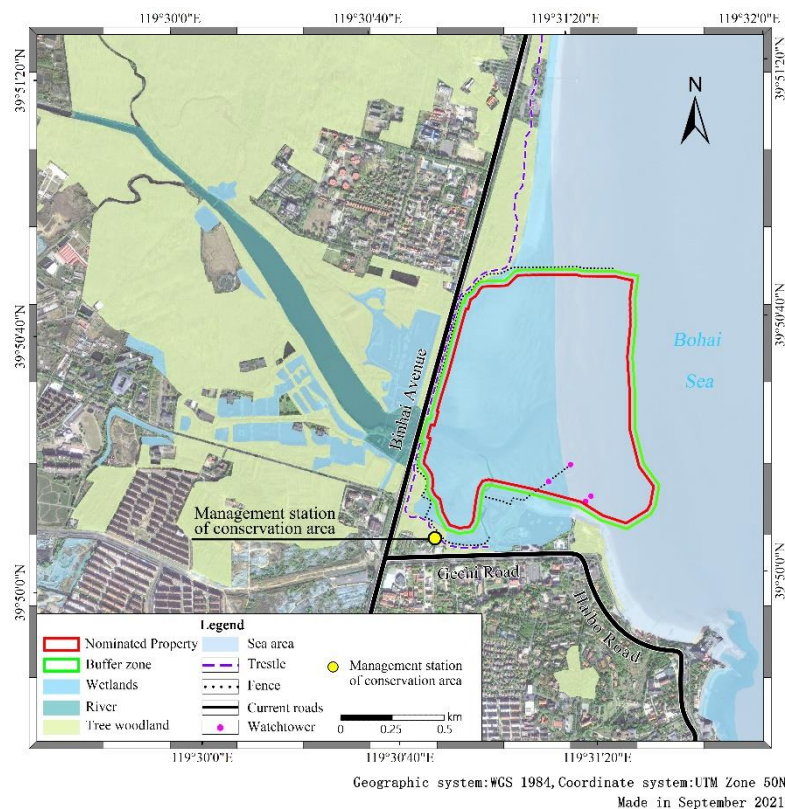


Figure 48 Plan Drawing of Monitoring Stations of Dachaoping (YS-8)

9.5.1.7 Distribution of monitoring stations of Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

The existing monitoring stations are fully used. There is currently one monitoring station within the nominated property, which also serves as an entrance management station. But the station lacks the necessary equipment. In addition, a monitoring management station shall be set up at the nominated properties.

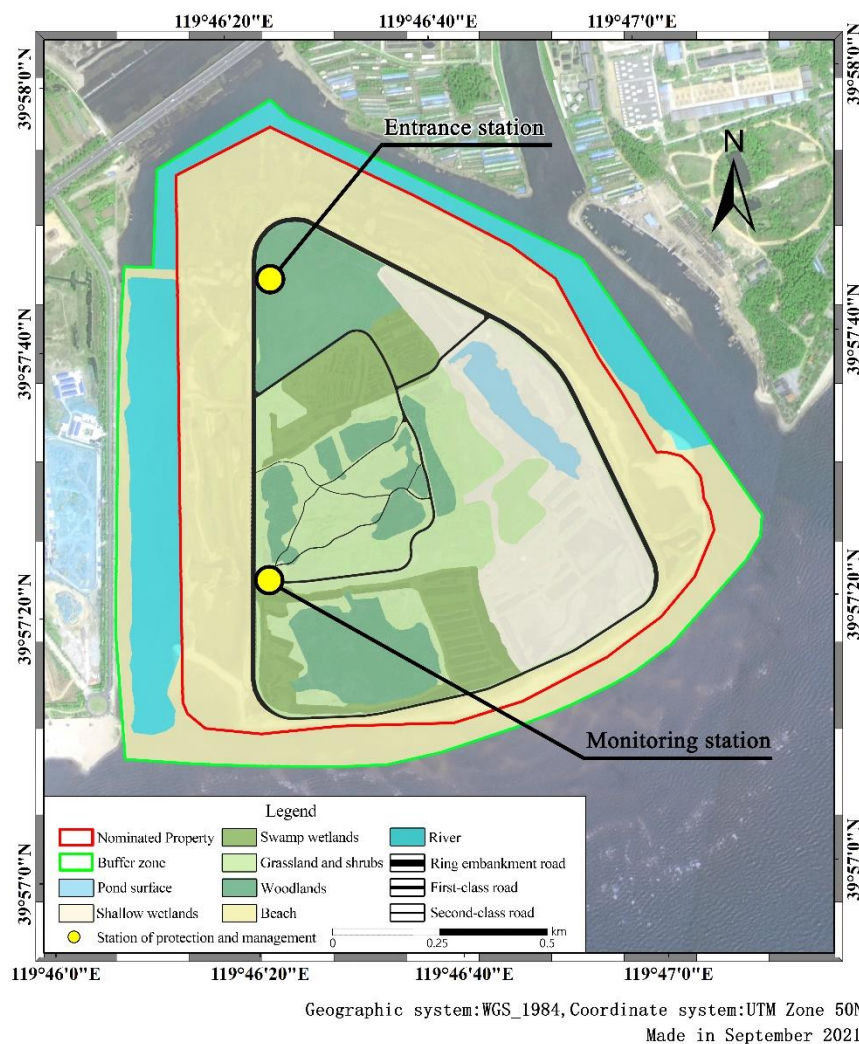


Figure 49 Plan Drawing of Monitoring Stations of Shihenandao (YS-9)

9.5.1.8 Distribution of monitoring stations of Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

The nominated property currently has three management stations at Dongguo, Zhaoquanhe, and Nanxiaohe.

There is a plan to build a *in situ* monitoring station for the wetland ecosystem at Nanxiaohe; a banding station at Nanxiaohe; an epidemic

source and disease monitoring station at Nanxiaohe, Spotted Seal Management Station; and an offshore monitoring point. Related equipment, facilities and patrol vessels will be provided.

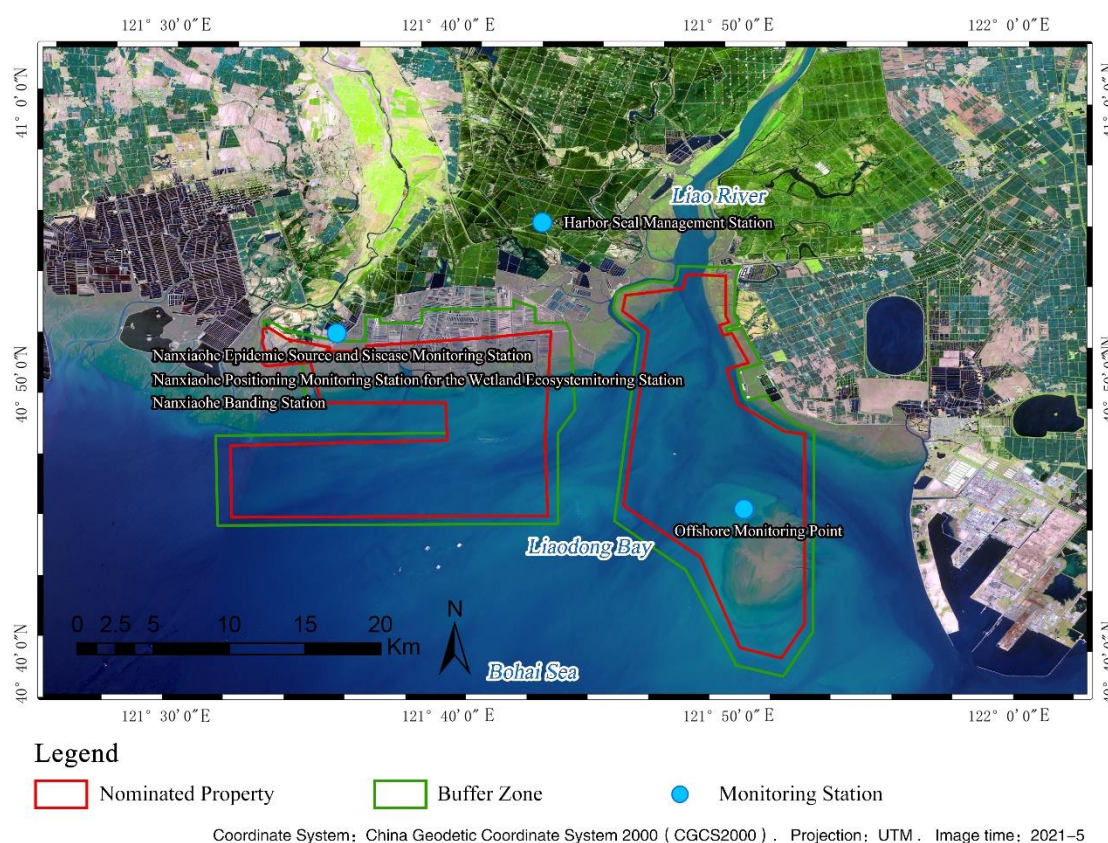


Figure 50 Plan Drawing of Monitoring Stations of Liao River Estuary (YS-10)

9.5.1.9 Distribution of monitoring stations of Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

There is a plan to build two ecological monitoring management stations at Jiutou Hill and Bailanzi, five checkpoints in core areas, a small meteorological station and a laboratory at both the Reserve Administration Bureau and Snake Island, on the basis of existing monitoring stations.

The construction of Bailanzi Monitoring Station, Jiutou Hill Monitoring Station and Snake Island Monitoring Point has also been planned.

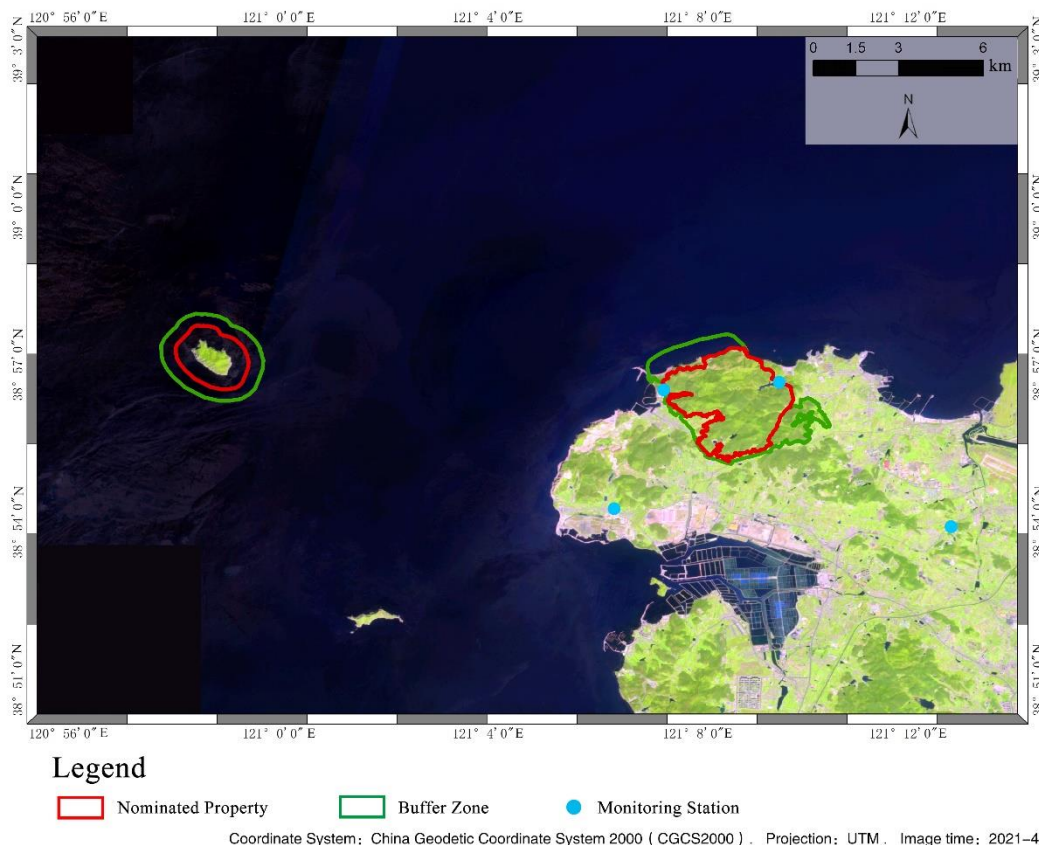


Figure 51 Distribution of Monitoring Stations of Snake Island - Laotieshan (YS-11)

9.5.1.10 Distribution of monitoring stations of Migratory Bird

Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

Based on the monitoring stations and management and conservation station of Dandong Yalujiang Estuary Wetland National Nature Reserve, the nominated property has Changshan Monitoring Station, and Gushan Monitoring Station at Gushan Management Station to be built. Dalu Island Monitoring Station has been built at the nominated property and the

peripheral area of the buffer zone.

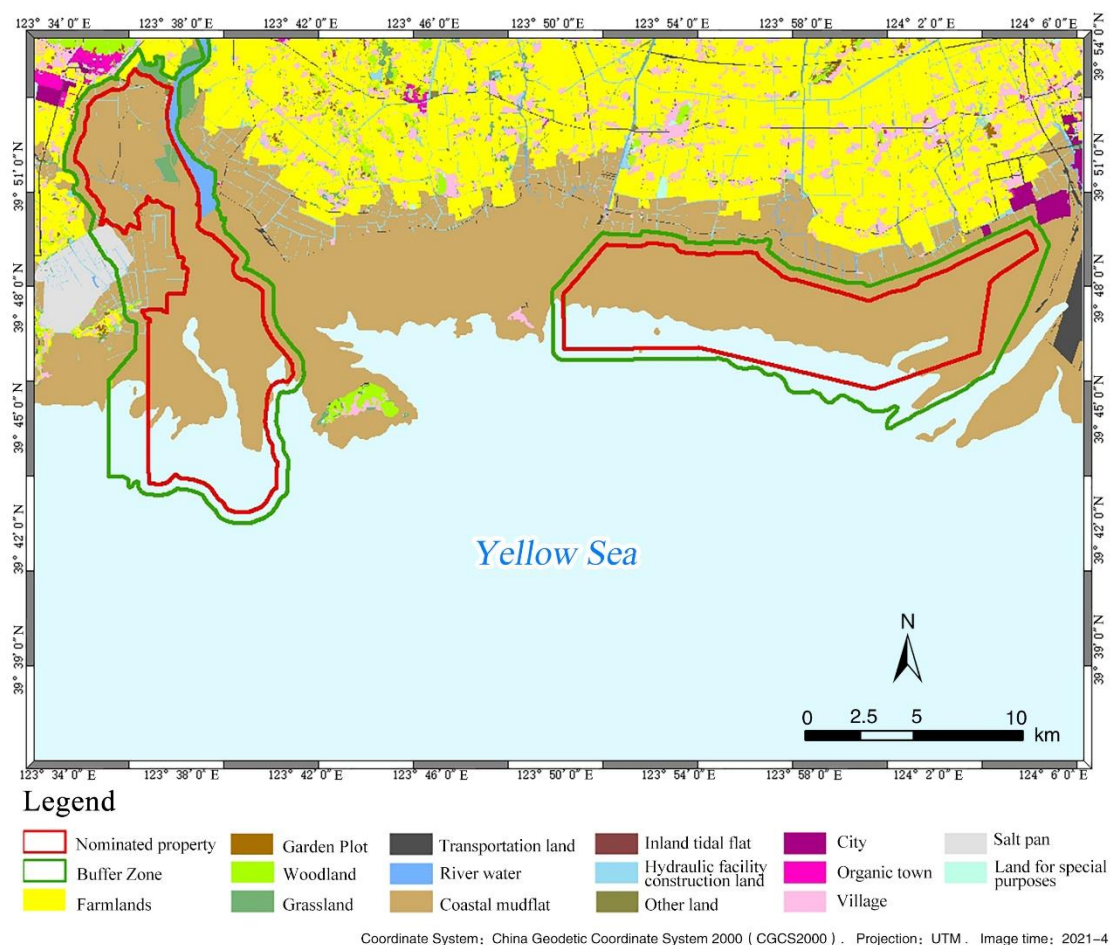


Figure 52 Plan Drawing of Monitoring Stations of Yalujiang Estuary (YS-12)

9.5.1.11 Distribution of monitoring stations of Migratory Bird

Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

There is a plan to establish Fantuozi Islet Monitoring Station, Ertuozi Islet of Gexian Island Monitoring Station, Guapi Island Monitoring Station, Wuhushi of Haxian Island Monitoring Station, Wushi Islet of Dahaozi Island Monitoring Station; Xicaotuozi of Dachangshan Island Monitoring Station, Beituozi Islet of Dachangshan Island Monitoring Station, Bashao

Island Monitoring Station, Offshore Monitoring Station, Natural Heritage Site Conservation Monitoring Center, Migratory Birds Observation Station.

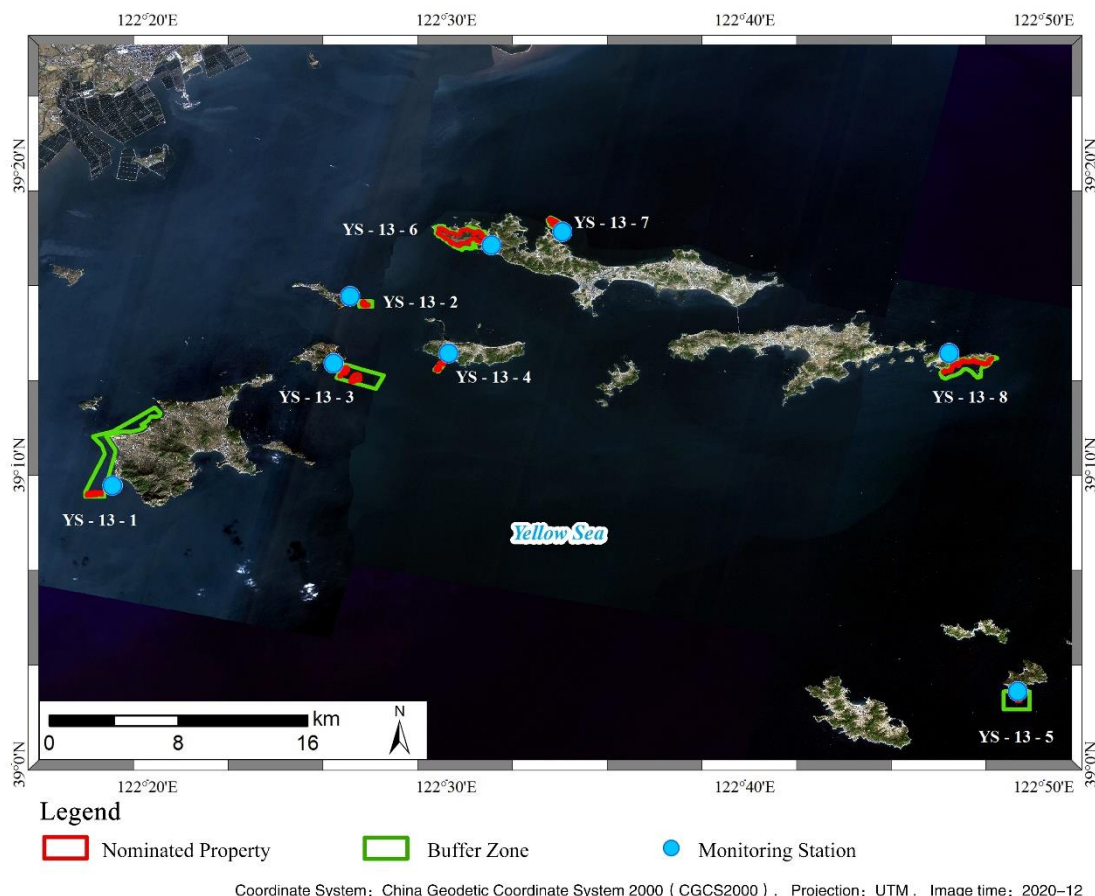


Figure 53 Plan Drawing of Monitoring Stations of Changshan Archipelago (YS-13)

9.5.2 Equipment of monitoring stations

The monitoring stations have auxiliary facilities for comprehensive purposes, including the scientific research station for bird banding and satellite tracking, scientific and technology archives, equipment and computer room, and watchtowers. Depending on the monitoring content, the monitoring stations of each nominated property have auxiliary facilities and equipment for wetland environmental monitoring, wetland

biodiversity resource monitoring, wetland bird resource monitoring, and peripheral community monitoring.

(1) Equipment required for wetland microclimate monitoring includes water level monitoring terminals or water level sensors, flow rate meters, water depth meters, flowmeters, micro weather stations, and other monitoring equipment.

(2) Equipment required for wetland plant resources monitoring includes handheld GPS, cameras, plant specimen folders, plant survey records, aerial cameras, and other monitoring equipment.

(3) Equipment required for wetland animal resources monitoring includes telescopes (7x-10x binoculars and 20-60 monoculars), telephoto cameras, SLR cameras, and other monitoring equipment.

(4) There is a scientific research station for bird banding and satellite tracking, with a bird banding and satellite tracking system.

(5) The scientific and technology archive mainly includes the database, archive room and specimen room.

(6) Watchtowers are for manual monitoring.

Equipment of monitoring stations and monitoring stations under planning of the nominated properties are shown in the table below.

Table 23 Equipment of Monitoring Stations of Nominated Properties

ID of Nominated Property	Equipment of Monitoring Facility
YS-3	Scientific research station for bird banding and satellite tracking; scientific and technology archive; machine room; watchtowers
YS-4	Flow rate meter, water depth meter, flowmeter, micro weather stations, plexiglass water collector, portable water quality detector, pH meter, Secchi disk, electrical conductivity meter, chlorophyll meter and YSCOD-100 automatic abatement; handheld GPS, cameras, plant specimen folder, plant survey records, tape measure, sampling frame (1m1m×), topographic map, pruning shears and aerial cameras; telescopes (7x-10x binoculars and 20-60 monoculars), telephoto cameras, SLR cameras, handheld GPS, topographic maps, infrared thermal imagers and infrared cameras.
YS-5	Scientific research station for bird banding and satellite tracking; scientific and technology archive; equipment and computer room; nine watchtowers.
YS-6	Scientific research station for bird banding and satellite tracking; scientific and technology archive; equipment and computer room; watchtowers
YS-7	
YS-8	
YS-9	
YS-10	Scientific research station for bird banding and satellite tracking; scientific and technology archive; equipment and computer room; watchtowers
YS-11	Analyzers for meteorological observation, atmospheric environmental quality monitoring, marine oil pollution monitoring; monitoring and multi-resource information management system.
YS-12	Scientific research station for bird banding and satellite tracking; scientific and technology archive; equipment and computer room; watchtowers.
YS-13	Solar power systems; (monitoring, surveillance) vehicles; high-speed boats.

9.6 Monitoring System Construction

9.6.1 Monitoring records and archives

1. Local natural resource management authorities as well as reserve management agencies will jointly formulate the monitoring record standards for the corresponding nominated property, and will be responsible for regular and irregular on-site visits, supervision, and

inspection of monitoring records.

2. The management agencies of the nominated properties are responsible for daily monitoring records, and summarizing the records to create archives. A digital database of property information should be established to achieve all types of records to ensure the effective recording and utilization of information.

3. The administration office and environmental authorities of each nominated property must submit the monitoring report of the previous year on the nominated property to the provincial forestry and grassland management department in January each year. The annual monitoring report reviewed by the provincial forestry and grassland departments must be submitted to the National Forestry and Grassland Administration in March each year, and the regular monitoring report should be submitted on time as per the requirements of the National Forestry and Grassland Administration.

9.6.2 Biodiversity database

Based on the comprehensive resource investigation, a comprehensive and systematic biodiversity information database of the nominated properties should be established, including the type and structure of tidal wetland ecosystem, the composition, characteristics and distribution of wild fauna and flora.

9.6.3 Establishment of monitoring and early warning system

The management agency of each nominated property should establish a monitoring and early warning system for heritage status based on the combination of property information database and monitoring system. The aims are to fully and effectively share and utilize property information and monitoring data; realize scientific and dynamic management and preventive conservation of nominated properties; establish an effective evaluation, feedback and improvement system.

1. Tasks of the system

(1) The system should regularly collect monitoring data and important dynamic information about the conservation management, presentation and utilization of the nominated property based on the existing information database, and update it in real time;

(2) The warning system for the nominated properties should be established based on scientific analysis and assessment of monitoring data, the change pattern, and early warning indicators and assessment criteria. It is necessary to issue early warning information and special assessment reports, and formulate response measures and plans based on the assessment results;

(3) The system should release data on a regular and real-time basis, in order to provide decision-making information and analytical data for the

management agencies and other stakeholders of the nominated properties; relevant research materials for the research institutions of the nominated properties; an information platform for the public to understand heritage values, and participate in and supervise heritage conservation.

2. Preparation of emergency response plans, and establishment of promotion, training and drill system

(1) Work management and security management measures for the nominated properties should be prepared in accordance with national laws and regulations, as well as the relevant local regulations and the actual conditions of the nominated properties;

(2) Specific emergency response plans should be prepared for all kinds of likely emergencies caused by natural or human factors that endanger the safety of the nominated properties, conservation work or the personal safety of relevant personnel. Emergency response plans should be prepared for natural hazards such as hailstones, frosts, rainstorms, windstorms, and lightning; acts of sabotage such as poaching and illegal conversions; various potential risks entailed in construction projects and tourism activities; public health emergencies such as casualties or serious illnesses;

(3) The necessary protections for heritage elements should be incorporated into the disaster emergency response procedures based on different scenarios;

(4) The promotion, routine training and exercises on heritage protection should be provided to organizations that would participate in the emergency response to factors threatening the properties.

9.6.4 Administrative system for monitoring and early warning

In order to ensure that the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) can be protected and managed sustainably, a multi-level monitoring system should be established, covering various parties including the relevant administrative agencies of forestry, tourism, ecology and environment, hydrology, resource planning, and statistics as well as universities. The relevant parties should carry out their monitoring and management duties to ensure efficiency and results of their work.

The administrative agencies of nominated properties responsible for monitoring mainly include the relevant departments of local people's governments, as well as the administration offices of the protected areas.

10 Scientific Research Plan

10.1 Status Quo

10.1.1 Scientific research achievements

With the support of National Forestry and Grassland Administration, Shanghai Forestry Bureau, Department of Natural Resources of Shandong Province, Forestry and Grassland Bureau of Hebei Province, Forestry and Grassland Bureau of Liaoning Province and local authorities of natural resources, as well as World Wide Fund for Nature (WWF), Wetlands International (WI), International Crane Foundation (ICF), Global FoodBanking Network (GFN) and SEE Foundation, numerous key research projects on the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) have been carried out by or in collaboration with more than 20 universities and research institutions, including Beijing Normal University, Fudan University, East China Normal University, Beijing Forestry University, Massey University, University of Groningen, National Bird Banding Center of China, Nanjing Institute of Environmental Sciences of MEE, Institute of Oceanology of Chinese Academy of Sciences, Yantai Institute of Coastal Zone Research ,Chinese Academy of Sciences, and First Institute of Oceanography of Ministry of Natural Resources of China, etc. The

research spectrum covers multiple disciplines, e.g., wetland ecosystem services, geomorphologic research on tidal flat, landscape changes, organic carbon accumulation in soil, patterns of bird distribution and migration, wetland ecosystem repair, vegetation restoration, and geographic remote sensing. A total of 71 research projects regarding the nominated property have been completed, with publication of over ten monographs, more than 80 scientific papers and some 60 survey and monitoring reports. Please refer to Table 24 for details.

The status quo of scientific research at the nominated property is as follows.

10.1.1.1 YS-3: Migratory Bird Habitat at Chongming Dongtan, Shanghai

The scientific research has been on a fast track since 2006. Scientific research service platforms, such as avian influenza research laboratories, bird banding and field work stations, and key species monitoring stations, have been established at the nominated property, so as to constantly raise the enthusiasm and initiative for scientific research projects. Key research projects have been carried out with the support of the Department of Wildlife and Forest Plants Conservation under the former State Forestry Administration, World Wide Fund for Nature (WWF), Global Environment Facility (GEF), Wetlands International (WI) and International Crane

Foundation (ICF), and with the assistance of universities and scientific research institutes in Shanghai. These projects include Synchronous Survey on Wintering Birds in Middle and Lower Reaches of the Yangtze River, Comprehensive Evaluation on Bird Habitat in Chongming Dongtan, Research on Theory and Method for Functional Area Division of Protected Areas, Preliminary Research on Monitoring and Control Measures of Avian Influenza of Wild Birds in Shanghai, Research on Migratory Route and Status Quo of Wintering Areas in Chongming Dongtan, Sustainable Utilization of Wetland Economic Resources, Restoration and Reconstruction Technology of Degraded Wetland and Community Environmental Education. According to non-exhaustive data, universities in Shanghai and the Yangtze River Delta have carried out more than 30 scientific research programs in the protected zone, involving National Basic Research Program of China (973 Program) and Program of National Natural Science Foundation of China, and have published more than 130 academic papers. They have facilitated scientific decision-making and provided important basis for formulation of the policies, regulations and specific management measures regarding the protection and management of the nominated property, directly guiding the protection and management of the nominated property.

Since the autumn of 2002, under the guidance and support of the National Bird Banding Center of China, and Shanghai Forestry Bureau, the

Administration Affairs Center of Chongming Dongtan National Nature Reserve has carried out bird banding activities as planned. This targets shorebirds that roost in Dongtan during their migration every spring and autumn. According to the requirements of the *Color Flagging Protocol for Migratory Shorebirds in the East Asian-Australasian Flyway*, the color flagging of migratory shorebirds has been performed in combination with the bird banding.

In cooperation with universities, the nominated property monitors the evolution of tidal flats, vegetation, benthos, phytoplanktons, intertidal fishes and water quality of tidal creeks in this region. It has established a GIS-based integrated information management application system for natural resources, and prepares the *Annual Monitoring Bulletin on Resources* every year in Shanghai Chongming Dongtan National Nature Reserve.

At present, the nominated property has become an important base for many well-known local universities and scientific research institutes (e.g., Fudan University, East China Normal University) to study the estuarine wetland ecosystem and the formation, development and succession of various organisms in the ecosystem. The platform for scientific research and practice teaching in Chongming Dongtan has initially taken shape.

10.1.1.2 YS-4: Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province

In recent years, universities and scientific research institutes, including Beijing Normal University, Beijing Forestry University, China University of Petroleum (East China), Fudan University, Shandong University, Qindao Agricultural University, Ludong University, Institute of Oceanology of the Chinese Academy of Sciences, and First Institute of Oceanography (under Ministry of Natural Resources), have carried out researches on wetland ecosystem services, tidal wetland geomorphic features, landscape change, organic carbon accumulation of soil, bird distribution and migration patterns, wintering areas of red-crowned cranes, and bird habitat, laying a solid foundation for the ecological protection, the understanding of bird migration patterns, and the protection policy formulation of the nominated property.

10.1.1.3 YS-5: Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province

Since 2001, Hebei Nandagang Wetland and Provincial Bird Nature Reserve, where the nominated property is located, has actively cooperated with relevant scientific research institutes and universities, conducted research on wetland protection, biodiversity protection, bird resource

protection, reed planting, wetland recovery, etc., and published related research papers. Hebei Normal University has successfully applied for the Program of National Natural Science Foundation of Hebei Province (Program No.: 400173) to study the wetland ecosystem in Nandagang. Through the research, many rare wetland waterfowls were discovered, and people have a deeper understanding of the biodiversity of the reserve. Furthermore, the research has attracted the attention of related experts at home and abroad. More importantly, the biodiversity protection and management measures have been set out theoretically, providing scientific basis for the protection and management of the reserve.

The preliminary work of scientific research in the reserve has provided great references and guidance for the administration office in formulating protection and management strategies. To ensure the long-term development of the reserve, it is still necessary to further ramp up scientific research. On the one hand, there is a need to expand external exchanges to keep abreast of nature conservation, creating a high starting point for the scientific research in the reserve. On the other hand, it is necessary to focus on the issues to be urgently solved in the reserve, and continuously improve the scientific research capacity through research projects.

10.1.1.4 YS-6: Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province

In recent years, universities and government departments, including Fudan University, Beijing Normal University and Beijing Forestry University, Forestry and Grassland Bureau of Hebei Province, have carried out researches on wetland ecosystem services, tidal wetland geomorphology, landscape changes, organic carbon accumulation of soil, bird distribution and migration patterns, staging site and wintering area of Oriental Stork, etc., laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

10.1.1.5 YS-7: Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province

In recent years, many scholars have carried out many studies on coastal erosion, bird investigation, red tide, marine hydrological environment in Qinhuangdao, etc., and have yielded substantial academic achievements, laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

10.1.1.6 YS-8: Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province

In recent years, many scholars have carried out many studies on coastal erosion, bird investigation, red tide, marine hydrological environment in Qinhuangdao, etc., and have yielded substantial academic achievements, laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

10.1.1.7 YS-9: Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province

In recent years, many scholars have carried out many studies on coastal erosion, bird investigation, red tide, marine hydrological environment in Qinhuangdao, etc., and have yielded substantial academic achievements, laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

10.1.1.8 YS-10: Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province

For Liao River Estuary (YS-10), numerous studies on wild animals,

natural wetlands, and artificial wetlands at the nominated property have been carried out, and fruitful scientific research results have been obtained. The wild animal protection research carried out jointly with universities in China has won two Science and Technology Achievement Awards granted by the National Forestry and Grassland Administration, one Liaoning Provincial Science and Technology Award, and three Panjin Science and Technology Progress Awards. The research on wetland vegetation restoration research has won four national awards, two provincial awards, and 27 municipal (departmental) level awards. The research on the rational use of wetlands at the nominated property has been carried out, which has brought together 54 experts from 13 countries to Panjin for technical inspections and exchanges. A total of 209 scientific research outcomes have been obtained, and 145 results have been rewarded. The research has been carried out on wetland ecosystem restoration, wetland vegetation recovery, geographical remote sensing, etc. at Liao River Estuary (YS-10), laying a foundation for the ecological protection and environmental restoration of the nominated property.

10.1.1.9 YS-11: Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province

There are plenty of professional and technical managers, sound scientific research foundation, and scientific research ability for Snake

Island - Laotieshan Reserve. The nominated property is a teaching and research practice base of Liaoning Normal University and Harbin Normal University. A series of scientific research programs at different levels have been conducted at the site, with fruitful achievements obtained. In recent years, attention has been paid to the research on molecular biology of snakes and migratory pattern of birds. Through monitoring and bird banding, 42 new bird species have been found in the reserve since 2007, including two national first-class key protected species and five national second-class key protected species. Among them, 12 species are newly recorded species in Northeast China. Since the establishment of the reserve, over 130 related papers have been published in domestic and foreign academic journals, and six related books have been produced independently or cooperatively. These monographs include *Avifauna of Liaoning*, *China's Snake Island*; *Medical Biological Research on Pit-Viper and Bird*; *Botanical Illustration of Snake Island - Laotieshan Reserve*; and *Birds of Snake Island - Laotieshan*. The articles and books have laid a solid foundation for ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

The existing partners of YS-11 include Peking University, Beijing Forestry University, Liaoning Normal University, and Chengdu Institute of Biology of Chinese Academy of Sciences. For a more in-depth comparison with heritage sites of the same type in China and other countries, the

management agency of the nominated property intends to expand and strengthen cooperation with international organizations in scientific research programs.

**10.1.1.10 YS-12: Migratory Bird Habitat at Yalujiang Estuary,
Dandong, Liaoning Province**

In recent years, universities and non-governmental organizations at home and abroad, such as Fudan University, Nanjing Normal University, Beijing Forestry University, Massey University, WWF, YSLME Project Management Office and SEE Foundation, have carried out many scientific research and conservation programs, including researches on distribution and migration patterns of migratory birds, shorebird migration and roosting ecology, wetland ecological restoration, and bird habitat protection through bird-watching activities, etc., laying a solid foundation for the ecological protection, understanding of bird migration patterns, and protection policy formulation of the nominated property.

**10.1.1.11 YS-13: Migratory Bird Habitat at Changshan Archipelago,
Dalian, Liaoning Province**

Several reports and monographs on scientific investigations at Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13) have been completed, including the *Scientific Research*

Report on Dalian Changhai Marine Precious Life Nature Reserve, the Scientific Research Report on Changshan Archipelago National Marine Park in Dalian, Liaoning Province, the Investigation Report on Plant Diversity in Xiaoshuikou Forest Park in Xiaochangshan Township, Changhai County, and the Fishery Resources in Changhai County. Meanwhile, special investigations and regular monitoring are performed at key areas and on key birds at the nominated property, including the investigation and monitoring on bird species diversity at Fantuozi, and the *Investigation Report on Biodiversity in Dahaozi Island* has been generated. In addition, multiple scientific research agencies have carried out research at the nominated property.

The key achievements in scientific research at the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are outlined below.

Table 24 Scientific Research Achievements on Nominated Property

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
1	East China Normal University	Research on the Response of the Life History of An Endangered Salt Marsh Plant <i>Bolboschoenoplectus marigueter</i> to the Environmental Resource Gradient, and Optimization and Recovery Strategy	19230742600	Shanghai International Science and Technology Cooperation Fund	With interests in the <i>Bolboschoenoplectus marigueter</i> population, this research project investigates the response of the life history of its natural population and experimental population to the principal environmental resource gradient, assesses and screens the suitable habitat conditions for the population and the small populations with the best life-history performance and optimum fitness, and systematically proposes the optimal ecological strategies for the scientific management, conservation, and restoration of the population. The research primarily involves: (1) the response of the life history of the natural population and experimental population of <i>Bolboschoenoplectus marigueter</i> to the principal environment and resource gradient; (2) the analysis of changes in population structure and life history patterns of	Li Dezhi	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					natural and experimental small populations of <i>Bolboschoenoplectus marigueter</i> along the environmental resource gradient after being transplanted to homogeneous environmental resource conditions, and the screening of optimized small populations; (3) the analysis of changes in population structure and life history patterns of natural and experimental small populations of <i>Bolboschoenoplectus marigueter</i> along the environmental resource gradient after the reciprocal transplantation, and the screening of optimized small populations; and (4) the influence of environmental condition changes on the life history patterns of the population and the screening of optimized conditions.		
2	East China Sea Fisheries Research Institute	Selection Differences and Causes of Habitat Sub-environment of <i>Acanthogobius ommaturus</i> and <i>Odontamblyopus</i>	18ZR1449800	Research Project of Shanghai Municipal Science & Technology	The research incorporates the in situ measurements of community composition and abundance changes, ecological groups, time and frequency of emergence of nektons in the three types of sub-habitats: native salt marsh, flat and tidal creek; the analysis of the degree of influence of species composition of fishes, shrimps, and crabs on the spatial and temporal distribution patterns of <i>Acanthogobius ommaturus</i> and	Zhang Heng	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		<i>lacepedii</i> in Salt Marsh Wetlands at the Yangtze River Estuary		Commission	<i>Odontamblyopus lacepedii</i> (including predator-prey relationships); the analysis of main influencing factors of such differences (abiotic and biotic) with focuses on the abundance, frequency of emergence, body length distribution and stomach content composition of the two species in different sub-habitats.		
3	East China Normal University	Coping with Deltas in Transition	2016YF E0133700	National Key R&D Program	Based on the previous two rounds of the Sino-Dutch Program Strategic Scientific Alliances, this program deepens and expands the collaborative research on the influence of human activities and climate change on Chinese and dutch estuarine deltas. The research areas are the Yangtze River Delta and the Rhine-Scheldt-Meuse River Delta; the research focuses on the mechanism of change and trend prediction for riverine material fluxes to the ocean, mechanism of transformation and trend prediction of geomorphological pattern of estuarine deltas, transformation process and mechanism of ecology and environment at estuarine deltas, environmental effects and counterstrategies of pattern changes of estuarine deltas, etc.	He Qing	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
4	Fudan University	Research and Demonstration of Key Technologies for Coordinated Development of Birds Conservation and Renewable Energy in Chongming	18DZ1205000	Research Project of Shanghai Municipal Science & Technology Commission	This research project examines the community structure of waterbirds in areas with and without wind farms and at different distances from wind farms on the community scale to know the influence of wind farms on waterbirds to understand the influence of wind farms and surrounding environmental factors on waterbirds by the multivariate statistical analysis.	Ma Zhijun	YS-3
5	East China Normal University	Modeling Nitrous Oxide Emission Factors and Watershed Scale for Rivers in Urbanized Areas	41977321	National Natural Science Foundation of China	Focusing on research areas such as Chongming Dongtan (YS-3), with the greenhouse gas nitrous oxide, C-degrading enzyme- β glucosidase (BG) of sediments, N-degrading enzyme-urease (UE), N-acetyl-amino-glucosidase (NAG), and lignin-degrading enzyme-polyphenol oxidase (PPO) as the research subjects, this project examines the spatial and temporal change features of emission fluxes of greenhouse gases, spatial and vertical distribution features of extracellular enzyme activity of sediments, and the influence of extracellular enzyme activity of sediments on the production of	Wang Dongqi	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					nitrous oxide gas in the wetland through field sampling, site observation, and laboratory culture and analysis. The research specifically involves: (1) the spatial and temporal change features of emission fluxes of greenhouse gases such as nitrous oxide; and (2) the influence of extracellular enzyme activity of sediments at the Yangtze River Estuary on the emission fluxes of greenhouse gases such as nitrous oxide. (BG) (UE) (NAG) (PPO)		
6	Fudan University	The Influence of Plant Invasion on Key Predation Processes in Salt Marsh Wetlands and Its Trophic Cascade Effects	31870414	National Natural Science Foundation of China	The research aims at (1) analyzing the differences in abundance and species composition of large predators between salt marshes of <i>Spartina alterniflora</i> Loisel. and <i>Bolboschoenoplectus marigueter</i> , and the influence of the invasion of <i>Spartina alterniflora</i> Loisel. on the abundance and species composition of large predators in salt marshes through field surveys; (2) studying the differences in the influence of large predators on the abundance, biomass, and diversity of benthic animals such as phytophagous crabs between salt marshes of <i>Spartina alterniflora</i> Loisel. and <i>Bolboschoenoplectus marigueter</i> , and the influence of the invasion of <i>Spartina alterniflora</i> Loisel. on the key predation processes in salt marshes;	He Qiang	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					and (3) primarily studying the differences in the trophic cascade effects of predation on phytophagy and the growth of native and invasive plants between salt marshes of <i>Spartina alterniflora</i> Loisel. and <i>Bolboschoenoplectus marigueter</i> .		
7	East China Normal University	The Response Mechanism of Typical Estuarine Wetland Ecosystems in the Yangtze River Delta under Multiple Stresses	32071609	National Key R&D Program	This research primarily involves: 1) the response of estuarine wetland vegetation to water-sediment dynamics and transformation of scouring/silting state; 2) the mechanism of algae bloom, ecological impact and control mechanism in water areas within the reclamation project area; 3) the influence of different control measures of <i>Spartina alterniflora</i> Loisel. on estuarine wetland ecosystem and the prevention and control mechanism of secondary invasion; and 4) the synergy effect of multiple stresses at different spatial and temporal scales and the multi-stability response of the ecosystem.	Liu Quanxing	YS-3
8	East China Normal University	Research on the Influence of <i>Spartina alterniflora</i> Loisel.	41771508	National Natural Science	The research is composed of (1) the seasonal changes of total mercury and methylmercury content in the rhizosphere of typical vegetation types at Chongming Dongtan, namely <i>Spartina alterniflora</i> Loisel., <i>Phragmites</i>	Wang Yongjie	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Invasion on Mercury Methylation Process in Sediments of Wetlands at the Yangtze River Estuary and Its Mechanism		Foundation of China	<i>communis</i> , and <i>Bolboschoenoplectus marigueter</i> ; and (2) the seasonal changes of total organic carbon and reduced sulfide -- acid-volatile sulfide (AVS) content in the rhizosphere of different plants.		
9	East China Normal University	Effects of Renewal Process on the Development of Plant Communities in Salt Marsh Wetlands	31870405	National Natural Science Foundation of China	The research focuses on: the seed dispersal process of dominant species and soil seed bank pattern; the influence of the interspecific interaction on seed germination and its contribution to the renewal of natural populations; the influence of environmental stress and competition of adult individuals on seedling survival and growth; and the comprehensive analysis of the role of renewal stages in the development of plant communities in salt marsh wetlands.	Wang Chenghu an	YS-3
10	Institute of Eco-Chongmin	Survey and Inventory of Biodiversity in Chongming	ECNU-IEC-202001	Research Project of Shanghai	The research intends to compile the biodiversity lists and generate the biological inventory of Chongming and complete the aerial survey of key ecological baseline points through historical data collection and	Liu Wenlian g	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	g			Municipal Education Commission	supplementary surveys on the basis of the existing inventory of historic basic data. The biological inventory covers protozoa/micro-benthos in tidal wetlands and peripheral waters around islands; bryophytes; terrestrial vascular plants; aquatic and wetland seed plants; plankton; macrobenthos (rivers, lakes, and reservoirs; tidal wetlands and peripheral waters around islands); spiders (intertidal wetlands); insects; soil animals; fish (rivers, lakes, and reservoirs; tidal wetlands and peripheral waters around islands); amphibians; reptiles; birds; and beasts.		
11	East China Normal University	The Influence of Simulated Warming on the Interspecific Competition Relationship between <i>Phragmites communis</i> and <i>Spartina alterniflora</i> Loisel. in	31500392	National Natural Science Foundation of China	In the background of global climate change and biological invasion, this research project investigates the <i>Phragmites communis</i> and <i>Spartina alterniflora</i> Loisel. in salt marsh wetlands at the Yangtze River Estuary by simulating the atmospheric warming using open-top chambers (OTCs) to explore how atmospheric warming influences the interspecific relationship between the two species.	Zhang Chao	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Salt Marsh Wetlands at the Yangtze River Estuary					
12	Fudan University	The Influence of Grazing on the Biological Functional Groups and Carbon-Oxygen Process of Salt Marsh Soil and Its Mechanism	31570513	National Natural Science Foundation of China	The influence of grazing on vegetation is largely achieved through its indirect influence on the soil. This research investigates the influence of grazing on the biological functional groups of salt marsh soil and the carbon-oxygen process of the ecological system in Chongming Dongtan Salt Marsh at the Yangtze River Estuary through field survey experiments and fenced controlled experiments, aiming at revealing its mechanism of influence in two aspects, namely plants above ground and siltation of sediments, and exploring the possible feedback of soil changes on plants above ground.	Wu Jihua	YS-3
13	East China Normal University	The Gambling Strategy and Physio-ecological Mechanism of Key Stages in the Life		National Natural Science Foundation of	With interests in clonal and non-clonal plants, this research investigates the gambling strategy and physio-ecological mechanism for key stages in their life history. Some key theoretical issues concerning the plant gambling strategy are analyzed and verified with specific plants and experiments.	Li Dezhi	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		History of Clonal and Non-clonal Plants		China	Under the spatially and temporally homogeneous and heterogeneous habitat conditions, the main stages, sites, forms, and manifestations of the plant gambling strategy and the sequential relationship are studied. This research also examines the possible traits of the plant gambling strategy induced by human disturbance factors, as well as the gambling strategy performance of sexual reproduction and clonal growth behavior of clonal plants of different types under integrational and non-integrational conditions. The gambling strategy of clonal plants of the mixed growth type is comprehensively analyzed with multiple methods. The trade-offs between costs and contributions of the plant gambling strategy are analyzed, and the common approach applicable to both clonal and non-clonal plants is explored. The possible mechanism for the occurrence of the plant gambling strategy is studied from several perspectives.		
14	East China Sea Fisheries	The Influence of <i>Spartina alterniflora</i> Loisel. Invading Plant	31600334	National Natural Science	Aiming at the invasion of an alien plant <i>Spartina alterniflora</i> Loisel. to salt marshes at the Yangtze River Estuary, this program applies the stable isotope, fatty acid and gastric content analysis methods to investigate the	Wang Sikai	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	Research Institute	Communities on Benthic Food Webs and the Mechanism Thereof		Foundation of China	influence of its invasion to <i>Bolboschoenoplectus mariqueater</i> , <i>Phragmites communis</i> , <i>Carex scabrifolia</i> Steud. and microalgae communities on the benthic food webs, and quantitatively analyze the changes in biological community structure, food source composition and feeding relationships. Moreover, it looks into the driving role of non-trophic effects on food webs through an analysis of environmental physical and chemical factors, and the driving process of nutritional effects through the stable isotope marking and tracing, to explore how plant invasion influences food webs.		
15	East China Normal University	Research on the Blue Carbon Flux to the Sea from Submarine Groundwater Discharge in Chongming Dongtan Wetland	19ZR1415300	Research Project of Shanghai Municipal Science & Technology Commission	The research focuses on the flux changes of SGD in the typical vegetation areas of Chongming Dongtan in different seasons (flood season: June-August, dry season: December-February). According to the actual characteristics of local rainfall, samples are taken in the dry season and wet season, respectively. The samples of groundwater and interstitial water are collected at three cross-sections in the north, south, and middle of different vegetation zones in the salt marsh wetlands of Chongming Dongtan, freshwater end members are collected in local near-shore well water, and	Zhang Fenfen	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					continuous observations are performed at fixed points offshore. The fluxes of SGD-carried carbon (DIC, DOC, RDOC) into the sea at Chongming Dongtan are evaluated. The quantitative analysis of RDOC is principally obtained by finding the integral of the peak areas of relevant spectrum peaks on the 1D NMR spectral graph for the hard-to-degrade structures. The spatial and temporal changes of (DIC, DOC, RDOC) and geochemical parameters (nutrients, salinity, dissolved oxygen, etc.) in groundwater end members (including interstitial water) along the coastal salt marsh wetlands of Chongming Dongtan are analyzed. By clarifying the extensive observation of typical cross-sections in Dongtan and the continuous observation technique under the tidal action, the fluxes of SGD-carried carbon (DIC, DOC, RDOC) to the sea in Chongming wetlands and the contribution of SGD-transported carbon to the offshore carbon pool are evaluated.		
16	Shanghai Normal	Research on Risk Assessment and Robust	5161101688-6	Scientific and Technological	Estuary deltas and coastal cities are confronted with the serious threats of extreme storms and floods compounded by typhoons, rainstorms, high tide	Wen Jiahong	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	University	Decision Making for Compounded Extreme Flood Disasters at the Yangtze River Delta: A Case Study of Shanghai		Development of Project of Shanghai Meteorological Service Bureau	levels, and upstream flood discharge. An integrated atmosphere-ocean-land coupled numerical simulation system has been constructed to achieve the simulation of extreme flooding in Shanghai under a scenario of multiple disasters like "wind", "storm", "tide" and “flood occurring at the same time, validating the effectiveness of the coupling method and providing a set of feasible numerical simulation methods for the integrated simulation of compounded windstorm and flood. Under the influence of Typhoon Winnie (9711), the simulated inundation area (with a water depth >0.2 meters) was reduced by 62% compared with that before the upgrading of the embankment in 1998, indicating that the construction of coastal and river embankment facilities plays a critical role in the prevention of typhoon and flooding in Shanghai. The effective simulation of the compound extreme windstorm and flood can provide a reference for property insurance and future municipal planning.		
17	Anhui University	The Spatial and Temporal Dynamics of	31772485	National Natural	This research carries out the high-throughput sequencing of microbiota in the fecal samples of Hooded Crane (<i>Grus Monacha</i>) wintering in Shengjin	Zhou Lizhi	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Gut Microbiota Complex of Hooded Crane (<i>Grus Monacha</i>) and Its Environmental Response Mechanism		Science Foundation of China	Lake to analyze the gut microbiota structure and construct the core microbiota and the differences in the gut microbiota composition during different winters. The gut microbiota structure of Hooded Crane and their temporal and spatial change features are also explored to accumulate basic materials for further study of the winter ecology of Hooded Crane.		
18	East China Normal University	Research on Quantitative Identification of N ₂ O Production Pathways and Regulation Mechanism in Estuary Tidal Flats	4167010241	National Natural Science Foundation of China	With tidal flats at the Yangtze River Estuary as the study area, this research discusses the influence of the sediment resuspension on the denitrification and anaerobic ammonium oxidation processes of overlying water with different salinity and flooding gradients and their microbial mechanisms through indoor simulation experiments using the ¹⁵ N isotope tracing technology. The coupled nitrification-denitrification and coupled nitrification-anaerobic ammonium oxidation processes were analyzed, the contribution of the denitrification and anaerobic ammonium oxidation processes to denitrification in the estuary were estimated, and the ecological effects caused by the resuspension were further analyzed.	Hou Lijun	YS-3
19	East China	The Sediment	4180610	National	Through the collection of historical topography, hydrology, and sediment	Wei	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	Normal University	Dynamics Process of Chongming Dongtan at the Yangtze River Estuary in Response to Windstorms	6	Natural Science Foundation of China	data and autonomous high-frequency continuous observations, with the research methods of cluster analysis, wavelet analysis, EOF analysis, and Gao-Collins model, the research explores the daily, monthly, interannual, and interdecadal dynamical geomorphological process, and profoundly analyzes the connecting mechanism of cross-scale dynamical geomorphology and potential influencing factors of tidal flats at the estuary.	Wen	
20	East China Normal University	Exploring the Sediment Movements of Muddy Coasts in the Delta during Windstorms	41576092	National Natural Science Foundation of China	To unveil the influence of windstorm events on water and sediment transport in tidal creeks of the coastal wetland, in the calm weather and stormy weather conditions (Typhoon Yagi and Rumbia), field observations of water and sediment data were conducted in a typical tidal creek at Chongmin Dongtan. The results indicated that the average wind speed offshore during the typhoon was 3~4 times higher than that in the calm weather with the effective wave height being seven to 7~15 times higher; the flats and tidal creeks in the forepart of the salt marsh have been severely eroded; the surface sediments of tidal flats have been coarsened by 1~2.1	Yang Shilun	YS-3

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					times; the suspended sediment concentration has increased by 3~11 times; the unit-width sediment transport flux during the tidal cycle of tidal creeks has increased by 4~33 time; the unit-width net sediment transport has increased by 8~17 times. In windstorm weather, the sediment transport of tidal creeks exhibits the characteristics of “high input and high output”. Under the actions of wave attenuation, flow retarding and sediment trap of vegetation in tidal flats of the salt marsh, the unit-width sediment transport flux during the tidal cycle points to tidal flats of the salt marsh and facilitates the siltation of sediments in salt marsh flats.		
21	Beijing Normal University	Dynamic Monitoring and Evaluation of the Ramsar Site Protection and Recovery Project at Shandong Yellow River Delta National Nature Reserve		Technical consultancy contract	Dynamic monitoring is conducted for the Ramsar Site Protection and Recovery Project at the Yellow River Delta, covering dynamic changes of various ecosystem elements such as hydrology and water quality, soil, vegetation, and benthos. A biodiversity monitoring index system and evaluation methods are developed to evaluate the implementation effects of the biodiversity protection project.	Wang Andong, Cui Baoshan	YS-4

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
22	Beijing Normal University	The Ecological Restoration and Industrialization Technology for Typical Estuarine Wetlands in North China	2017YF C0505900	National Program on Key Basic Research Project of China		Bai Junhong	YS-4
23	Beijing Normal University	Soil Nitrogen Mineralization and Its Water & Salt Driving Mechanism at the Coastal Salt Marsh Wetland in the Yellow River Delta	51179006	General Project of National Natural Science Foundation of China	This research project takes the coastal wetland in the Yellow River Delta as the research subject. It systematically examines the temporal and spatial variation characteristics of soil nitrogen mineralization at the coastal salt marsh wetland under different water and salt patterns, expounds the law in which the soil nitrogen mineralization rate varies with water and salt gradient, and explores the law in which wetland formation affects soil nitrogen mineralization; it analyzes the relationship between the soil nitrogen mineralization rate and environmental factors and physical and chemical soil properties at the wetland in the Yellow River Delta, so as to comprehensively diagnose the correlation between water and salt	Bai Junhong	YS-4

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					information and the soil nitrogen mineralization rate; it explains the effects of flooding frequency, water level, salinity and water-salt interaction on soil nitrogen mineralization, analyzes the mechanism with which soil microorganisms make short-term response and long-term adaptation to water & salt changes, and reveals the water & salt driving mechanism for soil nitrogen mineralization at the coastal wetland; it hence provides a scientific reference for the protection and restoration of the coastal wetland.		
24	Beijing Normal University	Technical Systems and Application on Ecological Water Demand Guarantee in the River-Lake-Marsh System	2017YF C0404500	National Program on Key Basic Research Project of China		Yang Zhifeng	YS-4
25	Beijing Normal University	A Dynamic Tradeoff Model for Wetland Ecosystem Services in	51579012	National Natural Science	The freshwater remediation project for degraded wetlands in the Yellow River Delta, which has been carried out annually since 2002 through water diversion from the Yellow River, has replenished important freshwater	Yang Wei	YS-4

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		the Yellow River Delta Driven by Freshwater Remediation Projects		Foundation of China (NSFC)	resources for wetlands, reshapes the hydrological regime of wetlands in the Yellow River Delta, and has a significant influence on the structure, service functions and key ecological processes of wetland ecosystems. This research highlights the central role played by the freshwater remediation project in driving the dynamic evolution of wetland ecosystem services. In the face of key scientific issues, namely the mechanisms of influence and tradeoff of the freshwater remediation project on the evolution of wetland ecosystem services, the approaches of GIS spatial overlay analysis, InVEST model simulation and structural equation model building will be adopted for a simulation analysis of the supply quantity and spatial distribution of dominant ecosystem services such as material production, water purification, climate regulation, flood storage, biological habitation, etc. It examines the inner mechanism of wetland ecosystem driving-pattern-services, clarifies the conversion and mutation thresholds for the evolution of various dominant ecosystem services in wetlands driven by the freshwater remediation project, develops a dynamic trade-off model among		

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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					wetland ecosystem services, reveals the quantitative trade-off relationship among various wetland ecosystem services and their dynamic conversion patterns, and provides the theoretical and technical underpinnings for the comprehensive ecological management of wetlands in the Yellow River Delta Nature Reserve.		
26	Beijing Normal University	Research on the Impact of Artificial Disturbance on the Habitat Utilization and Breeding of Waterbirds at the Bohai Gulf	31572288	National	With focus on the dominant species in the coastal wetlands of Bohai Gulf, i.e., Curlew Sandpiper (<i>Calidris ferruginea</i>), Black-tailed Godwit (<i>Limosa limosa</i>) and Kentish Plover (<i>Charadrius alexandrinus</i>), the long-term systematic ecological research aims to determine how to choose and utilize different types of habitats in the context of human disturbance, and whether human disturbance is the major cause to the very low success rate of Kentish Plover breeding locally. The findings of this research will provide an important basis for the conservation of waterbirds and their habitats at the Bohai Gulf.	Zhang Zhengwang	YS-6
27	Beijing Normal	Habitat Selection, Feeding Habit	31801985	National	This research project researches Pied Avocet (<i>Recurvirostra avosetta</i>), a common breeding waterbird in the coastal wetland of Bohai Bay. It studies	Lei Weipan	YS-6

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	University	Composition, and Breeding Success Rate of Pied Avocet (<i>Recurvirostra avosetta</i>) in Bohai Bay Wetland			this bird's habitat selection, feeding ecology, and nest survival rate using satellite tracking, stable isotope technology, infrared trigger camera, and other technologies. It aims to explore the value of different types of constructed wetlands in maintaining the long-term survival of the breeding population of Pied Avocet. This study will furnish an important scientific basis for the protection of waterbirds and their habitat in Bohai Bay.		
28	Fudan University /Beijing Normal University	The Migration Stability of Migratory Birds and Their Response to Environmental Changes: A Case Study of Two Species of Scolopacidae	31830089	Key Program of National Natural Science Foundation of China	Based on satellite tracking of individual behaviors, using methods like control experiments, mark recapture and model analysis, individual differences and interannual changes of migratory birds in migration activities such as time of migration, the research compares flyway and stopover decision to analyze the lagging effects of different experiences at the life history stages on migration activities, and response of migratory birds, and explore the stability of migratory patterns and maintenance mechanism.	Ma Zhijun/Zhang Zhengwang	YS-6
29	Beijing Normal	Comprehensive Scientific Investigation	10000886		Through comprehensive scientific investigation, the species composition, distribution, habitat condition, and threat factors of fauna and flora species	Zhang Zhengw	YS-6/12

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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	University	of Nanpu Wetland in Luannan, Hebei Province			within the Luannan wetland are to be ascertained.	ang	
30	Beijing Normal University	Monitoring Project on Shorebirds in Key Coastal Wetlands Along the Yellow Sea Ecoregion			This research project investigates the dominant species, protected species, and habitat utilization methods of shorebirds, especially those in the East Asian–Australasian Flyway.	Zhang Zhengwang	YS-6
31	Beijing Normal University	Assessment of the Effect of Applying Herbicide Imazapyr in <i>Spartina alterniflora</i> Loisel. Community on Salt Marsh Biodiversity	230200077		Supported by the local government, Paulson Foundation applied imazapyr to some 600 <i>mu</i> (40.02 ha) of <i>Spartina alterniflora</i> Loisel. on the coastal mudflat of Nanpu Wetland to conduct weeding treatment. To further verify the safety of imazapyr, four sampling tests in the experimental treatment zones and the surrounding tidal flats are conducted in this research project. Benthic soil (sediment), macrobenthos, and spartina flora samples were collected respectively in the <i>Spartina alterniflora</i> Loisel. sample plot sprayed with herbicide, <i>Spartina alterniflora</i> Loisel. sample plot without	Lei Weipan	YS-6

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					herbicide, and empty sample plot without <i>Spartina alterniflora</i> Loisel. Bird diversity study is carried out. These efforts aim to explore the effects of the herbicide imazapyr on wetland biodiversity.		
32	Beijing Normal University	Identification of Important Habitats of Wetland Birds	230200083		Through historical data collection and on-site supplementary study, this research project aims to understand the distribution of typical wetland birds along the Bohai Sea and complete the spatial delimitation of critical habitats of wetland birds along the Bohai Sea. Efforts are made to study the species, quantity, residing area, and flyway of birds in Nanpu Wetland in their breeding, overwintering, and aestivating seasons, and to determine the methods, indicators, frequency for monitoring wetland birds.	Zhang Zhengwang	YS-6
33	Beijing Forestry University	Strategic Research Program on the Conservation and Management of China's Coastal Wetlands	230300095		The research analyzes the present state, trend of change and management problems of China's coastal wetlands; focuses on the strategies and priority actions for the conservation and management of China's coastal wetlands; and provides viable policy advice for decision-makers and effective management tools for business management units.	Lei Guangchun et al.	YS-6
34	Beijing	Study on the	3124004	National	Driven by the actual need of protecting birds' habitat in the Beidaihe area,	Ni	YS-8

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	Museum of Natural History	Mechanism of Birds Response to Urbanization and Human Activities in Beidaihe Coastal Area	7	Natural Science Foundation of China (NSFC)	and basing on years of specific investigation and research, this study takes birds in the Beidaihe region as the research subject. It is underpinned by the animal ecology and ecological theory and adopts the secondary development technology method of geostatistics and GIS. This research project examines the temporal and spatial distribution characteristics of birds and the dynamic change characteristics of their suitable habitats under the background of different urbanization development levels, focusing on how birds respond to urbanization and human activities by their habitat selection. It establishes the key dynamic model of bird habitat response and makes a case analysis on the key species of Charadriiformes birds. Quantitative data support is hence furnished for decision-making on birds protection in the Beidaihe area.	Yongming	
35	Institute of Disaster Prevention	Geological Process and Tourism Development Value of Laolongtou and Dashihe Estuaries	201211775011	National Innovation and Entrepreneurs	The study of sea erosion landform and estuarine delta at Laolongtou and Dashihe estuaries in Qinhuangdao can assist college and university students in geological practice, enable them to learn more about river geological process and marine topographic features, and consolidate their professional	Zheng Qiliang	YS-9

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		in Qinhuangdao		hip Training Project for College Students	knowledge; through the research, local tourism resources will be explored to boost local tourism and create economic value.		
36	Panjin Science Research Institute on Phragmites Communities	Study on Biological Features of <i>Suaeda heteroptera</i> and the Formation and Protection of Red Beach			In recent years, <i>Suaeda heteroptera</i> in various lands with different areas has died of unknown causes, and was on the edge of disappearance in 2001. Therefore, the research on the biological characteristics of <i>Suaeda heteroptera</i> and the formation and protection of red beach was started, which was officially approved by the Science and Technology Bureau of Panjin in 2002. It was completed in cooperation with Shuangtai Estuary National Nature Reserve in Liaoning Province. In two years, seven experiments and field studies have been carried out, namely, "seed germination test of <i>Suaeda heteroptera</i> with different salt concentrations, soil culture, sand culture, hydroponic culture, and different water management, nutrient fertilization and salt-resistant variety breeding with	Liang Shuyu	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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					different salt concentrations". 2,507 field study data and 2,222 laboratory analysis data were obtained. The study concludes that the death of <i>Suaeda heteroptera</i> was caused by both human and natural factors. These factors include embankment and road construction, aquaculture, salt, water, nutrients, temperature, light, etc.		
37		Study on Sewage Purification in <i>Phragmites communis</i> Wetland Ecosystem			This research project monitors the inlet and outlet water quality through pool planting experiment and field test research so that the artificially erected <i>Phragmites communis</i> wetland will meet the following requirements after sewage treatment: first, the treated water quality can meet the maximum allowable discharge concentration standard for class II pollutants in GB8978-1996 and the environmental quality criterion for surface water; second, the impact of pollutants on <i>Phragmites communis</i> growth is mitigated through reasonable water distribution scheme; third, soil pollution is reduced and the formation of swampy <i>Phragmites communis</i> fields are prevented by adopting sound irrigation methods; fourth, the accuracy of test data and the reliability of scientific research	Wang Guosheng	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					results are achieved by adopting advanced analytical instruments and means with reasonable technical route.		
38		Protection and Restoration Construction plan for Panjin Coastal Wetland			This research project is compiled based on the advanced global experience and the research results of the Institute in many years. The plan integrates the wetland species conservation project, aquatic product breeding project, ecotourism project, wetland water conservancy construction project, and other engineering construction systems. It is a "low-carbon & heart-winning project". It is of great value for implementing the scientific outlook on development, conserving the ecological environment, protecting biodiversity, building a harmonious society, accelerating the development of <i>Phragmites communis</i> farms, and providing the experience for the protection and restoration of natural wetlands in China.	Yang Guangjian	YS-10
39		Research and Demonstration on Comprehensive Development and			Putting equal emphasis on the cultivation and comprehensive development of <i>Phragmites communis</i> fields, the project creates a feasible way to improve <i>Phragmites communis</i> yield and comprehensive production benefit. It hence opens up the direction for the large-scale development of	Tian Wenda	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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		Utilization of the <i>Phragmites communis</i> Fields			the <i>Phragmites communis</i> fields. The technology demonstration center carries out experiments, exemplary activities and introduces new varieties. The primarily selected model has been popularized and applied in 57,620 hectares (860,000 <i>mu</i>) of <i>Phragmites communis</i> fields in the Panjin <i>Phragmites communis</i> area. In 2004, the application and R&D results were popularized and tracked in 1,340 hectares (20,000 <i>mu</i>) of <i>Phragmites communis</i> fields at the Shengli branch of Yangquanzi <i>Phragmites communis</i> farm. <i>Phragmites communis</i> production rose by 16%, with an increased output value of RMB 768,000. The income of aquaculture grew by RMB 1.69 million with the net profit reaching RMB 1.13 million. The experimental, exemplary, and driving role of the model center has been brought into full play.		
40		Study on the Sustainably Increased Productivity of <i>Phragmites communis</i>			<i>Phragmites communis</i> Wetland ecosystem is composed of <i>Phragmites communis</i> and other hygrophytes, helophytes, aquatic animals and plants, microorganisms, and some other non-living materials, e.g., water, heat, light, and inorganic salts related to the above life forms. A dynamic	Liu Shu	YS-10

S. N.	Universit y/Researc h Institute	Project Description			Main Research Directions and Content	Project Respons ible Person	S.N. of Proje ct Site
		Project Name	Project Number	Project Level			
		Wetland			equilibrium is located in a space that displays a range of functions and features. To change the productive capacity of <i>Phragmites communis</i> wetland, it is necessary to take comprehensive air-conditioning measures to change the ecological environment of the <i>Phragmites communis</i> wetland in favor of its growth and development, to achieve sustainable growth of <i>Phragmites communis</i> productivity. According to the investigation and analysis, the main factors that affect the productivity of Panjin <i>Phragmites communis</i> Wetland are water, fertilizer, soil, grass, and engineering control standards. We can regulate the irrigation period, as well as the water quantity and quality through experiments. Comprehensive measures such as weed control, rational fertilization, soil fertility improvement, physical and chemical properties of soil, and changes of predatory harvesting can continuously improve the ecological system of the <i>Phragmites communis</i> wetland and form a healthy circle between the <i>Phragmites communis</i> production and environment, thus continually increasing <i>Phragmites communis</i> production capacity.		

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
41		<i>Phragmites communis</i> Diseases and Insect Pest Investigation and Control in the Wetland of Liaoning Province			There are 108,000 hectares of <i>Phragmites communis</i> wetlands in Liaoning Province, of which 91,000 hectares are harvested. The natural wetland is inhabited by emergent plants and hygrophytes dominated by the <i>Phragmites communis</i> community. Known as the "Second Forest", the vast <i>Phragmites communis</i> field not only provides a lot of material wealth for people but also plays an important role in the ecological environment. With the increase of the cultivated <i>Phragmites communis</i> area and its yield, accompanied by the advance of the project on returning farmland to <i>Phragmites communis</i> field, the microclimate of the <i>Phragmites communis</i> community has changed. The diseases and pests on <i>Phragmites communis</i> have become increasingly serious year by year. It not only reduces the economic benefit but also substantially reduces the ecological function of the <i>Phragmites communis</i> wetland. To understand the types of diseases and insect pests in <i>Phragmites communis</i> wetlands and to find out the occurrence and growth laws of major diseases and insect pests, we have collected specimens, raised insects, and conducted field surveys after years	Tan Yuci	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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					of hard work. As a result, we have basically identified the main diseases and insect pests that occur in the <i>Phragmites communis</i> wetlands in Liaoning Province. Besides, we have also identified the types of diseases and insect pests occurring all year round, as well as the types of diseases and insect pests occurring sporadically and often causing more serious damage. Our work provides accurate and timely forecast information for <i>Phragmites communis</i> production.		
42		Study on Cultivation Techniques of the Halophyte <i>Suaeda heteroptera</i> in Liao River Delta			Through the experiments on "sowing quantity, sowing method and sowing time of <i>Suaeda heteroptera</i> ", "effect of fertilization on growth of <i>Suaeda heteroptera</i> ", "irrigation frequency", "effect of intercropping on the growth of <i>Suaeda heteroptera</i> ", "picking fresh stem and leaf of <i>Suaeda heteroptera</i> ", "effect of soil salt content on growth of <i>Suaeda heteroptera</i> ", etc. a great deal of investigation and laboratory analysis data were obtained. The project plays an important guiding role for Panjin and other coastal areas and is critical in protecting the ecological environment and promoting the sustainable development of the regional economy. Its economic, social,	Liang Shuyu	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
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					and ecological benefits are of great significance with an immense application prospect.		
43		Study on the Model of Integrated High-efficiency Breeding and Circular Economy in the <i>Phragmites communis</i> Field			Based on the basic engineering conditions of the Panjin <i>Phragmites communis</i> Wetland, the project made full use of land, light, and water resources, scientifically and rationally dropping crabs, fishes, and shrimps. For the first time in China, our project promoted the ecological agriculture model of " <i>Phragmites communis</i> -crab-fish-shrimp", under which the energy flow and logistics are combined to achieve the goal of recycling and self-use. This research project facilitated the healthy development of the wetland economy, increased the comprehensive production capacity of the wetland and enabled the green and environment-friendly industrial chain of the ecological breed model. This research project provided a new way for speeding up the development of the <i>Phragmites communis</i> field economy in China, enriching the theory of ecological agriculture technology and improving the economic, social, and ecological benefits of <i>Phragmites communis</i> fields.	Wang Delin	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
44		Study on the Application of Ecological Slope Protection in Lianghuai River Regulation Project in Grand Canal			Under the principles of environmental management, ecological priority, reasonable economy, and sustainable development, this research project aims to reinforce the dikes, clear the water, beautify the environment, and promote the ecological environment. This research project explores how to use <i>Phragmites communis</i> to effectively protect the ecological slope of the riverbank, which can maintain the stability of the riverbank without changing the original natural ecological environment. Therefore, the construction of channels and rivers can be much more environment-friendly, providing suitable habitats for bacteria, insects, birds, fish, and other species. This research project also helps to maintain and improve the ecological landscape along the riverbank, to foster the healthy cycle of the ecological environment of channels and riverbanks.	Wang Xiyu	YS-10
45	Panjin Science Research Institute	Tidal Wetland Vegetation Restoration and Research and Development on Mixed			In this research project, a diversified, multi-level, and three-dimensional ecological breed model was established, in which the restoration of wetland vegetation (i.e., <i>Phragmites communis</i>) was the primary task and aquaculture the secondary task. Through the establishment of the surface	Sun Dechao	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
	on Phragmites communis Wetland	Culture of Crabs and Shrimps			water cycle, the water exchange capacity and turnover rate are increased. Some agricultural measures are taken to accelerate the restoration of plant communities and increase their productivity, thus achieving the full restoration of the structure and function of the tidal wetlands. In the meanwhile, the prawns and crabs feed on plankton and benthic organisms in the <i>Phragmites communis</i> wetlands, and their excreta are the organic fertilizer of the <i>Phragmites communis</i> , which are mutually beneficial and form a healthy ecological economic chain.		
46		Tidal Wetland Vegetation Restoration and Research and Development on Mixed Culture of Crabs and Shrimps			The study on the restoration of wetland vegetation and mixed culture of crab and shrimp is a diversified, multi-level, three-dimensional ecological culture model, in which the restoration of wetland vegetation is the principal part, and the aquaculture is the secondary part. Prawns and crabs feed on plankton and benthic organisms in <i>Phragmites communis</i> wetland, and their excreta are the organic fertilizer of <i>Phragmites communis</i> , forming a benign eco-economic chain. Therefore, in the context of rapid technological advances, it is imperative to fully excavate the	Jin Ming	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					comprehensive productivity of tidal wetlands, restore the natural mudflat ecosystem, boost biodiversity, and foster new economic growth drivers.		
47		Study on Vegetation Restoration Techniques for Estuarine Wetlands			Based on the key technologies for estuarine wetland vegetation restoration, this research project looks into the construction techniques of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> communities, and establishes the complex wetland ecosystem of <i>Phragmites communis</i> community and <i>Suaeda heteroptera</i> community. Through a series of measures such as hydraulic engineering construction, land formation, water and salt control, we create environmental conditions suitable for the growth of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> , increase the vegetation coverage of estuarine wetlands, and improve the ecological environment. A three-dimensional eco-circular economic model of fish and crab culture in estuarine wetland is established to improve the comprehensive utilization capacity of estuarine wetland and maximize its economic, social and ecological benefits.	Sun Dechao	YS-10
48		Study on Vegetation			Through the construction of the hydraulic engineering, a new model of	Liu Yan	YS-

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Restoration Techniques for Estuarine Wetlands			irrigation-salt drainage suitable for estuarine wetlands is put forward on the basis of salt pressing and salt washing, which is a new model of cultivating <i>Phragmites communis</i> by deep tillage, shallow transplanting and salt washing with fresh water, so as to achieve a large-scale restoration of <i>Phragmites communis</i> community in estuarine wetland. The vegetation restoration of <i>Suaeda heteroptera</i> community in the degenerated estuarine wetland is carried out by means of brackish water irrigation and freshwater-tidal alternation. In order to realize the large-scale restoration of <i>Suaeda heteroptera</i> community in Guangtan estuarine wetlands, the model of diffusion and propagation is studied by using hydrologic regulation and soil improvement measures.		10
49		Research on Vegetation Restoration and Mixed Culture of Crab and Shrimp in Tidal Wetlands			Because of the high salt content in the estuarine wetland soil, the wetlands have low productivity and low economic benefit, and the biodiversity of the wetland is sharply reduced as well. Therefore, effective recovery measures should be taken according to the actual situation. In this model research, <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> are selected as the	Song Honghai	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					vegetation restoration plants in the estuarine wetland. According to the biological characteristics of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i>, different experimental treatment areas are established to study the vegetation restoration models. First, we need to increase the vegetation coverage of the estuarine wetlands and improve the physical and chemical properties of the soil and water quality. Second, we need to make the plant communities assume a positive succession through optimization models such as artificial regulation. Third, we need to establish a healthy and stable ecosystem, which provides shelter and plant bait for fish and crabs, and habitats for birds and other wetland organisms, to enrich biodiversity.		
50		Study on Degradation Mechanism and Vegetation Restoration Techniques for Coastal Wetlands in Liao River Delta			This research project, which is dedicated to the field of resources and environmental science and technology, explores the evolution trend and degradation mechanism of different types of coastal wetlands in the Liao River Delta through remote sensing image interpretation, block comparison and source resolution. According to the research about the indoor pot and field experiments of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i>, the	Sun Dechao	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					internal relations between the growth and development of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> are clarified, and the key techniques of vegetation restoration of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> are grasped. It improves the comprehensive benefit of Liao River Delta coastal wetlands, provides theoretical basis and practical techniques for the restoration of wetland vegetation in Binhai, and plays a demonstration and driving role.		
51		Study on Vegetation Restoration Techniques for Estuarine Wetlands			At present, the Panjin Estuarine Wetland covers an area of 20,900 hectares, and the Liao River Estuary Wetland accounts for 80% of the area of the Panjin Estuarine Wetland. The estuarine wetland expands year by year due to the influence of river transportation and deposition and the change of ocean tide. Therefore, the estuarine wetland has a wide space for development and utilization, and is an important resource for establishing wetland eco-circular economy model, coordinating the economic, ecological and social benefits, and achieving healthy and rapid development. The estuarine wetland is a precious resource that Panjin is	Yu Changbin	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					endowed with. It is constrained by various conditions. At present, the overall level of development and utilization is not high; the competitiveness is not intense; the biodiversity is low; and the ecosystem is fragile. Many estuarine wetlands only have some scattered <i>Phragmites communis</i> and <i>Suaeda heteroptera</i>, and are barren. It is imperative to take scientific, reasonable effective measures to address the situation. Making full use of the natural resources of the estuarine wetlands and unleashing the comprehensive productivity of the estuarine wetlands can help restore the natural ecosystem and functions of the estuarine wetlands and boost biodiversity. It is very important to create a new economic growth driver to foster ecological economy.		
52		Study on Degradation Mechanism and Vegetation Restoration Techniques for Coastal Wetlands in Liao River			The coastal wetland of Liao River Delta is a typical coastal wetland in China. It is a compound delta formed by the alluvium and deposits from rivers flowing into the sea, such as Liao River, Daling River and Xiaoling River, with an area of about 315,000 ha, and the area of primary wetland is about 22,3000 ha. The Liao River Delta boasts unique coastal wetland	Yu Changbin	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Delta			landscapes, with a vast area of <i>Suaeda heteroptera</i> community, which forms the "Red Beach" and the world's largest coastal <i>Phragmites communis</i> wetland. Therefore, it has extremely high economic value and ecological environment value. The coastal wetland in Liao River Delta is a precious resource that Panjin is endowed with. However, due to various constraints, the overall level of development and utilization is not high; the competitiveness is not intense; the biodiversity is low; and the ecosystem is fragile. Some areas remain barren. Therefore, it is urgent to take scientific, reasonable effective measures to address the situation. This research is of great significance to improving the natural ecosystem function of coastal wetlands in the Liao River delta, boosting biodiversity, and creating a new economic growth driver to foster ecological economy.		
53		Integrated Research and Promotion of Ecological Restoration Techniques for Panjin			According to the situation of the degradation of coastal wetlands in Panjin, the degraded <i>Phragmites communis</i> wetland and degraded <i>Suaeda heteroptera</i> wetland are selected as the restoration subjects in this study. The integrated research and extension of ecological restoration techniques	Li Dong	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Coastal Wetland			for Panjin coastal wetland are carried out by adopting the measures of wetland habitat restoration, biological restoration and ecosystem function restoration. This research implements the major measures and practical actions proposed by the 18th CPC National Congress that "treasure nature more consciously, protect the ecosystem more actively, strive to usher in a new era of socialist ecological progress", "work hard to build a beautiful country, and achieve lasting and sustainable development of the Chinese nation". It is a sure choice to increase the wetland vegetation coverage rate, enhance the wetland ecosystem function, and boost the wetland biodiversity. It is an urgent need to promote regional ecological security as well as economic and social development. This research can provide a model and a demonstration technology for the ecological restoration of degraded wetlands. It can give full play to an important demonstration and leading role in the national restoration and protection of degraded wetlands.		
54		Study on Degradation Mechanism and			In this research, remote sensing image interpretation, block comparison and source apportionment are used to analyze the evolution trend and	Li Dong	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Vegetation Restoration Techniques for Coastal Wetlands in Liao River Delta			degradation mechanism of coastal wetlands in the Liao River delta. Based on the degradation mechanism, the laboratory and field experiments of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> are conducted, to figure out the internal relationship between environmental factors such as salinity and water and the growth and development of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> , so as to obtain key techniques for vegetation restoration of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> and provide technical support for wetland restoration in Binhai. This research focuses on a novel subject, with a clear goal and feasible technical scheme.		
55		Integrated Research and Promotion of Ecological Restoration Techniques for Panjin Coastal Wetland			The project involves the field of Resources and Environmental Science and Technology. Through field investigation and laboratory analysis, the main driving factors of the degradation of Panjin coastal wetland are identified. Research on the application of wetland ecological restoration techniques by comprehensive application of wetland ecological restoration, biological restoration and ecosystem function restoration techniques, solves the problems of uneven substrate, uneven water distribution, heavy salinity of	Wang Jinshuang	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					soil, degradation of vegetation, pollution of rivers flowing into the sea, reduction of biodiversity, reduction of comprehensive productivity and decline of ecosystem function. The research results on ecological restoration techniques are integrated and extended.		
56		Research and Application of High-yield and High-efficiency Production Model and <i>Phragmites communis</i> Wetland Protection Techniques			According to the current situation of <i>Phragmites communis</i> industry in China, this research project employs the principles of ecology, engineering, botany and economics to break through the technical barriers that restrict the development of <i>Phragmites communis</i> industry. It also establishes a high-yield high-efficiency three-dimensional production model, to protect the <i>Phragmites communis</i> wetland resources and boost the <i>Phragmites communis</i> industry efficiency, as well as the income of managers and workers. It plays the role in leading, driving and demonstrating the leap from underdeveloped areas to developed areas, which is of great significance to accelerating the overall construction of a moderately prosperous society.	Yu Changbin	YS-10
57		Study on Remote			This research project echoes what the CPC put forward at the 18th CPC	Wang	YS-

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Sensing Assessment and Integrated Management Techniques for the Coastal Buffer Zone in Liaodong Bay			National Congress: "Promoting ecological progress is a long-term task of vital importance to the people's wellbeing and China's future. Faced with increasing resource constraints, severe environmental pollution and a deteriorating ecosystem, we must raise our ecological awareness of the need to respect, accommodate to and protect nature. We must give high priority to making ecological progress and incorporate it into all aspects and the whole process of advancing economic, political, cultural, and social progress, work hard to build a beautiful country, and achieve lasting and sustainable development of the Chinese nation". It is imperative to promote regional ecological and environmental security, as well as economic and social development. It is of great historical and practical significance to enhancing the self-purification capacity, ecosystem service function and biodiversity of the buffer zone in Liaodong Bay, as well as ensure its marine ecological security. Furthermore, this research provides a model and techniques for the ecological restoration of the National Wetland Buffer Zone, and they play an important exemplary and leading role and are	Jinshuang	10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					expected to be widely applied.		
58	Panjin Forestry Technology Promotion Station, Panjin Wetland Science Institute	Popularization of Vegetation Restoration Techniques for Estuarine Wetlands			In this research project, <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> are selected as the vegetation restoration plants in the estuarine wetland of Liao River. In order to restore the ecological function of the Liao River Estuary Wetland, the hydraulic engineering facilities, water diversion and salt washing, artificial planting of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> , and artificial construction of biological community are adopted. According to the biological characteristics of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> , and the environmental conditions of the project area, four demonstration areas are established to promote the vegetation restoration techniques for the estuarine wetland. Through a series of control measures such as scientific planting of <i>Phragmites communis</i> and <i>Suaeda heteroptera</i> in the demonstration area, the vegetation coverage of the wetland is increased, the physical and chemical properties of soil and water are improved, and the plant community is in a positive succession. At the same time, a healthy and stable ecosystem is established	Dong Bo	YS-10

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					to provide shelter and plant bait for fishes, crabs and other wetland organisms such as birds, to enrich the biodiversity. As a result, it achieves both ecological development and sustained economic growth, promotes the coordinated, healthy, and rapid development of the ecological environment and economy of the Liao River Estuary Wetland, maximizes the economic, ecological and social benefits of the Liao River Estuary Wetland, and provides practical techniques for vegetation restoration in the estuarine wetlands of Liao River.		
59	Oceans and Fisheries Bureau of Panjin	Liao River Estuary Restoration Project			The general goal of the restoration of the Liao River Estuary is to gradually restore the structure and function of the degraded wetland ecosystem by adopting appropriate biological, ecological and engineering techniques, and ultimately achieve the self-sustaining state of the wetland ecosystem. But for different degraded wetland ecosystems, their emphases and requirements are different. The comprehensive ecological restoration project on the Liao River Estuary in Panjin is guided by the principle of "maintaining the natural balance of the wetland system, fully restoring and		YS-10

S. N.	Universit y/Researc h Institute	Project Description			Main Research Directions and Content	Project Respons ible Person	S.N. of Proje ct Site
		Project Name	Project Number	Project Level			
					protecting wetland functions and wetland biodiversity, and promoting the sustainable utilization of resources". According to the actual situation of the west coast of Liao River Estuary in Panjin, different protection, restoration and mudflat restoration measures are taken according to local conditions, so as to strengthen the protection, observation, tourism, publicity, education, etc. This research project maximizes the protection and restoration of the integrity of the Liao River Estuary Wetland Ecosystem and its ecosystem services, with a view to protecting wetland biodiversity and the important flora and fauna resources within wetlands, and preventing the destruction of vegetation and the decline of animal populations. It ensures the balance of nature of regional ecosystems, and restores and restores wetland areas, to explore ways of rational utilization of natural resources and environment. It gradually restores the ecological environment quality of the Liao River Estuary Wetland, maintains the integrity and stability of the wetland reserve ecosystem, and finally achieves the ecological goal of "Beautiful Wetland City of Panjin".		

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
60		Study on the Maximum Capacity of Chinese Pit Viper (<i>Gloydius shedaoensis</i>) on Snake Island			Based on the study of Chinese Pit Viper population size, predation rate, energy metabolism and edible birds in Snake Island, the maximum capacity of Chinese Pit Viper in Snake Island is calculated.		YS-11
61		Study on Biodiversity of Laotieshan National Nature Reserve			The species of plants, birds, mammals, amphibians and reptiles in the reserve are investigated.		YS-11
62		Study on Monitoring System of Chinese Pit Viper's Population Dynamics of Snake Island			VORTEX model is used to predict the development trend and extinction probability of Chinese Pit Viper in the Snake Island after 100 years.		YS-11
63		Sample Survey on Population and Habitat of Chinese Pit Viper in			Based on the population survey of six gullies in Snake Island, the snake population in the entire island is estimated.		YS-11

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Snake Island					
64		Insect Diversity Survey in Laotieshan National Nature Reserve in Snake Island, Liaoning			The insect background in the reserve is investigated; specimens are collected; and a catalog of insect diversity is made		YS-11
65	Wetlands International	Survey of Waterbirds in the Yellow Sea-Bohai Gulf			Wetlands International conducts annual surveys on waterbirds in the Yellow Sea-Bohai Gulf.		YS-11
66	Fudan University	Study on Migration Ecology of Shorebirds: Food Source, Composition and Energy Accumulation	31772467	National	Research interests: Avian ecology. Investigate the food composition of major shorebirds in their migratory stopovers in the EAAF; compare the relationship between the food composition of shorebirds and their feeding methods and characteristics of feeding organs. Study on Energy Accumulation Pattern of Shorebirds in Yalujiang Estuary Wetland	Ma Zhijun	YS-12
67	Fudan University	Influence of Changes in Food Resources in Roosting Sites on Food	31572280	National	Research interests: Avian ecology. Two threatened birds, Great Knot and Bar-tailed Godwit, are taken as the study subject, to discuss the effects of niche differentiation and resource competition on the food utilization and	Ma Zhijun	YS-12

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Utilization, Energy Accumulation and Activity of Shorebirds			energy accumulation of the sexual dimorphism birds, and analyze the adaptability of male and female individuals to the changes of food resources.		
68	Fudan University	Survey on Shorebirds Migrating in Spring in the Yellow Sea-Bohai Gulf Region of China		International Cooperation Program	This research conducts a comprehensive survey of shorebirds migrating in spring in the Yellow Sea-Bohai Gulf Region of China for understanding the current situations of species, quantity and distribution of shorebirds; and compares the results with those of a survey undertaken ten years ago, in order to analyze the population change trends of migratory shorebirds in the Yellow Sea region, and provide evidence for understanding the population changes of migratory shorebirds in East Asia-Australasia.	Ma Zhijun	YS-12
69	Fudan University	Protective Effect of Birdwatching on Birds and Their Habitats in Estuaries and Coastal Areas of China		International Cooperation Program	This research project collects basic data on bird-watching activities in major estuaries and coastal areas of the mainland, to understand the history and current situation of bird-watching activities, and identify the current problems and challenges faced by bird-watching organizations and bird conservation activities. The survey explores the possible future development of bird-watching activities and bird conservation, to	Ma Zhijun	YS-12

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
					strengthen communication between bird communities and enhance the role of bird-watchers in bird conservation. The survey also promotes the development of bird-watching activities and bird conservation in China, and explores the role of bird-watching activities in conservation of birds and their habitats in the major estuaries and coastal areas of Mainland China.		
70	Nanjing Normal University	Ecological Restoration Project of Gushan Phragmites communis Field in Yalujiang Estuary Wetland National Nature Reserve of Dandong Feasibility Study Report and Environmental Impact			The project carries out comprehensive ecological restoration and ecological construction in the Gushan Phragmites communis Field, to fully restore and enhance the ecosystem services of the Yalujiang Estuary Wetland in Dandong. It aims to construct a harmonious wetland eco-civilization demonstration site, which has the functions like wetland ecological conservation, wetland ecological engineering demonstration, wetland culture exhibition and wetland eco-tourism.		YS-12

S. N.	University/Research Institute	Project Description			Main Research Directions and Content	Project Responsible Person	S.N. of Project Site
		Project Name	Project Number	Project Level			
		Assessment Work Plan					
71	WWF and Great Yellow Sea Project Office	Demonstration of Ecosystem-based Management of Coastal Wetland at the Yalujiang Estuary		International Cooperation Program	Scientific research activities: the conceptual model is improved through the surveys on intertidal benthic communities (primary) and birds (secondary), according to the survey results, with reference to relevant literature. Management practices: after the formulation of the Rules for Ongoing Monitoring of Coastal Wetland Ecosystems at the Yalujiang Estuary, and building of an information base that can reflect the dynamic changes of ecological systems, this research monitors the level of harmony between human activities and the ecological environment of wetland in a real-time manner, determines the scientific objectives of management, meets the needs of economic activities of human beings to a maximum extent while ensuring the integrity of the food chain in coastal wetlands at the Yalujiang Estuary; representative areas are selected as experimental zones, adaptive management plans are developed and the implementation and evaluation thereof are organized.	WWF	YS-12

10.1.2 Scientific issues to be solved

For the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), there is a need to ramp up researches on wetland ecosystem services, tidal flat/marsh wetland geomorphy, bird distribution and migration patterns, key protected bird habitat, etc., to provide scientific basis for ecological protection, understanding of bird migration patterns, protection policy formulation, etc., and to establish an extensive, multi-level and multi-disciplinary research mechanism and cooperation model.

Additionally, other targeted scientific research should be carried out according to the actual conditions of the nominated property. They are set out below.

10.1.2.1 YS-4: Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province

(1) Restoration of fragmented wetland ecosystem. Human activities, such as reclamation for agriculture and oil exploitation, have destroyed the wetland ecosystem services to some extent, resulting in the fragmentation of the wetland ecosystem. Therefore, the fragmented wetland ecosystem needs to be restored through scientific research.

(2) Invasion of *Spartina alterniflora* Loisel. As the negative impact of *Spartina alterniflora* Loisel. invading the Yellow River Delta steadily become prominent, the research on the invasion mechanism, expansion

dynamics, resultant harm and prevention and control measures against the species has become one of the urgent scientific issues to be solved for the nominated property.

10.1.2.2 YS-10: Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province

- (1) Technical problem on *Suaeda glauca* community recovery;
- (2) Research on impact of oil exploitation, reed planting and other human activities on the habitat of migratory birds.

10.1.2.3 YS-11: Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province

- (1) Research on geomorphy of marine abrasion island;
- (2) Research on habitat of Chinese Pit-Viper.

10.1.2.4 YS-12: Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province

- (1) Cause and recovery plan of reed resource degradation;
- (2) Impact of artificial aquaculture (fish ponds, shrimp ponds, etc.) on bird habitat.

10.1.2.5 YS-13: Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province

- (1) Research on construction of ecological security system of island;
- (2) Investigation and research on nutritional condition of waters.

10.2 Research Directions and Contents

10.2.1 Basic scientific researches

10.2.1.1 Comprehensive resource investigation

Comprehensive and systematic investigation will be regularly conducted on the biological resources at the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II), mainly including vascular plants, birds, mammals, amphibians, reptiles, benthos and insects. Lists of species at all components or annual species monitoring reports will be prepared and published as the basis for monitoring the status and development trend of species. Investigation frequency: once every two years for birds, insects and benthos; once every five years for mammals, amphibians and reptiles.

Based on the comprehensive resource investigations, a comprehensive and systematic biodiversity database of the nominated sites will be established, covering the type and structure of tidal wetland ecosystem, the composition, characteristics and distribution of wild fauna and flora.

Five-year plan: research on the population of key species, including the investigation on population size, population dynamics, habitat distribution and threats of birds such as Hooded Crane, Black-faced Spoonbill, Great Knot, Oriental Stork, Baer's Pochard, White-naped Crane, Red Knot, Curlew Sandpiper, Saunders's Gull, Relict Gull, Siberian Crane,

Common Crane, Great Bustard, Golden Eagle, Chinese Egret, Yellow-breasted Bunting, and Cormorant.

Near-term plan: In light of the actual situation, 1-2 species at each nominated property will be selected for investigation every year; the first round of comprehensive biological resource investigation will be completed by 2035, while making efforts to establish a biodiversity database and fixed sampling plots.

Long-term plan: Comprehensive biological resource investigation will be carried out every year as planned to constantly improve the biodiversity database; the database will be continuously updated based on the information from comprehensive biological resource investigation, so as to provide scientific basis for rational development, utilization, protection and management of resources at the nominated property.

10.2.1.2 Investigation on major habitat elements

The main habitat elements at the nominated property include climate, hydrology, landform, geology and geomorphology, soil type, and landscape. The distribution pattern of habitat elements will be developed based on the investigation on habitat elements. Investigation on habitat elements will be performed every five years.

10.2.1.3 Research on dynamic evolution characteristics and impact of representative ecosystem

Long-term fixed-position monitoring research will be performed on dynamic evolution characteristics and impact of representative ecosystem

and impact thereof at the nominated property, including habitat monitoring and research on flyways of migratory birds, investigation on quantity and habitat of key protected birds, and research on the patterns of vegetation succession in swamps and riverine wetlands. GIS database will be established based on remote sensing data, field monitoring and investigation data. Vegetation succession will be monitored, and wetland dynamics will be monitored and analyzed.

10.2.1.4 Research on environmental pollution monitoring and environmental impact assessment

First, the environment of the nominated property will be regularly monitored, mainly covering river, seawater, groundwater, surface water, atmosphere, meteorological factors, human activities, and development status. Second, the population dynamics, behaviors and habitats of major species in important ecosystems will be investigated and studied, and the ecosystem and the relationship among population dynamics, species behaviors, habitats, environmental conditions and pollution changes in the region will be studied. Third, the ecological environment quality, status of animals and plants, etc. will be scientifically evaluated.

10.2.2 Management application research

The research results of management application research serve to facilitate the management. As the direct or indirect basis for the

formulation of management measures and macro policies, the results are classified into three fields:

10.2.2.1 Natural science research

Natural science research includes animal behavior, animal physiology, geological geomorphology, disaster prevention and recovery, and other related fields, mainly including the following:

- (1) Research on living and feeding habits of key migratory species;
- (2) Research on suitable habitat for key migratory species;
- (3) Research on monitoring and control of invasive species;
- (4) Research on recovery and optimization techniques for the damaged coastal ecosystem;
- (5) Research on geological hazards and their prevention and control measures;
- (6) Research on impact of global climate change on wetland.

10.2.2.2 Social science research

Social science research is centered on the allocation of scarce resources and human behavior management, with the aim of effectively reviewing the relationship between the nominated property and society and economy, primarily including the following:

- (1) Research on the impact of national and local government policies on conservation and development;

(2) Research on the impact of human activities on species habitat and species activities;

(3) Research on tourism activities, development model and tourism management of nominated property;

(4) Research on the direction and degree of environmental impact of the number and behaviors of tourists.

10.2.2.3 Conservation and management research

Conservation and management research is applied research to ensure the sustainable development of nominated property, mainly including the following:

(1) Research on the formulation and improvement of relevant laws and regulations regarding the nominated property;

(2) Research on the construction of geographical information system for the nominated property;

(3) Research on the construction of scientific research monitoring platforms and science & education experiment bases at the nominated property;

(4) Research on the management system for departmental coordination and collaboration, and scientific management;

(5) Research on the management mechanism for coordination and joint conservation of the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase I);

(6) Research on the coordination mechanism for the participation of

communities and social organizations in the conservation, monitoring and management;

(7) Research on ecological compensation and reward system of local communities;

(8) Research on rescue of waterbirds;

(9) Research on sustainable management of protected areas.

10.2.3 Other special research at the nominated property

In addition to the research in the foregoing three fields, corresponding special researches should be carried out according to the specific situation, urgent scientific issues to be solved, and key and difficult problems regarding management application.

Other special researches to be carried out for the nominated property are as follows:

10.2.3.1 YS-3: Migratory Bird Habitat at Chongming Dongtan, Shanghai

1. Natural science research

(1) Conventional research

1) Analysis on utilization pattern and intensity of natural resources

2) Sustainable management practices of natural resources

3) Research on management of estuarine wetland reserve

(2) Special research

- 1) Research on wetland ecological environment and human health
- 2) Research on estuarine siltation dynamics and ecological succession in intertidal zone
- 3) Habitat utilization, spatial and temporal distribution and foraging strategy of birds
- 4) Research on the application of remote sensing in establishment of the classification evaluation and simulation analysis system of bird habitat
- 5) Research on modern monitoring and information system of the nominated property
- 6) Research on carbon sequestration of wetland and wetland vegetation

2. Conservation management research

(1) Research on wetland ecosystem recovery

In the near future, restoration of the recovered wetland area will be continued to create a suitable natural environment according to the needs and preferences of different birds, including keeping ponds for water storage, planting reeds, and building semi-natural feeding and roosting places for migratory birds. At the same time, the research on ecological recovery method of *Spartina alterniflora* Loisel. will be continued.

(2) Research on wetland ecosystem management and monitoring

The research on the impact of environmental changes of bird habitats at the nominated property and buffer zone on wintering migratory birds, and the impact of exotic species on habitats of Hooded Crane and other

rare birds, and the Global Eye-powered electronic monitoring on biodiversity-rich areas, can improve the monitoring and management level of the nominated property from the perspective of ecosystem management. *Spartina alterniflora* Loisel. control efforts and bird habitat optimization will be tracked. The water level regulation, island height, habitat succession, tidal flat, tidal creek change and plant community in the ecological restoration area will be monitored and studied.

(3) Research on *Spartina alterniflora* Loisel. control and bird habitat recovery

Spartina alterniflora Loisel. occupies intertidal flat, defunctionalizing the bird habitat and decreasing the biodiversity. Currently, the elimination rate of *Spartina alterniflora* Loisel. is 95%. However, it is necessary to intensify the research to guard against resurgence, and develop early warning and control techniques for new invasive species in the future.

10.2.3.2 YS-4: Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province

(1) Research on effective management and sustainable development of wetland resources

The nominated property boasts abundant natural resources, with broad prospects for development and utilization. Studying the pattern, intensity and scale of development and utilization of wetland resources, determining the types of natural resources to be developed and utilized, reducing the pressures on natural resources and natural environment, and

achieving the goal of sustainable development, are the bases for effective conservation management of wetland and long-term research topics for the nominated property.

(2) Research on wetland ecological restoration and reconstruction techniques

In recent years, extensive wetland degradation and reduction have occurred as a result of the development of industry and agriculture, implementation of projects, reduction in water flow of the Yellow River water, seawater flooding, and other factors. It is necessary to study the best model of wetland restoration, develop the theory of wetland ecological restoration, explore the scientific method of wetland restoration, and provide theoretical guidance for the implementation of large-scale wetland restoration.

(3) Evaluation research on wetland ecosystem services

The wetland ecosystem services at the nominated property will be studied with a focus on productivity, biodiversity, and ecological functions of wetland, and the value of wetland will be quantified to provide a strong basis for conservation. Further, the public will be guided to clearly understand the value and role of wetland to raise their awareness of wetland conservation.

(4) Research on the impact of Yellow River Delta exploitation on reserve and coordinated development

The exploitation of the Yellow River Delta has damaged local

landscapes and ecosystems to varying degrees. The degree of damage to wetland will be quantified from a scientific point of view, and the impact of exploitation on nature reserve will be evaluated. An objective and fair evaluation system will be established. A coordinated development mechanism will be built to enhance sustainability.

(5) Research on comprehensive management of saline land

In recent decades, the unreasonable industrial and agricultural production activities, the reduction in water flow of the Yellow River and other factors have caused the secondary salinization of a large area of soil, with an ongoing expansion trend. It is important to study the formation and development patterns of saline land and improve the productivity of the land by comprehensive measures, so as to realize sustainable development and maintain local ecological balance.

(6) Research on the impact of the flow change of Yellow River on various resources at the nominated property

10.2.3.3 The Yellow River is the dominant factor that affects the local ecosystem. The hydrological change of the river directly impacts the nature and quality of the wetland ecosystem at the nominated property. The research and summary of the hydrological pattern of the Yellow River is of great theoretical significance to the conservation and exploitation of the wetland in the Yellow River Delta where the nominated property is located. YS-5: Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province

(1) Dynamic impact of global climate change on wintering population of Red-crowned Crane

On the spatial scale of the global migratory routes of migratory birds, the impact of dynamic climate change on the biodiversity of Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province should be studied, and its dynamic impact on the wintering population should be analyzed.

10.2.3.4 YS-10: Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province

(1) Dynamic impact of oil exploitation projects on migratory bird populations

Environmental impact assessment of oil exploitation projects should be carried out. The research on the potential impact of oil exploitation and pipeline on the biodiversity of migratory bird habitats should be conducted, including dynamic impact on migratory bird populations. The sustainable oil exploitation area around the buffer zone, to determine the exploitation scale and approach.

10.2.3.5 YS-12: Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province

(1) Research on control of invasive *Spartina alterniflora* Loisel

The *Spartina alterniflora* Loisel. invasion and influence factors will be studied. *Spartina alterniflora* Loisel. should be controlled to strictly prevent the species from expanding to the nominated property and the buffer zone.

10.2.3.6 YS-13: Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province

(1) Research on island (reef), intertidal zone and marine ecosystem protection

In the near future, the restoration status of island (reef), intertidal zone and marine ecosystem will be investigated, to perpetuate the most distinctive local ecosystem.

10.3 Organization and Management of Scientific Research

10.3.1 Cooperation mechanism

A cooperative scientific research mechanism will be established between the management agencies of the nominated property and scientific research institutions and universities. They will cooperate in applying for and carrying out research projects based on their personnel, equipment, facilities, resources, and techniques.

10.3.2 Funding sources

1. The funding for research projects of the nominated property and the funding for expert research will be applied for as diverse sources of scientific research funding.

2. Cooperation with research institutions will be adopted. The management agencies will provide necessary research conditions and funding for the research institutions, while the research institutions will share their research achievements with the management agencies.

3. Cooperation with non-governmental institutions, such as nature conservation foundation and non-governmental organization of nature conservation, will be adopted. The management agencies will provide necessary research conditions and funding for non-governmental institutions, while the non-governmental institutions will share their research achievements with the management agencies.

10.3.3 Infrastructure construction

Research bases will be jointly built by partners, and the staff of the management agencies can assist in data collection.

10.3.4 Outcomes sharing

Research achievements will be shared with partners. In other words, all reports, publications, research papers and transfer of intellectual properties will be jointly signed and shared by both parties.

10.3.5 Team building

By constructing and improving scientific research facilities at the

nominated property and improving the benefits of researchers, more researchers will be willing to engage in the protection of World Natural Heritage to improve the overall scientific research capacities of the management agencies. As a result, management agencies can cultivate relevant professionals based on the technical strengths of research institutions and universities.

11 Community Participation and Sustainable Development

11.1 Status Quo

The nominated properties and the buffer zones of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are home to a population of 2,362, including eight residents within the nominated properties and 2,354 residents in the buffer zones. There are residents in Snake Island - Laotieshan (YS-11) and Yalujiang Estuary (YS-12) and their buffer zones. There are no residents in the other nominated properties. The statistics of residents at the nominated properties are as follows.

Table 25 Population within Nominated Properties and Buffer Zones

ID	Name of Nominated Property	Population at Nominated Property	Population at Buffer Zone	Year
YS-3	Migratory Bird Habitat at Chongming Dongtan, Shanghai	0	0	2020
YS-4	Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province	0	0	2020
YS-5	Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province	0	0	2020

ID	Name of Nominated Property	Population at Nominated Property	Population at Buffer Zone	Year
YS-6	Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province	0	0	2020
YS-7	Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province	0	0	2020
YS-8	Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province	0	0	2020
YS-9	Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province	0	0	2020
YS-10	Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province	0	0	2020
YS-11	Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province	0	1894	2020
YS-12	Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province	8	460	2020
YS-13	Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province	0	0	2020
Total		8	2354	2020

The status quo of the nominated properties is as follows.

11.1.1 Migratory Bird Habitat at Chongming Dongtan, Shanghai (YS-3)

There is no community within the nominated property. Vegetable planting, freshwater juvenile crab raising, marine fishing, and agritainment are the major industries in Chenjia Town, where the nominated property lies, and there are sizeable cooperative organizations.

11.1.2 Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province (YS-4)

There is neither community nor resident in the nominated property and the buffer zone, but 15 km within them there are 24,000 residents who mainly engage in aquaculture, planting, and industrial and mineral industry (salt pans).

11.1.3 Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province (YS-5)

There is no community within the nominated property and the buffer zone.

11.1.4 Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province (YS-6)

There is no community within the nominated property and the buffer zone. Communities around the nominated property and the buffer zone involve five stakeholders, namely Nanpu Village, Beipu Village, Zhengyi Salt Farm, Luannan Xinyan Aquatic Product Breeding Co., Ltd., and Jidong Oilfield.

11.1.5 Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao, Hebei Province (YS-7)

There is no community within the nominated property and the buffer zone. Villages close to the north side of the lagoon include Chaohe Village, Niezhuang Village, and Tuanlindong Village.

11.1.6 Migratory Bird Habitat at Dachaoping of Beidaihe, Qinhuangdao, Hebei Province (YS-8)

There is no community within the nominated property and the buffer zone. Dachaoping (YS-8) lies in Beidaihe District, Qinhuangdao City, Hebei Province, and is adjacent to Geziwo Park in the south. The nominated property and buffer zone stretch across Haibin Forest Farm and Haibin Town.

11.1.7 Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province (YS-9)

There is no community within the nominated property and the buffer zone. The surrounding communities include Nanhai Village, Tianzhuang Village, Lunan Subdistrict, Tangzizhai Village, Tuanlianbu Village, Xijiangzhuang Village, and Dongjiangzhuang Village.

11.1.8 Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province (YS-10)

There is no community within the nominated property and the buffer zone.

11.1.9 Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province (YS-11)

No people are living in the nominated property. The communities in the buffer zone are situated in Shuangdaowan Subdistrict and Sanjianbao Subdistrict, Lushunkou District, Jiutou Hill Zone, where the number of residents is 1,894. The residents rely on planting, fishing, processing and manufacturing, and tourism. Some residents engage in tourism with their own orchards, and some engage in individual aquaculture businesses through contracted reservoirs.

11.1.10 Migratory Bird Habitat at Yalujiang Estuary, Dandong, Liaoning Province (YS-12)

The communities in the nominated property and the buffer zone are situated at the Reed Farm and Haiyanghong Farm at Gushan Town, Donggang City, Dayang River Zone, where the number of residents is 468. The residents depend on agriculture and fishing.

11.1.11 Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province (YS-13)

There is neither community nor resident within the nominated property and the buffer zone. Residential areas such as Chengling Village of Dachangshandao Town and Shajian Village of Guangludao Town exist in the surrounding areas. The principal industries in the areas are aquaculture, aquatic product processing, agriculture, and tourism.

11.2 Objectives

All communities in the nominated properties, buffer zones, and surrounding areas should be listed as stakeholders during heritage nomination and protection, and the following goals should be pursued:

1. To guide and encourage communities and residents to actively participate in heritage protection;
2. To guarantee sustainable economic and social development of

communities while protecting heritage sites.

11.3 Sustainable Community Development Measures

To ensure the sustainable development of relevant communities, the management agencies of all the nominated properties should implement the following three improvement measures: (1) making reasonable industrial adjustments based on the existing industrial development, and developing ecological industries that have less impact on migratory bird habitats; (2) establishing and improving the ecological compensation system to protect the development rights and interests of communities and residents; (3) carrying out community-based training mainly about education and promotion of heritage sites as well as ecological industry and skills.

11.3.1 Industrial restructuring

The major directions toward industry adjustments in the nominated properties are:

1. Developing eco-aquaculture

Over years of coexistence, some wild birds have adapted to the habitats at fishponds that are rare feeding sites. Different from the traditional aquaculture industry, the eco-aquaculture industry produces green and healthy organic products for the market by restoring a complete wetland biological community and establishing a healthy fishpond wetland

ecosystem, and the profit per *mu* of fishponds is higher. Furthermore, a certain proportion of aquatic products should be reserved for wild birds as a way to give back to the natural ecosystem during bird migration seasons. The health of the fishpond ecosystem should be assessed regularly, and ecological compensation should be granted when they meet relevant standards.

2. Developing organic farming

Many migratory birds rely on crops to regain energy during their migration and are highly dependent on farmlands. Hence, it is necessary to coordinate heritage protection and planting development. Over the course of organic farming, pesticides should not be used, and biological prevention and control approaches should be adopted with caution. A proper percentage of crops in farmlands should be reserved to provide food for migratory birds and overwintering birds. The health of organic farms should be assessed regularly, and ecological compensation should be granted when they meet relevant standards.

3. Developing tourism

It is necessary to encourage residents to participate in tourism through financial policy support and skill training in a phased manner, to gradually diversify their income sources (currently aquaculture, planting, fishing) and increase their income.

11.3.2 Compensation system

All the nominated properties should establish and improve the following two compensation system:

1. Compensation system for conflicts between humans and wild animals

A compensation system for conflicts between humans and wild animals should be established on the basis of the existing damage compensation policy, to provide timely economic compensation for villagers and fishermen suffering from loss caused by the conflicts between humans and wild animals, and support from higher-level finance departments and national special funding should be obtained for them.

2. Compensation for ecological organic agriculture

An ecological organic agriculture compensation system should be established to compensate fishermen, enterprises, and units that carry out production through eco-aquaculture, organic planting, and ecological salt farms, to cover the loss as a result of the reduction in aquaculture, planting, and production intensity.

11.3.3 Management training

All the nominated properties and buffer zones with human occupation should carry out community-based management training in the following:

1. Heritage promotion and value education should be conducted in the

communities within nominated properties, buffer zones, and the surrounding areas to enhance residents' protection awareness and skills and create a good heritage protection atmosphere.

2. Training in the basic skills of ecological organic agriculture and fishery should be provided for farmers and fishermen in the communities within nominated properties, buffer zones, and the surrounding areas. The local government should properly organize tourism activities, and carry out training in tourism services, product design, marketing, and other skills to communities.

11.4 Community Participation

All the nominated properties and buffer zones with human occupation should ensure the full participation of community stakeholders of the nominated properties, buffer zones, and the surrounding areas during World Heritage nomination and heritage protection, including their participation in planning, protection, operation, and scientific research tasks. The principles and measures of community participation are as follows:

11.4.1 Participation in planning

For plans regarding the nominated properties and buffer zones, opinions of relevant communities involved should be fully solicited through formal or informal meeting during the preparation of the plans and

the formation of results at important phases. The plans should be prepared on the basis of full negotiation to ensure that they reflect an extensive consensus and are more feasible.

A "1+X" negotiation model should be established; in other words, management agencies of nominated properties should take the lead in negotiating and discussing the requests raised by stakeholders according to the requirements specified in the protection and management plans. Problems difficult to handle should be resolved by local governments in a unified manner. Management agencies at all levels should regularly check the functioning of the buffer zone coordination mechanism to improve the mechanism. The government finance departments at all levels should prioritize projects regarding the building of public service facilities for communities in the nominated properties and buffer zones.

11.4.2 Participation in conservation

Local residents should be fully mobilized to become part of the protection and patrol teams to protect wild animals, curb the damage to heritage sites in a timely manner, and cooperate with local management agencies in law enforcement whenever necessary. Local residents should also be encouraged to participate in the protection and guarding of heritage sites, and report any behaviors that cause damage to heritage sites, and reporters should be rewarded accordingly. The management agencies of the nominated properties should fully communicate with local infrastructure

management and maintenance units, fully consider heritage protection needs during infrastructure construction and maintenance, formulate and implement scientific and reasonable procedures, to minimize the damage to heritage sites.

Community residents should be enlisted in routine patrol teams to stop poaching and report to the forest police. Ecological aquaculture, organic farming, and other industries can provide necessary resources and habitats for birds.

11.4.3 Participation in operation

Local residents, who have received adequate training and education, should be mobilized to participate in operations such as heritage presentation and tourism services. At the same time, preferential policies should be provided to local residents to encourage them to work at the management agencies, making full use of their knowledge about the local natural environment and traditions. Long-term environmental education partnerships and multiple ecological education bases should be established, and activities such as Bird Protection Week and Wetland Day should be held. Heritage tourism town projects should be planned, and bird-watching organizations from all over China should be invited to the nominated properties for bird observation, to raise the awareness of local residents, students, teachers, and organizations who watch TV programs and participate in activities.

The purpose of the above activities is to protect wildlife habitats, restore their populations, improve ecosystem functions, establish a monitoring system, and improve local residents' ability to protect and manage natural resources. The management agencies should also provide communities with financial support, protection planning, and capacity building, and assess the effectiveness thereof.

11.4.4 Participation in scientific research

Training in basic scientific research and monitoring skills should be offered to local residents, so they can monitor the distribution and activities of wild animals in time in their daily life and work, supporting the monitoring and scientific research work in nominated properties. After having received adequate bird-watching training, local residents can monitor the species and numbers of birds in their fishponds, farmlands, and salt farms, and record the data on a mobile bird watching app as real-time bird monitoring data providing reference for scientific researchers.

12 Management System and Capacity Building

12.1 Status Quo

12.1.1 Management agencies

The nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) are under unified management by the National Forestry and Grassland Administration. The municipal authorities of Dongying, Cangzhou, Qinhuangdao, Tangshan, Panjin, Dandong and Dalian are responsible for managing the nominated properties within their respective jurisdictions, under the coordination by the provincial authorities of Shanghai, Shandong, Hebei and Liaoning. The nature reserves where the nominated properties are located implement effective management on these nominated properties, and since the nomination, all municipal authorities concerned have established a leading group and a leading group office in charge of the nomination, supervision, management and guidance. After the inscription of the nominated properties on the World Heritage List, Phase I and Phase II of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China will form an integral entity, which will be managed by the National Forestry and Grassland Administration in a unified manner.

At present, the 11 nominated properties lie within the nature reserves, and direct management agencies have been established to take charge of regional ecological protection. Please refer to Table 26 for details of management agencies.

Table 26 Name of Existing Management Agencies of the Nominated Properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

ID of Nominated Property	Direct Management Agency
YS-3	Administration Affairs Center of Shanghai Chongming Dongtan National Nature Reserve
YS-4	Administration Committee of Shandong Yellow River Delta National Nature Reserve
YS-5	Administration Office of Hebei Nandagang Wetland and Provincial Bird Nature Reserve
YS-6	Administration Center of Hebei Luannan Nanpu Zuidong Provincial Wetland Park
YS-7	Administration Center of Hebei Changli Golden Coast National Nature Reserve
YS-8	Administration Office of Beidaihe National Wetland Park Administration Office of Beidaihe Scenic Area
YS-9	Shanhaiguan Service Center of Qinhuangdao City Shihenandao Conservation and Management Office of Shanhaiguan District
YS-10	Administration Bureau of Liaoning Liao River Estuary National Nature Reserve
YS-11	Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve
YS-12	Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve
YS-13	Changhai County Natural Resources Bureau Service Center for Natural Resources Affairs of Changhai County

12.1.2 Personnel structure

The management agencies of nominated properties include Administration Affairs Center of Shanghai Chongming Dongtan National Nature Reserve; Administration Bureau of Shandong Dongying Yellow River Delta National Nature Reserve; Administration Office of Nandagang Wetland and Provincial Bird Nature Reserve; Administration Center of Hebei Luannan Nanpu Zuidong Provincial Wetland Park (to be built); Administration Bureau of Liaoning Liao River Estuary National Nature Reserve; Administration Bureau of Snake Island-Laotieshan National Nature Reserve, Liaoning Province; and Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve. They together have a staff of 391 (including full- and part-time personnel).

The management agencies strictly follow the laws, regulations and relevant rules promulgated by the State and local governments. Scientific researchers regularly receive training in research and conservation, preparation of management plan, and ecological monitoring. The training programs include training at Ramsar Sites on guidance on how to prepare management plan, and guidance on ecological monitoring for researchers; training in monitoring of terrestrial wild animal epidemic source & disease for staff; and training in researchers' participation and organization of synchronous waterbird surveys in the Yellow Sea-Bohai Gulf.

Table 27 Education Level of Existing Personnel for the Nominated Properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Administration Office	Education Level					Total
	Master or higher	Bachelor	College	Vocational or lower	Other*	
YS-3: Administration Affairs Center of Shanghai Chongming Dongtan National Nature Reserve	7	16	1	0		24
YS-4: Administration Bureau of Shandong Dongying Yellow River Delta National Nature Reserve	10	76	22	20		128
YS-5: Administration Office of Nandagang Wetland and Provincial Bird Nature Reserve	2	2	6	26		36
YS-6: Administration Center of Hebei Luannan Nanpu Zuidong Provincial Wetland Park		2	4	2		8
YS-7: Administration Center of Hebei Changli Golden Coast National Nature Reserve	2	9	1	2		14
YS-8: Administration Office of Hebei Beidaihe National Wetland Park	2	10	1	0		13
YS-9: Service Center for Shanhaiguan Scenic Area, Qinhuangdao	0	7	2	0		9
YS-10: Administration Office of Liaoning Liao River Estuary National Nature Reserve.	11	70	15	20		119
YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve.	2	20	2	0		24
YS-12: Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve	1	5	4	1		11

Administration Office	Education Level					Total
	Master or higher	Bachelor	College	Vocational or lower	Other*	
YS-13: Service Center for Natural Resources Affairs of Changhai County		5				5
Total	37	222	58	71	3	391

* Note: Other means that their education level is unknown.

Table 28 Position Structure of Existing Personnel of the Nominated Properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II)

Administration Office	Post Structure			
	Managerial	Professional	Technical	Headcount
YS-3: Administration Affairs Center of Shanghai Chongming Dongtan National Nature Reserve	9	11	4	24
YS-4: Administration Bureau of Shandong Dongying Yellow River Delta National Nature Reserve	24	90	14	128
YS-5: Administration Office of Nandagang Wetland and Provincial Bird Nature Reserve.	4	32		36
YS-6: Administration Center of Hebei Luannan Nanpu Zuidong Provincial Wetland Park	6		2	8*
YS-7: Administration Center of Hebei Changli Golden Coast National Nature Reserve	7	7		14
YS-8: Administration Office of Hebei Beidaihe National Wetland Park	5	6	2	13
YS-9: Service Center for Shanhaiguan Scenic Area, Qinhuangdao	9			9
YS-10: Administration Office of Liaoning Liao River Estuary National Nature Reserve.	73	43	9	137
YS-11: Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve.	23		1	24
YS-12: Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve	2	5	4	11
YS-13: Service Center for Natural Resources Affairs of Changhai County	2		3	5

12.1.3 Conservation and management measures

All the nominated properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China possess the status of nature reserve. A multi-level management system has been established by national, provincial, and municipal authorities. The conservation and restoration of the species and their habitats at the nominated properties, and the improvement of ecosystem services have been prompted through the nature reserve system. Development of the nature reserve system is currently one of the most important measures of the Chinese government to realize the systematic protection of the nominated properties.

In recent years, for the nature reserves where the nominated properties lie, a number of ecological protection and restoration measures and a series of ecological protection projects have been implemented, and many facilities and equipment have been installed and adopted. As a result, significant progress and achievements have been made in the conservation of important migratory bird habitats along the Coast of Yellow Sea-Bohai Gulf. The measures taken for the nominated properties are set out in Table 29.

Table 29 Statistic Table on Current Conservation and Management Measures of the Nominated Properties

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
YS-3	Migratory Bird	<i>Spartina alterniflora</i> Loisel.	Five management and conservation

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
	Habitat at Chongming Dongtan, Shanghai	Control and Bird Habitat Optimization Project	stations, one monitoring station; one 27-km-long dike; one 44-km-long river along the seawall; four culverts and water gates; one sluice
YS-4	Migratory Bird Habitat at Yellow River Estuary, Dongying, Shandong Province	<i>Spartina alterniflora</i> Loisel. control project; biodiversity protection project; demonstration project on comprehensive restoration of coastal wetland; wetland monitoring project; water replenishment and diversion project; wild animal rescue project	Inspection stations, wetland museums, bird rescue centers, watchtowers, scientific research centers, wetland monitoring stations, and simple wharves for patrol purpose 19-km-long enclosing dam; 10-km-long separating dam; 12-km-long biological revetment; 9-km-long diversion canal; two water lifting stations; one mobile pump station; eight sluices
YS-5	Migratory Bird Habitat at Nandagang Wetland, Cangzhou, Hebei Province	Completed projects: Nandagang Wetland (northern aquatic pond) ecological restoration project; Nandagang Wetland afforestation and maintenance project Projects in progress: The project for demolition and reconstruction of the management and protection infrastructure of Nandagang Wetland (northern drainage pump station and crossing culvert); the project for the construction of the integrated scientific research and monitoring platform of Nandagang Wetland and Provincial Bird Nature	Facilities: one promotion and education center; one museum; one national epidemic source & disease monitoring station; multiple patrol roads and protection management stations Office, scientific research and patrol equipment: five computers; one copier; one printer; three fax machines; four telephones; two vidicons; two cameras

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
		Reserve; the project for upgrading and reconstruction of the management and protection infrastructure (protection sites) of Nandagang Wetland (approval document to be issued); the popular science sculpture project for the scenic spot of Nandagang Wetland; the project for establishment and upgrading of 4A scenic spot of Nandagang Wetland; the water pipe network project for the scenic spot of Nandagang Wetland	
YS-6	Migratory Bird Habitat at Nanpu Zuidong Wetland, Luannan, Hebei Province	<i>Spartina alterniflora</i> Loisel. control project; wetland restoration project; project for rescuing tiny wild fauna and flora species	One management and conservation station; two UAVs; three binoculars; two single binoculars; six handheld transceivers; two cameras; one computer; one field night vision camera; one animal epidemic source & disease rapid detector; two sets of first-aid instruments; one operating table; one microscope; two thermometers; two power-assisted electric vehicles; one set of video monitoring system, including nine cameras with 360-degree surveillance function.
YS-7	Migratory Bird Habitat at Qilihai Lagoon, Qinhuangdao,	Wetland conservation and ecological restoration project; comprehensive ecological environment management project;	Office and research buildings, canteens, garages, and other appurtenant facilities, with a gross floor area of 4,500 m ² , with

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
	Hebei Province	supervision guarantee and monitoring & evaluation project; bird habitat protection project	independent power supply, and water supply systems. 15 sets of office equipment such as computers, fax machines, and printers; an ecological monitoring laboratory with a floor area of 150 m ² in the workspace of the administration office; the meteorological monitoring station with a floor area of about 200 m ² and equipped with a set of automatic meteorological monitoring equipment. Patrol equipment, including one set of remote monitoring system, one patrol vehicle, one patrol & law enforcement speedboat; vehicles (ships) equipped with digital cameras, video cameras, GPS, and other information collection devices; monument outside the workspace of the administration office; 518 stakes and 85 signs buried at the land boundary; four floating boundary markers in the core sea area; fences with total length of 10,000 m.
YS-8	Migratory Bird Habitat at Dachaping of Beidaihe, Qinhuangdao, Hebei Province	Wildlife conservation project; wetland protection and restoration project; project for diverting Daihe (River) into Xinhe (River); project for Xinhe River wetland governance; bird habitat and migratory route protection project	Seven stations, including three management stations, one ecological environment monitoring station, one hydrology and water quality monitoring station, one animal epidemic source & disease monitoring station, and one meteorological station; 5.2-km-long fences; three

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
			watchtowers; boundary pillars; boundary posts; patrol boats; patrol scooters
YS-9	Migratory Bird Habitat at Shihenandao of Laolongtou, Qinhuangdao, Hebei Province	Shihenandao rehabilitation and protection project (comprehensive beach treatment project, river dredging and desilting project, island rehabilitation and humidity restoration project, ecological revetment project); water replenishment and diversion project; conservation and development project	3.5-km-long seawall around the island; island name sign at the southeast end
YS-10	Migratory Bird Habitat at Liao River Estuary, Panjin, Liaoning Province	Pilot ecological compensation projects, restoration of aquafarms to wetlands, mine rectification, wetland protection and ecological restoration in nature reserves, construction of protection and monitoring facilities in nature reserves, and protection of key endangered species have been implemented.	Three management stations, one national field monitoring station, and one field video surveillance system.
YS-11	Migratory Bird Habitat at Snake Island - Laotieshan, Dalian, Liaoning Province	Environment improvement and ecological restoration project	One nature museum; one wildlife epidemic source & disease monitoring station; one ecological monitoring and management station; one bird rescue station; one Snake Island hospital; several patrol roads and conservation and management stations
YS-12	Migratory Bird Habitat at	Project of returning farmlands to wetlands; project of returning	Three management and conservation stations: Gushan Management

ID	Nominated Property	Ecological Project Carried Out	Existing Conservation and Management Facilities and Equipment
	Yalujiang Estuary, Dandong, Liaoning Province	farmlands and aquafarms to wetlands; "Blue Bay" campaign at Yalujiang Estuary Wetland Nature Reserve	Station, Changshan Supervision Station, and Dalu Island Management Station. 14 waterbirds monitoring stations; the nature reserve is divided into three management areas; three management and conservation sub-network systems; two stations under each management and conservation sub-network.
YS-13	Migratory Bird Habitat at Changshan Archipelago, Dalian, Liaoning Province	Island protection and coastline restoration project	Changhai County Environmental Monitoring Station, equipped with more than one hundred pieces of monitoring equipment, including acidity meter, ion meter, infrared oil meter, conductivity meter, GPS locator, handheld weather station, and compound gas detector

12.2 Objectives

(1) To develop a well-structured management system and set up well-functioning management agencies to support all activities of conservation and management of nominated properties.

(2) To ensure sufficient management personnel and strengthen professional training so that the technical structure and age structure of management personnel are reasonable.

(3) To increase the number of volunteers, promote volunteer involvement, and enhance the management capacities of the management

agencies.

12.3 Management System

The National Forestry and Grassland Administration are responsible for guiding the nomination, protection and management of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II).

12.3.1 Three-level management system: national, provincial and municipal

12.3.1.1 National level

The National Forestry and Grassland Administration is responsible for guiding the nomination, protection and management of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) and for organizing the review of the natural World Heritage nomination, and review the natural and cultural World Heritage nomination together with other departments. The China National Commission for UNESCO is responsible for consulting and coordinating with UNESCO.

12.3.1.2 Provincial level

(1) Shanghai Municipality

Shanghai Forestry Bureau has established a leading group for Chongming Dongtan nomination to coordinate and organize all the work

for the nomination of Chongming Dongtan among the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II). The leading group is responsible for preparing, reviewing and submitting the conservation management plan for the nature reserve within Chongming Dongtan; exercising the nomination and administration right of Chongming Dongtan; organizing, implementing and supervising the conservation management of the nominated property; organizing training for heritage management personnel for coordination, exchange and cooperation among the nominated properties.

(2) Shandong Province

The Shangdong Provincial People's Government, the Dongying Municipal CPC Committee, and Dongying People's Government have established a leading group office for nomination for the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) (hereinafter referred to as the "Dongying Leading Group for Nomination"), with office at the Bureau of Natural Resources of Dongying. Dongying Leading Group for Nomination is responsible for guiding the nomination of Yellow River Estuary as a World Heritage site, including the supervision, review and submission of the prepared nomination text, and for organizing the implementation and supervision of the conservation management of the nominated World Heritage site.

(3) Hebei Province

The Provincial CPC Committee, People's Government, and Forestry and Grassland Bureau of Hebei Province attach great importance to wetland conservation, and they are responsible for guiding the nomination and management of five nominated properties as World Natural Heritage sites, i.e., Nandagang (YS-5), Nanpu (YS-6), Qilihai Lagoon (YS-7), Dachaoping (YS-8), and Shihenandao (YS-9).

(4) Liaoning Province

Forestry and Grassland Bureau of Liaoning Province has established a leading group and a leading group office for World Heritage nomination, with office situated at Forestry and Grassland Bureau of Liaoning Province. Panjin, Dalian and Dandong have established municipal leading groups for World Heritage nomination to comprehensively guide the conservation of resources at the four migratory bird habitats including Liao River Estuary (YS-10), Snake Island - Laotieshan (YS-11), Yalujiang Estuary (YS-12), and Changshan Archipelago (YS-13), as well as the nomination and management of World Natural Heritage.

12.3.1.3 Municipal level

The competent departments of nature reserves where the nominated properties lie directly manage the nominated properties under the guidance of the municipal forestry and grassland authorities. There are 11 direct competent authorities, i.e., Administration Affairs Center of Shanghai

Chongming Dongtan National Nature Reserve; Administration Committee of Shandong Yellow River Delta National Nature Reserve; the Administration Office of Hebei Nandagang Wetland and Provincial Bird Nature Reserve; Administration Center of Hebei Luannan Nanpu Zuidong Provincial Wetland Park; Administration Center of Hebei Changli Golden Coast National Nature Reserve; the Administration Office of Beidaihe Scenic Spot and the Administration Office of Beidaihe National Wetland Park; Service Center for Scenic Area of Shanhaiguan District, Qinhuangdao; Shihenandao Conservation and Management Office of Shanhaiguan District; Administration Bureau of Liaoning Liao River Estuary National Nature Reserve; Administration Bureau of Liaoning Snake Island-Laotieshan National Nature Reserve; the Administration Center of Dandong Yalujiang Estuary Wetland National Nature Reserve; Service Center for Natural Resources Affairs of Changhai County.

The direct management agency of each nominated property is responsible for monitoring and conserving the environmental resources, managing the law enforcement team, implementing the regulations and plans, etc., and has set up a supervision center and a scientific research center to strengthen scientific protection and management, and directly implements the protection and management of the nominated property. Besides, a leading group for World Natural Heritage nomination and a leading group office for World Heritage nomination have been set up to organize the work related to both World Natural Heritage and World

Natural and Cultural Heritage sites, and take charge of protection and management of the nominated property and the buffer zone.

12.3.2 Coordinated management system for the nominated properties

The nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China lie across five coastal provinces and centrally administered municipalities of China. As many jurisdictions are involved, it is difficult to manage the sites. To improve the management efficiency and the management rules for the nominated properties, an interprovincial coordinated management system should be established. Specific measures are as follows:

(1) The National Forestry and Grassland Administration should set up an interprovincial coordinated management agency. The group members should include competent forestry authorities in Shanghai, Jiangsu, Shandong, Hebei, and Liaoning, and take charge of the organization and management coordination. A liaison office for the Nominated Properties of Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China should be established in Yancheng.

(2) A regular coordination meeting mechanism should be implemented. The Coordination Leading Group should regularly hold two to three management coordination meetings each year to discuss common standards for conservation, management, scientific research, monitoring

and presentation of nominated properties, unified systems and professional cooperation, develop implementation plans, and the implementation effectiveness and improvement strategies of relevant measures.

(3) Professional cooperation and exchanges on research and natural wetland conservation should be carried out. Cooperative research programs should be launched with respect to the natural, cultural and social values of the nominated properties, the requirements for the conservation concept research, and the professional technologies for conservation, presentation, monitoring, and tourist management. The management agencies should organize special meetings and exchanges, 2-3 times a year. International exchanges and cooperation on the nominated properties should be ramped up. For example, the management agency of Yalujiang Estuary (YS-12) should work with North Korea on water environment governance in the area.

(4) An exchange platform dedicated to conservation and management should be established. It should cover management system, conservation technique standard, academic updates, project progress, technical experience and information sharing.

(5) A promotion and education system consisting of website, WeChat Official Account and Douyin account should be established to enhance public recognition of the nominated properties and encourage public involvement in heritage conservation. A unified and unique interpretation and comment system should be designed and developed to give the public

a better understanding of the overall value, intrinsic connection and outstanding features of the nominated properties.

12.3.2.1 Coordinated management system between management agencies of Phase I serial property and Phase II nominated properties

World Heritage sites (Phase I) of the Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China are located in Yancheng, Jiangsu Province were inscribed on the World Natural Heritage List on July 5th, 2019. Sound rules and regulations have been enacted for the protection, presentation and management of the heritage sites. The work related to Phase II nominated properties should be done with full reference to the techniques, experiences and models used for the Phase I World Heritage sites in Yancheng.

(1) The nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) should be managed using methods similar to those for Phase I World Heritage sites. Experiences in the nomination, management and maintenance should be adopted.

(2) Exchange between management agencies of Phase I World Heritage sites and Phase II nominated properties should be strengthened. A liaison system for them should be established, under which one to two liaison persons of each member unit should be assigned to promptly report to the National Forestry and Grassland Administration, and the provincial competent forestry and grassland authority on the work related to the conservation, management and monitoring performed. This can ensure the

openness and transparency of information between the management agencies, and the full exchange and understanding of such information among and by staff of each member unit.

(3) The Nature Reserve Management Department of National Forestry and Grassland Administration, the Union of Nature Reserves within the nominated Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China, and the direct management agencies of the nominated properties should invite relevant experts and personnel to conduct field surveys. At the same time researches at the World Heritage sites and domestic and foreign experts are to be organized to conduct training on the World Heritage sites, to link the duty among the nominated properties and enhance the conservation effectiveness.

12.3.2.2 Interdepartmental coordination system

A coordination system between the management agency of each nominated property and local government should be established to coordinate conservation and management of the nominated property and buffer zone, so as to ensure that all parties involved in the management fully exchange opinions and implement management plans. Local governments should coordinate with natural resources, ecological environment, urban and rural planning, forestry, transportation and other departments to jointly protect the surrounding environment of the nominated properties and buffer zones.

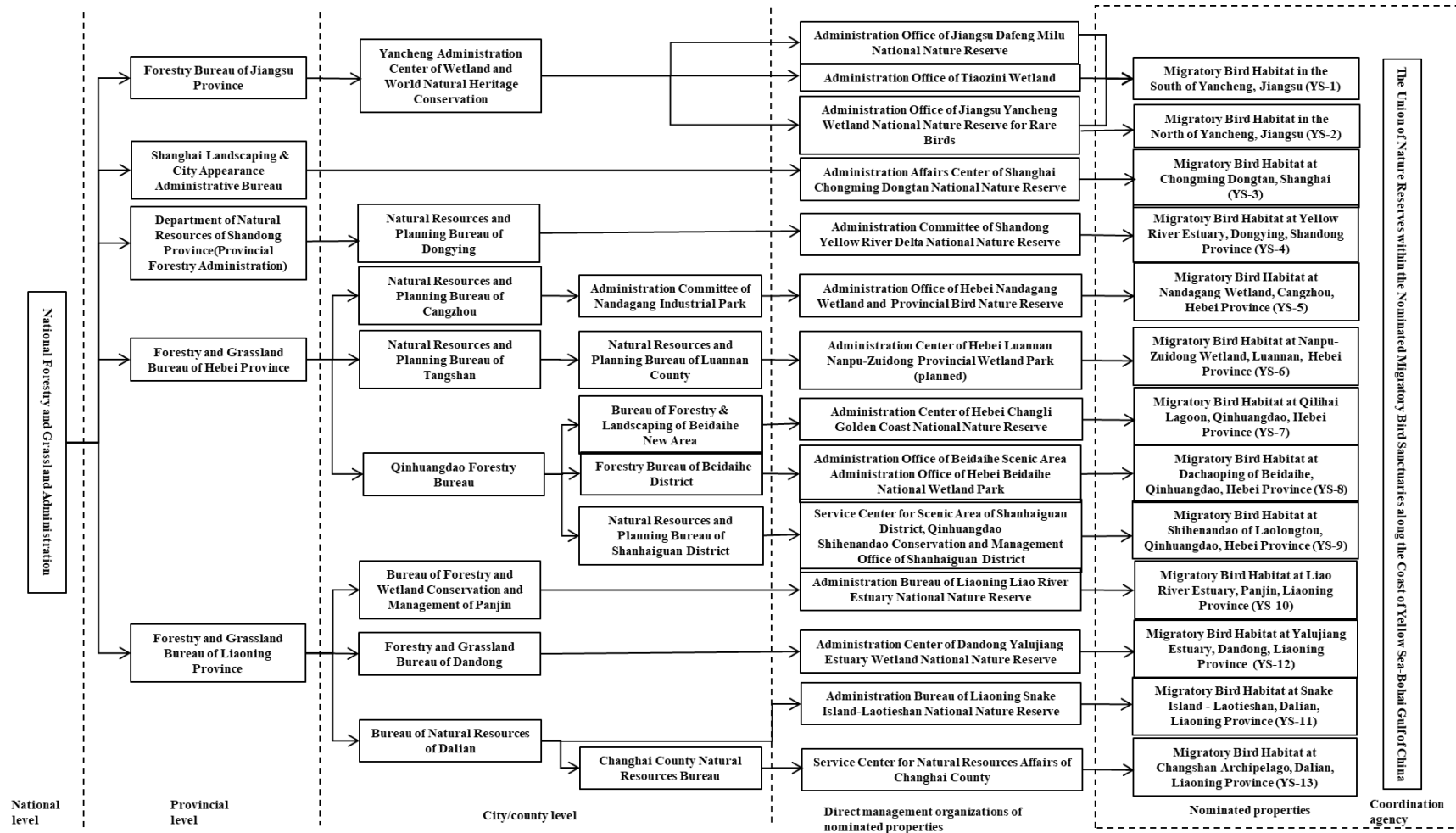


Figure 54 Management System of the Nominated Properties

12.4 Management agencies and their functions

To satisfy the requirements on conservation and management of the nominated properties, a comprehensive workforce including professionals should be built, in line with the characteristics and actual conditions of the nominated properties as well as the organizational structure and assignment of responsibilities, and based on the existing management agencies of the nature reserves where the nominated sites are located.

A management agency for each nominated property will be established, and relevant departments should be set up based on the characteristics and needs of the nominated properties. The specific functions of management agencies are set out below:

(1) Formulating and implementing management plan for natural resources within the nominated properties. The major work includes conducting routine patrol and rescue of natural resources, replenishing food for wintering birds, and making patrol logs. Routine patrol and rescue aim to protect the natural wetlands and rare birds. A community shared management system should also be established to raise resident awareness of conservation and get residents involved in the voluntary conservation of the World Heritage sites.

(2) Formulating long-term scientific research and investigation plans and annual monitoring plans, organizing baseline survey and scientific research on resources, implementing scientific research and investigation

projects, building and managing monitoring stations and sampling plots, carrying out bird observation and banding, and making monitoring reports.

(3) Organizing and managing ecotourism and resource development at the nominated properties and buffer zones. Specifically, this includes organizing visits, study tours and tourism, running resource development projects, and marketing local specialties and handicrafts to promote local long-term development. It also should guide community residents to rationally utilize wetland and land resources and carry out production activities, help improve the living conditions of local residents, and facilitate the building of green food or organic food demonstration base to reduce the utilization of fertilizers and pesticides at the nominated properties and surrounding areas.

(4) In charge of personnel, finance, capital construction, cadre training, logistics support, etc.

(5) Promotion and education of the nominated properties to make them well known among the public.

(6) Protecting the legitimate rights and interests of employees, and carrying out ordinary labor union activities to enrich the cultural life of employees in their spare time.

12.5 Capacity Building and Enhancement

12.5.1 Management personnel training

12.5.1.1 In-service training

Experts and scholars should be engaged to provide knowledge training for the staff on wetland ecology, wildlife conservation and sustainable use of resources, so that the staff can correctly understand the relationship between conservation and development and engage in tourism and management activities in a scientific and reasonable way. Under the nature conservation management requirements, candidates for crucial positions for nature reserves must receive adequate training and obtain permit before working.

12.5.1.2 Further study training

Some staff should be selected and assigned by group at different times to local universities, scientific research institutions and nature reserves to learn and share expertise in nature conservation, pest control, wildlife, etc.

12.5.1.3 Participation in academic conferences

Relevant technical personnel and management and conservation personnel should be selected to join training courses, scientific seminars, and even international academic conferences held by ministries, commissions, provinces and municipalities on nature conservation and

research, to obtain scientific management information and improve the understanding of science and technology.

12.5.1.4 Self-study for enhancement

Relevant professional newspapers, magazines and books should be made available to employees, and employees are encouraged to use multimedia, the Internet and related materials for self-study.

12.5.2 Improving conservation and management rules

(1) Based on the existing management rules, all activities carried out at the nominated properties must be in strict accordance with the *Convention Concerning the Protection of World Cultural and Natural Heritage*, the *Operational Guidelines for the Implementation of the World Heritage Convention*, and the relevant laws and regulations of China;

(2) The management agency of each nominated property should establish targeted conservation and management rules;

(3) The natural resources and natural environment within the nominated properties should be protected and managed by the direct management agencies of the nominated properties;

(4) Targeted protection measures should be implemented for the nominated property and buffer zone.

(5) All presentation and education activities carried out in the Heritage Presentation Area shall aim to protect natural resources and natural environment; heritage presentation activities should be for the purpose of

protection; control measures should be taken for environmental carrying capacity;

(6) Construction projects that cause pollution to the environment by discharging harmful wastewater, waste residue (liquid), radioactive elements, etc. are strictly prohibited near the nominated properties. Sewage, garbage and feces from eco-friendly toilets in the Heritage Presentation Area should be effectively treated to prevent environmental pollution;

(7) Public awareness of conservation should be enhanced. Relations with local communities should be strengthened. Extensive promotion activities in various forms should be carried out to enable all local residents, tourists and staff to understand the management rules for the nominated properties.

12.5.3 Improving management guidance documents

(1) Conservation plans and other relevant plans for Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China should be improved. The protected objects, zoning and major management measures should be made clear;

(2) Special conservation plans for wetland ecosystem and rare flora and fauna should be prepared to effectively protect the nominated properties and buffer zones;

(3) Wetland protection and environmental remediation plans should be established to eliminate the impact caused by the historical land

reclamation and oilfield mining activities and to guide the implementation of related work;

(4) Specific to each nominated property, implementation plan for establishing a monitoring and alert system should be made to ensure effective monitoring;

(5) Specific to each nominated property, an overall presentation and utilization plan should be established, with clear content, subject and method. A general presentation and utilization strategy should be developed in a coordinated manner and be used as a basis for revising and improving tourism plan;

(6) Other specific plans should be developed to guide the construction of protective facilities and infrastructure for Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China.

13 Action Plans and Investment Estimates

13.1 Action Plan on Key Projects

In response to the major pressures and threats faced by nominated properties, key projects will be carried out for the recent three years, including implementation planning, conservation and restoration, disaster emergency management, presentation and education, monitoring management, scientific research, community management and capacity building. This aims to make the 11 nominated properties that have well-preserved heritage values, are scientific and effective management, can generate significant social benefits, and feature the harmony between human and nature.

13.1.1 Implementation Plan

Relevant implementation plans need to be prepared to guide specific management activities, in order to implement the relevant requirements of this management plan. Implementation plans that will be prepared during planning period are shown in Table 30.

Table 30 List of Implementation Plans for Nominated Properties

No.	Name of Plan	Time of Preparation	Major Objectives
1	Special Plan for Interpretation System	2022	To specify the theme and specific content of the interpretation system, the type and

No.	Name of Plan	Time of Preparation	Major Objectives
			layout of facilities, and the method of environmental education
2	Special Plan for Promotion and Education	2022	To set out the content of heritage promotion and education facilities, presentation methods and facilities construction in the nominated properties
3	Assessment Plan for Monitoring Management	2022	To set forth the subjects, methods, indicator system, conduct of management assessment, and work plan for resource monitoring
4	Community Skills Training Plan	2022	To specify the content, time and method of training on skills needed for community participation in tourism and conservation management
5	Management Personnel Training Plan	2022	To specify the content, schedule, and cooperative agencies of training for staff of management agencies

13.1.2 Conservation and Restoration Project

Table 31 Conservation and Restoration Projects at the Nominated Properties

ID	Nominated Property	Project Description		Unit	Quantity
YS-3	Chongming Dongtan	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Coast, intertidal zone and sea area	Routine patrol	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
		<i>Spartina alterniflora</i>	Hydraulic engineering management	Project	1
		Loisel. control project	Monitoring equipment compensation	Project	1
		Bird habitat optimization project	Plant management and other supporting works	km ²	1
			Management of alien species	hm ²	10
YS-4	Yellow River Estuary	Oyster reef coastline project		ha	500
		Breakwater maintenance project		km	27.2
		Ecological water replenishment project		ha	600
		<i>Spartina alterniflora</i> Loisel. control project		ha	1500
		<i>Suaeda glauca</i> restoration project		ha	4000
		Rare and endangered species protection and rescue project		Project	1
YS-5	Nandagang	Ecological barrier project		Project	1
		Ecological water replenishment project		Project	1
		Wetland restoration and bird habitat restoration project		Project	1
YS-6	Nanpu	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast, intertidal zone and sea area	Routine patrol	Project	1
		Wetland restoration	<i>Spartina alterniflora</i> Loisel. control	ha	200
			Restoration of ecological revetment	km	20

ID	Nominated Property	Project Description		Unit	Quantity
			Ecological improvement demonstration of aquaculture ponds	ha	20
		Wildlife and habitat restoration	Optimization of high-tide habitat	ha	100
			Management of water level adjustment	Project	1
			Bird food source replenishment	Project	1
			Fencing	km	10
YS-7	Qilihai Lagoon	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast, intertidal zone and sea area	Routine patrol	Project	1
		Wetland restoration	Lagoon restoration	km ²	2
		Wildlife and habitat restoration	Bird food source replenishment	Project	8
YS-8	Dachaoping	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast,	Routine patrol	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
		intertidal zone and sea area			
		Wetland restoration	Restoration of ecological revetment	km	20
		Wildlife and habitat restoration	Bird food source replenishment	Project	8
			Fencing	km	5.2
YS-9	Shihenandao	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast, intertidal zone and sea area	Routine patrol	Project	1
		Wetland restoration	Restoration of ecological revetment	km	20
			Returning aquafarms to island	ha	10
		Wildlife and habitat restoration	Estuary sludge clearance	ha	56
			Bird food source replenishment	Project	1
			Ecological bank maintenance	km	2
YS-10	Liao River Estuary	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan	Routine patrol	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
		for coast, intertidal zone and sea area			
		Wetland restoration	Wetland restoration of abandoned well stations at Liao River Oilfield	Project	1
			Reed swamp restoration	ha	10
			Returning aquafarms to wetland	Project	1
		Wildlife and habitat restoration	Wetland vegetation restoration at Saunders's Gull breeding area	ha	380
			Artificial breeding island for Saunders's Gull at Nanxiaohe	ha	300
			Bird food source replenishment	Project	1
			Bird food base and food source area	Location	4
			Red-crowned Crane naturalizing base	Project	1
YS-11	Snake Island - Laotieshan	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast, intertidal zone and sea area	Routine patrol	Project	1
		Wildlife and habitat	Bird food source replenishment	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
		restoration	Ecological bank maintenance	km	3
			Woodland conservation	Project	1
			Habitat restoration at Snake Island	Project	1
YS-12	Yalujiang Estuary	Wetland eco-environmental protection	Aquatic ecosystem improvement	Project	1
			Control of surrounding pollution sources	Project	1
			Control of pollution from visitation	Project	1
		Protection plan for coast, intertidal zone and sea area	Routine patrol	Project	1
		Wetland restoration	<i>Spartina alterniflora</i> Loisel. prevention and control	——	——
			Restoration of ecological revetment	km	20
			Ecological improvement demonstration of aquaculture ponds	ha	100
		Wildlife and habitat restoration	Optimization of high-tide habitat	ha	100
			Management of water level adjustment	Project	1
			Bird food source replenishment	Project	1
			Fencing	km	30
YS-13	Changshan Archipelago	Conservation plan for coast and sea area	Routine patrol	Project	1
			Shoreline restoration project	Project	1

13.1.3 Disaster emergency management project

Table 32 Disaster Emergency Management Projects at Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Monitoring, prevention and control of invasion of alien species	Project	1
		Prevention and control of storm tide and flood disasters	Project	1
YS-4	Yellow River Estuary	Plan, equipment and facilities for emergency response to storm tide	Project	1
		Plan, equipment and facilities for emergency response to severe pollution	Project	1
		Plan, equipment and facilities for emergency response to severe flood and drought	Project	1
		Plan, equipment and facilities for emergency response to invasion of alien species	Project	1
YS-5	Nandagang	Monitoring and prevention of wild animal epidemic sources and diseases	Project	1
YS-6	Nanpu	Monitoring, prevention and control of invasion of alien species	Project	1
		Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of storm tide and flood disasters	Project	1
YS-7	Qilihai Lagoon	Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of red tide and green tide disasters	Project	1
YS-8	Dachaoping	Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of red tide and green tide disasters	Project	1
YS-9	Shihenandao	Wild animal epidemic source and disease	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		monitoring		
		Prevention and control of red tide, green tide and flood disasters	Project	1
YS-10	Liao River Estuary	Monitoring, prevention and control of invasion of alien species	Project	1
		Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of storm tide and flood disasters	Project	1
		Pest prevention and control	Project	1
		Fire prevention equipment and promotion facilities	Set	1
YS-11	Snake Island - Laotieshan	Forest fire prevention and management	Project	1
		Wild animal epidemic source and disease monitoring	Project	1
YS-12	Yalujiang Estuary	Monitoring, prevention and control of invasion of alien species	Project	1
		Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of storm tide and flood disasters	Project	1
YS-13	Changshan Archipelago	Monitoring, prevention and control of invasion of alien species	Project	1
		Wild animal epidemic source and disease monitoring	Project	1
		Prevention and control of storm tide and flood disasters	Project	1

13.1.4 Presentation and education project

Table 33 Presentation and Education Projects at Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Bird watching house	Location	6
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system*	m ²	500
		<i>Spartina alterniflora</i> Loisel. control presentation system	m ²	600
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities*	Bed	100
		Integrated media platform	Project	1
		Science popularization and promotion activities	Project/year	8
		Promotional brochure	Set	400
		Photo gallery	Set	400
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-4	Yellow River Estuary	Presentation site design of "Bird Science Service Center", supporting facilities and equipment and their maintenance	Project	1
		Presentation site design of "Oriental White Stork	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		Watching Area", supporting facilities and equipment and their maintenance		
		Presentation site design of "Yellow River Delta Wetland", supporting facilities and equipment and their maintenance	Project	1
		Presentation site design of "Wild Birds at Yiqianer", supporting facilities and equipment and their maintenance	Project	1
		Presentation center design, supporting facilities and equipment and their maintenance	Project	2
		Presentation site design of visitor service center, supporting facilities and equipment and their maintenance	Project	2
		Electric bicycle/bicycle parking area	m ²	1000
		Newly built birding platform	Platform	2
		Newly built observation platform	Platform	2
		Signage/promotional sign/warning sign	Board	80
		Website building and maintenance	Project	1
		Brochure publication	Project	1
YS-5	Nandagang	Visitor service center	Project	1
		Exhibition hall	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		Multimedia device	Project	1
		Explanatory signs	Project	1
		Website building and maintenance	Project	1
		Brochure publication	Project	1
YS-6	Nanpu	Public education center	m ²	500
		Bird watching house	Location	2
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system*	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities*	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-7	Qilihai Lagoon	Science promotion and education center	m ²	280
		Watchtower	Location	1
		Field promotion and education sites	Location	4
		Visitor service center	m ²	-

ID	Nominated Property	Project Description	Unit	Quantity
		Visitor service center	m ²	50
		Heritage value presentation system	m ²	240
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	10
		Warning sign	Board	20
YS-8	Dachaoping	Public education center	m ²	500
		Bird watching house	Location	2
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200

ID	Nominated Property	Project Description	Unit	Quantity
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-9	Shihenandao	Public education center	m ²	500
		Bird watching house	Location	2
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-10	Liao River Estuary	Public education center	m ²	500
		Wetland Museum	m ²	2500
		Bird watching house	Location	2
		Field promotion and education sites	Location	4

ID	Nominated Property	Project Description	Unit	Quantity
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system*	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities*	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	60
		Signage	Board	20
YS-11	Snake Island - Laotieshan	Public education center	m ²	500
		Bird watching house	Location	4
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250
		Visitor service point	m ²	50
		Heritage value presentation system	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities	Bed	100
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200

ID	Nominated Property	Project Description	Unit	Quantity
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-12	Yalujiang Estuary	Yalujiang Estuary Wetland Exhibition Center	m ²	4000
		Bird watching house	Location	3
		Field promotion and education sites	Location	3
		Tourism center	m ²	500
		Heritage value presentation system	m ²	500
		Science promotion and interpretation system	Set	1
		Visitor accommodation facilities	Bed	200
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20
YS-13	Changshan Archipelago	Presentation centers	m ²	1000
		Observation station	Location	1
		Field promotion and education sites	Location	4
		Visitor service center	m ²	250

ID	Nominated Property	Project Description	Unit	Quantity
		Heritage value presentation system*	m ²	500
		Science promotion and interpretation system	Set	1
		Website and WeChat platform	Project	1
		Science popularization and promotion activities	Project/year	5
		Promotional brochure	Set	200
		Photo gallery	Set	200
		Audio and video products	Set	100
		Large presentation board	Board	5
		Science promotion sign	Board	100
		Signage	Board	20
		Warning sign	Board	20

13.1.5 Monitoring and management project

Table 34 Monitoring and Management Projects at Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Tidal wetland and artificial wetland survey project	Project	1
YS-4	Yellow River Estuary	Monitoring facilities renovation and maintenance	Location	8
		Supporting equipment of monitoring facilities and maintenance	Project	8
		Monitoring system construction	Project	1
YS-5	Nandagang	Scientific research monitoring center	Location	1
		Watchtower	Location	9
		Monitoring equipment	Set	3
YS-6	Nanpu	Scientific research monitoring activities	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
		OUV elements monitoring system	Set	1
		Hydrological monitoring stations	Location	3
		Scientific research monitoring center	Location	1
		Monitoring Station	Location	3
		Air quality monitoring point	Location	1
		Soil and sediment sampling point	Location	3
		Line transect for animal monitoring	Location	1
YS-7	Qilihai Lagoon	Scientific research monitoring activities	Project	1
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
		OUV elements monitoring system	Set	1
		Hydrological monitoring stations	Location	1
		Monitoring Station	Location	3
		Air quality monitoring point	Location	1
		Soil and sediment sampling point	Location	3
		Line transect for animal monitoring	Location	1

ID	Nominated Property	Project Description	Unit	Quantity
YS-8	Dachaoping	Scientific research monitoring activities	Project	1
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
		OUV elements monitoring system	Set	1
		Hydrological monitoring stations	Location	1
		Monitoring Station	Location	1
		Air quality monitoring point	Location	1
		Soil and sediment sampling point	Location	3
		Line transect for animal monitoring	Location	1
YS-9	Shihenandao	Scientific research monitoring activities	Project	1
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
		OUV elements monitoring system	Set	1
		Hydrological monitoring stations	Location	3
		Scientific research monitoring center	Location	1
		Monitoring Station	Location	2
		Air quality monitoring point	Location	1
		Soil and sediment sampling point	Location	3

ID	Nominated Property	Project Description	Unit	Quantity
		Line transect for animal monitoring	Location	1
YS-10	Liao River Estuary	OUV elements monitoring system	Set	1
		Spotted seal management station	Location	1
		Positioning-based monitoring station for wetland ecosystem	Location	1
		Bird banding station	Location	1
		Epidemic source & disease monitoring station	Location	1
		Offshore monitoring point	Location	1
		Air quality monitoring point	Location	1
		Soil and sediment sampling point	Location	3
		Line transect for animal monitoring	Location	1
		Emergency life-saving supplies warehouse	Number	1
		Safety warning sign	Number	40
		General Office of Administration Bureau	m ²	2500
		Newly built conservation and management station	m ²	300
		Renovation of conservation and management station	m ²	700
		Disease and insect pests prevention center	Location	1
YS-11	Snake Island - Laotieshan	OUV elements monitoring system	Set	1
		Smart field patrol system	Set	1
		Multi-source satellite fire monitoring system	Set	1
		Eco-environmental monitoring	Set	1

ID	Nominated Property	Project Description	Unit	Quantity
		system		
		Remote sensing monitoring system for human activities	Set	1
		Supervision system for management and protection facilities	Set	1
		Big data-based visualized system	Set	1
		Command center system of Administration Bureau	Set	5
		Biodiversity management system	Set	1
		Infrared camera management system	Set	1
		Artificial Intelligence recognition system for mammals, birds and plants	Set	1
		Establishment of large quadrat of <i>Gloydius shedaoensis</i>	Board	2
		Line transect for animal monitoring	Line	10
		Emergency life-saving supplies warehouse	Number	1
		Safety warning sign	Number	40
		Administration Bureau office	m ²	800
		Conservation and management station	Location	2
		Management and protection point	Location	5
		Hydrological monitoring stations	Location	2
		Air quality monitoring point	Location	3
		Soil sampling point	Location	3
YS-12	Yalujiang Estuary	OUV elements monitoring	Set	1

ID	Nominated Property	Project Description	Unit	Quantity
		system		
		Monitoring Station	Location	2
		Scientific research monitoring center	Location	1
		Soil and sediment sampling point	Location	3
		Line transect for animal monitoring	Location	1
		Emergency life-saving supplies warehouse	Number	1
		Safety warning sign	Number	40
		Administration Bureau office	m ²	500
		Conservation and management station	Location	1
YS-13	Changshan Archipelago	Construction of aerospace-sky-ground integrated intelligent sensing network	Project	1
		Intelligent monitoring system for wild animal biodiversity	Project	1
		Construction of wild animal monitoring system and intelligent application management	Project	1
		Natural disaster monitoring	Project	1
		Construction of marine environment real-time monitoring system	Project	1
		Cloud resource rental and exhibition center construction	Project	1

13.1.6 Scientific research plan

Table 35 Scientific Research Plan for Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Wetland ecosystem restoration and dynamic conservation techniques	Project	1
		Eco-friendly utilization of Dongtan tidal flat	Project	1
		Bird population change	Project	1
		Wetland restoration and management model	Project	1
YS-4	Yellow River Estuary	Resource survey on World Heritage site	Project	1
		Research on environmental pollution monitoring and environmental impact assessment	Project	1
		Study on wetland birds	Project	1
		Wetland biodiversity monitoring and research	Project	1
		Research on ecological succession pattern of wetland	Project	1
		Research on conservation mechanism for rare and endangered species	Project	1
		Research on effective management and sustainable development of wetland resources	Project	1
		Research on wetland ecological restoration and reconstruction techniques	Project	1
		Evaluation research on wetland ecosystem services	Project	1
		Research on the impact of Yellow River Delta exploitation on nature reserve and coordinated development	Project	1
		Research on comprehensive management	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
		of saline land			
		Research on the impact of the yield change of Yellow River on various resources at World Heritage site		Project	1
YS-5	Nandagang	Comprehensive resource investigation		Project	1
		Research on bird habitat restoration and sustainable management		Project	1
		Research on wetland ecosystem restoration		Project	1
YS-6	Nanpu	Basic scientific researches	Research on population distribution and dynamics of key migratory species (Relict Gull, Oriental Stork, Red Knot, Eastern Curlew, etc.)	Project	1
			Research on dynamic evolution characteristics and impact of coastal wetland ecosystem at Luannan under global change	Project	1
			Research on dynamic change characteristics and trend of coastal geomorphy at Luannan	Project	1
		Natural science research	Research on living and feeding habits of key migratory species	Project	1
			Research on suitable habitat for key migratory species	Project	1
			Research on monitoring and governance of invasive species	Project	1
			Research on restoration and optimization techniques for damaged coastal ecosystem	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			Research on geological hazards and prevention and control measures	Project	1
		Social science research	Research on the impact of national and local government policies on conservation and development	Project	1
			Research on the impact of human activities on animal habitat and activities	Project	1
			Research on tourism activities, development model and management at the nominated property	Project	1
			Research on the way and degree of the environmental impact of the number and behaviors of tourists	Project	1
		Conservation and management research	Research on the formulation and improvement of relevant laws and regulations regarding the nominated property	Project	1
			Research on development of geographical information system for the nominated property	Project	1
			Research on the building of scientific research monitoring platforms and science and education experiment bases at the	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			nominated property		
			Research on the management system for departmental coordination and collaboration, and scientific management	Project	1
			Research on the coordination mechanism of conservation, supervision and management involving local communities and social organizations	Project	1
			Research on ecological compensation and reward mechanism for local communities	Project	1
			Research on waterbird rescue	Project	1
		Others	Academic seminars	Project/year	1
YS-7	Qilihai Lagoon	Basic scientific researches	Research on population distribution and dynamics of key migratory species (Siberian Crane, Oriental Stork, Red-crowned Crane, Common Crane, Saunders's Gull, swans, Bean Goose, etc.)	Project	1
			Research on dynamic evolution characteristics and impact of coastal wetland ecosystem under global change	Project	1
			Research on dynamic change characteristics and trends of	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			coastal geomorphy		
		Natural science research	Research on living and feeding habits of key migratory species	Project	1
			Research on suitable habitat for key migratory species	Project	1
			Research on restoration and optimization techniques for damaged coastal ecosystem	Project	1
			Research on geological hazards and prevention and control measures	Project	1
		Social science research	Research on the impact of national and local government policies on conservation and development	Project	1
			Research on the impact of human activities on animal habitat and activities	Project	1
			Research on tourism activities, development model and management at the nominated property	Project	1
			Research on the way and degree of the environmental impact of the number and behaviors of tourists	Project	1
		Conservation and management research	Research on the formulation and improvement of relevant laws and regulations regarding the nominated property	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			Research on development of geographical information system for the nominated property	Project	1
			Research on the building of scientific research monitoring platforms and science and education experiment bases at the nominated property	Project	1
			Research on the management system for departmental coordination and collaboration, and scientific management	Project	1
			Research on the coordination mechanism of conservation, supervision and management involving local communities and social organizations	Project	1
			Research on ecological compensation and reward mechanism for local communities	Project	1
			Research on waterbird rescue	Project	1
		Others	Academic seminars	Project/year	1
YS-8	Dachaoping	Basic scientific researches	Research on population distribution and dynamics of key migratory species (White Stork, Red-crowned Crane, Oriental Stork, etc.)	Project	1
			Research on dynamic	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			evolution characteristics and impact of coastal wetland ecosystem under global change		
			Research on dynamic change characteristics and trends of coastal geomorphy	Project	1
		Natural science research	Research on living and feeding habits of key migratory species	Project	1
			Research on suitable habitat for key migratory species	Project	1
			Research on restoration and optimization techniques for damaged coastal ecosystem	Project	1
			Research on geological hazards and prevention and control measures	Project	1
		Social science research	Research on the impact of national and local government policies on conservation and development	Project	1
			Research on the impact of human activities on animal habitat and activities	Project	1
			Research on tourism activities, development model and management at the nominated property	Project	1
			Research on the way and degree of the environmental impact of the number and	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			behaviors of tourists		
		Conservation and management research	Research on the formulation and improvement of relevant laws and regulations regarding the nominated property	Project	1
			Research on development of geographical information system for the nominated property	Project	1
			Research on the building of scientific research monitoring platforms and science and education experiment bases at the nominated property	Project	1
			Research on the management system for departmental coordination and collaboration, and scientific management	Project	1
			Research on the coordination mechanism of conservation, supervision and management involving local communities and social organizations	Project	1
			Research on ecological compensation and reward mechanism for local communities	Project	1
			Research on waterbird rescue	Project	1
		Others	Academic seminars	Project/year	1

ID	Nominated Property	Project Description		Unit	Quantity
YS-9	Shihenandao	Basic scientific researches	Research on population distribution and dynamics of key migratory species (Red-crowned Crane, Oriental Stork, Siberian Crane, etc.)	Project	1
			Research on dynamic evolution characteristics and impact of coastal wetland ecosystem under global change	Project	1
			Research on dynamic change characteristics and trends of coastal geomorphy	Project	1
		Natural science research	Research on living and feeding habits of key migratory species	Project	1
			Research on suitable habitat for key migratory species	Project	1
			Research on restoration and optimization techniques for damaged coastal ecosystem	Project	1
			Research on geological hazards and prevention and control measures	Project	1
		Social science research	Research on the impact of national and local government policies on conservation and development	Project	1
			Research on the impact of human activities on animal habitat and activities	Project	1
			Research on tourism	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			activities, development model and management at the nominated property		
			Research on the way and degree of the environmental impact of the number and behaviors of tourists	Project	1
		Conservation and management research	Research on the formulation and improvement of relevant laws and regulations regarding the nominated property	Project	1
			Research on development of geographical information system for the nominated property	Project	1
			Research on the building of scientific research monitoring platforms and science and education experiment bases at the nominated property	Project	1
			Research on the management system for departmental coordination and collaboration, and scientific management	Project	1
			Research on the coordination mechanism of conservation, supervision and management involving local communities and social organizations	Project	1
			Research on ecological	Project	1

ID	Nominated Property	Project Description		Unit	Quantity
			compensation and reward mechanism for local communities		
			Research on waterbird rescue	Project	1
		Others	Academic seminars	Time/year	1
YS-10	Liao River Estuary	Comprehensive investigation of resource		Project	1
		Research on the restoration and sustainable management of migratory bird habitats		Project	1
		Dynamic impact of oil exploitation projects on migratory bird populations		Project	1
		Research on satellite tracking and monitoring of wild animals		Project	1
		Research on restoration and optimization techniques for damaged coastal ecosystem		Project	1
		Research on geological hazards and prevention and control measures		Project	1
YS-11	Snake Island - Laotieshan	Research on population distribution and dynamics of key migratory species		Project	1
		Research on dynamic evolution characteristics and impact of coastal wetland ecosystem under global change		Project	1
		Research on dynamic change characteristics and trends of coastal geomorphy		Project	1
		Research on living and feeding habits of key migratory species		Project	1
		Research on suitable habitat for key migratory species		Project	1
		Research on monitoring and governance of invasive species		Project	1
		Research on restoration and optimization		Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		techniques for damaged coastal ecosystem		
		Research on geological hazards and prevention and control measures	Project	1
YS-12	Yalujiang Estuary	Research on population distribution and dynamics of key migratory species	Project	1
		Research on vegetation succession of coastal wetland	Project	1
		Research on tracking changes in food resources of threatened birds and adaptation of birds	Project	1
		Research on the restoration and sustainable management of migratory bird habitats	Project	1
		Research on monitoring and control of <i>Spartina alterniflora</i> Loisel.	Project	1
YS-13	Changshan Archipelago	Research on the restoration and sustainable management of migratory bird habitats	Project	1
		Comprehensive survey of population dynamics and habitat monitoring and biological resources	Project	1
		Research on the restoration and sustainable management of rare bird habitats	Project	1
		Research on geological hazards and prevention and control measures	Project	1

13.1.7 Community management project

Table 36 Community Management Project at Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Resident training	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
YS-4	Yellow River Estuary	Coastal eco-aquaculture adjustment	Project	1
		Development and utilization of reed resources	Project	1
		Development and utilization of wetland medicinal plants	Project	1
		Resident training	Time	30
YS-5	Nandagang	Establishment and improvement of ecological compensation mechanism	Project	1
YS-6	Nanpu	Industrial transformation and upgrading for local residents	Project	2
		Ecological compensation projects	Project	1
		Community management training	Time/year	1
YS-7	Qilihai Lagoon	Industrial transformation and upgrading for local residents	Project	1
		Ecological compensation projects	Project	1
		Community management training	Time/year	1
YS-8	Dachaoping	Community management training	Time/year	1
YS-9	Shihenandao	Industrial transformation and upgrading for local residents	Project	1
		Community management training	Time/year	1
YS-10	Liao River Estuary	Resident training	Project	1
		Improvement of ecological compensation mechanism	Project	1
YS-11	Snake Island - Laotieshan	Development of eco-agriculture	Project	1
		Establishment of a sound ecological compensation	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
YS-12	Yalujiang Estuary	mechanism		
		Resident training	Project	1
		Development of community-based eco-agriculture and aquaculture	Project	1
		Establishment and improvement of ecological compensation mechanism	Project	1
		Improvement of community participation mechanism	Project	1
		Ecological migration project at the nominated property (medium- to long-term)	Project	1

13.1.8 Capacity building project

Table 37 Capacity Building Project at Nominated Properties

ID	Nominated Property	Project Description	Unit	Quantity
YS-3	Chongming Dongtan	Management personnel training	Series	/
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
YS-4	Yellow River Estuary	Supporting facilities of management agency	Project	1
		Management personnel training	Time	30
YS-5	Nandagang	Management personnel training	Time	30
YS-6	Nanpu	Supporting facilities of management agency	Project	1
		Management personnel training	Time/year	1
YS-7	Qilihai Lagoon	Supporting facilities of management agency	Project	1

ID	Nominated Property	Project Description	Unit	Quantity
		Management personnel training	Time/year	1
YS-8	Dachaoping	Supporting facilities of management agency	Project	1
		Management personnel training	Time/year	1
YS-9	Shihenandao	Supporting facilities of management agency	Project	1
		Management personnel training	Time/year	1
YS-10	Liao River Estuary	Management personnel training	Series	/
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
YS-11	Snake Island - Laotieshan	Management personnel training	Series	/
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
YS-12	Yalujiang Estuary	Management personnel training	Series	/
		Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
YS-13	Changshan Archipelago	Construction of information management system for big data monitoring and management effectiveness assessment	Project	1
		Movable floating-bridge terminal construction	Location	2
		Management personnel training	Series	/

13.2 Funding Guarantee

The national, provincial, and municipal government finance will utilize special funding allocated each year for infrastructure construction, wetland protection, water conservation, pollution prevention and other environmental governance projects, in accordance with the management needs and implementation of conservation plan, and infrastructure construction of the nominated properties, and should guarantee the outlay for working of protection, planning, design, presentation, scientific research and nomination of the nominated properties.

The development of the nominated properties is a social public-benefit project. Given the limited national financial resources at present, it is necessary to raise funds through multiple channels for this project, in addition to national and local financial funds, and to seek social donations and funding from international organizations. It is necessary to actively carry out the ecological environmental protection while sustainably use of resources, and mobilize the whole society to pay attention to and participate in eco-environmental protection without changing local ecological functions. Meanwhile, policies should be formulated to spur economical use of natural resources, while giving priority to biodiversity in sector development.

(1) The funds required for the protection, management and presentation of World Heritage sites should be included in the national financial budget, and special funds should be allocated in accordance with

relevant laws and regulations.

(2) Provincial and municipal heritage management agencies should reasonably prepare budgets based on actual conditions and various special plans, and seek financial support from higher-level governments.

(3) The tourism revenues of the nominated properties should be transferred to the municipal finance for reasonable redistribution, and a certain proportion of the funds must be used for heritage protection and management.

(4) The specific allocated proportion of funds should be determined by the relevant management departments at the beginning of each year based on the current year's heritage protection and management plan and the implementation results of the previous year.

(5) Special funds should be allocated for protection of rare animals and plants and wetland ecosystem, and efforts should be stepped up to seek social donations and funding from international organizations.

14 Planning Safeguard Measures

14.1 Legal Guarantee

14.1.1 National and provincial legal protection

In terms of law, the nominated properties are national and provincial protected areas, protected by national laws and regulations. Nominated properties are protected by the *Constitution of the People's Republic of China*, *Environmental Protection Law of the People's Republic of China*, *Regulations of the People's Republic of China on Nature Reserves*, *Wild Animal Conservation Law of the People's Republic of China*, and other laws and regulations.

14.1.2 Establishment of the legal status of the nominated properties and the buffer zones

The legal status of the nominated properties should be established in order to scientifically protect and maintain their authenticity and integrity and show their overall values, thus improving the procedural management under the guidance of the heritage protection concept and protecting the heritage value.

(1) The land of all the nominated properties and the buffer zones are state-owned, and all the nominated properties have been granted the legal

status of national nature reserve in compliance with the national legal requirements including the *Regulations of the People's Republic of China on Nature Reserves*;

(2) The preparation of the plan should give full consideration to the content of the local plans for the nature reserves;

(3) The management mechanisms for the nominated properties should be incorporated into local protection and management agencies of the nature reserves;

(4) The areas of the nominated properties are included in UNESCO Man and the Biosphere Programme (MAB), North East Asian Crane Site Network, East Asian - Australasian Flyway Waterbird Site Network, List of Ramsar Sites, etc. Hence, the protection and management of the nominated properties shall comply with relevant regulations.

14.1.3 Guarantee of law enforcement procedures

Constructions and other activities at the nominated properties that may affect their heritage values should be approved and planned according to relevant legal procedures as well as the management status by government departments and relevant laws and regulations.

(1) Approval procedures: Construction activities that meet the management requirements shall be examined and approved by relevant departments in consultation with the management agencies of nominated properties in accordance with the relevant laws and regulations.

(2) Filing procedures: Construction projects shall be reported to the management agencies of nominated properties for record filing.

It is necessary to clarify further the constituent elements of the World Heritage sites and the legal status of the protected zones; improve further the legal system and management procedures for World Heritage protection; adjust, supplement and improve the existing local management plans as per the Forest Law of the *People's Republic of China*, *Environmental Protection Law of the People's Republic of China*, *Wild Animal Conservation Law of the People's Republic of China*, *Regulations of the People's Republic of China on the Protection of Terrestrial Wild Animals*, *Implementation Regulations of the People's Republic of China on the Protection of Terrestrial Wildlife*, *Implementation Regulations of the People's Republic of China on the Protection of Wild Plants*, and this plan.

14.2 Policy Guarantee

Laws, administrative regulations, local regulations and management regulations regarding World Heritage sites should be established and improved to provide policy guarantees for protection of World Heritage sites. While the management teams carry out relevant activities, joint law enforcement should be launched with competent public security agencies to improve the level of law enforcement and ensure that laws are observed and strictly enforced. Acts of destroying and poaching resources at World Heritage sites will be severely investigated and dealt with. Law knowledge

education programs should be organized for the residents at the heritage sites and surrounding communities, to raise their legal awareness of environmental protection and encourage them to engage in heritage development and management.

An integrated decision-making and cooperation mechanism should be established by strengthening collaboration among departments of environmental management, construction and tourism management and departments in charge of heritage protection, and joint law enforcement inspections should be actively carried out with other relevant departments. Non-profit heritage protection organizations should be established at the nominated properties to provide policy, financial and technical support and necessary education and training.

14.3 Talent Support

In light of the characteristics and reality of each migratory bird habitat, the organizational structure of management agency and assignment of responsibilities, a workforce should be built, including comprehensive and professional talents, to satisfy protection and management of nominated properties. Based on the needs of protection and management, professionals with the required expertise, administrative competence and social communication skills should be brought in for the protection of migratory bird habitat in the Yellow Sea-Bohai Gulf through communication, training, education and effective incentive system.

14.4 Coordination among Stakeholders

The National Forestry and Grassland Administration as well as provincial leading groups for World Natural Heritage nomination and direct management agencies of the World Heritage sites have prepared this plan according to the *Operational Guidelines for the Implementation of the Convention Concerning the Protection of the World Cultural and Natural Heritage*, intended to provide guidance for the management of nominated properties. This plan has been prepared with the involvement of all major stakeholders, including competent departments of forestry and grassland, ecology and environment, culture and tourism, ocean and fishery, water conservancy, legislation affairs, and commission office for public sector reform. The preparation of this plan included the full solicitation of opinions from communities, managers and other stakeholders through interviews, questionnaires and meetings. The opinions of all stakeholders have been fully communicated for the purpose of implementation of this plan.