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Chapter 1 Introduction

1.1. Background

Global Programme of Action for the Marine Environment from Land-based Activities (GPA) is an international agreement developed and adopted by many sea-bordering countries and regions in the United Nations in Washington of USA in 1995. United Nations Environmentak Programme (UNEP) takes charge of GPA that calls for regional sea institutions and each member to develop their corresponding programme of action, i.e. Regional Programme of Action (RPA) and National Programme of Action (NPA), which aim to promote and take joint actions at national, regional and global levels to protect marine environment. In 2001, the First Intergovernmental Review Meeting of the GPA was held in Montreal, Canada. Up to the end of 2005, there were 78 sea-bordering countries, 15 seas, 11 UN affiliated institutions, 7 inter-governmen cooperation organizations and 29 non-governmental organizations joined GPA. Among them, 60 countries have developed or are formulating their own National Programme of Action.

At global action level, China is one of the members of GPA. At regional seas action level, China is a member of some regional programmes such as North-West Pacific Action Plan, the UNEP/GEF Project in the South China Sea and Gulf of Thailand and UNEP/GEF Yellow Large Marine Ecosystem Project. At national action level, in the light of the requirements of GPA and RPA, the Chinese Government is organizing relevant institutions to develop “China’s National Programme of Action for the Protection of Marine Environment from Land-based Activities (China NPA NPA)” in order to guide and promote marine environmental protection work across the country.

In fact, as early as in 2000, the Chinese Government approved the first programme of action for the protection of marine environment that focuses on the control of land-based pollution——“Clean Sea Programme of Action of the Bohai Sea”. This programme was implemented during the 10^{th} Five-Year Plan (2001-2005) for National Economic and Social Development period. At present, the clean sea programmes of action for major sea waters like the esturies of the Yangtze River and Pearl River are close to finish. Meanwhile, State Reform and Development Commission is organizing the development of the Overall Plan for the Protection of the Bohai Sea. The above plan and programmes are basic references for the development of China NPA.

In the White Paper "Environmental Protection in China" issued in 2006, the Chinese Government attaches importance to appropriate development and protection of marine resources and the prevention of marine pollution and ecological damage in order to facilitate sustainable development of marine economy. A series of policies, laws and regulations show that China adheres to the principle of focusing on both economic development and environmental protection. Each national department and local governments at all levels are implementing relevant plan and programme of action with the basic principle same as the environmental idea of "Hilltop-2-Oceans (H_2O)" advocated by GPA.

According to the function division of the Chinese Government, the following government departments are involved in GPA activities: SEPA, Ministry of Communications, Ministry of Agriculture, Ministry of Construction, Ministry of Water Resources, Ministry of Land and Resources, State Oceanic Administration, State Forestry Administration, National Tourisism Administration, and the Environmental Protection and Afforestation Commision of People's Liberation Army of China etc..

According to the zoning of administrative regions of China, China NPA involves 11 coastal provinces (autonomous region or municipality under the State Council) including Liaoning Province, Hebei Province, Tianjin, Shandong Province, Jiangsu Province, Shanghai, Zhejiang Province, Fujian Province, Guangdong Province, Guangxi Zhuang Autonomous Region and Hainan Province. At present, Taiwan Province, Hong Kong Special Administartive Region and Macao Special Administration are temporarily not included in the current NPA.

1.2. Preparation of China for NPA

UNEP pays close attention to the development work of China NPA. After the First Inter-governmental Review Meeting, UNEP/GPA Secretariat has many negotiations with SEPA and supported the holding of the first workshop on China NPA in Qingdao, China in January, 2004.

In 2005 and 2006, four working meetings were held in Changdao, Zhanjiang, Beijing and Xining respectively with the participants coming sea-related government departments and representatives of sea-bordering provinces (municipality or autonomous region). These meetings had further discussions on the activities for

preparing China NPA. In 2006, 10 sea-related government departments and 11 provences established a leading group to guide the work on China NPA and made the arrangements for the preparation of the Second Inter-governmental Review Meeting of GPA held in Beijing, China.

At present, the formulation of China NPA goes smoothly and the Report of China on NPA Current Status, report of sea-related department and the reports of coastal province (municipality or autonomous region) have been completed. It is expected that China NPA will be completed within the next 12 months.

1.3. Compilation of China NPA

In order to prepare for the Second Inter-governmental Review Meeting of GPA, the Chinese Government has developed National Report on NPA Work (the current Report) and is going to submit it to the Meeting. SEPA takes charge of the organization and coordination work for the compilation of the current report. Nine GPA related government departments and local EPA of 11 coastal provinces (municipality or autonomous region) take part in the compilation work. Chinese Research Academy of Environemntal Sciences is in charge of technical support. At present, relevant authorities have developed local work reports at province and city levels, sectoral work report and National Work Report.

1.4. Main Contents of the National Work Report

The current report is a basic technical document for the compilation of China NPA in the near future with the following main contents:

1. Basic situation of each sea of China;
2. Impacts of major land-based activities on marine environment:
3. Current major actions on protecting marine environment;
4. National plan for the promotion of protecting marine environment;
5. Developmnet of the policies and regulations on marine environmental protection and management system;
6. Scientific research and international cooperation;
7. Relevant issues and recommendations

Chapter 2 Basic Situation of Each Sea

2.1. Introduction of Seas of China

Coastal seas of China include four seas, they are the Bohai Sea, Yellow Sea, East China Sea and South China Sea. The Bohai Sea is the internal sea of China. The east end and south end of mainland link to the Yellow Sea, East China Sea and South China Sea. Taiwan Province borders on the Pacific Ocean in the east. China has over 18,000 km continent coastal line and more than 14,000 km of island coastline. There are more than 6,500 islands with the area over 500 m^2 and their accumulated area is about 80,000 km^2.

According to the zoning principle of physical geography of China, the coastal areas of the Bohai Sea cover Tianjin and part of Liaoning Province, Hebei Province and Shandong Province; the coastal areas of the Yellow Sea include part of Shandong Province and Jiangsu Province; the coastal areas of the East China Sea cover Shanghai and part of Zhejiang Province and Fujian Provinc. the coastal areas of the South China Sea include the whole Hainan Province and parts of Guangdong Province and Guangxi Province.

2.2. Sea Natural Environment

2.2.1. Physical Geography

The topography of the seas of China presents the feature of high terrace in the west bordering the land and gradual slope down to the east where it is the deep ocean. Generally speaking, the coastal landscope of mainland China is like this: south to Hangzhou Gulf is dominated by hills and south to the gulf dominated by plain coast. According to the geomorphology classification of coast, they mainly include five categories, i.e. rock bank, gravel bank, silt bank, coral reef bank and mangroves bank.

The coastline of China enjoys a big span of latitude from the north to the south with diversified topography, leading to evidently different and various coastal climates in the south and north. The annual average temperature of coastal regions varies from 8.5□ (Dandong) to 25.5□ (Sanya) from the north to the south. The annual average precipitation of coastal areas is 60076 m^3 and the precipitation of coastal river basins accounts for 35.8% of the total in mainland China.

China has about 1,500 rivers flowing into sea, which bring large amount of fresh water and silt. Nearly 1,600 billion m^3 of water flow into sea each year. The Yangtze River and Pearl River rank the first and second in terms of outflow amount, accounting for 57% and 14% respectively. The Yellow River accounts for about 3% of the total flow to the sea. The East China Sea is the one with most inflowing fresh water, accounting for about 70%, the South China Sea ranks the second accounting for about 5% and the Yellow Sea ranks the last with 3%. A total of about 1.75 billion tons of silt and sand flows into seas each year. Among them, the Yellow River and Yangtze River dominate the amount by 61% and 26.8% respectively.

2.2.2. Coastal Sea Ecological System

China has a variety of coastal ecological systems. The typical types include estury, gulf, beach wetland, mangroves, reef and island. China is at the north edge of main distribution of mangrove areas of the West Pacific Ocean, which is mainly located along the coasts of Hainan Province to Zhejiang Province. There is natural distribution of disconnected mangroves in north coast of Taiwan Province. There are a total of 26 species of real mangroves in China, accounting for 43% of world total; 11 species of semi-mangrove plants and 19 species of associated plants. The existing area of mangroves in China is less than 50% of the historical record.

There are over 200 kinds of reef corals in coastal sea waters of China, accounting for one third of world total. In the coast of Hainan Province and Taiwan Island, bank reefs dominate. In Dongsha Island, Xisha Islands and Nansha Islands, ring reefs dominate. Guangdong, Guangxi, Hong Kong, north Taiwan and south Fujian have the distribution of reef corals, too. But the reef grows poorly.

There is a wide distribution of seashore wetlands in coastal areas of China. According to census on national wetland resources, the total seashore area is 59,400 km^2, accounting for 15.4% of the total wetland area of China. Besides mangroves and coral reefs, it also includes 10 other types of wetlands, they are maily rock bank, tidal sand & gravel beach, tidal silt beach and tidal sea-water marsh.

Subject to the influence of the special location, geology and topography conditions, diversified gulf ecological systems with unique features have been developed in coastal areas of China. For example, the Liaodong Gulf, Bohai Gulf and Laizhou Gulf of the Bohai Sea; Dalian Gulf, Jiaozhou Gulf and Haizhou Gulf of the Yellow Sea; Hangzhou Gulf of the East China Sea and Beibu Gulf of the South China Sea. They possess various and different environmental features and biological communities.

Right now, there are 29 national marine protected areas in China with a total area of about 25,000 km^2. Among them, 7 are administrated by SEPA, 10 by State Oceanic Administartion, 3 by Ministry of Agriculture and 9 by State Forestry Administartion. In addition, 8 special marine protected areas have been established. The protected targets include from rare and endangered sea biological species like branchiostomid, dugong, harbour seal, Chinese white dolphin, sea turtle, esculent swift，to typical marine ecological systems like mangroves, coral reef, coastal wetland, estury, gulf, island and lagoon as well as various valuable marine resources including marine scenary, geomorphology, natural and historic heritages.

2.3. Social and Economic Situation of Coastal Areas

From the north to the south, sea-bordering provinces (municipality or autonomous region) in mainland China are Liaoning, Hebei, Tianjin, Shandong, Jiangsu, Zhejiang, Shanghai, Fujian, Guangxi, Guangdong, Hainan, Taiwan, Hong Kong Special Administartive Region and Macao Special Administartive Region.

Besides Taiwan, Hong Kong and Macao, China has 11 sea-bordering provinces (municipality or autonomous region), 53 sea-bordering prefecture administrative regions and 125 sea-bordering county (city) level administrative regions.The total land area of the 11 sea-bordering provinces (municipality) is 1.247 million km^2, accounting for 13.0% of total land area.

The statistics of 2004 showed that the population of the 11 provinces (municipality) is 522.56 million, accounting for 40.2% of the total. Total GDP reached 9454.1 billion yuan RMB, taking up 69.1% of the total. According to the statistics of the 53 coastal prefecture administrative regions, the total population is 222.73 million. Its GDP reaches 6522.9 billion yuan RMB, accounting for 42.6% and 68.8% respectively of the total.

2.4. Marine Economic Situation

In 2005, the total output of major marine industries of mainland China reached 1698.7 billion yuan with added value of 720.2 billion yuan, taking of 4.0% of total GDP of China at the same time, 0.6 percentage point higher than in 2001. Among them, the added value was 120.6 billion yuan for the primary marine industry, 223.2 billion yuan for the secondary industry and 376.4 billion yuan for the tertiary marine industry.

Marine economy has made increasingly big contributions to economic growth of China, particularly to that of coastal regions.

From the perspective of industrial structure, service-based marine economy enjoys a rapid development. There has been a shift of marine economic field from "resource development" to "marine service". In 2005, the proportion of the primary, secondary and tertiary marine industries of China was 17□31□52. Among them, the tertiary industry took up 52%, up by 6% than in 2001, indicating increasing optimization of industrial structure. Among them, the output of coastal tourist industry ranks the first among all marine industries and becomes the pillar of marine service industries.

2.5. Zoning of Coastal Sea Environmental Function Areas and Marine Function Areas

2.5.1. Coastal Sea Environmental Function and Environmental Quality Objectives

According to national economic and social development plan and the requirements for conserving natural resources and protecting marine environment, coastal regions of China have been divided into four different kinds of environmental function areas with corresponding water quality standards, they are:

1. sea fishery waters, marine nature reserves and the protected areas for rare and endangered marine species are identified as Class I environmental function areas that should meet Grade I national marine water quality standard;
2. aquaculture area, sea bath, sea sports or entertainment areas where people have direct exposure to sea water as well as industrial water in direct relation to huam food are Class II environmental function areas that should meet no lower than Grade II national marine water quality standard;
3. general industrial water areas and costal scenic spots are Class III environmental function areas that should meet no lower than Grade III national marine water quality standard;
4. waters such as port area and marine development areas are Class IV environmental function areas that should meet no lower than Grade IV national marine water quality standard.

There are a total of 651 coastal environmental function areas in coastal seas across China. Among them, 80 fall into Class I, 268 Class II, 73 Class III and 230 Class IV.

2.5.2. Zoning of Marine Function Areas

Zoning of marine function areas aims at establishing a good order for marine development activities in line with marine function zoning, realizing appropriate development and sustained utilization of marine resources and meeting the requirements for national economic and social development. The main contents of sea function zoning are: 1) identifying sea waters function in a scientific way in the light of such physical factors as the location, natural resources and physical environment; 2) making an overall plan of each relevant sector for the utilization of marine resources in the light of the requirements for economic and social development; and 3) protecting and improving ecological environment, ensuring appropriate utilization of sea resources and promoting the development of marine economy.

The sea areas under the jurisdiction of China classified into 10 kinds of Grade I marine function areas such as port navigation area, fishery resource utilization and maintenance area, mineral resource development area, tourist area, sea water resources utilization area, marine function utilization area, project utilization area, marine natural reserves, special utilization area and reserve area as well as 33 Grade II marine function areas.

2.6. Sea Area Environmental Quality

1. Sea Water Quality

In 2005, the quality of most coastal sea water across China was good with serious pollution of some sea waters. The quality of distant sea water kept good. A total of 67.2% of coastal sea water meeting Grade I and II national marine quality standard, up by 17.6 percentage points than in last year; 8.9% meeting Grade III standard, down by 6.5 percentage points; 23.9% meeting or inferior to Grade IV standard, down by 11.1 percentage points. (See Figure 2-1 and Figure 2-2).

In 2005, among the four big seas of China, the overall marine water quality of the Yellow Sea and South China Sea was good, sea water quality of Bohai Sea was relatively good，but the quality of the East China Sea is poor (See Figure 2-3). Compared with last year, the quality of the water of the four big seas had some improvement at different degree.

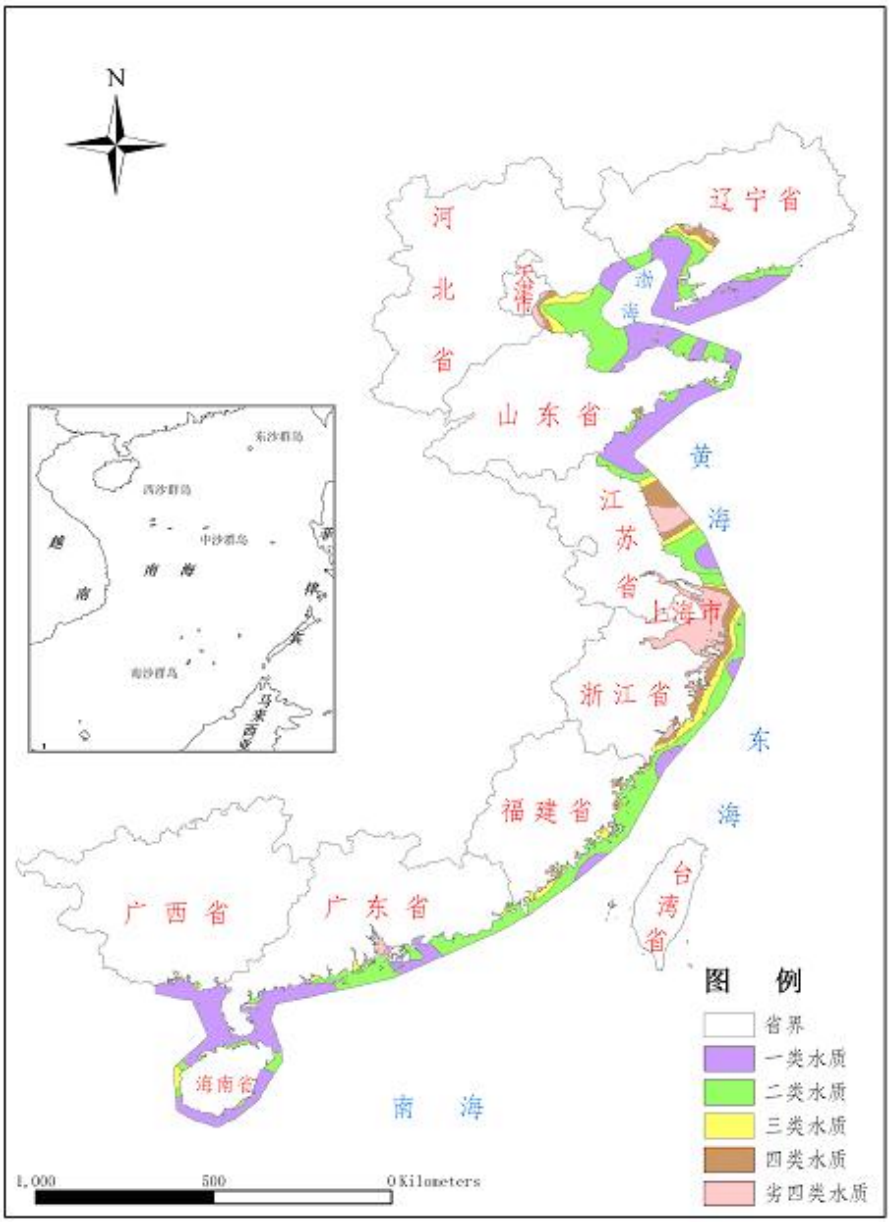


Figure 2-1 Map of coastal sea water quality in China in 2005

省名: 辽宁 Liaoning, 河北 Hebei, 天津 Tianjian, 山东 Shandong, 江苏 Jiangsu, 上海 Shanghai, 浙江 Zhejiang, 福建 Fujian, 台湾 Taiwan, 广东 Guangdong, 广西 Guangxi, 海南 Hainan,

渤海 Bohai Sea, 黄海 Yellow Sea, 东海 East China Sea, 南海 South China Sea

图例 Legend, 省界 Province Boundary, 一类水质 Grade I 二类水质 Grade II 三类水质 Grade III 四类水质 Grade IV 劣四类水质 >Grade IV

东沙群岛 Dongsha Islands 西沙群岛 Xisha Islands 中沙群岛 Zhongsha Islands 南沙群岛 Nansha Islands

越南 Viat Nam 菲律宾 Fillipines 马来西亚 Malaysya

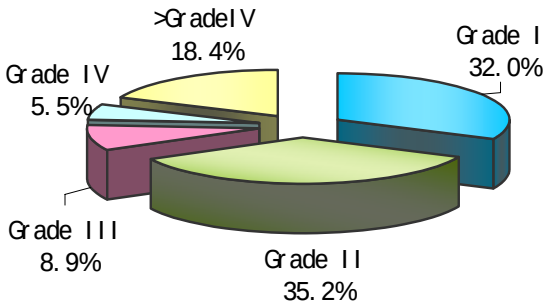
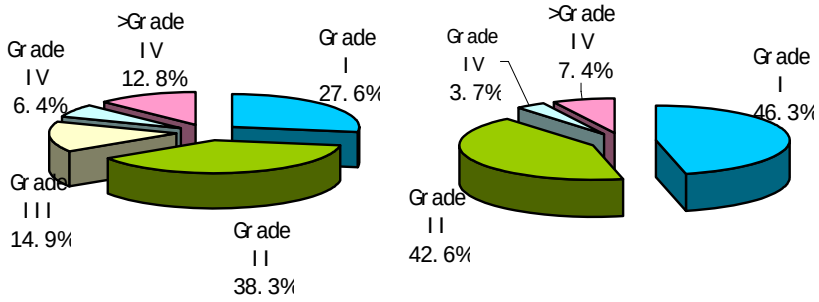
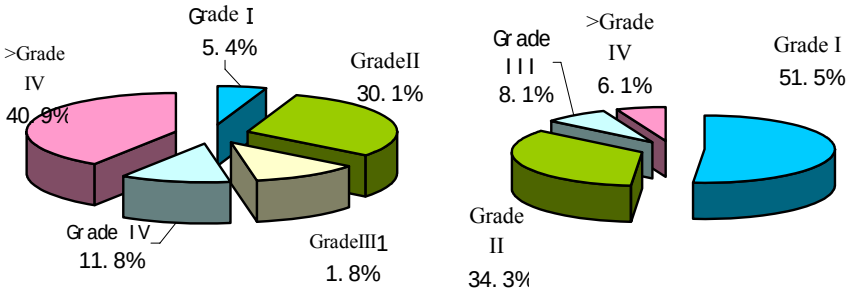


Figure 2-2 Proportion of different grade of coastal sea water quality in 2005



（a）Water quality of the Bohai Sea （b）Water quality of the Yellow Sea



（c）Water quality of the East China Sea （d）Water quality of the South China Sea

Figure 2-3 The water quality of the four big seas

In 2005, among the coastal province, autonomous region and municipality under the State Council across China, the quality of coastal sea water of Hainan, Guangxi, Shandong and Guangdong was relatively good. But the quality of sea water of Shanghai and Zhejiang was relatively poor (See Figure 2-4).

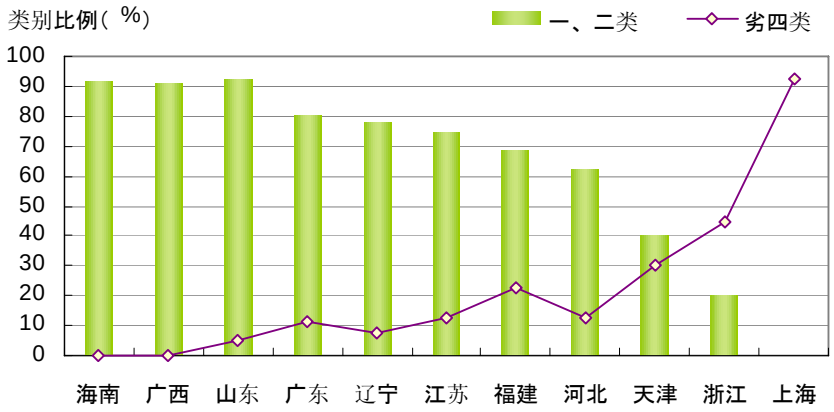


Figure 2-4 Proportion of different quality sea water of coastal province, autonomous region and municipality in 2005

(类别比例 Grade percentage； Hainan, Guangxi, Shandong, Guangdong Liaoning, Jiangsu, Fujian, Hebei, Tianjin, Zhejiang, Shanghai)

2. Major pollutants

In 2005, major pollutants affecting the quality of coastal sea water were still inorganic nitrogen and active phosphate. In certain sea area, the levels of COD, dissolved oxygen, petroleum, pH, lead, copper and non-ionic ammonia exceeded the standards.

Among them, inorganic nitrogen and active phosphates exist in major pollutants of the waters of the four big seas of China. Except the Yellow Sea, lead concentration of other seas exceeded national quality standard but with slight margin. In addition, the coastal waters of the four big seas were subject to the impact of petroleum. In the Yellow Sea, petroleum concentration exceeded national marine water quality standard by 8.0%.

3. Red tide

In 2005, a total of 82 red tides occurred across all seas of China, down by about 15% than in last year. The accumulated area was about 27,070 km^2, basically the same as in last year. However, both the occurance and affected area of red tide with toxic algae had a dramatic increase. Large-scale red tides concentrated on the sea waters of mid Zhejiang Province, estury of the Yangtze River, Bohai Gulf and Haizhou Gulf.

Red tide monitoring region would continue playing its role. A total of 42 red tides were monitored in the region with accumulated area of nearly 15,420 km^2,

accounting for 51% accumulated occurrence and 57% total area respectively of the total affected seas. The East China Sea is still the sea area with many occurrences of red tides.

Red tides mainly affect coastal fish and seaweed aquaculture. The direct economic loss resulting from red tides exceeded 69 million yuan.

4. Major sea pollution accidents

According to statistics, there were 115 pollution accidents in coastal areas of China caused by various kinds of ship in 2005. Among them, three oil or chemical pollution accidents were caused by ship with capacity larger than 50 tons. The ship pollution situation basially kept the same during the Tenth Five-Year Plan period. The authority has evidently improved its capacity in emergency response to pollution accidents.

In addition, there were 91 pollution accidents in marine fishery waters across China in 2005 affecting about 47,000 hectares with direct economic loss of about 400 million yuan. Among them, 5 were very big fishery pollution accidents (with economic loss more than 10 million yuan). Compared with that of 2004, the occurrence of pollution accidents had some increase but with less direct economic loss.

Chapter 3 Impacts of Major Land-based Activities on Marine Environment

3.1. Economic and Social Development of Coastal Cities and Towns

3.1.1. Discharge of Urban Pollutants

The total population of coastal prefectures, cities and counties is about 222.73 million. According to 2005 statistics, urban water-consuming population was 101.33 million. A total of 16.9 billion m^3 water was supplied with sewage release of 11.6 billion m^3.

Besides coastal cities, a significant proportion of pollutants of inland cities were discharged into seas via rivers. In 2005, a total of 31.7 billion tons of land-based wastewater was discharged into seas, that is, about 60% of total wastewater of China flew to seas. Various kinds of major pollutants flowing into sea were 9.54 million tons of COD, 500,000 tons of ammonia nitrogen, 30,000 tons of phosphate, 4.27 million tons of suspension materials, 80,000 tons of BOD, 120,000 tons of petroleum, 20,000 tons of heavt metals, 800 tons of cyanide and 70,000 tons of sulphides and chlorides as well as other pollutants.

3.1.2. Direct Discharge Outlets of Coastal Areas

According to the investigation on polluant discharge outlets of coastal regions and environmental management in 2004, there were 643 pollutant direct discharge outlets in coastal regions across the country. Among them, 285 were the outlets for industrial pollutant sources, 151 were urban sewage outlets, 87 were urban comprehensive sewage discharge outlets and 120 sewage rivers (ditches or channels).

In 2004, a total of 22.4 tons of wastewater were discharged into seas through those direct outlets. The amount of major pollutants flowing into seas were 960,000 tons of COD, 9,513 tons of petroleum, 95,000 tons of ammonia nitrogen, 0.05 ton of cyanide, 74 tons of arsenic, 1.2 ton of mercury, 162 tons of sexavalence chromium, 108 tons of lead, 6.2 tons of Cd, 140,000 tons of total nitrogen and 13,000 tons of total phosphorus.

3.2. Agriculture Production Activities

The total output of agriculture, forestry, husbandry and fisgery industries of China reached 3623.9 billion yuan RMB in 2004. China has the arable land area of 130.0392 million hectares with the application of fertilizers of 46.366 millions. Among them, 22.219 million tons were nitrogen fertilizers, 7.36 million tons phosphorus fertilizers, 4.673 million potassium fertilizers and 12.04 million compound fertilizers. The total amount of livestock on hand was 157.378 million. The total amount of full-grown meat pigs for sale was 618.007 million. While the total amount animals on hand was 481.891 million for meat pigs and 366.391 million for sheep at the end of the year.

Major impacts of agriculture production activities on the environment are mainly the non-point pollution resulting from such factors as field runoff (the loss of fertilizers and pesticides), water and soil erosion, domestic sewage and garbage in rural areas and the contamination by livestock and fowl farming. The generation of agricultural pollutants has a close relationship with precipitation. Nitrogen, phosphorus, pesticides and other organic and nonorganic substance enter rivers, lakes and seas through runoff or seepage during the precipitation period. In addition, the nitrogen- and phosphorus-containing leachate from the scattered domestic garbage piles and animal dung and urine flow into waters during the wet season, leading to water pollution.

The impacts of agriculture production activities also include the pollution of sea aquaculture. The main pollution sources come from the organic pollutants such as the excrement of the aquatic fish, shimp and crabs, residue bait and shell excrement. Compared with agricultural or other land-based pollution sources, the share rate of sea aquaculture pollution is quite low. Sea aquaculture modes in China are dominated by high-concentration aquaculture, which mainly locate at tidal areas and gulf waters of shallow sea where water exchange capacity is poor. Therefore, the impact of such activities on the environmental quality of some sea waters should not be ignored.

3.3. Sea Transportation

3.3.1. Pollutants Discharged by Ships

Pollutants discharged from ships mainly include the pollutants from various operations of ships which include petroleum, toxic liquids, ship sewage and garbage, etc. The waste water discharged by ships are mainly in the form of oil-containing water in the bottom of ship engine room, ballast water of oil ship, cleaning water from

oil ship cabins, toxic-liquid-contaning cabin cleaning water and ballast and ship sewage. Ship garbage is classified into domestic garbage and operation garbage, which mainly include solid waste such as food residue, empty tins, bottles and plastic food packaging bags as well as liquid waste including waste oil and greasy filth.

3.3.2. Pollutants of Shipyard and Dock

There are presently more than 700 ship repairing enterprises in China. They not only meet the requirements for repairing various domestic transportation ships, engineering ship, port working ships, military ships and marine oil drilling platforms, but also undertake the repair work for nearly 1,000 foreign ships each year. There are nearly 200 ship dismantling enterprises in China with the import of 1.7 million tons of waste ship steel each year.

Major pollution sources from repair and dismantling operations of ship plants or docks are mainly oil-containing cabin cleaning water, residue oil and greasy filth in oil cabins, as well as various kinds of garbage, waste and other hazardous substances from operations.

3.3.3. Sea Accidents

Sea oil spill accidents are one of the important sources of pollution. According to statistics, there were as many as 14,900 sea transportation accidents in China in the last 10 years of the 20th century with 3,107 ships sank, 6,084 dead and 1.9 billion yuan of direct economic losses. From 1976 to 2000, there were 2,353 oil spill accidents from ships, big or small, in coastal waters of China with one accident in every 3.5 days on the average. Among them, 53 were major accidents had spilled oil over 50 tons with total spill of 29,754 tons. Though the Chinese Government has continuously enhanced the management on marine safety, the risk of ship oil spill accidents is still relatively high now.

3.4. Sea Waste Dumping and Pollution Discharge of Offshore Oil Fields

In 2005, there were 98 sea dumping sites across China, 78 were in actual operation with 192.76 million m^3 of dumped dredge waste, up by 31.5% than in 2004. There were 39 off-shore oil fields across China. About 90.36 million tons of oil-containing wastewater was discharged into sea in the whole year, 58,763 tons of drilling mud was discharged into sea and that of drilling scraps were about 24,658 tons.

3.5. Coastal Land Resource Development Activities

Coastal belts are important buffer belt for sea-land interaction and also important purification belt for the transportation of land-based pollutants to seas. Inappropriate land development activities of coastal areas will directly lead to the degradation of ecological environment and affect marine environment. Recently, with rapid social and economic development of coastal regions, land resources of coastal regions are under big pressure. Because of high-intensity development of coastal land resources, the coastal areas with relatively high ecological value gradually devrease and the overall ecological quality is on the decline. As a result, the buffer and purification functions of coastal belts for the protection of marine environment are also decreasing.

3.6. Coastal Military Activities

Major activities in coastal military areas affecting marine environment include such activities as everyday life of serviceman; medical and health ensurance; the use, maintenance, repair and test of military equipment like military ships; the construction, use and maintenance of military facilities in the camps as well as the activities like military training and exercise.

Sewage, domestic garbage, medical waste water and solid waste mainly come from daily life of servicemen and logistic activities. Among them, about 48% of domestic sewage have been treated or get access to municipal drainage network. About 40% domestic garbage has been treated or disposed by urban garbage treatment system.

Military equipment like military ships generates such pollutants as oil-containing waste water, special waste water and solid waste. Among them, oil-containing waste water mainly includes three types, i.e. engine room water, ballast water and cabin cleaning water. It has complex composition with big difference in oil concentration. Military waste water includes oil-containing waste water, acid or alkaline waste water, battery lead-containing waste water, propellant waste water, and radioactive waste water, etc. Military solid wastes are certain amount of special waste resulting from the process of military training, tests, maintenance and repair of the equipment of the military units of coastal regions. Due to the factors such as treatment technology or limited fund, most military solid wastes have undergone only simple treatment or directly piled up or buried within the camps, imposing potential threats to the quality of marine environment.

Chapter 4 Major Existing Actions for the Protection of Marine Environment

4.1. Implemente Up-to-the-standard Control over Industrial Pollution Sources

China has implemented the up-to-the-standard control over industrial pollution sources and launched the pollution discharge registration work in an all-round way. It has set up a dynamic registration database, established the online monitoring system on major pollution sources, strengthened the supervision and inspection of major pollution sources and has expanded the pollution discharge permit system in an active and steady way. Presently, it is making concentrated efforts on the formulation of the environmental bearing capacity of major watersheds and various types of environmental functional zones in cities based on which the plan and targets concerning pollutants reduction shall be set out and such pollutants reduction tasks will be allocated to major pollution sources by the practice of pollution discharge permit. Besides, it has vigorously promoted the implementation of the *Law on the Promotion of Clean Production* and carried out the examination of clean production; encouraged public participation, gradually set up the system for making the environmental practice of enterprises open to the public, established the mechanism for public participation, urged enterprises to speed up their pollution treatment work; teamed up with relevant departments in the drafting of related preferential policies encouraging the recycling and reuse of wastes as well the export of products from environmental protection up-to-the-standard enterprises; further enhanced the certification of ISO14000 environmental management system as well as the environmental management level and competitiveness of industrial zones and enterprises.

Statistics have shown that with the implementation of various control measures, a total of 13,330 industrial pollution projects had been accomplished nationwide in 2005 with overall investment of 13.37 billion yuan in wastewater treatment. The total discharge amount of industrial effluent across the country stood at 24.31 billion m^3 with the up-to-the-standard discharge rate of 91.2%, among which the rate of major

enterprises was 92.8% while non-major enterprises was 80.6%. Compared with that of 2001, the up-to-the-standard level of industrial effluent raised by 5.6 percentage points.

4.2. Promote the Treatment of Urban Sewage and Refuse

The improvement of environmental protection infrastructure serves as a crucial link in the fulfillment of effective treatment and reduction of land-based pollutants as well as the control of their total amount entering the sea. China has paid great attention to the construction of wastewater treatment plants and urban landfill facilities in coastal cities by further improving the franchised operation system and related economic policies on municipal public utilities, amplifying the wastewater treatment levying system, optimizing the distribution of wastewater treatment facilities, vigorously promoting the utilization of reclaimed water, facilitating the reduce, reuse and recycle of urban domestic refuse and enhancing the supervision over the construction and operation of urban wastewater and refuse treatment facilities based on the perfection of supporting facilities for projects and the improvement of their treatment efficiencies.

1. The decontamination treatment of refuse in coastal cities and counties

By the end of 2005, 53 prefecture-level administrative districts in the coastal regions have already built 88 environment-friendly landfill facilities with the decontamination treatment capacity of 58,373 tons/day and the annual treatment capacity of 22.04 million tons.

2. The construction of wastewater treatment plants in coastal cities and counties

By the end of 2005, a total of 342 urban wastewater treatment plants have been completed or been under construction in the prefecture-level and county or city-level administrative districts in coastal regions, among which 197 plants were established with the daily capacity of 21.86 million m^3. The actual treatment amount was 17.1 million m^3/day and the rate of operation load was 78%. 145 plants were under construction with the designed capacity of 8.02 million m^3/day. Among them,

A. The construction of wastewater treatment plant in 53 prefecture-level cities in the coastal regions

In 2005, a total of 167 urban wastewater treatment plants have completed

construction in 53 prefecture-level cities in the coastal regions with the daily capacity of 20.82 million m^3, the actual treatment amount was 16.33 million m^3/day and the rate of operation load up to 78%。In addition, 98 plants were under construction with the designed capacity of 6.4 million m^3/day. Only two cities haven't initiated the construction of wastewater treatment plant.

B. The construction of wastewater treatment plant in 59 county-level cities in the coastal regions

In 2005, altogether 23 urban wastewater treatment plants (including the ones in some industrial parks) have completed construction in 59 county-level cities in the coastal regions with the designed daily capacity of 820,000 m^3, the actual treatment amount was 650 ,000 m^3/day and the average rate of operation load up to 79%。In addition, 28 plants were under construction with the designed capacity of 1.11 million m^3/day. 20 cities haven't yet initiated the construction work of wastewater treatment plant.

C. The construction of wastewater treatment plant in 66 counties in the coastal regions

Among all 66 counties under the statistics, 7 have already completed the construction of urban wastewater treatment plants with total capacity of 220,000 m^3/day and the actual treatment amount of 120,000 m^3/day. Besides, 19 treatment projects were underway in 16 counties with the designed capacity of 510,000 m^3/day.

During the 10th "Five-Year" Plan period, the amount of wastewater treatment plants as well as their capacity in the coastal cities of China increased year by year. The amount of secondary wastewater treatment plants in coastal cities (excluding coastal counties) soared from 73 in 2000 to 202 in 2005, almost three times the previous amount. The capacity of secondary wastewater treatment plants also grew by almost two times, from 5.63 million m3/day in 2000 to 16.23 million m3/day in 2005. The actual annual treatment amount amounted to 6.16864 billion m3 with wastewater treatment rate standing at 56%, slightly higher than the national average of 52%.

4.3. Prevention of Agricultural Non-point Pollution

By sticking to the principle of laying equal emphasis on both pollution prevention and ecological conservation, the authority is taking great efforts in speeding up the

ecological conservation and development and reducing the environmental impact of agricultural activities in different areas coupled with the work of the establishment of ecological province (city) of each region and the national agricultural geological environmental survey. The major activities are as follows:

1. Focusing on the popularization of ecological agriculture at the county (district) level, vigorously constructing ecological agricultural demonstrational zones, promoting the improvement of soil structure, making rational use of fertilizer and pesticides. The coastal areas need to control such non-ecologically-friendly development activities such as the cultivation of wasteland in coast areas.

2. Intensifying the management over the rational use of pesticides and fertilizers. Currently, the Bohai Sea area is performing the application of fertilizer based on soil examination and ecological prevention and control work. In addition, monitoring and management work are arranged in key agricultural counties (districts) to tighten the application of pesticides and fertilizers and clarify the control targets and tasks.

3. Speeding up the treatment and comprehensive use of wastes produced by livestock and poultry breeding. For example, China is presently exercising the treatment of wastewater discharged by the centralized livestock and poultry farms in the Bohai Sea area in line with related standard on discharged pollutants from livestock and poultry breeding industry.

4. Carrying out agricultural geological environmental survey project. From 1999 to 2006, the Ministry of Land and Resources have conducted overall assessment to the agricultural geological eco-environment in such key areas as the economic belts along the Yangtze River and the Yellow River, the economic belts along the coastal regions and that in Northeast China. The survey has provided lots of information to the assessment of soil environmental quality and the control of agricultural non-point pollution and stimulated the development of modern agriculture in China.

4.4. Control of Water and Soil Erosion and Watershed Ecological Development

In order to heighten watershed eco-construction, prevent water and soil erosion and

lessen the pollution of major rivers and deltas and wetlands in estuaries from human activities, the authority has organized and implemented a group of projects including six major forestry eco-construction projects, key state-level water and soil conservation project, the project of grain for green, water & soil conservation and ecological rehabilitation project. In specific, the six major forestry eco-construction projects include the natural forest resource conservation project, the project of grain for green, wind and flowing sand sources treatment project in Beijing and Tianjin, the project for the construction of the shelter belt system in the "Three north" areas as well as in the watersheds of the Yangtze River, the construction project of wildlife conservation zones and nature reserves and the construction project of quick-growing and high-yield forest bases in key regions.

The amount of key state-level water and soil conservation projects during the 10th Five-Year Plan period grew from 7 in the previous "Five-Year" Plan period to 11, and counties (cities and districts) conducting key state-level water and soil conservation projects nationwide was more than 700, up by more than 120 than in the 9th Five-Year Plan period. A total of 540,000 km^2 of land have undergone comprehensive prevention and control of water and soil erosion across the country, and the rate for such treatment more than doubled that of the 9th Five-Year Plan period. By the end of 2005, the conserved area of land nationwide undergoing comprehensive prevention and control of water and soil erosion had accumulated 920,000 km^2, a net growth of 90,000 km^2 than that of the end of the 9th Five-Year Plan period.

During the 10th Five-Year Plan period, a total of 8.67 million ha of farmland were converted back into forest, and 190 million of pasture were converted into grassland. 198 counties in 29 provinces across the country had carried out the pilot operation of water and soil conservation and ecological rehabilitation project successively, the preventive conservation project in the "Waterhead of the three major rivers" was initiated, and all the areas covered by the key state-level water and soil conservation projects have fully accomplished protection through hillside closing and afforestation. Furthermore, 136 prefectures (cities) and 697 counties in 20 provinces have issued relevant policies on closing hillsides and grazing ban, and over 1,000 counties have employed measures for such purpose covering a area of more than 600,000 km^2, among which the ecosystem of more than 300,000 km^2 of land have been preliminarily recovered.

4.5. Control over Pollution Sources of Ships and Harbors

4.5.1. Control of Oil Substances

All harbors in the coastal areas must be equipped with recycling equipment such as petroleum-containing wastewater collection vessels, and port areas are prohibited of discharging oil-bearing wastewater. Instead, the oil-bearing wastewater from the bottom of the engine room, cleaning water from cabins of oil tankers and oil-bearing ballast water should all be discharged into special collection facilities of the harbors. Starting from June 1, 2003, all types of ships (excluding ships for military use and fishing) sailing, anchoring or under operation over a month within the sea area of the Bohai Sea are prohibited from direct discharge of oil-bearing wastewater into the water body within the Bohai Sea area, and all related pollution discharging facilities must be sealed with lead.

4.5.2. Control of Toxic Liquid

China is currently implementing and improving the emergency response plan over the leakage and spill of toxic liquid substances, executing rigid control over the discharge of ballast water, the washing water of ship cabins or their residue or mixtures containing toxic liquid substance in coastal areas. In addition, the harbors and docks engaged in the load and unload of bulk toxic liquid substances have all established and improved relevant facilities to collect ballast water and ship-cabin cleaning water that contains toxic liquid substances.

4.5.3. Treatment of Domestic Sewage from Ships

All ships meeting related standard must install domestic sewage treatment facilities certified by the competent department in an effort to make the quality of domestic sewage of these ships meeting related standard. Besides, supervision efforts in this regard and the construction of treatment facilities will be reinforced to strictly control the discharge of domestic sewage from ships.

4.5.4. Treatment of Ship Refuse

All ships meeting related standard must be equipped with the "Ship Refuse Management Plan" certified by the competent department and must manage and treat the refuse in strict accordance with the plan. All harbors and docks should set up the

treatment and collecting facilities of refuse from ships, purchase or construct refuse collection vehicles (ships), collect the refuse from all ships and then transport it to urban sanitary landfill facilities for disposal.

4.6. Eco-conservation and Rehabilitation of Marine Fisheries

A series of methods including the formulation and implementation of related plans, strengthening fishery environment investigation and monitoring, adjustment of farming pattern and launching environmental impact assessment of fisheries are employed to control the impact of marine fisheries, especially aquiculture activities on marine environment.

The authority has worked out and implemented a number of plans including the 10th Five-Year Plan of National Fishery Development (2001-2005) and the Planning for Fishery Resources and Eco-environmental Protection Project, which focus on ecological environmental protection of fishery resources and fishery sea areas. It is planned that gradual rehabilitation of fishery resources and gradual improvement of ecological environment be realized through the implementation of the projects on recovering fishery resources and the monitoring of fishery ecological environment.
We have conducted the Initiative on the Transformation of Growth Mode in Animal Husbandry and Aquiculture (2006), energetically facilitated healthy farming patterns in aquiculture, actively promoted comprehensive utilization of watershed and tidal land resources and accelerated the scaling up, intensified operation, standardization and industrialization of animal husbandry and aquiculture so as to minimize the adverse impact on the environment.

We have carried out regular monitoring with National Fishery Ecological Environmental Monitoring Network and accumulated great amount of technical monitoring data, which have created favorable conditions for related evaluation, protection and management decision-making. We have also formulated and implemented a number of regulations including Measures on the Administration of Fishery Pollution Accident Investigation and Identification Qualification to regulate the investigation and handling of pollution accidents in fishery sea areas and safeguard the sanitation and safety of fishery ecological environment.

We have carried out environmental impact assessment (EIA) to all types of major construction projects involving fishery. In 2004 alone, we have conducted 117 review activities on various EIA work on major construction projects involving fishery to safeguard the safety of fishery ecology.

We have developed and implemented the Aquatic Resource Conservation Action Plan for China and stepped up the development of fishery nature reserves and wild aquatic rescue centers in order to protect the biodiversity of fishing species. According to estimate, the number of fishery nature reserves across China was more than 230, and 17 wild aquatic animal rescue centers were established by the end of 2005.

4.7. Wetland Protection and the Development of Shelter Belts in Coastal Regions

The Chinese government has attached great importance to the conservation of coastal eco-environment and carried out a lot of work on the protection and rehabilitation of coastal wetlands as well as the development of wetland nature reserves and coastal shelter forests.

4.7.1. Protection Actions Involving Offshore and Coastal Wetlands

In order to enhance the management over wetland protection, the competent national department has drawn up a series of policies and measures to secure the sustainable development of wetland resources and environment:

In 1994, the State Environmental Protection Administration and other related departments including the State Forestry Administration compiled the Action Plan of Biodiversity Conservation in China, which serves as the guideline document on biodiversity protection actions of the whole country and defines the protection targets and action plans for all types of biological resources including the resources of wetland species.

In 1996, the State Council approved the China Trans-Century Green Project Plan, which contains a great portion of water pollution treatment and eco-environmental conservation projects at both the state and local level.

In 1998, the State Council formally released the National Plan of Eco-environment Conservation of China, making an all-round deployment of the eco-environmental conservation works nationwide by the mid of the 21st century.

In 2000, a total of 17 national departments (commissions and administrations) lead by the State Forestry Administration jointly issued China National Wetland Conservation Action Plan, which serves as the guide for carrying out wetland conservation work for various departments and governments at all levels as well as the guideline document for wetland conservation and rational use of wetlands.

Also in 2000, the State Council printed and distributed the National Outline for Ecological Environment Conservation, which maintains that rescuing protection efforts must be made to those key eco-functional zones of special importance to the eco-environmental safety of the country and that compulsory protection must be performed to the eco-environment of major resource development zones.

In 2001, the State Forestry Administration (SFA) issued and implemented the Overall Planning on Nationwide Wild Fauna and Flora Protection and the Construction Project of Nature Reserves with wetland monitoring and wetland rehabilitation and reconstruction forming the major contents of the Planning.

In 2003, the State Council approved the National Plan for the Conservation of Wetland developed by SFA, which mainly focuses on the enhancement of the conservation and rehabilitation of coastal wetlands. In specific, it includes the comprehensive survey, evaluation and recovery of mangrove resource; the demonstration model for mangrove resources protection and rational utilization; the assessment of potential impact on wetland by oilfield exploration, salt field and agricultural development; reinforcing the protection of rare wild animals and their habitats; strengthening the protection, treatment and rehabilitation of major wetland eco-systems; and establishing the demonstration sites on the development and utilization of wetland enjoying benign cycle and ecological economic added-value. In order to enhance the implementation of the said Plan and facilitate the work in coming years, the State Council also approved the implementation of the National Implementation Plan for Wetland Conservation Projects (2005-2010). Other planning with regard to wetland protection includes two sub-plans under the National Plan on the Construction of Coastal Shelter Belt System Project, namely the Project Plan on the Protection and Development of Mangroves centered on the protection, rehabilitation and building construction projects of mangroves and the Project Plan on the Coastal Wetland Protection and Rehabilitation focusing on the development of wetland protection and rehabilitation projects.

4.7.2. Establishment of Wetland Nature Reserves

Starting from the 1970's, China began the establishment of nature reserves for coastal migrant birds mangroves and wetlands and set up 82 coastal wetland reserves of various levels by December of 2001 covering a total area of 3.965 million ha. Among them, 17 are of state level with 983,000 ha; 26 are of provincial level with 2.806

million ha; and 39 are of prefecture (city) and county level with 175,000 ha. In specific, 9 coastal reserves including harbor seal in Dalian City of Liaoning, Yancheng City of Jiangsu, the elk of Dafeng, the Chongming Island of Shanghai, Mipu to Houhai Bay in Hong Kong, Huidong Harbor of Guangdong, the mangroves of Zhanjiang, Dongzhaigang of Hainan and Shankou nature reserve of Guangxi have been included in the List of Wetlands of International Importance under the Ramsar Convention on Wetlands. Meanwhile, 5 offshore and coastal reserves were included in the International Man and Biosphere Reserve Network, the East Asian-Australasian Shorebirds Site Network and the East Asian Goose and Duck Protection Network.

By the end of 2004, China has already set up 120 marine nature reserves of various levels. As a result, a group of rare marine species have been under protection including such important habitats of coral reef, mangroves and seaweed bed.

4.7.3. Development Project of National Coastal Shelter Belt System (Phase II)

In 1998, the State Planning Commission gave a written reply in Document No. [1988] 174 of SPC to the *Overall Planning on the Development of National Coastal Shelter Belt System* in order to coordinate the development between economic growth and environmental protection and improve and protect coastal eco-environment. By the end of 2000, after over a decade's work, Phase I of the project had been completed with tremendous achievements. However, the development of forest eco-system of coastal areas still stood at a rather low level, and coastal eco-environment was quite venerable and far from the requirements for economic growth of coastal regions. Therefore, under the unified arrangement of the State Forestry Administration, the *Planning of the Development of National Coastal Shelter Belt System (Phase II)* was worked out in 2000. At present, the Phase II of the project is under implementation.

4.8. Pollution Control on Tourism Related Activities in Coastal Regions

The national tourism department has actively conducted pollution control on tourism activities with coastal regions and islands as the key areas. In specific, it has incorporated environmental protection considerations into the planning of scenic spots, brought pollutants discharge under strict control, included environmental quality into the evaluation indicator system of Class A scenic spots, and actively participated in the planning and management of coastal areas. In addition, it has taken great efforts in promoting the practice of ecologically friendly tourism. In August of 2006, the

National Tourism Administration and other related departments have jointly held the On-site Meeting of Ecologically Friendly Tourism to further discuss and publicize the concept of ecologically friendly tourism.

In addition, the authority has improved the development and conservation of tourism resources in coastal areas to promote sustainable utilization of such resources, enforced the sea area ownership management system as well as charged use of such ownership, issued sea area use permit and collected sea area use fee so as to conserve the natural scenery and ecological environment of scenic spots.

4.9. Pollution Control on the Development of Mineral Resources in Costal Regions

We have carried out investigations on geological environment and geological disasters of mines in the coastal regions, intensified environmental protection of mines in order to control the occurrence of new geological disasters and damage on ecological environment. In doing so, we have effectively reduced the impact of exploitation and utilization of mineral resources on marine environment of coastal regions. From 2002~2006, 31 provinces (autonomous regions and municipalities) across the country carried out investigation, assessment and research work on geological environment of mines. Based on the result of such survey and assessment, a nationwide treatment project of geological environment of mines was subsequently carried out. By the end of 2005, 11 provinces (cities) in the coastal regions had conducted 123 projects on the environmental treatment of mines with a total investment of 389.91 million yuan.

4.10. Pollution Control on the Development of Offshore Petroleum and Gas Resources

The State Council has recently approved the *Emergency Plan of Major Oil Spill Accidents in Offshore Petroleum Exploration and Development* to cope with possible sudden accidents during the process of offshore oil and gas exploitation. By this, the emergency response mechanism targeting the accidents in offshore oil exploitation has been initially established. Centralized management and land-based treatment approach are adopted to control environmental pollution during offshore oil and gas exploitation with the details as the followings:

- setting up land-based treatment facilities to treat industrial effluent, solid waste and the slurry from offshore operations;

- oil-bearing wastewater is collected by offshore equipment maintenance & service unit and treated by an exclusive organizations;
- domestic sewage from the platform and the dock cleaning water is treated by self-equipped wastewater treatment facility on the drilling platform and then is discharged into the sea when the treated water meets relevant standard;
- the waste water from oil/gas separation operation and sewage from the production platform is treated by self-equipped wastewater treatment facility on the drilling platform and then is discharged into the sea when such treated water meets relevant standard;
- the oil-bearing wastewater and other wastewater produced during the maintenance operation (e.g. facility maintenance, well repair, etc.) of the production platform is collected and transported to the land for recycle and treatment;
- wastewater from the engine room and ship sewage are stored and then transferred to the treatment units certified by State Maritime Safety Administration for recycle and treatment;
- establishing separate hospital wastewater treatment facility to treat medical wastewater;
- treatment of land-based domestic sewage is included in the collection system of the sewage treatment pipeline network of the city where it has located or establishing a separate wastewater treatment system;
- domestic refuse produced by land-dwelling residents is collected by related local institutions for treatment and disposal.

4.11. Intensifying the Management on Waste Dumping into the Sea

In order to strengthen the supervision and management of waste dumping into the sea and in light of the principles of "being scientific, proper, economical and safe", the competent maritime administrative department carries out strict examination for the approval of new dumping areas during the selection and zoning process of dumping areas based on the actual need of economic growth and the construction of harbors of coastal regions as part of an effort to reduce the impact of wastes and other substances dumping into the sea on marine environment and resources. In order to avoid pollution and damage to marine environment by dumping activities, the above

department has organized and launched tracing monitoring in marine dumping areas and conducted post-dumping appraisal to the dumping areas receiving large amount of waste over a long period of time. Up to now, the water quality of over 90% of the dumping areas is normal with the baseline environment remaining stable, and the structure of benthos in adjacent sea areas demonstrated no apparent change due to dumping activities, but silt up occurs in certain dumping areas.

4.12. Marine Environmental Protection in Military Facilities

Most military areas in coastal regions are located in sensitive zones to marine pollution and are within the key areas of marine environmental protection. In recent years, all PLA troops stationed in coastal regions have actively carried out extensive work including comprehensive environmental treatment in military camps of stationed troops, development of shelter belts in military areas, installation and upgrading of pollution prevention facilities in military equipment including naval vessels and the construction of the collection and treatment facilities for various types of pollutants at military harbors. Currently, major military marine environmental protection work are those related to the *National Blue Sea Action Plan in the Bohai Sea*, the *10th Five-Year Plan of Environmental Protection and Afforestation of the Whole Army*, water pollution treatment plan in military areas funded by national bonds and the development project on costal shelter belts.

- According to the *10th Five-Year Plan of Environmental Protection and Afforestation of the Whole Army*, by the end of 2005, the troops stationed in coastal regions have completed a group of treatment projects on domestic refuse, sewage and medical wastewater.
- In order to meet the requirements that all the refuse produced by naval vessels must be recycled for treatment and the discharge of domestic sewage from naval vessels must meet national standard by 2015, which are stipulated in the *National Blue Sea Action Plan in the Bohai Sea*, military organizations had finished the treatment of medical, domestic and industrial pollution sources in part of the troops within the Bohai Bay Rim area by 2005.
- In line with the Action Plan, water pollution treatment projects of around 1, 000 military areas will be completed within the period of 2004～2008, focusing on water pollution treatment project in coastal regions.

- In the development of coastal shelter forests, it is expected that 4 million mu shelter forests will be completed within the military areas stationed in coastal regions by 2010 according to the requirement of national planning of the development project of costal shelter belts. Currently, around 800,000 mu afforestation work will be launched in early 2007.

4.13. Marine Environmental Monitoring and Special Investigation

China has already set up the environmental monitoring network covering all marine areas and basically established the three-dimension monitoring technical system of offshore sea areas composed of diverse monitoring approaches such as satellite, airplane, ship, floating mark and land-based stations. In recent years, China has carried out a series of special monitoring campaigns including the monitoring of marine environmental quality and development trend, the monitoring zones of coastal red tides, the coastal monitoring zones of marine ecology, monitoring of key pollution discharge outlets and adjacent sea areas, monitoring of environmental quality of coastal sea areas and the monitoring of the environment of fishery sea areas. It has publicized the *Report on the State of the Environment in China*, *Report on the State of the Fishery Eco-environment in China* and notices on the special monitoring results over marine environment on a regular basis, which has laid a good foundation for understanding the current situation and development trend of marine eco-environment in China.

In 2001, the Central government carried out the first-ever national mangrove resources survey, which has identified current situation of mangrove resources in China and laid a sound foundation for the conservation and development of mangrove resources.

In 2002, the Central government organized national special survey on typical marine eco-environment situation to investigate representative and typical ecological patterns in coastal sea areas as well as marine ecological problems caused by various types of marine development activities such as seawater enclosure (reclamation), aquiculture and coastal tourism and so as to evaluate important eco-functions and conservation value of key marine ecological services.

In 2004, the Central government launched monitoring work on coastal marine ecological monitoring zones across the country and established 18 ecological monitoring zones in key marine ecologically sensitive areas including such typical

marine eco-systems as estuaries, coastal wetland, mangrove forests, coral reef, seaweed bed and gulfs to monitor environmental indicators, biological indicators and ecological pressure indicator, evaluate the health and safety level of marine eco-systems, identify major marine ecological problems and underlying reasons and provide scientific support to integrate environmental management of coastal regions.

In 2005, the Central Government launched the environmental situation survey at the estuaries of the Yangtze River and the Pearl River as well as their adjacent sea areas. This investigation was characterized by overall planning, equal consideration about and parallel action taken both on land and in the ocean. It highlighted the investigation of pollution sources and the monitoring of the flux of pollutants flowing into the sea in order to understand the relations between marine environmental problems and the corresponding pollution sources.

Chapter 5 National Plan on Promoting the Protection of Marine Environment

5.1. Pollution Prevention and Control Plan for Major Water Bodies

The pollution prevention and control projects of the Three Major Rivers (Huaihe River, Haihe River and Liaohe River), the Three Major Lakes (Taihu Lake, Chaohu Lake and Dianchi Lake) and the Bohai Sea are the key environmental protection projects during the 10th Five-Year Plan period, and the related plans of the pollution prevention and control work have already got the approval from the State Council. The implementation of these plans has greatly contributed to the reduction of land-based pollution, the curbing of further deterioration of marine environment and the rehabilitation and improvement of marine eco-system. These plans include the *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Huaihe River*, *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Haihe River*, *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Liaohe River*, *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Taihu Lake*, *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Chaohu Lake*, *10th Five-Year Plan on the Prevention and Control of Water Pollution in the Watershed of Dianchi Lake* and the *National Blue Sea Action Plan in the Bohai Sea*. In addition, the Three Gorges Reservoir area and the areas along all the routes of the "South-North Water Diversion Project" are also the key regions in the prevention and control work of water pollution during the same period.

During the 10th Five-Year Plan period, the water pollution prevention and control work within the above watersheds and sea areas (the Huaihe River, Haihe River, Liaohe River, Taihu Lake and Bohai Sea) concerning marine environmental protection progressed smoothly, the water quality of all watersheds remained basically stable, and the degrading trend of water quality has been under primary control. At present, the development of the 11th Five-Year Plan of all major watersheds and sea areas is underway, and the compilation work of the Blue Sea Action Plan over the sea areas around the estuaries of the Yangtze River and the Pearl River have already started. All types of plans will lean from the experience gained during the 10th Five-Year Plan

period so as to better accomplish the pollution prevention and control work during the 11th Five-Year Plan period.

5.2. Implementation of Water Pollution Prevention and Control Plan in Key Watersheds

5.2.1. Overall Progress

Based on the evaluation results of the water pollution prevention and control plan of each watershed, the target fulfillment rate regarding COD reduction of the Huaihe River, Haihe River, Liaohe River, Taihu Lake, Chaohu Lake, Dianchi Lake, the east route of the "South-North Water Diversion Project" and the Three Gorges reservoir area and its upper reaches was 100%, 61%, 65%, 76%, 95%, 0, 17% and 33% respectively in 2005, and the reduction target of total phosphor of the watersheds of Taihu Lake, Chaohu Lake and Dianchi Lake has been basically met.

By the end of 2005, out of all the 2130 pollution treatment projects on water pollution prevention and control set out in the 10th Five-Year Plan, 1378 had been completed (taking up 65% of the total); 466 were under construction (taking up 22%); and 286 were to be started (taking up 13%). 86.4 billion yuan had been invested, accounting for 53% of the total. The project completion rate of the Huaihe River, Haihe River, Liaohe River, Taihu Lake, Chaohu Lake, Dianchi Lake, the east route of the "South-North Water Diversion Project" and the Three Gorges Reservoir area and its upper reaches was 70%, 56%, 43%, 86%, 53%, 54%, 68% and 68%, and the corresponding investment-in-place rate was 57%, 55%, 34%, 77%, 62%, 15%, 19% and 77% respectively.

5.2.2. Environmental Quality of Watersheds

Out of the 453 water quality monitoring sections of the Huaihe River, Haihe River, Liaohe River, Taihu Lake, Chaohu Lake, Dianchi Lake, the east route of the "South-North Water Diversion Project" and the Three Gorges Reservoir area and its upper reaches set by their 10th Five-Year Plan for water pollution prevention and control projects, 270 meet relevant national standard, accounting for 60%.

Taking permanganate as the checkup index, the up-to-the-standard rate of water quality monitoring sections of the Huaihe River, Haihe River, Liaohe River, the east route of the "South-North Water Diversion Project" and the Three Gorges reservoir

area and its upper reaches was 84%, 57%, 50%, 45% and 73% respectively. Taking permanganate and total phosphor as the checkup index, the up-to-the-standard rate of water quality monitoring sections of the Taihu Lake, Chaohu Lake and Dianchi Lake was 36%, 50% and 50% respectively.

5.3. Implementation of the National Blue Sea Action Plan in the Bohai Sea

5.3.1. Overall Progress

Ever since the approval for the implementation by the State Council in 2001, the *National Blue Sea Action Plan in the Bohai Sea* has been vigorously implemented in all the provinces and cities within the Bohai Bay Rim area and related departments under the State Council. As a result, the construction of urban wastewater treatment plants, landfill facilities, conservation of coastal wetlands and coastal shelter belts have been accelerated. The prevention and control of agricultural non-point pollution, prevention and control of mobile pollution sources of ships, marine engineering and the management over waste dumping have all been strengthened. The authority has taken a series of integrated measures including the ban on phosphor. The implementation of the plan has yielded great fruits.

As relevant assessment indicates, by 2005, the planned total investment of all the projects was 27.68 billion yuan, while the actual investment in place was 21.08 billion yuan with the investment completion rate of 76.2%. Calculated in the capacity of completed projects (excluding the ones under construction), the urban wastewater and urban refuse treatment capacity completion rate stood at 69.3% and 47.9% respectively. The objective of the total reduction of such pollutants as nitrogen, phosphor and COD entering the sea have all been met.

5.3.2. Change in Environmental Quality

There are altogether 128 environmental functional zones within the offshore area of the Bohai Sea (excluding the mixed zones), and the water quality up-to-the-standard level of these functional zones reached 82.0% in 2005. The water quality of these zones is dominated by Grade I and Grade II, taking up 66.0% of the total, while the ratio of Grade III, Grade IV and Inferior to Grade IV was 14.9%, 6.4% and 12.8% respectively. Compared with that of 2001, the ratio of Grade I and II water climbed by

27.5 percentage points, while the percentage of water inferior to Grade IV dropped by 25.7 percentage points, demonstrating improvement of the overall water quality.

Among all the controlling areas of the Bohai Sea area, the water quality of that in Laizhou Bay and the Bohai Channel and that of the Yellow Sea is fairly good; while in all the coastal sea areas of all provinces and cities in the Bohai Bay Rim area, the water quality of that in Shandong Province is rather good with the water quality up-to-the-standard rate of the functional zones reaching 96.9% primarily at Grade I and Grade II.

Chapter 6 Laws, Regulations, Policy and Management System on Marine Environmental Protection

6.1. State Laws, Regulations and Standards

6.1.1. State Laws

Ever since 1984, China has successively enacted and implemented over 10 state laws regarding marine environmental protection covering diversified areas of environment, resources and economy with the content concerning both sea areas and land areas. They mainly include the followings:

- Environmental Protection Law of the People's Republic of China (December 26, 1989)
- Marine Environmental Protection Law of the People's Republic of China (April 1, 2000)
- Law on Environmental Impact Assessment of the People's Republic of China (October 28, 2000)
- Law on Prevention and Control of Environmental Pollution by Solid Waste (October 30, 1995)
- Law of the People's Republic of China on the Prevention and Control of Water Pollution (Amended in 1996) (November 1, 1984)
- Law of the People's Republic of China on the Promotion of Clean Production (January 1, 2003)
- Law of the People's Republic of China on Production Safety (November 1, 2002)
- Law of the People's Republic of China on Water (October 1, 2002)
- Law of the People's Republic of China on Prevention and Control of Desertification (January 1, 2002)
- Law of the People's Republic of China on the Administration of the Use of Sea Areas (October 27, 2001)

- Law of the People's Republic of China on the Exclusive Economic Zone and the Continental Shelf (June 26, 1998)
- Flood Control Law of the People's Republic of China (August 29, 1997)
- Law of the People's Republic of China on Water and Soil Conservation (June 29, 1991)
- Law of the People's Republic of China on the Protection of Wildlife (November 8, 1988)
- Fisheries Law of the People's Republic of China (Amended in 2004) (July 1, 1986)
- Land Administration Law of the People's Republic of China (Amended in 1998) (June 25, 1986)
- Mineral Resources Law of the People's Republic of China (Amended in 1996) (March 19, 1986)
- The Forest Law of the People's Republic of China (Amended in 1998) (January 1, 1985)

etc.

6.1.2. State Regulations

Ever since 1983, China has enacted and implemented a series of administrative regulations including provisions and rules regarding marine environmental protection, which has provided legal basis for concrete management work of related departments. They are mainly as follows:

- Provisions of the People's Republic of China on the Prevention and Control of Vessel Pollution of the Inland Water Environment (August 20, 2005)
- Regulations of the Conversion of Cropland to Forest Program (December 6, 2002)
- Regulations for the Implementation of Forestry Law of the People's Republic of China (January 29, 2001)
- Rules for the Implementation of the Law on the Prevention and Control of Water Pollution (July 1, 2000)

- Interim Regulation on the Prevention of Water Pollution in the Huaihe River Watershed (August 8, 1995)
- Regulations on Nature Reserves of the People's Republic of China (December 1, 1994)
- Regulations of the People's Republic of China on the Implementation of Wild Aquatic Animal Protection (October 5, 1993)
- Regulations on Prevention of Pollution of Marine Environment by Land-based Pollutants of the People's Republic of China (August 1, 1990)
- Regulations of the People's Republic of China on Prevention of Pollution of Marine Environment by Offshore Construction Projects (June 25, 1990)
- Regulations of the People's Republic of China on the Prevention of Pollution of Marine Environment by Vessel Dismantling (May 18, 1988)
- Rules on the Implementation of the Fisheries Law of the People's Republic of China (October 14, 1987)
- Regulations of the People's Republic of China on the Control over Dumping of Wastes in the Sea (March 6, 1985)
- Regulations of the People's Republic of China on Environmental Protection in Exploration of Offshore Petroleum (December 29, 1983)
- Regulations of the People's Republic of China on the Prevention of Pollution of Sea Areas by Vessel (December 29, 1983)

etc.

6.1.3. Environmental Standards

Up to now, China has issued over 20 standards and technical specifications regarding marine environmental protection. They are mainly as the followings:

- Environmental Quality Standard for Surface Water (GB3838-2002)
- Quality Standard for Marine Sediment (GB18668-2002)
- Quality Standard for Marine Life (GB18421-2001)
- Quality Standard for Marine Water (GB3097-1997)

- Water Quality Standard for Fisheries (GB11607-89)
- Integrated Wastewater Discharge Standard (GB8978-1996)
- Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant (GB 18918-2002)
- Standard for Pollution Control of Sewage from Marine Disposal Project (GWKB4-2000)
- Discharge Standard of Pollutants for Livestock and Poultry Breeding Industry (GB18596-2001)
- Technical Standard of Pollution Prevention and Control for Livestock and Poultry Breeding Industry (HJ/T81-2001)
- Effluent Standards for Oil-bearing Wastewater from Offshore Petroleum Development Industry (GB4914-85)
- Effluent Standard for Pollutants from Ship (GB3552-83)
- Requirements on the Contingency Equipment for Oil Spill Accidents in Harbors (JT/T 451-2001)
- Standard on the Rating of Oil Pollution Accidents of Ships (JT/T 458-2001)
- Oil Spill Dispersant-Technical Regulations (GB18188.1-2000)
- Oil Spill Dispersant-Application Criteria (GB18188.2-2000)
- Standards for Oil Boom Products (JT/T 465-2001)
- Principle for Categories and Grades of Nature Reserves (GB/T 14529-93)
- Technical Specifications for the Management of Marine Nature Reserves (GB/T 19571-2004)
- Technical Guideline for the Construction of Management and Conservation Infrastructure of Nature Reserves (HJ/T129-2003)
- Technical Directives for the Division of Marine Functional Zonation (GB 17108-1997)
- Technical Guidelines for Environmental Impact Assessment of Marine Engineering (GB/T 19485-2004)

- Technical Regulations for Afforestation (GB/T15776-1995)
- Technical Regulations for the Development of Non-commercial Forest (GB/T18337.3-2001)
- National Criteria and Indicators of Sustainable Forest Management in China (LY/T1594-2002)

etc.

6.2. Management Systems and Provisions

6.2.1. Management Systems

The management systems that China has already established and implemented regarding the protection of marine environment from land-based pollution are mainly the followings:

- The system of Environmental Impact Assessment (EIA)
- The system of "Three Synchronizations"
- The system of pollution discharge levying
- The system of environmental protection targets accountability
- The system of quantitative checkup on comprehensive urban environmental treatment
- The system of report and registration of pollutants discharge and pollution discharge permit
- The system of pollution treatment within a given period of time
- The system of the total emission control
- The system of civil compensation responsibility for oil pollution damage by ships
- The system of control over offshore shipping vessels
- The system of marine fishing suspension in the summer
- The system of franchised operation of municipal public utilities
- The system of wastewater treatment levying

- The system of classification of marine functional zones
- The system of marine protected areas
- The system of management on marine waste dumping
- The system of documentation on the use of sea areas

etc.

6.2.2. Management Provisions and Measures

The management provisions and measures that China has already implemented regarding the protection of marine environment from land-based pollution are mainly as follows:

- Provisions on the Conservation of Biological Resources in Bohai Sea (May 1, 2004)
- Measures for the Administrative Penalty for Environmental Protection (Amendment) (November 5, 2003)
- Provisions on Administration of Report and Registration of Pollutants Discharge (May 19, 2003)
- Provisions on Administration of Adjustments on Territorial Scope and Function Parts of State-level Nature Reserves and Change of the Names (April 15, 2003)
- Measures for the Administration of the Charging Rates for Pollutant Discharge Fees (Feb. 28, 2003)
- Provisions on the Administration of Fishery Licensing (December 1, 2002)
- Measures on the Administration of Major Water Pollutants Discharge Permit in the Watersheds of the Huaihe River and Taihu Lake (Draft) (July 2, 2001)
- Measures on the Administration on the Prevention and Control of Pollution from Livestock and Poultry Breeding (May 8, 2001)
- Measures on the Administration of Functional Zones in Offshore Sea Areas (December 10, 1999)

- List of Wild Plants under Special State Protection (First Group) (August 4, 1999)
- Provisions on the Prevention of Pollution of the Yangtze River Watershed Caused by Ship Refuse and Solid Wastes along its Banks (March 1, 1998)
- Measures on the Administration of Nature Reserves of Aquatic Animals and Plants (October 17, 1997)
- Provisions on the Procedures in the Investigation and Handling of Pollution Accidents in Fishery Watersheds (March 26, 1997)
- Provisions for the Administration of the Prevention and Control of Pollution in Protected Areas for Drinking Water Sources (July 10, 1989)
- Interim Measures on the Administration of Water Pollutants Discharge Permit (March 20, 1988)
- Interim Measures on Reporting Environmental Pollution and Damage Accidents (September 10, 1987)
- Provisions on the Procedures in the Lead-sealing of Pollution Discharge Facilities of Ships in the Bohai Sea Area (Febraury 8, 2003)
- Measures on the Administration of Marine Nature Reserves (May 29, 1995)
- Interim Measures on the Administration of Abandonment of Offshore Oil Platforms (June 24, 2002)
- Measures on the Administration of Sea Dumping Areas (November 14, 2003)
- Regulations on the Administration of the Protection and Utilization of Islands with no Residents (July 1, 2003)
- Interim Measures on the Administration of the Information Release for Red Tides (January 22, 2002)
- Measures on the Examination and Approval on the Classification of Provincial Marine Functional Zones (Feb. 17, 2002)
- Interim Measures for the Administration of Special Marine Protection Areas (November 16, 2005)

- Provisions on the Administration of Special Protected Forest Belt in Sea-bordering Countries (December 9, 1996)

etc.

6.3. Management Measures

Since the year 1998, relevant national departments of China have taken a number of measures for marine environmental protection and obtained remarkable achievements. The main management measures are as follows:

1. **Reinforce the prevention and control of land-source pollution, and promote the implementation of "National Blue Sea Action Plan in the Bohai Sea in an all-round way**

The "National Blue Sea Action Plan in the Bohai Sea", the development of which was organized by SEPA and relevant departments, is one of the key projects under the "33211 Program" as defined in the Tenth Five-Year Plan for environmental protection and approved by the State Council. Since its officially issuing in 2001, the degeneration trends of the Bohai Sea environment are initially kept under control through the construction of urban sewage treatment plants, landfill facilities, eco-agriculture and eco-forestry in coastal areas, treatment of small watersheds, oil pollution control in ports and docks, and the emergency response system for oil spills at the sea as well as the implementation of measures to forbid phosphor. As a result, no large scale red tides had ever occurred in Bohai Sea since 2002, and the water quality of offshore areas had gradually turned better. This has played a key role in promoting the sustained, rapid and healthy economic development in the neighborhood of Bohai Sea.

2. **The State Council promulgates relevant regulations to promote marine environmental protection**

In 2004, the State Council printed and distributed the *Circular on Some Issues on Further Enhancing Marine Management*, which points out the need to shift from paying attention to pollution prevention into emphasizing both pollution prevention and ecological development in marine environment protection work. It requires strict control over enclosure and filling up of the sea for farmland and exploiting sea sand, control the land-source pollutants from entering into the sea, enhancing the supervision of environmental pollution in fishery industry and sea areas near harbors,

intensifying the efforts in marine environmental monitoring, doing a good job in controlling red tides and disaster relief as well as marine environmental protection. In 2005, the State Council issued the *Decision of the State Council on the Implementation of Scientific Outlook on Development and Enhancing Environmental Protection*, which pointed out the need to give priority to the Bohai Sea and other major sea areas and estuaries, and required to strictly prohibit the exceeding-standard discharge of industrial wastewater into rivers, lakes and seas, and to do well in protecting mangroves, offshore wetlands, coral reefs, sea islands and other typical marine or coastal eco-systems.

3. Carry out zoning on coastal environmental function areas to privide a basis for scientific management of marine environment in China

The unremitting efforts over one decade brings birth to the *National Zoning on the Environmental Function Areas of Coastal Sea Areas*, which was formulated by 11 provinces, autonomous regions and municipalities directly under the State Council. The report and mapping of the environmental function zones were published, and the *Measures on the Administration of Environmental Function Zones in Coastal Sea Areas* was issued as a Ministerial Order. This has provided a scientific basis for the management of offshore environment by a target responsibility system in China.

4. Carry out marine function zoning to provide a basis for scientific development and management of marine resources

The State Council adopted the *National Zoning on Marine Function Areas* on August 22, 2002, which identifies that Seas are the key resources for sustainable economic and social development of China. In terms of the management of the use of sea areas, we must earnestly comply with the laws and regulations on marine management, adhere to the policy of "developing the sea in the protection efforts and protecting it during the development", rigorously carry out the zoning system of marine function areas, and realize the rational development and sustainable utilization of sea areas.

5. Guide the functional departments of local governments in coastal areas to establish a good working mechanism and do well the environmental protection work for off-shore areas

According to the targets of the Tenth Five-Year National Plan for Environmental Protection, timely efforts have been made to organize another seven coastal provinces, autonomous regions and municipalities directly under the Central Government to

work out and initiate the Blue Sea Action Plan. With local governments responsible for organizing the implementation of the program, environmental agencies leading the coordination, and departments involved in marine affairs implementing the program, a good situation has been created with collective efforts in off-shore eco-environmental protection.

6. Strengthen the capacity building in China's marine environmental protection and management to provide services for this effort

The management of environmental protection refers to the decision-making management through modern environment monitoring technology and on the basis of the available environmental monitoring data and scientific analysis results. The capacity building in environmental monitoring is the key to the management of marine environmental protection. In 2002, based on the offshore monitoring network covering China's four major seas, SEPA established offshore eco-environmental monitoring substations in seven major sea areas and gulfs. As a result, an environment monitoring system was initially established in China's offshore areas that enables three-dimension and multi-element monitoring by combining the network and substations and that can meet with the requirements of marine environmental protection management in the context of a new situation. Meanwhile, SEPA has actively raised funds for the procurement and updating of apparatus and equipment for monitoring, analysis, and testing of marine environment so as to enhance the monitoring capacity.

7. Improve legal development on marine environment and standardize marine environmental administartion

According to relevant provisions of the *Marine Environment Protection Law*, relevant departments of China actively organized the amendments to *Regulations of the People's Republic of China on the Prevention of Marine Environmental Pollution from Land-based Pollutants* and *Regulations of the People's Republic of China on the Prevention of Marine Environment Pollution by Coastal Construction Projects*. In combination with the national target systems such as "National Quantitative Assessment for Comprehensive Control of Urban Environment", "National Model Cities on Environmental Protection", and "Eco-demonstration Zones", those departments have incorporated the offshore environmental function zones in coastal cities into the assessment indicators. They also made arrangements for monitoring the offshore environmental function zones and completed the adjustments to monitoring

stations and monitoring sites, and formulated and released the "Report on China's Coastal Sea Environmental Quality", "Report on the State of Fishery Eco-environment in China", and "Weekly Report on the Quality of Sea Bathing Beaches in Major Cities".

8. International cooperation programs on marine environment provides important technical supports to China's marine eco-environmental protection with remarkable achievements

Thanks to arduous efforts, the international cooperation program on South China Sea acquired financial supports of 2 million U.S. Dollars and 14.8 million yuan respectively from GEF and Ministry of Finance in 2001. Among others, the research projects on the prevention of pollution of the oceans, mangroves, wetlands, and seaweeds by land-based activities conducted cause analysis and put up countermeasures on the basis of the findings on pollution status of and damages to marine eco-environment and resources in the three coastal provinces in South China, which provides a guidance for formulating the action plan for marine and coastal eco-environmental protection of this region. Up to now, China has established a national database and worked out national action plan. Due to solid work foundation, full and accurate data, and clear thinking for marine environmental protection, at the meeting of technical work groups for cooperation programs of seven countries in the South China Sea area, the programs on controlling pollution of Lingdingyang by land-based pollutants, protecting wetlands in Pearl River Estuary, preserving mangroves in Qinglan Harbor of Hainan Province, and protecting seaweeds of Hepu County in Guangxi Autonomous Region ranked the first among candidate demonstration sites and are ready for construction next year. In addition, the Northwest Pacific Region programme, the Program of Sino-Korean Environmental Surveys on the Yellow Sea, program on Seas of East Asian and GPA programs all made remarkable progress.

Chapter 7 Scientific Research and International Cooperation

7.1. Scientific Research

The Ministry of Science and Technology and other relevant departments of China undertook a number of scientific researches as follows for the protection of marine environment:

- National key scientific research projects under the Ninth Five-Year Plan, that is, the research program on key technology for sustainable utilization of environment and resources in coastal areas;
- National key scientific and technological project under the Tenth Five-Year Plan, that is, the research program on the carrying capacity and environment optimization technology of bays system;
- National "973" Programs: Bionomics, Oceanographic Mechanism, Forecast, Prevention and Control of Hazardous Red Tides in Coastal China (2001CB4097), Land-Sea Interaction and Its Environmental Effect of China's Typical River Estuary-Coastal Areas (2002CB412400), Oil and Gas Accumulation Mechanism and Distribution Prediction on Marine Carbonate Strata in China's Sedimentary Basins (2005CB422100), and The Key Process and Sustainable Mechanism of Food Outputs of China's Offshore Ecological System (2006CB400600), etc.;
- Eight programs under the National "863" Program;
- Six basic research programs under the Ministry of Science and Technology;
- Six special S&T programs under the former State Development Planning Commission;
- Five projects under National Natural Science Foundation;
- National Special Research Program for Public Good--"Countermeasures on Environmental Protection of Major Fishery Areas and the Reestablishment of Ecological System";
- Major projects of Chinese Academy of Fishery Sciences--"Research on

Eco-environmental Rehabilitation Technology for Seashell Cultivation in Shoals";

- National Agricultural Sci-Tech Program--"Demonstration Program on Technological System for Healthy Production of Seashells";
- The program of State Oceanic Administration--"Special Program on Integrated Surveys and Evaluation of Seas in China";
- The national key scientific and technological projects under the Ninth Five-Year Plan, i.e., "R&D of Engineering Technology on Eco-forestry", "Technical Research on Oriented Cultivation and Effective Utilization of High-quality Timber for Industrial Purpose", and "Research and Demonstration of the Technology to Combat Desertification";
- Major S&T Research Project of Guangdong Province under the Tenth Five-Year Plan--"Research on the Carrying Capacity of Net-cage Culture in Shallow Sea and Bio-rehabilitation Technology for Its Degraded Environment";
- Project of Science and Technology Commission of Shandong Province--"Restoration and Regulation of Aging Shoals in Seashell Cultivation Areas".

7.2. International Cooperation

One of the successful experiences of China's environmental protection is to base on national conditions, learn and introduce good experience and technology from abroad, and develop them with innovation from time to time. The Chinese Government has always been positively engaged in global environmental protection, intensified international environmental exchanges and cooperation, enhanced its capacity in addressing environment issues and played its active role in international cooperation on environment and development.

7.2.1. Relevant International Environmental Conventions Signed or Acceded to by China

China supports and actively takes part in the environmental affairs undertaken by UN system. As a member of UNEP Governing Council of its all previous phases, China has conducted fruitful cooperation with UNEP.

Up to now, China has concluded or acceded to more than 50 international environmental conventions, among which the following are concerned with marine environmental protection:

- *United Nations Convention on the Law of the Sea* (1982)
- *International Convention on Civil Liability for Oil Pollution Damage* (1992)
- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters* (1972)
- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters* (1972) and its 1996 Protocol
- *International Convention for the Prevention of Pollution from Ships* (1973), revised by 1978 Protocol（MARPOL73/78）
- *International Convention on Oil Pollution Preparedness, Response and Cooperation* (1990)
- *Convention on Biodiversity* (1992)
- *Global Programme of Action for the Protection of Marine Environment from Land-based Activities* (GPA)（1995）
- *Convention on Wetlands of International Importance Especially as Waterfowl Habitat*（1971）

In addition, China has signed more than 20 bilateral agreements or MOU on environmental protection with such countries as the United States, North Korea, Canada, India, South Korea, Japan, Mongolia, Russia, Germany, Australia, Ukraine, Finland, Norway, Denmark and Netherlands. China keeps close cooperative relationship with UNESCAP and other international organizations, and contributes to environment and development of Asia-Pacific region through environmental cooperation in Northeast Asia, Northwest Pacific Action Plan (NOWPAP) and the Coordinating Body on Action Plan for Seas of East Asia.

The Chinese Government has been earnestly implementing bilateral and multilateral cooperative agreements on marine environment and enhancing the regional cooperation with neighboring coastal countries in this field.

7.2.2. Form and Scope of International Cooperation

1. Form of International Cooperation

The main forms of international cooperation on the protection of marine environment from land-based activities are as follows:

- Bilateral or multilateral inter-governmental cooperation with neighboring countries or other coastal countries
- NOWPAP, Action Plan on Seas of North Asia, and regional cooperation under the environmental cooperation framework in Northeast Asia
- Cooperation with UNEP, GEF, IMO and other international organizations
- Cooperation with World Bank, ADB and other international financial organizations
- A variety of cooperation with marine environmental research institutes and higher education institutes of coastal countries

With the attention of foreign investors to China's market and investment environment after China's accession to WTO, the activities of some foreign NGOs, business activities of enterprises and private institutions also become a emerging form of international cooperation. They actively carry out marine environmental cooperation work with the the governments at all levels, enterprises and investors of China.

2. Scope of International Cooperation

The international cooperation on protection of marine environment from land-based activities covers a wide range of areas, and the major areas are as the followings:

- Policies and laws on regional management of marine environment
- Science and technology on the prevention and control of marine pollution and ecological conservation
- Technology and equipment that are applied in cleaner production and efficient urban sewage treatment
- Promotion of national action plans on environmental protection of watersheds and sea areas

7.2.3. Major International Cooperation Programs

1. UNEP/GEF Program on the South China Sea

UNEP/GEF Program on Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, which has been created under the framework of COBSEA, is a large-scale regional cooperation program on marine environment and attended by seven countries neighboring the South China Sea, that is, China, Vietnam, Cambodia, Thailand, Malaysia, Indonesia, and Philippines. The feasibility study report of the program, after discussions by Chinese and UNEP experts for more than 10 times, basically meet with the requirements of Chinese side. The program was initiated in early 2002 with a period of five years.

UNEP/GEF Program is organized by SEPA, and coordinated by nine national departments including the Ministry of Foreign Affairs, Ministry of Finance and the people's governments of three coastal provinces or autonomous regions along the South China Sea. This Program has secured funds from GEF, Ministry of Finance and other sources. In the six topics in the Project design, China takes part in four topics, i.e., mangroves, seaweeds, wetlands, and controlling land-based pollution.

This Program has obtained important stage-based achievements since its implemention one year ago. National Technical Working Group of the Program reached a consensus upon consideration that China achieved important outcomes on the implementation of this Program during 2002, and that the investigation conducted in the three provinces or autonomous region neighboring the South China Sea had important findings. The special group on seaweeds discovered more than 2,000 ha. of seaweed field in the shallow sea of Hainan, Guangdong Province and Guangxi Autonomous Region for the first time. The special group on mangrove undertook systematic investigations on the mangroves in coastal area of the South China Sea and found the most intact and original wild Silver Tree species community, mangrove beach snad dune vegetation and the semi-mangrove vegetation transition plant colonies. The special group on wetlands has primarily established the GIS for marine wetlands in the South China Sea, and completed the mapping of marine wetland types in South China Sea with the identification of wetland area. The special group on the prevention and control of land-based pollution has basically completed the investigation, statistics and analysis of land-based pollution in the South China Sea. It has conducted focused investigations on three hotspots, namely, the Pearl River estuary, urban Beihai area and Nanliu River catchments, and Daya Bay catchments. In

doing so, it has created a primary information system for land-based pollution in the South China Sea.

2. Northwest Pacific Action Plan (NOWPAP)

Northwest Pacific Action Plan, NOWPAP in brief, is one of the 14 global programmes of action on regional seas organized by UNEP to protect marine environment. The purpose of NOWPAP is to promote the cooperation of coastal countries in Northwest Pacific Region on the protection of regional marine environment and facilitate marine environmental protection of all member countries. China, Japan, South Korea and Russia are the full member countries of NOWPAP, and North Korea is an informal member. NOWPAP held regular intergovernmental meetings that are attended by all member countries to identify the scope and structure of NOWPAP, discuss its progress, work plan and budgets, and raise operational funds. In order to implement NOWPAP, a trust fund has been established.

The seven priority sub-programs conducted by NOWPAP are as follows:

- Sub-program on integrated database and management information system （NOWPAP/1）;
- Sub-program on environment policies, laws and regulations, and strategies of countries in this region（NOWPAP/2）;
- Sub-program on environmental monitoring and assessment of coastal and offshore waters and freshwater（NOWPAP/3）;
- Sub-program on preparedness and response to pollution caused by oil spills at the sea（NOWPAP/4）;
- Establishment of a coordinating body for the action plan（NOWPAP/5）;
- Sub-program on publicity and education of marine environmental protection（NOWPAP/6）;
- Sub-program on the protection of marine environment from land-based activities（NOWPAP/7）。

The Action Plan has been adopted by Chinese Government, and the implementation of such plan is both the commitments of Chinese Government to international programme and the specific action to implement the 21st Agenda. The implementation of the Plan reflects the basic policy of China on marine environmental issues, safeguards the national rights and interests, maintains the good image of Chinese

Government and protects marine environment.

3. Other International Cooperative Mechanisms on Marine Environmental Protection

Other international cooperation programs on marine environmental protection includes the Program for Establishing Cooperative Partnership for Protection and Management of East Asia Oceanic Environment, Building Partnerships for the Environmental Protection and Management of the East Asian Seas—Bohai, Capacity Building of Integrated Coastal Management of South China Sea, Sub-Commission for the Western Pacific of Intergovernmental Oceanographic Committee (IOC/WESTPAC), the Partnership in Environmental Management for the Seas of East Asia (PEMSEA), the Marine Resources Working Group under the APEC, the Coordinating Body on Seas of East Asia (COBSEA), etc.

4. Cooperation Programs with Canadian International Development Agency

China has undertaken 9 cooperation programs with CIDA through the former Ministry of Foreign Trade and Economic Cooperation. These programs mainly include the China Council for International Cooperation on Environment and Development (CCICED), capacity building, conservation of biodiversity and community development.

5. Sino-German Program on Environment Policy Consultation Service and Environment Management

The Program on Environment Policy Consultation Services and Environment Management was officially approved by China-Germeny Loint Government Development Cooperation Committee in May 2002. The Program officially commenced on January 1, 2003 and lasted for a period of three years with total donation of 3.5 million Euro dollars. It has four sub-programs focusing on 1) consultation of environment policy; 2) environment management of enterprises; 3) capacity building of personnel in environment system; and 4) capacity building for national ISO14001 system. Foreign Economic Cooperation Center of SEPA and Tianjin Municipal Environmental Protection Buraeu are responsible for specific implementation of those programs. The Program Management Office, which was jointly set up by Foreign Economic Cooperation Center and GTZ, takes charge of the routine operation of the Program.

6. Sino-Netherlands Program on the Overall Plan for Pollution Prevention and Control of the Taihu Lake

In 1999, Grontmij Company of Netherlands and Foreign Economic Cooperation Center of SEPA signed an agreement on the implementation of the Program on Overall Plan for Pollution Prevention and Control of the Taihu Lake. The Program is aimed to formulate the *Outline of the Overall Plan for Pollution Prevention and Control of the Taihu Lake* through comprehensive evaluation of socio-economic activities, water quality, ecological conditions, pollution situation, and water resources management of the Taihu Lake watershed so as to provide theoretical recommendations and references for China to treat Taihu Lake pollution and for Netherland Government and enterprises that take part in the programme. The donation to the Program from Netherland is 582,500 U.S. dollars.

7. Cooperation Programs of China-Korean Joint Committee

There are 16 cooperation programs under China-South Korean Joint Committee. They include such projects as the research on the technology to control non-point water pollution, acid rain, joint environmental investigation on the Yellow Sea, compost by wastes, study on the technology to recycle and treat high-concentration organic wastewater and the joint research on sand dust.

8. Cooperation Programs with Italian Ministry of Environment

At present, SEPA is conducting cooperation programs directly with the Ministry of Environment of Italy. The programs cover 11 fields including biodiversity, sustainable agriculture, ozone layer protection and sustainable energy.

9. Cooperation Programs with US Environmental Protection Agency

There are 8 cooperation programs with Environmental Protection Agency (EPA) of the United States, 6 programs between the former Ministry of Foreign Trade and Economic Cooperation of China and Trade Development Agency (TDA) of the US, and one cooperation program with East Asian-Pacific Environment Promotion Foundation of the United States. The programs mainly involve environmental monitoring, the impacts of environmental pollution on health, energy conservation of buildings and legal training.

10. Cooperation Programs with Australian Embassy

China has one program jointly conducted with Australian Embassy, that is, the

Research Program on the Development Policy of China's Environmental Industry.

11. Cooperation Programs under China-Japan Joint Committee

China has six cooperation programs with Japan through the Ministry of Science and Technology, Ministry of Finance, and the former Ministry of Foreign Trade and Economic Cooperation, and 30 other projects under China-Japan Joint Committee in the areas of capacity building, the establishment of information system and technical research and development.

12. Cooperation Program with Sweden International Development Agency (SIDA)

There is one program financed by Sweden International Development Agency (SIDA), namely, China-Sweden Training Program on Environmental Impact Assessment.

13. China-ASEAN Environmental Cooperation

At the China-ASEAN Summit held in Phnom Penh of Cambodia in November 2002, the two sides signed the *Framework Agreement on Comprehensive Economic Cooperation between the People's Republic of China and the ASEAN Countries*, which identifies even more specific target, scope, measures and timetable to establish the world largest free trade zone with a population of 1.7 billion by the year 2010. Both China and ASEAN identified environmental cooperation as one of the areas for cooperation.

At the moment when China and ASEAN countries are experiencing rapid economic growth, especially when ASEAN-China, Japan and South Korea (10+3) and ASEAN-China (10+1) have increasingly close cooperation in such areas as political, economic and trade, agricultural and forestry, the region is also facing increasing environmental pressure. The signing of the *Framework Agreement on Cooperation,* which is one of the important regional cooperation programs, not only marks the official startup of the process for China-ASEAN free trade zone, but also indicates that China and ten Southeast Asian countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Burma, Philippines, Singapore, Thailand and Vietnam) will carry out environmental cooperation in wider scope and integrate regional environmental resources.

14. Northeast Asia Environment Cooperation Meeting

Northeast Asia Environment Cooperation Meeting is a policy dialogue mechanism

among environmental protection agencies of the governments of China, Japan, South Korea, Russia and Mongolia. Established in 1992, it holds regular meetings once a year. Up to now, the five member countries of Northeast Asia Environment Cooperation Mechanism has had dialogues and conducted inter-regional cooperation on a variety of areas, such as the control of sandstorm on a regional basis, transboundary nature reserves of China, Russia and Mongolia, industrial acid rain, pollution of Northwest Pacific region, and the protection and development of the Yellow Sea. The above efforts have enhanced mutual understanding, exchange of experience and promoted cooperation. The Northeast Asia Environment Cooperation Meeting has become one of the important dialogue channels among environmental protection agencies of governments of the five countries.

Chapter 8 Existing Problems on the Control of Land-Source Pollution and Recommendations

8.1. Existing Problems

8.1.1. Marine Environment Facing Great Pressure

As the most developed region of China, coastal areas enjoy rapid and sustained socio-economic development momentum and soaring GDP growth. Without effective control measures, the pollutant discharge amount of both land areas and at seas will increase dramatically. Rapid economic growth and increasing population in coastal areas bring great pressure on water environment of rivers and coastal sea areas.

8.1.2. Arduous Task in Construction Projects for Pollution Control

During the Tenth Five-Year Plan period, some construction projects failed to be completed as scheduled due to poor capacity and insufficient capital inputs, and must be extended to the Eleventh Five-Year Plan period. Moreover, coastal areas are confronted with dual pressure from both sharply increasing pollutant load and higher environmental demands of socio-economic development during the Eleventh Five-Year Plan period. Therefore, the task to cut down pollutants remains very hard, and the investment, construction, management and operation of various engineering projects under pollution control plans all experience certain difficulties and challenges.

8.1.3. Challenges in Supervision Work

The evaluation results of the Tenth Five-Year Plan showed that currently the supervision and management work in relation to marine environmental protection failed to meet the demands for environmental protection, the supervision level needs to be raised, and so are the supervision efforts. During the Eleventh Five-Year Plan period, with rapid economic and population growth, drastically increase of pollutant load and the construction of relevant projects, environmental supervision and management will face very tough task. We must pay attention to and enhance the

supervision capacity building of relevant departments on marine environmental protection. At the same time, we must give full play to the supervision capacity of departments on marine affairs, intensify inter-department overall planning and coordination, collectively promote and ensure the implementation of various tasks, respond to possible impacts and facilitate the achievement of goal of protecting the marine environment and reducing land-source pollution.

8.2. Recommendations on the Control of Land-based Pollution

8.2.1. Enhance the Organization, Coordination and Implementation of NPA

Efforts should be made to promote the development of National Programme of Action for the Marine Environment from Land-based Activities (NPA), and enhance the organization, coordination, instruction, inspection and supervision work. It is recommended to set up an inter-regional and inter-department coordinating leading group for the action plan as entrusted and approved by the State Council and on the basis of the Joint Meeting of the Action Plan for the Seas, with the coordinating body headed by SEPA and composed by relevant departments and governments of coastal provinces, autonomous regions and municipalities directly under the Central Government. The Coordinating Body sets up an office in charge of daily management, information communication, coordination and liaison.

1. **Implement the administrative leader responsibility system for marine environmental protection**

   A. In coastal areas, local governments at all levels should identify their own targets and tasks in accordance with the National Programme of Action for the Marine Environment from Land-based Activities (NPA) adopted by the country, and integrate the Blue Sea Action Plan formulated and implemented in some sea areas. In accordance with environment quality conditions of local area, they should work out specific annual plan of implementation, and incorporate the specific targets and measures on both controlling total pollutant discharge amount into seas and improving the environmental quality of offshore areas into local government work plan and economic and social development plan, and organize relevant departments for the implementation. Each local government should rationally design the layout of marine industry, actively develop a resource-saving and

environment-friendly marine industry, and vigorously promote circular economy during the formulation of marine economic development plans.

B. Local governments at all levels in the upper reaches and coastal areas should make overall plans and take into consideration of environmental protection targets of both offshore areas and the upper reaches in accordance with NPA. They should also meet water quality targets and the target of control total pollutant discharge of the water sections bordering provinces and cities or between prefectural cities, according to the water quality target at the mouth of rivers flowing into the sea and the total amount of pollutants such as nitrogen and phosphor. The environmental problems of trans-prefectures (or cities)-border rivers will be coordinated by provincial (municipal) government, and that of trans-provinces (municipality)-border rivers flowing into the sea will be coordinated by the State. These targets shall be incorporated into the watershed plan for the prevention and control of water pollution.

C. In coastal areas, local governments at all levels should, in accordance with the tasks and responsibilities for marine environmental protection, improve the institution for marine environmental protection, enhance the team of grassroots law enforcing workers and intensify the law enforcement forces. Each provincial and municipal environmental protection agency should set up an organ on marine environmental management, and counties and county-level environmental protection agencies should have full-time staff on marine environmental management. Marine, maritime, and fishery departments should improve marine environmental management organization in accordance with their respective functions and conditions. Measures should be taken to reverse the situation of insufficient management tools, low supervision and surveillance level and outdated technical equipment. Efforts should be made to improve the modernization level of marine environmental protection so that the supervision and management capacity can meet the requirements of action plans at each sea area.

D. Local governments at all levels in coastal areas should earnestly enhance the unified leadership in the action plan for the protection of marine environment from land-based pollution in their respective administrative regions, give full play to the strength of each department and unit, make plans and take steps to

improve the offshore environmental quality, safeguard public health and conduct a variety of activities favorable to the marine ecological environment. Positive efforts should be made to address environmental pollution and ecological damages in offshore areas, and gradually realize the coordinated development of marine environment, economy and society.

2. Strengthen the development of regulations of each sea area on environmental management

Efforts should be made to enhance legal development, establish and improve the legal system for regional marine environmental protection. The major measures are as follows:

A. Formulate regulations on marine environmental protection of all sea areas so as to provide basic legal criteria with distinctive regional features to promote and safeguard marine environment from land-based activities.

B. Further improve environmental standard system related to maritime affairs, for example, completing the compilation of the "Standards for Sewage Discharge by Fishing Ships", "Standards for the Assessment of Pollution of Marine Sediments", and "Standards for the Assessment of Pollutants within the Body of Marine Organisms".

C. Formulate department rules and regulations as soon as possible, such as regulations on the protection of fishery resources of the Seas, regulations on eco-environmental protection of fishery water areas, measures on forbidding the production, sale, and use of detergents with phosphor in coastal areas, regulations on the introduction of biological species, and measures on the formulation of contingency plans for pollution accidents of major enterprises in coastal areas, etc..

D. Coastal provinces, autonomous regions, municipalities directly under the Central Government, and cities empowered with law-making powers in accordance with Legislation Law should, according to national laws and administrative regulations on the protection of marine environment and resources and in line with the environmental quality of offshore areas within the administrative region, enhance the formulation of local regulations on marine environmental protection, so that the action for the protection of marine environment from land-based activities in the seas can have laws and regulations to follow.

8.2.2. Improve Policy Measures on Environmental Management

In order to strengthen environmental management of each coastal region and protect ecological environment of each sea area, it is recommended that the following policy measures be taken as important components of the programme of action:

1. When developing marine economic development plan, local authority should appropriately plan the distribution of marine industries, actively develop the marine industries that are resource saving and environment-friendly and vigorously facilitate marine circular economy.
2. Coastal province (municipality and autonomous region) will promote theapplication of phosphorus-free detergents in an all round way. They will ban the selling and utilization of any phosphorus-containing detergent products.
3. The List of major counties/district on the control of pesticides and fertilizer pollution will be issued in costal provinces (municipality and autonomous region). The authority will put forward control index, identify the tasks and develop relevant regulations. In addition, they will carry out the demonstration work on comprehensive prevention and control of non-point pollution caused by fertilizers, pesticides and livestock & poultry breeding.
4. The intensive livestock and poultry breeding farms of the coastal provinces (municipality and autonomous region) shall strictly comply with the pollution discharge standard of pollutants of the livestock & poultry breeding industry, and the discharged pollutants shall meet the standard.
5. Sewage treatment facilities of new cities shall adopt the treatment process with high capacity in removing nitrogen and phosphorus. Existing sewage treatment plants should create conditions for improving efficiency.
6. The authorities will make more efforts in the development of various coastal nature reserves, special protected areas and ecological demonstration sites.
7. The authority will identify marine ecological isolation belt or ecological protected areas according to local conditions. Such activities as sand mining, livestock and poultry breeding, cultivation of wasteland and vegetation destruction shall be prohibited in the isolation belt or within the protected areas. New construction projects and tourist facilities shall not be constructed. The cultivated wasteland if any shall gradually resume its original landscape. Any

construction projects and tourist facilities that have been finished shall meet all standards for the discharge of pollutants. If not, the authority shall order it to "close down, stop operation, emerge with other enterprises or shift to other operation"in a given period of time.

8. The authority will enhance environmental management of tourism, strictly control the construction of tourist facilities in scenic spots, raise the treatment percentage of the sewage and garbage of the tourist areas. It will strive for the goal that the tourist industry has smooth development with more tourists but less pollution. A proportion of tourism revenue will be used for ecological restoration, ecological development and the development of pollution treatment facilities.

9. According to national guidelines for environmental protection planning of the development of small cities and towns, the authority will carry out concentrated pollution control in township industrial zones of coastal provinces (municipality and autonomous region. It will strengthen the construction of environmental infrastructure, protect major waters and species habitats, raise vegetation coverage, build garden communities and set good examples for environmental protection in small cities and towns.

10. The discharge of oil-containing waste water from off-shore petroleum platform must comply with the standard. Oil-based mud is prohibited in drillings.

11. The authority will strictly control the establishment of new sea waste dumping areas in each sea. Work should be done to clean and assess the existing sea waste dumping areas. For the dumping area evidently affecting marine ecological system, the authority shall stop their use or shut down them in a given period of time. For the necessary new dumping area, the authority must make strict checks and intensify the supervision and management.

12. The authority will carry out the investigation on aquaculture capacity, plan the aquacultural waters in a scientific way, identify the aquacultural density and promote healthy ecological aquaculture pattern.

13. The authority will comprehensively implement the "Three synchronization" system in port development and ensure that the installations for the prevention and control of pollution of port and dock shall be designed, built and commissioned together with the principal part of the project.

14. The authority will draft the "Regulations on the Discharge of Ship Water Ballast" to control the release of ship ballast water.

15. Large and medium sized fishing boats will install oil-water separator to meet pollutant discharge standard.

16. The authority will carry out strict ship management, expedite the phrasing out of single-shell oil ships navigating along Chinese coast and impose restrictions on oil and low-standard ships engaging in the transportation of bulk liquid chemicals.

8.2.3. Implementing Total Amount Control System

1. Establish supervision and check system

SEPA should, in cooperation with the Ministry of Supervision and other relevant departments, inspect each sea area the implementation of the programme of action for the protection of marine environment from land-based activities. The people's governments at all levels of coastal province (municipality or autonomous region) should mainstream the objectives and tasks specified in the programme of action for the protection of marine environment of the sea area from land-based activities into their government report and report it to the people's congress at the same level and local government at next higher level

The environmental protection departments at all levels of coastal province (municipality or autonomous region) should carry out strict supervision and administration on the treatment project under plan. In particular, they should enhance the monitoring and control on the enterprises shut down or stopping their operation due to heavy pollution to prevent the rebound of serious pollution. At the same time, they should strengthen the analysis and evaluation on environmental monitoring results, identify in time the cause of abnormal situations to provide basis for environmental decision making and ensure smooth implemention of the programme of action for the protection of the sea area environment from land-based activities.

2. Implementing various environmental management systems including the total amount control system

Pollutants of each sea area come from industrial waste water, domestic sewage, agricultural non-point sources, livestock and fowl breeding, aquaculture, transportation, navigation and atmospheric precipitation, etc. The objective of protecting sea area environment cannot be met until total amount control system is

implemented with comprehensive treatment. Therefore, on the basis of the realization of "One control, two meeting the standards" in coastal areas, establishing and implementing the total amount control system of in-flowing land pollutants is the key for the protection of water quality of coastal waters in the light of the stipulations of the Law of People's Republic of China on the Protection of Marine Environment and the requirements of the pragramme of action for the protection of marine environment from land-based activities. The total amount control work begins from the control of point pollution sources and gradually extends to the control of non-point sources. Apart from controlling COD, more efforts should be made to control the discharge of nitrogen and phosphorus. Also, the target total amount control system is implemented in the first place, when the conditions become mature, we should shift to capacity total amount control system.

We will actively promote clean production. For the enterprises meeting pollution discharge standards but exceeding the total amount limit, we will take such measures as promoting clean production and implementing ecological project to further reduce the release of pollutants.

We will strictly carry out various environmental management systems, especially the "Environmental impact assessment system", "Three synchronizations system" and the system of treatment within a given period of time and rigorously investigate legal responsibilities of the violators.

We will strictly implement the zoning of environmental functions and marine functions of coastal sea areas. Any unit or individual who engages in navigation, exploration, development, production, tourism, scientific studies and other activities in coastal sea waters or the activities at coastal land areas that affect coastal environment, shall comply with the requirements of relevant sea zoning. Local government at all levels of coastal regions should, according to law, strengthen the management on environmental function areas and marine function areas of coastal waters, prohibit any unit and individual in changing the zoning without any authorization, and take effective measures to improve marine environment quality.

8.2.4. Enhance Capacity Building in Supervision and Management

1. Enhance capacity building in environmental monitoring in practical way

We will enhance the capacity building in environmental monitoring to facilitate smooth and effective implementation of the planning and ensure effective assessment of the planning implementation. The focuses include the enhancement of the

monitoring of river-basin control sections, control unit of function areas and major pollution sources along the coast. We will facilitate the monitoring of total amount of pollutants that flow into seas; intensify on-line monitoring of pollution sources and automatic monitoring of water quality; carry out ecological monitoring and comprehensive eco-environment investigations of the Bohai Sea and establish a coordinated land-sea environmental monitoring system around the Bohai Sea coastal regions. In addition, we will master and apply advanced technologies such as remote sensing and automatic monitoring, gradually realize modern means of monitoring so as to develop a monitoring system for environmental quality, accidents and disasters in coastal regions.

2. Strengthen the capacity building in emergency response in a practical way

We will improve the awareness in preventing marine environmental risks and step up the capacity building in the response to sudden environmental accidents. We will establish a three-dimension monitoring network for sea oil spills and develop and improve the oil spill evaluation technology. We will improve the emergency response system for major ship pollution accidents and establish a ship pollution emergency response system suitable for the navigation situation of China in the light of national laws and regulations and the requirements for implementing 1990 OPRC. At the same time, centering on the development of emergency response plan and emergency response coordination command center, we will do well such work as the construction of hardware facilities for oil spill emergencies, the integration of emergency response resources, the study on emergency response technologies and ensurance of emergency funds. In doing so, we will provide technical reserve and practical guarantee for the handling of sudden environmental accidents.

8.2.5. Promote the Implementation of NPA Related Actions

1. Control of industrial pollution sources

The State should provide policy and technical supports to enterprises in terms of promoting industrial restructuring, technical reform and clean production.

2. Control of urban sewage

The State should take such measures as increasing the input in building urban infrastructure, improving sewage network and constructing concentrated sewage treatment plants. We should raise funds in various ways and from different channels

and explore new modes for the operation ofsewage treatment facilities. Only in this way can we ensure that sewage treatment facilities be constructed well, managed well and operated well.

3. Pollution prevention and control of ships and port and the development of monitoring facilities

Relevant government departments should further improve relevant laws, regulations and standards on the control of ship pollution and the construction of port environmental facilities. They should revise the *Regulations of the People's Republic of China on the Prevention of Pollution of Marine Environment by Ships* and the *Effluent Standards for Pollutants from Ships*. An information system tracking the discharge of ship pollutants has been set up to carry out on-line monitoring of ships. We should expand and improve the functions of monitoring systems for ships and carry out three-dimension monitoring on the pollutants discharged by ships. The Central Government will provide necessary support in terms of technical screening and demonstration projects.

4. Pollution control of marine construction program

Relevant national departments should make more efforts in establishing and improving relevant laws, regulations and standards, strengthen environmental management on off-shore projects like sea oil platform to ensure the discharged pollutants meeting standard.

5. Control of non-point pollution

Relevant national departments will take the development of shelter forest system and water and soil conservancy projects in coastal regions as the top priority in relevant plans and launch technical demonstration sites as soon as possible. The projects on the development of ecological agriculture and ecological demonstration sites should make full play of the initiatives of local governments. It is recommended that the Central Government provide necessary guidance and support in terms of policy and funds. The development plan for eco-demonstration sites should be submitted by local government to the competent national administrative department for approval, which will make an unified arrangement and arrange spcial funds.

6. Promotion of ecological aquaculture

Relevant national departments should accelerate the development of technical standards and guidance for ecological aquaculture and actively promote its

development and speed up the shift of growth mode of aquaculture.

7. Development of emergency response capacity for marine pollution accidents

Relevant national departments should put forward a unified plan and implementation program for emergency response projects to sudden marine pollution accident taking into account of the requirements of local governments. Such projects should be developed with the investments from both national and local governments.

8. Development of technical supporting system

The technical supporting system includes such contents as environmental monitoring capacity, marine environmental management system, scientific & technoilogical studies and the development of regulations and standards. The State should allocate special fund to support such work. The development programme shall be submitted by relevant department for review and then submitted to national planning and financial departments for unified arrangements and implementation.

8.2.6. Publicity, Education and Public Participation

1. Enhance the publicity and education on the efforts of each sea area in protecting marine environment from land-based activities

We will bring into play of the role of media in terms of supervision and guidance by public opinions and publicize the significance in implementing the current programme.

We will utilize various opportunities and various methods to carry out regular pubilicity work on the protection of marine environment in order to raise the awareness of the public in marine environmental protection, legal sense and participating environmental protection activities.

We will organize various kinds of training courses on the protection of marine environment, carry out on-the-job education and training for environmental management staff of environmental protection departments at all levels of coastal regions and improve the political and professional capacity of environmental law enforcement team in order to foster many professional talented people with competent capacity and skills in supervising marine environment.

2. Encourage and support public participation in the programme of action for the protection of marine environment of each sea area from land-based activities

We will organize and carry out scientific consultation activities for the protection of marine environment.

The people's government of coastal provinces (municipality and autonomous region) will list the quality of the marine environment under its jurisdiction in the regularly reported information about environmental quality and environmental pollution. They will provide the public and civil society with an information channel and feedback mechanism with which the public may participate in and supervise marine environmental protection.

Relevant competent national department and the department of coastal province (municipality and autonomous region) will jointly organize the volunteer actions on protecting the environment of each sea area from land-based pollution.

8.2.7. Enhance International Environmental Exchanges and Cooperation

Centering on major environmental protection work, the Chinese authority will, based on practical situation of each region, enhance foreign cooperation and exchanges, introduce advanced environmental ideas, management experience, skills, technology and funds. We will do well the work on implementing international environmental conventions and the pubility of environmental achievements of China, strengthen communications, improve understanding, establish and consolidate the good image of China being responsible for global environment and make active contributions to the creation of a good external environment for economic growth and sustainable economic and social development of China.