



IMPLEMENTING THE STRATEGIC ACTION PROGRAMME FOR YELLOW SEA  
LARGE MARINE ECOSYSTEM: RESTORING ECOSYSTEM GOODS AND  
SERVICES AND CONSOLIDATION OF A LONG-TERM REGIONAL  
ENVIRONMENTAL GOVERNANCE FRAMEWORK  
(UNDP/GEF YSLME PHASE II PROJECT)

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**A zoning plan including coordination mechanism in  
line with the master plan of local land use and sea use**

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# 1. Background

Yellow Sea is located between China and Korea. The name is given to the northern part of the East China Sea, which is a marginal sea of the Pacific Ocean. It is located between mainland China and the Korean Peninsula. Its name comes from the sand particles from Gobi Desert sand storms that turn the surface of the water golden yellow.

The innermost bay of Yellow Sea is called the Bohai Sea (previously Pechihli Bay or Chihli Bay). Into it flow both the Yellow River (through Shandong province and its capital Jinan) and Hai He (through Beijing and Tianjin). Deposits of sand and silt from those rivers contribute to the sea colour.

The northern extension of Yellow Sea is called the Korea Bay. Yellow Sea is one of four seas named after common colour terms — the others being Black Sea, Red Sea and White Sea. Since 1 November 2018, Yellow Sea has also served as the location of "peace zones" between North and South Korea.

Yellow Sea, excluding the Bohai, extends by about 960 km (600 mi) from north to south and about 700 km (430 mi) from east to west; it has an area of about 380,000 km<sup>2</sup> (150,000 sq mi) and the volume of about 17,000 km<sup>3</sup> (4,100 cu mi). Its depth is only 44 m (144 ft) on

average, with a maximum of 152 m (499 ft). The sea is a flooded section of continental shelf that formed after the last ice age (some 10,000 years ago) as sea levels rose 120 m (390 ft) to their current levels. The depth gradually increases from north to south. The sea bottom and shores are dominated by sand and silt brought by the rivers through Bohai Sea (Liao River, Yellow River, Hai He) and Korea Bay (Yalu River). Those deposits, together with sand storms are responsible for the yellow water color and the sea name. Major islands of the sea include Anmado, Baengnyeongdo, Daebudo, Deokjeokdo, Gageodo, Ganghwado, Huido, Heuksando, Hongdo, Jejudo, Jindo, Muuido, Sido, Silmido, Sindo, Wando, Yeongjongdo and Yeonpyeongdo (all in South Korea).

The area has cold, dry winters with strong northerly monsoons blowing from late November to March. Average January temperatures are  $-10\text{ }^{\circ}\text{C}$  ( $14\text{ }^{\circ}\text{F}$ ) in the north and  $3\text{ }^{\circ}\text{C}$  ( $37\text{ }^{\circ}\text{F}$ ) in the south. Summers are wet and warm with frequent typhoons between June and October. Air temperatures range between  $10$  and  $28\text{ }^{\circ}\text{C}$  ( $50$  and  $82\text{ }^{\circ}\text{F}$ ). The average annual precipitation increases from about  $500\text{ mm}$  ( $20\text{ in}$ ) in the north to  $1,000\text{ mm}$  ( $39\text{ in}$ ) in the south. Fog is frequent along the coasts, especially in the upwelling cold-water areas.

The sea has a warm cyclone current. It is a part of the Kuroshio Current, which diverges near the western part of Japan and flows northward into Yellow Sea at the speed of below 0.8 km/h (0.50 mph). Southward currents prevail near the sea coast, especially in the winter monsoon period.

Brown sediment spills out into Yellow Sea from rivers in eastern China and Korea. The nutrients in the sediment may be responsible for the bloom of phytoplankton seen as blue-green swirls. The water temperature is close to freezing in the northern part in winter, so drift ice patches and continuous ice fields form and hinder navigation between November and March. The water temperature and salinity are homogeneous across the depth. The southern waters are warmer at 6–8 °C (43–46 °F). In spring and summer, the upper layer is warmed up by the sun and diluted by the fresh water from rivers, while the deeper water remains cold and saline. This deep water stagnates and slowly moves south. Commercial bottom-dwelling fishes are found around this mass of water, especially at its southern part. Summer temperatures range between 22 and 28 °C (72 and 82 °F). The average salinity is relatively low, at 30‰ in the north to 33–34‰ in the south, dropping to 26‰ or lower near the river deltas. In the southwest monsoon season (June to August) the increased rainfall and runoff

further reduce the salinity of the upper sea layer. Water transparency increases from about 10 m (33 ft) in the north up to 45 meters (148 ft) in the south.

Tides are semidiurnal, i.e. rise twice a day. Their amplitude varies between about 0.9 and 3 m (3.0 and 9.8 ft) at the coast of China. Tides are higher at the Korean Peninsula, typically ranging between 4 and 8 m (13 and 26 ft) and reaching the maximum in spring. The tidal system rotates in a counterclockwise direction. The speed of the tidal current is generally less than 1.6 km/h (0.99 mph) in the middle of the sea, but may increase to more than 5.6 km/h (3.5 mph) near the coasts. The fastest tides reaching 20 km/h (12 mph) occur in the Myeongnyang Strait between the Jindo Island and the Korean Peninsula.

The tide-related sea level variations result in a land pass 2.9 km (1.8 mi) long and 10–40 m (33–131 ft) wide opening for approximately an hour between Jindo and Modo islands. The event occurs about twice a year, at the beginning of May and in the middle of June. It had long been celebrated in a local festival called "Jindo Sea Parting Festival", but was largely unknown to the world until 1975, when the French ambassador Pierre Randi described the phenomenon in a French newspaper.

The sea is rich in seaweed (predominantly kelp, *Laminaria japonica*), cephalopods, crustaceans, shellfishes, clams, and especially in blue-green algae which bloom in summer and contribute to the water color (see image above). For example, the seaweed production in the area was as high as 1.5 million tonnes in 1979 for China alone. The abundance of all those species increases toward the south and indicates high sea productivity that accounts for the large fish production in the sea. Newer species of goby fish was also discovered.

The southern part of Yellow Sea, including the entire west coast of Korea, contains a 10 km-wide (6.2 mi) belt of intertidal mudflats, which has the total area of 2,850 km<sup>2</sup> (1,100 sq mi) and is maintained by 4–10 m (13–33 ft). Those flats consist of highly productive sediments with a rich benthic fauna and are of great importance for migratory waders and shorebirds. Surveys show that the area is the single most important site for migratory birds on northward migration in the entire East Asian – Australasian Flyway, with more than 35 species occurring in internationally significant numbers. Two million birds, at minimum, pass through at the time, and about half that number use it on southward migration. About 300,000 migrating birds were transiting annually only through the Saemangeum tidal flat area. This estuary was however dammed by South Korea in 1991–2006 that



resulted in drying off the land. Land reclamation also took 65% of the intertidal area in China between the 1950s and 2002, and there are plans to reclaim a further 45%.

Oceanic mega faunas bio-diversities, such as of marine mammals, sea turtles, and larger fish drastically decreased in modern time not only by pollution but also mainly by direct hunting, most extensively Japanese industrial whaling, illegal mass operations by Soviet with supports from Japan and fewer species survived to today although being still in serious perils. Those include spotted seals, and cetaceans such as minke whales, killer whales, false killer whales, and finless porpoises, but nonetheless all the remnants of species listed could be in very small numbers. Historically, large whales were very abundant either for summering and wintering in the Yellow and Bohai Seas. For example, a unique population of resident fin whales and gray whales were historically presented, or possibly hosted some North Pacific right whales and Humpback whales (3 whales including a cow calf pair was observed at Changhai County in 2015) year-round other than migrating individuals, and many other migratory species such as Baird's beaked whales. Even blue whales, Japanese sea lions, dugongs (in southern regions only) and leatherback turtles used to breed or migrate into Yellow and Bohai seas.

Spotted seals are only species thriving in today's Yellow Sea and being the only resident species as well. A sanctuary for these seals is situated at Baengnyeongdo which is also known for local finless porpoises. Great white sharks have been spotted to prey on seals in these areas as well.

Yellow Sea is being negatively impacted by human induced disturbances such as Harmful Algal Blooms (HAB), Jellyfish Blooms, nutrient enrichment causing eutrophication and climate change. These challenges are causing numerous deleterious consequences to the fishing and tourism industries and upsetting the overall balance of natural marine ecosystems.

With the rapid development of the economy, Yellow Sea ecological environment has gradually developed from a small area problem in individual areas to a large-scale cross-border large-area problem. It is difficult to solve all ecological and environmental problems only through ecological compensation and ecological restoration in individual areas. This requires governments and departments at all levels to act in concert, and ecological cooperation is bound to become universal and normal. The diversification, complexity and trans-regionalization of ecological and environmental issues urgently require ecological cooperation among different

ecological stakeholders to deal with these problems. However, “who works with whom”, “what cooperation on ecological issues” and “how to cooperate” are issues that should be addressed before building regional ecological protection cooperation mechanisms and conducting regional ecological protection cooperation practices.

Research on how to carry out ecological cooperation and how to cooperate and manage the best, must rely on scientific theoretical guidance. Science and technology support are the foundation for implementing adaptive management of ecosystem-based large marine ecosystems. Participating in the trust, interest and interests of countries is the key to maintaining long-term cooperation in regional oceans.

The management of large marine ecosystems based on the sea can avoid the inefficiencies brought about by complex procedures at the national level and at the national level. Taking into account the impact of flow and non-point source pollution on the estuary and marine ecosystems, the combination of rivers and seas is still the necessary path for the adaptive management of large marine ecosystems. At the same time, marine science needs to be equal to social sciences. Strengthening the coordination and cooperation of

regional institutions is an important consideration for the persistence of regional mechanisms at the national level.

## **2 Process of regional ecological protection cooperation**

The construction of a reasonable and effective regional ecological cooperation mechanism needs to be completed through the following 10 steps: 1 to diagnose regional ecological problems; 2 to determine the main body of ecological cooperation; 3 to identify ecological cooperation objects; 4 to sort out the relationship between cooperation subjects; 5 to formulate cooperation programs; 6 consultation; 7 program implementation; 8 implementation supervision; 9 evaluation; 10 improvement of ecological cooperation program, implementation and supervision program.

1) Diagnosis of ecological problems: It mainly analyzes, analyzes and evaluates the ecological environment problems in Yellow Sea region, finds out the main ecological problems in the region, implements the geographical boundaries of various major ecological problems and the boundaries of administrative regions, and determines the main body of ecological cooperation. prepare for.

2) Identify the main body of ecological cooperation: According to the diagnosis results of ecological problems in Yellow Sea region, identify the stakeholders involved in the main ecological problems,

and identify the cooperating entities that deal with ecological problems.

3) Identify ecological cooperation objects: Identify the key ecological environment management objects for the existing ecological problems, such as the carriers that generate Yellow Sea green tide.

4) Combine the main body of ecological cooperation: analyze the factors affecting the quality of the ecological environment of the cooperation partners, determine the specific cooperation subjects, and clarify the rights and responsibilities of all parties in the ecological environment governance.

5) Formulate a cooperation plan: According to the ecological and economic interests of different cooperation entities, determine a reasonable ecological cooperation mode, and formulate multiple sets of regional ecological protection cooperation programs.

6) Consultation: The proposed multiple sets of ecological cooperation programs repeatedly seek opinions and suggestions from the various partners, and finally form a cooperation plan agreed upon by all parties.

7) Programme implementation: Each partner will take practical actions based on the finalized cooperation plan.

8) Implementation supervision: According to the signed cooperation agreement, supervise and inspect the practice of the ecological cooperation subject.

9) Evaluation: A comprehensive evaluation of the ecological protection cooperation in Yellow Sea region, including four aspects of evaluation, that is, the evaluation of the rationality of the cooperation program based on the effect of the practice, the evaluation of the implementation level of the program, and the evaluation of the effectiveness of the supervision. Re-evaluate the quality of the ecological environment after the implementation of the ecological cooperation program.

10) Improvements in ecological cooperation programmes, implementation and monitoring programmes. The purpose of the evaluation is to test and improve the existing programs. Therefore, based on the evaluation results, the ecological cooperation programs, program implementation methods and monitoring methods are improved to improve the effect of ecological cooperation.

The key to the success of the ecological protection cooperation in Yellow Sea region is whether it can design and develop an effective cooperation plan based on the actual ecological problems and the main situation of the region. The cooperation mode is the specific component and performance of the cooperation plan. Form, guiding the practice.

Supervision and evaluation is a guarantee mechanism to ensure the expected results of ecological cooperation in Yellow Sea region. If the cooperation plan cannot be implemented seriously, the cooperation effect will be greatly reduced, and the implementation link is also the most difficult problem in cooperation, which directly determines the ecological environment of Yellow Sea. Can environmental problems be solved? Therefore, there must be a regulatory mechanism and an evaluation mechanism to ensure the implementation and improvement of ecological cooperation. Supervision includes monitoring and evaluation of the implementation of cooperative programs and regular monitoring of the ecological environment. The evaluation of ecological cooperation includes the rationality evaluation of the cooperation program, the evaluation of coordination and supervision ability, and the staged and final evaluation of the quality of the ecological environment after



implementation. The main body of coordination and supervision is the co-construction coordination and management organization. The coordination and supervision are the partners and are responsible for the regular monitoring of the ecological environment. In order to ensure the implementation of cooperation programs and objectively evaluate the effectiveness of cooperation, we must introduce third parties for evaluation. The main tasks are to evaluate the capacity of coordination and regulatory agencies, stage and evaluation of ecological environment quality after cooperation and ecological The rationality of the cooperation program is evaluated.

### 3. The zoning plan of China, Taking Shandong province as an example

Yellow Sea is mainly involved in two provinces in China: Shandong and Liaoning. Although China's Hebei, Tianjin, Jiangsu and other provinces also belong to Yellow Sea region, due to the limited area in Yellow Sea, it is not introduced here. In addition, the Liaoning sea is mainly in the Bohai Sea. All of them do not involve international cooperation and joint protection in China. Here, Shandong is used as an example to introduce China's zoning plan. It should be emphasized that the legal basis for the preparation of marine planning in all provinces of China is the same, as follows:

*Law of the People's Republic of China on the Use of Sea Areas*

*Marine Environmental Protection Law of the People's Republic of China*

*Island Protection Law of the People's Republic of China*

*Land Administration Law of the People's Republic of China*

*Fisheries Law of the People's Republic*

*Law of the People's Republic of China on Maritime Traffic Safety*

*Port Law of the People's Republic of China*

*Law of the People's Republic of China on Military Facilities  
Protection*

*People's Republic of China Flood Control Law*

*People's Republic of China Nature Reserve Regulations*

*Outline of the Twelfth Five-Year Plan for National Economic  
and Social Development of the People's Republic of China*

*Reply of the State Council on National Marine Functional  
Zoning (2011-2020) (Guo Han [2012] No. 13)*

*China Biodiversity Conservation Strategy and Action Plan  
(2011-2030) (reviewed and approved at the 126th meeting of the  
State Council executive meeting on September 15, 2010)*

*"Technical Guidelines for Marine Functional Zoning" (GB/T  
17108-2006)*

Therefore, the management requirements for all marine functional planning in China are the same. The principles and objectives of zoning plans in different provinces are also very close. Therefore, all the coastal areas of China can be seen from the objectives, principles, functional division and management of marine

functional zoning in Shandong Province. The marine functional zoning of the province also has the same characteristics.

### 3.1 Zoning plan subjects

Focusing on the creation of Shandong Peninsula Blue Economic Zone and Yellow River Delta Efficient Ecological Economic Zone, rationally arranging sea resources, coordinating and coordinating the industry sea, establishing a marine development and utilization order in line with marine functional zoning, realizing the rational development and sustainable use of the sea area, and adapting The demand for the ocean in the national economic and social development of Shandong Province.

By 2020, the following main objectives will be achieved:

(1) Enhance the role of sea area management in macroeconomic regulation and control. The legal, economic, administrative and technological means of sea area management have been continuously improved, the overall control role of marine functional zoning has been significantly enhanced, the market mechanism of sea area use rights has been gradually improved, and the national ownership of sea areas and the legitimate rights and interests of sea area users have been effectively guaranteed.

(2) Improve the marine ecological environment and expand the area of marine protected areas. The total amount of major pollutants discharged from the sea was initially controlled, the environmental quality of the key polluted sea areas was improved, and the deterioration of marine ecology in local sea areas was suppressed. Some damaged marine ecosystems were initially restored, and the protection of offshore and coastal wetland tidal flats was further strengthened. By 2020, marine protected areas will account for more than 11%.

(3) Maintaining the stability of the sea for fisheries and strengthening the conservation of aquatic living resources. The fishery production and living and the development of modern fisheries have been strongly protected by sea demand, and important fishery waters, aquatic wildlife and aquatic germplasm resources conservation areas have been effectively protected. By 2020, the ecological environment of the waters will be gradually restored, the decline of fishery resources and the increase of the number of endangered species will be basically curbed. The fishing capacity and fishing yield will be generally compatible with the sustainable capacity of fishery resources. The sea functional area for marine aquaculture will reach 550,000 hectare.

(4) Reasonable control of the scale of reclamation. Strictly implement the annual reclamation planning system to curb the trend of excessive growth of reclamation. The control area of the reclamation is in line with the overall requirements of the macroeconomic regulation and control of the national economy and the carrying capacity of the marine ecological environment. The scale of the reclamation for construction during the zoning period is controlled within 34,500 hectares.

(5) Reserve the reserve space resources of the sea area. Delineate special reserved areas and implement strict phased development restrictions to reserve a certain number of nearshore areas for future development. The proportion of reserved areas in coastal waters is not less than 10%. Strictly control the occupation and utilization of shoreline occupation. By 2020, the natural coastline of the mainland will not be less than 40%.

(6) Carry out remediation and repair of coastal areas. The focus is on the damage to the natural landscape caused by development and utilization, the degradation of ecological functions, the weakening of disaster prevention capacity, and the use of inefficient coastal zones for remediation and restoration. By 2020, the length of the rectification and restoration of the coastline will be no less than 240 km.

Zoning plan implementation period: 2011-2020.

### 3.2 Zoning plan principles

(1) Based on natural attributes. According to the natural attributes such as location, natural resources and natural environment of the sea area, comprehensively evaluate the suitability of sea area development and utilization and the carrying capacity of marine resources and environment, and scientifically determine the basic functions of the sea area.

(2) Scientific development oriented. According to the needs of economic and social development, we will make arrangements for all industries to use the sea, reasonably control the scale of all types of construction and use of the sea, ensure the production, living and ecological use of the sea, and guide the marine industry to optimize the layout.

(3) Focus on the protection of fisheries. The premise of sustainable development of fisheries is that traditional fishery waters are not crowded and occupied. Protecting fishery resources and ecological environment is the basis of fishery production. The guarantee of increasing fishermen's income is the basis for ensuring the stability of fishing areas. Other types of functional areas clearly

retain the function of agriculture and fisheries when they are not exploited.

(4) Prerequisite to protect the environment. Practically strengthen marine environmental protection and ecological construction, make overall considerations for marine environmental protection and land-based pollution prevention, control pollutant discharge, improve the ecological environment of coastal waters, prevent marine environmental emergencies, and maintain estuaries, bays, islands, coastal wetlands, etc. Ecosystem security.

(5) Land and sea are co-ordinated as guidelines. According to the correlation between land space and ocean space, and the particularity of marine ecosystems, coordinate the development and utilization of land and sea and environmental protection. Strictly protect the coastline and ensure the safety of floods in the estuary.

(6) National security is the key. Safeguard national defense security and military use of the sea, ensure maritime traffic safety and safety of submarine pipelines, strengthen the protection of the territorial sea base and surrounding sea areas, and safeguard national maritime rights and interests.



(7) Centralized intensive concept. Promote the fundamental transformation of the sea, reverse the traditional sea use pattern of “distributed, extensive and inefficient”, adhere to overall planning, concentrate and intensive use of the sea, guide the relative agglomeration of the marine industry, and strictly control the reclamation.

### 3.3 Marine development and protection strategy

Adhere to the development of protection and development in protection, clear the functional positioning and development focus of space resources such as coastlines, tidal flats, bays and islands, strengthen marine environmental protection and ecological construction, enhance the level of resource development and utilization, and promote the optimization and upgrading of marine industry structure. Priority is given to ensuring the use of the sea for traditional fisheries, safeguarding the public interest and the demand for sea for major national construction projects. Adjusting the structure of fishery culture, scientifically protecting and rationally utilizing offshore fishery resources, and in-shore aquaculture will gradually develop into deep water areas, with emphasis on the eastern part of Laizhou Bay, Miaodao Islands, Yuli Island, Rongcheng, Lushan, Jimo Offshore, and Haizhou Bay North. Construction of an important

marine pasture demonstration area in the country. With Qingdao Port as the core, Yantai Port and Rizhao Port are the backbone, Weihai Port, Weifang Port, Dongying Port, Binzhou Port and Laizhou Port are the support to develop maritime shipping and port-based industries. Vigorously promote the intensive use of the sea, focusing on the creation of nine concentrated intensive sea areas in the northern part of Haizhou Bay, Dongjiakou, Tingziwan, Qiandao, Longkou Bay, southeastern coast of Laizhou Bay, Weifang Binhai, Dongying City East Sea and Binzhou Sea Area. Develop special tourism products, improve the quality of tourism products and internationalization, improve tourism and leisure facilities, and build Qingdao, Yantai and Weihai into well-known coastal leisure destinations at home and abroad. Strengthen the construction of marine nature reserves, marine special protection areas, aquatic germplasm resources conservation areas, carry out pilot construction and management of marine special protection zones, increase fishery spawning grounds, wintering grounds, feeding grounds, migratory passages and important aquatic products. The protection of breeding areas, the establishment of a sound marine and fishery protection system; the implementation of the protection and restoration of typical ecosystems such as Tamarix, seagrass beds and coastal wetlands, in international and national

important wetlands, and important ecological functions and conservation values. In the range of offshore and coastal wetlands, it is forbidden to reclamation and to enhance the protection of marine biodiversity, important marine ecological environment and marine landscape. We will improve the flood control, moisture prevention and mitigation system, and build high-standard coastal tidal dykes and tidal levees into the sea, renovate low-standard tidal dams, improve embankment shelterbelts, and build safety barriers. Accelerate the ecological improvement of the Gulf and maintain the health of the coastal ecological environment.

In order to speed up the implementation of the two major national development strategies of Shandong Peninsula Blue Economic Zone and Yellow River Delta Efficient Ecological Economic Zone, based on a comprehensive analysis of the current situation and situation of marine development protection in Shandong Province, the Shandong Province sea area is divided into five sea area units, namely Yellow River estuary is adjacent to the northwestern part of the Shandong Peninsula, the sea near the Miaodao Islands, the northeastern part of the Shandong Peninsula, the southern part of the Shandong Peninsula, and the Rizhao City.

➤ Yellow River estuary and the northwestern part of the

## Shandong Peninsula

The area is bordered by the reckless waters to the adjacent waters of Penglai. The coastal zone is flat, the silt and muddy tidal flat is wide, and the seabed is shallow; the petroleum and natural gas resources are abundant; the biological resources of the tidal flat are mainly shellfish, and the shallow sea biological resources are mainly shrimp and crab.

The main functions of this sea area are marine protection, agricultural and fishery areas, tourism and recreation, industrial and urban use of the sea. The Yellow River estuary mainly develops marine protection and marine fisheries, and strengthens marine ecological construction with marine biological nature reserves, national geological parks, marine special protection areas, Yellow River estuaries, aquatic germplasm resources conservation areas, and important wetland resources as the core. Protect and maintain the ecological service functions of coastal wetlands, maintain biodiversity, promote the improvement of the ecological environment in the Bohai Sea, control the construction of coastal industrial areas, strictly limit the development of heavy chemical industries, and prohibit industrial construction with high energy consumption and high pollution. Focus on intensive development of Dongying, Binzhou, Weifang North,

Laizhou, Longkou special port industrial zone, develop coastal tourism, and rationally develop ecological marine industries such as fishery, seawater utilization, marine life and wind energy. The development and use of the sea area should be coordinated with the moisture and flood control in the Yellow River estuary. Comprehensive remediation and restoration of the coastal wetlands of the Yellow River Delta and the Laizhou Bay. Implement total pollutant control to improve the quality of the marine environment.

➤ The sea area nearing Miaodao islands

The area is located in the waters of the Miaodao Islands. The 32 bedrock islands of the Miaodao Islands are distributed throughout the Bohai Strait, and the location advantage is outstanding. This area is the main producing area of sea treasures such as sea cucumber, platter, scallop, purple sea urchin and burly. The area is famous for its natural scenery, pleasant climate and abundant tourism resources. There are 247 species of birds in the temple island, and there are 7 national birds in 12 countries in the world. It is a national-level bird nature reserve.

The main functions of this sea area are tourism, recreation, agriculture and fishery. We will focus on the development of eco-efficient brand fisheries, marine new energy industries and tourism,

and the construction of seas for major projects such as the Long Island International Leisure Resort Island, the Bohai Strait Cross-sea Passage, and the Island Project. Strengthen the original marine natural environment of the Miaodao Islands and the protection of bird habitats, and maintain the shipping function of the Changshan waterway. Actively develop tidal energy and other marine clean energy, and coordinate and coordinate marine protection, fishery, tourism transportation and marine new energy development.

➤ Northeastern sea area of Shandong Peninsula

The area is adjacent to the sea from Penglai Point to Weihai Chengshantou. Large offshore bays such as Nest Bay, Zhifu Bay, Shili Liwan and Weihai Bay are well-developed waters for maritime transport, coastal tourism and marine aquaculture. The offshore water quality is fertile, the water quality is relatively clean, and more than 100 kinds of economic organisms are naturally distributed. It is a fishery culture area with an earlier development history in China.

The main functions of the region are agriculture and fishery, port shipping, tourism and recreation and marine protection. The Penglai Point to Pingchang River focuses on the development of coastal tourism and marine fisheries; the northwestern part of the Woziwan and the Zhiyuwan Sea area will focus on the development of port

shipping; the coastal waters of Yantai City to Chengshantou will mainly develop coastal tourism and modern service industries. The area shall coordinate the order of marine development and maintain the shipping functions of ports such as Changshan Waterway, Chengshantou Waterway and Yantai Coastal Route. Near-shore sea sand mining and reclamation activities in sandy coastal areas are strictly prohibited. It is planned to construct a concentrated intensive sea area such as the marine cultural tourism industry gathering area in eastern Yantai. The marine ecosystems such as the Yanji Island, Chengshantou, Zhangping Sandy Coast and Liugong Island will be protected. Carry out comprehensive rectification of the sea areas such as Zhifu Bay, Weihai Bay, Yangma Island and Jinshan Port, and maintain a virtuous cycle and sustainable development of the marine ecological environment.

➤ Southern sea area of Shandong Peninsula

The area ranges from Weishan Chengshantou to Baimahekou. Most of the reef shoreline in the sea area has good conditions for sea treasure breeding and construction of port industry. With a tens of kilometers of high-quality beach coast and clear blue water, it has excellent port resources, tourism resources and fishery resources.

The main functions of the region are marine protection, tourism and recreation, port shipping and industrial and urban use of the sea. The development of marine fisheries from Chengshantou to Wuleidaowan sea area, Rongcheng coastal waters, taking into account regional port construction and coastal tourism development, and moderate development of coastal industries; Wuleidao Bay to Qingdao sea area mainly develop coastal tourism, building ecologically livable type Coastal towns are prohibited from destroying coastal natural landscapes such as natural rock reef coastlines and beaches in the tourist area, strengthening the protection of ecosystems such as Penghu and the Gulf, and strengthening the construction of marine protected areas such as Rongcheng Chengshantou, Daswan, Jiaozhou Bay and Qianliyan Island; The southwestern sea area is rationally developing port shipping, and the Jiaozhou Bay is built to build a Gulf Economic Zone characterized by marine high-tech industries and modern service industries, and to build a Qingdao West Coast Marine Economic New Zone. It plans to build a concentrated intensive sea area such as Weihai Nanhai Marine Economic New Zone (former high-end manufacturing area of Qiandao), Dongjiakou Port Logistics Industry Cluster, and Tingziwan Marine Culture and Tourism Industry Cluster. Comprehensive



rectification of the bays such as Shidao Bay, Wulei Island Bay, Jiaozhou Bay and Tingziwan.

➤ The sea area nearing Rizhao

This area is adjacent to the sea area of Rizhao. The sea area has excellent sandy shoreline, the largest lagoon in northern China, and the near-shore reefs such as Taohua Island and Taigong Island. It has established one of the country's top ten hubs, Rizhao Port, a provincial-level tourist resort and a national-level coastal forest park. It is a key area for port and tourism development.

The main functions of the region are tourism, recreation, agriculture, fishery, marine protection and port shipping. From Baima River to Wanpingkou in the north, it mainly develops coastal tourism and entertainment industry, builds National Marine Park, protects the two cities' estuary ecological wetlands, and develops port-based shipping and fine steel and other port-oriented industries from Wanpingkou to Embroidery River. It is necessary to strengthen the overall management of port areas, tourist areas, fishery waters, islands and surrounding sea areas, ensure the use of seas for ports, tourism and fisheries, and meet the sea demand for coastal industrial clusters in the northern part of Haizhou Bay. Protect the marine environment and birds, important biological germplasm resources, and strengthen

the protection of Rizhao two cities to Wanpingkou near-shore island group, Wuhu, high-quality beach resources, and establish a coastal island group nature reserve. It is strictly forbidden to engage in activities such as sand mining that destroy geological features, develop special tourism such as sports and leisure, and proliferate and restore fishery resources.

### 3.4 Marine functional zoning and management requirements

According to the technical requirements for the preparation of provincial-level marine functional zoning in Shandong Province, combined with the characteristics of marine natural environment and natural resources, the status quo of sea area development and utilization, environmental protection and strategic development of marine economy, it is divided into agricultural and fishery areas, port shipping areas, industrial and urban areas. There are 329 marine basic functional areas in 8 categories including sea area, mineral and energy area, tourism and recreation area, marine protection area, special utilization area and reserved area. Among them, there are 291 basic functional areas of the coast, including 34 agricultural and fishery areas, 38 port shipping areas, 39 industrial and urban sea areas, 9 mineral and energy areas, 55 tourism and recreation areas, and 49 marine protection areas. There are 47 special utilization areas and 20

reserved areas; 38 offshore basic functional areas, including 4 agricultural and fishery areas, 9 port shipping areas, 1 mineral and energy area, 1 tourism and recreation area, and marine protection areas. 10, 9 special utilization zones and 4 reserved zones.

### 3.4.1. Marine zoning

#### ➤ Aquacultural and fishery area

Agricultural and fishery areas refer to sea areas suitable for expanding agricultural development space and exploiting marine biological resources for fishery infrastructure construction such as reclamation, fishing port and nursery, seawater aquaculture and fishing production, and conservation of important fish species. Including agricultural reclamation areas, fishery infrastructure areas, breeding areas, breeding areas, fishing areas and aquatic germplasm resources conservation areas.

There are 38 agricultural and fishery functional zones with a total area of 28,414.37 km<sup>2</sup> and a total coastline length of 746.36 km. Among them, there are 34 coastal basic functional areas, including: Binzhou North, Binzhou-Dongying North, Hekou-Lijin, Laizhou Bay, Laizhou Taipingwan, Laizhou Sanshan Island, Laizhou Sanshan Island North, Laizhou-Zhaoyuan, Longkou North, Long Island. West, Long

Island East, Long Island North, Penglai East, Yantai Covered Bay, Yantai-Zhuping, Luanping-Weihai, Weihai North, Liugong Island-Jiming Island, Chaoyang Port, Rongcheng Bay, Sanggou Bay-Mocho Island, Shidao - Renhe, Jinghai Bay, Wulei Island Bay, Wendeng-Rushan-Haiyang, Tadao North, Rushan Bay, Haiyang-Jimo, Laoshan Bay-Sandkou, Jiaozhou Bay, Huangdao-Jiaonan, Rizhao There are 4 agricultural and fishery areas belonging to the Rizhao Taoyu, Rizhao, and Shantou; there are 4 basic functional areas in the offshore, including: Yantai-Weihai North, Weihai-Qingdao East, Qingdao Chaolian Island, Huangdao-Rizhao East and other agricultural and fishery areas.

The area is mainly used for fishery infrastructure, development and utilization of marine resources for conservation and conservation of fishery resources, restricting offshore fishing, controlling offshore aquaculture at the current scale, developing modern fisheries, and ensuring clean and healthy production of marine food. The coastal basic functional area is mainly used for the construction of nearshore fishing ports and fishery infrastructure bases. The basic functional areas in the offshore areas are mainly used for open farming, fishing, fishery resource conservation, and marine pasture construction. It is forbidden to carry out activities that hinder fishery production,

damage aquatic biological resources and polluted water environment in the designated breeding areas, breeding areas and fishing areas. Other sea activities should deal with the relationship between breeding, breeding and fishing to avoid mutual influence. Gradually adjust the sea area use projects that do not meet the functional area management requirements, rectify environmental quality that does not meet the standard sea area, repair damaged islands, coasts, estuary and other ecological systems in the area, protect aquatic germplasm resources, important economic fishery species and Important fishery waters such as spawning grounds, wintering grounds, feeding grounds and migratory passages.

➤ Port and shipping area

The port shipping area refers to the sea area suitable for the development and utilization of port shipping resources, which can be used for the construction of ports, waterways and anchorages, including port areas, waterway areas and anchor areas.

There are 47 port shipping functional areas with a total area of 5791.86 km<sup>2</sup> and a total length of 509.85 km. Among them, there are 38 basic functional areas of the coast, including: Binzhou, Dongying, Guangli, Yangkou, Weifang, Xiaying, Laizhou Taipingwan, Laizhou, Longkou, Penglai-Long Island, Yantai West, Yantai, Weihai, Weihai

Northeast, Weihai South, Longyan Bay North, Longyan, Rongcheng Bay, Yeouido Bay East, Yeouido, Rongcheng, Rongcheng East, Shidao, Shidao Wangjiawan, Rongcheng Zhukou, Rongcheng Zhukounan, Jinghai Bay, Rushankou, Rushan Southeast There are 9 shipping areas in the southeastern part of Rushan, Haiyang, Laoshan Bay, Nanjiang, Jiaozhou Bay, Jimmy Cliff, Dongjiakou, Shijie, Laoshan, etc.; there are 9 basic functional areas in the offshore, including: Penglai-Yantai, Yantai West Port The coastal port area of the north of the district, Yantai Xigang District, northeast, Qiandao, Jiaozhou Bay, Dongjiakou South, Shijie, Lushan, and Laoshan Port East.

The area is mainly used for port construction, maritime shipping and other activities directly serving maritime transportation. It is forbidden to carry out activities that are not related to shipping and impede navigation safety in port areas, anchorages, waterways, navigable areas and prescribed routes. Avoid other projects occupying deep-water shoreline resources, and anchorages and navigation channels should be selected first in the port shipping area. The basic functional area of the coast is mainly used for the construction of coastal areas, docks, harbors and supporting maritime facilities for shipping services. The basic functional areas in the offshore areas are mainly used for shipping seas such as ports and

anchorage. In the undeveloped port area, marine development activities that do not impede the function of the port should be retained. However, when the above-mentioned development and utilization activities are carried out in the port, they should be gradually adjusted and withdrawn. New and adjacent marine ecological sensitive areas should improve the environmental quality standards of water areas according to the environmental quality requirements of the surrounding marine functional areas. Gradually adjust the sea area use projects that do not meet the functional area management requirements in the area, and rectify the environmental quality that does not meet the standard sea area.

➤ Industrial and urban sea area

Industrial and urban sea areas refer to sea areas suitable for the development of coastal industries and coastal towns, including industrial sea areas and urban sea areas.

There are 39 industrial and urban sea areas with a total area of 788.48 km<sup>2</sup> and a total length of 335.62 km. All belong to the basic functional areas of the coast, including: Wudi, Xi'er River West Bank, Donger River East Coast, Dongying Port North, Dongying Port South, Dongying Binhai, Yangkou, Shouguang North, Yubei, Xiaying, Longkou Bay, Saponin Bay, Huangshihuan, Mashantou, Linluowan,

Rongcheng Yudaowan, Rongcheng Ningjin, Rongcheng Black Mud Bay, Shidaowan North, Shidaowan West, Wendeng Zhangjiakou, Qiandao, Wendeng Longmen Port, People He, Yangcunkou Bay, Rushan Haiyang Institute, Rushankou East, Rushankou West, Haiyang Lingang, Qingdao Baisha River, Hongdao West, Huangdao Linhai, Qianwan Linhai, Haixiwan West, Haixiwan East Sea , Lingshan, Henghe East, Henghe West, Kuishanzui and other industrial and urban sea areas.

The coastal sea, port industrial and urban development and construction in the district should reflect the requirements of concentrated intensive use of the sea, guarantee the sea use needs of major national and local construction projects, optimize the industrial structure, and improve the use efficiency of sea space resources. The development activities of changing the natural attributes of the sea area, such as land reclamation, should be carried out under the premise of scientific argumentation, optimize the graphic design, and advocate the artificial sea, multi-dike, block group and other construction sea methods that have less impact on the marine environment, and the estuary area Sea land should meet the flood control plan. Strengthen environmental monitoring and evaluation of functional areas, pay attention to the protection of adjacent functional



areas, and prevent coastal projects and marine engineering from polluting the sea environment. According to the environmental quality requirements of the surrounding marine functional areas, the environmental quality standards for industrial and urban sea areas can be appropriately improved. The industrial and urban construction areas need to build a sewage collection pipe network and centralized sewage treatment facilities to reduce the impact of regional activities on regional environmental quality. Seawater quality, marine sediment quality, and marine biomass quality remain current when basic functions are not utilized.

➤ Mineral and energy zone

Minerals and energy zones refer to sea areas suitable for the development and utilization of mineral resources and offshore energy, for oil and gas and solid mineral exploration and mining operations, as well as for the development and utilization of salt fields and renewable energy, including oil and gas zones, solid mineral zones, Yantian District and Renewable energy zone.

There are 10 mineral and energy zones with a total area of 551.74 km<sup>2</sup> and a total length of 64.80 km. Among them, there are 9 coastal functional areas, including: Minbei, Shouguang North, Yubei, Hanting North, Changyi Hexi, Xiaying, Laizhou, Wulei Island Bay, and Wulei

Island Bay. Energy zone; one of the basic functional zones in the offshore, including: Haiyang Minerals and Energy Zone.

Under the premise of implementing relevant national laws and regulations and not affecting the operation quality of other functional areas, the oil and gas resources enrichment area is led by oil and gas development, giving priority to the protection of marine minerals and energy exploration and development, and strictly controlling near-shore minerals and energy development. The quantity, scope and intensity of the beach and estuary mining activities are prohibited, and monitoring and monitoring of mineral and energy development and utilization activities are strengthened to prevent disasters and impacts such as coastal erosion and oil spills. The abolition of the existing mineral and energy development and utilization zones must be reported and approved in accordance with relevant procedures.

➤ Tourism and recreation area

The tourism and recreation area refers to a sea area suitable for the development and utilization of coastal and marine tourism resources, which can be used for the development of tourist attractions and the construction of recreational areas for the sea. Including scenic tourist areas and cultural and recreational areas.

There are 56 tourist and recreation areas with a total area of 1502.82 km<sup>2</sup> and a total length of 934.92 km. Among them, there are 55 basic functional areas of the coast, including: Binzhou, Weifang Binhai, Laizhou, Laizhou Sanshan Island, Laizhou Shihuzui, Zhaoyuan, Longkou South Shandong Sea, Longkou Binhai, Long Island, Penglai West Coast, Penglai East Coast, Penglai Copper Well, Yantai Golden Beach, Yantai Datunjiahe East, Laishan Binhai, Laishan Shandong Binhai, Yangma Island, Shuangdao Bay, Shuangdaowan, Weihai City, Weihai Island, Weihai Bay, Weihai Bay, Weihai Salon Wangjiacun North, Xiaoyao Port-Xianrenqiao North, Liuyu-Xixiakou North, Sanggou Bay Binhai, Shidao Nanhai Village Binhai, Shidaowan Binhai, Shidao Size Wangjiadao, Rongcheng Zhukou East Circle, Rongcheng Zhukou West Circle, Qiandao, Nanhai-Silver Beach, Da Rushan, Tingziwan, Dongcun Hekou, Sanping Island, Hengmen Bay West, Tianheng Island, Laoshan Bay West, Laoshan East, Xiaoguan Island, Taiqing Gongkou to Liuqing River, Qingdao Binhai, Hongdao, Fenghuang Island, Dingjiazui, Lingshan Bay, Fujian and Taiwan, Rizhao two cities, Binhai, Rizhaoeshan Binhai, Rizhao Shanhaitian, Rizhao Liujiawan, Rizhao Qishantou and other tourist and entertainment areas. There is one basic functional area in the offshore, namely: Daguandao Tourism Recreation Area.

The area is mainly used for coastal tourism, tourism, recreation, public and other public services, strengthening the protection of natural landscapes, coastal city landscapes and cultural and historical sites and the construction of tourism service infrastructure in the coastal tourist areas, and prohibiting the destruction of natural shorelines. Construction projects such as beaches, coastal landscapes, and coastal shelter forests will rehabilitate and damage natural landscapes, repair damaged natural and historical sites, and conserve seaside beaches. In the tourism and recreation area, the construction of domestic sewage treatment facilities shall be arranged according to the current and planned number of tourists, so as to ensure that all domestic sewage is collected and processed.

➤ Marine protected areas

Marine protected areas refer to sea areas dedicated to marine resources, environment and ecological protection, including marine nature reserves and special marine protection areas.

There are 59 marine protected areas with a total area of 5223.36 km<sup>2</sup> and a total length of 478.24 km. Among them, there are 49 basic functional areas of the coast, including: Binzhou Shell Dike, Dongying River Estuary, Dongying Lijin, North Yellow River Delta, Yellow River Delta, Dongying Laizhou Bay, Dongying Guangrao, Shouguang Binhai,

Weifang Laizhou Bay, Weifang Changyi, Laizhou Shoal. Yantai Zhaoyuan, Yantai Qimu Island, Yantai Sang Island, Longkou Huangshui River Estuary, Long Island North Island, Long Island Yanji Island, Long Island Harbor Seal, Long Island Liancheng Bay, Changshan Island South, Dengzhou Shoal, Zhifu Island Group , Yantai Mountain, Yantai Island, Yantai Wandering River Estuary, Zhangping Sandy Coast, Weihai Xiaoshi Island, Weihai Black Island, Weihai Liugong Island, Weihai Ridao, Weihai Jiming Island, Rongcheng Chengshantou, Rongcheng Big Swan, Spotted Color Stone, Rongcheng Sushan Island, Rongcheng Ershan Island, Qinglong River Estuary, Rushan Tadao Bay, Rushan Huidao, Haiyang Wanmi Beach, Wulonghekou, Jiaozhou Bay Coastal Wetland, Rizhao Two City River Estuary, Rizhao City Xishen Tong , Rizhao Peach Blossom Island, Rizhao Taigong Island, Rizhao Dream Beach, Rizhao Wanpingkou Lagoon Wetland, Rizhao Lushan Sea Stele and other marine protection areas; 10 coastal functional areas Including: Qianliyan, Changmen Rock Island Group, Qingdao Wenchang Fish, Qingdao Dagong Island, Qingdao Chaolian Island, Jiaonan Lingshan Island, Rizhao Dazhuyu, Rizhao Wenchang Fish, Rizhao Golden Squid, Rizhao Qiansan Island and other marine protection areas.

The region strictly enforces relevant laws and regulations such as national and local nature reserves, marine special protection zones, and the Yellow River estuary and Rongsha District, strengthens sea activity monitoring and environmental monitoring, maintains, restores, improves marine ecological environment and biodiversity, and protects nature. Landscape, improve the level of protection. It is forbidden to damage the object of protection, change the natural attributes of the sea area, and use the sea activities that affect the ecological environment of the sea area. Strengthen the monitoring and management of the operational quality of the functional zones of marine protected areas, and irrational use of sea projects in the remediation areas to repair damaged marine ecosystems. The adjustment of protected areas shall be submitted for approval according to law.

➤ Special utilization area

Special use zones are those that are exclusively used for special purposes.

There are 56 special utilization areas with a total area of 231.00 km<sup>2</sup> and a total length of 64.72 km. Among them, there are 47 basic functional areas of the coast, including: Dongying Port, Xinmi River, Bailang River, Weifang Port, Longkou Bay, Longkou North, Longkou

Donghai, Longkou Huangshui River Estuary, Pingchang River Estuary, Yantai Golden River - Liulin River, Zhifu Island North, Xin'an Hekou, Yantaishan Beitou Village, Weihai Port West, Weihai Port East, Weihai City, Rongcheng Bay, Rongcheng Bahegang Reservoir, Yudaowai, Shidaowan, Nandawan, Qiandao, Rushankou , Dingziwankou, Lushan, Lushan, Lushanwan, Wanggezhuang, Jianggezhuang, Maidao, Tuandao, Haibo River mouth, Licun River mouth, northeast of Jiaozhou Bay, Hongdao, Dagu River mouth, Hongshi Cliff Special areas such as Lujiao Bay, Dingjiazui, Wanggezhuang River, Donggekou, Dongzhaokou, Rizhao Lijiatai, Rizhao Kuishanzui, Rizhao Port West Breakwater, Rizhao Cangkou, Rizhao Lushan, etc. There are 9 functional areas, including: Yantai Port, Yantai Port, Weihai Island, Weihai Northeast, Chengdao Bay, Rongcheng Sushan Island West, Haiyang Port, Nudao Port, and Laoshan Baxiandun. Area.

In order to facilitate the use of sea area management, the discharge of sewage should reach the standard discharge, and at the same time, it should be carried out in a certain sea area with strong hydrodynamic conditions and fast water exchange, and the impact on the natural environment of the sea should be reduced to the smallest extent possible. It is necessary to strengthen the monitoring and

management of the special use zones for marine use, strictly check illegal discharges, and prohibit excessive discharges.

➤ Reserved area

Reserved area refers to the sea area reserved for the development of the reserve space resources of the sea area and limited to the development within the zoning period. The reserved areas mainly include sea areas that have not been developed or utilized for the time being due to economic and social factors, and are limited to sea areas that are currently difficult or impossible to use due to factors such as scientific and technological means, and sea areas that should be retained from the perspective of long-term development.

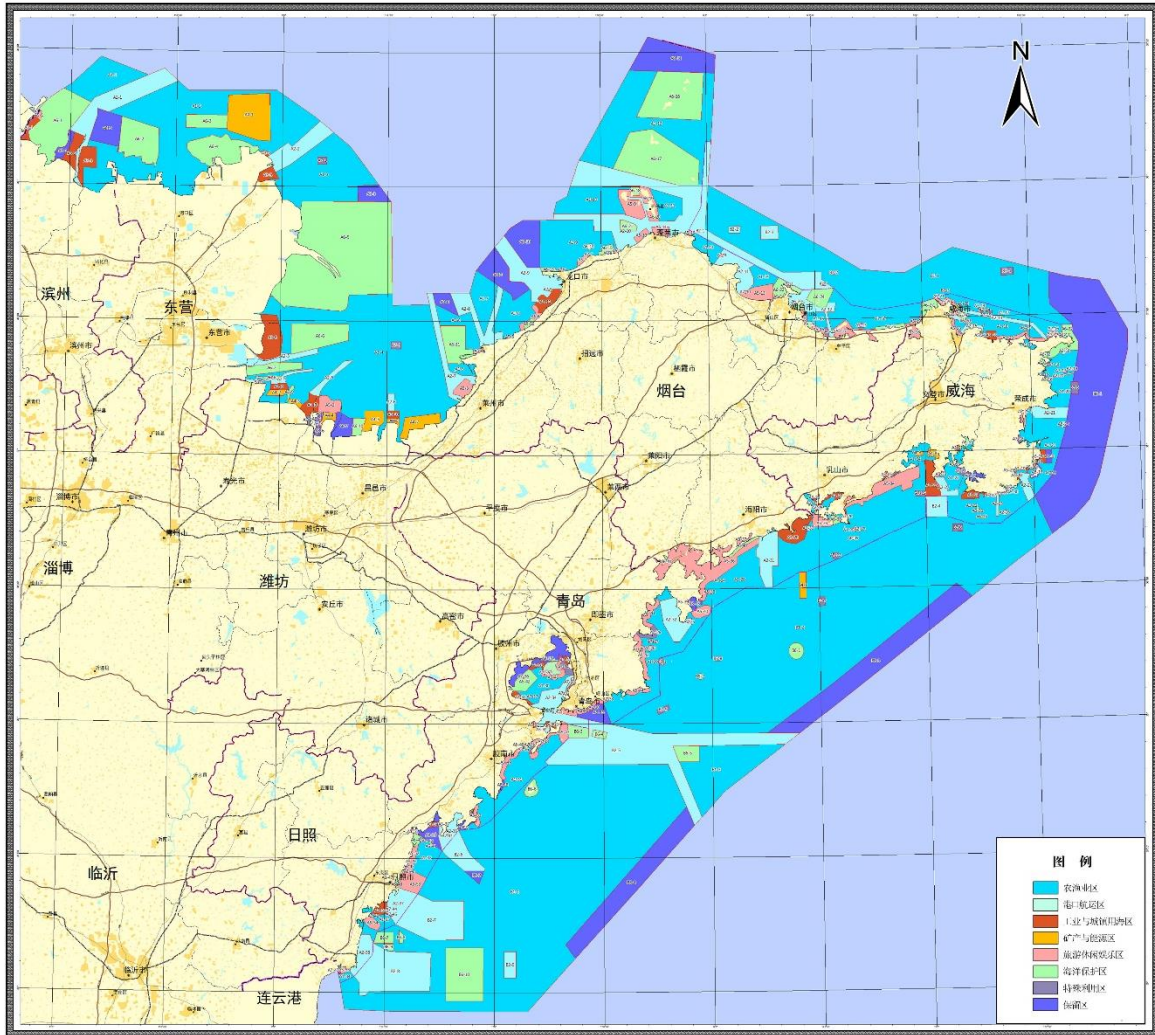
There are 24 reserved areas with a total area of 4,821.77 km<sup>2</sup> and a total length of 213.70 km. Among them, there are 20 basic functional areas of the coast, including: Binzhou Beihai New District, Binerhekou East, Dongying Yellow River North, Weifang Bailang River West Bank, Weifang Bailang River East Bank, Weifang Bailang River East Bank, Weihe River-Dihe River, Laizhou Longlongzui North, Longkou Port, North Longkou Port, Long Island North, Rongcheng Ningjin, Chengdao, Zhangmeng Port, Hengmen Bay, Qingdao Qianhai, Jiaozhou Bay North, Hudao, Hujiaoshan, Qizhawan, etc. District; there are



4 basic functional areas in the offshore, including: Rongcheng East, Dongjiakou, Qianliyan South, Chaolian Island South and other reserved areas.

The reserved area should be strengthened and it is strictly forbidden to develop at will. If it is necessary to change the natural attributes of the sea area for development and utilization, the provincial marine functional zoning should be modified first, and the function of the reserved area should be adjusted and submitted for approval according to the procedure.

### 山东省海洋功能区划图 (2011-2020年)



Zoning Plan of Shandong Province (2011-2020)

### 3.4.2. Management requirements

Strict implementation of the marine functional zoning system, fishery, salt industry, transportation, tourism, minerals and other industries planning for the use of sea areas, should be consistent with marine functional zoning; coastal land use overall planning, urban planning, port planning involving the use of sea areas, should be with the ocean The functional zones are connected.

To use the sea for the approval of projects, it is necessary to improve the sea-based project pre-trial system based on marine functional zoning. The sea area use project must conform to the marine functional zoning. The sea area use demonstration report should clarify whether the project site selection conforms to the marine functional zoning from the aspects of the sea area use mode, type and space requirements, environmental protection requirements, and the healthy operation of the maintenance function area.

Allow non-basic function types to be compatible with the development of marine projects and marine functional zones, and to adjust or relocate them in response to conflicts with basic functions. Seas involving public interest, national defense security, transportation

and shipping safety, marine energy (including renewable energy), marine emerging industries and ecological security shall be given priority under the conditions that do not affect the basic functions of the sea area and environmental protection requirements.

In the process of sea approval and sea area use, we must conscientiously implement relevant laws and regulations, strictly implement marine functional zoning, and must not engage in development activities that are incompatible with marine functional zoning. The examination and approval matters concerning the management functions of relevant departments shall strictly follow the approval procedures, and effectively coordinate the relationship with the stakeholders in the project, especially the fishermen's conversion and compensation work involving fishery seas, and safeguard the interests of fishermen and the harmony of fishing areas stable. Strictly follow the industrial policy, scientifically screen the construction of sea projects; rationally arrange the pattern of various functional areas surrounding the reclamation, set key functional areas around key development areas, and guide the development of reclamation to offshore and artificial islands. It is forbidden to carry out reclamation in the natural spawning grounds, breeding grounds and feeding grounds of economic creatures. When using the sea area, it is

necessary to strictly demonstrate the rationality of reclamation in the seas near the bay, estuary, important wetlands and protected areas. At the same time, it is necessary to scientifically determine the scale, mode and timing of reclamation in accordance with the reclamation planning plan.

It is necessary to strengthen the monitoring and monitoring of the maintenance of marine functional areas and the use of sea areas, and regularly evaluate the changes in marine functional areas and the impact on adjacent marine functional areas.

### **3.5 Regional marine environmental protection**

In order to implement the management requirements of marine functional zoning in Shandong Province and marine environmental protection in Shandong Province, Shandong Province has further formulated the “Shandong Province Marine Ecological Environmental Protection Plan (2018-2020)” (hereinafter referred to as “Planning”), which will Shandong The province's sea area is planned to be a natural reserve, a marine special protection area, an important estuarine ecosystem, an important coastal wetland, an important fishery area, a special protection island, a natural landscape and historical and cultural relics, an important sandy shoreline and adjacent sea areas,

and a sandy source protection area. And 17 important categories of 341 sub-districts such as important coastal tourist areas, general fishing areas, general coastal tourist areas, reserved areas, port shipping areas, industrial and urban sea areas, minerals and energy areas, special utilization areas, etc. Environmental protection requirements, speed up the construction of marine ecological environment monitoring "one network"

According to the "Shandong Province Marine Functional Zoning (2011-2020)", the "Environmental Protection Requirements for Various Marine Functional Zones and the Environmental Protection Requirements of Various Marine Ecological Red Lines", combined with the marine natural environmental conditions and economic and social development of Shandong Province And the needs of ecological civilization construction have been refined and integrated on the basis of the original marine division. The "Planning" defines the environmental quality objectives of each sub-district, and gradually achieves environmental quality objectives by controlling the total amount of pollutants discharged, reducing ecological damage, and implementing ecological restoration.

The planning area starts from the administrative boundary of the Lusong Sea area in the north, the administrative boundary of the Lusu

Sea area in the south, the coastline approved by the People's Government of Shandong Province, the sea to the outer boundary line of the South Yellow Sea to the territorial sea, the Bohai Sea and the North Yellow Sea to about 12 nautical miles. The sea area covers an area of about 47,300 km<sup>2</sup>, and the total length of the mainland coastline is 3345 km.

According to the "Planning", in the implementation process, some environmental functional areas with poor water quality and large differences with the target water quality, or environmental functional areas where the current water quality is acceptable but still cannot reach the target water quality in the short term, should be adopted. The reversal mechanism will be gradually tightened in stages to achieve gradual improvement of water quality. During the planning period, the water quality or water quality will be slightly improved according to the requirements of the current situation. In the long-term, the water quality standards should be consistently achieved according to the function of use management. The seawater quality shall not be lower than the current value of the surrounding sea pond area reserved for remediation in the coastal waters.

The "Plan" proposes that by 2020, the marine environmental quality of our province will be improved overall, the near-shore water

quality will be stable, the marine habitat and biodiversity will be effectively protected, and the marine ecological environment risk prevention and response capacity will be significantly improved. The satisfaction of the people with the marine ecological environment has been effectively improved.

According to the "Planning", the province will strengthen marine ecological environment protection from marine ecological protection, vigorously promote marine pollution prevention, strengthen joint prevention and control of land and sea pollution, prevent and control marine ecological environment risks, and promote marine ecological environment monitoring and energy efficiency. .

The "Planning" emphasizes that the key areas and important ecosystems should be promoted from the existing scattered fragmentation protection to the centralized protection on the surface, and the coordinated protection of the bay, sea, island, beach and coast should be implemented; Control and control, strengthen the management of ship and port pollution prevention, promote the prevention and control of coastal and marine garbage pollution; implement comprehensive management of river basin environment and coastal waters; accelerate the construction of a "one network" for marine ecological environment monitoring.



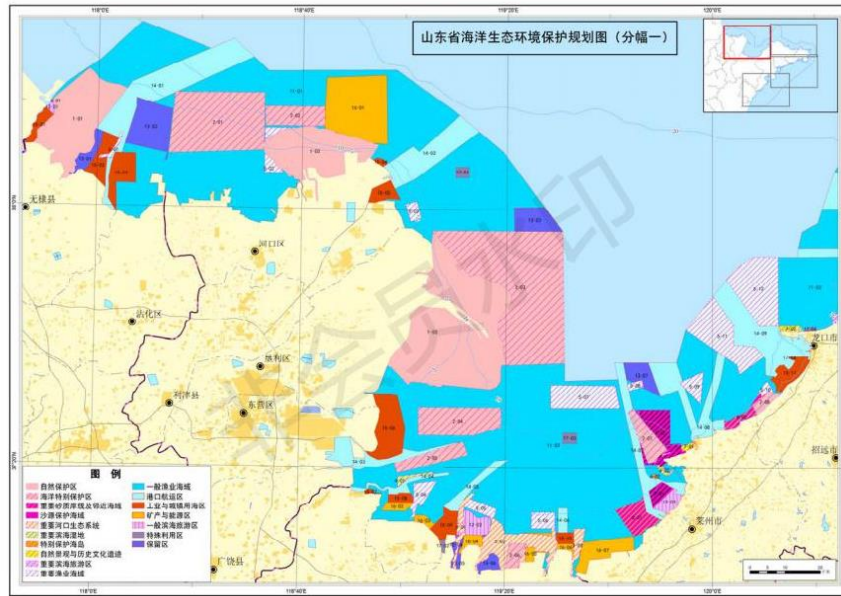


Figure 1. Marine ecological environment protection plan 1 of Shandong province

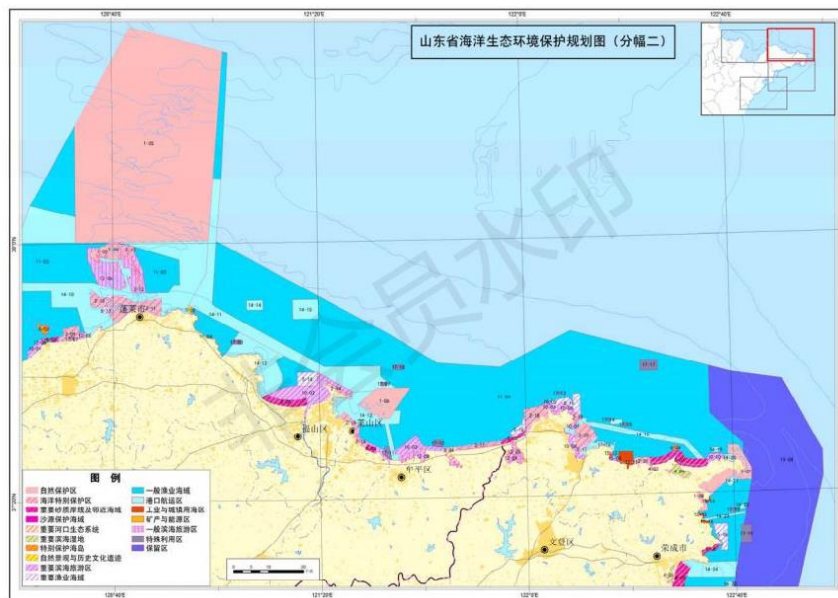


Figure 2. Marine ecological environment protection plan 2 of Shandong province



Figure 3. Marine ecological environment protection plan 3 of Shandong province



Figure 4. Marine ecological environment protection plan 4 of Shandong province

## **4. Making Coordinated mechanism for Land-Marine overall planning**

In Yellow Sea and around the world, human use of coastal and marine resources including tourism, fishing, recreation and other activities, is placing increasing and often conflicting demands on natural resources. As a result, important coastal areas are under increasing pressure that is threatening the health of coral reefs, wetlands, mangroves and sea grass beds, and the environmental services they provide, such as coastal protection from storms, food security and tourism-based economies.

As place-based activities continue to increase, the "space" of the ocean is becoming more limited and conflicts among users are increasing. It is clear that there is an urgent need for a process to guide sustainable uses of the marine environment; one that provides for a diversity of uses while maintaining and protecting biodiversity, resilience and adaptation to climate change, and the services people depend on. Using an ecosystem approach to help identify the right balance between social and economic demands for development, and protecting the health and resilience of ecosystems is a difficult task, particularly in the marine environment. Marine spatial planning and

the development of a multi-use zoning design has recently emerged as a tool that can help people better manage multiple activities taking place in the ocean and achieve the goals of sustainable development.

Analogous to land-use planning in the terrestrial environment, MSP is a comprehensive multidisciplinary planning process which lays out a spatially focused, multi-objective, integrated vision to be developed for an area in which ecological, economic and social objectives can be simultaneously accommodated. A further tenet of MSP is that stakeholder engagement is central to the process. Providing a transparent framework that can accommodate a wide diversity of multi-disciplinary information in an accessible format can serve to improve stakeholder understanding and involvement in decision-making and governance.

The YSLME project goal is to engage Yellow Sea resource users in the development of an ecosystem-based, holistic multiple-use marine zoning plan to facilitate effective management of marine resources reduce existing or possible conflicts between multiple marine uses/users and ensure ecological connectivity of MPAs in order to achieve the goals of sustainable development.

A multi-use zoning plan and coordinated mechanism will bring together marine, policy and planning experts to define the overall

framework. Such a framework is multi-criteria and multi-objective, and attempts to optimize the boundaries of different zones to maximize benefit for all stakeholders and minimize conflict. Such a framework consists of a) defining desired marine zones, such as fully-protected areas, restricted-harvest zones, transportation corridors, etc.; b) defining zoning criteria and objectives, such as protecting biodiversity, protecting ecosystem function and connectivity, enhancing fish stocks, protection of heritage, developing recreational sites, facilitating appropriate development, diversification of tourism, research interests, and transportation needs; c) collecting spatial data about the biophysical environment, marine human activities and interests, such as the Marine Resource and Space-use Information System (MRSIS) project, and d) a computer-assisted method (e.g., the MARXAN, weighted-overlays), to best allocate zones to meet the multiple criteria and objectives. Including marine resource users in the marine planning process will assist with achieving broader public acceptance of the process and aid in the ownership and self-enforcement of the marine zoning plan. Equitably addressing the various sectors of resource use, including conservation, in a coordinated manner will help ensure the long-term sustainability of the plan that is developed.

With a heavy reliance on marine resources and increasing numbers of marine resource users in Yellow Sea, there is a clear need for integrated marine resource management. In order to augment management effectiveness, it is well recognized that the resource users themselves must be a part of the data gathering and planning process and that their resource space-use profiles must be clearly understood. This information can provide more appropriate information for marine spatial planning and management initiatives. Furthermore, multi-sectoral collaboration and meaningful community participation involving a range of stakeholders in the information gathering, research and evaluation processes can maximize management efforts by allowing for equity in decision-making. By meaningfully including and considering both sectoral and community interests, mutual respect and understanding for management initiatives can allow for a participatory framework for co-management. In addition, stakeholder engagement in management can provide for better compliance with rules, increased stakeholder capacity in problem solving and decision-making, local empowerment and community cohesion and ultimately build a more sustainable future.

While supporting the rapid development of China's national economy and coastal areas, the ocean is also under tremendous

pressure from the ecological environment. The deterioration of the marine ecological environment has not been fundamentally contained. The coastal areas such as the estuary and the bay are seriously polluted, the natural habitats in the coastal zone are degraded, the constraints of marine resources and environment are intensified, marine biodiversity is threatened, and the marine ecological security and health situation is very severe. Through in-depth analysis of marine environmental pollution and ecological damage, it is only a matter of formulating protective measures at sea that cannot solve the problem fundamentally. It is necessary to respect the overall law of the ecosystem and the objective laws of the system, and implement the double-layer of land-sea linkage and overall planning. Sub-governance and protection can solve the problem of marine environmental pollution and ecological damage fundamentally and effectively. Land-Sea Coordination is a comprehensive coordination relationship and development model of resource utilization, economic development, environmental protection and ecological security established between the two systems of land and sea. It is a coastal country (region) in the world. The fundamental philosophy to follow when developing and implementing a marine development strategy. The Third Plenary Session of the 18th CPC Central Committee clearly

stated that it is necessary to reform the ecological environmental protection management system and establish a regional linkage mechanism for ecosystem protection and pollution prevention and control. The "13th Five-Year Plan" outline once again puts forward "consistent with land and sea planning, development of marine economy, scientific development of marine resources, protection of marine ecological environment, maintenance of maritime rights and interests, and building of a maritime powerhouse", marking China's economic and social development from land to land. The strategic shift from the main to the land and sea has fundamentally broken the mindset of heavy and light seas. In May 2018, China implemented the government to reform, and the State Oceanic Administration and the Ministry of Land and Resources joined the newly established Ministry of Natural Resources. Its marine protection duties were placed under the newly established "ecology" with the environmental protection departments of other institutions. The Ministry of the Environment has cleared the mechanism barrier for the Land-Sea Coordination.

In the past few decades, China has exerted tremendous pressure on the offshore ecological environment in the development of marine resources and the concentrated development of coastal industries. In recent years, China has actively participated in international climate



and environmental governance. The land and sea have made solid efforts to promote the improvement of marine ecological environment, and have formed certain experiences that can be promoted in the construction of marine ecological civilization. In the marine ecological protection cooperation of countries along the line, the first priority is to broadly establish the ocean view of sustainable development of the blue economy and the integration of land and sea ecological civilization, and respect the phased and demand differences of marine environmental protection in various countries. Based on the United Nations Convention on the Law of the Sea, it will achieve full exchanges and cooperation with the marine environment of neighboring countries. China should actively use the existing projects and platforms for marine ecological environment under the multilateral cooperation mechanism, actively learn from the experience of marine ecological protection in developed marine countries, carry out various forms of cooperation in the marine environment, and coordinate the promotion of ecological construction and marine environment in the region. Protection; establish a sharing mechanism for marine environmental information with neighboring countries in Yellow Sea, and build a comprehensive marine catastrophe defense system along the line; rely on the Internet

to strengthen cooperation and docking of marine ecological databases and information, and improve the integration of marine environment based on ecosystems Management mechanism, strictly control the direct discharge of land-based pollutants into the ocean; increase the international exchange of coastal marine ecosystems such as coastal wetlands, coral reefs, estuaries, etc., try to build a network of transboundary marine ecological corridors and transboundary marine protected areas, and strengthen marine endangerment Species protection and pragmatic cooperation. Initiatives for the 21st Century Maritime Silk Road Blue Carbon Program to enhance the investigation and awareness of the oceans, safeguard global marine ecological security, reduce the impact of marine disasters, deepen cooperation in marine disaster prevention and mitigation, maritime search and rescue and law enforcement, and build a green and safe Blue partnership. "The country is in the hands of the people", building a mutually beneficial and win-win blue partnership, and civil exchanges and cooperation are the foundation. It is necessary to actively play the role of the platform under the UN, APEC, and other multilateral mechanisms to jointly plan and promote major projects. Based on the existing China-Korea Ocean Cooperation Center and other national marine cooperation centers, strengthen the

marine science and technology partnership of Yellow Sea countries. It is necessary to promote multi-level and wide-area exchanges with countries along the line in marine culture and education, and promote the country to provide environmentally friendly technical cooperation in deep-sea farming, ecological restoration, and promote cooperation in maritime affairs and vocational education. Encourage China and South Korea to conduct exchanges and cooperation in marine surveys, academic seminars and important projects to build a think tank alliance. Encourage non-governmental organizations in the surrounding countries of Yellow Sea to carry out various cultural and artistic exchanges such as the Ocean-themed film festival and the Ocean Culture Year, and jointly produce literary and artistic works and media propaganda that reflect multi-national culture and multilingualism along the route.

The most intense area of land-sea interaction is in the coastal zone. The coastal zone is one of the most viable parts of the close and complex material energy exchange process of the land and sea ecosystem. It is the most active interface between the land, ocean and atmosphere. It has high natural energy and biological productivity. Rich in diversity. The coastal zone has nearly a quarter of global primary productivity, providing about 90% of the world's catch. The

coastal zone is also an ecologically sensitive and vulnerable zone. The various types of human development activities in the coastal zone and the natural variability of global climate change will drive certain disturbances and impacts on the marine and terrestrial ecosystems, and may break the two. The balance between the systems. Once this ecosystem balance is destroyed, it is extremely difficult to recover. Only from the perspective of land and sea pooling can we effectively maintain and improve the ecological balance and environmental quality of the two systems. In the environmental protection of Yellow Sea, it is also necessary to focus on ecologically representative coastal zones.

- Implement the integrated management concept based on the ecosystem, and prepare and implement the coastal zone development plan for land and sea planning. Adhere to ecological priority, protection priority, land and sea coordination, fully respect the integrity, natural connectivity and regularity of both land and sea ecosystems in the coastal zone, and scientifically plan the coastal zone based on the resource and environmental carrying capacity of land and sea. Production, living, ecological spatial layout, and organic integration with the upstream river basin economic and social development and

ecological environmental protection planning, strictly adhere to the "natural resources utilization online", "ecological function guarantee baseline" and "environmental quality safety bottom line" of the land and sea ecosystem, coordination The relationship between land and sea areas, development and protection, and the promotion of ecological co-construction and environmental co-existence in coastal areas such as the Bohai Sea, the Yangtze River Delta and the Pearl River Delta, and the creation of ecological barriers, ecological corridors and ecological spaces linked by land and sea. . In particular, it is necessary to implement the "Measures for the Protection and Utilization of Coastline Protection", strengthen the classification protection and economical utilization of coastlines, and coordinate the environmental protection and conservation of resources in the coastal zone as a guide to achieve the unification of economic, social and ecological benefits. .

- Carry out joint control of watershed-sea pollution joint prevention and control to effectively improve the environmental quality of coastal waters. Adhere to the coordination of land and sea, rivers and seas, regional linkages, with the Yellow River estuary as the key area, the water quality target assessment

system for coastal waters and the total pollutant control system for key sea areas as the important starting point, to find out the river, sewage outlet, atmosphere Settlement, marine aquaculture, marine engineering sewage and other land and sea pollution sources, zoning assessment of offshore coastal environmental capacity and associated land pollution abatement costs, integration of coastal water quality improvement requirements into national water and gas pollution reduction and basin integration The overall strategic layout of governance will strengthen the supervision of land source and marine ecological environment, and implement the model of governing the sea, rivers, rivers and rivers.

- Implement marine ecological protection and restoration system engineering to effectively curb the trend of ecological destruction and degradation. Starting from the overall situation of ecological security, we will coordinate the construction and management of marine ecological protection areas, strengthen the spatial integration of marine protected areas and the convergence of protection objectives, and realize the coordinated protection of coastal areas, beaches, bays, seas and islands, and integrate them into the protection of local governments along Yellow Sea coast.

The district construction and development plan basically forms a network system of national and local marine protected areas. Plan the layout of major ecological restoration projects such as “Blue Bay” and “Ecological Island Reef”. Around the project construction, a number of landmark key construction projects will be established, and project reserve, demonstration and implementation will be done to effectively curb the ecological destruction and degradation trends of typical marine ecosystems. Actively promote new models such as “watershed-river-bay” comprehensive remediation and restoration, and promote land-sea linkage and coordination and cooperation across departments and administrative regions with regional ecological governance. Actively promote the "removal, repair, protection, increase" of high-quality shoreline recovery mode, strengthen the comprehensive remediation of the shore beach, expand the public shoreline of the shoreline, so that the people enjoy a real sense of acquisition.

- Promote joint prevention and control of coastal environmental disaster risks to protect public property and health and safety. Red tides such as red tides, green tides and jellyfish in the coastal waters of Yellow Sea frequently occur, posing a greater threat to

the health and safety of the public. It is necessary to strengthen the joint prevention and control of land and sea ecological disasters and environmental accident risks in coastal areas, investigate the risk sources and risk points of coastal environmental disasters, scientifically formulate disaster risk zoning, information sharing and emergency response systems, and effectively ensure the production safety of coastal zones. Ecological security, public property and health and safety.

- Improve the unified and coordinated policy system and form a complete and efficient coordination and linkage mechanism. Establish cross-departmental high-level decision-making mechanisms, give full play to the comprehensive coordination role of the marine administrative departments to ocean affairs, consolidate and stabilize the systems of all departments and regions, and form a policy synergy to ensure policies related to marine ecological environmental protection and The law is effectively enforced. Taking the implementation of the coastal zone development plan as an opportunity, we will establish and improve the supporting mechanism for land and sea planning and regional linkage; and take the guidance of the integrated management concept based on the ecosystem to further



rationalize the legal management and division of labor coordination mechanisms of various sea-related departments; Policy and institutional innovation, consolidate the long-term mechanism of capital and technical support for marine ecological environmental protection, environmental law enforcement linkage mechanism, social force participation mechanism, supervision and balance and feedback mechanism, assessment and assessment and accountability mechanism. After the reform of China's institutions, all provincial and municipal governments have set up marine offices, which are higher than the marine authorities and are responsible for coordinating relevant government departments.

- Strengthen the construction of monitoring and early warning system for sea-land synergy and implement the responsibility for marine ecological environmental protection. Guided by the overall requirements and objectives of Yellow Sea Eco-environment Monitoring Network, the marine eco-environment monitoring system and the terrestrial eco-environment monitoring system will be coordinated and integrated, and the relevant eco-environmental elements monitoring indicators and technical standards will be unified to promote data sharing and

establishment. Information sharing platform. In particular, it is necessary to strengthen the construction of a real-time online monitoring system for the national marine environment, realize the three-dimensional, dynamic and real-time monitoring of the pressure status of various human development activities and the process, scope and extent of impact on the marine ecological environment, and systematically develop the resources and environment of the coastal zone. The assessment and early warning of carrying capacity, marine ecological environment risk, etc., provide accurate supervision information for the implementation of marine ecological environmental protection responsibility, and provide decision support for the implementation of ecosystem-based adaptive management and dynamic management.

## **5. Establishing emergency response mechanism for marine ecological disasters in Yellow Sea**

China, South Korea are both close to Yellow Sea. Yellow Sea is located in the core area of the Northeast Asian regional economy, and its location advantage is obvious. It is of great strategic significance for the economic and social development of neighboring countries to play the advantages of Yellow Sea and build a harmonious Yellow Sea and a peaceful Yellow Sea. This paper is mainly aimed at the frequent occurrence of marine disasters in Yellow Sea, the lack of cooperation between countries in dealing with marine disasters, and only on how to establish an emergency response mechanism for Yellow Sea marine disasters in China and South Korea.

### **5.1 Major Marine Disasters and Problems in Yellow Sea**

Yellow Sea is one of the 64 large marine ecosystems in the world with an area of 400,000 km<sup>2</sup> and an average water depth of 44 m. Yellow Sea is located in the warm temperate zone. The seasonal variation of the climate is mainly affected by the Asian monsoon system. The winter is cold and dry, and the summer is warm and humid.

The biota belongs to the East Asia sub-region of the North Pacific Region. The biological group is mainly temperate and has a few tropical species. The circulation mainly consists of Yellow Sea warm current and Yellow Sea coastal current. The warm current flows northward, while the coastal current flows southward to form a cyclonic flow. The sea area is affected by the freshwater runoff from the river and the river, and has typical ecological characteristics such as estuary wetlands, bays and islands. . Yellow Sea is one of the important international golden waterways. It has many foggy days in summer, long duration, frequent winter winds and frequent sea collisions, which has become one of the important constraints to the economic development of the region. There are many types of marine disasters in Yellow Sea, mainly storm surges, tsunamis, red tides, oil spills, ship collisions, and canola. Its typhoon storm surge and red tide have a greater impact on the safety of life and property in neighboring countries. Since 1972, there have been 104 red tides in Yellow Sea, including 54 times of red tides between 2000 and 2007, and the frequency has increased significantly. The storm surges that occurred in Yellow Sea since 2007 have only caused significant economic losses to China's coastal areas. Due to the lack of coordination mechanisms in response to marine disasters in Yellow Sea countries, for a long time,

whether it is forecasting, prevention, rescue, and information exchange, they have remained in a separate situation.

## 5.2 Necessity and assumption of establishing emergency response mechanism for marine disasters in Yellow Sea of China and South Korea

China and South Korea are across the sea and are close to the Asian region. They are the two largest countries along Yellow Sea. With the rapid development of China-South Korea economic cooperation, South Korea has established a number of different types of industrial parks in China's coastal areas. The exchange of visits between the two heads of state has enhanced cooperation between the two countries in various fields and set off a new round of Sino-Korean cooperation. With the continuous warming of cooperation between the two countries and the development of economic cooperation in coastal areas, it is not only necessary and important to strengthen the emergency response mechanism for marine disasters between the two countries, but it should also be mentioned on the agenda.

## 5.3 Construction of emergency response mechanism

1. Establish a cooperative organization involving national and local marine administrative departments

(1) It is proposed to establish the China-Korea Yellow Sea Marine Disaster Emergency Response Cooperation Committee. The committee is led by the marine authorities of the two countries, led by the Chinese National Oceanic Administration, Shandong Province, Liaoning Province, Jiangsu Province, South Korea's Jingji Road, Zhongqing South Road, Jeollanam-do, Jeollabuk-do and the National Marine Administration. composition.

(2) Establishing the China-Korea Yellow Sea Marine Disaster Emergency Response Cooperation Office in China's National Oceanic Administration and relevant Korean authorities. The office is responsible for the cooperation committee, and each person in charge of the Chinese and South Korean parties serves as the director of the office, responsible for the daily work of the emergency response to Yellow Sea disaster.

2. Cooperation and exchange matters

Give full play to the role of the China-Korea Science and Technology Exchange Center and work closely with the Cooperation Office to explore and cooperate in the following five areas:

(1) Strengthen the cooperation between the two countries in the marine disaster monitoring and forecasting technology and scientific research in Yellow Sea, and continuously improve the marine disaster emergency response capability and scientific and technological level.

(2) In terms of oil spills, it is necessary to strengthen exchanges and collaborations with the International Shipowners Mutual Assurance Association and the International Oil Pollution Fund's monitoring and evaluation agencies to jointly study the oil spill disaster management involving lawyers, monitoring technology assessment agencies and administrative agencies. Mechanism and marine oil spill assessment mechanism provide a strong guarantee for the prevention and control of environmental pollution caused by oil spills in Yellow Sea.

(3) In the prevention and control of red tides, the two sides will strengthen cooperation and establish a monitoring and monitoring cooperation organization for Yellow Sea Red Tide, and form a joint defense joint action to achieve information sharing.

(4) Strengthen cooperation and exchanges. Establish an informal meeting and exchange system. Each year, the cooperation office of the two countries convene a consultation meeting to study the mechanism construction and corresponding countermeasures. An academic exchange meeting is held every two years to discuss disaster occurrence, prevention research and cooperation.

(5) Exploring the establishment of Yellow Sea Ocean Disaster Fund, which is funded by government and private donations, and is mainly used for disaster assessment, disaster research, marine disaster warning and prediction, and prevention and emergency response capacity building.

(6) It would be good to add China-Korea's joint conservation efforts for protected organisms



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