The Yellow Sea:

Analysis of Environmental Status and Trends

Volume 4: Governance Analysis

UNDP/GEF Project:
Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem

About this publication:

This publication contains the reports of "Governance Analyses" conducted under the UNDP/GEF Project entitled, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem." The publication consists of the following three reports: National Governance Analysis for China, National Governance Analysis for Republic of Korea, and Regional Governance Analysis. The national reports describe governance issues in the Yellow Sea in terms of stakeholders, national institutions, and national policies and legislations. The regional analysis addresses the issues from regional perspectives, providing suggestions on how to improve the current co-operative mechanisms in the Yellow Sea. Research institutes and universities in the region conducted data collection and analysis. Data were collected from online data bases, data information centres, peer-reviewed journal articles, universities, and through interviews with regional experts. The results of the Governance Analyses were used to provide the basic foundation for identifying possible interventions to mitigate the transboundary problems of the Yellow Sea, and greatly contributed to the "Transboundary Diagnostic Analysis" and the "Strategic Action Programme."

DISCLAIMER:

For reference purposes, this report may be cited as:

UNDP/GEF 2008. The Yellow Sea: Governance Analysis Reports. UNDP/GEF Yellow Sea Project, Ansan, Republic of Korea (334 pages).

Cover design: Mr. Xu Jian

Photo credits: Dalian Maritime University

The Yellow Sea:

Governance Analysis Reports

Table of Contents

CHINA

Republic of Korea

Regional Report

Governance Analysis

National Report-China

Xiangmin XU
Shang CHEN
Yan LIU
Meiming ZHONG
Yalin PENG
Mingyuan ZHU
Ming YU
Wei ZHENG
Yang BAI
Yingjie MA
Jian LIU
Yingying DONG
Qixiang WANG

Law School, Ocean University of China; First Institute of Oceanography

Chapter One — Implementation Progress

From April to May 2006, members of our team conducted surveys on five groups of stakeholders concerning the ecological problems of the Yellow Sea, visiting relevant institutions and individuals in Beijing, Liaoning, Shandong and Jiangsu.

Governmental departments related to marine affairs comprised the first group of stakeholders. We worked with 11 departments, i.e. State Oceanic Administration (SOA), North China Sea Branch of SOA, Liaoning Oceanic and Fisheries Department, Shandong Oceanic and Fisheries Department, Shandong Maritime Safety Administration, Jiangsu Oceanic and Fisheries Department, Dalian Oceanic and Fisheries Bureau, Yantai Oceanic and Fisheries Bureau, Qingdao Oceanic and Fisheries Bureau, Qingdao Environmental Protection Bureau, and Huangdao District Oceanic and Fisheries Bureau.

Coastal enterprises comprised the second group of stakeholders. We conducted questionnaires with several enterprises and factories, i.e. marine transportation, sea food processing, marine biological pharmacy, marine chemical industry, coastal shipbuilding, seawater utilization and seashore tourism. The following enterprises answered our questions: Qingdao Harbour Company, Rongchen Xinshan Fishery Company, Qingdao Aohai Marine Pharmacy Factory, Qingdao Electric Power Plant, Qingdao Shipbuilding Factory, Qingdao Guankai Seafood Restaurant, and Qingdao Seashore Tourism Group.

Coastal residents comprised the third group of stakeholders. We visited several residential areas and downtown areas in Qingdao, distributing questionnaires in Lihaihuanyuan, Xiangganglu, Taidong and Xianggangzhonglu.

The fishermen community comprised the fourth group of stakeholders. We visited and conducted questionnaires in 5 fishery villages in Weihai, Yantai and Qingdao.

Non-governmental organizations (NGOs) comprised the fifth group of stakeholders. We contacted several NGOs by email and phone. We conducted interviews with two of them: the Chinese Society of Oceanography in Beijing, and the Shandong Society of Oceanography in Qingdao.

For each group of stakeholders, we designed and delivered questionnaires (see Annexes 1-5 for results) as follows (Table 1-1):

Table 1-1 Questionnaires investigation

Stakeholder	Number of Questionnaires	Number Of Responses
governmental departments	50	46
coastal enterprises	50	35
coastal residents	310	302
fishermen	40	32
NGOs	20	10

In general, most stakeholders visited were pleased to answer our questionnaires, with the exception of enterprise staffs, some of which refused our requests to visit and did not accept our questionnaire.

We completed our analysis on the Yellow Sea stakeholders according to the data and information obtained; the results are shown in the following chapter.

Chapter Two — Stakeholders Analysis of the Yellow Sea

2.1 Current Status of Exploitation and Utilization of the Yellow Sea

2.1.1 Ports Construction and Maritime Transportation

Eight major ports are located in the coastal area of the Yellow Sea, i.e. Dandong Port, Dalian Port, Yantai Port, Weihai Port, Qingdao Port, Rizhao Port, Lianyungang Port and Sheyang Port. The total length of quay line of these 8 ports is 60,668m; the number of 10000-tonnage class berths is 170 (2004 data). Cargo throughput for each of Dalian Port and Qingdao Port exceeds 100 million metric tons per year. In 2005, cargo throughput of Dalian Port reached 120 million tons and 2.651 million standardized containers. In 2005, cargo throughput of Qingdao Port reached 180 million tons and 6 million standardized containers (SOA 2006).

2.1.2 Exploitation of Biological Resources

The mariculture industry has been fully developed in the coastal area of the Yellow Sea. The total area used for mariculture in the Yellow Sea reached 963,204 ha in 2004, of which fish culture accounted for 18,823 ha, crustacean culture 132,791 ha, shellfish culture 643,574 ha, macro algal culture 47,905 ha, and other cultures 120,111 ha. In 2004, the gross benefit of mariculture in the Yellow Sea reached 352.3×106 CNY. The main mariculture areas in the Yellow Sea are: Dalian, Changhai, Changdao, Sanggouwan Bay, Daxiawa (Rizhao), Guanbei and Rudong.

In 2004, the total catch of fish in the Yellow Sea was 3.17 million tons (SOA 2005). The major harvest species were Japanese anchovy, porgy, spotted mackerel, hairtail, pomfret and yellow croaker. Since the 1950's, the fish catch has declined significantly; as well, the body weight and length of fished individuals has continued to decrease.

2.1.3 Coastal Tourism

Coastal tourism is well-developed in the Yellow Sea region. There are

approximately 30 coastal scenic spots in Liaoning, Shandong and Jiangsu provinces, the main ones being Dalian, Lushun, Penglai, Yantai, Weihai, Qingdao, and East-west Island. In 2004, tourism income from the 3 coastal provinces (including some coastal cities of the Bohai Sea) totaled 55.5 billion CNY (SOA 2005). Of this, contributions from domestic tourists amounted to 47.1 billion CNY, while those from inbound tourists (including tourists from Taiwan, Hong Kong, Macau and foreign countries) amounted to 8.5 billion CNY. In that same year, 1.6 million inbound tourists visited major coastal cities in the Yellow Sea; the income from this source was 985.26 thousand USD.

2.1.4 Sea Salt Industry and Seawater Utilization

There are 21 sea salt development areas in the Yellow Sea region, including both exclusive and mixed salt pans (with shrimp culture). The salt pan areas are located mainly in Piziwo, Jingou, Donggou, Qinduizi (Liaoning Province); Yantai, Weihai, Jiaozhou Bay (Shandong Province); and Lianyungang, Nantong (Jiangsu Province).

Seawater desalination is in the preliminary stage of development in the coastal areas of the Yellow Sea. Each of Changdao county and Weihai municipality has one seawater desalination factory. The desalinated seawater is used as drinking water.

A secondary use of seawater is as cooling water for electrical power plants and for some factories in coastal cities, e.g. Qingdao and Weihai.

The discharge of water whose temperatures differ (both warm and cold) from that of the coastal waters causes some changes in the dominant species.

2.2 Identification of Stakeholders

The term stakeholders in this paper refers to the institutions/populations whose benefits are affected due to ecological changes in the Yellow Sea, or due to the utilization activities of other institutions (populations) in the Yellow Sea.

For purposes of this paper, we have grouped the stakeholders into 5 classifications: 1) Marine governmental departments, 2) Coastal industrial enterprises, 3) Coastal residents, 4) Fishermen, and 5) NGOs.

2.2.1 Marine Governmental Departments

Marine governmental departments intervene and balance utilization and protection activities in the Yellow Sea, through drafting and enforcing laws and regulations. The activities of these departments affect the interests of other stakeholders in the Yellow Sea. There are four levels of marine governmental departments in China: 1) ministry, 2) provincial, 3) municipal and 4) county. However, according to the laws of China, ministries and provincial departments have the major responsibilities; therefore, we focused on these management departments.

2.2.1.1 Ministry Departments Related to Marine Management

Four main ministry departments are related to marine affairs, namely:

A) State Oceanic Administration (SOA)

B) State Environmental Protection Administration (SEPA)

C) Bureau of Fisheries Management, Ministry of Agriculture (BOF), and

D) Maritime Safety Administration (MSA).

Table 2-1 shows the marine-related responsibilities of these departments, together with other detailed information.

2.2.1.2 Provincial Departments Related to Marine Management

Provincial departments related to marine management include:

- Liaoning province Oceanic and Fisheries Bureau of Liaoning province, Environmental Protection Administration of Liaoning province, and Liaoning Maritime Safety Administration. Table 2-2 shows marine-related responsibilities and other detailed information.

- Shandong province Oceanic and Fisheries Bureau of Shandong province, Environmental Protection Administration of Shandong province, and Shandong Maritime Safety Administration. Table 2-3 shows marine-related responsibilities and other detailed information.

- Jiangsu province Oceanic and Fisheries Bureau of Jiangsu province, Environmental Protection Administration of Jiangsu province, and Jiangsu Maritime Safety Administration. Table 2-4 shows marine-related responsibilities and other detailed information.

2.2.1.3 Coastal Governmental Departments Related to Marine Management

Coastal governmental departments related to marine management include:

- Dandong—Oceanic and Fisheries Bureau of Dandong, Environmental Protection Administration of Dandong, Maritime Safety Administration of Dandong.

- Dalian—Oceanic and Fisheries Bureau of Dalian, Environmental Protection Administration of Dalian, Maritime Safety Administration of Dalian.

- Yantai—Oceanic and Fisheries Bureau of Yantai, Environmental Protection Administration of Yantai, Maritime Safety Administration of Yantai.

- Weihai—Oceanic and Fisheries Bureau of Weihai, Environmental Protection Administration of Weihai, Maritime Safety Administration of Weihai.

- Qingdao—Oceanic and Fisheries Bureau of Qingdao, Environmental Protection Administration of Qingdao, Maritime Safety Administration of Qingdao.

- Rizhao—Oceanic and Fisheries Bureau of Rizhao, Environmental Protection Administration of Rizhao, Maritime Safety Administration of Rizhao.

- Lianyungang—Oceanic and Fisheries Bureau of Lianyungang, Environmental Protection Administration of Lianyungang, Maritime Safety Administration of Lianyungang.

- Yancheng—Oceanic and Fisheries Bureau of Yancheng, Environmental Protection Administration of Yancheng, Maritime Safety Administration of Yancheng.

- Nantong—Oceanic and Fisheries Bureau of Nantong, Environmental Protection Administration of Nantong, Maritime Safety Administration of Nantong.

Table 2-1 Ministry Level Departments Related to Marine Management

		State Oceanic Administration (SOA)	Bureau of Fisheries Management, Ministry of Agriculture (BOF,MOA)	State Environmental Protection Administration (SEPA)	Maritime Safety Administration (MSA)
Upper Unit		Ministry of Land and Resources	Ministry of Agriculture	State Council	Ministry of Communication
Governing Laws		1) Marine Environmental Protection Law of the People s Republic of China (PRC) 2) Sea Area Use Management of PRC	1) Fisheries Law of PRC 2) Marine Environmental Protection Law of PRC	1) Environmental Protection Law of PRC 2) Marine Environmental Protection Law of the PRC 3) Environmental Impact Assessment Law of PRC	1) Maritime Traffic Safety Law of PRC 2) Marine Environmental Protection Law of PRC 3) Regulation on the prevention of pollution from vessels of PRC
Internal marine-related sections		1) Policies, Laws, Regulation and Programming; 2) Sea Area Use Management; 3) Marine Environmental Protection; 4) Science and Technology; 5) International Co-operation	1) Integrated Office; 2) Policies, Laws and Regulations; 3) Planning; 4) Boats and Port; 5) Resources and Environmental Protection; 6) Mariculture; 7) Market and Process; 8) Ocean Fishery; 9) International Co-operation	1) Policies, Laws and Regulations; 2) Science, Technology and Standards; 3) Pollution Control; 4) Nature and Ecology Conservation; 5) Environmental Impact Assessment Management; 6) Development of Environmental Supervision; 7) Office of Marine Environmental Protection 8) International Co-operation	1) Laws and Regulations; 2) Planning and Basic Construction; 3) Navigation Management; 4) Vessels Supervision; 5) Sailor Management; 6) Vessel Inspection 7) Navigation Mark and Mapping; 8) Safety; Administration; 9) Office of Environmental Protection
Subordinate agency related to the Yellow Sea		North China Sea Branch	Fisheries Management and Fishing Harbour Superintendence of the Yellow Sea and Bohai Sea (FMFHSYB)	Environmental Monitoring Centre of China	1) Liaoning Maritime Safety Bureau; 2) Shandong Maritime Safety Bureau; 3) Jiangsu Maritime Safety Bureau
Contacting Information	Address	1 Fuxingmenwai Ave, Beijing	11 Nongzhanguannanli Rd, Beijing	115 Xizhimennanjie St, West District, Beijing	11 Jianguomenneidajie Ave, Beijing
	ZIP code	100860	100026	100035	100736
	Tel	010—66151780	(010) 64193366	010—66151780	010-65293200
	Web site	www.soa.gov.cn	www.agri.gov.cn	www.sepa.gov.cn	www.msa.gov.cn

Table 2-2 Departments Related to Marine Management in Liaoning Province

		Oceanic and Fisheries Bureau of Liaoning	Environmental Protection Administration of Liaoning Province	Maritime Safety Administration of Liaoning Province
Upper Unit		Liaoning provincial government; Accepting technical guidance from SOA and BOF, MOA	Liaoning provincial government; Accepting technical guidance from SEPA	Maritime Safety Administration
Major Responsibility		See Chapter 3	See Chapter 3	See Chapter 3
Administrative Waters		Inter-tidal zone and waters between coastal line and 12nm territorial line in the Yellow Sea	Coastal waters (boundary not decided)	Port, navigation line, freshwater, etc.
Major supporting Laws		1) Marine Environmental Protection Law of PRC 2) Sea Area Use Management Law of PRC 3) Fisheries Law of PRC	1) Marine Environmental Protection Law of PRC 2) Environmental Protection Law of PRC	1) Maritime Traffic Safety Law of PRC 2) Regulation of Vessels' Pollution Prevention of PRC
Sections on Inter Departments		1) Policy, Laws and Regulations 2) Planning and Finance 3) Sea Area Use Management 4) Marine Environmental Protection 5) Fishing Port Supervision 6) Fishery 7) Marine Surveillance Section	1) Policies, Laws and Regulations 2) Science, Technology and Standards 3) Pollution Control 4) Nature and Ecological Conservation 5) Environmental Supervision 6) International Co-operation	1) Navigation Management 2) Vessels Supervision 3) Pollution Prevention 4) Laws and Regulations
Subordinate Agency Related to the Yellow Sea		Liaoning Fishery Harbour Superintendence	Environmental Monitoring Centre of Liaoning province	Dalian Office and Dandong Office
Contacting Information	Address	2 Taiyuanbeijie Rd, Heping District, Shenyang	34 Shandong Rd, Yuhong District, Shenyang	25 Changjiang Rd, Zhongshan District, Dalian
	ZIP	110001	110033	116001
	Tel	024-23414301	024-86625021	—
	Web site	www.lnhyw.gov.cn	www.lnepb.gov.cn	www.lnmsa.gov.cn

Table 2-3 Departments Related to Marine Management in Shandong Province

		Oceanic and Fisheries Bureau of Shandong Province	Environmental Protection Administration of Shandong Province	Maritime Safety Administration of Shandong Province
Subjected to		Shandong provincial government; Accepting technical guidance from SOA and BOF,MOA	Shandong provincial government; Accepting technical guidance from SEPA	Maritime Safety Administration
Major responsibility		1) Supervising marine environmental protection of Shandong 2) Supervising the utilization of the Sea Area of Shandong 3) Having responsibility for the utilization and protection of fishery resources of Shandong	1) Guiding, coordinating and supervising marine environmental protection across the region 2) Supervising marine pollution prevention due to land-sourced pollution, vessels, and coastal projects 3) Guiding and coordinating major environmental problems in local regions, departments and cross-regions and cross-river basins 4) Handling major environmental pollution accidents and ecological damages accidents	1) Supervising maritime traffic safety of coastal areas, ports, and rivers of coastal cities in Liaoning province 2) Supervising pollution from vessels, and inspecting vessels and marine facilities
Administrate Waters		Inter-tidal zone and waters between the coastal line and 12nm territorial line in the Yellow Sea	Coastal waters (boundary not determined)	Port, navigation line, freshwater, etc.
Major supporting Laws		1) Marine Environmental Protection Law of PRC 2) Law of Administration on the Use of the Sea Area of PRC 3) Fisheries Law of PRC	1) Marine Environmental Protection Law of PRC 2) Environmental Protection Law of PRC	1) Maritime Traffic Safety Law of PRC 2) Regulation of Vessels' Pollution Prevention of PRC
Internal marine-related Departments		1) Policy, Laws and Regulations 2) Technology and International Co-operation 3) Sea Area Use Management 4) Marine Environmental Protection 5) Fishery	1) Planning and Finance 2) Policies, Laws and Regulations 3) Science, Technology and Standards 4) Pollution Control 5) Nature and Ecological Conservation	1) Transportation Management 2) Vessels Supervision 3) Pollution Prevention 4) Laws and Regulation
Subordinate Agency Related to the Yellow Sea		1) Shandong Fishery Superintendence (also as Shandong Marine Surveillance) 2) Shandong Fishery Vessels Inspection Bureau	Environmental Monitoring of Shandong province	Yantai Office, Jinan Office, Qingdao Office, Rizhao Office, and Weihai Office
Contacting Information	Address	162 Jiefang Rd, Jinan	12 Zhijinshi Rd, Jinan	21 Wuxia Rd, Qingdao
	ZIP	250013	250012	266002
	Tel	0531-86956442	0531-86106112	0532-86671192
	Web site	www.hssd.gov.cn	www.sdein.gov.cn	www.sdmsa.gov.cn

Table 2-4 Departments Related to Marine Management in Jiangsu Province

		Oceanic and Fisheries Bureau of Jiangsu Province	Environmental Protection Administration of Jiangsu Province	Maritime Safety Administration of Jiangsu Province
Subjected to		Jiangsu provincial government; Accepting technical guidance from SOA and BOF,MOA	Jiangsu provincial government; Accepting technical guidance from SEPA	Maritime Safety Administration
Major Responsibility		1) Supervising the marine environmental protection of Shandong 2) Supervising the utilization of sea area of Shandong 3) Responsible for the utilization and protection of fishery resources of Shandong	1) Guiding, coordinating and supervising marine environmental protection across the region 2) Supervising marine pollution prevention due to land-sourced pollution, vessels, and coastal projects 3) Guiding and coordinating major environmental problems in local regions, departments and cross-regions and cross-river basins 4) Handling major environmental pollution accidents and ecological damages accidents	1) Supervising the maritime traffic safety of coastal areas, ports, and rivers of coastal cities in Liaoning province 2) Supervising pollution from vessels, and inspecting vessels and marine facilities
Administrative Waters		Inter-tidal zone and waters between coastal line and 12nm territorial line in the Yellow Sea	Coastal waters (boundary not decided)	Port, navigation line, freshwater, etc.
Major Supporting Laws		1) Marine Environmental Protection Law of PRC 2) Law of Administration on the Use of the Sea Area of PRC 3) Fisheries Law of PRC	1) Marine Environmental Protection Law of PRC 2) Environmental Protection Law of PRC	1) Maritime Traffic Safety Law of PRC 2) Regulation of Vessel Pollution Prevention of the PRC
Sections on Internal Marine-related Departments		1) Policy, Laws and Regulations 2) Planning and Finance 3) Sea Area Use Management 4) Fishery 5) Marine Resource and Environmental Protection 6) Technology and Education	1) Planning and Finance 2) Science and Technology 3) Pollution Control 4) Nature and Ecological Conservation 5) Environmental Management 6) Environmental Supervision 7) Environmental Monitoring 8) Policies, Laws and Regulations	1) Navigation Management 2) Vessel Supervision 3) Pollution Prevention 4) Laws and Regulations
Subordinate agency Related to the Yellow Sea		1) Fisheries management of Jiangsu 2) Jiangsu Fishery Vessels Superintendence	Environmental Monitoring Centre of Jiangsu province	Lianyungang Office, Yancheng Office, Nantong Office
Contacting Information	Address	90 Xinmofan Rd, Nanjing	70 Beijingxi Rd, Nanjing	1 Beijingxi Rd, Nanjing
	ZIP	210003	210013	210013
	Tel.	025-83581200	025-83305768	—
	Web site	www.jsof.gov.cn	www.jshb.gov.cn	www.js-msa.gov.cn

2.2.2 Coastal Enterprises

Coastal enterprises are the main contributors to the marine economy; they create various products by using several kinds of resources from the Yellow Sea. Due to inappropriate utilization activities, coastal enterprises are the parties most responsible for damages that have been inflicted upon the yellow Sea; thus, they bear the greatest responsibility for its protection.

According to the classification system of marine industry in the China Marine Statistical Yearbook 2005, coastal enterprises are divided into 9 types: Marine Salt, Marine Chemical, Marine Biological and Pharmaceutical, Marine Shipbuilding, Marine Electric Power, Marine Seawater Utilization, Marine Engineering Architecture, Marine Transportation, and Coastal Tourism.

We note (from table 2-5) that Liaoning province and Shandong province are located in coastal areas of both the Yellow Sea and Bohai Sea. It is difficult to distinguish the contribution of the Yellow Sea from the overall statistical data of each province; thus, the following data also include the contribution of the Bohai Sea. Even with this limitation, we feel that the statistical data indicates a rough trend of the utilization of the Yellow Sea.

In 2004, total output value of marine industry reached 1514.94×10^8 CNY. Coastal tourism was the most important source, accounting for 1/3 of the total. Marine transportation and marine shipbuilding rank after tourism, accounting together for 1/3 of the total. The other types of enterprises listed above accounted for the remainder.

Table 2-5 Marine Industrial Output Value of Three Coastal Provinces of the Yellow Sea in 2004 (Unit: $\times10^8$ CNY) (from SOA 2005)

Major marine industries	Liaoning	Shandong	Jiangsu	Total
Marine Salt	5.06	51.38	6.65	63.09
Marine Chemical	14.88	84.57	21.41	120.86
Marine Biological & Pharmaceutical	1.37	11.62	14.67	27.66
Marine Shipbuilding	108.42	55.88	98.24	262.54
Marine Electric Power	—	31.26	37.89	69.15
Marine Seawater Utilization	—	27.55	8.64	36.19
Marine Engineering Architecture	29.60	55.81	15.75	101.16
Marine Transportation	120.00	147.04	12.04	279.08
Coastal tourism	203.65	279.08	72.48	555.21
Total	482.98	744.19	287.77	1514.94

2.2.2.1 Marine Salt Industry

Shandong has the most significant marine salt industry along the Yellow Sea. In 2004, it possessed 59% of the total salt field area; in addition, the province contributed 73% of the total marine salt production and 81% of the industry s total output value (Table 2-6).

Table 2-6 Marine Salt Industry of Three Coastal Provinces of the Yellow Sea in 2004 (From SOA 2005)

Region	Salt field area (ha)	Marine salt production ($\times 10^4$ ton)	Labor force (individual)	Output value ($\times 10^8$ CNY)
Liaoning	48980	297	8516	5.06
Shandong	124573	1358.85	32268	51.38
Jiangsu	38400	194.78	22904	6.65
Total	211953	1850.63	63688	63.09

2.2.2.2 Marine Chemical Industry

Shandong s output in the marine chemical industry was less (23.5×10^4 ton); however, it led the three provinces in output value (84.51×10^8 CNY) in 2004 (Table 2-7).

Table 2-7 Marine Chemical Industry of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Output ($\times 10^4$ ton)	Employees (individual)	Output value ($\times 10^8$ CNY)
Liaoning	125.7	_	14.88
Shandong	23.5	145,020	84.51
Jiangsu	160.8	5260	21.41
total	310	150,280	120.8

2.2.2.3 Marine Biological Pharmaceutical Industry

"Marine biological pharmaceuticals" refers to products that have a medicine or health care function. They are manufactured directly or indirectly, fully or partially by marine living organisms or from extracted elements. The following are examples of marine biological pharmaceuticals: medicines, bacterins, amino acids, glucose, vitamins, antibiotics, reagents, and so on. In 2004, Jiangsu's output value (14.67×10^8 CNY) accounted for about 50% of total value in the Yellow Sea region (Table 2-8).

Table 2-8 Marine Biological Pharmaceutical Industry of Three Coastal Provinces of the Yellow Sea in 2004 (From SOA 2005)

Region	Employees (individual)	Output value ($\times 10^8$ CNY)
Liaoning	—	1.37
Shandong	4800	11.62
Jiangsu	510	14.67
Total	5310	27.66

2.2.2.4 Marine Electric Power Industry

"Marine electric power industry" refers to the production of electric power by using marine energy, including tidal energy, wave energy, heat energy, ocean current energy, wind energy, and salt range. It also includes the production of electric power by using cooling seawater; however, this method has been used only in Shandong and Jiangsu. In 2004, the output values of marine electric power of Shandong and Jiangsu were 31.26×10^8 CNY and 37.89×10^8 CNY, respectively (Table 2-9).

Table 2-9 Marine Electric Power Industry of Three Coastal Provinces of the Yellow Sea in 2004 (From SOA 2005)

Region	Employees (individual)	Output value ($\times 10^8$ CNY)
Liaoning	—	—
Shandong	6258	31.26
Jiangsu	5590	37.89
Total	11848	69.15

2.2.2.5 Marine Seawater Utilization Industry

Marine seawater utilization refers to the desalination and utilization of seawater in industry production, urban life, and fire fighting. In 2004, this industry provided 12,200 job opportunities in Shandong, with an output value of 27.55×10^8 CNY (Table 2-10).

Table 2-10 Marine Seawater Utilization Industry of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Employees (individual)	Output value (x10^8 CNY)
Liaoning	_	_
Shandong	12200	27.55
Jiangsu	700	8.64
Total	12900	36.19

2.2.2.6 Marine Shipbuilding Industry

The marine shipbuilding industry covers ship building and repairing. In 2002, three coastal provinces along the Yellow Sea repaired 9461 ships and built 766 new ships (Table 2-11). Shipbuilding ranked third among all marine industries, with a total output value of 262.54 ×10^8 CNY.

Table 2-11 Marine Shipbuilding Industry of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Ships repaired	Ships built		Employees (individual)	Output value (x10^8 CNY)
		number	×10^4 ton		
Liaoning	60	29	196.74	18501	108.42
Shandong	8889	701	23.76	22644	55.88
Jiangsu	512	36	85.17	5570	98.24
Total	9461	766	305.67	46715	262.54

2.2.2.7 Marine Engineering Architecture Industry

The marine engineering architecture industry includes construction of ports, coastal electricity stations, coasts, dykes, etc. In 2004, the total output value of this industry was 101.16×10^8 CNY (Table 2-12), 50% of which was contributed by Shandong province.

Table 2-12 Marine Engineering Architecture Industry of Three Coastal Provinces of the Yellow Sea in 2004 (From SOA 2005)

Region	Employees (individual)	Output value (x10^8 CNY)		
		2002	2003	2004
Liaoning	_	_	_	29.6
Shandong	11180	20.06	40.44	55.81
Jiangsu	7710	_	15.82	15.75
Total	18890	20.06	56.26	101.16

2.2.2.8 Marine Transportation Industry

The marine transportation industry has been developed along the Yellow Sea, where 7 major ports are located. The number of berths in Yellow Sea coastal ports has increased to 360 (2004 data); of these, 170 are 10,000 ton class berths (Table 2-13). In 2004, these ports handled 56,422×10^4 tons cargo and 8,970.3×10^4 tons standardized containers; they also transported 1,351×10^4 passengers (Table 2-14).

Table 2-13 Berths for Productive Use at Coastal Ports of the Yellow Sea in 2004 (From SOA 2005)

Region	Port	Length of quay line (meter)	Number of berths (#)	10000 Tonnage class (#)
Liaoning	Dandong port	1793	11	5
	Dalian port	26119	192	57
Shandong	Yantai port	6225	34	21
	Weihai port	1554	12	4
	Qingdao port	12005	49	37
	Rizhao port	5794	30	19
Jiangsu	Lianyungang port	6421	32	27
Total	7	59911	360	170

Table 2-14 Passengers and Cargo Transportation of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Cargo handled (×10^4 tons)	Passenger Departure and Arrival (×10^4 =individual)	International standardized containers handled		Marine transport vessels (tonnage)	
			Containers (#)	Weight (×10^4 tons)	Coastal	Distant Sea
Liaoning	24002	629	298.9	2909	659401	1342817
Shandong	27822	722	576.8	5556	697827	1089778
Jiangsu	4598	—	50.8	505.3	700449	815512
Total	56422	1351	926.5	8970.3	2057677	3248107

2.2.2.9 Coastal Tourism

"International tourism receipts" refers to income received from transportation, sightseeing, accommodation, food, shopping, entertainment, etc. In 2004, inbound tourism receipts for the nine coastal cities along the Yellow Sea totaled 98,526×10^4 USD, with Dalian

and Qingdao ranking first and second, respectively (Table 2-15).

Table 2-15 Inbound Tourism in Coastal Cities of the Yellow Sea in 2004 (from SOA 2005)

Province	City	Foreigners (individual)	International tourism receipts ($\times 10^4$ USD)
Liaoning	Dandong	86583	2770
	Dalian	520035	35000
Shandong	Yantai	149109	10479
	Weihai	121739	5097
	Qingdao	522498	29182
	Rizhao	47178	1008
Jiangsu	Lianyungang	40298	3520
	Yancheng	34001	1536
	Nantong	109966	9934
Total	9 cities	1631407	98526

2.2.3 Fishermen

In 2004, the fishermen population of the three coastal provinces of the Yellow Sea reached 239×10^4 – approximately 5% of the total population. Fishermen receive many benefits from mariculture and fishing. With vast shallow waters, a flat inter-tidal zone, high primary production, and being the natural habitat of many living resources, the coastal waters of the Yellow Sea are quite suitable for the mariculture industry. Shrimp, crab, scallop, clam oyster, abalone, sea urchin, sea cucumber, fish and macro algae are extensively cultured in the area. Shellfish and algae are the most important products in the mariculture area (Table 2-16) (Table 2-17).

Table 2-16 Fishery and Mariculture Area of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Fishermen ($\times 10^4$ individual)	Mariculture area (ha)					
		Fish	Crustacean	Shellfish	Algae	Other	Total
Liaoning	56	5696	26206	313788	13445	48221	407356
Shandong	103	9112	80121	206882	22312	71141	389568
Jiangsu	80	4015	26464	122904	12148	749	166280

Table 2-17 Mariculture Yield and Output Value of Three Coastal Provinces of the Yellow Sea in 2004 (from SOA 2005)

Region	Mariculture yield (ton)						Output value (× 10^8CNY)
	Fish	Crustacean	Shellfish	Algae	Other	Total	
Liaoning	31027	23781	1490500	383705	41366	1970379	342
Shandong	93573	67631	2648177	534701	74758	3418840	709
Jiangsu	9853	34343	422905	12717	4760	484578	168

2.2.4 Coastal Residents

Approximately 4.4×10^7 people live in the coastal provinces of the Yellow Sea (Table 2-18). Living here, they receive many benefits such as good food, sightseeing, clean air and living necessities. On the negative side, ecological degradation in the Yellow Sea has been harmful to the life of coastal residents; hence, they are major participants in the protection of the Yellow Sea.

The coastal residents live in the cities of Dandong and Dalian (Liaoning province), Yantai, Weihai, Qingdao and Rizhao (Shandong province), and in Lianyunguang and Yancheng (Jiangsu province).

Table 2-18 Coastal Resident and Living Area of the Yellow Sea in 2004 (from SOA 2005)

Province	City	Population ($\times10^4$ individuals)	Living region (km^2)
Liaoning province	Dandong	240	15030
	Dalian	558	12574
Shandong province	Yantai	648	13746
	Weihai	248.39	5436
	Qingdao	731.12	10654
	Rizhao	280	5310
Jiangsu province	Lian Yungang	468.81	7444
	Yancheng	460	9351
	Nantong	773.79	8001
Total	9 cities	4408.11	87,546

2.2.5 Non-governmental Organizations

2.2.5.1 Academic Consulting Organizations

Chinese Society of Oceanography

The Chinese Society of Oceanography (CSO) is a voluntary academic and public-welfare, socially-incorporated association organized by ocean scientists, technologists and sea-related units. This Society is an important social force in the development of the course of ocean science and technology in China. Registered with the Ministry of Civil Affairs and established in July 1979, CSO is attached to the State Oceanic Administration and works under the professional guidance of the Chinese Association for Science and Technology. CSO has 12 branches and 9 professional committees, with 8000 individual members and 180 incorporated members. Tasks of CSO include the following: 1) to carry out ocean scientific and technological exchange; 2) to organize marine scientists and technologists for participation in ocean policy making, ocean development strategy, ocean development planning, providing advice for legislation related to sea laws, and providing advice for decision-making; 3) to undertake evaluation of the ocean projects and verification of the results of the research projects; and 4) to edit ocean literature and popularize the current knowledge on ocean science.

CSO has received many awards. For example, in 1999 and 2002, CSO was awarded "Advanced Corporation for Popularizing Knowledge" by the Ministry of Science and Technology of China, the Ministry for Propagandizing of China, and the Chinese Association for Science and Technology. In 2001, CSO was awarded "Advanced Society" by the Chinese Association for Science and Technology. In 2002, CSO received two "excellent organizer" awards for organizing "academic exchange activities of reducing natural hazards", and "academic exchange activities of preventing plant diseases and insect pests", by the Chinese Association for Science and Technology. It was also awarded "excellent organizer in Xihu Lake expo" for organizing "International Asia and the Pacific Environmental Remote Sensing Meeting".

Address: 1 Fuxingmenwai Rd, Beijing
Post code: 100860
Tel: 010-68047626
Website: http://www.cso.org.cn

Chinese Society of Oceanography and Limnology

The Chinese Society of Oceanography and Limnology (CSOL) is an academic and public-welfare, social incorporated association, voluntarily organized by

ocean and limnology scientists. CSOL is attached to the Institute of Oceanography and the Chinese Academy of Sciences, and is under the professional guidance of the Chinese Association for Science and Technology. Affiliated to CSOL are 15 professional committees, 9 local branches and 15 task committees, totaling 8000 members. The tasks of CSOL are as follows: 1) to carry out ocean and limnology scientific exchange; 2) to provide advice for the state development strategy of ocean and limnology; 3) to organize ocean and limnology scientists to participate in scientific development policy, strategy, laws and regulations; and 4) to edit the ocean literature and popularize the knowledge on ocean science. CSOL has held 150 academic meetings on oceanographic and limnologic topics.

Address: 1 Nanhai Rd, Qingdao
Post code: 266071
Tel: 0532-82898636
Website: http://csol.qdio.ac.cn

There are also some general organizations which periodically organize academic and consulting activities on marine affairs; among these are the Chinese Society of Environmental Protection, the Chinese Society of Environmental Science, the Chinese Society of Environmental Laws, WWF-China, Wetland China, IUCN-China, etc.

2.2.5.2 Voluntary Organizations

In coastal cities, there are some voluntary organizations such as Dahai Environmental Protection Community (Da Hai Huang Bao Gong She) and Qingdao Travel Club (You Shan Wan Shui) at www.qingdaonew.com. Although the members have different careers, they often gather online to discuss environmental protection issues, such as the "jellyfish bloom" in Jiaozhou Bay in August 2006. They participate in many public-welfare activities to popularize knowledge of environmental protection and they help to strengthen consciousness of environmental protection.

2.3 Analysis on the Relationship among Different Stakeholders

2.3.1 Relationships among Different Governmental Departments related to Marine Management (Figure 2-1)

2.3.1.1 Relationship between Oceanic and Fisheries Administrative Systems

As a function body of the central government, the State Oceanic

Administration (SOA) manages such major marine affairs as sea area utilization, marine environmental protection, maintenance of marine rights and interests, marine science and technology, laws and planning, etc. SOA has two branches: North China Sea Branch (NCSB) based in Qingdao, and East China Sea Branch (ECSB) based in Shanghai. NCSB has responsibility for the Bohai Sea and waters north of 35°N in the Yellow Sea; ECSB has responsibility for waters south of 35°N in the Yellow Sea and East China Sea.

As a function body of the central government under the Ministry of Agriculture (BOF, MOA), the Bureau of Fisheries Management supervises utilization of fishery resources and environmental protection of marine fishery waters.

As a subordinate department of BOF, MOA, Fisheries Management and Fishing Harbour Superintendence of the Yellow Sea and Bohai Sea supervises utilization and protection of fishery resources and environment in both seas.

In each of the three provinces bordering the Yellow Sea, one comprehensive department has responsibility for both marine and fisheries affairs in coastal waters (<12nm from the coastal line), as follows: Oceanic and Fishery Department of Liaoning, Oceanic and Fishery Department of Shandong, and Oceanic and Fishery Department of Jiangsu.

In addition, local oceanic and fishery departments receive technical guidance from SOA and BOF, MOA. Hence, administrative conflicts between SOA and BOF, MOA can be readily solved, whether at provincial or local levels.

2.3.1.2 Inter-relationship in Environmental Protection System

The State Environmental Protection Administration (SEPA) has responsibility for guiding, coordinating and supervising national environmental protection, with focus on land, water and air.

Each province has an environmental protection bureau that acts under the direction of its provincial government, i.e. Environmental Protection Bureau of Liaoning, Environmental Protection Bureau of Shandong, and Environmental Protection Bureau of Jiangsu. These bureaus receive technical support from SEPA as they guide, coordinate and supervise environmental protection in their respective provinces.

2.3.1.3 Inter-relationship in Maritime Safety Systems

Shandong, Liaoning and Jiangsu maritime safety administrations work directly under the supervision of the State Maritime Safety Administration

in financial, personnel and technical affairs. The provincial maritime safety administrations have responsibility for the guidance and supervision of principal maritime safety administration.

2.3.1.4 Relationship among Oceanic, Fisheries, Environmental Protection and Maritime Safety Administrative Systems

Oceanic and fisheries systems, environmental protection systems and maritime safety systems strive to work cooperatively as they administer marine safety. At present, each department has complex and somewhat overlapping responsibilities. Indeed, disputes occur, especially with regard to marine environmental pollution. An example follows.

SEPA has responsibility for guiding, coordinating and supervising marine environmental protection and pollution prevention caused by land-sourced pollution and coastal construction.

SOA has responsibility for guiding and supervising marine environment, including the organization of marine environmental survey, environmental monitoring, environmental appraisal and marine scientific research. It also handles marine environmental pollution accidents, assumes responsibility for marine pollution prevention during coastal construction, and handles waste treatment.

MSA (the national Marine Safety Administration) has responsibility for supervising and handling environmental pollution caused by vessels in its administrative waters.

BOF, MOA supervises marine environmental pollution due to fishery vessels, protecting fishing areas, and investigating and handling of fishery pollution accidents.

Because marine pollution events occur regularly and pollutants tend to diffuse among the different administrative waters, more than one system usually becomes involved in a pollution event. These systems traditionally contend for power and profit, and cooperation is limited. Thus, conflicts among the four systems occur frequently.

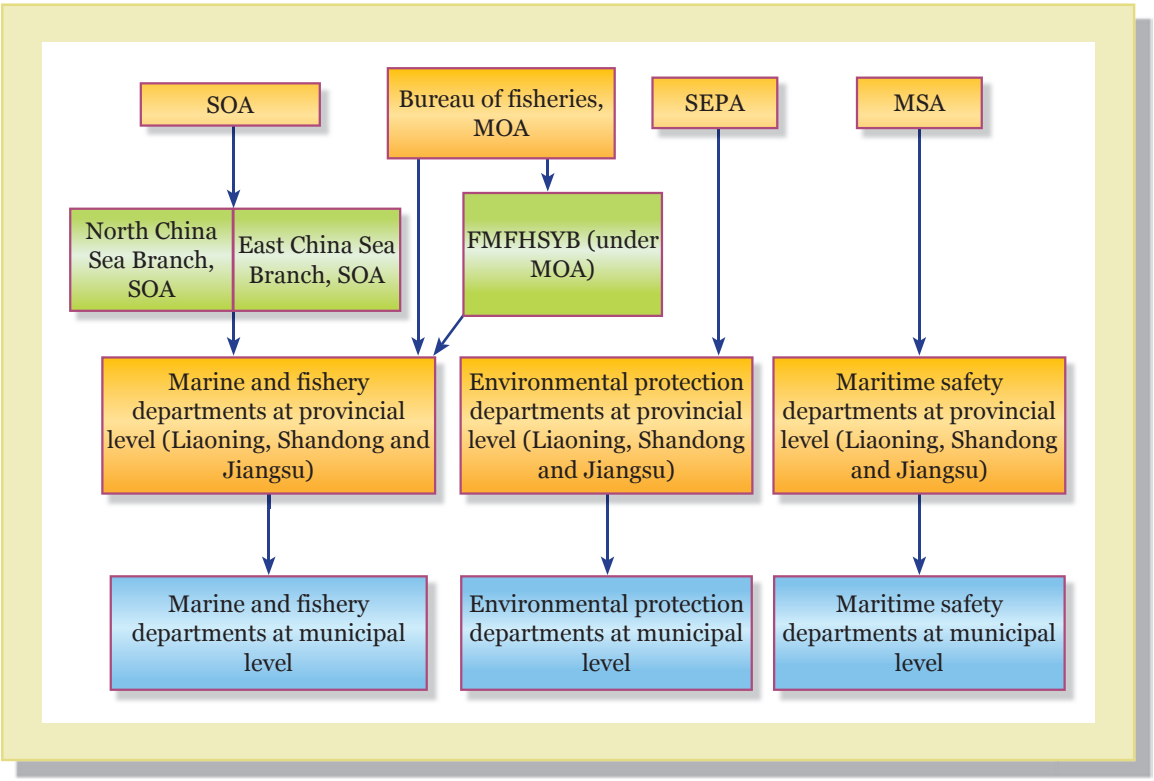


Figure 2-1 Relationship among Departments related to Marine Management

2.3.2 Relationship between Departments related to Marine Management and Coastal Enterprises

On one hand, the four governmental departments listed above guide, coordinate and supervise utilization activities of coastal enterprises in the Yellow Sea; they also draft national laws and regulations related to marine management. On the other hand, they check and punish coastal enterprises which have been involved in illegal activities. Currently, it is difficult for ministry departments to supervise effectively, due to problems such as regional protectionism, inadequate penalties for breaching the law, weak enforcement capacity, etc. In addition, some coastal enterprises manifest a lack of social responsibility, giving attention only to their particular development. They often neglect damage caused by their utilization activities on the marine environment and resources of the Yellow Sea.

2.3.3 Relationship between Governmental Departments and Fishermen

Governmental departments and fishermen interact over such aspects

as management of mariculture areas and the implementation of mariculture technologies. According to the marine functional zone and mariculture planning, governmental departments conduct scientifically based mariculture management.

In recent years, it has been difficult to manage mariculture; thus it has become the most poorly managed activity in the maritime area. The main reasons are as follows: 1) most fishermen still consider the mariculture area as their own or their ancestors' legacy; 2) parties engaging in mariculture are complex and change frequently; 3) local governments have not exerted their full influence on management of mariculture area; 4) the administrative regulations on mariculture have lagged behind the practical situation. Furthermore, many people have changed careers from fishing to mariculture after the enactment of the strategy on protection of marine fishery resources; however, insufficient mariculture areas are available.

2.3.4 Relationship between Coastal Enterprises and Fishermen

With the rapid development of marine economy and urbanization of coastal areas, the relationship between coastal enterprises and fishermen has deteriorated, as evidenced by strong conflicts between industrial pollution and environmental protection. Increased industrial pollution results directly in a loss to mariculture.

Discharged waste products diffuse to nearby mariculture waters, exceeding their natural capacity to cope. Both illegal and legal waste discharge harm mariculture species; in addition, they deteriorate the water quality and sediment quality in the mariculture area. This type of problem often occurs because the current marine function zoning and development plans do not adequately consider environmental impact of discharged products.

Ports and vessels also contribute significantly to the problem. For example, many mini-sized and medium-sized ports have not been equipped with sewage and garbage disposal facilities; hence, direct waste discharge into the sea has become another significant source of pollution. Such situations have had a direct, negative influence upon fishermen of the Yellow Sea.

2.3.5 Relationship between Non-governmental Organizations and Other Stakeholders

In China, non-governmental

organizations, especially academic ones, play an important consultative role relative to the utilization and protection of the marine environments of the Yellow Sea. NGOs encourage their members, most of whom are marine scientists and technologists, to become involved by 1) participating in drafting state ocean policy, ocean development strategy and planning, and laws and regulations, and 2) providing suggestions for decision-making. Because there are few NGOs, their voice is weak and their contribution is limited.

2.4 Analysis of Questionnaires

Each of the five stakeholders was given a different questionnaire, containing about 20 questions. The questionnaires were in Chinese; their English versions are listed as Annexes 1-5.

The committee designed common question types, including 1) identification of major threats to the Yellow Sea environment, 2) identification of responsibility-sharing for environmental destruction of the Yellow Sea, and 3) identification of sectors having greatest influence upon the government in marine policy-making.

35% of the respondents believed that industrial pollution constituted the major threat to the Yellow Sea environment, while 25% felt that residential raw sewage was the main threat (Figure 2-2)

40% of interviewees thought that coastal enterprises should bear responsibility for environmental destruction of the Yellow Sea, while 34% felt that the responsibility rested with government departments (Figure 2-3).

These results indicate a conflict: while 25% of interviewees understood that raw sewage from their kitchens and toilets was harmful to the Yellow Sea ecosystem, only 6% acknowledged their responsibility for environmental pollution (Figure 2-3).

In excess of 90% of interviewees indicated that they never offered suggestions on marine policy-making to governments; on the other hand, 61% of them felt that scientists play a very important role in marine policy-making (Figure 2-4). Most interviewees were unaware that coastal enterprises also play an important role in marine policy-making.

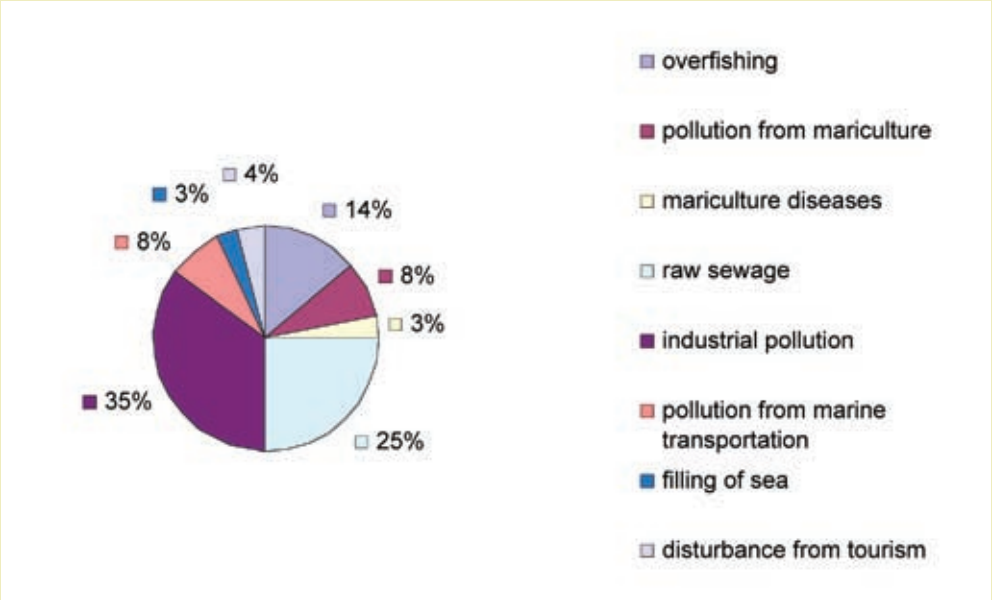


Figure 2-2 Major Threats to the Yellow Sea Ecosystem

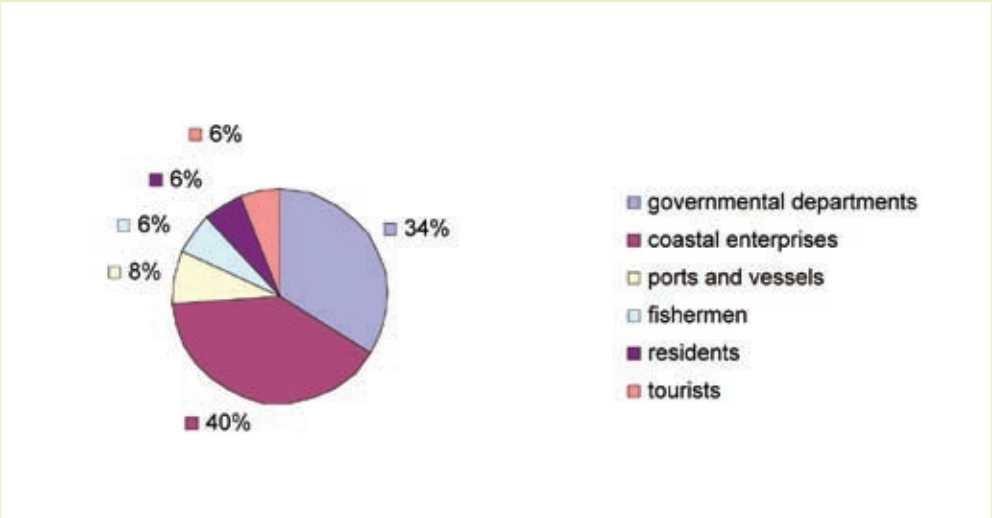


Figure 2-3 Responsibility Sharing for Environmental Destruction of the Yellow Sea

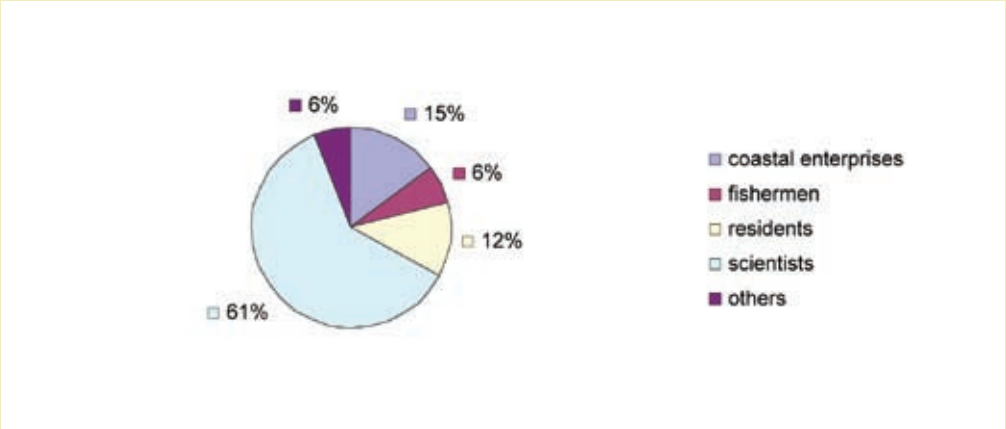


Figure 2-4 Which Sector has Greatest Influence Upon Government in Marine Policy-making

2.4.1 Analysis on Government Department Questionnaire

When asked about attitudes of local governments on marine exploitation and protection, 49% of interviewed officials ranked exploitation as important as protection; however, some 31% of them confessed that exploitation was superior to protection in practice (Figure 2-5). Only 6% of interviewees believed that exploitation policies conform to laws (Figure 2-6). The contradictions between current marine exploitation policies and related laws should receive attention.

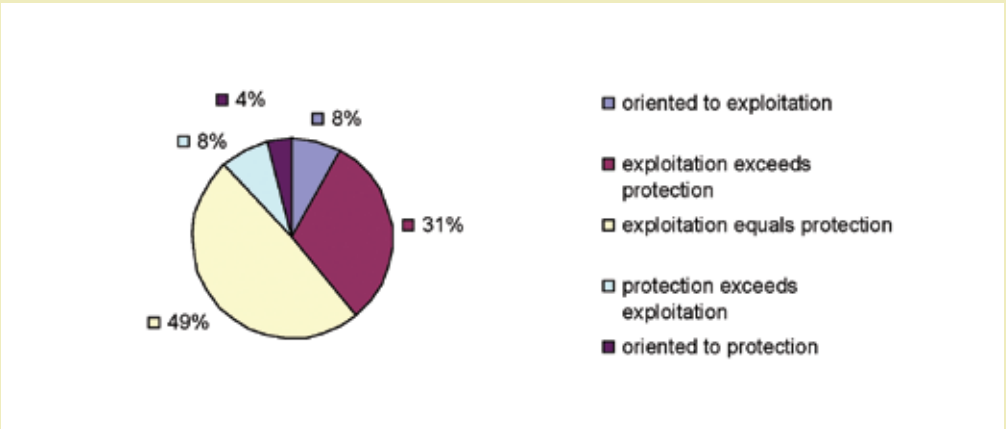


Figure 2-5 Attitudes of Local Officials on Tendency of Marine Policies

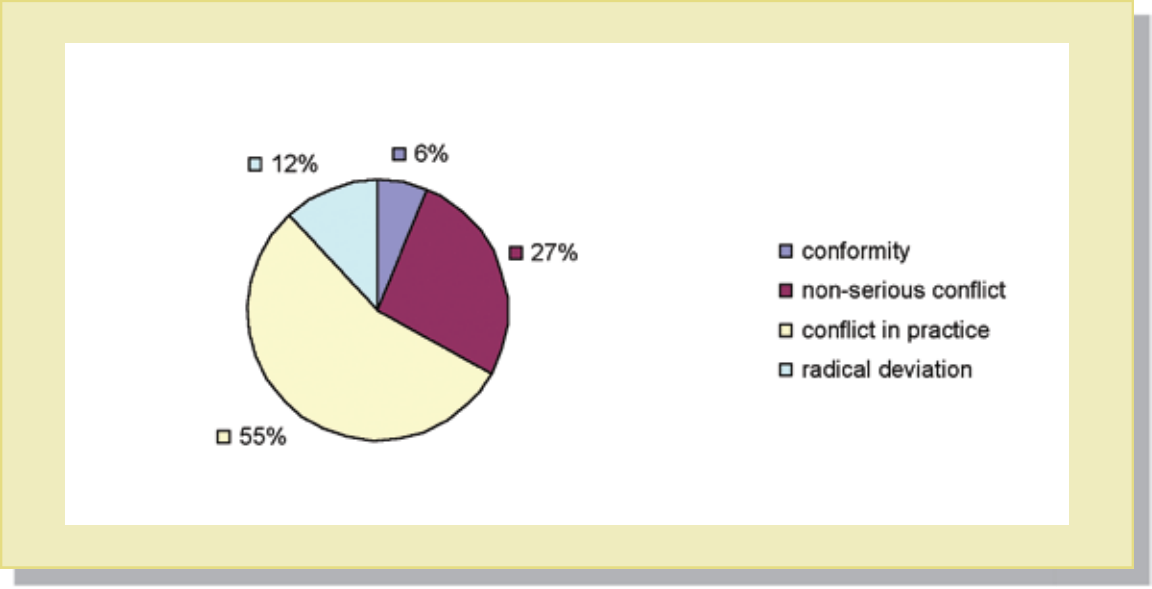


Figure 2-6 Relationship Between Laws and Policies

With respect to the implementation of present laws, 29% of interviewees agreed that it has improved, while 71% expressed their dissatisfaction and disappointment (Figure 2-7). In addition, 51% thought that current laws need to be more concrete, and 22% hoped that more severe punishment measures would be taken (Figure 2-8). This indicates the need for improvement of current legal systems relative to the regulation of Yellow Sea utilization.

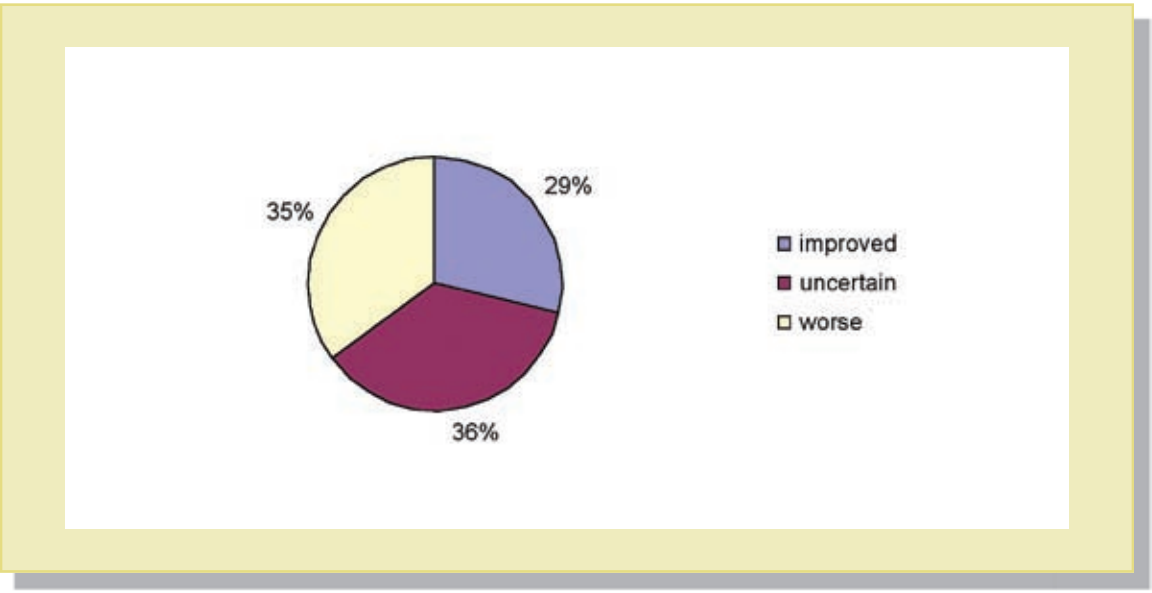


Figure 2-7 Implementation of Current Laws and Regulations

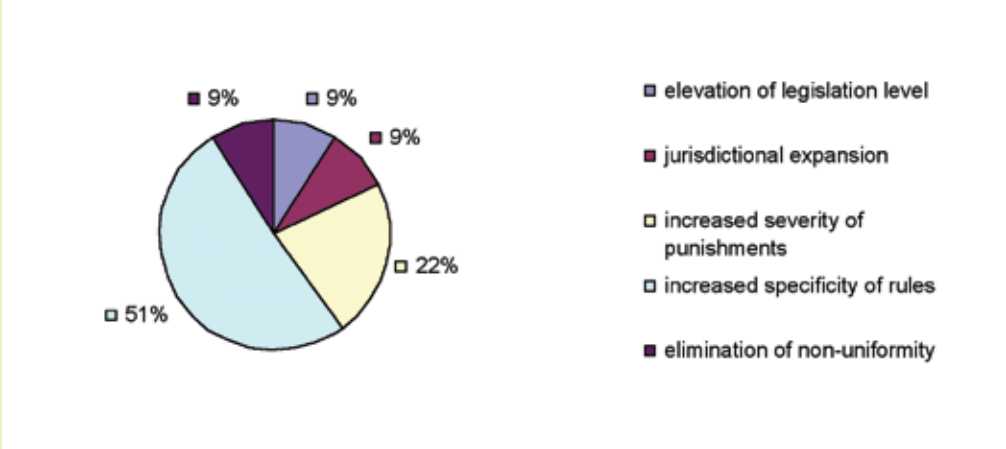


Figure 2-8 Suggestions for Improvements of Current Laws and Regulations

In regard to difficulties with administration of the Yellow Sea, 56% of interviewees felt that poor co-operation among governmental departments was the main problem; 16% considered avoidance of supervision to be another problem (Figure 2-9). Figure 2-9 confirms that there are many reasons for administrative difficulties, such as poor administrative systems, economic interests, local protectionism, inappropriate laws and policies, etc.

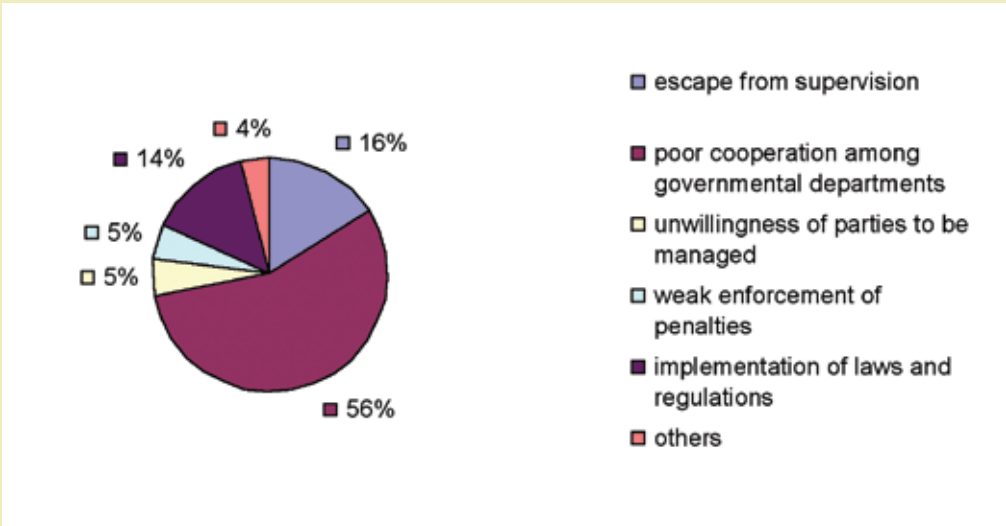


Figure 2-9 Management Difficulties in the Administration of the Yellow Sea

Approximately 50% of the interviewees thought there were conflicts of jurisdiction among various marine-related governmental departments, and conflicts of jurisdiction and economic benefit among the three coastal provinces and nine coastal cities around the Bohai Sea. An effective coordination system should be established among the departments, coastal provinces and cities.

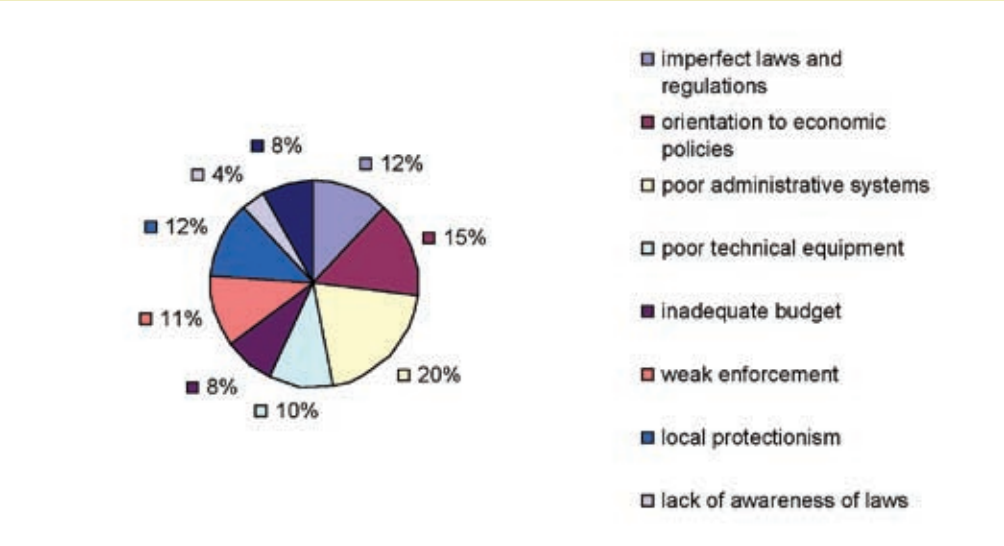


Figure 2-10 Reasons for Management Difficulties in the Administration of the Yellow Sea

2.4.2 Analysis on Coastal Enterprises Questionnaire

Although many enterprises refused a survey request, some valuable data was collected. Most enterprise practitioners seemed to be quite sensitive to the problems of pollution and environmental protection.

53% of the interviewees thought that a major impact of coastal enterprise activities was loss of health for the Yellow Sea ecosystem. 25% acknowledged that their enterprise activities caused a decrease of fishery resources (Figure 2-11).

Some 74% of the respondents were aware that environmental deterioration of the Yellow Sea negatively impacted the income of their enterprises (Figure 2-12).

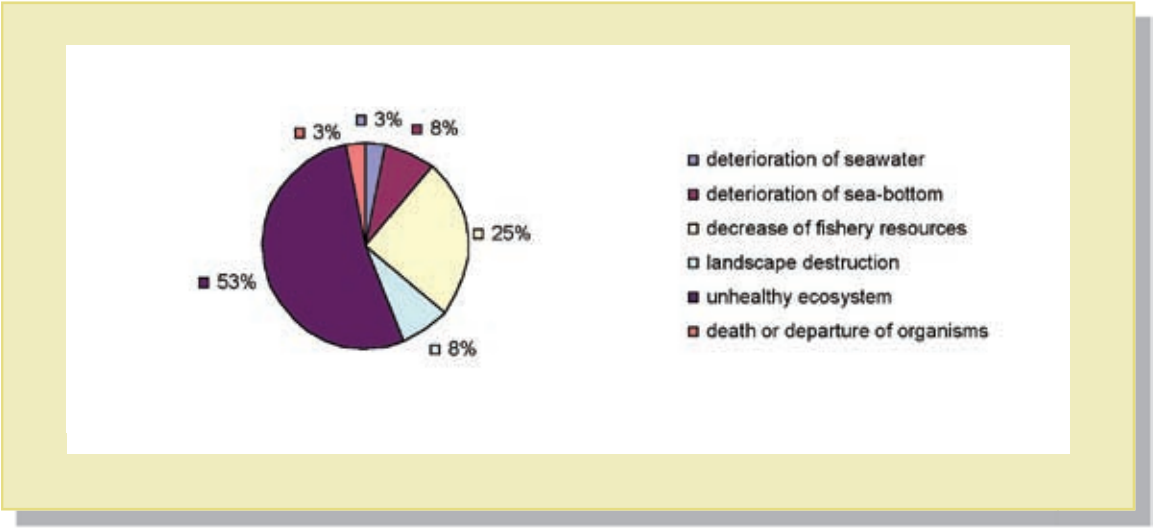


Figure 2-11 Impact of Enterprise Activities on the Yellow Sea Ecosystem

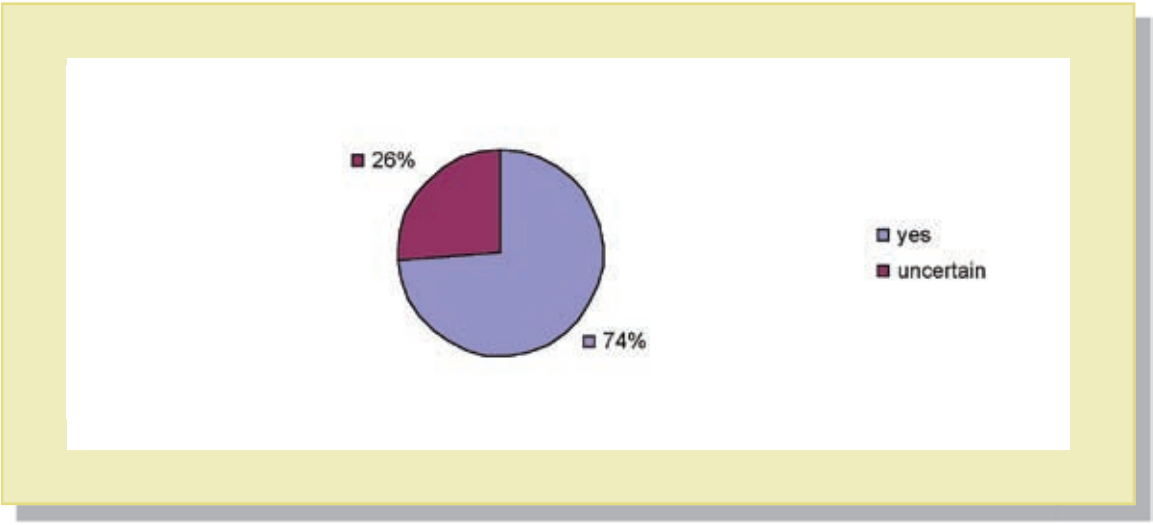


Figure 2-12 Environmental Deterioration in the Yellow Sea Impacts Coastal Enterprises

Concerning attitudes on present laws related to utilization of the sea, 46% of interviewees thought their enterprises would not be influenced even under stricter rules; 34% were uncertain (Figure 2-13).

On the other hand, 89% of interviewees indicated that they would obey rules and policies as far as possible; 11% acknowledged that they occasionally disobeyed when faced with unreasonable rules (Figure 2-14).

Regarding practical actions to protect the Yellow Sea, only 14% expressed positive responses; 60% were uncertain (Figure 2-15).

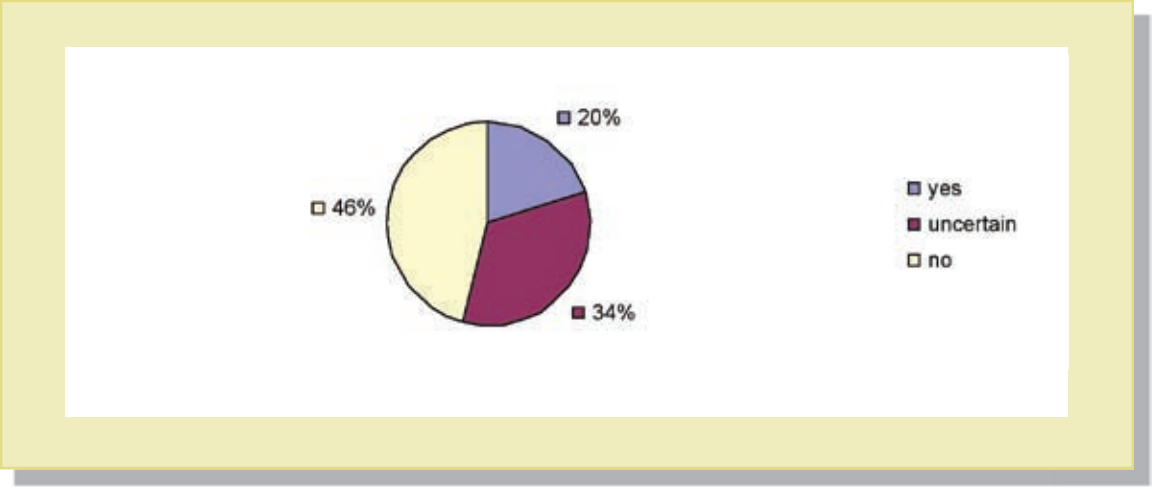


Figure 2-13 Increased Strictness of Rules Will Affect Enterprise Success

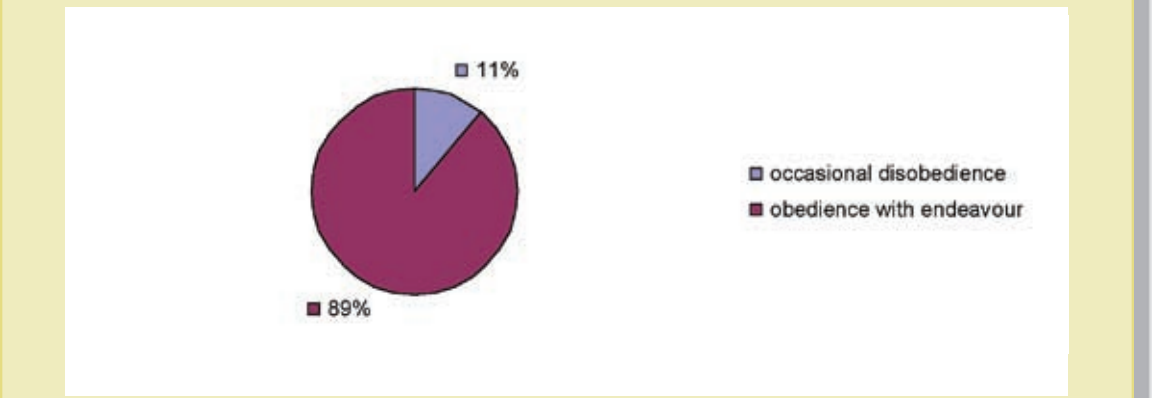


Figure 2-14 Attitude of Enterprises Relative to Unreasonable Rules

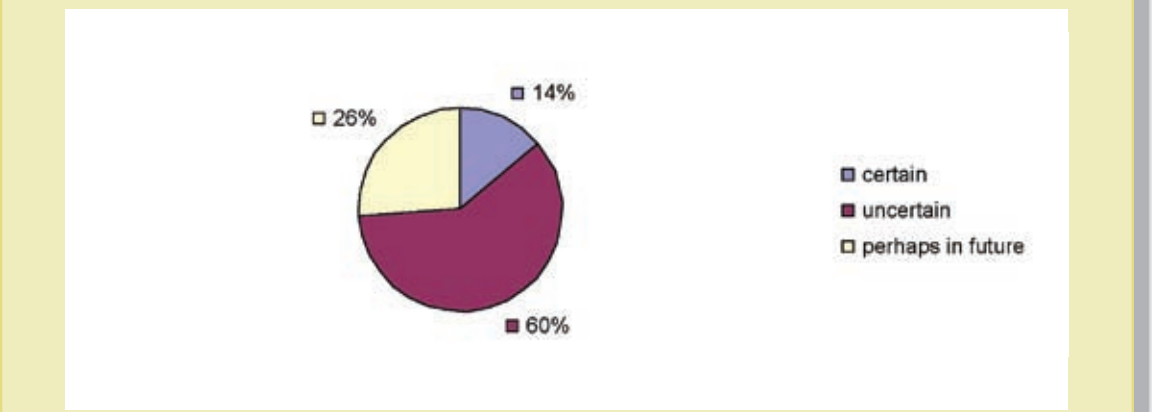


Figure 2-15 Willingness to Make a Donation to Protect the Yellow Sea Ecosystem

2.4.3 Analysis on Fishermen Questionnaire

When answering the question of what had damaged their benefits, 69% of interviewees selected coastal enterprises, while 15% chose ports and vessels (Figure 2-16). This indicates a conflict of interest between fishermen and coastal enterprises. Although 47% recognized that their own mariculture activities had an effect on wild species; 31% expressed disinterest relative to the impact from mariculture activities (Figure 2-17).

Regarding protection of the Yellow Sea, 87% of interviewees gave responses of support; just 3% indicated disinterest (Figure 2-18). This confirms the strong concern of fishermen for the ecological environment of the Yellow Sea.

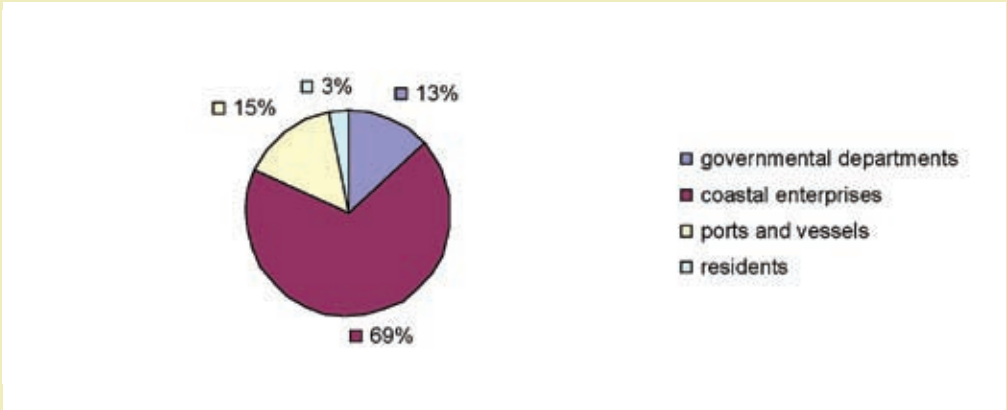


Figure 2-16 Party Responsible for Damaging Fishermen Benefits

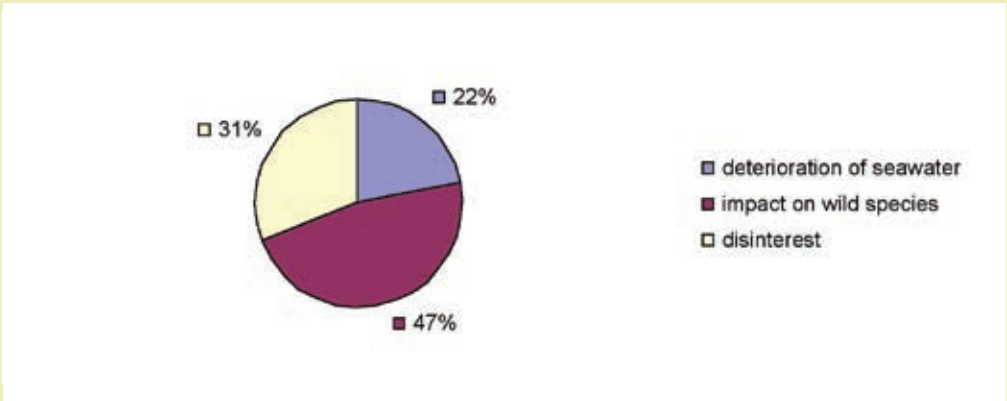


Figure 2-17 Negative Influences of Mariculture on the Yellow Sea

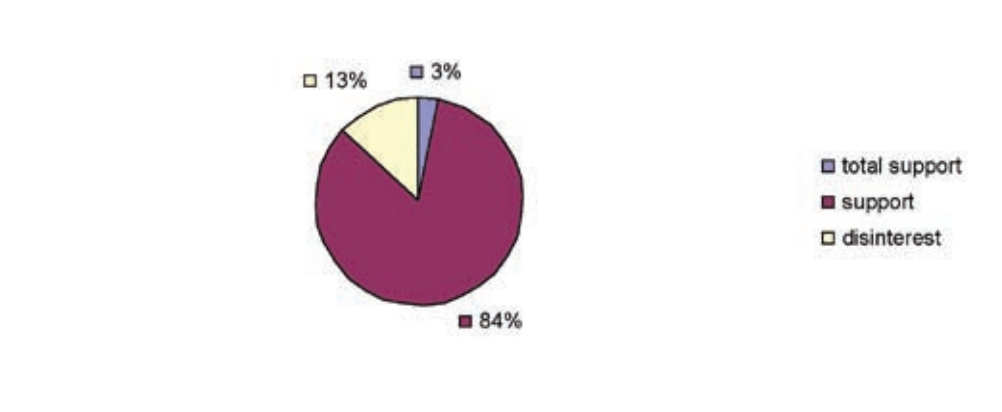


Figure 2-18 Attitude of Fishermen With Respect to Protection of the Yellow Sea

2.4.4 Analysis on Coastal Residents Questionnaire

When assessing the work of governmental departments, 54% felt that law enforcement is insufficient, 17% felt that governmental departments lack co-operation, and 14% thought governmental departments are partial to enterprises. Only 11% expressed the opinion that governmental departments protect public benefit (Figure 2-19).

When facing activities destructive to the ecological environment of the Yellow Sea, 34% of interviewees thought they would dissuade the destroyers, 31% would choose to keep silent, 19% thought they would report them to governmental departments, and 12% preferred to disclose them to the media. 4% were disinterested (Figure 2-20).

Regarding individual behaviours destructive to the Yellow Sea, 52% of interviewees considered littering on the seashore to be destructive; 31% were concerned about the use of phosphorus detergent (Figure 2-21).

In response to whether they were willing to work as volunteers in protecting the ecological environment of the Yellow Sea, 90% of interviewees said they were willing to participate in these activities (Figure 2-22). This indicates that most coastal residents have a strong willingness to protect the Yellow Sea.

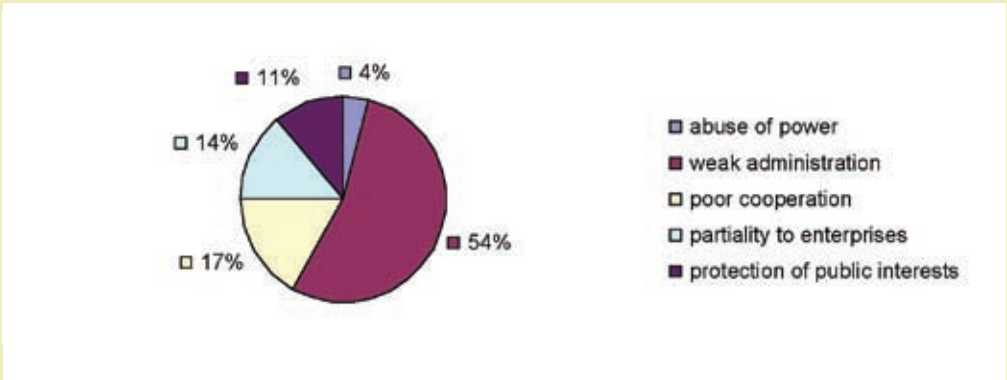


Figure 2-19 Assessment of Performance of Governmental Departments

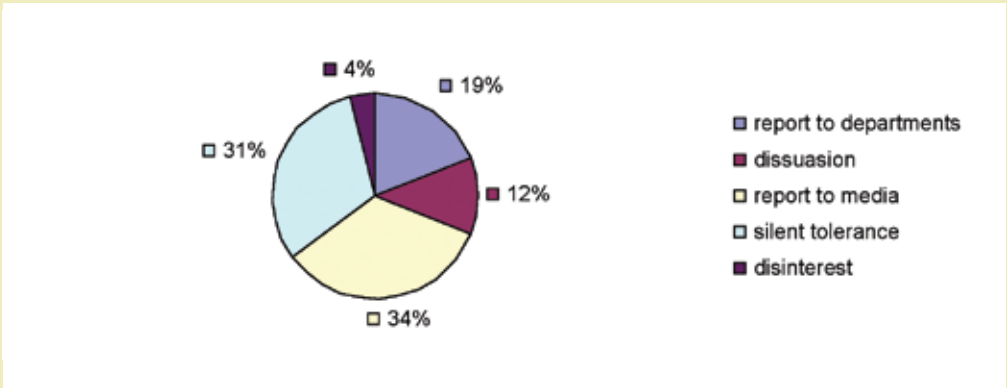


Figure 2-20 Attitudes of Residents Concerning Activities Destructive to the Yellow Sea

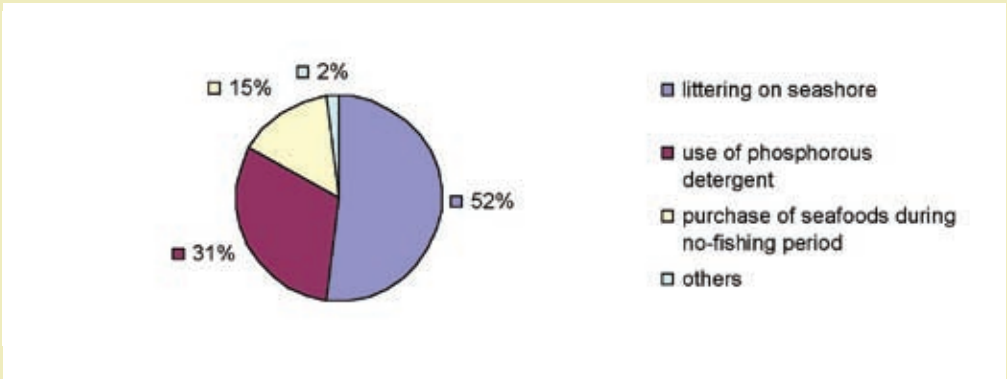


Figure 2-21 Individual Behaviours Destructive to the Yellow Sea

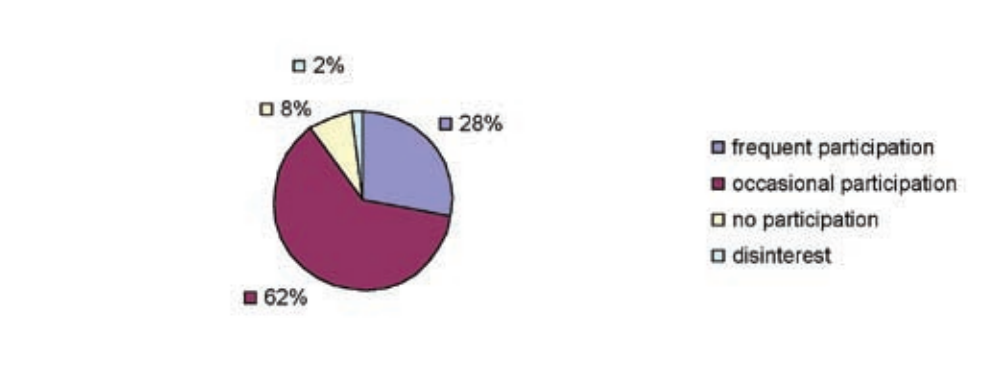


Figure 2-22 Attitudes of Residents Concerning Volunteer Activities to Protect the Yellow Sea

2.4.5 Analysis on Non-governmental Organizations Questionnaire

Contact was made with 5 non-government organizations (NGOs) along the Yellow Sea; 20 questionnaires were delivered, with 10 responses. Because the completed questionnaires were too few, a statistical analysis was not conducted. The responding interviewees indicated strong support of their organizations with respect to protecting the Yellow Sea. NGO activities related to preservation of the environment are supported both by the general public and management departments.

2.5 Plan for Encouraging All Stakeholders to Participate in Protecting the Health of the Yellow Sea Ecosystem

2.5.1 Rationale and Objectives

There are approximately 44 million residents living along the coastal area of the Yellow Sea in China. Many of their activities significantly impact the health of the Yellow Sea ecosystem and damage its services, whether done consciously or unconsciously. It is vital to improve the knowledge of residents relative to protecting the Yellow Sea. The objectives of this plan are as follows:

- To strengthen the awareness of the local communities about the

importance of the Yellow Sea

- To improve their knowledge of the environmental problems of the Yellow Sea
- To increase the capacity of local residents to protect the Yellow Sea ecosystem through their daily activities.

2.5.2 Activities and Approaches

1. Set up an Internet homepage and forum on the protection of the Yellow Sea ecosystem.

Invite local residents and scientists to join an online discussion of coastal waters environment issues, such as hygiene at the swimming beaches, This invitation could be made using the Qingdao News website and online questionnaires.

Responsible Agency: Ocean and Fisheries Bureau of Qingdao

2. Prepare brochures and posters on Protecting the Health of the Yellow Sea Ecosystem Our Responsibility.

3. Communicate, give presentations and provide consultation at local communities and schools to improve public awareness.

3.1 World Biodiversity Day (May 22)

Give lectures at primary and middle schools in the main coastal cities of the Yellow Sea (e.g. Lianyungang, Qingdao, Dalian, etc.).

Topic: Yellow Sea Biodiversity and Us

Responsible Agency: Municipal Ocean and Fisheries Bureaus

3.2 World Environment Day (June 5)

Conduct activities to encourage awareness of environment protection of the Yellow Sea in main public venues of coastal cities:

- Disseminate brochures and posters
- Conduct face-to-face discussions
- Conduct investigations using questionnaires.

This may require some donations from companies or enterprises.

Responsible Agency: Environmental Protection Administration in each coastal municipality

3.3 World Ocean Day (July 18)

Carry out activities to increase public awareness of protection of the Yellow Sea, at beaches attractive to tourists in Qingdao, Dalian and Lianyungang cities:

- Disseminate brochures and posters
- Conduct face-to-face discussions
- Conduct investigations using questionnaires.

This may require some donations from companies or enterprises.

Responsible Unit: Ocean and Fisheries Bureau in each coastal municipality

3.4 Organize local residents and students to visit marine environment protection facilities and marine exploitation activities, such as waste water treatment plant, ports and harbours, mariculture sites, etc.

Date: annually, last Sunday in August

Responsible Agency: Municipal Ocean and Fisheries Bureau

3.5 Associated activities during Ocean Festival of Qingdao

Conduct campaigns to increase public awareness at Wusi Square:

- Disseminate brochures and posters
- Conduct face-to-face discussions
- Conduct investigations using questionnaires.

Topic: Protect the Yellow Sea, Hand in Hand

Detailed arrangements will be determined together with the Office of Ocean Festival of Qingdao. It may require some donations from companies or enterprises.

3.6 Associated activities during Dalian International Fashion Festival

Conduct campaigns to increase public awareness at Xinghai Square (2 days):

- Disseminate brochures and posters
- Conduct face-to-face discussions
- Conduct investigations using questionnaires .

Topic: Fashion and Ocean

Detailed arrangements will be determined together with Office of Dalian International Fashion Festival. It may require some donations from companies or enterprises.

3.7 Associated activities during Festival of "Summer in Lianyungang".

Conduct campaigns to increase public awareness at Shiming Square as well as at 3 local communities, Lianyungang (1 community per day; total 3 days):

- Disseminate brochures and posters
- Conduct face-to-face discussions
- Conduct investigations using

questionnaires.

Topic: Environmental Health of Community and Island

Detailed arrangements will be determined together with Office for Summer Festival of Lianyungang. It is better to find sponsor to these activities.

3.8 Association with TV media of Liaoning, Shandong and Jiangsu Provinces to hold a knowledge competition about the Yellow Sea.

Responsible Agency: State Oceanic Administration, Yellow Sea LME PMO

Time: March—June

4 Public participation in oceanic scientific research activities

4.1 Open day at universities and institutes

Invite local residents and students to visit universities and institutes.

Detailed arrangements will be made together with National Marine Environment Monitoring Centre, First Institute of Oceanography, SOA and Yanchen Wetland Nature Reserve. Provide information about oceanic scientific research to the local residents.

Time: 1 university / institute per day

Invited Persons: local residents and students

Responsible Agency: Ocean and Fisheries Bureau in each coastal municipality

4.2 Invite local residents and students to participate in a field cruise in the coastal area of the Yellow Sea, conducted by universities or institutes. Train participants how to do sampling of water and plankton, etc.

Date: August

Responsible Agency: Ocean and Fisheries Bureau in each coastal municipality

5 Train and establish a team of volunteers to conduct ongoing activities for public awareness.

5.1 Select 1 primary school and 1 middle school in each coastal city (Dandong, Dalian, Yantai, Weihai, Qingdao, Rizhao, Lianyungang, Yanchen, Nantong, etc.) as training bases for volunteers. Approximately 50 volunteers could be trained each year.

5.2 Select 1 local community in each coastal city (Dandong, Dalian, Yantai, Weihai, Qingdao, Rizhao, Lianyungang, Yanchen, Nantong, etc.) as training bases for volunteers. Approximately 20 volunteers could be trained each year.

6 Submit suggestions to local governmental system.

6.1 Hold an oceanic education course entitled "Know Ocean, Love Ocean" in primary schools and middle schools in each coastal city (Dandong, Dalian, Yantai, Weihai, Qingdao, Rizhao, Lianyungang, Yanchen, Nantong, etc.). The purpose of this course would be to cultivate the consciousness of youth to protect the ocean. This course could be conducted at seaside, for example, on beaches or islands.

6.2 Public hearings should be conducted by local governments prior to the start of projects relating to the ocean. At the same time, related information should be available to the public by major media (TV, newspaper, broadcast, Internet).

2.5.3 Expected Outcomes

- Open and run a long-term Internet forum on protection of the marine environment.
- Disseminate 80,000 brochures and 1,000 posters.
- Disseminate 5,000 questionnaires about protection of the marine environment.
- Involve 100,000 local residents and 50,000 students in public awareness activities.
- Train 630 volunteers to conduct public awareness activities of marine environment protection in their local communities in the main cities along the Yellow Sea within 5 years. Additionally, set up a system to train volunteers continuously.
- Initiate oceanic education courses in the primary schools and middle schools in coastal cities.
- Involve local residents in the discussion and establishment of projects related to the ocean, by means of public hearings.

2.5.4 Expected Budget

The plan will last 3 years, and have a total proposed budget of approximately 300,000CNY.

Chapter Three – Institutional Analysis

In the 1970s, China began to recognize the importance of marine environment management, and gradually strengthened the supervision and management of marine environment in light of national conditions.[1] After more than 30 years of hard work, a comprehensive marine environmental supervision and management system has now been established. Under the current system, the major players in national marine environment management include the National People's Congress (NPC) and its Standing Committee; the State Council and its subordinate organizations; local people's congress and local people's government; the general public, and NGOs.

Generally speaking, the highest legislative authority in China is the National People's Congress (NPC) and its Standing Committee. Laws passed by the NPC and its Standing Committee are applied nationwide and are mostly general in nature. They are usually supplemented by rules and regulations that deal with more specific matters, issued by the State Council, which is the highest executive organ, and by relevant ministries.[2] In addition, the people's congresses and governments of provinces, autonomous regions and municipalities may exercise legislative power, provided that such local laws and regulations, which proceed from specific conditions in their geographical areas, do not contravene the Constitution or the laws and regulations adopted by the central government. Over the past few decades, many local laws and regulations have been adopted that have relevance for marine environment protection. This overview mainly addresses those laws and regulations adopted by the central government.

Departments under the State Council with ocean-related functions have played a major operational role in China's national marine environment management. Their roles and mandates have changed over time, reflecting changes in China's national environment policies. Before the 1980s, the main function of government agencies was to promote economic production. As a result, much government investment went toward developing maritime transportation, fisheries, sea salt making and coastal mining, etc. Along

with the development of society, the Government of China gradually realized the significance of marine environment protection, and gradually adopted marine environment protection and marine resources conservation as one of the major concerns in the last two decades.

Local authorities include the people's congresses and governments of provincial, municipal and county levels. They are required to implement the national policies and laws, and given a certain level of flexibility to modify the policies and laws during the implementation process, if necessitated by local circumstances. Local authorities are also participants in promoting national marine environmental protection management by making recommendations. With on-going economic structural reform, local authorities in coastal areas are given a higher level of autonomy with regard to local economic and social development programmes.

The Chinese Constitution, laws and regulations encourage the general public to participate in marine environment and resources protection. A common legal requirement is that the government should encourage and reward institutions and individuals who have made remarkable contributions to protect and improve marine environment and resources.[3] However, the role and function of the people's organizations, NGOs, industries and private sector in marine environment management still need improvement.

3.1 Governmental Agencies and Their Responsibilities Related to the Yellow Sea Marine Environment Management

Governmental agencies related to marine environment management of the Yellow Sea include both the central and local governments. The central government and its subordinate organizations play a dominant role in the Yellow Sea management, while local governments execute the policies, strategies and regulations formulated by the central government.

1 The Development of China's Marine Programs. State Council. http://news.xinhuanet.com/employment/2002-11/18/content_633178.htm
2 Legislation Law of the People's Republic of China.
3 Article 8 of the Environmental Protection Law of PRC.

3.1.1 Departments of Central Government with Ocean-related Functions

- State Oceanic Administration (SOA) under Ministry of Land and Resources
- Bureau of Fisheries Management under Ministry of Agriculture
- Maritime Traffic Safety Administration under Ministry of Transportation
- State Environmental Protection Administration
- State Development and Reform Commission
- State Tourism Administration
- Ministry of Water Works
- The People's Liberation Army

3.1.2 Changes of Important Governmental Agencies Related to Marine Environment Protection

3.1.2.1 State Oceanic Administration (SOA)

The SOA was established in 1964; its primary mandates were oceanographic survey and research. During the governmental restructuring of 1984, the mandates of SOA were modified to include marine environmental monitoring, management of environmental protection work in relation to offshore petroleum exploration and exploitation, and ocean dumping activities. In 1988, SOA assumed the additional responsibility of organizing relevant departments to: 1) draw up basic marine laws, regulations and policies; 2) hold national marine development programmes; 3) layout marine use zonation; and 4) conduct coastal zone surveys and management. In 1988, SOA was placed within the framework of the Ministry of Land and resources. With the adoption of the Sea Area Use Law, SOA was further required to review and issue permits for sea area use, and to levy usage fees.[4]

3.1.2.2 State Environmental Protection Administration (SEPA)

SEPA plays a lead role in overall environmental management. It also undertakes inter-agency consultation and coordination in national environmental policy. Specifically, SEPA supervises the prevention and management of pollution from land-based sources and coastal engineering projects. It also has the responsibility to supervise and manage national nature reserves, and to monitor the implementation of national environmental quality standards and effluent discharge standards.[5]

4 http://www.soa.gov.cn/jigou/1/zhize.htm; http://www.soa.gov.cn/jigou/1/zhize.htm
5 http://www.zhb.gov.cn/dept/jgznjj/200404/t20040428_89743.htm

3.1.2.3 Maritime Traffic Safety Administration under the Ministry of Transportation

During the 1960s, the Ministry of Transportation was given responsibility for ensuring safety at sea, and for the management of ocean-going vessels and port development. In 1970, the mandate of the Ministry of Transportation was enlarged to include prevention and control of marine pollution by ship sources. In 1984, the Ministry of Transportation was mandated to undertake shoreline use planning, and to review and approve shoreline use projects as part of its responsibilities for ports, navigation channels and waterway salvage activities. With the growing concern for oil-spill incidents, the problem of oil-spill pollution warranted attention. In 1998, the Ministry of Transportation was charged with the responsibility of developing a contingency plan to deal with oil spills from shipping accidents. In the 1998 government reconstruction, the Harbour Superintendence under Ministry of Transportation was renamed the Maritime Traffic Safety Administration under Ministry of Transportation.[6]

3.1.2.4 Fishery Administration (Bureau of Fisheries Management under the Ministry of Agriculture)

During the early 1980s, the Fishery Administration was given responsibility for management of fishing activities and conservation of fishery resources. In 1984, the Fishery Administration incorporated the following into its management responsibility: 1) supervising and managing environmental impacts of fishing vessels; and 2) preserving fishery biological balance through fishery nature reserves, fishing areas and seasonal closures. The Fishery Administration also supervised the issuance of aquaculture production permits. Concern for environmental protection and biological preservation became more apparent in the mandates of Fishery Administration during the 1980s and 1990s. The most significant change in the mandate of the Fishery Administration was a shift of emphasis from the promotion of fishing production to the control of fishing efforts for sustainable fishery development.[7]

3.1.3 Agencies and Their Responsibilities Related to the Management of the Yellow Sea Environment

Central and local governments share responsibility for China's marine environment management. Under the supervision of the People's Congress and its Standing Committee at different levels

6 http://www.msa.gov.cn/Jgjj/Hsj.aspx?category_id=1
7 http://www.agri.gov.cn/nyb/jgzz/t20040528_207683.htm

and with administrative coordination defined according to relevant provisions of laws and regulations, the central and local governments partition their responsibilities into function zones, pollution sources, and natural resources. The two levels of government execute environmental protection laws co-operatively.

Departments in charge of marine environment management, and their responsibilities, are stipulated in *Constitution, Organic Laws, Marine Environmental Protection Law, Fisheries Law, Sea Area Use Law, Wild Animal Protection Law* and other laws and regulations, as well as in *Department Function Mandates of the State Council*. The departments and their detailed responsibilities related to Yellow Sea management are listed in Table 3-1.

Table 3-1 Agencies and Their Responsibilities as Related to Managing the Yellow Sea Environment

Agencies	Responsibility
State Oceanic Administration (SOA)	• Manage sea area use of the Yellow Sea inside the territorial line and issue Sea Area Use Certificates at state level. • Conduct function zoning of the Yellow Sea at state level. • Supervise marine environmental protection of the Yellow Sea, and manage investigation and monitoring activities of the Yellow Sea at state level. • Organize scientific research on environment of the Yellow Sea. • Prevent and control pollution damage to the Yellow Sea caused by marine construction projects and sea dumping. • Organize state-level marine environment monitoring and supervision network, in co-operation with relevant departments. • Evaluate marine environment quality at regular intervals. • Manage marine integrative information system. • Develop state oil spill contingency plan for offshore oil exploration and exploitation. • Claim damages compensation for destruction of marine ecology, marine natural resources and reserves, on behalf of state. • Establish state-level marine nature reserve and special marine reserves in the Yellow Sea.
State Environmental Protection Administration (SEPA)	• Guide, co-ordinate and supervise integrated environmental protection of the Yellow Sea. • Prevent and control pollution damage to the Yellow Sea by land-based pollutants and coastal construction projects. • Compile state environment quality bulletins (including the Yellow Sea). • Make state contingency plan for marine pollution accidents caused by land-based pollutants. • Establish state sea-water quality standard. • Establish state pollutant discharge standard. • Establish state level coastal nature reserves in the Yellow Sea.

Maritime Traffic Safety Administration (MTSA)	• Supervise and control pollution to the Yellow Sea caused by vessels (not including fishing and military vessels). • Settle pollution accidents caused by vessels (not including fishing and military vessels). • Monitor and supervise port water environment. • Create state-level contingency plan to cope with oil-spilling accidents caused by vessels. • Punish vessels that engage in illegal transportation of dangerous wastes through the Yellow Sea within China's jurisdiction.	
Fishery Bureau of Ministry of Agriculture (BOF)	• Monitor and supervise condition of fishing ports and fishing zones in the Yellow Sea. • Supervise and control pollution to the Yellow Sea caused by fishing vessels. • Assist in investigation and settlement of fishery pollution accidents caused by vessels (not including fishing and military vessels) and supervise settlements of other fishery pollution accidents. • Claim damage compensation for destruction of fishery ecology, marine aquatic resources and relevant marine reserves, on behalf of state. • Establish state-level marine nature reserves and special marine reserves in fishing zones. • Conserve and manage fishery resources in the Yellow Sea at state level. • Protect rare and endangered wild animals and plants in the Yellow Sea; determine the list of endangered species at state level; examine and approve the import of wild marine animals and plants; issue Catching License for rare and endangered species.	
	Fishery Management and Fishing Harbour Superintendence of Bohai Sea and the Yellow Sea, under Ministry of Agriculture	• Manage oversea fisheries affairs. • Take charge of important fishing grounds and fishing ports. • Supervise and manage fishing operations, vessels, and fishing ports including resources conservation and environmental protection of fishing grounds. • Maintain orderly fishing operations. • Implement fisheries laws, regulations and international treaties. • Protect legitimate rights and interests of fishermen. • Settle fishery disputes. • Maintain navigational safety and order of fishery communication. • Register fishing vessels.
State Development and Reform Commission	• Carry out strategy of sustainable development. • Study and formulate plans for resource conservation and comprehensive utilization. • Participate in formulation of ecological improvement plans. • Put forward policies of resource conservation and comprehensive utilization. • Co-ordinate solution of major issues of ecological improvement, resource conservation and comprehensive utilization. • Co-ordinate environmental protection.	

State Tourism Administration	• Organize investigation and evaluation of tourism resources. • Direct planning of, and develop, important tourism regions. • Conduct tourism statistics.
Ministry of Water Works	• Monitor quantity and quality of water of rivers, lakes and reservoirs. • Review and approve the pollution loading capacities of water bodies; make proposals for the limits of total wastewater discharge.
Environment Protection Department Of Navy	• Supervise and control pollutant discharge from military vessels. • Settle pollution accidents caused by military vessels. • Monitor and supervise environmental condition of military zones.
Governments of Coastal Provinces along the Yellow Sea, including Jiangsu, Shandong and Liaoning Provinces	• Confirm duties of relevant departments in governments of coastal areas at or above county level. • Establish local pollutant discharge standards for items not specified in state standards; set local marine environmental quality standards and land-based pollution discharge standards, which are more stringent than state standards. • Set up regional co-operation organizations for marine environmental protection. • Approve local marine nature reserves, marine sanctuaries and coastal scenic and tourist areas.
Local governments of coastal areas at different levels	• Exercise leadership in marine environmental protection, and improve marine environmental quality within their jurisdictions. • Take effective measures to relieve or mitigate damage caused by serious pollution. • Set targets and tasks for offshore environmental protection within their administrative districts. • Ratify environmental protection plans which are worked out by environmental protection departments, assisted by planning departments. • Protect typical marine ecosystems such as coastal wetlands, islands, bays, estuaries and important fishery waters. • Protect sea areas with a natural distribution of rare and endangered wild animals and plants. • Protect habitats of wild animals and plants with high economic values. • Protect natural marine historic relics and natural landscapes with great scientific and cultural significance. • Build shore safeguards and coastal shelter belts, as well as gardens and greenbelts in coastal cities and towns. • Establish local nature reserves. • Conserve and manage fishery resources, as well as rare and endangered species within coastal waters. • Issue fishing licenses to coastal fishing vessels. • Inspect fishing vessels including fishing license, gear and operation. • Prosecute illegal fishing activities. • Supervise the safety and orderly operation of fishing ports. • Give awards to units and individuals that have made outstanding achievements in protecting and improving marine or coastal environment.
Governments of coastal cities	• Build and perfect urban drainage net. • Build urban sewage treatment plants or other sewage treatment facilities.

3.2 Non-governmental Agencies and Their Responsibilities Related to the Yellow Sea Coastal and Marine Environment Management (Tabel 3-2)

Table 3-2 Non-governmental Agencies and their responsibilities

Non-governmental Agencies	Responsibility
Chinese Society of Oceanography[8] Chinese Society of Oceanography and Limnology[9] Society of Environmental Sciences of China[10] China Zoological Society[11] China Wildlife Protection Society[12] China Zoological Park Society[13] Society of Environment and Resources Protection Law of Shandong Province under China Law Society[14] etc.	Non-governmental agencies (NGOs) in China play a somewhat different role from the more autonomous, activist NGOs in other countries. Their contribution to marine environment protection in China is primarily through research, monitoring and public information. NGOs have a substantial potential role in raising public awareness of the importance of, and threats to, China's marine environment.

3.3 Marine Environment Research, Education, Technology and Monitoring

3.3.1 Research, Education and Technology

Since the founding of the People's Republic of China in 1949, much survey and research work has been done in marine environment. This work began in offshore areas, with surface observation of the sea; it later expanded to deep-sea regions by means of aerospace remote sensing and underwater detection, as well as surface observation. As early as 1958-1960, a national comprehensive survey of China's offshore waters was made. From 1980 to 1986, a comprehensive survey of coastal zones and shoals resources was conducted nationwide; as well, several pilot projects on comprehensive development and utilization of coastal zones were launched. From 1988 to 1995, a general investigation of the country's island

8 http://www.cso.org.cn/
9 http://159.226.158.2/
10 http://www.chinacses.org/CN/index.html
11 http://www.czs.ioz.ac.cn/
12 http://www.cwca.org.cn/
13 http://www.cin.gov.cn/main/org/b0218.htm
14 http://www.chinalawsociety.org.cn/user/office/jianjie.asp?id=5

resources, and an experiment on their comprehensive development, were carried out. In recent years, China has made further efforts to: 1) promote investigation and exploration of marine resources and marine environment; 2) search actively for new exploitable resources; 3) study new techniques and methods of marine resources exploitation and protection; 4) train technical personnel in marine development and protection; and 5) spread oceanographic knowledge among the general public in order to rouse the whole nation to protect the marine environment. [15]

On the basis of a multidisciplinary oceanographic research setup, consisting of some 15000 research personnel, China has had a series of achievements in marine environment survey and research, studies in basic marine science, development and protection of ocean resources, marine monitoring technologies, and manufacturing of oceanographic technical equipment. With increased attention given to the study of inshore shelf marine environment, China has established a multidisciplinary marine environment research system with regional characteristics. Guided by its marine development strategies, support programmes, and plans for development drawn up by relevant state departments, China has made marked progress in many aspects of marine environment in recent years. These achievements have provided scientific direction and references for the promotion of offshore fishing, oil and gas exploitation, protection of the marine environment, and reduction and prevention of marine disasters. [16]

China has made vigorous efforts to develop oceanographic technologies; it has built up an oceanographic technology system focusing mainly on marine environment, exploration and exploitation of marine resources, and general marine engineering, covering more than 20 technological fields. The country has now turned its attention to implementing a marine high-tech programme, designed for tackling key problems in marine science and technology. In its marine high-tech research, China gives priority to technologies covering marine monitoring, marine exploration and resources exploitation, deep-sea exploration, and marine biology. The programme for tackling key problems in marine science and technology centres on fields directly related to modern marine development, such as

15 Memo of Major Marine Affairs, http://www.soa.gov.cn/memo/index.html
16 Development of China's Marine Program, State Council, 1998. http://www.gmw.cn/01gmrb/1998-05/29/GB/17707^GM3-2903.htm

sustainable exploitation of resources and environments of coastal zones, desalinization of seawater, exploitation of marine energy, and comprehensive utilization of seawater resources. In 1996, concerned government departments jointly formulated the *National Plan For Implementing The "Programme For Marine Development By Reliance On Science And Technology*" in the Ninth Five-Year Period (1996-2000) and on to the Year 2010. This plan focuses on the following: 1) research, development and dissemination of the technologies of marine reproduction and mariculture; 2) fine processing of marine biological resources; 3) exploration and extraction of marine pharmaceuticals; and 4) exploitation of chemical resources in seawater. Through implementation of this plan, China hopes to foster marine technology enterprises and improve the productivity of its marine industries.

China has developed an oceanographic education system embracing professional education, vocational education and popular knowledge education. Oceanography as an area of study is taught in 37 institutions of higher learning and 29 secondary specialized schools in China; large numbers of technical and managerial personnel are being trained in this area. The mass media is also used as a vehicle to inform young people about marine topics and to educate residents of coastal regions in the proper way to exploit marine resources and protect the marine environment.

In addition, a service system providing marine data and information, headed by the National Oceanographic Information Centre,[17] has been established in China in the wake of the progress in this field in the past decades. This system provides comprehensive information services for ocean development, oceanographic research and marine environmental protection.

To further support marine technology, offshore development and marine environment protection, the Government of China has worked out the *Medium And Long-Term Programme For The Development Of Marine Science And Technology, and The Marine Technology Policy (Blue Paper)*, together with a number of concrete development plans. The main areas of focus for marine technology development in the future are as follows: 1) strengthen research into basic marine science; 2) tackle the key technologies of marine resources exploitation and environmental protection; 3) promote the application of marine technologies to marine industries; 4) improve marine resources development and service

17 This Centre located in Tianjin. http://www.nmdis.gov.cn/

support for marine disaster prevention and reduction; 5) improve marine environmental protection; and 6) narrow the gap between China and developed countries in marine technology.

3.3.2. Marine Environment Monitoring

The basic tasks of marine pollution investigation and monitoring are as follows: 1) grasp the baseline situation of marine environmental pollution and its long-term tendency to change; 2) evaluate marine environmental quality; and 3) provide a basis for formulating marine environmental protection policies. Marine environmental monitoring has a wide range of involvement, broad professional fields, and many links in the work. It emphasizes the collaboration and coordination of different units, both with respect to needs and benefits. At present, the environments of the Yellow Sea are monitored by state and local agencies, universities, research institutes, dischargers, and volunteers.

Routine marine environmental monitoring has been undertaken mainly by agencies under Oceanic Administrations, Environmental Protection Administrations, and the Fishery Administration. In this connection, Oceanic Administrations monitor marine environmental quality; Environmental Protection Administrations monitor land-based discharges and coastal marine environment quality; and the Fisheries Administration monitors fishery waters. Each of them publishes an annual assessment concerning the state of marine environment.[18] Each also has a network of monitoring stations across the country, namely: State Marine Environment Monitoring Net, State Coastal Marine Environment Monitoring Net, and State Fishery Water Monitoring Net. Although the State Council requires that State Marine Environment Monitoring Net should include the latter two nets, there is some progress to be made before major participants actually share resources and monitoring results in order to fulfill their common objectives.

3.3.3 Major Agencies and Their Responsibilities Relative to Monitoring of the Yellow Sea Environment

3.3.3.1 Agencies in Oceanic Administration System

1) State Marine Environment Monitoring Centre[19] (Under the State Oceanic Administration)

18 Marine Environment Protection Law.
19 http://www.nmemc.gov.cn/

a. Study the programming and plan used for monitoring state marine environmental pollution and the ecosystem; draw out the technical regulations, technical standards, technical management policies and rules used for monitoring; supervise and harmonize the implementation of the state marine environment monitoring system.

b. Supervise the organization, technology and information management of the state marine environment monitoring system; handle affairs of the State Marine Environment Monitoring Office; oversee the estimate and forecast of marine environment quality; and compile the State Marine Environment Quality Communiqué.

c. Manage professional organizations engaging in marine environment monitoring, pollution monitoring, ecosystem monitoring and land-based pollution monitoring, and provide technical support to those organizations. Organize a major state marine environment investigation and conduct professional monitoring experiments.

d. Oversee the estimate and forecast work on natural disasters such as red tide and sea ice.

e. Set up and manage a state marine environment monitoring data-base; assess and manage the monitoring data; organize an information system of marine environment monitoring and sea area use.

f. Offer technical support to marine environment, ecosystem monitoring and supervision; manage the databases of oil-spilling and pollution damage incidents; investigate and monitor major marine pollution damage; compile technical reports of major marine pollution damage incidents; offer scientific evidence for marine pollution damage arbitration.

g. Carry out science and technology studies; encourage international co-operation in the realm of marine environment monitoring.

2) North China Sea Marine Environment Monitoring Centre[20] (under the North China Sea Branch of the State Oceanic Administration)

a. Monitor and manage the marine environment of the North China Sea;

b. Maintain the marine environment monitoring net of the North China Sea;

c. Evaluate the monitoring work on

20 http://www.ncsb.gov.cn/fenjujianjie/jigoushezhi/xiashu/jiancezhongxin.htm

marine environment regularly; issue announcements on the quality of marine environment.

In addition, the Centre also takes part in the construction of marine projects, exploration of marine resources, and marine environment protection in coastal provinces and cities.

3) Marine Environment Monitoring Stations of coastal provinces, municipalities and counties (under the oceanic departments of relevant governments); e.g. Marine Environment Monitoring Centre of Shandong Province.[21]

3.3.3.2 Agencies in Environmental Protection Administration System

1) Environment Monitoring Centre of China[22] (under the State Environmental Protection Administration)

a. Organize relevant departments to draw up the developing plan, technical course, technical rules, technical standards and annual plan of state environment monitoring work; guide environment monitoring station at different levels to implement the above plans and regulations.

b. Collect, check and manage state environment monitoring information and statistic data on environment.

c. Take charge of the Chinese Network in Global Environment Monitoring System; take charge of the environment monitoring network of state level; strengthen the network management of national environment monitoring and guide its construction.

d. Organize relevant departments to monitor coastal sea areas nationwide.

e. Assume responsibility for quality guarantee and quality control of monitoring in the state environment monitoring system; assume responsibility for Quality Supervision and Test Centre on Environment Monitoring Apparatus under the SEPA.

f. Assume responsibility for monitoring related technical and business-like work in major projects assigned by the SEPA, such as total control of pollutants.

g. Write the Environment Quality Report of Coastal Sea Areas and Water Quality Weekly Report of Bathing Beaches in Coastal Cities. Write the Ecosystem Environment Quality Status chapter and the Environment Quality Status of Coastal Sea Areas chapter in the State Environment Quality Statement.

21 http://www.hycflt.com.cn/newsfile/hyywgn/200547152004.asp
22 http://www.zhb.gov.cn/dept/jgzn/znjs/zhishu/200409/t20040921_61560.htm

h. Organize relevant departments to draw up technical courses and technical rules for environment monitoring of ecosystem and coastal sea areas.

2) Coastal Environment Monitoring Central Station (under the Environment Monitoring Centre of China)

Manage the environment monitoring network of coastal sea areas.

3) Yellow Sea Coastal Environment Monitoring Station (under the Environment Monitoring Centre of China)

Monitor the marine environment in coastal areas of the Yellow Sea.

4) Coastal environment monitoring stations of coastal governments (under the environmental protection department of relevant governments)

Monitor marine environment in coastal areas within their jurisdictions.

3.3.3.3 Agencies in Fishery Administration System

1) Yellow Sea Fisheries Research Institute[23]

The Yellow Sea Fishery Research Institute (YSFRI), founded in 1947 and located in Qingdao, Shandong Province in the north of China, is an integrated research institute involved in scientific and technological research for fishery development of the Yellow and Bohai seas. It focuses mainly on such research fields as marine fishery resource survey and assessment, marine fishing gears and fishing methods, marine aquaculture, fishery resource enhancement, and fishery environment protection. YSFRI comprises a number of research sections: marine resource, marine fishing techniques, marine animal enhancement, algae culture, aquatic product processing, fishery environment, fishery economics, and fishery information. It also has an advanced experiment base in Xiaomai Island, and a well-equipped fishery resource survey vessel, Beidou Hao . In addition, several nationwide organizations are set up within YSFRI, such as National Quality Monitoring Centre for Aquatic Products, Sino-Canadian Mariculture Research and Training Centre, Fish Drug and Diet Monitoring and Testing Centre, and Fishery Environment Monitoring Centre for the Yellow Sea and Bohai Sea.

2) Fishery Water Environment Monitoring Stations of coastal Provinces, municipalities and counties (under the fishery management departments of relevant governments).

23 http://www.ysfri.ac.cn/DesktopDefault.aspx?tabid=803

Chapter Four – Legal and Policy Analysis

4.1 Legal Status on Marine Environment Protection of the Yellow Sea

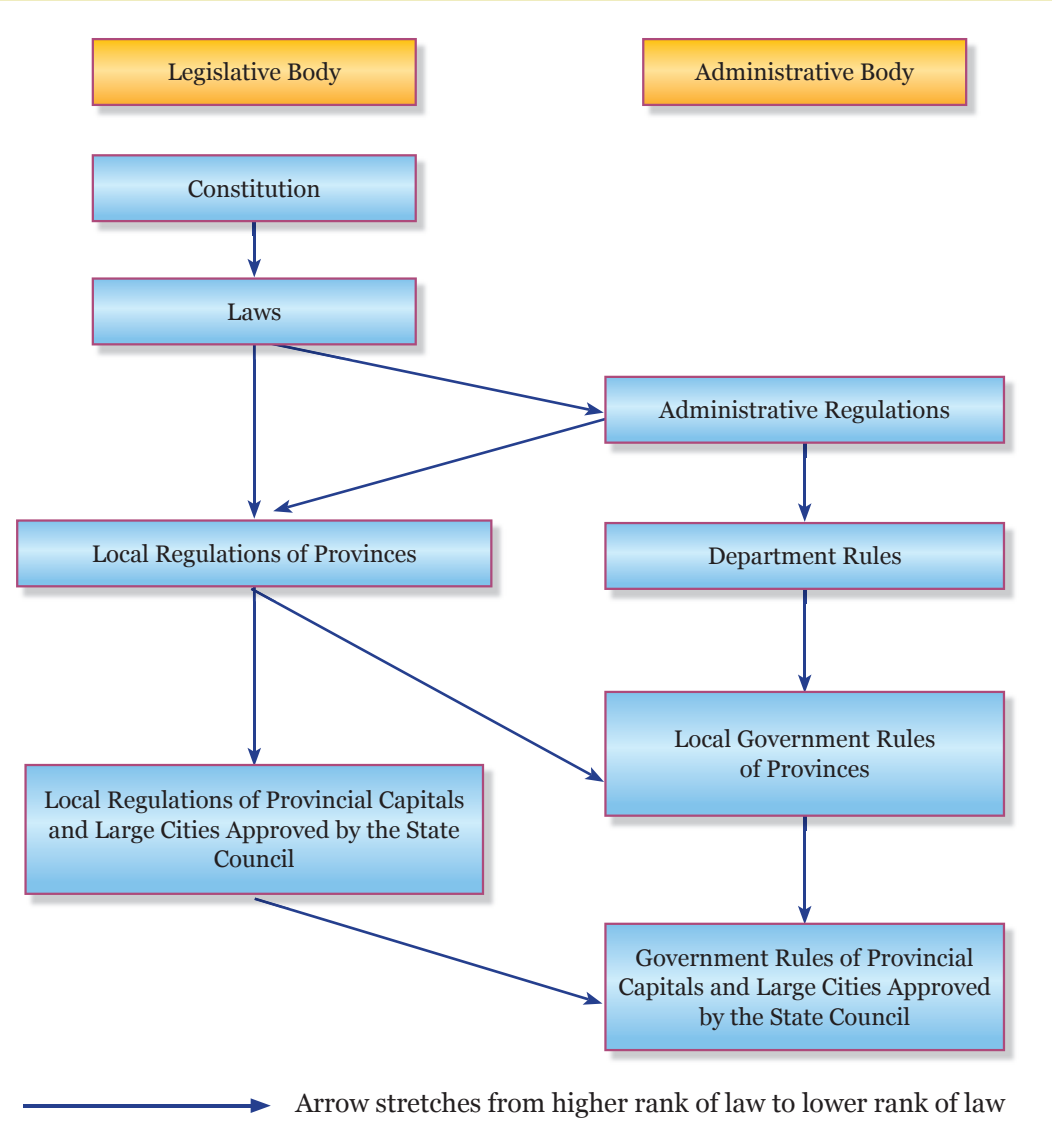
4.1.1 The Hierarchy of Chinese Laws

Marine environment protection law and policy are integral to the Chinese legal system. To understand the current legal status on the prevention of pollution and sustainable use of marine resources of the Yellow Sea, it is necessary to have a brief look at the Chinese legal system. Chinese laws have a fairly strict hierarchy based on legislative authority. The top level of this hierarchy is the basic law – the Constitution. The Constitution, legislated by the National People's Congress (NPC), is the supreme national law; it forms the foundation for all other laws. It also provides a legal basis for the profound changes in China's social and economic institutions, and has significantly revised governmental structures and procedures. Basic national law ranks next to the Constitution, being legislated by the NPC or its Standing Committee. The people's congress of each province, each provincial capital and each large city may make local regulations according to its local circumstances, as approved by the State Council. In order to implement the Constitution and national laws, the State Council has the right to make administrative regulations, and departments subordinate to the State Council may make department rules. In order to implement laws and local regulations, the provincial governments and the governments of provincial capitals, autonomous regions and large cities approved by the State Council, may make local government rules.

As China is a unitary state, vertically national laws are superior, and they override local laws made by local people's congresses and governments. Also, local laws must be consistent with national laws, and laws of lower rank must be consistent with laws of higher rank. This is the case for laws related with marine environment protection; however, in accordance with the Environment Protection Law (1989), provincial

governments may establish local standards for discharge of pollutants on items not specified by national standards. With regard to items already specified by national standards, they may set local standards that are more stringent than national standards and report them to the competent authority of the central government.[24] That is to say, in the environmental law field, a law of lower rank, which establishes more stringent discharge standards than a law of higher rank, is not seen as a violation of law.

The hierarchy and relationship of different legal forms are shown in the chart below:



24 Article 9 of Environmental Protection Law

4.1.2 Development of Legal System on Marine Environment Protection

Although China had passed several administrative regulations on environmental pollution in China, it was only after the 1972 Stockholm Conference that environment protection was put on the agenda of the Government of China. In 1973, the first national conference on environment protection was held. As a result, the State Council issued Provisional Rules *On The Prevention And Control Of Coastal Marine Pollution* the following year. It was the first administrative law on marine pollution in China, providing more detailed rules on ship-based pollution. In 1978, a provision on environmental protection was put into the Constitution. In 1979, the basic law for environmental protection – *Environmental Protection Law* – was promulgated on a trial basis; it formally came into force in 1989. This law represented the beginning of the establishment of an environmental protection framework in China. The decade of the 1980s was the most active period in environmental legislation. The *Marine Environmental Protection Law (1982)* and the *Water Pollution Prevention And Control Law (1984)* were passed during this time; in addition, attention was also given to environmental protection in other laws. For example, the *General Principles of Civil Law* (1986) provided civil liability for damages caused by environmental pollution (Article 124); the *Fisheries Law* (1986) incorporated the concept of resources conservation; and the *Wild Animal Protection Law* (1988) initiated the protection of wild endangered animals. In the 1990s and 2000s, China's marine environmental legal system developed rapidly. In 1997, *Criminal Law* incorporated a section entitled "Environmental Crime"; in 1999, the *Marine Environmental Law* was revised and a new section "Marine Ecology Protection" was added; in 2001, the *Sea Area Use Law* established state ownership of sea and marine resources in China. Supplementing the laws, many regulations and rules have been adopted and have played important roles in the management of marine environment. Coinciding with its development of a legal domestic framework, China also participated in more than 50 environmental treaties.

4.2 Domestic Law on Marine Environment Protection of the Yellow Sea

4.2.1 List of Domestic Laws, Regulations, Rules and Standards on Marine Environment Protection

4.2.1.1 The Constitution

The current *Constitution (1999)* contains several provisions on environmental protection. For example, Article 9(2) provides, "The State ensures the rational use of natural resources and protects rare animals and plants. The appropriation or damages of natural resources by any organization or individual by whatever means is prohibited." Article 26(1) also provides, "The State protects and improves the living environment and the ecological environment, and prevents and remedies pollution and other public hazards." Accordingly, it is a constitutional rule that the state has the obligation to protect the environment and to ensure rational use of natural resources. These articles provided the constitutional basis for environmental legislation and enforcement.

4.2.1.2 Environmental Protection Law

The *Environmental Protection Law* makes the harmonization of economic construction, social development and environmental protection a fundamental Chinese policy. The *Law* stipulates that government organizations at various levels, as well as all units and individuals, are obligated to protect the environment. Protection of the marine environment is implicit in this law. For example, Article 2 provides: "Environment refers to the total body of all natural elements affecting human existence and development, which includes the atmosphere, water, seas, land, minerals, forests, grasslands, wildlife, natural and human remains, nature reserves, historic sites and scenic spots, and urban and rural areas." Article 3 provides: "This law should apply to the territory and other sea areas under the jurisdiction of China." Article 21 provides: "The State Council and the governments at various levels in coastal areas should provide better protection for the marine environment. The discharge of pollutants and the dumping of wastes into the seas, the construction of coastal projects and the exploration and exploitation of offshore oil must be conducted in compliance with legal provisions so as to guard against the pollution and damage of the marine environment."

4.2.1.3 Marine Environment Protection Law

For the general purposes of protecting the marine environment and resources,

preventing pollution, maintaining ecological balance, ensuring human health and promoting maritime developments, China adopted the *Marine Environment Protection Law* in 1982. Article 2, section 1, of the law provides: "This law applies to internal seas and territorial seas of China, and all other sea areas under the jurisdiction of China. All vessels, platforms, airborne vehicles, submersibles, as well as all enterprises, institutions and individuals engaged in navigation, exploration, exploitation, production, scientific research and other activities in the sea areas under the jurisdiction, should comply with this law." *The Marine Environment Protection Law* also applies to the discharge of harmful substances and the dumping of wastes beyond the sea areas under the jurisdiction, if they cause pollution to such areas.

The stipulation of this law is harmonious with corresponding international conventions and customary rules. As for provisions on vessels, the *Marine Environment Protection Law* is harmonious with the *International Convention On Civil Liability For Oil Pollution, 1969*. The law also takes into consideration the standards stipulated in *MARPOL 73/78 and its Annex I*. The provisions on dumping wastes at sea make reference to the *Convention On Prevention Of Marine Pollution By Dumping Wastes And Other Matters Into Ocean, 1972,* and other international Acts on dumping.

The *Marine Environment Protection Law* was amended during the 13th conference of the 9th National People's Congress in 1999; the amended law became effective as of April 1st, 2000. The significant characteristic of this amendment was that some concrete articles on the harmonization of domestic law with related international conventions were incorporated into the law. It specifies clearly that, "If an international treaty regarding environment protection concluded or acceded to by the People's Republic of China contains provisions differing from those contained in this law, the provisions of the international treaty should apply, unless the provisions are ones which the People's Republic of China has announced reservations." [25] This article demonstrates to the international community that China is serious about the implementation of international conventions; this is helpful in perfecting domestic institutions concerned with marine environmental protection. The Marine Environment Protection Law, as amended, covers:

- Supervision and management of marine

25 Article 97 of the Marine Environmental Protection Law.

environmental protection (Chapter 2)

- Marine ecological preservation (Chapter 3)
- Land-based pollutants (Chapter 4)
- Prevention of pollution from coastal construction projects (Chapter5)
- Prevention of pollution from offshore construction projects (Chapter 6)
- Dumping of wastes (Chapter 7)
- Prevention of pollution from vessels (Chapter 8)

The Marine Environment Protection Law, as amended, provides for implementing mechanisms as follows:

- Environmental Impact Assessment (EIA);
- System for "total quantity control" of contaminant discharges in major zones;
- Marine zoning and marine environmental protection planning;
- Marine environmental quality standard and pollutant discharge standard;
- Levy of discharge fees and dumping fees;
- Contingency plan for oil-spill from offshore platforms, vessels, and coastal units likely to cause marine pollution;
- Marine nature reserve;
- Report of quantity, type, content and installation of discharge;
- Permit for discharge;
- Dumping permit and zoning;
- Damage compensation.

These provisions have adopted sustainable development principles and incorporated proven and innovative concepts and practices, such as "total quantity control" of contaminant discharges based on measured environmental carrying capacity,[26] marine zoning,[27] improved inter-agency coordination, the use of market mechanism, and improved implementation mechanisms.

4.2.1.4 Fisheries Law

The Fisheries Law was adopted in 1986 and amended in 2000. According to the Fisheries Law and its Implementing Regulation, people's governments at or above the county level may grant licenses to units or individuals, for using state-owned water surfaces and tidal flats to develop aquaculture.[28] Natural spawning, breeding and feeding grounds of fish, shrimp, crab, shellfish and algae in state-owned water surfaces and tidal flats, as well as their major migration passages,

26 Article 2 of the Marine Environment Protection Law.
27 Article 6 of the Marine Environmental Protection Law.
28 Article 11 of the Fisheries Law of PRC.

must be protected and cannot be used as aquaculture grounds.[29] Disputes over ownership and rights to the use of water surfaces and tidal flats will be solved through consultation. If no agreement is reached, disputes will be handled by the people's government at or above the county level, and ultimately, by the court.[30] The State draws up plans for the use of water surface areas and defines those areas of water surface and inter-tidal zone or mudflats to be used for aquaculture purpose. Units or individuals who wish to use designated areas must apply for an aquaculture permit through the competent fisheries administration at or above the county level; the aquaculture permit will be granted by the people's government at the same level. [31]

4.2.1.5 Wildlife Protection Law

The Wildlife Protection Law was adopted in 1988 and amended in 2004. Its purpose is to save wildlife species which are rare or near extinction. According to this law, all marine wildlife is owned by the state, and the government is responsible to strengthen the protection of wildlife resources, domesticate and breed wildlife, rationally develop and utilize wildlife resources, and encourage scientific research on wildlife.[32] The state should also award persons who have made outstanding achievements in the protection of wildlife resources, in scientific research, or in the domestication and breeding of wildlife. This law is supplemented by the *Regulations for the Protection of Aquatic Wildlife (1993)*, which grants the responsibility of managing precious or endangered species of aquatic wildlife to the fishery administration. Any instance of transportation of such species out of a county, import or introduction of such species from abroad, and export of such species, requires an application to be filed to the competent fishery administration under the people's government of the relevant province, autonomous region or municipality. The import or introduction of such species also requires scientific authentication of the science research institution designated by the competent department of fishery administration under the people's government, at or above the provincial level. Other measures include regular monitoring of aquatic wildlife resources and designation of aquatic nature reserves, as well as issuance of special catching, domestication and breeding licenses, etc. On September 1st, 2006, the State Council adopted the *Regulations on the Import and Export of Endangered Wildlife*, which provide that the export and import

29 Article 12 of the Implementation Rules of the Fisheries Law of PRC.
30 Article 13 of the Fisheries Law of PRC.
31 Article 11 of the Fisheries Law of PRC
32 Article 4 of the Wildlife Protection Law of PRC.

of specimens of species included in the appendices of the *Convention on the International Trade in Endangered Species of Wild Faunu and Flora*, are prohibited. When required for scientific research, domestication, reproduction or exchange, a permit should be obtained before import or export.[33]

4.2.1.6 Law on Entry and Exit of Animal and Plant Quarantine

The *Law On Entry And Exit Of Animal And Plant Quarantine* was adopted in 1991. It aims to prevent infectious or parasitic diseases from spreading into or out of the country, and seeks to protect agriculture production, forestry, animal husbandry and fisheries, as well as to protect human health. The Law also seeks to promote the development of trade. Animals, which according to the Law include fish, shrimp and prawn, crab and shellfish (domesticated or wild), as well as animal products, containers and packaging materials used for carrying animals and animal products, including the means of transport from animal epidemic areas, are, on entry or exit, subject to quarantine inspection. They must be accompanied by quarantine certificates issued by the quarantine departments of the countries of export.

4.2.1.7 Environmental Impact Assessment Law

The *Environmental Impact Assessment Law*, which came into effect on September 1st, 2003, expands EIA requirements from individual construction projects to government planning for the *inter alia* development of agriculture, aquaculture, animal husbandry, forestry, water conservation and natural resources.

4.2.1.8 Administrative Regulations on Marine and Coastal Environment Protection

In order to enforce the *Marine Environmental Protection Law*, the State Council has formulated and promulgated 6 regulations, namely:

- Regulations on the Prevention of Pollution to Sea Areas by Vessels
- Regulations on Environmental Protection in Offshore Oil Exploration and Exploitation
- Regulations on the Dumping of Wastes at Sea
- Regulations on Prevention of Environmental Pollution by Ship-Breaking
- Regulations on Prevention of Pollution to the Marine Environment by Land-Based Pollutants
- Regulations on Prevention of Pollution to the Marine Environment by Coastal Construction Projects.

33 Article 6 of the Regulations on the Import and Export of Endangered Wildlife of PRC.

Protection regulations for marine living resources are as follows:

- Executive Order on Motor Trawler Restricted Zone in the Bohai Sea, the Yellow Sea, and the East China Sea
- Regulations for the Protection of Aquatic Wildlife
- Regulations on the Management of Natural Reserves

4.2.1.9 Department Rules on Marine and Coastal Environment Protection

In order to implement the *Marine Environment Protection Law* and corresponding regulations, departments of the State Council which lawfully exercise the right of supervision and management of the marine environment have drafted and issued administrative rules such as the following:

- Measures for Implementation of the Regulations on the Dumping of Wastes at Sea
- Measures for Implementation of the Regulations on Environmental Protection in Offshore Oil Exploration and Exploitation
- Measures for Surveillance and Emergency Management at Sea
- Measures for Marine Nature Reserves Management
- Management Plan for Safe Production in Oil Port
- Regulations for Oil Tanker Safety in Production
- Interim Provisions for Management of Dangerous Goods in Harbour
- Procedural Provisions on Punishing Oil Polluters in Ship Casualties
- Procedural Provision for Dealing with Pollution Accident by Vessel
- Stipulations on Augmenting Environmental Protection Strength in Fishing Waters
- Stipulations on Utilization of Chemical Oil Depleting Agent in Marine Oil Exploitation
- Procedural Provisions on Working Out and Ratifying Emergency Plan for Oil Spilling in Marine Oil Exploitation
- Guideline for Choosing and Monitoring Marine Dumping Area
- Rules on the Collection of the Proliferation and Maintenance Fee for Prawn in the Yellow Sea and Bohai Sea
- Rules on the Management of Fishing Licenses
- Provisional Measures on the Collection of Resources Proliferation and Protection Fee of the Yellow Sea and the Bohai Sea, the East China Sea and the South China Sea.

4.2.1.10 Local Regulations and Rules on Marine and Coastal Environment Protection

To implement national laws and regulations on marine and coastal environmental protection, local governments and people's congresses of coastal areas have drafted and issued local regulations and administrative rules of local government. For example:

Jiangsu Province

- Implementation Rules of Jiangsu Province on the Protection of Aquatic Resource Reproduction
- Supplementary Provisions to the Implementation Rules of Jiangsu Province on the Protection of Aquatic Resource Reproduction
- Interim Provisions on Strengthening the Management of LÜSi Fishery Ground
- Circular on Issuing Offshore Fishery Permits
- Urgent Notice on Prohibition of Capturing Spawning Parent Crab
- Interim Provisions of Jiangsu Province on the Management of Haizhou Bay Fishery Ground
- Circular on Strengthening the Management of Eel Fry Resources
- Details on about Strengthening the Management of Eel Fry Resource
- Implementation Provisions of Jiangsu Province on the Fisheries Law of the People's Republic of China
- Circular on the Allowable Catch Size, Fishing Gear, Net and Closed Fishing Season
- Circular on Strengthening the Management of Eel Fry Resource
- Circular Strengthening the Management of Production and Sale of Eel Fry
- Regulations of Jiangsu Province on the Management of Coastal Zone
- Regulations on Environmental Protection of Jiangsu Province
- Circular on Enhancing the Development of Coastal Shallow Seas and Tidelands
- Regulations of Jiangsu Province on the Management of Harbour
- Regulations of Jiangsu Province on the Development and Use of Shallow Seas and Tidelands
- Regulations of Jiangsu Province on Fishery Management
- Regulations of Jiangsu Province on the Management of Sea Area Use
- Regulations of Jiangsu Province on the Management of the Project in Huaihe River Mouth
- Circular of the Oceanic and Bureau of Fisheries Management of Jiangsu

Province on Reporting the Basic Information of the Mobile Ships Used in Fishery

- Interim Provisions of Jiangsu Province on the Management of Jiang Jiasha and Zhu Gensha Areas
- Scheme on Enhancing the Safety of Fishery Production of Jiangsu Province
- Circular on Strengthening the Management to Inshore Fishing Boats
- Circular on Stopping Illegal Construction of Inshore Fishing Boat and Illegal Use of Labour in Fishing Village
- Circular on Establishing the Sanshan Island Marine Resources Reproduction Reserve in Dalian
- Implementation Provisions of Liaoning Province on the Protection of Aquatic Resource
- Circular on Strengthening the Protection of the Shrimp Resources.

Liaoning Province

- Circular on Regulating the Catching of Salmon
- Measures of Liaoning Province on Levying and Using the Proliferation and Protection Fee of Fishery Resources
- Supplement to Measures of Liaoning Province on Levying and Using the Proliferation and Protection Fee of Fishery Resources
- Circular on Establishing the Proliferation Area of Shellfish in Lüshunkou, Jinzhou and Changhai
- Circular on Strengthening the Management and Conservation of Jellyfish Resources in Liaodong Bay
- Environmental Protection Regulations of Dalian
- Directive of Liaoning Province on Protected Animals
- Interim Provisions of Dandong on the Management of Shellfish Resources
- Measures of Liaoning Province on Sea Boat Registration
- Circular on Establishing the Seal Nature Reserve in Dalian
- Interim Provisions of Dandong on the Management of Marine Fishery Ships
- Environmental Protection Regulations of Liaoning Province
- *Regulations of Dalian on the Protection of Special Marine Resources*
- Implementation Provisions for Regulations of Dalian on the Protection of Special Marine resources
- Circular on Strengthening the Protection of Perch and Eel Seedling Resources
- Implementation Provisions of Liaoning Province on the Fisheries Law of the

PRC

- Supplement for the Implementation Provisions on Regulations of Dalian on the Protection of Special Marine Resources
- Regulations of Liaoning Province on the Management of Fishing Boat
- Interim Provisions of Liaoning Province on the Management of Fishery Permit
- Regulations of Liaoning Province on the Management of Fishing Port
- Implementation Measures of Liaoning Province on the Water Law of the PRC
- Regulations of Dandong on the Management of Eel Seedling Resource
- Provision of Dalian on the Protection of Coastal Aquatic Environment
- Interim Provisions of Dalian on the Security of Marine Fishery
- Operation Rules of Dalian on the Security of Mobile Fishing Boat
- Regulations of Liaoning Province on the Surveillance of Fishery Boats
- Regulations of Liaoning Province on the Security of Marine Fishery
- Regulations of Liaoning Province on the Management of Harbour.

Shandong Province

- Implementation Provisions of Shandong Province on the *Fisheries Law of the People's Republic of China*
- Circular of Bureau of Fisheries Management on Approving and Issuing Cultivation Permit of Coastal Waters, Shallow Seas and Tide Zones of Jiaozhou Bay
- Regulations of Shandong Province on the Levying and Using of Protection and Proliferation Fee of Fishery Resources
- Regulations of Shandong Province on the Management of Parent Shrimp in the Southern Sea Area
- Circular on Revising the Regulations of Shandong Province on the Management of Parent Shrimp in the Southern Sea Area
- Regulations of Shandong Province on the Security of Marine Fishery
- Implementation Rules of Shandong Province on the *Wild Animal Protection Law of the People's Republic of China*
- Directive of Shandong Province on Protected Wild Animal
- Rules of Shandong Province on the Management of Special Marine Fishery Resources
- Regulations of Shandong Province on the Cultivation in Shallow Sea and Tidelands
- Interim Provisions of Shandong

Province on Encouraging the Foreign Investment to Develop Shallow Seas and Tidelands

- The Inshore Marine Environment Protection Regulations of Qingdao
- Regulations of Qingdao on the Coastal Zone Planning
- Circular on Strengthening the Management in Moratorium
- Marine Environment Protection Regulation of Shandong Province
- Environmental Protection Regulations of Shandong Province
- Rules on the Security of Marine Fishery Production of Qingdao
- Provisions of Qingdao on the Management of Sea Area Use
- Regulations of Qingdao on the Management of Marine Fishery
- Regulations of Shandong Province on the Management of Navigation Channel
- Rules of Shandong Province on the Surveillance of the Coastal Fishing Boat Safety and Fishing Port Safety
- Regulations of Shandong Province on the Management of Channel Traffic
- Provisions of Shandong Province on the Protection of Fishery Resources
- Regulations of Shandong Province on the Management of Sea Area Use
- Regulations of Shandong Province on Marine Functional Zoning.

4.2.1.11 Marine Environment Standards

To implement national law and regulations protecting marine and coastal environment, the State Council of China has promulgated a series of marine environment standards. A comprehensive regime of marine environmental quality standards has been developed to guide marine pollution monitoring and environmental quality assessment. For example:

- Sea Water Quality Standard
- Quality Standard for Fisheries Waters
- Integrated Waste Water Discharge Standard
- Standard of Waste Water from Ship Sources
- Standard of Oily Sewage Discharge for Offshore Petroleum Exploitation Industry.

According to stipulations of the law, both environmental quality standards and pollutants discharging standards are compulsory. In case of a violation of laws and environmental standards, liabilities should be investigated and the violator charged.

4.2.1.12 Legal Provisions on Marine and Coastal Environment Protection in Other Laws

Because marine and coastal environment protection is complex and systematic, it is not sufficient to regulate all legal relationships only by means of marine environmental legislation. This must be supplemented by provisions on environment protection in other laws, regulations and rules. The laws are as follows:

- Law on Prevention and Control of Water Pollution
- Law on Prevention and Control of Solid Waste
- Mineral Resources Law
- Law on Territorial Sea and Contiguous Zone
- Criminal Law
- General Provisions of the Civil Law
- Security Administrative Punishment Law.

The regulation is:

- Interim Regulations for the Management of Places Famous for Scenery and Historical Relics.

Each of the laws and regulations has provisions to safeguard or improve ecological environment and marine environment for habitation, and to prevent and control marine pollution. The legal system for marine and coastal environment protection in China is an integrated entity, ensuring not only that the laws are in place, but also that appropriate regulations and rules have been enacted and are observed.

4.2.2 Major Non-Legal Documents and Policies Relating to Marine Environment Protection

4.2.2.1 Tenth Five-year Plan for Environmental Protection

This Plan was formulated by SEPA, together with the National Development and Planning Committee, State Economic and Trade Commission, and Ministry of Finance, in December 2001. The Plan reviewed the status of environmental protection since the "Ninth Five Plan", and presented the current status quo. It set forth guiding principles, objectives, plans, and tasks for environmental protection, and also specified detailed measures to guarantee their implementation. The Plan contains sections for marine environmental protection. The State Council approved the "Tenth Five-year Plan" and emphasized that the Plan is the foundation for environmental protection during this period. Provinces, municipalities, cities and relevant

agencies subordinate to the State Council should make their respective detailed implementation plans according to the characteristics of local situations. Local governments and departments should include major environment protection projects in their annual plans for national economic and social development, and should take concrete measures to implement them. SEPA should conduct its tasks on environment monitoring, information, technology, standard, education and public awareness according to one set of rules, plans and monitoring requests. SEPA and other related departments should strengthen supervision of enforcement of environmental laws. In order to achieve the objectives of the "Tenth Five-year Plan", harmonious co-operation among ministries and local governments should be strengthened, and the study of major environment issues across boundaries and zones should be promoted.

4.2.2.2 Function Zoning of National Sea Areas

The work on function zoning of national sea areas was headed by the State Oceanic Administration under the Ministry of Land and Resources, in September 2002. The task was to divide sea areas into various function areas according to their locations, natural resources, environmental conditions and their demand for development and utilization. Function zoning provides a scientific basis for marine management and utilization, as well as marine environmental protection, so as to guarantee national economic and social development. The sea areas affected by function zoning cover inland waters, territorial seas, contiguous zones, exclusive economic zones, continental shelf, and other sea areas within the jurisdiction of China. The sea areas have been partitioned into ten main function areas, namely: 1) port and navigation; 2) fishery resource utilization and conservation; 3) mineral resource utilization mining; 4) tourism; 5) marine resource utilization; 6) marine energy utilization; 7) construction projects; 8) marine conservation; 9) specific-purpose; and 10) reserved area. The main functions of significant sea areas have been defined according to their locations. The State Council approved the function zoning of sea areas, and emphasized that such zoning is the foundation for the utilization, management and environmental protection of sea areas. Additionally, zoning plans have legal force and should be strictly implemented.

4.2.2.3 National Environmental Function Zoning of Coastal Sea Areas

SEPA organized and completed the national environmental function zoning of coastal sea areas in 1999. The function zoning process considered the general

situation of coastal waters, socio-economic status of people living in coastal areas, and quality of coastal waters. It also dealt with methods, schemes, implementation, and management measures of function areas. The national function zoning covered eleven provinces, municipalities and cities along the coastal line of China, and were based upon the environmental functions of local coastal sea areas. There were 651 coastal environmental function areas, of which 80 were of Level I, 268 of Level II, 73 of Level III and 230 of Level IV. In order to strengthen the management of coastal environment function areas, SEPA issued *Management Measures on Coastal Environment Function Areas* in 1999. Function zoning formed the basis of regulations on marine environmental protection that were created by national and local governments. Function zoning supports the task of incorporating marine environmental protection into the planning of national economic and social development. It has become a major approach taken by environmental protection administrations to monitor the environment according to their different functions. It is significant that China can achieve the tasks of national environmental protection by partitioning the coastal environmental function areas, and by administering these areas effectively, in accordance with the law.

4.2.2.4 Guidelines for the Development of National Marine Economy

The *Guidelines* were compiled by the Committee for National Development and Improvement, Ministry of Land and Resources, and SOA. The *Guidelines* focus on marine industries, including the marine fishery, maritime transportation, offshore oil & natural gas, coastal tourism, shipbuilding, sea salt & chemistry industry, seawater desalination & utilization, and marine pharmaceuticals. The Guidelines presented the current status of Chinese marine economy, including existing problems, and confirmed the task and direction of marine industries. It also designed the district layout for marine economy and clarified the main measures for marine resources conservation and economic development. While distributing the Guidelines, the State Council declared: "Being depositories of abundant living resources, oil and gas, and minerals, oceans are significant for the development of marine industries that are in turn fundamental to rational development of coastal economies and industrial structures, so as to maintain a fast-growing and sustainable national economy."

4.2.2.5 Guideline on Ecological Environment Protection in China

The *Guideline on Ecological Environment Protection in China*

was issued by the State Council on December 21st, 2000. It briefly describes both achievements and problems in the ecological protection of China. Having identified the main causes of ecological damage in China, it puts forward the guidelines, basic principles and targets of ecological environment protection in China, of which marine environment protection is a significant part. Enhancement of the legal system, performance of international treaties, and education are important measures.

4.2.2.6 Guideline on Actions to Protect Living Resources in Water

The Guideline *on Actions to Protect Living Resources in Water* was adopted on March 3rd, 2006 by the State Council. It briefly presents current situations and problems in the protection of living resources in China, and puts forward the guidelines, principles and objectives of future actions. It puts forward a series of protection and enhancement actions, namely: 1) protection of important fishery resources; 2) enhancement of fishery resources; 3) management of responsible fishing; 4) construction of nature reserves; 5) rescue of endangered species; 6) domestication and raising of endangered species; 7) management of utilization of endangered species; 8) monitoring and controlling of alien species; 9) prevention and treatment of water pollution and ecological disasters; 10) ecological compensation of construction; 11) restoration of water ecological environment; and 12) promotion of scientific aquaculture. It also addresses some guarantee measures, for example: 1) to establish and perfect effective and harmonious management mechanisms; 2) to establish and perfect multi-source investment mechanisms; 3) to enhance construction of legal system and execution teams; 4) to promote participation of the whole society; 5) to improve science and technical conditions and globalization.

4.2.2.7 Decision of the State Council on Practicing Scientific Development Theory and Enhancing Environmental Protection

The *Decision of the State Council on Practicing Scientific Development Theory and Enhancing Environmental Protection* was adopted on February 14th, 2006 by the State Council. It requires that governments at all levels understand the importance of environmental protection, and that they use scientific development theory as a guideline in environmental protection. It also requires that the development of society and the economy should be harmonious with the environment; important problems should be solved in a timely manner; and that management of environmental protection should be enhanced.

4.2.3 Current Legal Approaches on Prevention and Control of Marine Pollution

In managing existing marine pollution, China has a policy of giving priority to prevention, and combining prevention with control. While endeavouring to be successful in the protection of marine biological resources and the prevention and control of marine pollution, China has drawn up a series of regulations on control of land-sourced pollution, ship-sourced pollution, pollution from oil drilling, pollution from coastal and marine projects and ocean dumping. In addition, China has enhanced the monitoring, surveillance and control of marine environmental conditions.

4.2.3.1 Prevention and Control of Pollution to Marine Environment by Land-Based Pollutants

Approximately 80% of the pollutants entering into the sea come from land. In order to prevent and control land-based pollution, China has strengthened the legislation on this aspect. The *Environmental Protection Law* has stipulated the basic principles and institutions dealing with prevention and control of land-based pollution. The *Law on the Prevention and Control of Water Pollution* and its detailed regulations for implementation have played important roles in controlling and decreasing pollutants discharge carried by rivers. The *Water and Soil Conservation Law* and its detailed regulations for implementation deal with prevention and treatment of soil erosion, as well as protection and rational utilization of water and soil resources; thereby, pollution and damage to marine environment by surface runoff have been abated. The *Agriculture Law, Administrative Regulation on Pesticide, Provisions on Pesticide Registration and Rules on Safe Use of Pesticide* are also involved, directly or indirectly, in marine environmental protection, through protection of agriculture resources and environment, as well as management of pesticide production and use. The *Marine Environmental Protection Law* contains a chapter entitled "Prevention of Pollution to the Marine Environment by Land-based Pollutants", which has principle-based provisions on the discharge of domestic sewage and industrial sewage, disposal and handling of solid wastes on the beach, etc. China has also formulated regulations, rules and standards dealing with control of land-based pollution. A series of legal approaches has been adopted to prevent and control land-based pollutants, containing such items as:

1) Concentration and total pollution load control [34]

34 Article 29 of the Marine Environmental Protection Law.

Discharge of land-based pollutants into the sea should be conducted in compliance with standards and relevant stipulations laid down by the State and localities.

The State should establish and implement a system to control the total pollution load in key sea areas, determine standards to control the total load of key pollutants, and control the pollution load assigned for key pollution sources, in which control of land-based pollutants takes an important part.

2) Pollutants discharge report and registration

Units or individuals discharging land-based pollutants into sea should report to the competent department, and register both the discharging and treatment facilities. They should also report the types, quantities and concentrations of pollutants discharged under normal operation conditions, and provide relevant techniques and data on pollution control. In addition, they should give timely reports when there are great changes of pollutants discharge in kinds, quantities and densities.

Units or individuals discharging land-based pollutants and refusing to report, or making a false report about the items in the original report to register for pollutants discharge, should be ordered by environmental protection departments at or above the county level to correct the report, and should be fined. [35]

3) Collection of pollutants discharge fee[36]

Units or individuals directly discharging pollutants into the sea must pay a pollution discharge fee. Discharge fees and disposal fees collected must be used to treat marine environmental pollution and not be diverted for other uses.

Anyone who has not paid the fee on pollutants in excess of standards should be ordered to pay the fee and an overdue fine, and may be given an additional fine.

4) Treatment of pollution within a prescribed time [37]

Enterprises or institutions that have caused serious pollution to marine environment, or discharged land-based pollutants exceeding the standards, or failed to accomplish the pollutants discharge reduction task within a limited period of time, should be ordered by the governments to treat the pollution within a prescribed time. They should fulfill the target for controlling pollution within

35 Article 32 of the Marine Environmental Protection Law of PRC.
36 Article 11 of the Marine Environmental Protection Law of PRC.
37 Article 12 of the Marine Environmental Protection Law of PRC.

that time, or be ordered to suspend operations and close down, or switch to other types of production.

Those enterprises or institutions that have not yet completed the tasks of their pollution abatement within a deadline, should have imposed upon them a double fee for discharging pollutants in excess of standards, and may be fined based on the consequences of damage and loss, or be ordered to suspend operations or close down.

5) On-the-spot inspection [38]

Environmental protection departments of local governments at or above county level in coastal areas have the right to make on-the-spot inspections of pollutants discharge and pollution treatment within their jurisdictions. The inspected party should report the situation accurately and provide necessary information. The inspectors have an obligation to guard both the technical and business secrets for the inspected party.

Any violator who refuses on-the-spot inspection or employs deceit in response to such an inspection should be ordered by the environmental protection departments to correct his behaviour, and may be fined.

6) Report of pollution accidents [39]

Any unit or person involved in an event that has caused or may result in pollution, should immediately 1) circulate a notice to the units and residents who may suffer from the pollution, 2) report to the local environmental protection departments, and 3) subject itself or himself to investigation and handling. If the environment may be polluted seriously or the life and properties of residents may be threatened, the environmental protection departments should immediately report to the local government, and the local government should take effective measures to eliminate or reduce the damage.

Anyone who, by land-based pollutants, has caused an accident which harms the marine environment and results in grave economic loss, should be fined 30% of that loss, calculated on the basis of direct economic loss by the environmental protection departments; however, such a fine should not exceed a maximum of 200,000 RMB.

Anyone who has discharged land-based pollutants which cause serious marine environmental pollution and damage

38 Article 19 of the Marine Environmental Protection Law of PRC
39 Article 22 of the Regulations On Prevention Of Pollution To The Marine Environment By Land-Based Pollutants of PRC.

should bear the compensation liability.

Any violator who, by discharging land-based pollutants, has direct causal responsibility for pollution and damage accidents which result in serious losses of public or private properties, or in deaths, should be investigated and charged with the responsibility for a crime.

4.2.3.2 Prevention of Marine Environmental Pollution by Coastal Projects

Chapter IV of the *Marine Environment Protection Law* addresses the prevention of marine environmental pollution by coastal construction projects. To enforce the *Environmental Protection Law* and *Marine Environment Protection Law*, competent departments have drafted *Regulations on Prevention of Pollution to Marine Environment by Coastal Construction Projects*. In addition, there are other laws, regulations and rules on this subject; e.g. *Environmental Impact Assessment Law, Management Measures for Environmental Protection of Construction Projects, Regulation on the Check-for-Acceptance upon the Completion of Environmental Protection Facilities of Construction Projects*, etc. Now a series of legal approaches has been adopted in this regard. For example:

1) Environmental Impact Assessment for coastal construction projects [40]

Units responsible for coastal construction projects should write an Environmental Impact Statement or complete an Environmental Impact Form during the period of feasibility study. After being pre-examined by relevant departments in charge of projects, the Environmental Impact Statement or Environmental Impact Form should be submitted to the environmental protection department for examination and approval. Units undertaking environmental impact assessment for coastal construction projects should hold Credentials of Environmental Impact Assessment for Construction Projects, and only take assessment work within the limits permitted by the credentials.

Anyone who builds a coastal construction project without possessing environmental impact assessment properly examined and approved, should be ordered to stop the construction and adopt remedial measures, by the competent department under the local people's government above county level, and be fined not less than 50,000 Yuan and not more than 200,000 Yuan. Alternatively, the local people's government above county level, acting in accordance with the limits of its administrative authority could order the person to have the project removed within a certain period of time.

40 Chapter 5 of the Marine Environmental Protection Law of PRC.

2) Environmental protection installations being designed, built and commissioned simultaneously with the principle project

Environmental protection installations of coastal construction projects must be designed, built and commissioned together with the principal part of the project. Coastal construction projects can only put into production or use at the time that the environmental protection facilities for the projects have been checked and accepted by the environmental protection administrative department.

Anyone who puts a coastal construction project into commission or use without completing the construction of environment protection installations, or having environment protection installations that are not up to stipulated requirements, should be ordered to stop production and use of the project by the competent administrative department, and be fined not less than 20,000 Yuan and not more than 100,000 Yuan.

3) On-the-spot inspection [41]

Environmental protection administrative departments of governments at or above county level, pursuant to the limits of their authority for the projects, can convene related departments to conduct on-the-spot inspections for coastal construction projects. Inspected parties must report their situation accurately and provide necessary information. Inspectors have an obligation not to divulge related technical and business secrets. Any violator refusing or obstructing an on-the-spot inspection by environmental protection departments, or employing trickery in response to such an inspection, should be ordered by the environmental protection administrative departments to set a deadline to correct his behaviour, and may be fined.

4.2.3.3 Prevention of Marine Environmental Pollution by Marine Projects [42]

Chapter VI of the *Marine Environmental Protection Law* contains 8 articles designed to prevent and control pollution and damage to marine environment by marine projects. Also, Articles 13, 14, 19, 24, 28 and 31 of the *Marine Environmental Protection Law* are applicable to environmental protection and management in marine projects. In order to enforce the *Marine Environmental Protection Law*, competent departments of the State Council have issued special regulations,

41 Article 19 of the Marine Environmental Protection Law of PRC.
42 Regulations on Environmental Protection in Offshore Oil Exploration and Exploitation and Regulations on the Prevention of Marine Pollution from Marine Projects

measures and standards; for example: *1) Regulation on the Exploitation of Offshore Petroleum Resources in Co-operation with Foreign Enterprises; 2) Implementation Measures of the Regulations on Environmental Protection in Offshore Oil Exploration and Exploitation; 3) Discharge Standards of Oily Waters for Offshore Oil Exploitation; 4) Rules on the Use of Oil Dispersant in Marine Oil Exploration and Exploitation; and 5) Procedures on Drafting and Approval of the Emergency Plan of Marine Oil Exploitation and Exploration. The Mineral Resource Law* and its implementation details also include applicable provisions. At present, the major environmental protection approaches in this aspect are as follows:

1) Environmental Impact Assessment for marine projects [43]

At the project (e.g. an oil field) feasibility study period, the enterprise or operator should draw up an Environment Impact Statement and submit it to the oceanic department for examination and approval. The enterprise or operator should then report to the environmental protection department for recording and supervision.

The oceanic department must, before the examination and approval of marine environmental impact assessment statements, seek the opinions of competent departments in charge of maritime traffic safety and fisheries, as well as the environment protection department of the Armed Forces.

2) Installation of anti-pollution equipment

Fixed and mobile platforms should be installed with oil-water separators, equipment for treatment of oily water, monitoring devices for oil discharge, recovery facilities for residual and waste oils, and garbage-smashing equipment. Equipment and facilities should be inspected by the Vessels Inspection Agency of China, proven to be up to standard, and then granted a certificate of effectiveness.

3) Wastes treatment

Residual oil, waste oil, oily mud, oily garbage, and other noxious liquids or residues should be recovered, as their discharge into the sea is forbidden. The disposal of industrial garbage in large quantities should be controlled according to provisions on marine dumping. Scattered industrial garbage should not be dumped into fishing areas and navigation channels. When it is necessary to dump domestic refuse within 12 nm

43 Chapter 6 of the Marine Environmental Protection Law of PRC.

from the nearest land, it must be smashed into grains with diameters less than 25mm.The discharge of sewage should comply with the *Discharge Standard of Oily Sewage of Marine Oil Industry*. The treatment of discarded marine oil platforms should comply with the *Interim Management Method of the Discard of Marine Oil Platform*.

4) Fishery resources protection

When a marine project necessities dynamite explosion or other operations harmful to fishery resources in important fishing grounds, effective measures should be taken to keep away from the spawning, breeding and fishing seasons for those fishes and shrimps of major economic value. Such operations should be reported in advance to the competent authority, and distinct signs and signals should be given while operations are carried out. Upon receiving such a report, the competent authority should promptly inform relevant units of the location and time of the operations.

5) Prevention of oil pollution accidents

Offshore oil-storage installations and oil pipelines should meet the requirements concerning seepage, leakage and corrosion, and be kept in good condition through regular inspection, so as to prevent oil leakage accidents.

6) Control of use of chemical dispersant

a. When an oil-pollution accident occurs, a small amount of chemical dispersant may be applied to a limited amount of oil that is deemed to be unrecoverable by normal recovery measures.

b. The amount of unrecoverable chemical dispersant (including its solvent) should be prescribed by competent authority in accordance with various sea areas and other conditions. The operator should submit a report to the competent authority in pursuance of relevant provisions, and may use chemical dispersant only after permission is granted.

c. In an emergency in which oil spills cannot be recovered, and which may cause fire or serious threat to the safety of human life and properties, whereas using chemical dispersant can mitigate pollution and prevent the accident from expanding, then dispersant may be used without a previous report. Such an action is exempt from the restrictions under paragraph b . However, the facts of such an accident and the use of chemical dispersant should be reported in detail to the competent authority after the accident has been treated; and

d. Only the chemical dispersant approved by competent authority may be used.

7) Oil Pollution Accidents Contingency Plan

The State Oceanic Administration should be responsible for drawing up state contingency plans to deal with major oil spill accidents on the sea caused by offshore oil exploration and exploitation, and submit the plans to the State Environmental Protection Administration to be recorded. Enterprises, institutions or operators should have the ability to meet emergencies related to the control of oil pollution accidents, to work out emergency plans, and to provide oil-recovery facilities as well as oil enclosure and elimination equipment and materials commensurate with the scale of offshore exploration and exploitation in which it is engaged.

8) On-the-spot inspection

Functionaries of, and persons designated by a competent authority have the right to board any fixed or mobile platform and any other relevant installations to conduct monitoring and inspection. The inspected party should furnish convenience to such public-duty ships, functionaries and designated persons, and should provide complete and factual information.

4.2.3.4 Prevention of Marine Environment Pollution by Vessels

The *Marine Environment Protection Law* contains a chapter dedicated to the prevention of marine environment pollution by vessels. Articles 14, 21, 31 and 33 of the *Environment Protection Law* are also applicable. In addition, there are provisions in the *Law On Territorial Sea And Contiguous Zone* and the *Maritime Traffic Safety Law*, as well as regulations and rules such as *Regulations On The Prevention Of Pollution Of Sea Areas By Vessels and Vessel Pollutant Discharge Standard*. A series of legal approaches has been adopted in this regard, namely:

1) Installation of anti-pollution equipment [44]

Any oil tankers with a gross tonnage of 150 tons or more, and any other vessels of 400 tons or more should be fitted with appropriate anti-pollution equipment and facilities. All oil tankers less than 150 tons and any other vessel less than 400 tons, should be fitted with special containers for recovering waste oil.

2) Preparation of Anti-pollution documents

Any oil tanker with a gross tonnage of 150 tons or more, or any other vessel of 400 tons or more should provide an Oil Record Book and oil spilling contingency

44 Regulations On The Prevention Of Pollution To Sea Areas By Vessels

plan. Any vessels carrying more than 2,000 tons of bulk oil as cargo should have a valid Certificate of Insurance or other Financial Security in respect of Civil Liability for Oil Pollution, or a Credit Certificate for Civil Liability against Oil Pollution, or hold other financial credit guarantees.

3) Control of waste water discharge

The discharge of oily water from an oil tanker with a gross tonnage of 150 tons or more, or from any other vessels with a gross tonnage of 400 tons or more, must be conducted in compliance with relevant state standards and regulations, and accurately recorded in the Oil Record Book.

The discharge of hold-washings and other residues by vessels carrying noxious or corrosive goods must be conducted in compliance with state regulations for vessel sewage discharge, and be accurately recorded in the Log Book.

4) Control of discharge of radioactive substances from nuclear-powered vessels and vessels carrying such substances

Foreign nuclear-powered vessels and those carrying such substances that traverse the territorial sea of China must hold appropriate certificates and take special prevention measures. The discharge waste water containing high concentration of radioactive matter into the sea is prohibited. If it is deemed necessary to discharge waste water containing a low concentration of radio-active matter into the sea, then radioactive inspection should first be carried out in compliance with the state regulations and standards.

5) Ballast water treatment

Vessels with ballast water taken from epidemic ports should report to the Quarantine Authorities for special treatment.

6) Garbage treatment

Vessels are not permitted to dump garbage into port waters. Vessels carrying harmful cargoes or dusty bulk cargoes must not freely wash decks or holds, nor discharge residues into port. Vessels coming from epidemic ports should apply to the Quarantine Authorities for sanitary treatment of the garbage on board. No plastic goods may be dumped at sea in a voyage. Waste crumbled into granules less than 25mm in diameter can be dumped into the sea 3 miles away from land. Waste without crumbling treatment can be dumped into sea 12 miles away from land.

Vessels should make a true record of

the dumping of garbage and should submit a written report to the local Maritime Traffic Safety Administration after returning to the port. No foreign vessels are allowed to conduct dumping operations, including abandoning ships or other floating objects in water areas under the jurisdiction of China.

7) Operation of loads

When bunkering, loading or unloading oil, vessels must observe operation instructions and take effective measures to prevent oil spills. Oil tankers must make an accurate record of the operation in the Oil Record Book. Common vessels should record the operation in the Engine Log Book or On-Duty Record. If any oil seeping, oozing or leaking has occurred during the cargo operation, immediate cleaning-up measures should be taken to alleviate oil pollution, and the accident should be reported to the Maritime Traffic Safety Administration. After the cause has been found, a written report should be handed to the Maritime Traffic Safety Administration, and the vessels should be investigated and treated by the Maritime Traffic Safety Administration.

Vessels carrying inflammable, explosive, corrosive, poisonous or radioactive cargo must take proper measures for safety and prevention of pollution, and they must display the prescribed signals. In order to avoid pollution caused by any accident of falling or leaking of dangerous cargoes, vessels should observe the *Regulations On Supervision And Control Of Vessels Carrying Dangerous Goods issued by the Ministry of Communication, and the International Maritime Dangerous Goods Traffic Regulations* issued by the International Maritime Organization.

8) Vessel pollution accidents treatment

In the event that pollution has occurred from an abnormal discharge of oil, oily mixtures or other harmful wastes, or from the falling of noxious or corrosive goods, the vessel concerned should immediately take measures to control and eliminate such pollution and should report to the nearest agency of Maritime Traffic Safety Administration for investigation and settlement.

In the event that any vessel is involved in a marine accident that has caused, or is likely to cause, serious pollution to the marine environment, the Maritime Traffic Safety Administration has the power to take measures to avoid or minimize such pollution.

4.2.3.5 Prevention of Marine Environment Pollution by Dumping

A chapter in *Marine Environmental Protection Law* entitled "Prevention of Pollution to Marine Environment

by Dumping of Wastes" is designed to control waste-dumping at sea and to prevent pollution caused by dumping. In order to enforce the Marine Environmental Protection Law, China has drafted such administrative regulations and rules as the following: *1) Regulations on the Dumping of Waste at Sea; 2) Measures for Implementation of the Regulations on Dumping of Wastes at Sea; 3) Classification Standard and Assessment Procedure for Dredged Dumping at Sea,* etc. A series of legal approaches has been adopted in this aspect, namely:

1) Wastes classification

Wastes are classified into three categories, according to their toxicity, content of harmful substances, and impact on marine environment. The first category refers to the wastes listed in Annex 1 of the *Regulations on the Dumping of Wastes at Sea*; the second category refers to the wastes listed in Annex 2; the third category refers to those wastes not listed in either Annex 1 or Annex 2. The dumping of waste is controlled based on its categorization. Dumping of the first category of wastes is banned, except for emergencies where land treatment can put people's health at high risk. In such cases, dumping by a specific method can be conducted in a designated sea area after an emergency permit is obtained. Wastes in the second category only can be dumped when a special permit is issued. Dumping wastes of the third category that are slightly poisonous or non-poisonous, can be carried out with a general permit.

2) Classification of dumping areas

Dumping areas can be divided into A, B and C categories, as well as temporary dumping areas. Category A is defined for emergency treatment of wastes of the first category; category B is for waste of the second category, and category C for the third. A temporary dumping area is designated as a one-off dumping area for special waste. The designation of dumping areas is made by the Oceanic Administration, according to scientific and rational principles. The establishment of A, B and C dumping areas must be approved by the State Council.

3) Permission to dump

Any unit intending to dump wastes and other substances at sea must apply to competent authorities in advance, to obtain a dumping permit. Dumping permits are classified as Emergency Permit, Special Permit and General Permit. A dumping permit should state the dumping unit, term of validity and quantity, location of dumping and name

of vehicles, type of waste, and dumping method. A unit, after being granted a dumping permit, must carry out dumping in the designated area, under the terms and conditions specified by the permit.

All vessels, aircraft and other vehicles carrying out dumping operations should hold a Dumping Permit. Any vessels, aircraft or other vehicles without a permit should not conduct any dumping activity. According to the status of the marine ecological environment and development of science and technology, the competent authority may replace or cancel the permit. Dumping of foreign wastes is prohibited within sea areas under the jurisdiction of China.

4) Verification of loading wastes

At the time of loading wastes onto vessels, aircraft or other vehicles employed for dumping operation, a notice should be given to the permit-issuing authority for verification of the operation. If wastes are shipped out of a harbour by a vessel, notice should be given to the nearest agency of the Maritime Traffic Safety Administration for verification. When shipment starts from a military port, notice should be given to the relevant military department for verification. If the actual load of cargo does not conform to what is specified in the Dumping Permit, the vessel should not be permitted to leave port, and notice should be given promptly to the permit-issuing authority.

5) Supervision and examination

Competent authorities are responsible for supervision, examination and control of dumping activities at sea. When necessary, inspection officers may board or stay on a vessel that is to be dumped, for supervision and examination; in this case, the vessel should provide facilities for the inspection officers to perform their official duties.

6) Record and Report

The details of a dumping operation should be recorded in the Record Form and Log Book, and such record should be submitted to the permit-issuing authority within 15 days after the return of the vessel to harbour.

4.2.4 Current Legal Approaches on Management and Conservation of Marine Biological Resources and Ecosystems

The *Fisheries Law of the People's Republic of China* came into effect in 1986. As a consequence of the Law and its implementation regulations, China's fisheries management has improved

markedly and concomitantly with the rapid development of its industry. By virtue of this development, a series of regulations, measures, rules and technical standards governing different aspects incorporating international requirements, was adopted. The regulations, rules and standards encompass fisheries administration, fishing resource conservation, aquaculture enhancement, post-harvest processing, fishing vessel control, fish trade and environmental control. The 1986 *Fisheries Law* did not stipulate the fulfilment of China's responsibilities as a signatory to recent international conventions and agreements, notably the International Convention on the Law of the Sea and the Code of Conduct. With the establishment of the Exclusive Economic Zone, conservation of fishery resources and marine ecosystems has become more urgent and difficult due to the vast sea areas covered. In order to adapt theses changes and legalise the international requirements, China amended the *Fisheries Law* in 2000 and again in 2004; however, implementation regulations are yet to be enacted. The amended *Fisheries Law*, together with other regulations and rules, established the fishery management regimes in China, including: *1) Regulations on the Management of Fishing Licences; 2) Regulations on the Collection of the Proliferation and Maintenance Fee for the Chinese Prawn of the Yellow Sea and the Bohai Sea; 3) Provisional Measures on the Collection of Resources Proliferation and Protection Fee of the Yellow Sea and the Bohai Sea, the East China Sea, and the South China Sea; 4) Executive Order on Motor Trawler Restricted Zone in the Bohai Sea, the Yellow Sea, and the East China Sea,* etc.

4.2.4.1 Total Allowable Catch

The *Amended Fisheries Law (2000)* introduces the concept of total allowable catch to China's fisheries management. Based on the principle that the fishing effort should be lower than the recruit of fish stocks, fishing quotas in China jurisdictional waters are to be set by the Bureau of Fisheries Management of the Ministry of Agriculture, and approved by the State Council. The *Fisheries Law* also requires that the fishery administration of the State Council should organize stock assessment and scientific surveys to provide a scientific base for determination of total allowable catch. Because of its desire for considerable scientific and policy expertise, including means of allocation and detailed procedures for implementation, China has not yet brought this regime into practice.

4.2.4.2 Licensing Fishing

Units or individuals who intend to engage in offshore and distant water

fishing must first apply to departments of fishery administration for licenses. Fisheries authorities at various levels are responsible for the approval of fishing licenses. Licenses for large trawlers and purse seiner fishing under agreements with other states, as well as licenses for foreigners, are subject to approval of the State Bureau of Fisheries Management. Other fishing licenses are granted by local governments at or above county level. Each type of license stipulates the areas, seasons, total catch, and permitted fishing gear to be used. License holders must conduct fishing operations in accordance with the type of license issued.

Yellow Sea offshore (within the Motor Trawler Restricted Line) fishing licenses are granted by fishery authorities of the coastal counties or municipalities. Distant (outside the Motor Trawler Restricted Line) fishing licenses are granted by the Fishery Management and Fishing Harbour Superintendence of the Yellow Sea and Bohai Sea under the Ministry of Agriculture.

4.2.4.3 Collection of Resources Fee

The collection of a resources fee was first applied to a single species (Chinese prawn), and later covered all fish stocks. The 1997 *Resources Fee Measures* specified the application of the measures, including fee adjustments for various types of fishing, according to a vessel' s engine power and the fishing grounds. The use of a resources fee is limited to fisheries programmes: 70% for resources proliferation and 30% for resources maintenance.

4.2.4.4 Closed Fishing Seasons, Closed Fishing Areas and Summer Moratorium

A closed fishing areas approach has been in effect in China since the promulgation of the *Executive Order on Motor Trawler Restricted Zone in the Bohai Sea, the Yellow Sea, and the East China Sea* in 1955. The trawler restricted zone was set up with a line of 17 coordinates close to China's coast; motor trawlers were not permitted to fish on the western side of western waters. Since then, trawling has been banned within all coastal waters. In 1975, the *Sino-Japanese Fisheries Agreement* established 5 closed zones and 2 conservation zones to protect juvenile fish of some important species. Since the 1980s, increasing numbers of conventional species such as Chinese prawn, large and small yellow croaker, herring, and jellyfish have been protected in protected zones. Some coastal provinces have also set up seasonal conservation zones for fish stock spawning and breeding.

Since 1995, China has practiced a midsummer moratorium system – every year during July and August, fishing

is banned in the sea areas north of 27 degrees north latitude. In 1998 and in each subsequent year, the fishing closure was extended both in area and duration, and now includes a large section on the South China Sea. At present, closed zones have been extended to cover all of China's fishing ground; the annual closure lasts for three months.

4.2.4.5 Fishing Capacity Control

In 1987, China began to control the power of fishing vessels. In 1997, China announced a "double control" policy as part of the *Ninth Five Year Plan*, which aimed at limiting both the number and power of fishing vessels. In 1999, China issued *Guideline for Fisheries Industries Structural Adjustment* to put forward some method to reduce the numbers and power of fishing vessels. In 1999, China adopted a "zero growth" policy, which was advanced to a "minus growth" policy in 2000.

Concomitantly, to ease the pressure on capture fisheries and to reduce excessive fishing capacity, China has promoted aquaculture, fish product processing and alternative employment.

4.2.4.6 Promotion of Responsible Fishing Practices

Fisheries management authorities at state and provincial levels should designate criteria for specially-protected species. The criteria should include: 1) allowable catch of such species; 2) restricted fishing zones/seasons; 3) banned or restricted fishing gear and methods; and 4) minimum mesh sizes. Additional measures should be created for the general protection of these species. The inclusion of a wide range of offences addresses threats affecting the sustainability of fishery resources. At the same time, severe penalties help to achieve responsible fisheries in China.

4.2.4.7 Fishery Resources Enhancement

Article 28 of *Fisheries Law* provides that fisheries management departments of governments above county levels should conduct integrated plans for fishery waters within their jurisdictions, and take measures to enhance fishery resources. More than 10 resources restoration stations have been established in coastal areas: billions of fingerlings of prawns, crabs and fishes have been released into the China Seas. The following three paragraphs detail the proliferation work done by Liaoning, Shandong and Jiangsu Provinces along the Yellow Sea.

Liaoning Province: In the past 20 years, one hundred billion prawn fingerlings have been released into the Yellow Sea in Liaoning Province. This measure brought approximately 12 billion CNY benefit to the province and greatly

improved the income of fishermen; more importantly, it ensured proliferation of the prawn species in China. Aquaculture researchers in Liaoning Province have conducted experiments on prawn proliferation release as early as 1984. After 20 years of focused efforts, they have mastered the biological nature and life habit of prawn. In recent years, Liaoning Province has spent several billion CNY annually to release 1cm-3cm prawn fingerlings into the sea; the highest release number was 21 billion.

Shandong Province: In 2006, the People's Government of Shandong Province held the "Proliferation Release Ceremony on Fishery Resources in the Yellow Sea and Bohai Sea" in Laizhou Bay. 19.15 million fingerlings have been released, including 18 million jelly fish, 100 thousand *paralichthys olivaceus*, 250 thousand blue crab, and 800 thousand common shrimp. In 2006, more money will be spent on fishery proliferation in Shandong Province, and the number of species used for public release will continue to increase. According to estimates, the total number of fingerlings may reach 13 billion this year in the entire province, and the total capital used in the *Shandong Fishery Resources Restoration Plan* will reach 120 million CNY. In order to improve normative management of proliferation release and realize the goals of scientific proliferation, high efficiency proliferation and equity proliferation, a series of measures has been taken to ensure efficient implementation of the Shandong proliferation project. The measures include: 1) further refinement of the management system of proliferation; 2) establishment of comprehensive proliferation technology regulations for all species; and 3) strengthening of management and protection to fingerlings after release, etc.

Jiangsu Province: In February 2006, in the Lvsi Fishing Ground at latitude 32°08'312" north and longitude 121°39' 076" east, China Fishery Management No. 32503 fishing boat of Fishery Headquarter of Jiangsu Province successfully released 1510 bags of jellyfish (about 14269.5 thousand fingerlings) in accordance with release standards. This was the second jellyfish proliferation release made by the Fishery Headquarter in Lvsi Fishing Ground since May 2005. Successful implementation of jellyfish proliferation release can effectively restore the coastal jellyfish resource, and thereby bring a hope of harvest to many fishermen.

4.2.4.8 Fishery Water Protection

To protect the ecological environment of fishing grounds, *Water Quality Standards of Fishing Grounds* has been drawn up by the Government of China;

as well, *Regulations on the Supervision and Control of the Environmental Sanitation of Shellfish-Raising Areas* and other regulations have been drawn up by departments concerned. In addition, a series of measures has been taken to further strengthen the eco-environmental protection of spawning grounds of saltwater fish and shrimps, feeding grounds, wintering grounds, migration channels, and aquatic farms. A multi-level setup for the protection of the fisheries environment has been established by state and coastal management authorities, including some monitoring stations at or above the provincial level around the country, as well as a number of marine life protected areas in major fishing grounds.

According to *Regulations on Prevention of Marine Environmental Pollution by Coastal Projects*, measures must be taken to prevent such building projects as the sea wall, water conservancy facilities, sea-lane, and tidal-power stations, as well as comprehensive estuary renovative projects, from causing damage to the ecological environment and aquatic resources. If the construction of floodgates and dams across fish, shrimp, mollusk or crab migration routes may have serious impact on fishery resources, the constructor must first build fish ladders or take other preventative or remedial measures. Prior to conducting underwater explosions, exploration or construction operations, measures shall be adopted to prevent and reduce damage to fisheries resources.

4.2.4.9 Marine Ecological System Protection

Protection of important ecological systems is a major target of natural reserves in the world; it is also a prominent concern of marine environmental protection in China. In order to strengthen protection for species and ecological environments, the *Environmental Protection Law* has made principle provisions. The *Marine Environmental Protection Law* takes protecting marine resources and maintaining ecological balance as the purpose of legislation, and has a chapter entitled Marine Ecology Protection ; it also has provisions for the protective objects and needs of the marine eco-system. In laws which deal with resources, such as the *Wild Animals Protection Law, Fisheries Law, and Forest Law*, additional systematic provisions have been made, for example: *Regulations of Nature Reserves, Management Methods of Marine Nature Reserves Protection, Water Quality Standard of Fishery,* and *Sea Water Quality Standard.*

According to Article 20 of the *Marine Environmental Protection Law*, the State

Council and local people's governments at provincial levels shall adopt effective measures to protect the following: 1) typical and representative marine ecosystems, such as mangroves, coral reefs, coastal wetlands, islands, bays, estuaries, important fishery waters, etc; 2) sea areas in which rare and endangered marine organisms are naturally and densely distributed; 3) marine organisms habitats with important economic value; and 4) marine natural historic relics and landscapes with great scientific and cultural significance. Damages to the above shall be strictly forbidden; at the same time, efforts shall be made to renovate and restore damaged marine ecosystems with important economic and social value.

According to Article 20 of the *Marine Environmental Protection Law*, relevant departments of the State Council and coastal people's governments of provinces, cities and towns shall, in accordance with the need for marine ecosystem conservation, delimit and establish marine nature reserves. Establishment of national marine nature reserves shall be subject to the State Council for approval. In an area that possesses one of the following characteristics, a marine nature reserve may be established: 1) typical marine physiographic areas; 2) representative natural ecosystem areas, as well as those within which natural ecosystems have been damaged to some extent, but may be recovered through efforts of protection; 3) areas with higher marine bio-diversity, or in which rare and endangered marine species are naturally and densely distributed; 4) sea areas, seashores, islands, coastal wetlands, estuaries, bays and the like with special protection values; 5) areas in which marine natural remains of great scientific and cultural values are located; and 6) other areas which call for special protection.

According to Article 30 of the *Marine Environmental Protection Law*, coastal construction projects that pollute the environment, as well as new pollutants discharge sources, may not be set up within marine nature reserves and major fishing areas. In an outlet which has already been built, anyone who discharges pollutants in excess of national or local standards for pollutant discharge shall be given a deadline for elimination and control of that pollutant.

According to the *Environmental Impaction Assessment Law*, EIA statements shall be compiled and measures for ecological environment protection shall be put forward for natural resources development projects; these shall be submitted to the environmental protection departments for approval.

4.2.4.10 Protection of Rare and Endangered Aquatic Wild Animals

According to the *Wild Animal Protection Law*, aquatic wild animals are partitioned into two categories: national major protected aquatic wild animals and local major protected aquatic wild animals. Animals in the national category are sub-divided into first- and second-categories. Aquatic wild animals are protected and managed by the competent authority in charge of fisheries. During the construction of offshore construction projects, the existing environment of major marine organisms protected by the state or local governments cannot be changed or damaged.

4.2.4.11 Protection of Major Species of Fishery Resources

According to the *Fisheries Law,* the departments of fishery administration under the people s governments shall designate prohibited fishing methods, minimum mesh-size, and fishing-forbidden periods in the spawning grounds, feeding grounds, wintering grounds, and migration channels of important species of fish, shrimp, crab, shellfish, algae, and other aquatic animals and plants.

4.2.4.12 Assessment of Introduction of Marine Biological Species

According to Article 25 of the *Marine Environmental Protection Law*, the introduction of marine biological species shall be subject to scientific assessment to avoid damages to marine ecosystems.

4.2.5 Ownership of Sea Space in China

Ownership of natural resources is particularly relevant because it may, to a large extent, determine the regulation of human activities in the course of protection and exploitation of natural resources and the subsequent impact of these activities on the environment.

The Chinese *Constitution* explicitly provides that mineral resources, water, forests, mountains, grassland, un-reclaimed land, beaches and other natural resources are owned by the State; that is, by the whole population, with the exception of the forests, mountains, grassland, un-reclaimed land and beaches that are owned by collectives in accordance with the law (Article 9). Land in the cities is owned by the State. Land in the rural and suburban areas is owned by collectives, except for those portions which belong to the State in accordance with the law; house sites and privately farmed plots of cropland and hilly land are owned by collectives (Article 10).

The *Law on the Use of Sea Areas* (2001) re-confirmed state ownership of sea spaces; the State Council exercises the

ownership on behalf of the State. The law requires competent ocean departments of the State Council to prepare a national marine functional zonation scheme, in consultation with other concerned departments of the State Council and coastal provincial and municipality governments. Ocean Administrations above county level prepare local marine functional zonation schemes. Coastal land use planning, urban planning, port planning, sectoral development planning (such as that of aquaculture), salt-making, and marine tourism should be consistent with the scheme. Sea users should obtain registered rights by making a Sea Use Assessment and applying to Oceanic Administration for a permit. In addition, sea area use rights may be obtained through bidding and auction. Sea users, with some exceptions, should pay a fee to the state treasures. The *Law on the Use of Sea Areas* promotes the rational utilization of China's seas by bringing them under one umbrella with an integrated management approach, and thus establishes a fundamental system in the use and environmental protection of China's seas.

4.3 International Treaties, Conventions and Agreements on the Marine Environment Protection of the Yellow Sea

China is well aware of its responsibilities and obligations relative to marine environmental protection; it takes an active part in global and regional marine environmental protection affairs, which include joining relevant international organizations and signing, as well as acceding to and implementing, relevant international conventions and treaties. China's international obligations prevail in the event that national legislation differs from them. Following is a list of international treaties to which China is a party.

4.3.1 List of International Treaties, Agreements and Conventions regarding to Marine Environment Protection of the Yellow Sea

4.3.1.1 United Nations Conventions on the Law of the Sea, Montego Bay, 1982

UN conferences of 1958 and 1960 dealt with legal regimes for the territorial sea and contiguous zone, fishing and high sea living resource conservation, and the continental shelf; this eventually resulted

in negotiations for a new convention that would deal with all aspects of the law of the sea. After a decade of text drafting, negotiations and consensus building, the 1982 *UNCLOS Convention* was adopted and opened for signature on December 10th, 1982. The Convention came into effect on November 16th, 1994. Under the 1982 UNCLOS Convention (Article 192), each coastal nation has a basic obligation to protect and preserve its marine environment. The Convention adopts a basic principle of international law, namely that all activities should be conducted in a manner that does not cause damage by pollution to other countries, and extends the principle to protect areas beyond national jurisdiction. On May 15th, 1996, China became a party to the 1982 UNCLOS Convention. The Convention became effective in China on July 7th, 1996.

4.3.1.2 International Convention on Civil Liability for Oil Pollution, Brussels, 1969

The Government of China deposited the instrument of accession on January 30th, 1980. At the same time, the Government stated that Taiwan's signature and accession to this convention was illegal and invalid because it usurped the name of China.

The Convention came into force in China on April 30th, 1980.

4.3.1.3 Protocol of 1976 Relating to the International Convention on Civil Liability for Oil Pollution, 1976

China acceded to this Protocol on September 27th, 1986.

The Protocol came into force in China on December 28th, 1986.

4.3.1.4 International Convention relating to Intervention on the High Seas in Case of Oil Pollution Casualties, Brussels, 1969

The Government of China deposited the instrument of accession on February 23rd, 1990.

The Convention came into force in China on May 24th, 1990.

4.3.1.5 Protocol of 1973 relating to Intervention on the High Seas in Case of Marine Pollution by Substances Other Than Oil, London, 1973

The Government of China deposited the instrument of accession to the Protocol on February 23rd, 1998.

The Protocol came into force in China on May 24th, 1990.

4.3.1.6 International Convention on Oil Pollution Preparedness, Response and Co-operation, London, 1990

The Government of China deposited the instrument of accession to this

Convention on March 30th, 1998.

The Protocol came into force in China on June 30th, 1998.

4.3.1.7 Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter, London, Mexico, Moscow, Washington, 1972

The Government of China deposited the instrument of accession to this Convention on November 14th, 1985.

The Convention came into force in China on December 15th, 1985.

4.3.1.8 LC.49(16) (Decision on Gradually Ceasing Dumping Industrial Waste to the Sea)

Chinese representatives gave an affirmative vote for LC.49(16).

LC.49(16) came into force in China on February 20th, 1994.

4.3.1.9 LC.50(16) (Decision on Burning Waste on the Sea)

Chinese representatives gave an affirmative vote for LC.50(16).

LC.50(16) came into force in China on February 20th, 1994.

4.3.1.10 LC.51(16) (Decision on Deposing Radioactive Waste on the Sea)

Chinese representatives gave an affirmative vote for LC.51(16).

LC.51(16) came into force in China on February 20th, 1994.

4.3.1.11 Protocol of 1996 relating to the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter, London, 1996

This Protocol was adopted on November 7th, 1996, but is not yet effective.

The Protocol has been signed by the Chinese representative, but has not been ratified by the Government of China.

4.3.1.12 Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, London, 1978

The Government of China deposited the instrument of accession to the Protocol on July 1st, 1987. Appendix 1 of "MARPOL 73/78" came into force on October 10th, 1983; Appendix 2 came into force in China on April 6th, 1987. China acceded to Appendix 5 "MARPOL 73/78" on September 21st, 1988; it came into force in China on January 1st, 1989.

4.3.1.13 Agreement for the Implementation of the Provision of the United Nations on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995

China signed this agreement on November 6th, 1996. At the same time, Chinese delivered a memorandum of understanding on Clause 7 in Article 21 and Clause 1(f) of Article 22.

4.3.1.14 Agreement on the Network of Aquaculture in Asia and the Pacific, Bangkok, 1988

China signed the Agreement on January 8th, 1988.

The agreement came into force in China on January 11th, 1990.

4.3.1.15 Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof, London, Moscow, Washington, 1971

The Government of China ratified the Treaty on October 31st, 1990, and deposited the instrument of accession on February 28th,1991.

The Convention came into force in China on February 28th, 1991.

4.3.1.16 Basal Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal, Basal, 1989

China signed the Basal Convention on March 22nd, 1990, and ratified it on September 4th, 1991.

The Convention came into force in China on August 20th, 1992.

4.3.1.17 Amendment to the Basal Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal, Geneva, 1995

The Chinese representative signed this Amendment, but the Government of China has not ratified the Amendment.

4.3.1.18 Convention on Biological Diversity, Rio De Janeiro, 1992

China signed this Convention on June 11th, 1992, ratified it on November 7th, 1992, and deposited the instrument of accession on January 5th, 1993.

The Convention came into force in China on December 29th, 1993.

4.3.1.19 Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971

China acceded to this Convention on January 3rd, 1992.

The Convention came into force in China on July 31st, 1992.

4.3.1.20 Convention on International Trade in Endangered Species of Wild Fauna and Flora Washington, 1973

The Government of China deposited the instrument of accession on January 8th,

1981.

The Convention came into force in China on April 8th, 1981.

4.3.1.21 Amendment to Article XXI of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Gaborone, 1983

The Government of China deposited the instrument of accession on July 7th, 1988.

4.3.1.22 International Convention on Maritime Search and Rescue, 1979 (SAR 1979) - 1998 (Revised Annex) Amendments (MSC.70 (69))

The amendment became effective to China as of January 1st, 2000.

4.3.1.23 Cartagena Protocol on Bio-safety to the Convention on Biological Diversity

China signed this Protocol on August 8th, 2000.

The Government of China deposited the instruments of ratification on June 8th, 2005.

4.3.1.24 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

China adopted the Convention on December 29th, 2004.

4.3.1.25 Stockholm Convention on Persistent Organic Pollutants

China signed this Convention on May 23rd, 2001; the Convention was adopted on June 25th, 2004.

The Government of China deposited the instruments of ratification on August 13th, 2004.

4.3.1.26 Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution, 1969

The Government of China deposited the instruments of accession on January 5th, 1999.

The Protocol become effective in China as of January 5th, 2000.

4.3.1.27 Amendment to 1973 International Convention for Prevention of Pollution from Ships and Appendix I (MARPOL73/78)

The amendment was adopted by acquiescence on January 7th, 1986, and become effective in China as of January 7th, 1986.

4.3.1.28 Protocol of 1992 to Amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution, 1971

The Government of China deposited the instruments of accession on January 5th,

1999.

The Protocol become effective in China as of January 5th, 2000.

4.3.1.29 Amendment to Article XXI of the Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Government of China deposited the instruments of accession on July 7th, 1988.

This amendment has not yet become effective.

4.3.1.30 Amendment to the Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal (By Decision III/1, of 22 September 1995, the Third Meeting of the Conference of the Contracting Parties to the above Convention)

The Government of China deposited the instruments of ratification on July 7th, 1988.

This amendment has not yet become effective.

4.3.1.31 Agreement on Co-operation in Environment Between the Government of the People's Republic of China and the Government of the Republic of Korea Was Signed on October 8th, 1993.

4.3.1.32 Fishery Agreement between China and the Republic of Korea

4.3.1.33 Non-Legal Binding Documents on Environmental Protection Signed by China

- Johannesburg Declaration on Sustainable Development (passed on September 4th, 2002)
- Plan of Implementation of the World Summit on Sustainable Development (passed on September 4th, 2002)
- Monterrey Consensus (passed on March 4th, 2002)
- Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (passed on November 3rd, 1995)
- The Montreal Declaration on the Protection of the Marine Environment from Land-Based Activities (passed on November 30th, 2001)
- Code of Conduct for Responsible Fisheries (passed on October 31st, 1995)
- International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (passed in March, 2001)
- Jakarta Mandate on the Conservation and Sustainable Use of Marine and Coastal Biological Diversity of the Convention on Biological Diversity (passed in November,1995)

- Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem (passed in October, 2001)

4.3.2 Implementation of International Environmental Convention in State Policies and Legislation

As a signatory state of more than 40 international environmental conventions, China consistently and conscientiously fulfills its duties and contributes its share to international marine environment protection. Several Chinese laws have clearly recognized the supremacy of international treaties. For example, Article 46 of the *Environmental Protection Law* (1989), Article 97 of the *Marine Environmental Protection Law*, and Article 40 of the Wild Animal Protection Law, provide that if an international treaty regarding environment or wild animal protection, concluded or acceded to by the PRC, contains provisions differing from those contained in the laws of China, the provisions of the international treaty shall apply, unless the provisions are those to which the PRC has announced reservations. Article 23 of the Fisheries Law provides that any person engaging in fishery operation in sea areas under the jurisdiction of other countries should observe related international conventions, bilateral agreements and laws. Therefore, the supremacy of international treaties is recognized by Chinese law.

China has incorporated the requirements of international conventions into its domestic laws, regulations and policies, and has designated a competent department for almost every Convention (see following list). China has incorporated the issue of rational utilization and protection of marine resources and marine environment into the overall cross-century plans for national economic and social development, and has adopted the sustainable development of marine programmes as a basic strategy.

The Government of China has always supported and actively participated in various forms of marine-related activities promoted by the United Nations. China has joined approximately 20 international organizations, including the following: 1) Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC); 2) Scientific Committee on Oceanic Research (SCOR); 3) Commission on Maritime Meteorology (CMM); 4) International Maritime Organization (IMO); 5) UN Food and Agriculture Organization (FAO); 6) North Pacific Marine Science Organization (PICES);

and 7) Pacific Conference on Science and Technology (PACON).

Acting upon its desire to promote worldwide oceanographic co-operation, China has participated in such global oceanographic activities as: 1) GSMMP (Global Studies and Monitoring of Marine Pollution); 2) TOGA (Tropical Ocean and Global Atmospheric Project); 3) WOCE (World Ocean Circulation Experiment); 4) JGOFS (Joint Global Ocean Flux Study); 5) LOICE (Land-ocean Interaction in the Coastal Zone); and 6) GLOBEC (Global Ocean Ecosystem Dynamics). China also joined other regional organizations such as the Working Group on Marine Resources Conservation of the Asia-Pacific Economic Conference and GOOS (Global Ocean Observation System) initiated by the UNESCO/IOC. Additionally, China assisted with the initiation and organization of the Northeast Asia Ocean Observation System. In the area of scientific marine projects, China has cooperated extensively with many countries, including the United States, Germany, France, Canada, Spain, Russia, DPRK, ROK and Japan, which has resulted in fruitful achievements.

China has worked assiduously to foster co-operation in the area of marine living resources protection according to the principles of equality and mutual benefits. China has entered into a (Yellow Sea) fishery agreement with the Peoples Republic of Korea. China has also signed the *Agreement on the Conservation of Migratory Birds and Its Habitat between the People's Republic of China and Japan*.

4.3.2.1 United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea (UNCLOS) comprises 320 articles and nine annexes, governing all aspects of ocean space, such as: 1) delimitation; 2) environmental control; 3) marine scientific research; 4) economic and commercial activities; 5) transfer of technology; and 6) the settlement of disputes relating to ocean matters. UNCLOS is a constitutional document on maritime affairs.

Please see Table 4-1 for the performance of China on the UNCLOS

Table 4-1 The performance of China on UNCLOS

UNCLOS Requirements in Marine Environment and Resources Protection	Performance of China
• Part XII of the *Convention* (articles 192 - 237) addresses Protection and Preservation of the Marine Environment and outlines basic obligations to prevent, reduce and control the following: pollution from land-based sources; pollution from sea-bed activities subject to national jurisdiction; pollution from activities in the area; pollution by dumping; pollution from vessels; and pollution from or through the atmosphere. • *UNCLOS* recognizes broad coastal state authority over living resources within its territorial sea and exclusive economic zone, to a maximum of 200 miles seaward from the baselines used to measure the territorial sea. • In managing living resources, the coastal state is to determine allowable catches and promote optimal use of the resources. • The term "as qualified by relevant environmental and economic factors" appears in Article 61(3); it provides a basis for harvesting at rates other than the maximum sustainable yield. Regardless, determination of allowable catch within a coastal state's Exclusive Economic Zone is not subject to compulsory procedures leading to binding dispute settlement. If a coastal state is unable to harvest the entire allowable catch, other states must be given access to these resources, subject to appropriate terms and conditions. Resource populations are to be managed in such a way that they can produce harvests at maximum sustainable yield levels. • Article 61(4) of the *Convention* encourages attention to incidental by-catch concerns by calling for consideration of associated or dependent species so that their reproduction is not seriously threatened.	• Relevant Legislation: 1 China ratified the *Law of the Sea in* 1996. 2 China enacted the *Law on Exclusive Economic Zone and Continental Shelf* in 1998. In accordance with this law, China has the entitlement to an exclusive economic zone of 200 nautical miles. China has the sovereign rights over its exclusive economic zone for the purpose of exploring, exploiting, conserving and managing the natural resources therein, and with regard to other activities for the economic exploitation and exploration of the zone. China has jurisdiction in the exclusive economic zone with regard to the establishment and use of artificial islands, installations and structures; marine scientific research; and the protection and preservation of the marine environment. Other countries do have freedom of navigation and over-flight in the exclusive economic zone of China. 3 China amended the Marine *Environment Protection Law* in 1999. The amended *Marine Environmental Protection Law* stipulates the responsibilities and rights of the relevant departments on marine environmental management, with two new chapters on "Marine Environmental Supervision Management" and "Marine Ecological Protection", as well as three chapters on " Supervision Management on Pollution Prevention of Marine Engineering Construction Projects", "Marine Ecological Protection" and "Marine Environmental Pollution Prevention of Marine Engineering Construction Projects". Items concerning conducting total pollution discharge control system and oil spill emergency response plan have been added into the Law, and the articles on legal responsibilities have been improved. 4 China amended the Fisheries Law, extending the licensing system to cover fishing activities conducted in China's exclusive economic zone and joint fishing zones under China's bilateral fisheries agreement. It adds two new requirements to the licensing system: fishing must be conducted in conformity with the fishing quota specified in the license; large and medium-sized fishing vessels must complete logbooks. The *Amendment of the Fisheries Law* introduces the concept of “total allowable catch" to China's fisheries management.

4.3.2.2 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972 London Convention)

The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter aims to prevent marine pollution, but focuses on controlling the dumping at sea of wastes generated on land.

Please see Table 4-2 for the performance of China on the 1972 London Convention

Table 4-2 The performance of China on the 1972 London Convention

Requirements of 1972 London Convention	Performance of China
• The *Convention* includes a list of substances for which dumping is prohibited (Annex 1) and other lists for which dumping may be authorized by permit. Annex 2 specifies substances for which a special permit is required before they can be dumped at sea; Annex 3 specifies substances for which a general permit is required before they can be dumped at sea. • The 96 Protocol significantly alters the 1972 *Convention* and reverses the approach taken by the earlier Convention. Rather than attempting to control sea dumping, it prohibits all dumping of hazardous and radioactive waste, incineration at sea and exports of waste for such purposes, with some limited exceptions for substances specified in Annex 1. The Protocol also bans the incineration of wastes at sea. The Protocol includes strong precautionary language in the general obligations, and urges parties to consider the "polluter pays" principle. It also calls for waste prevention audits to assess alternatives to sea dumping. The Protocol supersedes the 1972 London Convention for those countries that have agreed to become contracting parties. The *London Convention* requires that Contracting Parties take all practicable steps to prevent pollution of the sea by the dumping of waste and other matter that may create hazards to human health, harm living resources and marine life, damage amenities, or interfere with other legitimate uses of the	• Relevant Legislation: 1 The State Council issued the *Management Regulation on Dumping of Waste at Sea* in 1985. 2 The *Amended Marine Environment Protection Law* incorporated 7 articles in this chapter. Besides issuing several rules in this aspect, China has carried out a series of measures such as (1) wastes classification; (2) classification of dumping areas;(3) permission of dumping; (4) verification of loading wastes; (5) supervision and examination; and (6) record and report of dumping activities. 3 In order to harmonize China's measures with the requirements of the 1996 Protocol, the Government of China is considering revising the *Management Regulation on Dumping of Waste at Sea*. • Enforcement: 1 The State Oceanic Administration is responsible for the implementation of this Convention. 2 To date, China has designated about 40 dumping areas for dredged materials of the third category and four areas for mid-air oil discharge. Thousands of dumping permits have been issued, and monitoring of the environmental quality of dumping areas has been enhanced. In addition, China has strictly prohibited the disposal of any radioactive substance and incineration of toxic waste at sea, and plans to gradually stop the dumping of industrial waste into the sea.

sea. The 1996 Protocol further requires that Contracting Parties take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable, eliminate pollution caused by dumping or incineration at sea of wastes or other matter. Where appropriate, they shall harmonize their policies in this regard.	3 The North China Sea Branch of the State Oceanic Administration is has legal administrative responsibility for all sea dumping in three provinces and one city of the North China Sea area, and supervises it in accordance with the provisions of the law. Under the administration, several enterprises and individuals who did not adhere to the regulations were investigated and punished severely. In this way, peccancies such as dumping without admission, dumping in undesignated areas and conditions, etc. have been efficiently controlled. At present, there are 4 formal sea dumping areas in the North China Sea area. In addition, 22 temporary sea dumping areas are being put into effect, of which 6 will be designated as formal sea dumping areas. During the years 2000-2004, the North China Sea Branch authorized 484 copies of sea dumping license and 1.8940×10^8 m^3 of dumping wastes.

4.3.2.3 International Convention for the Prevention of Pollution from Ships (1973) as amended by the Protocol of 1978 (MARPOL73/78).

The International Convention for the Prevention of Pollution from Ships was adopted in 1973. This *Convention* is the most significant global treaty for the prevention of pollution from the operation of ships. The Convention was subsequently modified by a Protocol; the 1978 MARPOL Protocol absorbed the 1973 MARPOL Convention and came into force on October 2nd, 1983.

Please see Table 4-3 for the performance of China on the MARPOL 73/78

Table 4-3 The Performance of China on the MARPOL 73/78

MARPOL73/ 78Requirements	Performance of China
• The *Convention* requires that states provide reception facilities for the disposal of oily waste and chemicals. • It applies to ships of all types, and covers all technical aspects of pollution from ships, except the disposal of waste into the sea by dumping. • It includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. • It establishes requirements in the design and equipment of ships. • It establishes a system of certificates and inspections.	• In December 1982, the Communication Ministry promulgated *The Environmental Surveillance Working Regulation of Communication Ministry* with some detailed rules on the prevention of pollution from ships. • In April 1983, China promulgated the national *Standard of Shipping Pollutant Discharge*, which included standards of shipping sewage with oil discharge (oil tanker ballast water, cabin washing water and cabin bottom sewage), shipping raw sewage discharge and shipping waste discharge. These discharge standards are identical to the shipping discharge standards regulated in the MORPOL73/78. • In 1986, the Shipping Inspection Bureau of the Communication Ministry promulgated *The Pollution Prevention Criterion of Sea Ship Structure and Facility*. • In June 1990, the Ministry of Communication promulgated *The Administrative Regulation of Environmental Protection of Communication Construct item, The Environmental Protection Design Criterion of Port and The Environmental Protection Administration Criterion of Port*. • In 1993, the Ministry of Communication promulgated *The Administrative Regulation for Environmental Protection of Communication Industry*. The regulation clearly prescribed the functions of institutions and main executives of the ministry, maritime system, shipping check, all levels of local administration of communication departments, enterprise institutions of communication, general stations of environmental surveillance, all levels of project and statistic departments, and all levels of administration of communication departments. In addition, the regulation prescribed prevention of new pollution, control of the source of pollution, science research, design and education, and encouragement and punishment. • "Port State Control Inspection" is an import measure for prevention of marine pollution from ships. In April 1994, China adopted the *Tokyo Memorandum of Understanding on Port State Control 1993 (MOU)*. The MOU calls for "Port State Control" (PSC), which enables the control of foreign ships in port to ensure that ships do not have structural or operational deficiencies before sailing. This jurisdiction supersedes ship owners, classification societies, and even the ship's flag-state. It enables signatory countries to inspect ships in port to check compliance of ship safety and disposal of oil. In June 1998, Korea provided member countries with a listing of ships which had been detained due to deficiencies in their safe performance; this list has been updated on a monthly basis.

	• In September 1997, the Ministry of Communication promulgated *The Regulation on Water Safety Supervise and Administrative Punishment*. • On November 5th, 1997, China promulgated the amended *Regulation of Shipping Safety Inspection (1997);* this has been the most important national guiding force for PSC inspection in China. At present, there are 200 PSCO in China; examinants are trained in basic knowledge, refresher knowledge and professional knowledge every year. Excellent and advanced examinants have regularly been assigned to *Tokyo Mou* to take part in "follow ship training" and "advanced training". By the end of 2003, PSC inspection had been developed by the maritime administration institutions of 44 ports under authorization of the Maritime Safety Administration of the People's Republic of China. China's PSC inspection programme has attracted extensive recognition in international shipping circles. • At present, oil-water separators have been installed on board all ships. Oil-polluted water treatment equipment, including emergency treatment equipment, has been installed at all sea-ports; this equipment can treat tens of millions of tons of oil-polluted water from vessels, and recover in excess of 1million tons of waste oil a year.

4.3.2.4 Convention on Biological Diversity (CBD)

The *Convention on Biological Diversity* serves as a key coordinating, catalyzing, and monitoring mechanism for international biodiversity.

Please see Table 4-4 for the Performance of China on the CBD

Table 4-4 The Performance of China on the CBD

CBD Requirements	Performance of China
• CBD requires states to adopt and carry out conservation policies to maintain biological diversity. • Parties to the Convention are contracted to undertake the following provisions: 1 develop national strategies for the conservation and sustainable use of biological diversity; 2 integrate the conservation and sustainable use of bio-diversity into sectoral and cross-sectoral programmes and policies;	• A series of policies, regulations and strategies has been established to maintain biological diversity. For example: 1 *The China Biodiversity Conservation Action Plan* determined the national target of "protecting the wild-species of particular importance for biodiversity". 2 The *National Planning on Conservation of Wild Animal and Plant and Nature reserve Construction* states that by 2030, 60% of wild animals and plants under national protection will maintain restored and increased populations; by 2050, the figure will improve to 85%. 3 The *Outline on Action Plan of Conservation of Aquatic Biological Resources of China* states that a gene bank and a cell bank shall be established, and germ plasma resources shall be conserved for aquatic wild animals under national key protection, such as Chinese sturgeon, Dabry's sturgeon, mullet, etc.

3 establish a monitoring and early-warning system to alert governments and the public about potential threats to biodiversity; 4 identify activities likely to have a significant adverse impact on the conservation of bio-diversity; 5 integrate considerations of the sustainable use and conservation of bio-diversity into national decision making; 6 introduce the requirement of environmental impact assessment to proposed projects likely to adversely effect bio-diversity; 7 adopt economic, social and scientific measures necessary to ensure conservation of bio-diversity, including both in-situ conservation and ex-situ preservation.	4 The *Planning of Medium and Long-term Development of Oceanic Science and Technology* will establish a genetic resource gene bank for important marine life in the sea area under Chinese jurisdiction and in the deep regions of the ocean, and will carry out relevant research of molecular biology. 5 Both the *Wild Animal Conservation Law and Regulation on Protection of Wild Plants* encourage *ex* situ conservation, active domestication and breeding, and reasonable development and utilization for wild animals and plants. The research of ex situ biodiversity conservation is a specific relevant plan for implementing national targets. 6 The *Marine Environment Protection Law* contains a chapter, "Marine Ecosystem Protection", which requires the construction of marine nature reserves and control of invasive alien species. • In order to harmonize and strengthen the implementation of the CBD, the Government of China established a National Coordination Committee, headed by the State Environmental Protection Administration. This committee was composed of 22 ministries and departments, including Ministry of Foreign Affairs, State Development and Reform Commission, Ministry of Education, Ministry of Science and Technology, Ministry of Public Security, Ministry of Finance, Ministry of Construction, Ministry of Agriculture, Ministry of Commerce, Ministry of Health, State Forestry Administration, State Administration of Radio, Film and TV, State Administration of Industry and Commerce, General Customs Administration, Xinhua News Agency, Chinese Academy of Sciences, State Intellectual Property Office, State Oceanic Administration, State Traditional Chinese Medicine Administration, People's Daily, and Guangming Daily. • In order to strengthen the implementation of the CBD, China established a working group, which established the Convention Implementation Office. At each annual meeting, the working group develops an annual work programme and conducts a series of activities in many forms.

4.3.2.5 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The *Convention on International Trade in Endangered Species of Wild Fauna and Flora* aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. By many accounts, CITES has been a success. No specie protected by CITES has become extinct as a result of trade since the implementation of the *Convention*.

Please see Table 4-5 for the Performance of China on the CITES

Table 4-5 The Performance of China on the CITES

CITES Requirements	Performance of China
• CITES requires member states to adopt domestic legislation to implement CITES at the national level. • CITES requires that international trade in specimens of species covered by the Convention be authorized through a licensing system. The covered species fall into three categories: 1 Species threatened with extinction 2 Species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. 3 Species that are protected in at least one country, which country has sought assistance in controlling trade from other CITES Parties . • Each Party to the Convention must designate one or more management authorities to be responsible for administering the licensing system, and one or more scientific authorities to advise management authorities on the effects of trade on the status of the species.	• International trade of wild animals and plants is managed by the *Wild Animal Conservation Law, Forest Law, Regulation on Protection of Wild Plants, Law on Quarantine of Animals and Plants Entering and Leaving the Country* (1991) and its implementation regulation, *Law on Animal Quarantine* (1997), and the newly issued *Regulation on Management of Import and Export of Endangered Wild Animals and Plants (2006)*. • The competent authorities involved are State Forestry Administration, Ministry of Agriculture, State Fishery Administration, Ministry of Commerce, and General Customs Administration. • In accordance with the requirement of Article 9 of the *Convention*, the State Management Office of Import and Export of Endangered Species was set up to implement CITES on behalf of the Government of China; it is responsible for managing the import and export of wild animals and plants of China. It examines and approves import and export permits for wild animals, plants and their parts or products. • Customs transacts import and export procedures, and is responsible for dealing with smuggling and illegal import and export of wild animals and plants. • The Management Office of Import and Export of Endangered Species established 17 offices and three inspection stations in major domestic port cities. The Chinese Academy of Sciences established the Scientific Commission of Endangered Species, which serves as a scientific consulting institution for import and export management.

4.3.2.6 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971 Ramsar Convention)

The *Convention on Wetlands*, signed in Ramsar, Iran, in 1971, is an inter-governmental treaty which provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources.

Please see Table 4-6 for the Performance of China on the 1971 Ramsar Convention.

Table 4-6 The Performance of China on the 1971 Ramsar Convention

Ramsar Convention Requirements	Performance of China
• The Convention requires that its contracting parties designate suitable wetlands within their territories for inclusion in a "List of Wetlands of International Importance". • Each contracting party should designate at least one wetland to be included in the List and should formulate and implement its planning so as to promote the conservation of the wetlands included in the List. • The Convention encourages contracting parties to consult with others about the implementation of obligations arising out of the Convention, particularly those regarding trans-boundary wetlands, international watercourses, and conservation of wetlands species.	• Each agency has different responsibilities with respect to the implementation of the Convention, forming a complex system. The State Forestry Administration is responsible for organizing and coordinating the implementation. The Ministry of Agriculture, Ministry of Water Resources, Ministry of Land and Resources, SEPA and State Oceanic Administration are responsible for those parts of the work that pertain to their respective areas of responsibility. Local governments establish management institutions corresponding to those of the central government; they are responsible for the specific work of protection and management of local wetlands under the operational guides of various competent authorities of the central government. • The Government of China has taken a series of actions to implement the Wetland Convention. 1 The State Forestry Administration, together with 16 other ministries or committees, promulgated the *National Wetland Conservation Action Plan for China*, which put forward guiding principles and an action programme for wetland conservation. 2 The *National Programme for Conservation of Wild Fauna and Flora and Improvement of Nature Reserves for China* has been launched to identify the priority areas of wetland conservation, and the development emphasis of the areas. 3 The State Forestry Administration (appointed by the State Council as a focal agency), in co-operation with 10 other sectors, has completed the National Programme of Wetland Conservation Planning for China. This is a testament that the Government of China is determined to conserve and restore the ecological system of wetlands through engineering measures. 4 The six-year national inventory on wetland resources has been completed; it will provide a systemic base for decision-making in the field of scientific and rational conservation and wise use of wetlands.

	5 Construction and management of wetland nature reserves has been strengthened; by June 2002, a total of 353 wetland nature reserves had been established, containing a total of 16 million ha of protected natural wetland. Some 33 nationally-protected waterfowl species have been put into secure protection in these reserves. 6 International co-operation has been strengthened; to date, 30 wetland sites covering an area of 3.46 million ha have been designated as wetlands of international importance. A number of international co-operation projects are under successful implementation. 7 A large-scale, nation-wide campaign of education and publicity on conservation of wetland and water-birds has been undertaken, leading to improved social awareness of wetland issues. • Following are the wetlands appearing in the "List of Wetlands of International Importance" along the coast area of the Yellow Sea: 1 Shanghai Chongming Dongtan Natural Protection Area, located in the eastern part of Chongming island, a low-level alluvial island. Under the alluvial action of mud and sand of Yangtze River, the Chongming Dongtan has formed a broad fresh-water and brackish wetland, tide channel, and shoal of littoral zone. There are many croplands, fish cultured ponds, crab cultured ponds and bulrush ponds in which abound exuberant fenny vegetation and benthic animals. Of all Pacific and Asian areas, Chongming Dongtan is the best stopover in spring and autumn, as well as an important wintering region of migratory birds. 2 Dafeng Elk Natural Protection Area is a typical Yellow Sea shoal with abundant biodiversity; thus it has significant ecologic, social and economic values. 3 Jiangsu Yancheng Protection Area is in the western coast of the Pacific and Jianghuai plain. The Area has a coastline of 582 km, and an expansive silty tide shoal that has formed the largest shoal wetland in the coastal area of China. Jiangsu Yancheng Protection Area has facilitated the breeding of many organisms, ensured the migration of millions of birds, and provided wintering safety for endangered species such as red-crown crane.

4.3.2.7 International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 90) and 2000 Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC 1990) aims at providing a global framework for international co-operation in combating major incidents or threats of marine pollution.

Please see Table 4-7 for the Performance of China on the OPRC 90

Table 4-7 The Performance of China on the OPRC 90

OPRC 1990 Requirements	Performance of China
• Parties to OPRC are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries. • Ships are required to carry a shipboard oil pollution emergency plan. • Operators of offshore units under the jurisdiction of Parties are required to have oil pollution emergency plans or similar arrangements; these must be coordinated with national systems for responding promptly and effectively to oil pollution incidents.	• Important provisions in the revised *Marine Environmental Protection Law:* 1 The State should, in accordance with the necessity to prevent marine environment pollution, draw up state contingency plans to deal with major marine pollution accidents. The State Maritime Traffic Safety Administration should be responsible for drawing up contingency plans to deal with nation-wide major vessel oil spill accidents on the sea, and report to the State Environmental Protection Administration for recording. 2 The State Oceanic Administration should be responsible for drawing up State contingency plans to deal with major oil spill accidents on the sea caused by offshore oil exploration, and report to the State Environmental Protection Administration for recording. 3 Vessels must be equipped with appropriate anti-pollution equipment; damage to the marine ecological system may result in an order to make restoration, together with a fine of RMB 10,000 (USD 1,215) to RMB 100,000 (USD 12,150). • On the basis of actualizing the *Shipping Oil Pollution Emergency Reaction Plan* and compiling the *Northern Sea Region Shipping Oil Spillover Emergency Reaction Plan*, the Maritime Safety Administration finished compiling the *Sea Shipping Oil Spillover Emergency Reaction Plan and Shipping Oil Spillover Emergency Plan* in every sea region, by February 2000. These were issued by the Communication Ministry in conjunction with the State Environmental Protection Administration, and went into effect on April 1st 2000, synchronous with the effective date of the amended *Marine Environmental Protection Law*. In addition, *a Port Pollution Emergency Plan* was made in Shanghai and Shenzhen. This Plan, supported vigorously by the local governments, fostered the development of oil spillover emergency plans in the entire country. In June 2000, the Maritime Safety Administration held a salvage and oil spillover emergency reaction manoeuvre in Guangdaong, Hongkong and Macao. This manoeuvre was very successful, providing valuable experience for reaction to future oil spillover emergencies.

• Ships are required to report incidents of pollution to coastal authorities; OPRC 1990 details actions that are then to be taken. The Convention calls for the establishment of stockpiles of oil spill combating equipment, the holding of oil spill combating exercises, and the development of detailed plans for dealing with pollution incidents. • Parties to the Convention are required to provide assistance to others in the event of a pollution emergency; provision is made for reimbursement of any assistance provided. • The contracted parties are required to develop detailed plans for dealing with pollution incidents, establish contingency plans for oil pollution, establish stockpiles of oil spill combating equipment, and conduct oil spill combating exercises.	• China has strengthened international coalitions in Northern and Western Pacific area, and worked with Japan, Russia and South Korea in creating the *Environmental Protection Action Plan of Northern and Western Pacific Area*. In order to strengthen environmental protection in the Yellow sea area, China is currently working with neighbouring countries to develop a bilateral agreement. • In 1995, the Maritime Safety Administration promoted and efficiently supervised enforcement of the *Shipping Oil Pollution Emergency Reaction Plan* in order to carry out the provisions of MARPOL73/78 Convention. In addition, the Communication Ministry developed a series of research projects in the ports of Dalian, Tianjin, Shanghai, Ningbo, Xiamen and Guangzhou. As a result, 6 ports oil spillover emergency reaction plans were created and several pollution-clearing facilities were equipped using the funds and loans supported by the World Bank. The achievement was checked and accepted by the Bank in 1995. • In 1996, the Communication Ministry invested more than 5.8×10^7 RMB to carry out a demonstration project for the prevention and control of oil spill by offshore ships in the northern sea area of China in Yantai, thus realizing the fourth article of *OPRC l990*. This project was checked and accepted by the end of 2001. The project can react to oil spill emergencies in Chengshantou channel, Laotieshan channel and Changshan channel. In addition, the project also provides oil spill emergency inspection, satellite photography processing, oil spill emergency information processing, oil spillover clearing facility and emergency reaction training. In 2001, the Communication Ministry invested 10×10^7 RMB to establish an Oil Spill Emergency Centre in Qinghuangdao; this Centre will tackle the problem of oil spill emergencies, resource storage and emergency information support. • China has established an extremely good oil spill emergency system which includes the following: 1) oil spill emergency plan for offshore ships; 2) oil spill emergency plan for sea areas; 3) emergency plan for port pollution; 4) emergency plan for pollution in vessels; and 5) emergency plan for pollution caused by facilities in oil terminals. The establishment of an oil spill emergency system and the implementation of emergency plans have improved the emergency reaction ability against oil spill accidents, and alleviated marine environmental pollution and damages caused by those accidents.

4.3.2.8 Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)

The *Basel Convention* was crafted to maintain flexibility for safe trans-boundary movements of wastes among nations with existing environmental protection programmes, and to prevent the shipment of wastes to inappropriate facilities in countries without the means to control management and disposal activities. The treaty covers all wastes defined as hazardous by the originating, receiving and transit countries. It also covers medical wastes, municipal solid wastes and incinerator ash, which are not considered hazardous. It s key purposes are: 1) to encourage the environmentally sound management of hazardous wastes, and 2) to protect developing countries from receiving hazardous wastes without prior informed consent.

Please see Table 4-8 for the Performance of China on the Basel Convention.

Table 4-8 The Performance of China on the Basel Convention

Basel Convention Requirements	Performance of China
• The Convention provides the obligation of pre-notification to, and approval by, the importing and transit countries; further, it defines the information required in pre-notification and shipment documents. • The Convention also obliges Parties not to engage in waste trade with non-Parties unless a compatible bilateral or regional agreement is in place.	• The competent implementation department of China is the State Environmental Protection Administration. • The following laws and regulations relate to this Convention: 1 The Law on Prevention of Environmental Pollution Caused by Solid Waste Article 58: "Transit of dangerous waste passing through the territory is forbidden." 2 The *Marine Environment Protection Law and Regulations on the Control over Dumping of Wastes into the Sea Waters* establish a procedure under which prior informed consent is required before wastes may be dumped in sea areas under Chinese jurisdiction. They clearly identify responsibilities borne by the "dumping entity" and governmental agencies. There is, however, no definition of the "dumping entity". A prior informed consent procedure is in place; this involves the Maritime Traffic Safety Authorities, with the aim of safeguarding, inter alia, the environment and human health. The State Oceanic Administration, which is the competent authority, receives the applications for dumping operations; it is clearly required to have the technical capacity to assess the nature of the wastes prior to granting a permit, and to verify the loaded wastes. The dumping entity submits a written report to the Maritime Traffic Safety Administration at the port of departure when the vessel has completed the dumping operation. 3 The *Procedures for International Navigation Ships Entering and Exiting Ports* requires that an application should be made, prior to entry into Chinese ports for a foreign ship, as follows: (a) The owner or the agent of a ship must complete an "Application Form for International Navigation Ships Entering and Exiting Chinese Ports" seven days before the arrival of the ship to the port (before exiting the previous port if the voyage takes less than seven days), and report to the Maritime Traffic Safety Administration of the port of arrival for approval.

	(b) The owner or agent of a ship must also report the time of arrival, the site of anchorage, and the plan for anchoring and moving, as well as related information about the crew and passengers, to the inspection agencies concerned 24 hours before arrival at the port (before exiting the previous port if the voyage takes less than 24 hours). (c) Upon entry to a port, the ship, crew and passengers, cargoes and other goods are subject to an inspection carried out by the Maritime Traffic Safety Department of China, Customs General Administration of China, Border Checking Departments of Health Quarantine Departments of China, and Animal and Plants Quarantine Departments of China. (d) When the owner or agent of the ship has completed the formalities for entering the port, the crew and passengers may leave the ship and cargoes may be loaded on or off the ship upon its arrival at the port. However, if the formalities have not been completed prior to entry into the port, no one may leave the ship, and cargoes and other goods must not be loaded on and off unless the previous port of call was also within China. (e) In addition, the ship owner or agent must complete exit formalities within 4 hours before the ship exits the port. The relevant inspection agencies confirm that the formalities have been met by signing the *"Ship Exiting Formalities Certificate"*; then the owner or the agent is, *inter alia*, required to go to the Health Quarantine Department to apply for an exiting license with the certificate. 4 *Regulations Governing Supervision and Control of Foreign Vessels* [45] provided that: (a) One week prior to expected arrival at the port, the master or owner of a vessel must submit the required forms for completion of entry formalities to the Maritime Traffic Safety Administration through the vessel's port agent. He must also report, 24 hours in advance of arrival (or on departure from the last port of call if the voyage takes less than 24 hours), the vessel's ETA and fore and aft drafts. The Maritime Traffic Safety Superintendent Department of the port gives approval for entry into the port. (b) Three days prior to the estimated time of arrival, vessels carrying Grade I highly hazardous cargoes must apply to the Maritime Traffic Safety Administration through their port agent for endorsement; they must provide, in detail, descriptive names, properties, packing, quantity, and locations of stowage, and attach a booklet of Description of Dangerous Materials. The vessel must not enter the port, discharge the cargoes or make transit until permission has been obtained. (c) Upon arrival at the port, vessels must immediately submit an Entry Report and other relevant forms and documents. Prior to departure, vessels must submit a Departure Report and other relevant forms for clearance, and may only leave the port after port clearance has been obtained.

45 Issued on August 22, 1979, by the State Council. The text of the Regulations may be found at http://www.novexcn.com/supervis_control_for_vess.html.

	• In recent years, several illegal trans-boundary movements of hazardous wastes and other wastes have been discovered by the customs administrations and environmental protection bureaus in the coastal regions. These cases were reported to the Secretariat of the Basel Convention. Most of the wastes involved were returned to the exporting countries. The wastes which were not returned were properly disposed according to the requirements of the Basel Convention and Chinese law.

4.3.2.9 Stockholm Convention on Persistent Organic Pollutions (POPs)

As part of its ongoing efforts to protect the environment and public health, the Government of China actively participated in the negotiations and formulation of the *Stockholm Convention on POPs*, and was among the first signatory parties, signing the Convention on May 23rd, 2001. In June 2004, the National People's Congress of China ratified the Convention.

Please see Table 4-9 for the Performance of China on the POPs

Table 4-9 The Performance of China on the POPs

Stockholm Convention Requirements	Performance of China
• All Parties are required to stop production and the introduction of new uses of intentionally produced POPs, with limited country-specific and general exceptions. • All new manufacture of PCBs is banned, and Parties should take steps to reduce use of existing PCBs. DDT use is restricted to vector control (e.g., to control malaria-bearing mosquitoes), and is slated for ultimate elimination as cost-effective alternatives become available. • Parties are also required to implement rigorous controls on sources of POP by-products to reduce releases. The *Convention* includes requirements for safe handling and disposal of POPs in an environmentally sound manner. • The *Convention* includes provisions restricting trade of POPs for which use or production continue to exist, and bans all export of POPs, except for environmentally sound management after no further legitimate uses exist.	• Before accession to the Convention, China had already carried out much work in the prevention of POPs pollution. For example, in 1999 the State Environmental Protection Administration began a survey of production, distribution, use, import and export, stockpiling, obsolete waste and emission of pesticidal POPs. The investigation, now in its completion phase, will be conducive to prevention work. • The development of the National Implementation Plan (NIP) is another prevention measure. • A series of strategic researches is being undertaken to mobilize all societal powers in the prevention of POPs. Moreover, substantial work in international co-operation on POPs control and reduction has been undertaken. In May 2003, the GEF council approved a full-size project (11 million USD), with 60% co-financing from Italy, Canada, and other countries; this assisted China to develop the National Implementation Programme and to increase China's capacity to implement the Stockholm *Convention* on POPs. More significantly, GEF has approved PDF-B grants for preparation of two demonstration projects on PCB management and disposal, as well as alternatives to Chlordane/Mirex in termite control; these should be in parallel to NIP formulation. The projects have been designated to mobilize 20 million USD from GEF, bilateral/multilateral resources, government funds, and funds from specific private sectors. China will also launch additional demonstration activities in areas such as alternatives to DDT, management and disposal of hazardous waste and medical waste, and disposal of pesticidal stockpiles/wastes.

• In addition, a strong financial and technical assistance provision in the agreement will provide support to developing countries and those in economic transition, to assist them in implementing the obligations under the Convention. • Finally, the Convention includes a science-based procedure to allow for the inclusion of additional chemicals in the agreement.	• Through the Convention negotiation and the development and implementation of projects under the POPs Convention, a domestic technical supporting network has been established, with members from organizations of environmental protection, agriculture, public health, construction, related industrial sectors, associations, institutes and plants. These experts in POPs production, distribution, use, alternatives, research and development, and environmental protection policies, have provided valuable assistance with Convention implementation activities.

4.3.2.10 International Convention on Civil Liability for Oil Pollution with the Protocol of Amendments, 1992(CLC)

The *International Convention on Civil Liability for Oil Pollution of 29 November 1969* with the *Protocol of Amendments, 1992*, is an international treaty that constitutes the legal basis for individual claims against persons liable for maritime pollution caused by the release or discharge of oil from tank vessels. This *Convention provides* for a compensation fund for clean-up costs and environmental damage, subject to certain conditions and ceilings. It has already been incorporated into China s law.

Please see Table 4-10 for the performance of China on the CLC

Table 4-10 The performance of China on the CLC

CLC Requirements	Performance of China
• The ship owner is strictly liable for oil pollution without need to prove negligence or fault, except in certain circumstances, notably war and insurrection. • Persons who suffer damage from oil pollution have recourse directly against the owner of the vessel without involving states.	• All laws on pollution control and natural resources protection have provisions on liability and compensation, of which civil liabilities include the following: eliminating dangerous or harmful conditions; restoration (including monetary compensation); administrative liabilities (including a warning notice, fine, suspending operation); and closing down. • The *General Principles of the Civil Law* provides that: "Any person who pollutes the environment and causes damage to others in violation of state provisions for environmental protection and the prevention of pollution shall bear civil liability in accordance with the law." (Article 124) • The *Environment Protection Law* specifies: "A unit that has caused an environmental pollution hazard shall have the obligation to eliminate it and make compensation to the unit or individual that suffered direct losses. A dispute over the liability to make compensation or the amount of compensation may be settled by competent authorities." (Article 41)

CLC Requirements	Performance of China
• The owner's liability is limited according to a formula related to the tonnage of the ship unless the incident arose out of his own negligence. • Contracted States should guarantee that ships going in or out their ports are equipped with relevant insurance and financial certificates.	• The Marine *Environment Protection Law* specifies: "Whoever causes pollution to the marine environment shall remove the pollution and compensate the losses; in case of pollution to the marine environment resulting entirely from the intentional act or fault of a third party, that third party should remove the pollution and be liable for the compensation. For damages to marine ecosystems, marine fishery resources and marine protected areas which cause heavy losses to the State, the department invested with power by laws should, on behalf of the State, put forward compensation demand to those held responsible for the damages." • Concerning the insurance of vessels, the *Marine Environmental Protection Law* stipulates: "The State shall make perfect and put into practice a responsibility system of civil liability compensation for vessel-induced oil pollution; it shall establish vessel-induced oil pollution insurance, and an oil pollution compensation fund system in accordance with the principles or owners of the vessel and the cargoes jointly undertaking liabilities for compensations of vessel-induced oil pollution. Specific measures for the implementation of vessel-induced oil pollution insurance and oil pollution compensation fund system shall be formulated by the State Council." (Article 66) • *The Regulations on Prevention of Pollution of Sea Areas by Ships* provides that the *CLC* is applicable to ships sailing in international lines and to oil tankers with a gross tonnage of 2000 tons or more (Article 13). The *Maritime Traffic Safety Law*, currently under revision, will establish a mandatory ship insurance system in China.

4.3.2.11 Rio Declaration and Agenda 21

China participated in the *UN Conference on Environment and Development* held in Rio de Janeiro in 1992, and signed all concluded major legal documents, including *Rio Declaration on Environment and Development and Agenda 21*. Since the Rio Summit, China has actively worked to implement Rio Declaration and Agenda 21. After the Earth Summit, a number of important new policies, plans and laws were formulated for carrying out the Rio principles and Agenda 21. Following are the major developments and progress made since 1992:

1) The Government of China adopted the Ten *Important Measures on Environment and Development* in August, 1992, which was the first official adoption of the concepts and strategy of sustainable development.

2) The State Council adopted the *National Agenda 21-The White Paper on China's Population, Environment and Development in the 21st Century (China's Agenda 21)* on February 25th, 1994. This strategic plan is far-reaching, comprehensive and operational. According to *China's Agenda 21*, the strategy of sustainable development consists of three integrated parts:

sustainable economy, sustainable society and sustainable environment and natural resources. The *Agenda* states that sustainable development is based on the sustainability of natural resources and ecological environment. It calls for the protection of nature's life-supporting capacity, and the solution of major ecological problems. It also calls for prevention and control of pollution, and improvement of urban and rural environment conditions. The Agenda declares that China will actively participate in global environmental protection, and will increase international co-operation in the fields of greenhouse gas control, safe alternative substances of CFC and relevant technology, toxic chemicals and hazardous wastes control, marine environmental protection, and biodiversity conservation.

3) China integrated the *China's Agenda 21* into the *National Five-Year Plan for Social and Economic Development and the Outline of Long-term Social and Economic Development Objectives for the Year 2010* on March 17, 1996.

4) China adopted the *China Ocean Agenda 21* in 1996, putting forward a sustainable development strategy for its marine programmes.

5) China has established a large framework of environmental legislation consisting of laws, regulations, treaties, and environmental standards.

6) China has established a nation-wide environmental regulatory institution.

4.3.2.12 Agreement on Fisheries between the Government of the People's Republic of China and the Government of the Republic of Korea (Sino-Korea Fishery Agreement)

Because China and the Republic of Korea are situated on opposite sides of the Yellow Sea, they share its fisheries resources. The depletion of fish stocks aggravated the competition for resources; hence, it became necessary to establish effective measures to ensure the long term utilization of common resources. The *Agreement on Fisheries Between the Government of the People's Republic of China and the Government of the Republic of Korea* was signed in 1998 and came into force in 2001. The agreement established a fisheries management regime based on the *International Convention on the Law of the Sea* framework, and promoted co-operative exploitation and conservation of shared fisheries in the Yellow Sea.

According to the Agreement, a Joint Fishery Committee was formed, which consisted of one representative and several members appointed by each party, and a scientific committee.

A Provisional Measures Zone was established in the middle of the Yellow Sea as a joint fishing zone; both parties are free to fish in the current fishing pattern zone. Transitional Zones are situated on the eastern and western sides of the Provisional Measures Zone. In 2005, the Provisional Measures Zone was became the Exclusive Economic Zone.

In June 1999, The Ministry of Agriculture of China adopted the *Provisional Regulation on Foreigners and Foreign Vessels in the Jurisdictional Waters of PRC*, designed to regulate foreign fishing in China's Exclusive Economic Zone. It set forth a range of rules to regulate fishing operations, surveys on marine living resources, and fisheries-related activities conducted by foreigners and foreign vessels in China's jurisdictional waters.

In September 1999, the Bureau of Fisheries Management issued the *Circular on Specific Procedures in Dealing with Fishing Violations by Foreigners and Foreign Vessels* as a supplementary instrument to the above mentioned regulation; the Circular set down standard procedures to be followed by Chinese enforcement authorities when dealing with fisheries violations by foreigners or foreign vessels.

In order to enhance enforcement of the Exclusive Economic Zone, the Bureau of Fisheries Management of China issued the *Management Measures on Exclusive Economic Zone Fisheries Surveillance Patrolling*, setting out the surveillance patrol, duties of fisheries authorities, and requirements for vessels on surveillance patrolling.

In order to standardize the procedures to board and inspect foreign vessels, the Bureau of Fisheries Management issued the *Regulations on the Procedures of Fisheries Enforcement Vessels Boarding and Inspection Foreign Vessels,* and the *Management Measures on the Fisheries Enforcement Vessels on Duty of Patrolling Exclusive Economic Zone*.

In February, 2001, the Ministry of Agriculture issued the "Management Rules *on the Provisional Zone and Transitional Zone Listed by the Sino-Korean Fisheries Agreement*". The Bureau of Fisheries Management of the Yellow Sea and Bohai Sea is the competent authority to take charge of the China-Korea Provisional Measures Zone and Transitional Zones. The Management Rules also laid down detailed regulations for fishing permit applications, logbooks, vessel markings, as well as templates for the required forms.

From 2001 to 2005, the Bureau of Fisheries Management of China issued

9171 permits to Chinese fishing vessels for fishing in the Transitional Zone on the Korean side; the resulting total harvest was 103000 tons. The Bureau also issued 6000 permits to Korean vessels for fishing in the Transitional Zone on the Chinese side.

Chapter Five Synthesis Analysis

China has officially attached great importance to marine development and protection; it has enacted in excess of 20 laws and a range of regulations and rules. Almost all of the international conventions to which China is a contracted party, have implementing departments and detailed domestic implementing provisions in China. However, the practice of marine environment protection in China is not yet perfect.

5.1 Major Threats to the Yellow Sea Large Marine Ecosystem

5.1.1 Pollution

According to the *China Coastal Water Quality Report 2005*, pollution of coastal water has not been alleviated; approximately 139000 km² of sea area did not meet the requirements of the Seawater Standard.

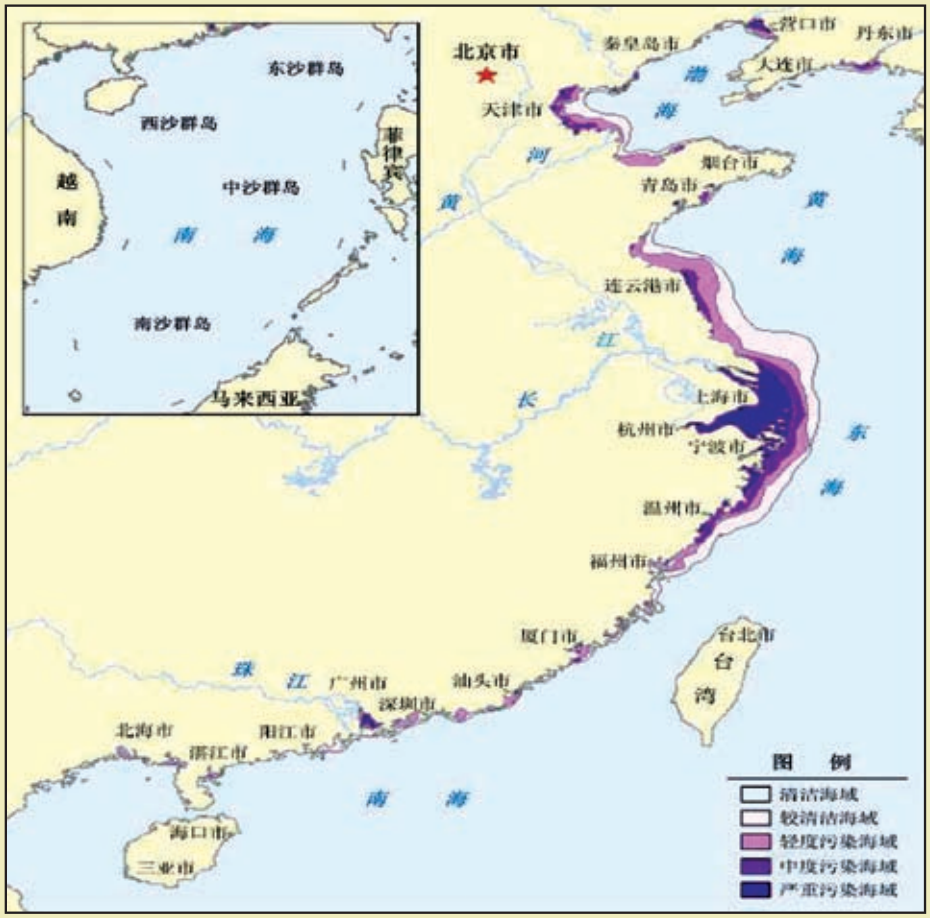


Figure 5-1 The sketch map of national coastal water environment condition 46

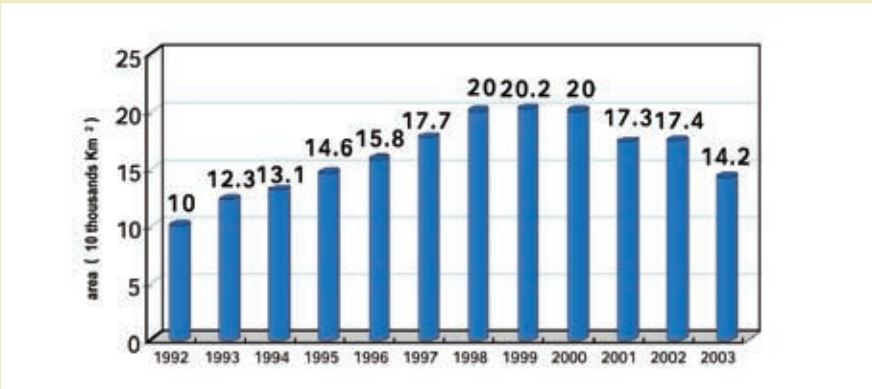


Figure 5-2 Trends in national coastal and marine water area inferior to the marine water quality standards of Grade

46 From the State Marine Environment Quality Report 2005, http://www.soa.gov.cn/hygb/2005hyhj/2.htm

Trends in national coastal and marine water area inferior to the marine water standard of Grade I [47]

As of 2005, about 43000 km² of the sea area of the Yellow Sea did not meet the requirement of the Seawater Standard; of this amount, 3000 km² were seriously polluted, 4000 km² were polluted to a medium extent, and 14000 km² were lightly polluted (Table 5-1). The seriously polluted areas were distributed along the Yalujiang River Estuary, Jiaozhou Bay, and Jiangsu Province, with major pollutants being inorganic nitrogen and phosphate figure 5.3. With respect to marine pollution, land-based pollutants account for about 90%; the remaining pollutants are from sea–based activities such as maritime culture, petroleum and gas development, dumping, etc.

Table 5-1 Seawater Quality of the Yellow Sea 2003~2005 (km²)

Year	Clean	Lightly Polluted	Polluted to Medium Extent	Seriously Polluted	Total
2003	14,440	5,700	3,520	3,200	26,860
2004	15,600	12,900	11,310	8,080	47,890
2005	21,880	13,870	4,040	3,150	42,940

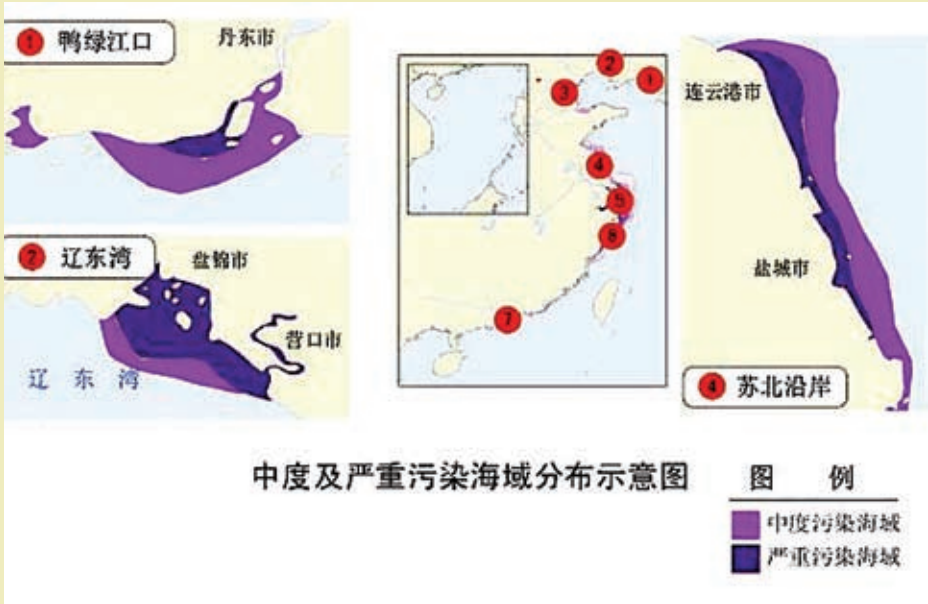


Figure 5-3 The map of medium and heary polluted area in the Yellow Sea

48 China Coastal and Marine Environment http://www.zhb.gov.cn/eic/652466692596695040/20040607/1051317.shtml

The development of fish farming is one of the causes of seawater pollution. Pervasive usage of high-tech fishing instruments and years of immoderate fishing contributed to a continual decline in the quantity of fish; this forced increasing numbers of fishermen to retreat from fishing and move to fish farming from the 1990s onward. The disorder in the approval procedures and the weakness in the management system accelerated the chaotic development of fish farming. Indeed, China is already beginning to exhaust appropriate sites and freshwater supplies available for fish farming.

Land-based pollution is another cause of seawater pollution. Under-investment in infrastructure by the State has resulted in an insufficient number of sewage treatment installations in many coastal cities. Due to the lack of capital funds required to update techniques, many enterprises continue to use old techniques and equipment. In addition, some coastal enterprises have discharged sewage directly into the sea, which has seriously polluted the marine environment.

5.1.2 Over-fishing

Besides pollution, the greatest threat to China's marine ecosystem is over-fishing. The Yellow Sea was once one of the most intensively exploited in the world. Major fisheries are at an extremely low level (the average total catch is 200,000 tons) compared with 3 decades ago. The fisheries are no longer economically sustainable. Since the 1960s, there has been a major change in catch composition. Larger, commercially important species such as the yellow croaker and hair-tail have been replaced by smaller-bodied and low value forage fish, such as anchovy. The Japanese anchovy is presently believed to be the most abundant specie in the Yellow Sea, with a potential catch of 1/2 million tons per year. The stress of over-fishing has affected the self-regulatory mechanism of the Yellow Sea. The Global International Waters Assessment (GIWA) characterizes the Yellow Sea as severely impacted in terms of over-fishing, with destructive fishing practices; this impact continues to increase.

China has adopted measures to control fishing vessels and has re-issued fishing licenses. To improve the effectiveness of its fisheries laws and regulations, China established a Fisheries Law Enforcement Command in 1999; this is part of its plan to develop a multi-agency surveillance and enforcement team. To improve its capacity to deal with illegal, unreported and unregulated fishing, China has built new enforcement vessels with better equipment to patrol EEZ. To formalize

the enforcement procedure, China has adopted the *Measures on Fisheries Administration and Enforcement Vessels*, and increased personnel in law enforcement. Notwithstanding, illegal, unreported and unregulated fishing continue to present a challenge to Chinese fisheries industries, especially in coastal areas. Many of China's fishing boats are 'day sailers' with small crews; environmentally, this is a double-edged sword. Although these boats do not have the range to fish far offshore and thus decimate stocks there, over-fishing along the coast has become intense. The small mesh of some fishing nets graphically demonstrates the situation. In the absence of sufficient sizable fish for an economical catch, fishermen attempt to seize whatever they can. The fishing effort, as a whole, is much higher than the reproduction of fish stock; hence, over-fishing remains the main threat to the sustainability of fish stocks.

5.1.3 Loss of Biodiversity

According to statistics, approximately 37% of the inter-tidal areas existing in the Chinese portion of the Yellow Sea in 1950 have been reclaimed. The two largest rivers flowing into the Yellow Sea, the Huang He (Yellow River) and Chang Jiang (Yangtze River) are undergoing significant changes that will greatly reduce the amount of sediment input; it is predicted that future loss of inter-tidal areas will occur at an increasing rate due to the combined effects of reclamation and reduced accretion. It is estimated that at least 2,000,000 shorebirds use the region during northward migration, this number being approximately 40% of all the migratory shorebirds in the East Asian-Australasian Flyway. Large numbers of birds are also present during southward migration, when perhaps 1,000,000 shorebirds pass through the region. Many shoreline birds have lost their habitats. A kind of acorn worm, *Saccoglossus hwangtaoensis*, which is in the *Directive of Protected Animals in China*, has not been found for many years. Whales, dolphin, seals, and sea lions, once common in this area, are seldom seen.

5.2 Major Problems Exist in the Protection of the Yellow Sea and Policy Suggestions

5.2.1 Legislation First

Environmental problems existing in the Yellow Sea marine ecosystem are basically determined by the relationship between supply and demand. Before ways can be found to effectively change the relationship between supply and demand,

legislation enhancement is undoubtedly the most important way to solve the environmental problems. Although China has issued more than 20 laws related to marine ecosystem protection, much more must be done, including the following:

1) China should enact additional laws and increase the comprehensiveness of their jurisdiction.

2) China should establish detailed rules to make laws more exercisable. Usually, general rules comprise the major component of Chinese laws; these rules serve only as guides to deal with the many types of cases. General rules give law enforcers a great deal of discretion when dealing with specific cases, and make it difficult to enforce the laws. It is difficult to increase the enforceability of laws through amendments or the issuance of implementation rules.

3) China should regularly review existing laws and unify inconsistent provisions in the law. As actual situations change faster than legislation, the law may fall behind the development of society. Therefore, it is of great importance to amend out-of-date provisions. For example, according to the law, the punishment for illegal waste discharge activities undertaken by coastal enterprises ranges from 20,000 to 200,000 CNY. In some large-scale enterprises, however, the waste treatment fee for one day is about 100,000 CNY. This is seen to be so exorbitant that enterprises would rather accept punishment than run waste treatment facilities. In addition, department rules and local legislations may contain inconsistent stipulations concerning a particular situation; this affects the unification of Chinese laws. Therefore, harmonization of stipulations is also necessary.

5.2.2 Enhance the Enforcement of Law

To manage the marine ecosystem and protect marine environment, legislation is basic, while law enforcement is key. Only the proper combination of the two can bring about desired results. The major problem affecting the enforcement of law is the inconsistency among relevant law enforcement departments. At present, many departments exercise their authority on the sea, including the departments of communication, agriculture, policy, energy, environment, land management, marine affairs, customs, and navy, etc. As the limits of authority among these departments are not well-stipulated by law, several gaps and overlaps exist in the process of law enforcement. If a unitary planning and coordinating mechanism could be established, the enforcement of law would become more effective.

Consider the surveillance and enforcement team as an example. Besides the army and the armed policy, four departments under the State Council have their own surveillance and enforcement teams, namely: Marine Safety Administration under the Communication Ministry, Fishery Management and Fishing Harbour Superintendence under the Agriculture Ministry, Anti-smuggling Squad under the General Administration of Customs, and Marine Surveillance under the State Oceanic Administration. Because of differing allegiances, communication and co-operation among various surveillance and enforcement teams tend to become quite difficult, and joint actions are seldom taken. If these organizations can re-organize existing teams, detail their duties, exchange information and enhance co-operation, they will be better able to guard the entire China Sea.

5.2.3 Promote Regional Co-operation and Advance the Subscription of Regional Agreement

The People's Republic of China, P.R.Korea and R.Korea are neighbouring countries, and share the Yellow Sea. The environmental problems of one country may spill over to the other countries through the same atmosphere and oceans. In order to improve environmental conditions along the Yellow Sea, co-operation among these three countries is greatly needed. Except for the *Fish Agreement* signed by China and P.R.Korea, there is currently no regional agreement aimed at protecting the marine environment of the Yellow Sea. This indicates a direction for related international organizations. Historically, three methods have been used to reach an international agreement on environmental problems: military force, economic control and negotiation at the round table. Under the current peaceful and equal international situation, force and control are no longer viable or desirable; hence, negotiation is the only road which can lead to an international agreement. If the countries wish to promote co-operation on the protection of marine environment in the Yellow Sea region, they must work together to determine the areas of common understanding on these problems, reduce differences through bargaining, and gradually come to consensus on solutions for the protection of the Yellow Sea.

5.2.4 Strengthen the Management System

1) Increase harmony among Ministries concerned with marine management. As the authority over seas belongs to several Ministries and some duties are not clearly stipulated, conflicts among Ministries

are inevitable. Although the laws have definite stipulations, nevertheless because of poor communication, various agencies may waste much money doing the same things. For example, Article 6 of the *Regulations Concerning Prevention of Pollution Damage to the Marine Environment by Land-based Pollutants* provides: "Units and individuals should register to the environmental protection administrations of their land-based pollutant discharge details, and copy to the oceanic administrations." Since 2005, oceanic administrations have focused their efforts on the monitoring of land-based pollution; this has been very costly and there have been many redundancies. This has also occurred within the sea-monitoring institutions. The State Marine Environment Monitoring Net, State Coastal Marine Environment Monitoring Net, and State Fishery Water Monitoring Net come under the Oceanic Administration, Environmental Protection Administration and Fishery Administration. While each of the Nets publishes respective annual assessments concerning the state of marine environment, their data is not shared; hence, repeated monitoring exists.

2) More carefully manage and provide surveillance of the roles of local governments. According to the *Marine Environmental Protection Law*, local governments should be responsible for ocean environment in their respective regions;[48] however, some of the local governments promote different standards or seek methods to elude State-issued laws. Local governments are the direct executors of law; if under weak surveillance and management, they may violate the law for their local interests. For instance, the Sea Area Use Management Law stipulates that sea area use exceeding a certain limit should be approved by state level authorities, and the sea area use fee should be collected into the state treasury. In order to circumvent the law, many local authorities partition a large project into smaller ones, so their use of sea areas may fall within the limit provided by the law, and be approved by local authorities. Hence, the management and surveillance of local governments is of great importance.

5.2.5 Strengthen the Construction of the Management Team

One reason for weak enforcement of law is that China lacks qualified sea management managerial and technical staff. Because of the low education level of the whole population (although China has done a great work to promote education) the accomplishments of some

48 Article 16 of the Environmental Protection Law.

managerial teams are not satisfactory. Many officials have insufficient knowledge of marine-related fields, especially marine management; it is difficult for them to correctly understand and enforce marine policies and laws, to say nothing of issuing a policy or a law. Most of them have not received technical training required to meet the needs of marine environmental protection. The State should adopt a life-long study mechanism, and provide managerial teams with regular training and classes.

Additionally, there is a great need to provide incentives in order to obtain well-trained staff, and to reward them for the effective use of their abilities.

5.2.6 Establish a Public Surveillance Programme, Enhance Public Participation and Transparency in Marine Management

The *Marine Environmental Protection Law* specifies: All units and individuals entering the sea areas under the jurisdiction of the People's Republic of China shall have the obligation to watch for and report on actions causing pollution damage to the marine environment; and all vessels have the obligation to guard against pollution of the sea. Upon discovering violations of regulations or occurrences of pollution, they shall immediately report them to the nearest harbour superintendence administration; fishing boats may also report such occurrences to the nearest fisheries administration and fishing harbour superintendence agency. The State Oceanic Administration has established a Volunteer Ships Monitoring System. While environment surveying is comprehensive, a public surveillance programme should be established to cover all aspects of marine environment.

Many Laws have special requirements with respect to public participation and transparency in marine management. For example, the *Environment Protection Law and Marine Environment Protection Law* state: Citizen has the right to supervise, accuse and bring a complaint before the court against anybody who has caused pollution and damage to the environment and the competent State department should release environment quality reports. The *Environment Impact Assessment Law* also encourages concerned units, experts and the public to participate in the environmental impact assessment process, using appropriate means.

Despite the provisions of laws, the right of the public to access information on environment and resource management cannot be guaranteed, because these provisions are not exercisable. Although

the government has established websites on the management of environment and resources, some pivotal management data are confidential, and the public cannot access it. In the environmental assessment process, public opinions are seldom collected and considered. In the process of drafting management regulations, only the advice of some related departments are heard, while the public voice is neglected.

Transparency and participation can be improved in two main ways:

1) Publicize basic information, proceedings and outcomes of the management process more widely; establish a disclosure institution for important management issues, such as Sea Area Function Zoning, Environmental Impact Assessment, Issuance of Sea Area Use Permits and Fishing License, etc.

2) Allow higher degrees of involvement of stakeholders in the decision-making process; enhance public participation in State actions and programmes.

5.2.7 Enhance Education in Marine Policy and Law

Prior to the 21st century, oceans and seas did not attract much public attention; however, society has come to realize that the 21st century is one of oceans and seas, and that the degree of marine development is a good indication of the integrated national power of a country. As a result, more funding is provided for marine-related areas. However, marine policy and law are relatively under-developed in China, compared with other large coastal countries. Because of the key function of marine policy and law in marine development, more investment should be provided for the teaching and research of marine policy and law.

Universities can appropriately train specialists in marine science and management, and can provide common classes for the public to gain marine knowledge. At present, university resources are not fully used to train talented people for marine-related fields. Marine-related majors are not popular among students; few classes are held to train governmental officials; and no lectures are opened to public for the dissemination of marine knowledge. To change this situation,

1) More elites should be attracted to devote themselves to the study of marine science and technology, marine management, marine economy, marine policy, and laws.

2) For students with other majors, courses on marine policy and law should

be added to their curricula, especially in universities located in coastal cities.

3) Government officials of coastal areas should be provided with more opportunities to receive regular training in universities, both on natural knowledge of the sea and knowledge of sea management.

4) Fishermen should be convened and educated regularly, especially in non-fishing seasons.

References

1. Marine economic statistical yearbook. SOA, ed. 2005. Ocean Press
2. Environmental Protection in China, Information Office of the State Council, P.R. China, June 1996, Beijing, Peoples Daily (Overseas Edition)
3. China's Agenda 21- White Paper on China's Population, Environment, and Development in the 21st Century, Ocean Press, 1997
4. Ocean Polluters Must Be Told to Pay, China Daily July 6, 2004
5. State Marine Environment Quality Report 2005, SOA, Ocean Press, 2006
6. China Fisheries Yearbook 2003 (in Chinese), Bureau of Fisheries Management, Agriculture Publishing House, 2004.
7. China Fisheries Yearbook 2004 (in Chinese), Bureau of Fisheries Management, Agriculture Publishing House, 2005.
8. China Fisheries Yearbook 2005 (in Chinese), Bureau of Fisheries Management, Agriculture Publishing House, 2006.
9. China Ocean Yearbook 2003 (in Chinese), State Oceanic Administration, Ocean Press, 2004.
10. China Ocean Yearbook 2004 (in Chinese), State Oceanic Administration, Ocean Press, 2005.
11. China Ocean Yearbook 2005 (in Chinese), State Oceanic Administration, Ocean Press, 2006.
12. China Agriculture Statistical Report, 2004 (In Chinese), Ministry of Agriculture, PRC, China Agriculture Press
13. Collections of Laws of the People's Republic of China, Jilin People's Press
14. Collections of Fisheries Laws and Regulations of China, Fisheries Administration and Fishery Harbour Superintendency of China, Legal Press of China 1999
15. On the Ocean Century and Marine Development Strategy of China, Li Yaozhen and Xu Xiangmin, Press of the Ocean University of China 2004
16. Development of China's Marine Programme, State Council, 1998, Ocean Press

Annexes 1-5 (Questionnaires)

The original questionnaires are in Chinese. Their English translations are listed here.

Annex 1 Questionnaire for Governmental Departments

Questionnaire for Governmental Departments Related to Marine Affairs

In order to understand the concerns of officials, fishermen, coastal enterprises, coastal residents, and non-government organizations on the Yellow Sea ecosystem, and to provide data for governance analysis on the Yellow Sea, we conduct this questionnaire.

We sincerely appreciate your answering the following questions, which will take several minutes of your time.

1 You live at_____county/district_____city_____ province.

2 Do you know which countries are along the Yellow Sea?

A China B P. R. of Korea C R. of Korea D Japan

3 Do you know which cities and provinces in China are along the Yellow Sea?

A Liaoning B Shandong C Jiangsu D Shanghai E Zhejiang

4 Which do you think are main stresses on the ecological environment of the Yellow Sea?

A Over-fishing B Mariculture C Raw sewage

D Waste discharge from coastal enterprises

E Pollution from ports and ships

E Coastal reclamation

F Disturbance from coastal tourists

5 Compared to 1980s, what is current status of ecosystem environment of the Yellow Sea?

A No change B Deteriorating C Seriously Deteriorating D Better

6 Who are responsible for ecosystem environment damage of the Yellow Sea?

A Governmental departments B Coastal enterprises

C Ports and ships D Mariculture practitioners

E Fishing companies F Coastal residents

G Tourists H Other _____

7 Whose interests do you think are considered when drafting marine development plans or programmes?

A Central government

B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 What do you think the tendency of national policies between the development and protection of the Yellow Sea has been in the past 20 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

9 What do you think the tendency of national policies between the development and protection of the Yellow Sea will be in next 10 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

10 What do you think is the current policy tendency of coastal provincial and municipal governments between the development and protection of the Yellow Sea?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

11 What roles do you think governmental departments play in protecting ecosystem environment of the Yellow Sea?

A Protector for national interests B Protector for coastal residents

C Protector for coastal enterprises which discharge pollutants

D Protector for fishermen E Coordinator for above stakeholders

12 Do you think the current laws, policies and measures have been carried out perfectly?

A Yes B Uncertain C No

Please give examples _____

13 Do you think that if current laws, policies and government measures are carried out perfectly, the environment of the Yellow Sea ecosystem will improve much?

A Yes B uncertain C No

14 What kinds of difficulties does your unit face during marine enforcement and management activities?

15 What do you think are the main reasons for the above difficulties?

A Imperfect laws, and policies do not match the actual situation

B Economic benefits prior to environmental benefits

C Imperfect ocean management system

D Poor technique and equipment

E Inadequate budget

F Local protectionism when conflict between local and national benefits

G The parties to be managed have low awareness of marine protection and law obedience

F other_____

16 Are there overlap phenomena of power range between marine management departments?

A Yes B No

If yes, please give examples _____

17 Are there conflicts between policy tendencies and laws for environmental protection of the Yellow Sea?

A No B Slight conflicts

C Severe conflicts during the implementation D Theoretical conflicts

18 What jurisdiction conflicts and benefits conflicts exist among coastal provinces and cities along the Yellow Sea?

19 In your opinion, how can laws and policies related to the Yellow Sea environment protection be improved?

20 What roles do you think the United Nations play in the management of the Yellow Sea?

A Facilitating public awareness

B Facilitating regional coordination among countries along the Yellow Sea

C Provide guide for laws framework

D Other _____

21 How much would you like to donate for restoration of the environment of the Yellow Sea? (_____CNY each year)

Annex 2 Questionnaire for Enterprises

Questionnaire for Coastal Enterprises Along the Yellow Sea

In order to understand the concerns of officials, fishermen, coastal enterprises, coastal residents, and non-government organizations on the Yellow Sea ecosystem, and to provide data for governance analysis on the Yellow Sea, we conduct this questionnaire.

We sincerely appreciate your answering the following questions, which will take several minutes of your time.

1 You live at_____county/district_____city_____ province.

2 Do you know which countries are along the Yellow Sea?

A China B P. R. of Korea C R. of Korea D Japan

3 Do you know which cities and provinces in China are along the Yellow Sea?

A Liaoning B Shandong C Jiangsu D Shanghai E Zhejiang

4 Which do you think are main stresses on the ecological environment of the Yellow Sea?

A Over-fishing B Mariculture C Raw sewage

D Waste discharge from coastal enterprises

E Pollution from ports and ships

F Coastal reclamation G Disturbance from coastal tourists

5 Compared to 1980s, what is the current status of the ecosystem environment of the Yellow Sea?

A No change B Deteriorating

C Seriously deteriorating D Better

6 Who are responsible for ecosystem environment damage of the Yellow Sea?

A Governmental departments B Coastal enterprises

C Ports and ships D Mariculture practitioners

E Fishing companies F Coastal residents

G Tourists H Other_____

7 Whose interests do you think are better considered when marine development plans or programmes are being drafted?

A Central government B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other

8 What do you think the tendency of national policies between the development and protection of the Yellow Sea has been in the past 20 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

9 What do you think the tendency of national policies between the development and protection of the Yellow Sea will be in next 10 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

10 What do you think is the current policy tendency of coastal provincial and municipal governments on development and protection of the Yellow Sea?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

11 What roles do you think governmental departments play in protecting ecosystem environment of the Yellow Sea?

A Protector for national interests B Protector for coastal residents

C Protector for coastal enterprises which discharge pollutants

D Protector for fishermen E Coordinator for above stakeholders

12 In what way(s) do your enterprises utilize the Yellow Sea?

A Marine transportation B Fishing C Mariculture

D Seafood process E Oil extraction F Exploitation of sea sand

G Seawater as cooling water H Desalination of seawater

I Marine chemical J Coastal engineering construction

K Coastal tourism L Sea area as waste dumping area

13 In what way(s) do your enterprises affect the Yellow Sea ecosystem?

A Discharge liquid pollutant B Discharge gas pollutant

C Discharge solid pollutant D Make noise E Heat discharge

F Hydrological disturbance (destroying vertical structure of waters)

G Reduce quantity of fishery resource directly

H Modify natural coast line I Other_____

14 What is the ecological effect from the activities of your enterprises?

A Water quality deterioration B Sediment quality deterioration

C Fishery resource decreasing D Destroying seascape

E Health loss of ecosystem F Death or moving out of living organisms

15 Whose benefits are destroyed by the activities of your enterprises?

A Coastal residents B Mariculture practitioners

C Fishing companies D Tourist

E Unconcern F Other_____

16 Do you think the environment deterioration of the Yellow Sea ecosystem has an effect on the development of your enterprise?

A Yes B No C Uncertain D Unconcern

17 If laws and regulations are strictly enforced, will the development of your enterprise be affected?

A Yes B No C Uncertain D Unconcern

18 Does your enterprise observe the imperfect regulations and rules?

A Observe sometimes B Not observe accidentally

C Try our best to observe D Try our best to elude

E Other_____

19 What are your concerns relative to sea area utilization by your enterprise during government management activities?

20 How much would you like to donate for restoration of the environment of the Yellow Sea? (_____ CNY each year)

Annex 3 Questionnaire for Fishermen

Questionnaire for Fishermen along the Yellow Sea

In order to understand the concerns of officials, fishermen, coastal enterprises, coastal residents, and non-government organizations on the Yellow Sea ecosystem, and to provide data for governance analysis on the Yellow Sea, we conduct this questionnaire.

We sincerely appreciate your answering the following questions which will take several minutes of your time.

1 You live at_____county/district_____city_____ province.

2 Do you know which countries are along the Yellow Sea?

A China B P. R. of Korea C R. of Korea D Japan

3 Do you know which cities and provinces in China are along the Yellow Sea?

A Liaoning B Shandong C Jiangsu D Shanghai E Zhejiang

4 Which do you think are main stresses on the ecological environment of the Yellow Sea?

A Overfishing B Mariculture

C Raw sewage D Waste discharge from coastal enterprises

E Pollution from ports and ships F Coastal reclamation

G Disturbance from coastal tourists

5 Compared to 1980s, what is the current status of the ecosystem environment of the Yellow Sea?

A No change B Deteriorating

C Seriously deteriorating D Better

6 Who are responsible for ecosystem environment damage of the Yellow Sea?

A Governmental departments B Coastal enterprises

C Ports and ships D Mariculture practitioners

E Fishing companies F Coastal residents

G Tourists H Other_____

7 Whose interests are better considered when drafting marine development plans or programmes?

A Central government

B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 What has the tendency of national policies between the development and protection of the Yellow Sea been in the past 20 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

9 What do you think the tendency of national policies between the development and protection of the Yellow Sea will be in the next 10 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

10 What do you think is the current policy tendency of coastal provincial and municipal governments on development and protection of the Yellow Sea?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

11 What role do you think governmental departments play in protecting the ecosystem environment of the Yellow Sea?

A Protector for national interests B Protector for coastal residents

C Protector for coastal enterprises which discharge pollutants

D Protector for fishermen E Coordinator for above stakeholders

12 As a mariculture practitioner, what method do you prefer to select for your long-term benefits?

A Pursue massive mariculture to achieve more benefits in a short term.

B Negotiate with neighbouring mariculture practitioners; both maintain suitable mariculture quantities, and both reduce profit.

C Pursue multi-species mariculture mode, maintain suitable mariculture quantity, and reduce own profit.

13 Which influences do your mariculture activities bring the Yellow Sea ecosystem?

A Water quality deterioration B Sediment quality deterioration

C Change of wild species D Unconcern

14 How much do your mariculture activities affect the Yellow Sea ecosystem?

A No damage B slight damage C One of major destroying factors

15 What is the relationship between mariculture disease spread and mariculture quantity?

A Some relationship B No relationship C Hard to confirm

16 Do you think the current laws, policies and management measures for the Yellow Sea are reasonable?

A Reasonable; fully consider benefits of mariculture practitioners

B Relatively reasonable; partially consider benefits of mariculture practitioners

C Not reasonable, ignore benefits of mariculture practitioners

17 What is your attitude relative to strengthening the protection of the ecosystem of the Yellow Sea?

A Definitely support, prefer to reduce my own economic interests

B Support, prefer to reduce my own economic interests

C No support, the current ecosystem condition of the Yellow Sea is good

18 What thing most influences your mariculture interests at present?

A National policy change B Intervene from administration departments

C Disease D Marine pollution

E Change of market supply and demand

19 As far your mariculture activities are concerned, what problems do you think presently exist in government management departments?

20 How much would you like to donate for restoration of the environment of the Yellow Sea? (_____ CNY each year)

Annex 4 Questionnaire for Residents

Questionnaire for Coastal Residents

In order to understand the concerns of officials, fishermen, coastal enterprises, coastal residents, and non-government organizations on the Yellow Sea ecosystem, and to provide data for governance analysis on the Yellow Sea, we conduct this questionnaire.

We sincerely appreciate your answering the following questions which will take several minutes of your time.

1 You live at_____county/district_____city_____ province.

2 Do you know which countries are along the Yellow Sea?

A China B P. R. of Korea C R. of Korea D Japan

3 Do you know which cities and provinces in China are along the Yellow Sea?

A Liaoning B Shandong C Jiangsu D Shanghai E Zhejiang

4 Which do you think are main stresses on the ecological environment of the Yellow Sea?

A Overfishing B Mariculture C Raw sewage

D Waste discharge from coastal enterprises

E Pollution from ports and ships F Coastal reclamation

G Disturbance from coastal tourists

5 Compared to 1980s, what is the current status of the ecosystem environment of the Yellow Sea?

A No change B Deteriorating

C Seriously deteriorating D Better

6 Who are responsible for ecosystem environment damage of the Yellow Sea?

A Governmental departments B Coastal enterprises

C Ports and ships D Mariculture practitioners

E Fishing companies F Coastal residents

G Tourists H Other

7 Whose interests do you think are considered when marine development plans or programmes are drafted?

A Central government

B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 What do you think the tendency of national policies between the development and protection of the Yellow Sea has been in the past 20 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

9 What do you think the tendency of national policies between the development and protection of the Yellow Sea will be in the next 10 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

10 What do you think is the current policy tendency of coastal provincial and municipal governments on the development and protection of the Yellow Sea?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

11 What role do you think governmental departments play in protecting the ecosystem environment of the Yellow Sea?

A Protector for national interests B Protector for coastal residents

C Protector for coastal enterprises which discharge pollutants

D Protector for fishermen E Coordinator for above stakeholders

12 Does detergent in your kitchen influence the environment of the Yellow Sea?

A Yes B No C Unconcern

13 Do you think that littering garbage at the coast influences the ecological environment of the Yellow Sea?

A Yes B No C Unconcern

14 Do you think that purchasing illegal marine living organisms (e.g. coral) or fishing in no-fishing periods, contribute to damaging the ecosystem?

A Yes B No C Unconcern

15 What is your response when you witness activities which destroy the environment of

the Yellow Sea?

A Reporting to management departments B Dissuading destroyers

C Disclosing to media D Silently tolerate E Unconcern

16 Do your above responses have positive feedback?

Reporting to management departments:

A No taking action

B Taking action, destroying behaviour have been stopped

Dissuading destroyers:

C No positive reply D Temporarily stop the destruction action

Reporting to media:

E Yes, positive reply F No reply

17 How do you assess the behaviour of the local management department?

A Power abuse B Weak enforcement of laws

C Passive management, neglect residents' demands

D Partial to enterprises E Protect residents' interests

18 Would you like to join the group of protectors of the Yellow Sea ecosystem?

A Yes, may often participate in volunteer activities

B Yes, may participate in volunteer activities sometimes

C Yes, but do not participate in volunteer activities

D Unconcern

19 How much would you like to donate for restoration of the environment of the Yellow Sea? (_____CNY each year)

Annex 5 Questionnaire for NGO

Questionnaire for NGOs along the Yellow Sea

In order to understand the concerns of officials, fishermen, coastal enterprises, coastal residents, and non-government organizations on the Yellow Sea ecosystem, and to provide data for governance analysis on the Yellow Sea, we conduct this questionnaire.

We sincerely appreciate your answering the following questions which will take several minutes of your time.

1 You live at_____county/district_____city_____ province.

2 Do you know which countries are along the Yellow Sea?

A China B P. R. of Korea C R. of Korea D Japan

3 Do you know which cities and provinces in China are along the Yellow Sea?

A Liaoning B Shandong C Jiangsu D Shanghai E Zhejiang

4 Which do you think are main stresses on the ecological environment of the Yellow Sea?

A Overfishing B Mariculture C Raw sewage

D Waste discharge from coastal enterprises

E Pollution from ports and ships

F Coastal reclamation G Disturbance from coastal tourists

5 Compared to 1980s, what is current status of the ecosystem environment of the Yellow Sea?

A No change B Deteriorating

C Seriously deteriorating D Better

6 Who are responsible for ecosystem environment damage of the Yellow Sea?

A Governmental departments B Coastal enterprises

C Ports and ships D Mariculture practitioners

E Fishing companies F Coastal residents

G Tourists H Other_____

7 Whose interests are better considered when drafting marine development plans or programmes?

A Central government

B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other

8 What do you think the tendency of national policies between the development and protection of the Yellow Sea has been in the past 20 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

9 What do you think the tendency of national policies between the development and protection of the Yellow Sea will be in the next 10 years?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

10 What do you think is the current policy tendency of coastal provincial and municipal governments on the development and protection of the Yellow Sea?

A Orientated to development B Development prior to protection

C Development and protection are equal

D Protection prior to development E Orientated to protection

11 What role do governmental departments play in protecting the ecosystem environment of the Yellow Sea?

A Protector for national interests B Protector for coastal residents

C Protector for coastal enterprises which discharge pollutants

D Protector for fishermen E Coordinator for above stakeholders

12 What are main purposes of the activities conducted by your organization?

A Provide communication opportunities for colleagues who work in the same field

B Propagandize scientific knowledge to public

C Promote social reputation

D Protect ecological environment

E Strengthen public awareness of environment protection

13 With what frequency does your organization organize activities aimed at ecological environment protection?

A Once each month B At least 5 times each year

C Once each year D A-periodically

14 At what the target people do the activities of your organization mainly aim?

A Residents B Staff in enterprises C Officials D Students

E Tourists F Craft brother (please give examples)

15 What kinds of ways do you adopt to organize activities?

A Picture-based exhibition B Scientific seminar

C Field activities of protection the Yellow Sea

D Discussion with officials E Submit suggestion to related institutions

F Other_____

16 Do you think your organization's activities often get support from public?

A Strong support from the most public B Support from many public

C Less support from some public

17 Are you confident in improving the ecological environment condition of the Yellow Sea through organizing activities?

A Yes, very confident B Confident

C Uncertain D Unconcern

18 What do you think are the main problems regarding Yellow Sea management activities of government departments?

19 How much would you like to donate for restoration of the environment of the Yellow Sea? (_____ CNY each year)

Governance Analysis

National Report– Republic of Korea

Dong-Oh Cho

Dong-Hyun Choi

Korea Maritime Institute

I. Background of Assignment

The Yellow Sea Large Marine Ecosystem (YSLME) is one of the largest semi-enclosed bodies of waters in the world, which is bordered by China and the Korean Peninsula. It is also one of the largest shallow continental shelf areas in the world, covering an area of about 400,000 km^2 at an average depth of 100m (Tang, 2003).

The Yellow Sea LME is considered a Class I, highly productive ecosystem (>300 gC/m^2/year) based on SeaWiFS global primary productivity estimates (NOAA, 2003). The Yellow Sea LME is an important global resource, supporting substantial populations of fish, invertebrates, marine mammals and seabirds. The fauna in the Yellow Sea LME is recognized as a sub-East Asia province of the North Pacific Temperate Zone (Zhao, 1990).

However, the rapid economic development and huge population (about 600 million people) in the bordering coastal area have overexploited the marine resources and degraded the marine environment of the Yellow Sea. The major environmental stress and its results are as follows: (i) Overexploitation and illegal fishing have greatly depleted the stock of fisheries in the YSLME; (ii) Land-based pollutants have degraded the water quality, reduced the biodiversity and productivity, and have been the major causes of Harmful Algal Blooms (HAB); (iii) Reclamation of wetlands and coastal waters for agricultural use, and for building coastal cities, ports and industrial complexes has been the major cause of loss of habitat and spawning areas, which also have resulted in loss of biodiversity and productivity; (iv) Recent sand mining in the coastal waters has degraded valuable habitats and has resulted in coastal erosion; (v) Marine debris, such as derelict fishing gear and styrofoam, remain in the water and surface for a long time, damaging the marine environment, and causing maritime accidents in the Yellow Sea; (vi) The demand for use of the ocean as a place to dump landfill waste has increased and degraded water quality of Yellow Sea; (vii) Finally, maritime traffic has increased and caused oil pollution accidents, which has been a major cause of loss of biodiversity and productivity.

In the approved Implementation Plan of the UNDP/GEF Yellow Sea Project, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem," one of the main activities of the Investment Component is to identify stakeholders

and assess their capacities to contribute to the Transboundary Diagnostic Analysis (TDA). The Regional Working Group for the Investment Component (RWG-1) agreed at its second meeting (Jeju, Korea, 14-17 November 2005) to implement a Governance Analysis which addresses issues of not only stakeholders but also institutional arrangements, and legal and policy frameworks.

The objective of this task is to conduct the Governance Analysis so as to understand the underlying root causes of the Yellow Sea's ecosystem problems, through the analysis of the whole political environment that affects environmental problems including: stakeholders, institutions, laws, policies, and projected investments. The results of the analysis will provide a basic foundation for identifying possible interventions, the key inputs to the TDA, as part of causal chain analysis, and to the Strategic Action Programme (SAP), as management suggestions used in the preparation of the SAP.

II. Review of Preliminary Governance Analysis

1. Major Marine Ecosystem Issues

1) High Demand for Intensive Coastal Development

The Korean government expected intensive coastal development for agriculture, industrial complexes, ports, and coastal cities in the implementation of the National Economic Development Plans. Therefore in 1962, the Korean government enacted "the Public Water Reclamation Act" as soon as "the First National Economic Development Plan" started.

Then why was coastal development popular? The main reasons are low cost for securing sites and simple administrative procedures: (i) The costs of reclamation of wetland and coastal water for development are far cheaper than purchasing land from many private owners; (ii) Administrative procedures, such as solving conflict, compensation fund raising, legal and administrative support, is very simple in comparison to purchasing land from many private owners.

2) Loss of Wetlands

Korea has very large wetlands (2,393 square km) in comparison with land area. The portion of wetland to national land is 2.4%. Wetlands are very important fishery habitats and produce various and large quantities of fish. However, from 1987 to 1998 about 25.3% of total wetlands were lost due to reclamation or filling for expanding of agriculture land or making industrial complexes. It is said that more than 40% of the total wetlands were lost since 1945.

The reclamation and infilling of tidal wetlands, carried out at a large scale mostly on the west coast, has caused the loss of important marine habitat and fishing grounds. According to the assessment by Ministry of Maritime Affairs and Fisheries (MOMAF) (1998), the total area of Korean coastal wetlands diminished by 30-40% since 1987, and only 2,393 square kilometres of wetlands were left in the west and south coasts. Also the decentralization of administrative power and responsibility gave

regional governments strong incentives to reclaim areas to develop a regional economy and income tax base.

The high demand for intensive coastal development will increase pressure to reclaim wetland areas. For example, the current Saemanguem Reclamation Project is building a dyke of 33 km to create a 28,300 ha of land for rice production.

3) Declining Water Quality

Over the last three decades, various pollutants, which were produced by industrial activities and municipalities located along coastal areas, have been discharged into the coastal waters. They have imposed cumulative impacts on coastal ecosystems and caused serious problems of eutrophication, red tides and mass mortality of marine organisms. Since 1991, coastal water quality measured by the COD was maintained at the second-class standard. Although the COD level showed a decreasing annual trend, the level of nitrogen and phosphorus, which are the main triggering factors of red-tides, are much higher than the standard.

With the increased activity of cargo transported by ships, Korean marine waters suffered approximately 300 oil-spill accidents, annually. The spill accidents were mostly from oil-tankers, and the major cause was carelessness by crew members.

Korea entered into the London Dumping Convention in December 1993, which came into force in January 1994. However, ocean dumping has increased continuously due to population growth in the coastal area and economic and industrial development.

4) Declining Nearshore Fisheries

Total fisheries products have decreased continuously from a peak of 3.5 million tons in 1994. All fisheries products, such as those from ocean and coastal fishing vessels, aquaculture, and fresh water, have decreased. The main reasons are over-exploitation, deterioration of water quality, and loss of areas for aquaculture due to reclamation. Although aquaculture is a very important alternative, frequent red tides and deteriorated water quality make it very difficult. MOMAF plans for a rate of aquaculture increase in total products from 27% in 2000 to 45% in 2030.

Compared to the decrease of total fisheries products, the domestic demand for fisheries products increased rapidly. As a result, the rate of fisheries products to domestic consumption decreased continuously from a peak of 138% in 1980.

5) Decreasing Population of Fishermen

Despite strong government policies

and support, the number of fishermen employment and population of fishermen have continually decreased. The main reasons are a decrease in quality of life for fishermen. Fishermen's income per capita increased 107.9% in ten years from 8,079,000 Won in 1989 to 16,794,000 Won in 1998. However, in the same period, the per capita income for agriculture and urban workers increased 117.2% and 162.5% respectively.

6) Limited Public Access

There are many forecasts that coastal tourism would increase rapidly as income increases and work hour's decrease, which would require public access to the coastal zone. However, public access is limited seriously due to unplanned development and limited recognition for public access. Designated places for tourism by law in the coastal zone are national parks, provincial parks, municipal parks, and various tourism purpose districts. Most of them are public beaches for swimming in the summer. Surveys revealed that there were about 100 natural places remaining. However, those areas were not developed with the environment in mind. Many motels, restaurants, and various pleasure facilities deteriorated water quality, have destroyed scenic value, and limited public access to the coastal zone. Also most harbours, fishing harbours, industrial complexes, and military facilities were constructed for their own purposes and limit public access to the coastal zone.

7) Intensifying Industrial Urban Development

Korea's coastal lands have been very densely used. A total of 22 industrial complexes, 25 coastal cities, 50 harbours, and 415 fishing harbours are sited in the coastal zone. Most of the chemical complexes and steel factories are situated on coastal lands. In addition all shipbuilding docks and many generators are situated in the coastal land.

About 33% of the total population lives in coastal areas. Forecasting predicts that coastal populations will increase to 40% of the total population and coastal GDP will increase to 50% of the total GDP in 2030.

8) Growth in Tourism Facilities

Demand for tourism and leisure has increased rapidly with an increase in income and leisure hours. Inland tourism is limited due to traffic jams, crowds of travellers, and inconvenient facilities. Coastal tourism is an emerging industry due to the crowded inland tourism. Yacht leisure is predicted to become popular in 2010 when GNP per person is approximately US$15,000 and ocean leisure will become popular when GNP per person is about US$20,000.

Generally coastal tourism is recognized as

an environmentally friendly industry and contributes to the local economy. Therefore, local governments are strongly planning to invest in coastal tourism for local economic development, employment increases, and tax revenue. However, most local governments plan large tourism facilities without considering the impacts on the coastal ecosystems.

2. Socio-Economic Data

Compared to the country's area of 99,291 square kilometres, Korea has a long coastal line of 11,542 kilometre and numerous islands. Korea's coastal sea is composed of the East Sea, the South Sea, and the Yellow Sea. The management area of the above coastal sea of 447,000 square kilometres is about 4 times of the national land area. The continental shelf of the South and Yellow Seas is 345,000 square kilometres. Korea's wetlands are one of the five biggest wetlands in the world and are considerably important habitat for fisheries and marine ecosystem.

Korea's coastal areas have been highly used. A total 22 industrial complexes, 25 coastal cities, 50 harbours, 415 fishing harbours are sited in the coastal zone. Most of the chemical complexes and steel factories are situated in coastal areas. In addition all shipbuilding docks and many power generators are situated in these areas. About 33% of the total population lives in the coastal area in Korea. Forecasts of the coastal population state an increase to 40% of the total population and a 50 % increase in coastal GDP in 2030.

Korea's coastal waters have also been used for coastal zone development, fisheries industry of fishing vessels and aquaculture, vessel traffic, ocean dumping, pollution of land-based and sea-based sources, and recreational activities.

Therefore, this "Socio-Economic Data" shows much pressure to the YSLME, such as over-exploitation and decrease of fisheries stock, heavy vessel traffic and oil spill accidents, dense development and degradation of coastal water quality.

Table II-1 Major Particulars and Usage of Korean Coastal Area

Classification	Unit	Status	Remarks
1) Land Area - Publicized Area - Land - Sea	km² km² km²	 99,915 6,196	- Natural Environment Consecration 5,093 km² (82.2%) ※ Fisheries Resources Consecration Area 2,953 km² (31)
2) Total Population	million	47	- Coastal Population 13 (27.2% of total population)
3) Length of Coastal Line		11,914	- Land 6,228(52.3%), islands 5,686(47.7%)
4) Coastal Facilities	ea	3,014	- Total length 2,075 km² (33% of land shore line)
5) Designated	ea	51	- International port 28, Coastal port 23
6) Fishing Port		2,266	
7) Islands		3,170	- Non-livings island 2,691(85%), Living island 479(15%)
8) Tideland		2,393	- West coast 1,980(83%), South coast 413(17%)
9) Sea Surface -Territorial water(12n.m.) - EEZ (200n.m.) - Continental Shelf - Within 3n.m.		 71 447 345 13	 - 72% of land area - 4 times of land area - 3.5 times of land area - 13% of land area, 18% of territorial water

Sources: MOMAF

Table II-2 Population and Families in the Coastal Areas (2003)

Classification	Population (thousand)	Family (ea)	Population per Family	Area (km²)	Population Density (person/km²)	Administrative District (ea)
Nationwide(A)	47,925	15,436,263	3.10	99.915	479	234 Cities, Towns, Autonomous Districts
Coastal City, Town, District (B)	12,741	4,267,958	2.99	32,026	398	78 Cities, Towns, Autonomous Districts
B/A(%)	26.6	27.6	96.5	32.05	83.1	33.3

Sources: MOMAF

Table II-3 Designation of Special Management Marine Area and Marine Environment Conservation Area

Classification	Name	Area(km²)	
		Land	Coastal
SMMA	1) Coastal waters of Busan	505.77	235.73
	2) Coastal waters of Ulsan	144.29	56.56
	3) Coastal waters of Kwangyang	334.56	131.37
	4) Coastal waters of Masan	157.66	142.99
	5) Coastal waters of Siwha-Inchon	576.12	605.76
	Sub-total	(1,718.40)	(1,172.41)
MECA	1) Bay of Kamak	101.13	154.17
	2) Bay of Deugyang	234.51	315.74
	3) Bay of Wando-Doam	431.50	338.48
	4) Bay of Hanpyung	165.87	140.73
	Sub-total	(933.01)	(949.12)
Total		2,651.41	2,121.53

Source: MOMAF

Table II-4 Oil Spill Accidents (1986~2005)

	`86	`87	`88	`89	`90	`91	`92	`93	`94	`95
Accident	158	152	158	200	248	240	328	371	365	299
Oil	2,617.6	482.4	1,058.2	368.0	2,420.6	1,257.0	2,942.5	515,460.3	4,565.1	15,775.9
	`96	`97	`98	`99	`00	`01	`02	`03	`04	`05
Accident	337	379	470	463	483	455	385	297	343	
Oil	1,720.1	3,441.0	1,050.2	386.9	583.0	668.1	409.9	1,457.7	1,461.7	

(Unit : case, kℓ)

Table II-5 Ocean Dumping

	Quantity of Annual Dumping										
	`95	`96	`97	`98	`99	`00	`01	`02	`03	`04	`05
Total	4,170	5,014	5,643	5,976	6,444	7,104	7,671	8,475	8,874	9,749	9,929
West Sea (Byung)	1,049	1,614	2,013	2,429	2,380	2,423	2,390	2,424	2,406	2,397	2,383
East Sea (Byung)	1,739	1,997	2,216	2,140	2,325	2,862	3,394	4,088	4,372	5,262	5,883
East Sea (Jung)	1,382	1,403	1,413	1,407	1,739	1,819	1,887	1,963	2,096	2,090	1,663

Sources: MOMAF (Unit: thousand Ton)

Table II-6 Water Quality in the West Sea

Year	Temp (℃)	Sal	pH	DO (mg/L)	COD (mg/L)	T-N (mg/L)	T-P (mg/L)	(mg/L)	Transpa -rency (m)
1997	14.4	30.04	8.04	7.97	1.37	0.328	0.018	48.6	1.7
1998	15.0	28.84	8.09	8.73	1.36	0.313	0.021	34.5	1.9
1999	15.7	29.00	7.86	8.19	0.95	0.319	0.024	20.5	2.4
2000	13.8	30.11	7.97	7.68	1.25	0.216	0.022	21.0	2.0
2001	14.6	31.12	7.99	8.10	1.35	0.238	0.060	25.7	1.7
2002	13.9	30.45	8.10	8.38	1.33	0.472	0.063	23.0	1.6
2003	14.2	29.96	8.02	9.16	1.73	0.627	0.047	21.2	2.1
2004	14.6	30.18	8.13	9.44	1.91	0.550	0.060	29.2	1.6
2005	14.9	30.41	8.12	8.95	1.52	0.752	0.060	23.2	1.6

Table II-7 Clean-up of Marine Debris

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
quantity	328,965	343,845	107,727	87,340	65,002	203,854	236,558	87,517	98,730

Sources: MOMAF

Table II-8 Vessels by Fishery

		2000	2001	2002	2003	2004
Total	Number	95,890	94,935	94,388	93,257	91,608
	Power Vessel	89,294	89,347	89,327	88,521	87,203
	Non-power Vessel	6,596	5,588	5,061	4,736	4,405
	GT	923,099	884,853	816,563	754,439	724,980
	Power Vessel	917,963	880,467	812,629	750,763	721,398
	Non-power Vessel	5,136	4,386	3,934	3,676	3,582
Distant Waters Fisheries	Number	597	568	543	517	491
	GT	349,420	335,552	318,855	273,086	261,237
Off-shore, Coastal Fisheries	Number	68,629	67,990	67,411	66,698	66,063
	GT	397,868	386,181	362,163	344,992	330,203

(Unit: vessels, ton)

Table II-9 Vessels by Province

		2000	2001	2002	2003	2004
In-cheon	Number	2,357	2,369	2,396	2,450	2,386
	GT	45,399	43,922	41,459	40,349	37,800
Gyeonggi	Number	2,202	2,196	2,209	2,335	2,336
	GT	3,440	3,489	3,819	4,301	4,648
Chungnam	Number	6,643	6,695	6,620	6,585	6,517
	GT	19,666	21,161	21,808	22,006	22,231
Jeonbuk	Number	4,979	4,936	4,844	4,792	36,095
	GT	27,772	26,164	20,268	18,504	101,646
Jeonnam	Number	35,820	36,303	36,628	36,834	36,095
	GT	115,036	110,884	108,997	103,309	101,646

(Unit: vessels, ton)

Table II-10 Number of Fishermen by Province

		2000	2001	2002	2003	2004
No. of Persons		140	137	128	125	122
Province	Incheon	5	5	4	4	3
	Gyeonggi	3	3	3	3	3
	Chungnam	17	17	17	17	16
	Jeonbuk	8	9	7	7	7
	Jeonnam	52	51	46	45	45

(Unit: 1,000 persons)

Table II-11 Fisheries Income

	2000	2001	2002	2003	2004
Fisheries Income	10,078	11,087	10,165	10,741	11,959

(Unit: 1,000won)

Table II-12 Fisheries Consumption per Capita (kg)

	2000	2001	2002	2003	2004
Total	36.8	42.9	44.5	44.7	-

(Unit: kg/year)

Table II-13 Exports and Imports of Fishery Products

	2000	2001	2002	2003	2004
Exports	1,504,470	1,273,619	1,160,435	1,129,385	1,278,638
Imports	1,410,598	1,648,372	1,884,417	1,961,145	2,261,356

(Unit: $1,000)

Table II-14 Economic Importance of Fisheries (GDP Contribution)

	2000	2001	2002	2003	2004
GDP	578,664	600,866	642,748	662,655	693,424
Fisheries	2,155	2,164	2,000	2,006	1,966
GDP Contribution	0.4	0.4	0.3	0.3	0.3

(Unit: Thousand million won, %)

3. Preliminary Governance Analysis

The purpose of the "Preliminary Governance Analysis" is to give a basic understanding of governance issues surrounding the Yellow Sea's environmental problems. It consists of four components: Biodiversity; Ecosystem; Fisheries; and Pollution. Generally each component consists of its problems, impacts (environmental impact or socio-economic impact), causes (immediate causes (technical causes), underlying causes, root causes), and a governance analysis. A review of the results of the "Preliminary Governance Analysis" is as follows.

1) Clear Definition of the Four Components

The "problems" of the four components are not clearly distinguished based on their definitions. For example, "Habitat Loss" and "Habitat Conversion" of the "Biodiversity Component" are associated with "Ecosystem Components." The "Habitat Conversion" of the "Biodiversity Component" and "Habitat Modification" of "Ecosystem Components" are connected. In fact, it is better to review the "Preliminary Governance Analysis" using one large concept.

2) Clear Definition of "Problems"

It is not always clear whether the "Problems" of each component are limited to the natural and physical phenomenon or if it includes issues related to management practices. Most of the "Problems" are related to the natural and physical phenomenon, however, the "Uncontrolled Aquaculture Practices" and "Inadequate Capacity to Assess Ecosystem" of "Fisheries Component" are related to management practices. If the "Problems" of each component include management practices, then the existing "Problems" should be re-analyzed. This project has analyzed many problems related to management practices in the YSLME.

3) A More Practical Model

The structure of the "Preliminary Governance Analysis" is so theoretical that it is useful to understand the basic problems of the YSLME, but it is not practically useful in conducting this project. For example, the "immediate causes, underlying causes, and root causes" have not been distinguished practically. It is suggested that more practical mode should be developed.

4) Factors in Governance Analysis

In this project, the Governance Analysis is conducted by grouping (1) Stakeholders Analysis, (2) Institutional Analysis, and (3) Legal and Policy Analysis, which was very useful in the broad governance analysis. Therefore, it is suggested that the same groupings are used.

5) Governance of the Biodiversity Component

In addition to the results of the existing "Governance of Biodiversity Component," a general summary finds that there is weak management because relevant laws or programs are absent and a needed comprehensive survey or marine biodiversity is absent due to the lack of prioritization of the marine environment.

6) Ecosystem Component

In addition to the results of the existing "Governance of Ecosystem Component," a general summary finds that terrestrial ecosystem are highly prioritized, while marine ecosystem are not, there is weak management because relevant laws or programs are absent, and there is limited recognition of the marine ecosystem by NGOs and the public.

7) Fisheries

In addition to the results of the existing "Governance of Fisheries Component," a general summary finds that the main needs include addressing illegal fishing by domestic and foreign vessels, addressing over-exploitation, and conducting a fisheries stock assessment.

8) Pollutants

In addition to the results of the existing "Governance of Pollution Component," a general summary finds that there is weak management of land-based sources of pollutants and that dense development is encouraged at the local level.

III. Stakeholder Analysis

1. Overview

Under an ecosystem management concept of expanded inclusiveness, a stakeholder is anyone who has an interest in the topic at hand and wishes to participate in decision making[1]. It is observed that major stakeholders' interests, decision-making process and means, and ability of decision-making in YSLME Governance are as shown in Table III-1.

1 Meffer (2002) suggests that stakeholder fit into one or more of five categories according to the variety of interests : (1) People who live, work, play, or worship in or near an ecosystem, (2) People interested in the resource, its users, its use, or its non-use, (3) People interested in the process used to make decisions, (4) People who pay the bills, (5) People who represent citizens or are legally responsible for public resources.

Table III-1 Summary of Stakeholders in YSLME Governance

Stakeholder	Interest	Decision-making process/means	Ability to make or influence decisions
Congress	- Secure the goal of the committees of Congress in which the Congressmen are members. - Protect the interest of the region where the Congressmen were elected.	- Policy and legislation discussion in the relevant committees. - Cast a vote in the general assembly.	- Legally authorized for legislation, annual national budgeting and settlement of account.
Central Government	- Secure their own ministries' goals. - MOCT : Construction-oriented - MOMAF: Dual function (development and conservation): fisheries promotion, port construction, marine environmental conservation. - MAF: Agriculture (reclamation for paddy fields). - MOE: Environmental-oriented.	Policy issues filing→ Inter-vice-ministerial meeting→ Inter-ministerial meeting→ decision.	Ministers are members of the cabinet which decides high-level policies.
Industry	- Secure their own interests mostly through representing organizations (associations, corporations)	- Participation in public hearings. - Document review member ship of special committees	- Specific importance of the industry in the national economy (oil, fisheries, shipping) - Political influence with voting power in general and presidential elections
NGOs	- Conservation of the environment to be endowed to next generations	- Demonstration - Protest campaign - Outreach program	- Solidarity among (small)NGOs - Public support
Scholars and Journalists	- Research, writing, speech	- Research report, lecture, speech, seminar	- Decision-makers' support - Public support

2. Structure of Stakeholders

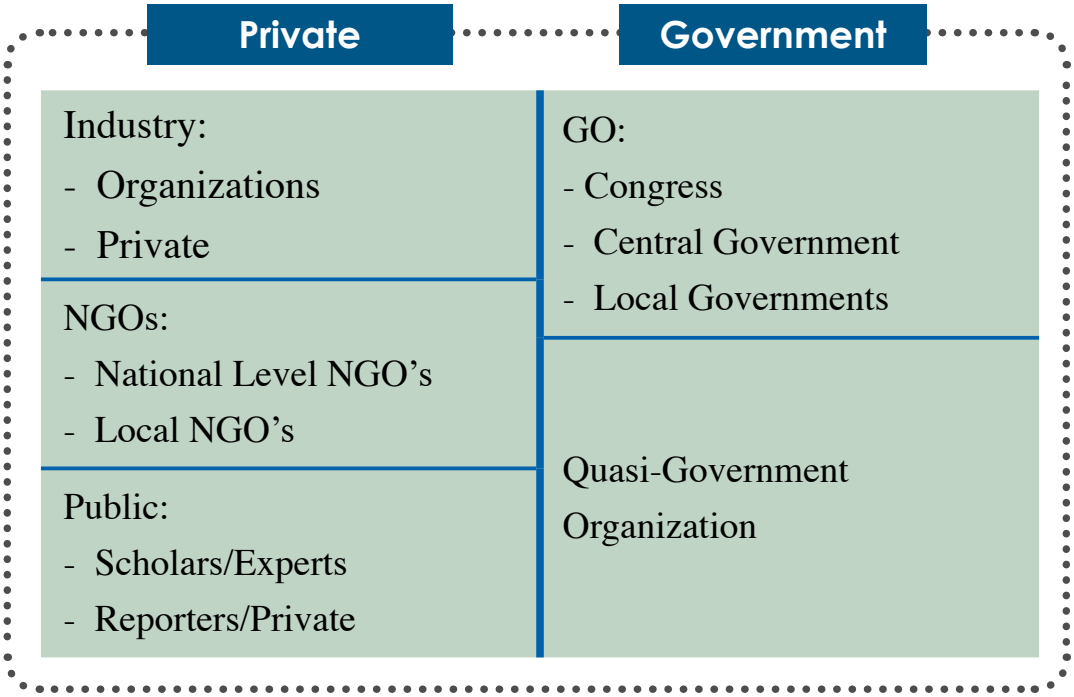
YSLME stakeholders can be divided into the government sector and the private sector in Korea. The government sector can be divided into GOs (Government Organizations) and Quasi-Government Organizations. GOs are stakeholders, which make decisions on YSLME, and can be divided into the congress, central government agencies, and local government agencies. Quasi-government

organizations are stakeholders, which are established, owned, and managed by government organizations. The quasi-government organizations do not make decision on YSLME, but participate in decision-making in depth, such as the development of policies, recommendations on policies, analysis of laws and policies, feasibility studies, etc.

The private sector includes stakeholders, who are affected directly by government sector decision-making on the YSLME. The private sector can be divided into three categories: Industry, NGOs, and the Public. The industry includes fisheries, shipping and logistics, ports, oil mining, tourism, R&D, marine environment industry, etc. Most industries have representative organizations, to protect the benefits of the industry.

NGOs are stakeholders who are also affected by decisions on the YSLME and are representative of the general public. Recently environmental NGOs are active in protecting the marine environment and its ecology. The general public includes stakeholders, who are affected and interested in decision-making on the YSLME. scholars, researchers, experts, and reporters are representative of the public.

Fig. III-1 Structure of Stakeholders



3. Governments

The governments sector can be classified as follows: (i) Ministry of Maritime Affairs and Fisheries (MOMAF) and its subsidiaries, such as Korea Coast Guard (KCG,), National Fisheries Research and Development Institute (NFRDI), National Oceanographic Research Institute (NORI), (ii) other relevant institutes, such as Congress, Ministry of Agriculture and Forestry (MAF), Ministry of Construction and Transportation (MOCT), Ministry of Environment (MOE), and local governments, (iii) quasi-governments, such as research institutes and universities.

MOMAF and its subsidiaries are directly in charge of the marine environment and resources management, such as enactment of relevant laws and establishment and implementation of government programs and polices. The Congress is in charge of enactment and revision of relevant laws and regulations and also supervises the effectiveness of implementation of government programs and policies. The Congress also deliberates and authorizes government budgets.

Although MOMAF is in charge of the marine environment and resources management, MAF, MOCT, and MOE have strongly effected decisions made especially in the marine environment and in coastal zone management. The central governments, such as MOMAF, MOCT, and MOE, have delegated much of their jobs to local governments, especially implementation of policies, such as fisheries management. The research institutes and universities are in charge of suggestion of policy recommendations and R&D on the marine environment and resources management.

However, MOMAF is the most responsible government organization for the marine environment and resources in Korea. However, most of the central governments are involved in the decision-making on important marine environment and resources program. For example, the “Marine and Fisheries Development Basic Plan” (Korea’s Oceans Policy) was established in 2004 by most of the central governments.

More details in governments sector as stakeholders are described in Section IV.

4. NGOs and the Public

1) Evolution of Coastal NGOs in Korea

Nongovernmental organizations (NGOs), including environmental NGOs, in Korea have a very strong impact on political decisions and public opinion. Korea's government supports activities of environmental NGOs based on the "Basic Law on Environment Policy," which regulates in Article 16-2 as follows: (1) the central government and local governments should take measures to prove information to enhance environmental NGOs voluntary activities related to environmental conservation; (2) the central government and local governments can give financial support to environmental NGOs when they purchase and manage scenic and valuable lands for conservation.

However, most NGOs have not been interested in the coastal environment until recently. Most of them have focused on the problems of water quality on land, air pollution, industrial waste, among other land based environmental issues.

However, recently, they have recognized the importance of the coastal marine environment and its resources. This may be due in part to the severe damage caused by several big oil spill accidents, including the Sea Prince Accident in 1995 and the deterioration of water quality resulting from the Lake Shiwha Reclamation Project. Especially since the failure of the Lake Shiwha Project, several local NGOs have participated in the restoration of the Shiwha Estuary and the conservation of its wetland. These NGOs will be expected to be future stewards for the conservation of the Lake Shiwha along with experts and scientists.

Currently the public and most NGOs oppose large development projects in the coastal zone and conflict with development-related governmental policies, the majority of which are development projects in the coastal zone.

For example, the development of the Young San River was the largest reclamation project in Korea before the Lake Shiwha Project and was scheduled to be built over the course of five consecutive development plans. However, in the face of strong opposition from environmental groups and the public after the environmental disaster of the Lake Shiwha, the Fourth Young San River Development phase was officially cancelled in 2000 by the central government. This fourth phase would have completed a 126 square kilometres coastal development that was intended to

provide land for agriculture.

After the success of the opposition to the Fourth Young San River Development Project, the public and NGOs also opposed the Saemangeum Reclamation Project purporting that it would bring another environmental disaster similar to the Shiwha Reclamation Project. Also they argued that the Saemangeum Reclamation Project had no feasibility, that is, the feasibility studies did not incorporate the benefits of wetlands. However, unlike the Fourth Young San River Development Project, the supporters for the Saemangeum Reclamation Project were persistent and argued that the feasibility study was accurate. Most supporters for development of the Saemangeum Reclamation Project were from Ministry of Agriculture and Forestry (MAF) , the local government of Jeollabuk-Do, and the residents, who believed the project would bring beneficial economic development.

2) Major Environmental NGOs

There have been many NGOs in Korea who have a very strong impact on political decisions and public opinion. However, there are only two nationwide environmental NGOs with environmental protection as their goal: the Korean Federation for Environmental Movement (KFEM) and the Green Korea United (GKU). KFEM is the largest environmental NGO that have 47 local branches and 85,000 members. Although KFEM was established in 1993, its former organization, the Korean Research Institute of Environmental Problems, was established in 1982. GKU was established in 1991 and has 15,000 members and many local branches in Korea.

In addition to KFEM and GKU, there are many other NGOs, with a focus in the marine environment. Also many local YMCAs in coastal areas are active in the marine environment and its resources.

NGOs` interest is based on the belief that if marine ecosystem is degraded, restoration work is difficult or impossible. As Gray K. Meffce put it, some of the public are interested in total protection of resources for its intrinsic value or ecosystem functions (Gray K. Meffee et. al., 2002). They may object to its extreme uses as commodities (e.g. hunting and fishing) or as an amenity (e.g. hiking and boating). NGOs` opposition activities are accelerated since they are linked with local people whose daily individual life and wellbeing are directly connected with marine ecosystem. It has been observed that many national and local NGOs are trying to protect the values of marine ecosystem, such as therapeutic recreation, spiritual inspiration, or

solitude. For example, wetlands and watershed provide marine biodiversity, riparian habitat, and beautiful scenery for beach tourism and field education sites

5. Industry Representatives

There are many industries, which are stakeholders of Yellow Sea marine environment and resources, such as fisheries, shipping, oil, port, mining, tourism, and logistics industry. However, in this review, fisheries, shipping, and oil industry are analyzed because of the followings:

(i) Port industry: All the Korean ports are owned and constructed by the Korean government (MOMAF) and most of them are also managed by the government. So the port industry as stakeholders is assumed to be included into government sector.

(ii) Mining industry: At present there is not any mining in the Korea jurisdiction of Yellow Sea except sand mining. The sand mining is described in detail in Section V.

(iii) Tourism industry: At present the largest tourism in Korea is beach swimming while recreational fishing are just in the early stage. Although local governments have much interests in marina, it is also in the early stage and the private sector is hesitated in the much invest in marina. So at present the tourism industry does not much affect the marine environment and resources management.

(iv) Logistics industry: The logistics industry is included in the shipping industry.

1) Fisheries Industries

(1) Fisheries Cooperatives [1]

Representing the fishing industry are three cooperatives: the National Federations of Fisheries Cooperatives; Regional Fisheries Cooperatives; and Fishing Village Cooperatives. The fishing village cooperative was founded in 1962 after the central and regional fisheries cooperatives were established. The main role of the fishing village cooperatives is managing commonly held fishing grounds and co-op facilities. As the main economic organization of the fishing community, it plays an important social function of organizing and representing local fisheries households.

Before the cooperative was organized, village councils under the leadership of

2 So-Min Cheong, Managing Fishing at the Local Level: The Role of Fishing Village Cooperative in Korea. Coastal Management, 32:191-2002, 20045.

village chiefs led community enterprises. Once fishermen established their own cooperative, the economic function of the village council was transferred to the village cooperative, and the council was left with administrative duties. Other changes occurred when several communities merged to produce a fishing village cooperative. If these communities did not get along in the past, the management of commonly held local fisheries resources was difficult. They might fight over the distribution of earnings from fishing and the way fishing grounds should be operated.

The cooperative structure is the result of a top-down process set in motion by the national government. The government brought it to life with subsidies and regulations in 1962 and established three types of cooperative organizations: the National Federation of Fisheries Cooperatives, Regional Fisheries Cooperatives, and Fishing Village Cooperatives. The state initially exercised its control over the national cooperative by appointing the president of the national cooperative, giving subsidies, and defining cooperative regulations, but its role has diminished over time. The president has been elected through direct vote since 1988 and the cooperatives have generated up to 80% of their funds since the mid-70s. Currently, the main function of the National Federation of Fisheries Cooperatives located in Seoul is the servicing of credit and financing through cooperative banking.[3]

The Korean fisheries cooperative was established to replace the exploitative middlemen dominating the capital and distribution markets, to organize dispersed fishing communities, and to upgrade the productive and social status of fishermen. The hierarchical cooperative system placed the local cooperative under the supervision of the regional cooperative, and the regional fisheries cooperative initially played an important role in local resource management. Sixty-six fisheries regional cooperatives, based on geographic units, were responsible for selling fish products, training, granting loans, and managing fishing rights; essentially, regional cooperatives managed local common fishing grounds. The fishing village cooperatives paid a user fee to the regional fisheries cooperative and worked on village fishing grounds, since the use of village fishing grounds was restricted to members of the regional fisheries cooperative. Restricted access and user fees, however, generated discontent among fishing village cooperative members.

3 NFFC has three businesses: (1) Economic business, such as cooperative purchases of materials for fishing vessels, cooperative sales, and strengthening logistic functions; (2) Credit business, such as management of credit loan and foreign exchange; (3) mutual aid business.

The government gradually ceded control of local fisheries resources to the fishing village cooperative. The change in fisheries regulations in 1975 relinquished regional control of local fisheries resources and granted local fishing rights to the fishing village cooperative. For example, the 1972 revision allowed the fishing village cooperative to obtain a license from the government to retain common fishing grounds and fixed net fishing grounds. Further, the revision in 1975 and 1977 gave priority to fishing village cooperatives to manage common fishing grounds and aquaculture sites. A 1981 revision also stipulated that if an individual fishing right in the common fishing ground expired, fishing village cooperatives had priority in acquiring the fishing right. Control of village fishing grounds, consequently, was transferred from the regional fisheries cooperatives to the local fishing village cooperatives. This trend was motivated by democratization in fishing operations and the regional cooperatives' efforts to shrink their size of operation.

Once the resources use right of the common fishing ground was transferred to the fishing village cooperatives, the regional cooperatives no longer maintained a solid linkage to the local cooperative and could not exercise its power as before. Other than helping with the sale of fish products, the only real tie that remains between the fishing village cooperatives and regional cooperative is through membership. The regulations state that one must join the regional cooperative first to be a member of the fishing village cooperatives, but in reality, the fishing village cooperative does not accept fishermen who do not sign up with them first. Membership in the regional cooperative has henceforth become a mere formality.

With respect to the sale of fish products, fishermen no longer need to go to the regional cooperative to report and sell their catch. Changes in fisheries regulations abolished the fish sale reporting system, and fishermen are now free to sell their catch anywhere they like. This further weakened the connections between the regional cooperative and the fishing village cooperative.

Subsequently, other than sharing membership, most of the local operations and functions are separate from the national or regional cooperatives, though fishing village cooperatives are still officially linked to the national and regional fisheries cooperatives. This makes the fishing village cooperative the key local resource manger. The transfer of authority from the regional cooperative to the local cooperative indicates the state' s recognition of the critical role fishing village cooperatives play in local resource

management. The government now directly communicates with the fishing village cooperative on matters pertaining to local fisheries management.

It is generally noted that fishing ground has two aspects in consideration of its characteristics of property right(s): One is common property and the other is individual property right. The first is explained by the concept of the common property, of which conservation activities are less positive (the tragedy of the commons property). The second is based on the reality that the governmental approval of access to fishing grounds is regarded as civil property rights among fishermen. At present, the motivation of fishermen to respond to the restricted access to fishing grounds is to improve their poor livelihood. They might prefer more free access to strict restriction. One of the alternatives to solve this problem is to accelerate the development of marine ranching to increase fisheries resources as scheduled.

(2) KFIPA

In 1987 KFIPA (Korea Fisheries Infrastructure Promotion Association) was established for R&D and public relations for fisheries village and ports development and clean-up of coastal land and seas. KFIPA conducts the following functions: (1) R&D and outreach of fishing village and ports technologies; (2) Dredging of fishing ports and cleaning of coastal waters; (3) Management of fishing ports cleaning vessels; (4) Clean-up of marine debris in the coastal waters and fishing grounds.

2) Shipping Industry

(1) KSA

In 1960 KSA (Korea Ship owners' Association) was established for the interests of the ocean shipping industry, such as improvement of rights and interests of the industry, improvement of friendship of the industry, improvement of the economic and social position of the industry, and implementation of international activities. As of 2005, the member companies of KSA are 89 shipping companies. Its major function is: (i) research and study on shipping policies, tax, and the financial system, (ii) policy on demand and supply for seamen, (iii) policy on labour and management of seamen, (iv) international conferences, and (v) research and study on international marine insurance.

KSA's activities on the marine environment and resources are as follows: (i) prevention of maritime accidents and marine pollution, (ii) measures for incorporation of international maritime conventions; (iii) activities for marine environment conservation through regional

cooperation systems, such as ASF (Asian Ship owners' Association), (iv) seminars for maritime safety, and (v) participation in government decision-making processes.

(2) KSA

In 1962 KSA (Korea Shipping Association) was established with an interest in the coastal shipping industry. The KSA has been playing an important role both in improving the socio-economic position of its members and in developing the coastal shipping industry and implementing a set of comprehensive shipping-related tasks. KSA has 50 member companies. KSA does the following : (i) management consulting, investigation & research, and providing information, (ii) collective purchases of oil & other materials necessary for shipping, (iii) financial support and loans for businesses, (iv) mutual-insurance projects against disasters, (v) general management of passenger terminals, (vi) safety management for passenger ships, (vii) implementation of projects assisted or entrusted by the central or local governments, (viii) and implementation of other projects on behalf of its members.

3) Oil Industry

(1) KMPRC

The Sea Prince Accident of 1995 was the first Very Large Crude Carrier (VLCC) oil spill accident in Korea, which damaged huge areas of the coastal waters and was a shock both to the general public and government on the adverse impact of VLCC accidents. Its damage to the fisheries, aquaculture, and the marine environment was unimaginable. However, the government's response to the accident was inadequate because there was no established plan for a large oil spill and the resources for oil spill response were not adequate for a spill of this size. The Korean government established a task force team (TFT) to analyze the problems of oil spill management in Korea and to give recommendations for an effective plan. The TFT, consisted of researchers and experts on oil spill management, conducted a study in 1995 and recommended the following (NFFC, 1995): to establish an oil spill response organization, to ratify '92CLC/FC, to ratify OPRC, and to establish the Korean P&I Club.

In addition to TFT for oil spill management, the Korean government conducted a feasibility study on the establishment of an oil spill response organization in 1995. The feasibility study recommended that a special oil spill response organization should be established, which would be funded by the oil industry, such as oil refinery

industry, tanker industry, and shipping industry (KEEI, 1995).

Before the Sea Prince Accident, Korea's government agencies, such as the Korean Coast Guard (KCG), Maritime and Port Administration (MPA), Fisheries Administration (FA), and local governments, were in charge of oil spill response. So, the government agencies maintained resources for oil spill management, such as personnel, vessels, facilities and materials, and actually removed and cleaned all oil spilled from vessels at sea. However, the oil spill response by the government budget brings into the question the effectiveness of the principle of polluter pay (PPP), which is regulated in "the Basic Environment Policy Act" and "the Marine Pollution Prevention Act." Furthermore, the capacity of oil spill response, such as personnel and equipment from the government agencies, was always lacking for oil spill accidents.

After the Sea Prince Accident, the Korean government persuaded the oil refinery and tanker shipping industries to establish an oil spill response organization. As a result, the Korea Marine Pollution Response Corporation (KMPRC) was established in 1997. Being an exclusive oil spill response, KMPC has secured personnel and equipment, trained its personnel and advanced oil spill response technologies. KMPRC now has the capacity to respond to spills of greater than 7,000 tons.

Major Services: KMPRC has established a comprehensive system for protecting the marine environment based on a host of technologies, experiences, and manpower, implementing many tasks related to the marine environment. The main activities of KMPRC are as follows: (i) Oil spill response operation and collecting oil waste from vessels and oil storage facilities, (ii) Stockpiling and rental services of response materials and equipments; (iii) Operating waste storage and waste oil disposal facilities; (iv) R&D for oil spill response technology; (v) Maintaining and stationing Oil Spill Response Vessels (OSRV); (vi) Operating Port Cleaning Vessels and waste oil storage facilities; (vii) Clean-up of deposited marine debris in the coastal waters and fishing grounds.

Prospects: MOMAF is scheduled to establish a "Public Marine Environment Management Corporation" through the expansion of KMPRC, in order to facilitate comprehensive and professional management of the marine environment. MOMAF has revised the Marine Pollution Prevention Act (MPPA) to establish the "Public Marine Environment Management Corporation" and will present it to Congress in 2006.

Participation of Decision-Making: KMPRC does not make direct policy decisions on marine ecosystems, but participates in decision-making in the following ways: (i) KMPRC is under the supervision of MOMAF and submits reports to MOMAF regularly, which are important references for marine environmental management; (ii) KMPRC submits recommendations of marine environmental management to MOMAF; (iii) KMPRC participates in public hearing and in the process of relevant laws revisions and conducts feasibility studies on marine environmental management.

(2) KPA

The Korean Petroleum Association (KPA) was started in 1980 in recognition by both the government and business circles of the need to create a central entity for the oil refining industry to address the turmoil caused by the second oil crisis. KPA has now five regular member firms (SK Corporation, GS Caltex Corporation, Inchon Oil Refinery Co., S-Oil Corporation, and the Hyundai Oilbank Corporation), one special member firm (Korea National Oil Corporation) and other associate member firms.

Members of KPA are the major stakeholders in oil spills in the coastal waters in Korea and contribute much funding to the KMPRC, which it uses to prepare oil response resources, such as experts, vessels, equipment, and materials. Also members of KPA actively participate in the decision-making of management of KMPRC

6. Initiatives for Decision-Making

The government sector initiates feasibility studies, public hearings, expert and stakeholder committees, and public meetings for decision-making. However, the government sector has tended to utilize the mechanism for their benefit. The private sector participates and expresses their interests in the feasibility studies, public hearings, stakeholders committees, and public meetings for decision-makings. However, if they are not satisfied with the results, they then express their interests through mass-media or by demonstration.

Table III- 1 Initiatives for Decision-making by Private and Government Sectors

Private	Government
- Mass Media - Demonstration	- Feasibility Studies - Public Hearings - Stakeholder Committees - Public Meetings - Policy Outreach

1) Government Sector

(1) Feasibility Study

The Budget & Accounting Act and the Construction Technology Management Act in Korea regulates that the applicant, who applies for a project costing more than U.S. $50 million, must conduct an economic feasibility study. The government should permit the project only if the ratio of benefit-cost is more than one.

Also "Integrated Impact Assessment Law on the Environment, Transportation, and Population" mandates that an EIA (environment impact assessment) should be conducted on 17 projects including the development of ports, reclamation projects, and other projects that the minister of MOE (Ministry of Environment) recognizes to have important impacts on the environment.

Generally, the researchers of the feasibility and EIA studies have reporting conferences during research or at the final stages of the process. The stakeholders have opportunity to express their interests at the reporting conference. However, until now, the government sector has strong influence over the study and the private sector has weak power.

Example of Feasibility Studies: Before starting the Saemangeum Reclamation Project in 1991, the relevant government agency conducted the feasibility study on the Saemangeum Reclamation Project from1986 through 1988. However, as opposition against the project from various stakeholders became strong, the Prime Minister established PGJSC (Public and Government Joint Survey Committee) to conduct a feasibility study on the Saemangeum Reclamation Project again in 1999 through 2000 (PGJSC, 2000), which also brought additional conflicts because of its methodology. Among the disputes on the Saemangeum Reclamation Project included its controversial feasibility. As soon as the report was released, academics criticized the study (KSEE, 2000, Lee et. al., 2001, Pyo, 2001, 2003).

(2) Public Hearing

The government including the congress, central government, and

local governments usually holds public hearings on important public policy, to explain and present the new policies to get support from various stakeholders. At the public hearing, the stakeholders have opportunity to express their interests. However, the voices opposed to the new policies have little impact because time and opportunity to express their opinions is limited.

(3) Experts and Stakeholders Committee

Usually the government establishes the stakeholders and experts committees to analyze the present situation, future policy demand, and develop a new alternative when necessary. The committees are composed of various stakeholders including government officials, experts such as professors and researchers, industries, and the public. The stakeholders have much opportunity to express their interests in the committee.

(4) Public Meetings

In the case of a small project, the government sector has direct meetings to hear the voices from various stakeholders. During the meeting, the stakeholders have opportunities to express their interests, and the government can coordinate the stakeholders or establish a new policy.

2) Private Sector

(1) Demonstration

Usually the public and NGOs have demonstrations when they oppose the public policies or their interests are not properly considered in the policies. As democratization is developing quickly in Korea, many stakeholders have frequent opposition demonstration. The public and NGOs seem to believe that as large populations assemble in the demonstration and opposition is stronger, then the impact is also effective.

Marine environmental policies are not an exception. Today the public and NGOs oppose most reclamation projects by demonstrating. The most representative are those in opposition of the Saemangeum Reclamation Project, the Shiwha Reclamation Project, and the Fourth Young San River Development Project.

(2) Mass-Media

These days, mass-media has strong power to impact the general public, so most stakeholders including the government, business and industry, and NGOs like to utilize mass-media to explain and publicize their policy alternatives to get support from the general public. The marine environment is not an exception. When the public and NGOs opposed the

Saemangeum Reclamation Project, the mass-media, such as TV and newspapers, broadcasted the demonstration and got much interest from the public.

7. General Public Participation

Marine Debris Purchasing Program: Derelict fishing gear can entangle new fishing gear and create more derelict fishing gear. It is necessary to remove the existing derelict fishing gear. However, it is hard and costly to search and remove derelict fishing gear in vast fishing grounds.

So at a local level, Incheon City has established an "Incentive Program" that pays fishermen who collect and bring marine debris such as derelict fishing gear including other ship-based marine debris during fishing operations.

At first, when Incheon City implemented the program in 2002, the fishermen did not support the program because the fishermen did not fully understand the effect of the program, and collection of derelict fishing gear during fishing operation is time-consuming. However, Incheon City persuaded the fishermen, the owners of fishing vessels, and the Local Fisheries Cooperatives, and the fishermen have begun to support it. The quantity of collected marine debris by fishermen was only 380 cubic meters in 2002, but it increased to 882 cubic meters in 2003.

Learning from the local government of Incheon City, MOMAF has implemented the Incentive Program since 2003. The program applied to areas beyond 12 miles from the coastal line and fishing vessels registered in the Port of Busan, Yeosoo and Mokpo in 2003 and thereafter has expanded to areas within twelve miles of the coast and vessels registered at 12 major ports in Korea.

MOMAF, local governments, Fisheries Cooperative Unions, Korea Marine Pollution Response Corporation (KMPRC), Korea Fisheries Infrastructure Promotion Association (KFPA), and fishermen have participated in this project, and the role of each participating organization is as <Table III– 2>. In 2003, MOMAF implemented this program at three local municipals as a pilot project and the cost was shared by MOMAF alone. MOMAF expanded this project at 11 and 31 municipals in 2004 and 2005 respectively and the compensation costs have been shared by MOMAF and the local governments of 80% and 20% respectively. In 2004 total 1,707 million Won invested for purchasing 2,453 tons of marine debris, which means that the cost per ton is 696

Won. In 2005 total 1,842 million Won invested for purchasing 3,076 tons of marine debris, the cost per ton is 599 Won (Jung, et. al., 2006).

Table III – 2 The role of participating organizations

Organization	Role
MOMAF	- Selecting the project areas - Allocating the national fund estimate - Makings as project guide - - Supervising the project
Local municipals	- Making a locality estimate - Supervising the project
The fisheries cooperative union	- Purchasing marine waste from fisherman - Requesting the national funds - Distributing sacks to fisherman
KMPRC & KFPA	- Disposal of marine wastes - Making sacks and distributing it to the fisheries cooperative union - Supplying the national funds

Source: Jung, et. al., The result of The Project of Purchasing Marine Waste Pulled up during Fishing in Korea. In The 1st NOWPAP Workshop on Marine Litter. 8-9 June 2006, Northwest Pacific Action Plan (NOWPAP) and Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC).

Table III - 3 Results of Marine Debris Purchasing Program from 2003 to 2005

	2003	2004	2005
No. of places	3	11	31
Budget	731,072	1,706,641	1,841,513
Result of purchasing	578	2,453	3,076
Cost per ton	1,265	696	599

Source: Jung, et. al., 2006. (unit : thousand Won, ton)

MOMAF invested 6,893 million Won for collecting and removing 3,619 tons of marine debris deposited underwater in 2004 and 7,965 Million won for collecting 5,352 tons in 2005. This means that the costs per ton are 1,905 Won and 1,488 Won in 2004 and 2005 respectively. The works for collecting and removing marine debris deposited underwater need a fleet of vessels consisted of a waste collecting boat, a towing boast, and a crane barge, so the cost of the works are high. The costs for “Marine Debris Purchasing Program” are about 40 % lower than the collecting project and the program is successful in cost (Jung, et. al., 2006).

Table III-4 Results of collecting marine debris deposited underwater from 2004 to 2005

	2004	2005
Budget	6,893,070	7,964,946
Result of collecting	3,619	5,352
Cost per ton	1,905	1,488

Source: Jung, et. al., 2006. (Unit : thousand Won, ton)

4) Deregulation and Self-Management

Most programs in marine environment and resource management are top-down. The government enacts relevant laws and establishes programs by which the stakeholders, residents, community, and the general public should be in compliance. However, the jobs in marine environment and resources management are too large for a top-down system. In some cases, deregulation and self-management can be effective.

Fishing Village Cooperatives: As described in detail above, MOMAF has delegated more authority and responsibility to Fishing Village Cooperatives from Regional Fishing Cooperatives and National Federation of Fishing Cooperatives. As the Fishing Village Cooperatives have more authority and responsibility, they conduct more sustainable fisheries management in their fishing grounds.

Fisheries Self-Management Program: The traditional fisheries resources management initiated by the government has resulted in the following impacts: (1) it has weakened the self-reliance of fishermen; (2) therefore, the fishermen has sought government support and overexploited fisheries resources; (3) the conflicts between government and fishermen have deepened: (4) and it has not considered various characters of area, fisheries, and fishermen.

To address this, MOMAF established Fisheries Self-Management Program in 2001, which is described below:

First, involvement of fishermen in fisheries management is needed. In particular, market function should be applied in fisheries management. Second, deregulation and self-management are needed to incorporate various characteristics of areas and fisheries and interests of fishermen. Third, the resources and responsibilities should be

shouldered by both fishermen and the government. Fourth, government and fishermen should build mutual credit and keep a common philosophy in fisheries management.

Under the Fisheries Self-Management Program, the fishermen conducted self-management within the guidelines and permits of relevant laws and MOMAF supported administrative, technical, and financial to fishermen. In 2001, pilot projects of Fisheries Self-Management Program were implemented in 63 communities and with participation of 4,710 fishermen. In 2002, the projects expanded in village fisheries, aquaculture, and fishing vessels in 79 communities.

5) Honour Surveillance Program

Enforcement of laws and programs for marine environment and resources management is very difficult because of its complexity and the wide area of sea. Surveillance of illegal activities by stakeholders is very effective.

Honour Fishing Surveillance: The government designated 1,429 people as Honour Observers for Fisheries Resources Protection and 408 fishing vessels as Honour Surveillance Ships.

Honour Marine Environment Guard System: The Korean Coast Guard designated 846 persons of NGOs, 303 persons of relevant organizations, 358 persons of business companies, and 228 persons of the general public as Honour Marine Environment Guard.

9. Summary

The stakeholders of YSLME can be divided into two parts: government sector and private sector. The government sector is consisted of the government organizations, such as the congress, central government agencies, and local governments and the quasi-government organizations. The private sector is consisted of the relevant industry, NGOs, and the public.

The ocean-related central governments agencies are (i) Ministry of Maritime Affairs and Fisheries (MOMAF) and its subsidiaries, such as Korea Coast Guard (KCG,), National Fisheries Research and Development Institute (NFRDI), National Oceanographic Research Institute (NORI), (ii) other relevant institutes, such as Congress, Ministry of Agriculture and Forestry (MAF), Ministry of Construction and Transportation

(MOCT), Ministry of Environment (MOE), and local governments, (iii) quasi-governments, such as research institutes and universities. Among the ocean-related central government agencies, MOMAF has the most direct authority on the marine environment and resources management.

The major environmental NGOs are the Korean Federation for Environmental Movement (KFEM) and the Green Korea United (GKU), both of which have strong political voices in Korea. The representatives of the fisheries industry are the National Federations of Fisheries Cooperatives, Regional Fisheries Cooperatives, and Fishing Village Cooperatives, all of which are the major stakeholders and have strong voices for the fisheries industry. The government has delegated many functions on fisheries resources management to the Fishing Village Cooperatives. KFIPA (Korea Fisheries Infrastructure Promotion Association) also conducts the following for the fisheries industry: R&D and outreach of fishing village and ports technologies; dredging of fishing ports and cleaning of coastal waters; management of fishing ports cleaning vessels; and clean-up of marine debris in the coastal waters and fishing grounds.

The representatives of the shipping industry are the Korea Ship owners' Association (KSA) and Korea Shipping Association (KSA), which are playing important roles for the ocean shipping industry and the coastal shipping industry, respectively. The Korea Marine Pollution Response Corporation (KMPRC) was established in 1997. As exclusively an oil spill response organization, KMPC has secured personnel and equipment, trained its personnel and advanced oil spill response technologies. KMPRC now has the capacity to respond to spills of greater than 7,000 tons. The Korean Petroleum Association (KPA) is the representative of the oil industry. The members of KPA are the major stakeholders in oil spills in the coastal waters in Korea and contribute much funding to the KMPRC and actively participate in the decision-making of management of KMPRC.

The government sector initiates environmental impact assessment (EIA), feasibility studies, public hearings, expert and stakeholder committees, and public meetings for decision-making. Except EIA, the feasibility study of large projects, and public hearings, expert and stakeholders committees and public meeting are not mandatory procedures. The private sector participates and expresses their interests in the feasibility studies, public hearings, stakeholders committees, and public meetings for decision-makings. However, if they are

not satisfied with the results, they then express their interests through mass-media or by demonstration.

The decision-making procedure has been generally utilized for development by the government. The period of decision-making has been short. The private has not been fully participated in the decision-making. The government sector has tended to utilize the mechanism for their benefit. Therefore, after the decision-making the public and NGOs opposed strongly the government's projects, such as the Shiwha Lake Project and Saemangeum Reclamation Project. The decision-making procedure should be established and initiated for the stakeholders' active participation with full information and knowledge of it.

In addition to the stakeholders' participation in the decision-making procedure, other alternative, such as the partnership program, incentive program, deregulation and self-management, and honour surveillance program should be developed for the stakeholders' active participation in decision-making procedure.

IV. Institutional Analysis

1. MOMAF and Subsidiaries

1) MOMAF

(1) Establishment of MOMAF [4]

In implementing the seven National Economic Development Plans from 1962 to 1996 the Korean government densely developed and used the marine ecosystem for a short period of time. The public accepted losses in environmental quality and resources as a necessary and acceptable cost of the development process in the 1960s, 1970s, 1980s, and even in the early 1990s. The public and government's recognition of ocean and coastal resources was poor. Also, the government agencies for the marine ecosystem were fragmented, and there were more than 50 relevant ocean laws, of which individual laws and programs were implemented without coordination and unsustainably. As a result, serious issues, such as high demand for intensive coastal development, loss of wetlands, declining of water quality, declining of nearshore fisheries, decreasing of fisheries population, limit of public access, intensifying industrial urban development, and growth in tourism facilities, were occurred before establishing MOMAF in 1996.

Usually sectoral management is implemented by fragmented government agencies. Institutional integration is closely related to integrated oceans policy and is an essential element for ocean governance. Chapter 17 of Agenda 21 recommends that coastal states integrate management of the coastal and marine environment. To this end, it is recognized that institutional adaptation will be required, with greater emphasis being placed on the need for mechanisms to coordinate governmental efforts in the management of ocean and coastal areas and for organizations, local communities, resource user groups, and indigenous people (Juda, 2003).

The Stratton Commission saw a similar pattern in both federal and state governments, one in which responsibility

4 Dong-Oh Cho, Evaluation of the Ocean Governance System in Korea, Marine Policy, in press.

for ocean activities was spread among a number of departments and agencies, with departments having overlapping jurisdiction leading to conflicts, and with important ocean-related programs placed in departments in which those programs were seen to be of only marginal importance. The establishment of National Oceanic and Atmospheric Administration (NOAA) was an example of institutional integration for ocean governance in the U.S.

The implementation of the Australian Oceans Policy (AOP) was developed to address the problematic institutional arrangements in the Commonwealth-State Government relations and the existing powerful sectoral interests that hinge on these arrangements (Wescott, 2000). AOP focuses on integration for the protection and management of Australia s ocean domain through the establishment of a cross-sectoral National Oceans Ministerial Board (OBOM) comprising Commonwealth (Federal) Government Ministers responsible for the environment (chair), industry, resources, fisheries, science, tourism and shipping. Although the institutional arrangement of Australia is different from those of the U.S. and Canada, its purposes are to implement the AOP effectively.

The Department of Fisheries and Oceans (DFO) is an example of institutional integration for ocean governance in Canada. The Oceans Act assigns DFO as the lead agency, giving a leadership role to the Minister of Fisheries and Oceans with regard to the stewardship of the oceans, for the development of Canada s Oceans Strategy (COG), integrated management (IM) and planning, and marine protected areas (MPAs) (Foster, et. al., 2005).

Establishment of MOMAF: Until recently, the oceans policy in Korea like most countries has been fragmented with multi-government agencies. The Korean government, however, integrated these fragmented government authorities into one single agency recently, called the Ministry of Maritime Affairs and Fisheries (MOMAF).

MOMAF was established officially on August 8, 1996 in response to a Presidential declaration made on the very first Ocean Day, which was celebrated nationally on May 31, 1996. MOMAF integrated almost all marine administrations into one “superagency.” The basic framework of the Ministry incorporates the Maritime and Port Administration (MPA), the Fisheries Administration (FA), the National Marine Police Administration (NMPA), the Hydrographic Affairs Office and other marine-related agencies (Hong & Chang, 1997).

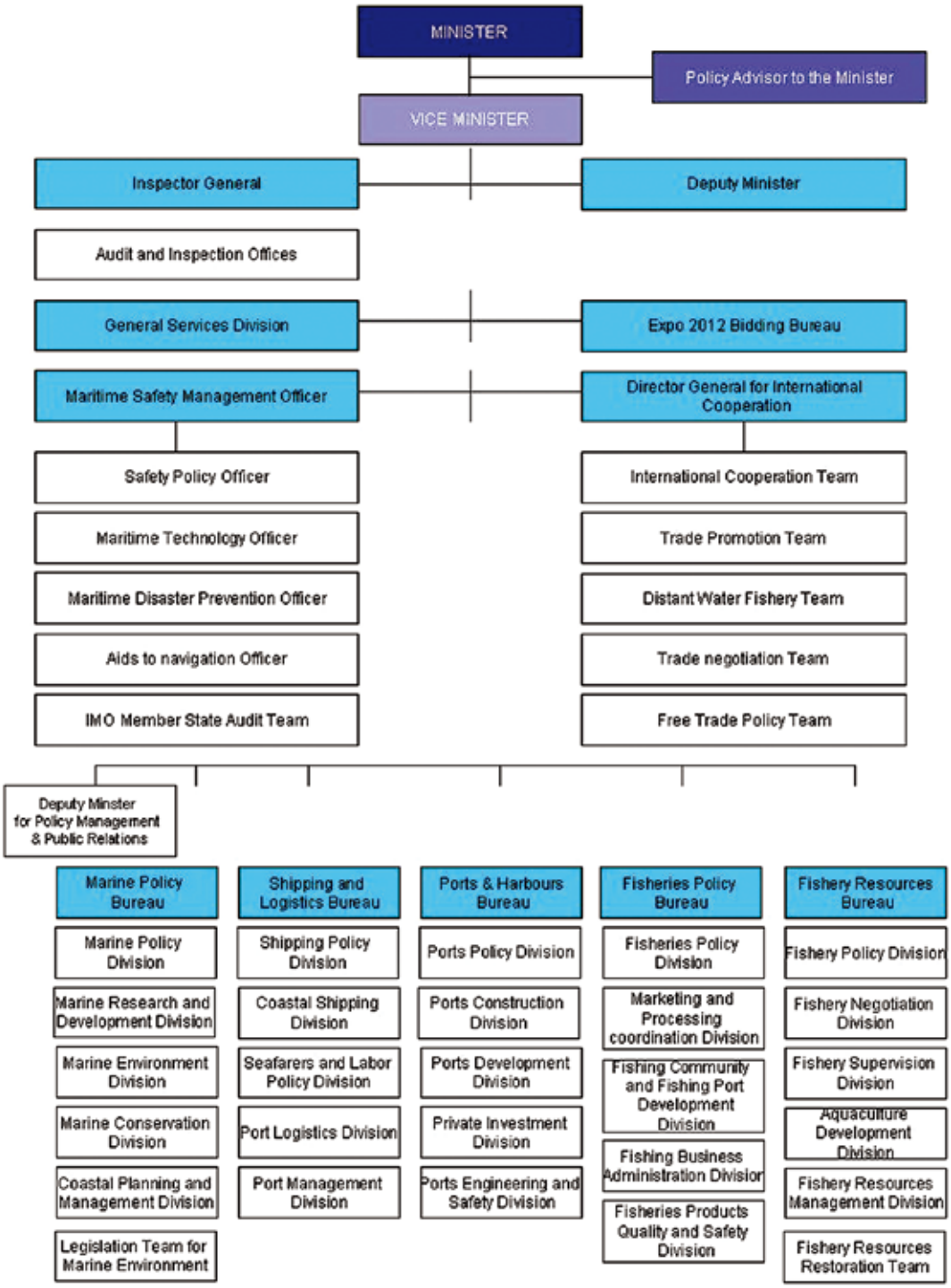
Together with the establishment of MOMAF, the Korean government revised the Government Organization Act (GOA) mandating MOMAF to be in charge of the oceans policies as follows (Article 44): (1) the Minister of MOMAF is in charge of function of fisheries, shipping, ports, marine environment preservation, oceanographic research, marine resources development, marine science technology research and development and maritime safety and judge; (2) and the NMPA, which is in charge of the function of police and oil response at sea, is under the Minister of MOMAF.

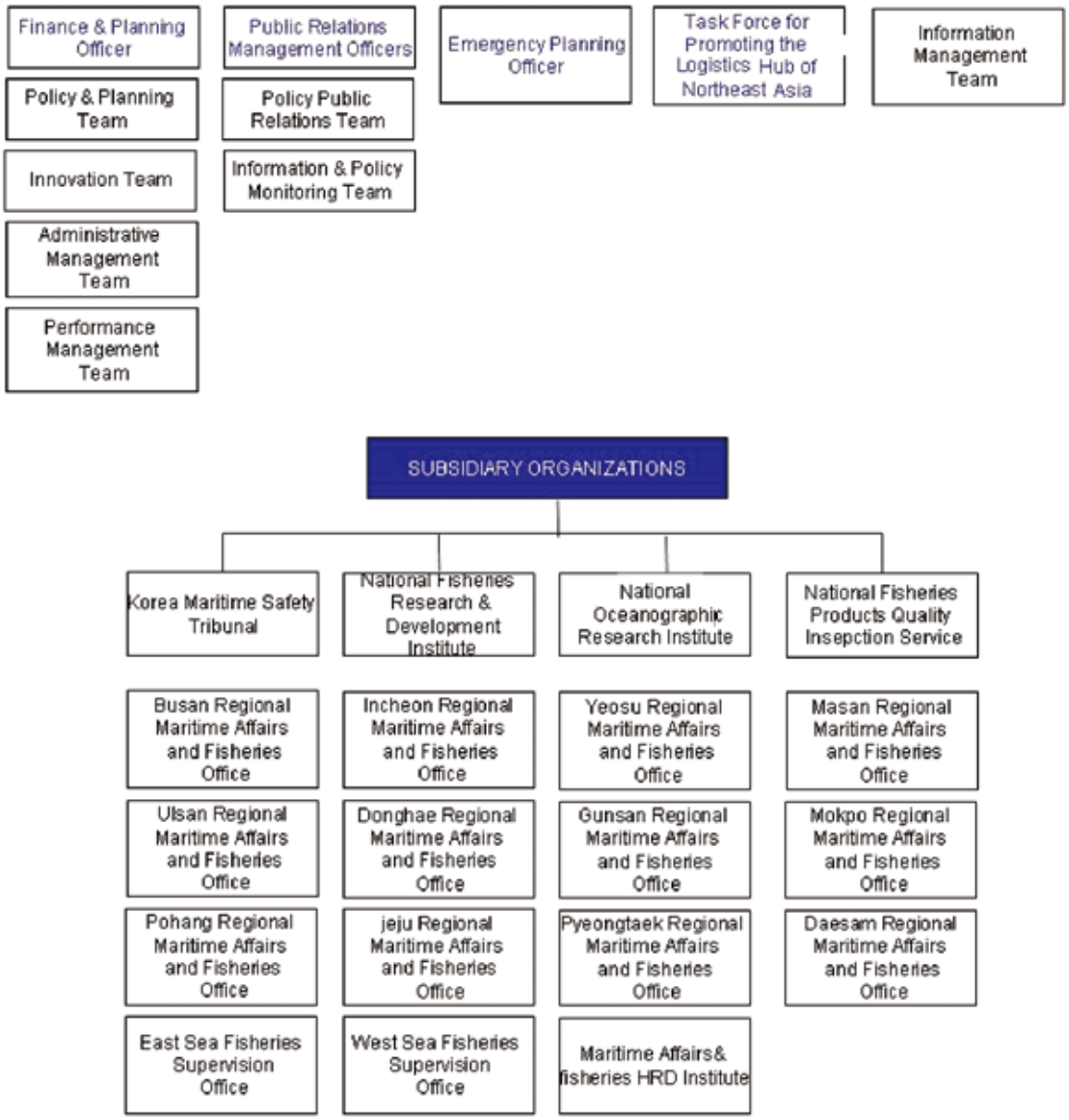
Under the GOA, most of the ocean-related government agencies together with their authorities, such as MPA with shipping and port management, FA with fisheries management, NMPA with maritime law enforcement, Maritime Safety Tribunal with maritime accident investigation and judgment, and National Oceanographic Research Institute with research on oceanographic, were integrated into MOMAF. Also under the GOA, MOMAF took over marine environmental management from the Ministry of Environment (MOE) and public water management and reclamation policy from the Ministry of Construction and Transportation (MOCT). Therefore, most of the ocean-related organizations and their authorities were integrated into one single administration except shipbuilding, atmospheric forecasting and exploitation of offshore oil and gas.

However, the revised GOA does not make any demarcation of ocean spaces. So other ocean-related government agencies, such as MOE and MOCT, claim that authorities of MOMAF are geographically limited to the sea beyond the coastline. As a result, various laws and programs on the coast have not been integrated into MOMAF and remain under the fragmented system of other existing agencies.

(2) Organization and Function of MOMAF

Fig. IV-1 Organization Chart of MOMAF





2) MOMAF Subsidiaries

(1) KCG

Korea's Coast Guard is in charge of all maritime police affairs and marine pollution control task. In 1953, the Korean government enacted a Presidential Decree No. 844, establishing that Coast Guard Authority (Busan) belongs to the Ministry of Commence and Industry, reorganizing the Coast Guard Authority under the Ministry of Commerce & Industry in 1955, reorganizing the Coast Guard Authority belonging to the Ministry of Home Affairs in 1962, reorganizing the command of public security to the Department Security in Ministry of Home Affairs,

and reorganizing as a independent branch office of MOMAF in 1996. KCG has 1 Deputy Commissioner General, 6 Bureaus, and 23 Divisions in the KCG Headquarters. As a subsidiary, there are a KCG Academy and a KCG Maintenance Workshop. As the special local administrative agency, KCG has 13 Regional Coast Guard Offices nationwide on top of 71 Branch Offices, and 266 Subagencies. KCG has patrol ships, crime response boats, pollution response boats, and aircrafts (airplane, helicopter), etc.

KCG's main services are as follows: search & rescue, marine security; marine environment protection, international affairs, marine traffic management, and marine pollution response.

(2) NFRDI

NFRDI (National Fisheries Research and Development Institute) was established in 1921, reorganized in 1949 as the Central Fisheries Experiment Station under the Ministry of Commerce and Industry, renamed in 1963 as the National Fisheries Research and Development Institute, reorganized in 1966 as the National Fisheries Research and Development Institute under the National Fisheries Administration, and reorganized in 1996 as the National Fisheries Research and Development Institute under MOMAF.

NFRDI is actively researching practical technologies to boost the competitiveness of Korea's fisheries industry and to deal with current marine issues. Focusing on aquaculture, the institute has infused advanced technologies into traditional oceanographic research to create high-end fisheries technologies that can virtually turn oceans into fishing farms. It has also placed high priority on the protection of the marine environment.

Fields of R&D are as follows: research for the investigation and the protection of the marine environment, maintenance of fisheries resources and development of oceanographic technology, development of methods to reproduce and cultivate useful aquatic organisms, development of technologies for hygienic management of fisheries resources and processing technology, genetic improvement of aquaculture species, and development of new high value added materials from aquatic organisms.

NFRDI conducts a variety of events and exhibitions on the ocean to raise public interest and understanding: maritime and fisheries education and training, new curriculum to fit the paradigm shift in human resources development, on-site training and curriculum focusing on major themes, program to raise teenager's interests in maritime affairs, training sessions for public servants in relevant

division, programs for fishery households to boost the competitiveness of the fisheries industry, and operation of the Fisheries Science Museum.

(3) NORI

NORI (National Oceanographic Research Institute) has greatly contributed to maritime traffic safety and marine development through the issue and distribution of charts, electronic navigational charts, and publications made by oceanographic research around the ports and coastal area in Korea and its analysis of data.

In 1949 NORI was established as the Hydrographic Division under the Operation Department of the Korea Navy, became a member of International Hydrographic Organization (IHO) in 1957, enacted Hydrographic Act in 1961, was reorganized as Hydrographic Office under the Ministry of Transportation in 1963, and was reorganized as the National Oceanographic Research Institute under MOMAF.

Major functions of NORI are ocean observation, hydrographical survey, coastal survey, basic maps of the sea, marine information network, safety navigation, information for fishery, international cooperation, and marine geographic names.

2. Other Governments Organizations

1) Congress

(1) Committee on Agriculture, Forestry, and Fisheries

The Korean Congress enacts and revises relevant laws, reviews the government policies, and deliberates the government budgets. In 1996 the Korean Congress established “the Committee on Agriculture, Forestry, and Fisheries” as one of 17 Standing Committees to review the laws, policies, and budget for the oceans. The committee consists of 20 members, most of whom are elected from coastal and rural areas. Since its establishment, the Committee has made every effort to enact laws and support the ocean policies toward sustainable development.

(2) Oceans Forum

In 2004, "the Oceans Forum" was established by 50 members of Congressmen, who were deeply interested in the ocean and ocean policies. Although the Oceans Forum is not a standing committee in the Congress, it has strongly supported the establishment of ocean policies in Korea. The Oceans Forum has

initiated many workshops, seminars, discussions and expert presentations to extract implications for oceans policies.

2) Ministry of Agriculture and Forestry.

Traditionally, Koreans have been rice farming, and rice paddies have long been very important to Koreans. However, Korea has little arable land considering the large population. Therefore, existing rice paddies have always been insufficient to supply enough rice for the population and, therefore, historically, farmers have reclaimed marsh wetlands for rice paddies.

The Ministry of Agriculture and Forestry (MAF) is in charge of agriculture in Korea and has a government-supported organization under its control, called the Korean Agricultural and Rural Infrastructure Corporation (KARICO), of which its main function is to supply land for agriculture. KARICO has a long history of nearly 100 years: it was first established as the Okgu West Irrigation Cooperative in the Province of Jeonbuk in 1908, expanded to become the Farmland Improvement Association in 1971 and later revised its name to the present name, KARICO.

The cheapest and easiest way for supplying land for agriculture is the reclamation of wetlands because wetlands belong to the public and the cost, paid by the central government, is only in building a dike in the mouth of an estuary or along the outer border. Therefore, from the beginning, KARICO had adopted this convenient way of reclaiming wetlands. The Korean society had agreed and supported the strategy, until recently. So most of the reclamation of wetlands except for recent industrial complexes has been initiated and conducted by KARICO.

3) Ministry of Construction and Transportation

Most of the reclamation of wetlands in Korea has been conducted to create land for agriculture, and more recently for industrial complexes, ports and harbours. While land suitable for ports, harbours, and shipbuilding yards is created by the reclamation of public water along the coasts, the lands for industrial complexes are created by the reclamation of wetlands.

The supply of land for industrial complexes is under the charge of the Ministry of Construction and Transportation (MOCT). Similar to KARICO, MOCT established the government-controlled organizations, the Korea Land Corporation (KLC) and the Korea Water Resources Corporation (KOWACO). The mission of KLC is

to supply land for cities, house and apartment complexes, industrial complexes, and other land intensive infrastructure-related uses. KLC was first established in 1975 as a Land Bank, reorganized into the Korea Land Development Corporation in 1979 and renamed as the presently known KLC in 1996. KOWACO is another government-controlled organization, whose missions are to develop and manage water resources for multi-purposes including drinking and to supply land for industrial complexes. KOWACO was first established in 1967 as the Korea Water Resources Development Corporation, re-established as the Korea Industrial Land Development Corporation in 1974 and re-established as the Korea Water Resources Corporation in 1988.

Similar to agriculture, the cheapest and easiest ways for supplying land for industrial complexes is the reclamation of wetlands. This is because the cost of land developed in this manner is far less to developers than the cost of purchasing privately owned land that is suitable for development. The costs of reclamation are usually borne by the central government. The local governments see filling in wetlands as a major benefit since it provides employment, taxes, and economic activities of various kinds. As a result, the majority of the nation's chemical industries, steel factories, shipbuilding yards, and, of course, port facilities are all located on reclaimed land along the west and south coast (Cho & Olsen, 2003).

4) Ministry of Environment

Under the GOA, environmental management in Korea has become a dual system based on spatial divisions: the terrestrial environment is managed under MOE and the marine environment under MOMAF. However, MOE is still connected to the marine environment.

The water quality management on land remains under the charge of MOE based on the Water Quality Conservation Act (WQCA). Coastal water quality management, however, is controlled by MOMAF under the Marine Pollution Prevention Act. However, as of yet, the end-pipe discharge criteria based on WQCA are regulated in all waters including the coastal waters and ports. Until now, MOMAF claims that a special law regulating discharge criteria into the coastal waters such as "Land-Based Pollution Discharge Management Law" should be enacted. However, MOE has strongly opposed enacting such special law.

MOE is also in charge of environment impact assessments (EIA) based on Environmental Impact Assessment Act.

The EIA Act regulates a large scale of projects, such as reclamation of wetlands, port development, and sand mining in the coastal waters. However, the EIA Act does not consider the detailed characteristics of the marine environment and ecology. So MOMAF is challenged to regulate the EIA and consider the characteristics of marine environment and ecology.

MOE is in charge of the Marine Natural Park based on the Natural Park Act despite the GOA, which mandates MOMAF to be in charge of the marine environment and its resources.

MOE is in charge of waste management under the National Waste Comprehensive Management Plan based on the Waste Management Act. However, MOE has not addressed marine debris in the National Waste Comprehensive Management Plan and struggles to manage waste on land only.

5) Local Governments

The marine environment and resources management are so complicated that MOMAF alone cannot implement it effectively. Therefore, many Oceans Policies are implemented by the local governments. Particularly most policies on the coastal land, which affect the marine environment and resources directly, are established and implemented by local governments.

So from the beginning of its establishment, MOMAF strongly suggested the local governments to establish an organization, which is exclusively in charge of their local marine environment and resources. At present most local governments have established an organization to implement their ocean policies. MOMAF as one of central government agencies has delegated some authorities related to implementation of marine environment and resources management to the local government as shown in Table IV-1.

Table IV-1 Examples of the Central Government's Delegation of Authority to the Local Government

Relevant Laws	Contents of Delegated Authority
1) Fisheries Law and its Decree	- Permission or restriction of inshore fisheries - Permission or restriction of coastal fisheries
2) Wetland Conservation Law and its Decree	- Administrative orders of termination of utilization activities or operation of restoration work of wetlands - Entrance restriction or prohibition into certain wetlands - Collection of levies on the wetland uses
3) Coastal Zone Management Act and its Decree	- Surveillance of the marine pollution in the coastal zones
4) Public Water Management Law and its Decree	- Permission of possession and utilization of public water - Collection of levies on the public water uses - Approval of restoration work of the public water uses
5) Public Water Reclamation Law and its Decree	- Approval of the implementation plan for reclamation work - Approval of the completion of reclamation work

3. Quasi-Governments Organizations

1) Research Institutes

There are two research institutes in the field of our concern: the Korea Maritime Institute (KMI) and Korea Ocean Research and Development Institute (KORDI), under MOMAF and the Prime Minister.

In 1984, KMI was established as a social science institute under the Maritime and Port Administration (KMPA). In 1997, KMI integrated the Division of Marine Policy Research (KORDI), the Division of Fishery (KREI: Korea Rural Economics Institute), the Fisheries Economics Institute (NFFC), and the Division of Fisheries Economics (NFRDI). KMI's major areas are as follows: (use commas between items in list) Policy and Market Analysis, Coastal & Ocean Policy Research, Shipping, Logistic & Marine Safety Research, Port Research, and Fisheries & Fishing Community.

In 1973, KORDI which was established at the Korea Institute of Science & Technology (KIST), separated from KIST and became an independent comprehensive ocean research institute in 1990, and was reorganized under MOMAF in 1997. KORDI's main

functions are as follows: to perform basic and applied research in order to promote the efficient use of coastal and ocean resources, to undertake a comprehensive survey and study of Korea's seas and open oceans, to conduct scientific research in Polar Regions, especially in Antarctica, to develop technologies related to the coastal & harbour engineering, ships & ocean engineering and maritime safety, to support and cooperate with other government agencies, universities and private industries towards the development of marine resources and the protection of the ocean environment, to coordinate international cooperation concerning oceanographic research projects, and to perform basic and applied research in order to promote the efficient use of coastal and ocean resources.

2) Universities

There are twenty universities which have a department of oceanographic and ocean science, ocean engineering, marine biology, marine environment, and maritime safety.

4. Summary

Until recently the Korean government densely developed and used the marine ecosystem for economic development. The public also accepted losses in environmental quality and resources as a necessary and acceptable cost of the development process. The public and governments recognition of ocean and coastal resources was poor. Also, the government agencies for the marine ecosystem were fragmented, and there were more than 50 relevant ocean laws, of which individual laws and programs were implemented without coordination and unsustainably. As a result, serious issues, such as high demand for intensive coastal development, loss of wetlands, declining of water quality, declining of nearshore fisheries, decreasing of fisheries population, limit of public access, intensifying industrial urban development, and growth in tourism facilities, were occurred before establishing MOMAF in 1996.

In 1996, the Korean government established the Ministry of Maritime Affairs and Fisheries (MOMAF) integrating almost all marine administrations into one super agency. The basic framework of the Ministry incorporates the Maritime and Port Administration (MPA), the Fisheries Administration (FA), the National Marine Police Administration (NMPA), the Hydrographic Affairs Office and other

marine-related agencies.

The National Marine Police Administration recently changed its name to the Korea Coast Guard (KCG) and remained by one of MOMAF subsidiaries. Its major services are search & rescue, marine security; marine environment protection, international affairs, marine traffic management, and marine pollution response. NFRDI (National Fisheries Research and Development Institute) is one of MOMAF subsidiaries and is actively researching practical technologies to boost the competitiveness of Korea's fisheries industry and to deal with current marine issues. NORI (National Oceanographic Research Institute) has greatly contributed to maritime traffic safety and marine development through the issue and distribution of charts, electronic navigational charts, and publications made by oceanographic research around the ports and coastal area in Korea and its analysis of data.

Although MOMAF has authorities on the coastal and ocean environment and resources management, there are still many other governmental agencies, such as the Congress, Ministry of Agriculture and Forestry (MAF), Ministry of Construction and Transportation (MOCT), Ministry of Environment (MOE), and local governments, all of which have strong interests on marine environment and resources management.

Together with the establishment of MOMAF, the Korean government revised the Government Organization Act (GOA) mandating MOMAF to be in charge of the oceans policies. However, the revised GOA does not make any demarcation of ocean spaces. So other ocean-related government agencies, such as MOE and MOCT, claim that authorities of MOMAF are geographically limited to the sea beyond the coastline. As a result, various laws and programs on the coast have not been integrated into MOMAF and remain under the fragmented system of other existing agencies.

Under the GOA, environmental management in Korea has become a dual system based on spatial divisions: the terrestrial environment is managed under MOE and the marine environment, under MOMAF. The water quality management on land remains under the charge of MOE based on the Water Quality Conservation Act. The coastal water quality management, however, is controlled by MOMAF under the Marine Pollution Prevention Act. The jurisdiction of wetlands management is also divided into land-wetlands and tidal-wetlands under the Wetlands Preservation Act. Solid waste management is divided into land waste and marine debris. Marine

natural resources management is under the authority of MOMAF by revisions of the Natural Environment Preservation Act in 1997, while all the other natural resources management remains under the charge of MOE. Despite the dual system of environmental management, there are still conflicts on the separation of functions or policies between MOMAF and other governmental agencies, such as estuary and watershed management, public beach management, management of marine national park, management of uninhabited island, environment impact assessment (EIA) for marine environment. These conflicts occur mainly from undefined spatial demarcations and turf protection of the governmental agencies.

By revising the GOA and establishing MOMAF, MOMAF has become the sole government agency in charge of conservation of the marine environment and its resources. However, there are still other government agencies, such as MOCT and MAF, who have strong incentive and power for development of marine ecosystems. Also the local governments have shown strong incentives for the development of marine ecosystem for tax revenues and regional economic development since the local self-government movement started in 1995.

V. Legal and Policy Analysis

1. Fisheries

1) Overview

"The Fisheries Law" and "the Fishery Resources Protection Law" provide the legal framework for the management of the fisheries sector and the protection of fishery resources. Based on the Fisheries Law, the central government (MOMAF) and local governments (provincial, city, and district) are responsible for fishery resources management. MOMAF is largely in charge of managing fishery resources in the off-shore, distant, and foreign flagged vessels and fishing areas within the Korea's EEZ while local governments are mainly in charge of fishery management in the coastal areas. The monitoring and enforcement are conducted by MOMAF, KCG, and local governments (Kang, 2006).

Until recently the fisheries policy in Korea has been growing in quantity of the fishery industry by strong governmental support together with economic development. As a result, the catch of fisheries of Korea ranks twelfth in the world and the export of fishery among primary industry ranks the biggest in Korea. However, total fisheries products have decreased continuously from the peak of 3.5 million tons in 1994. The problems were that all kinds of fisheries products, such as ocean fishing vessel, coastal fishing vessel, aquaculture, and fresh water, have been decreasing. The main reasons are the over exploitation and deteriorated water quality, and loss of aquaculture area due to reclamation. Although aquaculture is a very important alternative, harmful algal blooms (HAB) and deteriorated water quality make it very difficult.

Comparing the decrease of total fisheries products, the domestic demand for fisheries products have increased rapidly. As a result, the rate of domestic fisheries products to domestic consumption has decreased continuously from a peak of 138% in 1980. In 1990 Korea exported fisheries products 1,058,000 tons (1.5 billion dollars) and imported 380,000 tons (368 million dollars). However, in 1997 imports increased to 1,189,000 tons and 1.0 billion dollars. In seven years,

imports increased by 313 % and 284 % by weight and value respectively.

The direction of fisheries policy has fundamentally changed from growth in quantity to sustainable development of fisheries resources as Korea entered the OECD and the WTO. The Korean government has established various programs and policies, such as a TAC system, a marine ranch program, and aquaculture program, and a buy-back program to restore the fisheries stock and sustain fisheries. However, the scientific assessment of fisheries resources, which is the most important factor for sustainable fisheries management, has not been conducted effectively due to lack of agreement between neighbouring countries on transboundary fisheries and illegal fishing by domestic and foreign fishers.

2) License System: Traditional Fisheries Management [5]

The license system limiting entry into the fisheries has been the main fisheries management tool for the past 50 years. In accordance with Article 41 of the Fisheries Law and Article 27 of the Fisheries Resources Protection Decree, types of license system are classified into inland, coastal, offshore, and distant water licenses. MOMAF is responsible for fishing licenses in offshore and foreign-flagged vessels fishing within the Korea's EEZ. On the other hand, local governments at provincial, city and district levels are mainly responsible for fishing licenses in the coastal area.

The license system aims to control fishing vessels with high-efficiency fishing methods or gear that lead to over-exploitation, and thus ensure the sustainability of the fishery resources. "The Fishery Resources Protection Law" defines jurisdictional waters and permission to fish. "Ordinance for the Implementation of the Fishery Resources Protection Law" describes fishing boundaries, restrictions of fishing permission, and application procedures for fishing licenses. To ensure effective management and sustainable production of fishery resources, the maximum number of licenses is established. This depends on the intensive fishing capabilities of the fishery. In 2005, as shown in Table V-1, for 25 types of fisheries, 68,379 numbers of licenses were provided. The fishing license specifies the allowable size of net, engine power, fishing ground, fishing seasons, and size of fish.

5 Kang, J. S., Analysis on the Development Trends of Capture Fisheries on North-East Asia and the Policy and Management Implications for Regional Co-operation, Ocean & Coastal Management 49:42-67, 2006.

Table V–1 Fishery types and number of licenses

Fishery types	Number of licenses	Major target species
Coastal gill net	19,273	Croaker, anchovy, crab
Coastal stow net	850	
Coastal trap	10,672	Sea eel, blue crab
Coastal purse seine	426	Anchovy, sardine, jack mackerel
Coastal lift net	781	Anchovy
Coastal shrimp beam trawl	1,475	Shrimp
Coastal anchovy drag net	17	Anchovy
Coastal mixed fishing	30,753	Squid, hairtail
Offshore jigging	915	Squid, hairtail
Offshore gill net	855	Croaker, anchovy, crab
Diving apparatus	230	Oyster, hen cockle, pen shell
Offshore long time	865	Hairtail, sea bream, puffer
Offshore purse seine	90	Hairtail, sardine, Mackerels
Offshore trap	320	Sea eel, blue crab, octopus
Offshore anchovy drag net	80	Anchovy
Offshore Stow net	290	Hairtail, croaker, pomfret
Offshore lift net	70	Saury
Shellfish dredge	170	Shellfish
Eastern sea trawl	35	Alaskan Pollack, herring
Eastern sea Danish seine	35	Alaskan Pollack, cod, shrimp
South-western sea Danish seine	37	Plaice, angler, shrimp
South-western sea pair trawl	10	Plaice, angler, shrimp
Danish seine	35	Haritail, flounder, file fish
Pair trawl	45	Haritail, flounder, file fish
Large trawl	50	Shrimp, Mackerels, Hairtail
Total : 25 fisheries	68,379	

Source: Kang, J. S., Analysis on the development trends of capture fisheries in North-East Asia and the policy and management implications for regional co-operation. *Ocean & Coastal Management* 49:42-67, 2006.

3) Decision-making Structure

Executive and administrative organization of the licensed fishery system in Korea is composed of MOMAF, local self-governments at the provincial, city, and district levels, the Regional MOMAF Office, Korea Coast Guard (KCG), and the Regional Fisheries Supervision Office (RFSO).

Decision making related to the licensed fishery involves two level of government: the central government (e.g. MOMAF),

and local self-governments at the provincial, city, and district levels. In the off-shore case, the minister of MOMAF is the decision maker for fishing permits, but within particular areas, the decision is delegated to governors of provinces or mayors of metropolitan cities. In an in-shore case, governors of provinces or mayors of metropolitan cities make fishing permit decisions, but the decision is delegated to mayors of cities, magistrates of counties and headmen of wards. In addition, mayors of cities, magistrates of counties and headmen of wards make fishing permit decisions about reported, district, and licensed fisheries involving village, aquaculture, and set-net fisheries. Thus, mayors, magistrates, and headmen manage most fisheries other than those off-shores (Ryu, et. al., 2006).

4) TAC System

Since the mid-1970s, Korea has faced depletion of fishing stocks in coastal and off-shore waters due to overexploitation and indifferent management of fishing stocks by fishers and the government, respectively. To restore the reduced fishing stocks and to redevelop the Korean fisheries industry, the Korean government has suggested various alternatives (e.g. a limited license regulation, technical regulation methods, and a vessel buy-back program) related to a licensed fishery system that has been a major part of the conventional fisheries management regime in Korea since 1908. Nevertheless, these measures have had little effect on the Korean fisheries industries and its resource recovery (Ryu, et. al, 2006).

The TAC (Total Allowable Catch) system was adopted for the first time in Korea in 1999. In accordance with Article 61 of the UN Convention, which states that "the coastal state shall determine the allowable catch of the living resources in its EEZ," Korea in 1997 amended its regulations (Article 27 of Fishery Resources Protection Decree) and introduced a TAC system. The background to this was the decline of commercially important fish stocks in the coastal waters in Korea, despite continued efforts to manage fishery resources using a license system. The TAC system aims to ensure an optimal management system for sustainable fisheries and to control fishing capacity. TACs are determined based on biological, economic, and social considerations. The Committee for TAC and the Central Committee for Fisheries Co-ordination, whose members come from academia, the business sector and other professions, set the TACs. The TAC system is applied to species requiring urgent conservation measures due to overexploitation. In 1999-2000, the TAC system was adopted

on a trial basis for four species in the large seine fisheries (mackerel, sardine, and jack mackerel), and in the offshore fish pot fisheries (red large crab). TAC was implemented for 7 species in 2001 and 9 species since 2003. To operate the TAC system, observers are employed and they check the amount of catches at landing places and collect biological data of the catches. Table V-2 shows the level of TACs and actual catches in 2001 and 2004. Actual catch accounted for 81% in 2001 and 89% in 2004 of the TAC respectively (Kang, 2006).

Nine species and five fisheries are in the TAC system as of 2004 and the Korea government will expand TAC system to 21 species in 2010.

Table V– 2 TACs and actual catches in 2001 and 2004

Species	2001		2004		Actual catch/TAC (%)	
	TAC	Actual catch	TAC	Actual catch	2001	2004
Mackerel	165,000	156,081	155,000	151,268	94.6	97.6
Jack mackerel	10,600	9,335	10,000	9,933	90.3	99.3
Sardine	19,000	125	5,000	2	0.7	0
Red snow crab	28,000	19,319	22,000	22,745	69	103.4
Snow crab	-	-	1,000	780	-	78
Purplish Washington clam	9,500	6,051	8,000	4,636	63.7	57.9
Pen shell	4,500	1,479	2,500	1,740	33	69.6
Cheju top shell	2,150	1,938	2,150	1,688	90.2	78.5
Blue crab	-	-	13,000	878	-	6.8
Total	238,750	194,328	218,650	193,670	81.4	88.6

Source: Kang, J. S., Analysis on the development trends of capture fisheries in North-East Asia and the policy and management implications for regional co-operation. *Ocean & Coastal Management* 49:42-67, 2006.

5) Marine Ranching

The fishing grounds for Korea fishing vessels have been reduced worldwide as most coastal countries have declared an EEZ and strictly implemented sustainable fishing policies. In addition, the fishing resources in the coastal ground of Korea have been reduced rapidly because of overexploitation and illegal fishing.

Therefore, MOMAF has enforced the

marine ranch program, such as artificial reefs, artificial seaweed beds, and algal forest for restoration of fisheries stocks. The investment for marine ranch program of five sites from 1998 to 2010 will be 158.9 billion Won.

Table V– 3 Marine ranch investment in Korea

	Total	Tongyoung	Yeosoo	Taiahn	Ooljin	North Jaejoo
Budget	158.9	24.0	30.7	33.7	35.5	35.0
Period	8-9 yrs	'98-'06	'01-'08	'02-'10	'02-'10	'02-'10
Ranch Type		Archipelago	Archipelago	Wetlands	Tourism	Tourism

Source: MOMAF (Units: billion Won)

The economic benefit of Tongyoung marine ranch will be 3,300 tons per year and 30 billion Won of income annually after 2016, and business period will be 11 to 17 years (KORDI, 2004).

MOMAF has also designated 422 sites (10,603.6km^2) as MPA (Marine Protected Area) for restoration of fishing stocks. MOMAF has invested in artificial reefs for spawning areas and habitat of 181,035 ha from 1971. The total artificial reefs will be 306,751ha.

6) Aquaculture

According to "Fisheries Law" there are three kinds of aquaculture business: licensed aquaculture, permitted aquaculture, and reported aquaculture. The licensed aquaculture is the major business in Korea. As the government policy has changed from catching business to the feeding business, the aquaculture industry has gotten strong support from the government. The aquaculture in Korea is an alternative to catches by fishing vessels. MOMAF's plan is that the rate of aquaculture to total products would increase from 27% in 2000 to 45% in 2030.

However, the aquaculture business has polluted the marine environment. Generally, the government has not permitted new aquaculture business for fisheries which have not maintained competitiveness due to imports or lack of securing seeds. Also the government has not permitted new aquaculture business in the areas, which are polluted by aquaculture.

The Korean government has established and implemented the "Aquaculture Cleaning-up Project" in polluted areas. The project includes the following: collection of deposits, seabed ploughing, and collection of deposited fishing nets. In 2004, the government conducted the

"Aquaculture Cleaning-up Project" of 16,000 ha and also collected deposited fishing nets over an area of 1,522 ha.

7) Fishing Capacity Reduction Program: Buy-back Program

The fisheries industry of coastal and near seas grew strong until the 1980s, when production (catch) was about 3.5 million tons. However, fisheries resources were depleted due to overexploitation, reclamation, and pollution. In addition fishing grounds decreased due to the agreement on maritime boundaries for fisheries between Korea and Japan, and Korea and China. Therefore, in the early 1990s, it was suggested that fishing capacity in coastal areas should be reduced and the fishing industry should be restructured. Therefore, a study on the status of fishing resources and fishing capacity was conducted in 1992 by the "Korea Rural Economic Institute." The study showed that fishing capacity was 23-25% more than the fishing resources.

The government first established the "Coastal & Near Sea Fishing Structure Coordination Plan" in 1993, which supported a reduction of fishing capacity. The period of the plan was from 1994 to 2001 and total budget was 223.7 billion Won, and the reduction would be 6,673 vessels and 104,000 tons. Compensation was done based on guidelines of relevant regulation.

The plan was revised in 1995, 1996, and 2001. The original reduction goal for 1994 through was 2,990 vessels, and the achievement was 2,163 vessels for 1994 through 2001. A total 64,080 vessels remained at the end of 2000.

Also in 2002, the government established the "Comprehensive Plan for Coastal and Near Sea Fishery Industry Restructure" for sustainable fisheries resources in the coastal and near seas in Korea, of which the main contents are as follows. Based on the plan, a total of 19 billion Won was invested for the reduction of 110 vessels in 2003.

Table V– 4 Comprehensive Plan for Coastal and Near Sea Fishery Industry Restructure

Goals	Details
Restructuring of fishing industry	- Unification of fishing business - Arrangement of fishing sort system - Guideline for fishing tool and method
Coordination of fishing areas	- Coordination of fishing prohibited areas - Flexible operation of coastal and island fishing areas
Sustainable fishing capacity	- Control of fishing fleet - Limit of engine capacity - Limit of tools - Reduction of fishing capacity
Scientific fishing management	- Assessment of fisheries resources - Tools real-name system
Development of eco-friendly tools	- Development and supply of eco-friendly tools - GPS instalment
Support for fishermen	- Support to fishermen for restructuring

Source: MOMAF

A Fishing Area Coordination Committee has been established for effective coordination and establishment of a detailed plan of Comprehensive Plan for Coastal and Near Sea Fishery Industry Restructure. The Committee is composed of a General Coordination Committee and Sectoral Committees. Sectoral Committees, which consists of experts and stakeholders, discuss in depth the agendas requested by the General Coordination Committee. The General Coordination Committee is composed of the government, fisheries organizations, scholars, and local governments.

8) Prevention of Illegal Fishing

Illegal fishing occurs in the coastal and near seas in Korea and exacerbates an already diminishing resource. In addition, this illegal fishing results in further resource depletion and reflects an inefficiency of fisheries management policies.

MOMAF, the Ministry of Government Administration and Home Affairs, and the Ministry of Justice declared a joint statement on illegal fishing twice a year. Additionally, the central and local governments established a

Comprehensive Task Force Team for prevention of illegal fishing in coastal and near seas in Korea.

Achievement of surveillance of illegal fishing is as follows: 3,291 cases in 2001, 3,102 cases in 2002, 2,067 cases in 2003, and 3,673 cases in 2004. Punishment for illegal fishing is criminal charges, suspension of sale of tax-exempted oil and fishing materials, and suspension of fishery loans.

9) International Cooperation

The Korean Government joined 7 regional fisheries agreement or commission for conservation of fisheries resources, such as the International Whaling Commission (Dec., 1946), the Commission for the Conservation of Southern Bluefin Tuna (May, 1993), the Asian-Pacific Fishery Commission (Nov., 1948), the International Commission for the Conservation of Atlantic Tunas (May, 1963)), the Eastern Central Atlantic Fishery Commission (Nov., 1973), the Indian Ocean Tuna Commission (June, 1992), and the Commission for the Conservation of Antarctic Marine Living Resources (Apr., 1982).

Also the Korean Government made 12 bilateral fisheries agreements including the New Korea-Japan fisheries Agreement and the Korea-China Fisheries Agreement. In 1998 Korea and China made the Korea China Fisheries Agreement for the sustainable development of fisheries resources in the Yellow Sea.

2. Biodiversity

1) Overview

While MOE is in charge of biodiversity and ecosystems in Korea, MOMAF is in charge of most of the marine biodiversity and ecosystem management. "The Natural Environment Conservation Law" is the major law for biodiversity and ecosystem management in Korea. Several Marine Protected Areas have been designated based on the act. However, MOE has mainly addressed terrestrial, not marine biodiversity and ecosystems. "The Wildlife Fauna and Flora Protection Law" mandates MOE to designate and manage to conserve endangered species in Korea. And the "Wetland Conservation Law" and "Cultural Heritage Management Law" are relevant to marine biodiversity and ecosystem.

There is rich biodiversity in Korea despite a small land area because of its diverse climate and complex of

geography. More than 100,000 species are assumed to exist in Korea. Until now 29,828 species of living things have been surveyed: 18,029 species of animal life, 8,271 species of plant life, 3,528 species of etc. The Wildlife Fauna and Flora Protection Law designate 221 species as endangered. The data and information on habitat in Korea are mostly limited to the mountains and not those of marine areas.

There are three oceans, the East Sea, the South Sea, and the Yellow Sea, which have quite different characteristics in biodiversity and ecosystems. There is rich marine biodiversity in the three oceans. However, no comprehensive survey of marine living resources except fisheries has been conducted. In addition, until recently there has not been a management program or policies for marine biodiversity. The enactment of the "Marine Ecosystem Conservation and Management Law," which mandates MOMAF to establish a "Marine Living Resources Diversity Management Plan" and other related policies, may address these problems.

2) International Conventions and Domestic Implementation

(1) CBD (Convention on Biological Diversity)

CBD was adopted at UNCED in 1992 by 158 countries and its basic goal is sustainable use of biodiversity. The major contents are as follows: conservation and sustainable use of bio-diversity, use control of heritage resources, technology use and transfer, technology cooperation, education, public awareness, and financial support.

Korea ratified CBD in October 1994 and incorporated most of CBD in the "Natural Environment Conservation Law."

(2) CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)

CITES was adopted in 1973 in Washington D.C. and its goal is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The major contents are to regulate import and export of more than 30,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.

Korea ratified it in 1993 and incorporated most of CITES in the "Wild Fauna and Flora Protection Law." Korea's government has designated 221 species as endangered species as of 2005 and managed to conserve them based on the act. Also many wildlife animals and plants have been designated as

"Ecosystem Destructive Wildlife Animal and Plant," however, none of the marine living resources have been designated as "Ecosystem Destructive Wildlife Animal and Plant."

NFRDI of MOMAF is in charge of marine CITES including the regulation on permits of fishery transplants and the regulations on prohibition of whale catch.

Recently, this agenda of marine living resources and CITES lists are expected to increase. However, the response based on scientific data on marine living resources and resources assessment is poor in Korea. Recently Asian countries, such as Japan, China, Indonesia, and Thailand, have showed positive interest in CITES and submitted many proposals. Korea is in the situation to arrange domestic institutes and strengthen resources in response to CITES.

Table V–5 Government agencies and related la ws in relation to CITES in Korea

Gov. Agency	Related Laws	Major Contents
MOE	Wildlife Fauna and Flora Protection Law	Designation of internationally endangered species; Regulation on international trade of internationally endangered species (Any one who wants to import or export internationally endangered species should get a permit from MOE)
KFDA	Pharmacist Law	International trade of endangered species; Permit for import and export of endangered species; Endangered species of wild fauna and flora
MOMAF	Fisheries Law	Regulation on permit of fishery transplant; Regulation on prohibition of whale catch
Customs Administration	Customs Law	Certificate and confirmation of permit; Prohibition of import and export; Illegal import and export

(3) CMS (Convention on the Conservation of Migratory Species of Wild Animals)

CMS was adopted in 1979 at Bonn and its goals are to conserve terrestrial, marine and avian migratory species listed on Appendix I of the Convention. CMS Parties should strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. As of 2006, Korea has not ratified the CMS.

(4) Ramsar Convention (Convention on Wetlands of International Importance Especially as Waterfront Habitat)

The Ramsar Convention was adopted in 1971 in Ramsar, Iran. Its goals are "Realization of sustainable development through conservation and wise use of wetlands based on local, regional, national and international cooperation." The major contents are as follows: (i) definition of wetlands, (ii) obligation of ratified countries, and (iii) information sharing. The obligations of member state are as follows: (i) registration of more than one wetland of ratified countries at Ramsar Convention List, (ii) establishment of conservation and use plan of such wetlands, and (iii)

establishment of plans for preservation of wetlands and birds.

Korea ratified the Ramsar Convention in 1997 and enacted "the Wetland Conservation Act" in 1999. Until now, five sites covering 141 square kilometres have been designated as Wetland Conservation Sites. The Wetland Conservation Act and Wetland Management are described in detail in the next "Ecosystem" section.

(5) WHC (Convention Concerning the Protection of the World Cultural and Natural Heritage)

WHC was adopted in 1972 by UNESCO and its goals are to preserve and protect the world cultural and natural heritage from regional and artificial destruction.

Korea ratified WHC in 1988 and incorporated WHC in the "Cultural Heritage Management Law." Korea government has designated 7 sites including "Jongmyo" as cultural heritage sites, and is planning to designate "Jeju Island" as a natural heritage site.

3) Marine Biodiversity

In addition to enacting "Marine Ecosystem Conservation and Management Law," MOMAF is now under development of "Marine Living Resources Diversity Management Plan."

Main goals of the Plan are as follows: (i) sustainable use of marine living resources and comprehensive conservation and management of marine living resources, (ii) establishment of a national strategy in response to the International Convention on Marine Living Resources Diversity, and (iii) securing national right on marine living resources.

Major programs of the Plan are as follows: (i) a comprehensive status survey of structural factors of marine living resources diversity, (ii) designation and establishment of a conservation plan of protective target of marine living resources, (iii) establishment of a comprehensive marine living resources diversity management plan, and (iv) the establishment of marine living resources museums.

"Marine Ecosystem Conservation and Management Law" has the following provisions related to CBD and CITES:

1) Article 38 (Establishment of Marine Living Resources Management Plan and International Cooperation), which includes a Marine Living Resources Conservation Plan, and items for implementation of CITES.

2) Article 39 (R&D for Marine Living Resources Diversity), which includes

a survey and restoration of structure and function of marine ecosystem, classification of marine living resources, R&D for marine living resources, and regulation on development.

3) Article 41 (Marine Living Resources Diversity Management Contract), which includes a contract on marine living resources management.

4) Article 42 (Limit on Import and Export of Marine Living Resources), which includes a permit for international trade of species which could impact the marine ecosystem and marine living resources, species to be prohibited for import and export, and a procedure of import and export, quantity, area, and business.

3. Ecosystem

1) Overview

The marine ecosystem in Korea has been impacted seriously due to the degradation of coastal water quality, loss of wetlands, reclamation of coastal waters, sand mining, over-exploitation and illegal fishing, coastal erosion, loss of beach, and red tides. The demand for ocean use and development will continue because of misaligned economic and social incentives. However, until recently, the government programs and policies or laws regarding the marine ecosystem have been absent.

In 1999, MOE and MOMAF revised the "Natural Environment Conservation Law," which mandates MOE and MOMAF to be in charge of terrestrial and marine natural living resources, respectively. However, the act does not fully address the marine ecosystem. Therefore, MOMAF and Congress are enacting the "Marine Ecosystem Conservation and Management Law" for conservation and management for a sustainable marine ecosystem. The law is independent and separated from the "Natural Environment Conservation Law" and, if enacted, will be under the authority of MOMAF.

Wetlands and marine sand are important habitat and a critical factor for marine ecosystems. However, until recently the wetland and marine sand management has been development-oriented. Therefore, MOMAF and MOE enacted "the Wetland Conservation Act" in 1999 and struggled to conserve the wetlands while MOCT, MAF, and local governments were still interested in

reclamation of wetlands. MOMAF also struggles to conserve marine sand, but MOCT and the dredging and construction industry have established a strong development system of sand mining and have strong political pull.

2) Marine Ecosystem Conservation and Management Law

If enacted, MOMAF will be in charge of the "Marine Ecosystem Conservation and Management Law." In fact, MOMAF is already establishing various programs based on the act. Major contents of the act and development of policies, which are under development, are as follows.

(1) Major contents of the "Marine Ecosystem Conservation and Management Law"

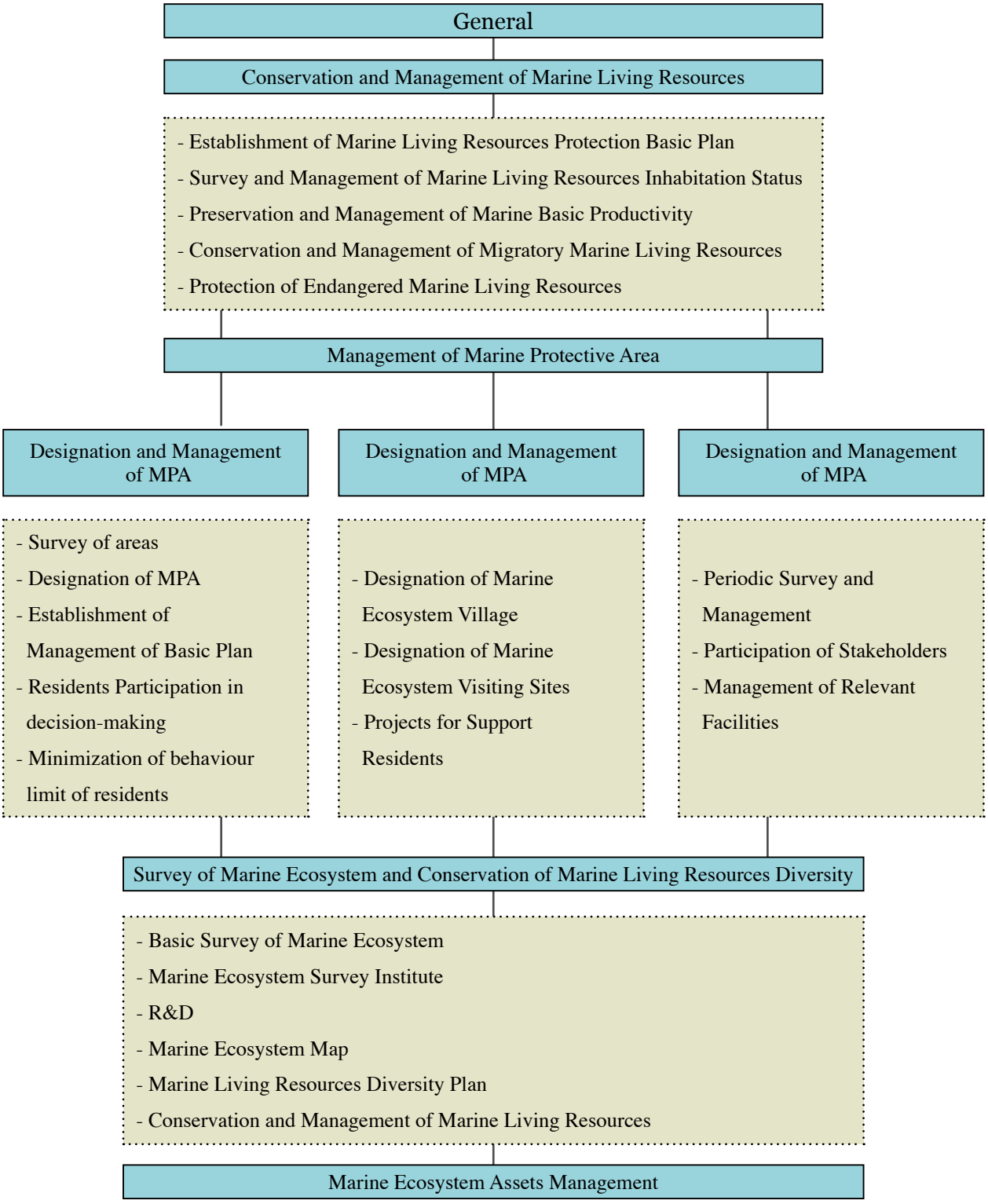
Establishment of Marine Living Resources Conservation and Management System: To establish and implement a comprehensive plan for conservation and management of marine living resources and maintaining marine basic productivity, prevention of extermination of marine endangered species, and conservation of marine endangered species.

Designation and Management of "Marine Protective Area": To designate and manage areas, which have value particularly to be conserved, as "Marine Protective Areas" to protect and conserve marine ecosystem, scenic view, and marine living resources; To establish and implement a Conservation Plan, which include a Marine Environment Conservation Project and Enhancement of Living Standards of Residents; To survey marine ecosystem, to make marine ecosystem maps, and to establish and implement programs for conservation of marine living resources diversity.

Program to Support Residents and Marine Living Resources Conservation Fund: To establish programs to support residents adjacent to MPA for enhancement of living standards; To designate "Marine Ecosystem Villages" and "Marine Ecosystem Visiting Sites" for the public; To establish "Marine Living Resources Conservation Fund" for conservation of marine ecosystem and prevention of loss of marine living resources diversity; The Fund is designed to be collected from all projects conducted at ocean and coastal zone.

Fostering Private Organizations: To raise and foster Private Organizations for public awareness of marine ecosystem and marine living resources.

Fig. V- 1 Structure of Marine Ecosystem Conservation and Management Law



Sources: MOMAF

(2) Development of Government Policy on Marine Ecosystem

a. Management of MPA

Goals of Policy: Expansion of MPA designation; Growth of regional economy by conservation and management of MPA

Major Policies: Additional designation of MPA based on Marine Ecosystem Basic Survey; Building of Museums for keeping sample materials of Marine Ecosystem Basic Survey

b. Establishment of Marine Living Resources Diversity Management Plan

Goals of Policy: Sustainable use of Marine Living Resources and Systematic and Comprehensive Conservation & Management of Marine Living Resources Diversity; Establishment of National Management Strategies on International Conventions on Marine Living Resources Diversity

Major Policies: Comprehensive Status Survey for Structural Factors of Marine Living Resources; Designation of Species to be Protected and Establishment of Conservation Programs; Establishment of Marine Living Resources Conservation Comprehensive Plan; Building of Museums for Marine Living Resources Management

c. Basic Survey for Marine Ecosystem

- Comprehensive Basic Survey of Nation-Wide Marine Ecosystem (2006-2014)

- Expansion of Designation of MPA and Establishment and Implementation of Management Basic Plan

- Building Sample Libraries for Keeping Sample Materials of Marine Ecosystem Survey

d. Establishment of Comprehensive Marine Ecosystem Management Plan

- Establishment of Marine Peace Park in the area adjacent to South and North Korea for Environment Protection, Settlement of Peace, and Economic Development.

e. Establishment of Quality Management System of Marine Environment Data and Information

- Establishment of Relevant-Legal Basis and Institutional Organization

- Establishment of Quality Management Centre

f. Basic Plan for Establishment of Coastal Wetlands Conservation (2006-2010)

- Establishment of Basic Plan for Coastal Wetlands Conservation (2006-2010) for sustainable conservation and use of coastal wetlands.

g. Establishment of Comprehensive Coastal Wetlands Information Management System

- Establishment of Comprehensive Coastal Wetlands Information Management System to provide with scientific information for policy and public awareness

h. Establishment of Marine Environment Management Corporation

- Establishment of Marine Environment Management Corporation for conducting programs on conservation of marine environment

2) Sand Mining Management [6]

Marine sand is not only an essential input in construction, but also functions in the marine ecosystem habitat, nursery, and buffer for shorelines. Traditionally, large amounts of aggregates (sand and gravel) have been consumed in Korea in construction projects, such as buildings, houses, apartments, roads, ports, dams, dikes, and reclamation, which are essential infrastructure for economic development. Until now, most sand has been supplied by dredging rivers. However, sources of land-based sand are being depleted and marine sand has become a new source. The supply of marine sand has increased rapidly and is expected to increase continuously. However, excess dredging of marine sand may bring adverse effects to the marine ecosystem, such as degradation of the marine environment, destruction of spawning and nursery habitats for certain fisheries, changes of underwater sea beds, currents and tides, and thereby erosion of coastal shorelines.

(1) Demand and supply for marine sand

The sources of sand in Korea are from coastal waters and from terrestrial sources, such as rivers, mountains and land. The total quantity of mining sand was 101.8 million cubic meters in 1992, peaking in 1996 at 139.0 million cubic meters and thereafter decreased due to a contraction of the construction industry caused by an economic crisis and recession in the late 1990s. Recently, however, with economic development, the total quantity of sand has increased to 119.6 million cubic meters in 2002.

The share of total sand from rivers was 46.7% in 1992, but it decreased to 17.3% in 2002. In the mean time, the share of sand from the coastal sea was only 15.3% in 1992, but it increased to 27.7% in 2002. The share of sand from mountains

6 Dong-Oh Cho, Challenges to Sustainable Development of Marine Sand in Korea, Ocean & Coastal Management 49, 2006.

and land has remained around 50%.

By law, the Ministry of Construction and Transportation (MOCT) should make the Basic Plan of Demand & Supply for Aggregates every five years. According to the present plan from 2004 through 2008, the demand of total aggregates is about 257 billion cubic meters per year, which is very stable. Sand and gravel share 44% (112 billion cubic meters) and 56% (145 billion cubic meters) respectively.

Recently about 70% of the fine sand is supplied by marine sand mined in the coastal waters within 12 km from the shorelines in the west and south coast and the share is expected to increase as resources in rivers deplete and environmental criteria on mining on rivers becomes stricter. According to a survey of the Korea Institute of Geosciences and Mineral Resources (KIGAM) in 2003, there were 5.1 billion cubic meters of aggregates in Korea, among which oceans, rivers and land, including mountains share 46.5%, 9.1% and 44.4% respectively.

(2) Legal system of marine sand mining

In order to supply aggregates efficiently the Aggregate Mining Act was enacted in 1991, which was under the MOCT. By law, MOCT should make a Basic Plan of Demand and Supply for Aggregate for every five years. The First Basic Plan of Demand and Supply for Aggregate was from 1994 to 1998, the Second Plan was from 1999 to 2003, and presently the Third Plan is from 2004 to 2008.

A mining company should get a permit for mining from the local government. The local government permits mining by considering the plan for mining, capacity of facilities and equipments and position of mining area, but should not permit mining in certain areas such as habitat conservation areas, nature conservation areas, fishery resources conservation areas and one kilometre within the breakwater. The period for mining should not exceed five years.

Compared with the strong development system for aggregate mining, the conservation system is weak and vulnerable. In order to mine in the ocean, the mining company should get a permit for mining from both the local government based on the Aggregate Mining Act and the Public Water Management Authority (PWMA) and the Public Water Management Act. PWMA should consult with relevant governmental agencies on the application of sand mining with the following information: the applicant particulars; position, scale and contents of mining; purpose and period of mining; other

items on consultation.

Also the PWMA should consult the Ocean Use Consultation with MOMAF based on the Marine Pollution Prevention Act before issuing a permit for sand mining. For the Ocean Use Consultation, PWMA through the applicant companies should present documents on marine environmental impact caused by the mining to MOMAF, who can request PWMA to present additional evidence documents related on environment impact if needed.

Finally, in case of mining on rivers and in mountains the mining firms should restore any environmental damage caused by mining with its own expenses or the local government should restore it using funds deposited by the mining firm. However, in case of sand mining, the Public Water Management Act articulates that if it is impossible or not necessary to restore environmental damage or if the mining companies get a permit from PWMA, then the regulation on restoration and deposit is exempted.

(3) Policy for sustainable sand mining

Natural Environment Conservation Act: Generally, all the natural resources, which are under the authority of MOE, are governed by the Natural Environment Conservation Act. Recently, MOMAF initiated a revision of the Natural Environment Conservation Act to clearly define that natural marine resources, including marine sand are under the authority of MOMAF and all the other natural resources are under the charge of MOE.

Under this revision, MOMAF is trying to establish a government plan for sustainable development of marine sand. Until now, there has not been any government plan for conservation of marine sand. There, MOMAF is establishing a plan for conservation.

Long-term monitoring: Mining of marine sand imposes marine environmental externalities by harming benthic species, disrupting habitat, and creating sediment plumes, which can adversely affect exposed biota. Although the environmental impact of sand mining is apparent, there have been only two studies on them, both of which were conducted by mining firms. Therefore to evaluate marine environmental impact from sand mining, MOMAF has set a long-term program to monitor the following from 2004: surveying quantity of marine sand resources, impact on habitat, impact on fisheries on-site and off-site, changes of seabed geology, and coastal and beach erosion.

Preventing Illegal Sand Mining: As

more of the local governments prohibit permits for mining in the coastal waters, more illegal sand mining will prevail. Illegal mining may not only harm the environment, but will also supply sand at lower than market prices, which increases the demand of total marine sand. Until now, the local governments have the responsibility of preventing illegal sand mining, but do not have the resources, such as manpower and vessels, for surveillance. However now, MOMAF is exercising surveillance and prohibiting illegal sand mining using resources from Korea s Coast Guard (KCG), which is a branch agency of MOMAF.

3) Wetland Management

(1) Reclamation Trends

South Korea is 99,291 square kilometres. About 66% of this land is mountainous, most of which is in the eastern and central part of the peninsula. Plains are located along the south and west coasts comprising 27% of the total landmass.

Compared to a small landmass, Korea has a large area of tidal mudflats (2,393 square kilometres), a territorial sea including tidal mudflats (71,000 square kilometres), EEZ (286,543 square kilometres) and a continental shelf including the EEZ (345,000 square kilometres). Also, Korea has a long coastline, stretching for 11,542 kilometres. This comes from an indented coastline along the west and south regions including many rivers that empty to the sea (Lee & Chang, 1998). The ratio of its coastline to land is one of highest in the world with 24.4 kilometres per thousand square kilometres. Some 83% of Korea's 2,393 square kilometres of tidal wetlands lie along the west coast, where the high tidal range and shallow depth produce wide expanses of mudflats and extensive salt marshes along this highly indented coastline (Cho & Olsen, 2003).

In Korea, reclamation of tidal wetlands is historically based - that is, from the colonial period of Japan. However, reclamation has increased continuously from small to large scales, as the Korean economy has grown. For example, from 1946 to 1960, before industrialization begun, the total reclaimed area was 630ha and the reclamation scale per site was only 3.6ha. In the 1960s – that is, at the beginning of industrialization - the numbers of sites and reclamation area and the scale per site started to increase.

In the 1970s when the government established the agricultural policies and the manufacturing industry began to grow, the first large-scale reclamation projects occurred, which resulted in increasing of scale per site of reclamation. In the 1980s, when the growth policies

for heavy and chemical industry were established, the scale per site of reclamation peaked. In the 1990s to present, although the scale of reclamation has decreased, considerable wetlands have still been reclaimed.

Table V– 6 Reclamation of coastal wetlands since the early 1900s

Time Period	No. of sites(A)	Area filled (B)	B/A	Comments
1946-1960	177	630	3.6	
1961-1969	1,136	17,220	15.2	Through initial national economic plans
1970-1979	233	19,370	83.1	First large-scale projects
1980-1989	63	9,310	147.7	Includes many private sector projects
1990-1999	89	1,403	15.7	Includes Saemangeum Project
2000-2002	33	77	5.9	

Source: Adapted from Lee and Chang (1998) & MOMAF (2003). (Unit: ha)

(2) Conservation Policy of Wetland

In the 1960s, 1970s, 1980s, and even early 1990s, the public accepted losses in environmental quality and resources as a necessary and acceptable cost of the development process. The public recognition of ocean and coastal resources was very poor. This has been due mainly to a long history of Confucianism in Korea society. Generally, the practice of Confucianism in Korea has not reached a familiarity with the ocean and coastal zone (Cho & Olsen, 2003).

Also because Korea has plains of less than 30% of the total landmass, the land for rice farming, which is the main agricultural food product, has always been insufficient to feed the large population. So the public has accepted the feasibility of reclamation of wetlands to create rice paddies until the negative publicity over the environmental disaster of the Lake Shiwha in the late 1990s.

Wetlands conservation policy in Korea can be divided into the before and after the establishment of MOMAF in 1996. Before the establishment of MOMAF, MOCT was in charge of reclamation of wetlands based on “the Public Water Reclamation Act.” The main function of this act was the creation of land for industrial complex, construction of houses and apartments, roads and railroads, ports and airports, dams, and bridges.

Until 1996, there was no act to manage coastal resources. Also there was not a government agency in charge of the management of coastal resources. Only MOE had natural resource related management duties through its charge

to manage coastal water quality based on "the Water Quality Conservation Act." Therefore it was easy for governmental agencies to come to an agreement on a project or program of wetland reclamation regardless of its scale if based on project guarantees of improving the water quality. Most of the large reclamation projects in Korea were planned and accepted by "the Public Water Reclamation Act" before 1996.

By the Public Water Reclamation Act, MOCT should submit a "Basic Public Water Reclamation Plan" every ten years, the contents of which should include: position and scale of expected reclamation areas, land use plans for expected reclamation areas, reclamation methodology, impacts caused by the reclamation and policy alternatives, and feasibility studies on the reclamation. The First Basic Public Water Reclamation Plan was from 1990 to 2000, where 459 sites totalling 960 square kilometres were planned to be reclaimed.

A private entity or a local government can request to reclaim wetlands. However, the requested site for the project should be included in the Basic Public Water Reclamation Plan. Therefore, private entities and the local governments should apply for reclamation during the discussion period of the next Basic Public Water Reclamation Plan.

From 1996, at the time of establishment of MOMAF, the function of the reclamation of wetlands based on "the Public Water Reclamation Act" now fell under its direction. By this time, however, the Second Basic Public Water Reclamation Plan for the period of 2001 to 2011 had already been approved. This ten year plan called for reclamation projects on 355 sites totalling 390 square kilometres. MOMAF, however, accepted only 186 sites totalling 38 square kilometres. Comparatively, in the First Basic Public Water Reclamation Plan established by MOCT, there were 459 sites of 960 square kilometres.

One of the legislations for conservation of the coastal resources was the ratification of "Ramsar Convention" and enactment of "the Wetland Conservation Act" in 1999, of which main objectives are to conserve and manage the important and precious wetlands and thereby to preserve endangered wildlife and biodiversity.

Under the Wetland Conservation Act, MOMAF has designated important sites as "Wetland Conservation Sites," which is a very difficult undertaking because most of the fishermen living in these areas were strongly opposed to the designation of "Wetland Conservation Sites." The fishermen believe that the price of their affronting land will drop or will

not increase because of the prohibition of development if the wetlands are designated as the Wetland Conservation Sites. Until now, five sites covering 141 square kilometres have been designated as Wetland Conservation Sites. MOMAF has plans to designate a further 13 sites by 2010. Also MOMAF has designated 4 wetland sites covering 71 square kilometres as Biodiversity Conservation Sites.

4. Pollution

1) Overview

Over the last three decades, various pollutants, which were generated by industrial activities and municipalities located along coastal area, have been discharged into the coastal waters. Also with industrialization and economic growth, ocean dumping has increased continuously. Also there have been about 300 cases of oil spill every year as vessel traffic increases in the coastal waters. They imposed cumulative impacts on the coastal environment and caused serious problem, such as eutrophication, red tides, and mass mortality of marine organisms. Since 1991, coastal water quality measured by the COD was maintained at the second class standard. Although the COD level showed a decreasing annual trend, the levels of nitrogen and phosphorus, which were the main triggering factors of red-tides, were much higher than the standard. Due to the declining water quality and increase of nitrogen and phosphorus, the number of red-tides increased continuously.

The sources of coastal water pollution can be divided into two: land-based and sea-based sources of pollutants. Korea's government ratified most of the international conventions for preventing pollution from sea-based sourced of pollutant and enacted national laws and thereby established relevant government policies. However, land-based sources of pollutants have not been effectively managed. The Marine Pollution Prevention Act (MPPA), which includes MARPOL and ocean dumping, is the major law to prevent marine pollution from vessels and ocean dumping. However, MPPA has weak regulation over land-based sources of pollutant. MOMAF is now revising the law to address land-based sources of pollutants and reinforce marine environment impact assessments.

The Water Quality Conservation Act (WQCA), which is under the authority of MOE, is the major law on water quality. The basic scheme of WQCA for water quality is the end-pipe discharge control, which also does not address the

coastal water quality. So MOMAF tried to enact "Land-Based Sources of Pollutant Management," however, failed due to the strong opposition from MOE.

In addition to water quality, there is an issue on marine debris in Korea. As industrialization and population growth increases, as well as dense aquaculture increases in the coastal zone, huge quantities of marine debris will be generated and flow into the coastal waters.

2) Marine Environment Management Policy

In 1995, before the establishment of MOMAF, MOE was in charge of marine environment management mainly based on the MPPA (Marine Pollution Prevention Act) and the WQCA (Water Quality Conservation Act). However, MOE did not give priority to the preservation of the marine environment because there had been so many urgent issues on land, such as drinking water quality, air quality, soil quality, solid wastes, all of which occurred in the short time period of rapid economic development. MOE established limited coastal water management, such as prevention of pollutants from ships and control of waste material based on MPPA. MOE was also in charge of the coastal water quality based on WQCA. However, MOE enforced WQCA for water quality on land strictly but not for ports and coastal waters mainly due to low prioritization of the marine environment.

Together with its establishment of MOMAF and revision of the GOA, which mandates MOMAF the authority of marine environmental management, MOMAF took over MPPA from MOE. First of all, MOMAF tried to establish a more comprehensive marine environmental preservation plan including especially prevention and mitigation of the land-based sources of pollutants. In 1996, MOMAF initiated to establish the "First Marine Environment Preservation Comprehensive Plan" for five years from 1996 through 2000 and the Second Comprehensive Plan for five years from 2001 through 2005. Both of the plans are based on the MPPA. MOMAF is now preparing the third Comprehensive Plan for five years from 2006 through 2010.

Congress and MOMAF planned a total of 4,400 billion Won to invest for implementation of "Comprehensive Plan for Marine Environment Preservation for 2001~2005," which included the following: prevention of land-based sources of pollutants, improvement of coastal water quality and preservation of marine ecosystem, strengthening of international cooperation and

preservation of global environment, and strengthening of marine environment infrastructure. In addition, more will be invested for the "Third Comprehensive Marine Environmental Preservation Plan for 2006-2010."

3) Land-Based Sources of Pollution

The United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) has concluded that, globally, 80% of marine pollution stems from land sources and that waste materials reach the oceans via "direct discharges, runoff and to a lesser extent, the atmosphere." The dense population and many industrial complexes in the coastal areas in Korea have resulted in a large quantity of pollutants, all of which eventually flows into the coastal waters. Therefore, some coastal waters have become seriously polluted.

(1) Marine Pollution Prevention Act

In 1977, the MPPA (Marine Pollution Prevention Act) was originally enacted to prevent pollution from vessels, most of which incorporated the MARPOL convention and gave MOE (Ministry of Environment) authority over the act. The MPPA does not address much the land-based sources of pollution. However, due to population growth, industrialization and development in coastal areas, much of the land-based sources of pollutants flow into the coastal waters and degrade the marine environment. However, MOE did not revise MPPA to prevent land-based sources of pollution.

Together with its establishment of MOMAF and revision of the GOA, which mandates MOMAF the authority of marine environmental management, MOMAF took over MPPA from MOE. Now MOMAF is revising the law to reflect these needs and to include the "Establishment of Marine Environment Management Corporation," the "Strengthening of EIA (Environment Impact Assessment)," and the "Strengthening of Regulation of Pollutant Disposal." Additionally, the name of MPPA will be changed to the "Marine Environment Management Law."

(2) Water Quality Conservation Law

The WQCA, which is under the authority of MOE, is the major law on water quality in Korea. The basic scheme of WQCA for water quality is the end-pipe discharge control for all waters in Korea, such as the lakes, rivers, ports, and coastal waters. This principle of the end-pipe discharge criteria could not be effective in the large and dense industrial complex areas, where the much pollution loads flow into

the coastal waters. Therefore, MOMAF tried to enact "Land-Based Sources of Pollutant Management," however, failed due to the strong opposition from MOE.

The "Four Great River Special Law" mandates the establishment and implementation of the "Total Pollution Loads Management System." However, at present it is only starting in the Han River Watershed.

(3) Special Area Management Plan

The MPPA regulates that such seriously polluted areas might be designated as a Special Management Area. Before the establishment of MOMAF, the Special Management Marine Areas were under the authority of MOE, which designated the coastal waters of Ulsan, Busan, Masan and Kwangyang as Special Management Marine Areas. The MPPA regulates that a Special Area Management Plan should be established once an area is designated as a Special Management Area. However, MOE did not establish any Special Area Management Plan because most of the pollutants in the area are land-based and it is hard to persuade stakeholders to reduce their pollutants.

However, since taking over the MPPA from MOE, MOMAF has monitored, surveyed and forecasted the carrying capacity of the Special Management Area and the total land-based and sea-based pollutants flowing into the area. After long discussions with major stakeholders including local governments, MOMAF established Special Area Management Plans for the coastal waters of Ulsan, Busan, Masan, Kwangyang and Shiwha-Incheon, totalling 1127.61 square kilometres of sea and 1065.15 square kilometres of land, of which the main objectives are to regulate land-based pollutants. For the effective implementation of the plans, a Special Area Management Committee for each site, which consisted of the local stakeholders, has been established.

MOMAF is trying to implement a "Total Pollution Loads Management System" at Masan Bay, introducing the following: goals for water quality, target sources of pollution, total discharge allowable quantity of pollution, expansion of sewage treatment facilities, and strict regulation of discharge.

Also MOMAF has revised the MPPA to designate such valuable areas as fishery resources conservation areas. MOMAF designated the Bay of Kamak, Hampyung, Wando-Doam and Deugryang as Environmental Conservation Areas and established the management plan, totalling 1172.41 square kilometres of sea and 1718.40 square kilometres of land of which main objectives also are to control the land-based pollutant.

Also MOMAF tried to enact the "Land-Based Sources of Pollution Discharge Management Law" to control the land-based sources of pollution. However, in September 22, 2004, a relevant government agencies meeting concluded that the enactment should be postponed and MOMAF should establish and implement the "Comprehensive Action Plan for Prevention of Land-Based Sources of Pollution," including both the policy and a budget.

4) Ocean Dumping Management

Korea entered London Dumping Convention in Dec. 1993, which went into effect from in January 1994. However, ocean dumping increased continuously due to population growth and economic and industrial development: 552 tons in 1988, 1,068 tons in 1990, 1,990 in 1992, 3,291 tons 1994, 5,014 tons in 1996, and 9,749 tons in 2004.

Demand for ocean dumping has increased rapidly due to industrialization and strict regulation on land. For example, direct waste reclamation is prohibited on land. Excretion and industrial wastes dumping at sea started in 1981 and 1984 respectively. MOMAF designated 3 area as ocean dumping sites: East Sea "Byung" (3,700km^2, depth: 200-2,000m); East Sea "Jung" (1,616 km^2, depth: 150m); West Sea "Byung" ((3,165 km^2, depth: 80m).

MOMAF established "Comprehensive Plan for Land-Based Waste Ocean Dumping,", by which the total quantity of ocean dumping will be reduced by 50% by 2011, ocean dumping of livestock waste water to be prohibited by 2012, and ocean dumping areas will be changed in a certain period of time.

5) Marine Debris Management

Marine debris is by-products of human activity that have ended up in the oceans. Most marine debris harms the marine environment and communities through maritime accidents, habitat degradation, loss of fisheries products, and loss of tourism. Much marine debris, such as derelict fishing gear, plastics, bottles, and wood, floats on the surface and moves from its original source. Much land-based marine debris flows into the coastal areas from upland rivers. Much derelict fishing gear and related marine debris flows into fishing grounds and aquaculture areas from different areas.

Some marine debris is trans-boundary and moves long distances, which is controversial internationally. Floating debris travels long distances over the ocean and is deposited far from its

source, which can cause problems over a large area. The most buoyant types of floating debris are plastics and some types of rubber (U.S. EPA, 2002). In addition to the Pacific-wide impact of derelict fishing gear, the problem is exacerbated by oceanographic surface currents which ultimately concentrate much of the debris from the greater North Pacific Ocean in ecologically sensitive regions. Huge amounts of derelict fishing gear and related marine debris are discarded and flow into the coastal waters of Pacific Islands including Hawaii (APEC, 2004). The transfer of marine debris from one place to another place is an urgent challenge for domestic and international management.

Marine debris in the sea is usually so heavy, lengthy and bulky that it is hard to remove. First of all, it is difficult to survey the exact position of deposited marine debris. Usually it is deposited across deep coastal water. Therefore, special facilities and equipment are necessary to collect and remove them from the bottom. Marine debris is not only costly to move, but also to dispose. In addition, it is also salty, which hinders incineration. Also a shortage of waste facilities makes it difficult to dispose of marine debris on land.

Most of the land-based marine debris flows into the sea through rivers during times of flooding, so it is difficult to monitor their origin and source of generation. Some land-based marine debris is generated through recreation at the beach and along the coast. There are not international legislations, which control land-based marine debris, leaving it up to individual coastal countries. However, it is hard to legislate domestically an act on land-based marine debris from rivers or beaches.

As population increases and economic development continues, huge quantities of marine debris are generated from the land in Korea. Also large quantities of marine debris are generated from the aquaculture and fishing industries, which are densely active in coastal areas.

This marine debris not only harms the marine environment, but also causes a large number of marine accidents in Korea. However, until recently the management system for this marine debris has not been well established and ineffective. So the public and government of Korea have found challenges in solving the problem of marine debris.

(1) Budget for Marine Debris Management

MOMAF acquired a budget for marine debris management in 1999 and thereafter the amount has increased. The total budget for removal of deposited

marine debris from 1999 to 2003 was U.S. $125 million, and U.S. $70 million from 2004 to 2006. The budget for "Establishment of Comprehensive Marine Debris Disposal System" from 1999 to 2008 is U.S. $20.7 million. In addition to the above, considerable amounts of the budget for various marine debris management have been acquired by MOMAF.

(2) Removal of Marine Debris

MOMAF searched and surveyed deposited marine debris at 146 areas, such as ports and fishing ports, from 1999 to 2000. Major fishing grounds in the coastal waters and EEZ will be surveyed from 2003 to 2007.

At a local level, Incheon City surveyed deposited marine debris at the coastal area (500,000 ha) of Incheon City in 2000. The total quantity of deposited marine debris was 194,000 cubic meters or 97,000 tons.

MOMAF removed deposited marine debris at commercial ports, major fishing ports, and major fishing grounds, such as blue crab fishing grounds in the Yellow Sea and king crab fishing grounds in the East Sea (Table 1). Two government-controlled organizations remove and dispose deposited marine debris: in fishing grounds by the Korea Fishing Port Association and in the coastal waters by the Marine Pollution Response Corporation.

A total of 46,649 tons of deposited marine debris has been removed from 1999 to 2003, most of which were derelict fishing gear, wire, and tires. Floating marine debris at commercial and fishing ports were collected by 28 cleaning vessels. At a local level, Incheon City removed 1,713 tons of deposited marine debris in 2002 and 867 tons in 2003.

Table V– 6 Removal of deposited marine debris

Year	1999	2000	2001	2002	2003	Total
Quantity	1,135	12,687	10,798	10,112	11,917	46,649

(Unit: ton)

(3) MOU between Local Governments

Most of the local governments in Korea have not established any program for marine debris because it is not addressed in the National Waste Comprehensive Management Plan and so there is no financial support from the central government. However, Incheon City has trouble in managing marine debris.

About 191,000 cubic meters of land-based marine debris flow into the coastal water of Incheon City through the Han River every year. The land-based marine debris consists of wood (50.3%), vinyl and plastic (27.2%), and nets (8.9%), which are generated by Incheon City and upstream Seoul and Kyungki Province. However, the local government of Incheon City, alone, is damaged by land-based marine debris.

Incheon City has claimed that Seoul and Kyungki Province should compensate the victim, Incheon City, but was refuted. Through long discussions, the three local governments have made a memorandum of understanding (MOU) to raise funds for the removal of land-based marine debris in proportion to the population and quantity of land-based marine debris generated. Incheon City, Seoul and Kyungki Province have established funds shared by 50.2%, 22.8%, 27.0% respectively. The first phase of the MOU was 2001 to 2002 and the second phase is 2002 to 2006, of which the total fund is U.S. $23.9million.

(4) R&D for Marine Debris Management

Once marine debris is at sea, it is hard and costly to remove and dispose on land. So, scientists at research institutes have developed materials for a public outreach program and facilities and equipment for searching, collecting, and disposing marine debris. The major outputs of R&D are as follows: Development of Materials for Public Outreach Programs; Floating-Fence Collection System for Land-based Marine Debris; Styrofoam Volume Reduction System (SVRS); Search and Collection of Derelict Fishing Gear in Deep Sea; Marine Wastes Incineration System.

6) Oil Spill Management

With the increased activities of cargo transported by ships, Korean coastal waters have suffered continually from oil spill accidents, approximately 300 cases annually. During the period of 1991 through 1998, total of 3,100 cases of oil spill accidents took place, discharging 42,500 kiloliters of oil. The spill accidents occurred mostly by oil-tankers, and the major cause was identified as carelessness of crew members. These oil spills imposed adversely on the marine environment including dense aquaculture in the south and west coast in Korea.

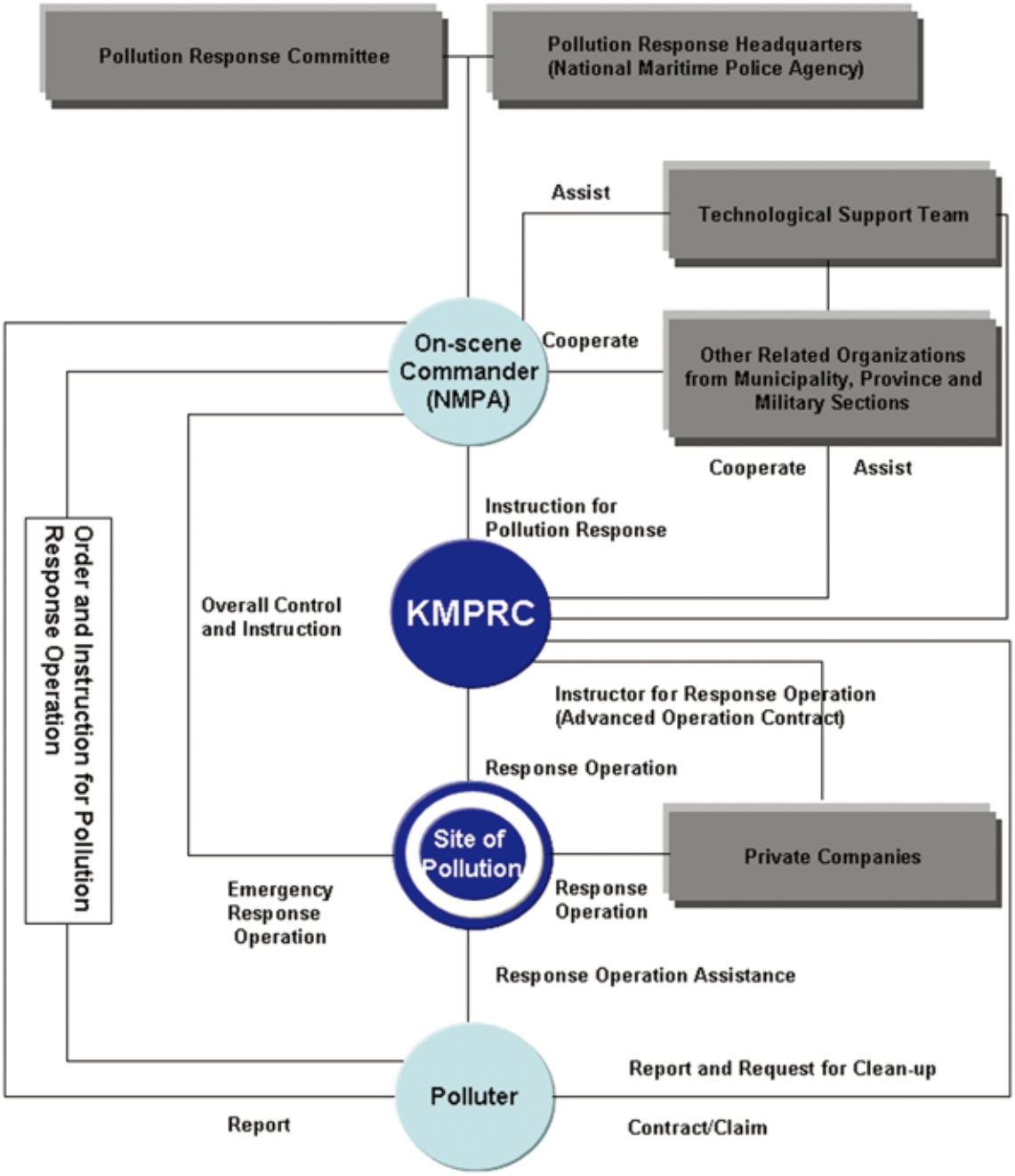
The Sea Prince Accident of 1995 was the first VLCC oil spill accident in Korea, which damaged huge areas of the coastal waters and was a shock both to the general public and government on the adverse impact of VLCC accidents. However, the oil spill management before Sea Prince Accident was poor because oil

spill management was fragmented into multi-government agencies: Maritime and Port Administration (MPA) was in commercial ports, Fishery Administration (FA) in national fisheries ports, local governments in small fisheries ports and Korea Coast Guard (KCG) at sea beyond twelve miles from shoreline or in charge of large oil spills – more than 200 litres. Also the oil spill management at the time of the Sea Prince Accident was so poor that the National Contingency Plan (NCP) or any Regional Contingency Plan (RCP) was not established and the resources for response to large oil spill were not enough.

The oil spill response conducted by fragmented agencies without NCP and RCPs resulted in inefficiencies in oil spill management, preparedness of resources, and development of oil spill management technology.

After the Sea Prince Accident, the responsibility and function of all the oil spill response agencies were unified into KCG regardless of size and areas of oil spill. And in 1997, MOMAF established KMPRC (Korea Marine Pollution Response Corporation) to effectively respond to oil spill accidents from the oil refinery industry and tanker and shipping industry. Also KCG of MOMAF established NCP in 2000 and RCPs for twelve major coastal waters from 1999 to 2002. And then the Korea government ratified the OPRC in 2000 and has tried to cooperate with neighbouring nations throughout the Northwest Pacific Action Plan (NOWPAP) to respond to big oil spill accidents.

Fig. V– 2 Oil Pollution Response System in Korea



5. Summary

The legal and policy analysis is consisted of fisheries, biodiversities, ecosystem, and pollution. Until now, fisheries, biodiversities, ecosystem, and pollution have been strong press of economic development and fragmented

governmental agencies with fragmented legal system and policies. However, since establishment of MOMAF, sustainable development of marine environment and resources has been on the top priority.

Until recently the fisheries industry has grown by strong governmental support together with economic development. However, total fisheries products have decreased continuously from the peak of 3.5 million ton in 1994. The main reasons of decreasing fisheries products are the reducing fisheries ground in the foreign countries, decreasing fisheries stocks in the Korean coastal waters, and devastating aquaculture such as pollution. Also much import of fisheries from foreign contributed the reducing fisheries products in Korea.

The direction of fisheries policy has been fundamentally changed from growth in quantity to sustainable development of fisheries resources. Until recently the major fisheries policies have been traditional fisheries management such as the license system. However, the Korean government has established various programs and policies, such as a TAC system, a marine ranch program, and aquaculture program, and a buy-back program to restore the fisheries stock and sustain fisheries. However, the scientific assessment of fisheries resources has not been conducted effectively due to lack of agreement between neighbouring countries on transboundary fisheries and illegal fishing by domestic and foreign fishers.

While MOE is in charge of biodiversity and ecosystems in Korea, MOMAF is in charge of most of the marine biodiversity and ecosystem management. Until recently both the MOE and MOMAF have not address the marine biodiversity and ecosystem management. MOE and MOMAF have not established a management program or policies for marine biodiversity. Also they have not conducted any comprehensive survey of marine living resources except fisheries.

Also the marine ecosystem in Korea has been impacted seriously due to the degradation of coastal water quality, loss of wetlands, reclamation of coastal waters, sand mining, over-exploitation and illegal fishing, coastal erosion, loss of beach, and red tides. However, until recently the Korean government has not established any program and policy on the marine ecosystem. Therefore, MOMAF and Congress are enacting the "Marine Ecosystem Conservation and Management Law" for conservation and management for a sustainable marine ecosystem. The law is independent and separated from the "Natural Environment Conservation Law" and, if enacted, will be under the authority of MOMAF.

Over the last three decades, various pollutants, which were generated by industrial activities and municipalities located along coastal area, have been discharged into the coastal waters. Also with industrialization and economic growth, ocean dumping has increased continuously. And there have been about 300 cases of oil spill every year as vessel traffic increases in the coastal waters. They imposed cumulative impacts on the coastal environment and caused serious problem, such as eutrophication, red tides, and mass mortality of marine organisms.

Korea's government has ratified most of the international conventions for preventing pollution from sea-based sourced of pollutant and enacted national laws and thereby established relevant government policies. The Marine Pollution Prevention Act (MPPA), which includes MARPOL and ocean dumping, is the major law to prevent marine pollution from vessels and ocean dumping.

However, land-based sources of pollutants, which are more than 70% of sources of the total coastal water pollution, have not been effectively managed. First of all, MPPA has weak regulation over land-based sources of pollution because it was originally enacted to prevent pollution from vessels. The Water Quality Conservation Act (WQCA), which is under the authority of MOE, is the major law on water quality. However, the basic scheme of WQCA for water quality is the end-pipe discharge control, which can not address the "total pollution load" of land-based sources of pollution.

Therefore, MOMAF is now revising the MPPA to address land-based sources of pollutants and reinforce marine environment impact assessments.

VI. Synthesis Analysis

1. Integrated Governance Analysis

1) Stakeholder Analysis

YSLME stakeholders can be divided into government sector and private sector in Korea. Government sector can be divided into government organizations and quasi-government organizations. Government organizations, such as congress, central government agencies, and local government agencies, make decisions on YSLME. Quasi-government organizations are research institutes and universities. The private sector can be divided into three categories: Industry; NGOs; Public. The industry includes fisheries industry, shipping and logistic industry, port industry, oil industry, mining industry, tourism industry, R&D industry, marine environment industry, etc. NGOs are stakeholders who also affected by decision on YSLME and representative of the general public. The scholars, researchers, experts, and reporters are representative of the public.

The government sector initiates feasibility studies, public hearings, expert and stakeholders committees, and public meetings for decision-making. The private sector participates and expresses their interests in the feasibility studies, public hearings, stakeholders committees, and public meetings for decision-makings. However, if they do not satisfy with the results, then they express their interests in mass-media or by demonstration. The demonstration for opposing the Samangeum Reclamation Project is a good example.

The marine ecosystem and resources management is too large for the government alone, so the active participation of all the relevant stakeholders is indispensable for its success. However, the government sector has tended to utilize the mechanism of decision-making for their own sake. And generally the participation of stakeholders in decision-making is poor in Korea because of the following reasons: the short history of marine ecosystem management, the short history of NGO, the lack of culture of discussion among stakeholders, and development-oriented policy for economic development.

However, the Korean government established a few programs, such as Partnership Program for Marine Debris Management, Marine Debris Purchasing Program, Fisheries Self-Management Program, Deregulation on Fisheries Management, Honour Fishing Surveillance Program, and Honour Marine Environment Guard System, for inviting stakeholders to participation in decision-making process. Although it is too early to evaluate all of the mentioned programs, some of them have been implemented effectively.

2) Institutional Analysis

The negative issues related to the marine ecosystem were the results of sectoral management of oceans policy. The oceans policy in Korea like most countries was fragmented with multi-government agencies. In 1996, the Korean government, however, integrated the fragmented government authorities into one single agency recently, called the Ministry of Maritime Affairs and Fisheries (MOMAF). MOMAF integrated almost all marine administrations, such as the Maritime and Port Administration (MPA), the Fisheries Administration (FA), the National Marine Police Administration (NMPA), the Hydrographic Affairs Office.

Together with the establishment of MOMAF, the Korean government revised the Government Organization Act (GOA) mandating MOMAF to be in charge of oceans policies. Under the GOA, most of the ocean-related government agencies together with their authorities, such as MPA with shipping and port management, FA with fisheries management, NMPA with maritime law enforcement, Maritime Safety Tribunal with maritime accident investigation and judgment, and National Oceanographic Research Institute with research on oceanographic, were integrated into MOMAF. Also based on the GOA, MOMAF took over marine environmental management from the Ministry of Environment (MOE) and public water management and reclamation policy from the Ministry of Construction and Transportation (MOCT). Therefore, most of ocean-related organizations with their authorities integrated into one single administration except shipbuilding, atmospheric forecasting, and exploitation of offshore oil and gas.

The environmental management has become a dual system based on spatial divisions. The water quality management on land remains under the authority of the MOE based on the Water Quality Conservation Act. The coastal water quality management, however, is under the authority of MOMAF based on the Marine Pollution

Prevention Act. Despite the dual system of environmental management, there are still conflicts on the separation of functions or policies between MOMAF and other governmental agencies, such as estuary and watershed management, public beach management, management of marine national park, management of uninhabited island, environment impact assessment (EIA) for marine environment. These conflicts occur mainly from undefined spatial demarcations and turf protection of the governmental agencies.

In addition to MOMAF, there are still other government agencies, such as MOCT and MAF, who have strong incentives and power related to the development of marine ecosystem. Also, local governments have shown strong incentives for development of marine ecosystems for tax revenues and regional economic development since the local self-government movement started in 1995.

Also even after the establishment of MOMAF, the previous sectoral management has continued. This is due to the individual laws and organizations of MOMAF. All the previous sectoral management was based on the individual relevant laws, and MOMAF took them over without integration. Also MOMAF organized its organization to carry out the previous sectoral management, such as Shipping and Logistics Bureau, Ports and Harbours Bureau, Fisheries Policy Bureau, Fishery Resources Bureau, Maritime Safety Management Office, National Oceanographic Research Institute, Maritime Safety Tribunal, and KCG.

3) Legal and Policy Analysis

(1) Fisheries

"The Fisheries Law" and "the Fishery Resources Protection Law" provide the legal framework for the management of the fisheries sector and the protection of fishery resources. Based on the Fisheries Law, the central government (MOMAF) and local governments (provincial, city, and district) are responsible for fishery resources management (Kang, 2006). Based on the above mentioned laws, the fisheries policy in Korea has been growing in quantity because of strong governmental support together with rapid economic development. As a result, the catch of fisheries of Korea ranks twelfth in the world and the export of fishery as a primary industry ranks highest in Korea. However, total fisheries products have decreased continuously from the peak of 3.5 million ton in 1994. The problems were that all kinds of fisheries products from ocean fishing vessels, coastal fishing vessels, aquaculture, and fresh water, have been decreasing. The main

reasons are the over exploitation and deterioration of water quality, and loss of aquaculture areas due to reclamation. Although aquaculture is a very important alternative, harmful algal blooms (HAB) and deteriorated water quality make it difficult.

Recently, the direction of fisheries policy has been fundamentally changed from growth in quantity to sustainable development of fisheries resources. The Korean government has established various programs and policies, such as a TAC System, a marine ranching program, an aquaculture program, and a buy-back program to restore the fisheries stocks. However, the scientific assessment of fisheries resources, which is the most important factor for sustainable fisheries management, has not been conducted effectively due to a lack of agreement between neighbouring countries on transboundary fisheries and illegal fishing by domestic and foreign fishers.

(2) Biodiversity

While MOE is in charge of biodiversity and ecosystems in Korea, MOMAF is in charge of most of the marine biodiversity and ecosystem management. "The Natural Environment Conservation Law" is the major law for biodiversity and ecosystem management in Korea. Several Marine Protected Areas have been designated under this act. However, MOE has mainly addressed the terrestrial realm. "The Wildlife Fauna and Flora Protection Law" mandates MOE to designate and manage endangered species in Korea. In addition, the "Wetland Conservation Law" and "Cultural Heritage Management Law" are relevant to marine biodiversity and ecosystem.

The data and information on habitat in Korea are mostly limited to terrestrial systems. In addition, no comprehensive survey of marine living resources, except fisheries, has been conducted. There are no established management programs or policies related to marine biodiversity. Currently, MOMAF is enacting "Marine Ecosystem Conservation and Management Law," which mandates MOMAF to establish a "Marine Living Resources Diversity Management Plan" and other related policies.

(3) Ecosystem

Until recently the marine ecosystem in Korea has been degraded due to decreasing coastal water quality, loss of wetlands, reclamation of coastal waters, sand mining, over-exploitation and illegal fishing, coastal erosion, loss of beach, and red tides. However, until recently government programs and policies have not addressed the marine ecosystem. In 1999, MOE and MOMAF revised the "Natural Environmental

Conservation Law," which gives MOE and MOMAF authority of terrestrial and marine ecosystems and natural living resources, respectively. However, the act does not specifically address the marine ecosystems. Therefore, MOMAF and Congress are enacting the "Marine Ecosystem Conservation and Management Law" for conservation and management of sustainable marine ecosystem. If enacted, the law will be under MOMAF.

Wetlands and marine sand are important habitat and factors in marine ecosystems. However, until recently the wetland and marine sand management has been development-oriented. Therefore, MOMAF and MOE enacted "the Wetland Conservation Act" in 1999 and struggle to conserve the wetlands while MOCT, MAF, and local governments are still much interested in reclamation of wetlands. MOMAF also struggles to conserve marine sand but MOCT and dredging and the construction industry have established a strong development system and political lobby.

(4) Pollution

Over the last three decades, various pollutants, which were generated by industrial activities and municipalities located along coastal area, have been discharged into the coastal waters. Also, as industrialization and economic growth, ocean dumping has been increased continuously. There have been 300 cases of oil spills every year as vessel traffic increases in the coastal waters. They imposed cumulative impacts on coastal environment and caused serious problem, such as eutrophication, red tides, and mass mortality of marine organisms.

Since 1991, coastal water quality measured by the COD was maintained at the second class standard. Although the COD level showed a decreasing annual trend, the level of nitrogen and phosphorus, which were the main triggering factors of red-tides, marked much higher than the standard. Due to the decline of water quality and increase of nitrogen and phosphorus, the number of red-tides increased continuously.

Korea's government ratified most of the international conventions regarding sea-based pollutants and enacted national laws in response. However, land-based sources of pollutants have not been effectively managed. The Marine Pollution Prevention Act (MPPA) is the major law on preventing marine pollution from vessels and ocean dumping.

The Water Quality Conservation Act (WQCA), which is under the authority of MOE, is the major law on water quality. The basic scheme of WQCA for water quality is the end-pipe discharge control,

which also does not address the coastal water quality. Therefore, MOMAF tried to enact the "Land-Based Sources of Pollutant Management," but failed due to the strong opposition from relevant government agencies. At present the policy on preventing land-based sources of pollution is weak in Korea.

2. Policy Recommendations

Total 23 recommendations in five policy areas of (1) Stakeholders Participation in Decision-Making, (2) Institutional Reforms for Ensuring Coordination and Harmonization, (3) Recommendations for Marine Ecosystem Programs: National Legislation, (4) Recommendations for Marine Ecosystem Programs: National Plan, (5) Recommendations for Sustainable Fisheries Resources Management has been suggested in this review. Survey by questionnaire for priority rank among the five policy areas and 23 recommendations of each policy area were conducted. Most of the respondents are Working Group Members of YSLME and researchers. Several meetings of experts were held based on the questionnaire for priority rank, of which results are as table VI-1.

Table VI-1 Policy priority for policy recommendations

Policy Area	Priority rank	Recommendations	Priority rank
1) Stakeholders Participation in Decision-Making	(4)	1 Enhancement of Involvement in Decision-Making Process	(3)
		2 Enhancement of Partnership Program	(1)
		3 Expansion of Incentive Program	(2)
		4 Enhancement of Deregulation and Self-Management	(4)
		5 Enhancement of Honour Surveillance Program	(5)
2) Institutional Reforms for Ensuring Coordination and Harmonization	(3)	1 Coordination of Dual Environment Management System	(3)
		2 Coordination among Stakeholders for Marine Ecosystem	(2)
		3 Coordination for Marine Ecosystem inside MOMAF	(1)
3) Recommendations for Marine Ecosystem Programs: National Legislation	(1)	1 Enactment of "Marine Ecosystem Conservation and Management Law	(1)
		2 Enactment of "Marine Environment anagement Law	(3)
		3 Enactment of "Land-Based Sources of Pollution Management"	(2)
4) Recommendations for Marine Ecosystem Programs: National Plan	(2)	1 Reinforcement of Marine Environment Impact Assessment	(2)
		2 Comprehensive Plan for Marine Environment Management	(1)
		3 Ocean Dumping Management	(4)
		4 Special Area Management Plans	(3)
		5 Marine Debris Management	(7)
		6 Marine Sand Management	(5)
		7 Oil Spill Response Management	(6)
5) Recommendations for Sustainable Fisheries Resources Management	(5)	1 TAC System	(1)
		2 MPA Program	(3)
		3 Marine Ranch Program	(5)
		4 Aquaculture Program	(4)
		5 Prevention of Illegal Fishing	(2)

1) Stakeholders Participation in Decision-Making

(1) Enhancement of Involvement in Decision-Making Process

Stakeholders' Involvement in decision-making process should be initiated by the government sector and should be enhanced. For example: (i) Document review; (ii) Feasibility studies and EIAs; (iii) Public hearings, experts committees, and public meetings.

(2) Enhancement of Partnership Programs

Partnership Program such as Marine Debris Monitoring by NGOs with support from MOMAF and KMI should be expanded to other areas such as fisheries.

(3) Expansion of Incentive Programs

Incentive Programs such as the purchase of marine debris collected by fishermen can be expanded to other areas such as fisheries.

(4) Enhancement of Deregulation and Self-Management

Marine environment and resources management is too large for solely a top-down system. Deregulation and self-management, such as Fishing Village Cooperatives management and Fisheries Self-Management Program, could be expanded into other area.

(5) Enhancement of Honour Surveillance Programs

Honour Surveillance Programs, such as Honour Fishing Surveillance and Honour Marine Environment Guard System, could be expanded for positive involvement of stakeholders in decision-making and policy enforcement.

2) Institutional Reforms for Ensuring Coordination and Harmonization

(1) Coordination of Dual Environment Management System

Under the GOA, the environmental management in Korea has become a dual system based on spatial divisions: the terrestrial environment is managed under MOE and the marine environment, under MOMAF.

MOE and MOMAF should establish a Committee for the Coastal Ecosystem-Based Management in order to fill this gap, such as land-based sources of pollution, marine debris disposal, estuary and watershed management, public beach management, national marine park management, uninhibited island management, and marine environment impact assessment, all of which are created by dual environmental management.

(2) Coordination among Stakeholders for Marine Ecosystem

Despite of establishment of MOMAF as the sole government agency in charge of conservation of marine environment and resources, there are still other government agencies, such as MOCT and MOAF, who have strong incentives and power for development of marine ecosystems. Also the local governments have shown strong incentives for development of the marine ecosystem for tax revenues and regional economic development.

It is imperative to establish an "Ad Hoc Committee on Coordination for Sustainable Development of Marine Ecosystem" under the Prime Minister, of which members include relevant

central government agencies, local governments, experts, NGOs, and the public.

(3) Coordination for Marine Ecosystem inside MOMAF

MOMAF established a new bureau, the Marine Policy Bureau, to establish and implement policies for sustainable development of the marine environment and resources that were not tried or neglected before MOMAF. However, the function of coordination of the Marine Policy Bureau is weak because the level of the bureau is the same as the other bureaus, such as Shipping and Logistics Bureau, Ports and Harbours Bureau, Fisheries Policy Bureau, Fishery Resources Bureau, and the Maritime Safety Management Office.

It is necessary to increase the authority of the Marine Policy Bureau to be able to coordinate on major issues of Marine Ecosystem Management.

3) Recommendations for Marine Ecosystem Programs: National Legislation

(1) Enactment of "Marine Ecosystem Conservation and Management Law"

MOMAF is scheduled to enact "Marine Ecosystem Conservation and Management Law" in 2006. If enacted as scheduled, the objective and mandates are independent and separated from the "Natural Environmental Conservation Law." The major mandates in the new law, such as "Comprehensive Plan for Marine Living Resources Conservation and Management," "Designation and Management of Marine Protective Areas," "Program for the Support of Residents and the establishment of Marine Living Resources Conservation Fund," and "Fostering Private Organizations" should be implemented as scheduled.

(2) Enactment of "Marine Environment Management Law"

MOMAF is scheduled to revise "Marine Pollution Prevention Act," which addresses prevention of pollution from vessels. The major revisions are as following: prevention of land-based sources of pollution, establishment of "Marine Environment Management Corporation," and reinforcement of marine environmental impact assessments, all of which should be prioritized. The major mandates in the revised law should be implemented as scheduled.

(3) Enactment of "Land-Based Sources of Pollution Management"

MOMAF tried to enact a "Land-Based Sources of Pollution Discharge Management Law" to control the land-based sources of pollution. However,

relevant government agencies, especially MOE, strongly opposed the enactment and the "Relevant Government Agencies Meeting" concluded that the enactment should be postponed and instead MOMAF should establish and implement a "Comprehensive Action Plan for Prevention of Land-Based Sources of Pollution" including policy and budget development.

However, MOMAF has a limited effect on the control of land-based sources of pollutants without relevant law. Therefore, "Land-Based Sources of Pollution Discharge Management Law" should be enacted together with the government action plan on land-based sources of pollution.

4) Recommendations for Marine Ecosystem Programs: National Plan

(1) Reinforcement of Marine Environment Impact Assessment

At present any marine environment impact assessment is conducted based on the "Environmental Impact Assessment Act," which, however, has not considered the characteristics of the marine environment and ecosystem. The representative examples are port dredging, marine sand mining, and wetlands and coastal waters reclamation.

Therefore, a "Marine Environmental Impact Assessment" should be established from general EIAs and strictly reinforced considering the characteristics of marine ecosystem.

(2) Comprehensive Plan for Marine Environment Management

At present MOMAF is establishing a "Third Comprehensive Marine Environment Preservation Plan for 2006~2010," which will include the most important and basic policy for the marine environment and ecosystems. The plan should address followings: prevention of land-based sources of pollution and marine living and non-living resources conservation.

(3) Ocean Dumping Management

Due to industrial development and strict environmental regulation on land, demand for ocean dumping of land-based waste material has increased rapidly. However, ocean dumping also degrades the water quality and marine environment. "Comprehensive Plan for Ocean Dumping Management" should be established to include the following: ratification of 1996 Protocol of London Convention, reduction of ocean dumping by 50% by 2010, prohibition of dumping of livestock waste water by 2012,and change of designation of ocean dumping sites.

(4) Special Area Management Plans

MOMAF has established Special Area Management Plans for the coastal waters of Ulsan, Busan, Masan, Kwangyang and Shiwha-Incheon, totalling 1127.61 square kilometres of sea and 1065.15 square kilometres of land, of which the main objectives are to regulate land-based pollutants. MOMAF also designated the Bay of Kamak, Hampyung, Wando-Doam and Deugryang as the Environment Conservation Areas and established the management plan, totalling 1172.41 square kilometres of sea and 1718.40 square kilometres of land. However, the above plans have not been implemented effectively because "Total Pollution Load Management System" has not been experienced in Korea and most relevant agencies are reluctant to cooperate in the implementation of "Total Pollution Load Management System."

A "Committee on Special Area Management Plans" consisted of relevant central government agencies, local government, and stakeholders under the Prime Minister should be established for control the land-based sources of pollution and development in the watershed.

(5) Marine Debris Management

As population increases in the coastal area and economic development continues, huge quantities of marine debris are generated from the land in Korea. Also large quantities of marine debris are generated from the aquaculture and fishing industries, which are densely active in coastal areas. This marine debris not only harms the marine environment, but also causes a large number of marine accidents.

A "Comprehensive Marine Debris Management Plan" should be established, which should include the following: statistics of marine debris, such as generation, collection, and disposal of marine debris, a program for prevention of marine debris, a program for collection and disposal of marine debris, partnership monitoring among government, NGOs, and researchers, and international cooperation.

(6) Marine Sand Management

Traditionally, large amounts of aggregates (sand and gravel) have been consumed in Korea in construction projects, such as buildings, houses, apartments, roads, ports, dams, dikes, and reclamation, which are essential infrastructure for economic development. Until now, most sand has been supplied by dredging rivers. However, sources of land-based sand are being depleted and marine sand has become a new source. The supply of

marine sand has increased rapidly and is expected to increase continuously. However, excess dredging of marine sand may bring adverse effects to marine ecosystems, such as degradation of the marine environment, destruction of spawning and nursery habitats for certain fisheries, changes of underwater sea beds, currents and tides, and thereby erosion of coastal shorelines.

A "Comprehensive Marine Sand Management Plan" should be established, which includes the following: demand and supply of marine sand, long-term monitoring on marine sand, reinforcement of environmental impact assessments on marine sand mining, reinforcement of "Ocean Use Consultation" on marine sand mining, and prevention of illegal sand mining.

(7) Oil Spill Response Management

With the increased activities of cargo transported by ships, Korean coastal waters continually suffered from oil-spill accidents, approximately 300 cases annually. These oil spills imposed adversely on the marine environment including dense aquaculture in the south and west coast in Korea. Korea's Coast Guard (KCG) of MOMAF established the NCP in 2000 and RCPs for twelve major coastal waters from 1999 to 2002. Then Korea's government ratified the OPRC in 2000 and has tried to cooperate with neighbouring nations throughout the Northwest Pacific Action Plan (NOWPAP) to respond to big oil spill accidents. However, Marine Pollution Prevention Act (MPPA) has no regulation on NCP or RCP.

It is necessary to have NCP and RCP legal regulation in MPPA and thereby reinforce the function of NCP and RCPs.

5) Recommendations for Sustainable Fisheries Resources Management

(1) TAC System

The conventional fisheries management alternatives in Korea, such as limited license regulations, technical regulation methods, and vessel buy-back program, have related to a licensed fishery system, which are basically input controls systems. Conventional fisheries management has been proved to have a limited effect on the fisheries industry and resources management. In 1995, the government established a TAC system revising the Fisheries Law, which is an output control system that regulates the annual total amount of catch per species. It is one of the major management measures in the world of fisheries management. Nine species and five fisheries are now in the TAC system as of 2004 and it will be expanded to 21

species in 2010. The TAC system should be continued and reinforced as scheduled for sustainable fisheries stock restoration and management.

Although it is difficult to assess the effectiveness of TAC system because of its short period of implementation, both TAC and CPUE (catches per unit effort) of most species have continuously decreased since the introduction of TAC. One of the reasons is that most of the TACs have exceeded ABC (acceptable biological catch). For success of TAC system in Korea the following should be conducted: All the neighbouring countries of YSLME should conduct TAC system at the same time and same level; For scientific assessment of ABC and thereby effective implementation of TAC system, stock assessment of major target species of TAC should be conducted scientifically and regularly; And illegal fisheries should be prevented in the whole YSLME.

(2) MPA Program

MPA (Marine Protected Area) is an effective alternative for preservation and restoration of marine living resources including fisheries resources. The government designated MPA for preservation of fisheries resources, protection and preservation of marine ecosystem, and the marine environmental management based on twelve individual laws. However, because MPAs have been designated for different objectives based on different individual laws by different agencies, the effects have been reduced. Therefore, MPAs should be integrated and reinforced by unification of laws and government agencies.

(3) Marine Ranching Program

As fisheries resources have been depleted due to overexploitation and illegal fishing, MOMAF has enforced the marine ranching program, such as artificial reefs, artificial seaweed beds, and algal forest. The investment for marine ranching programs of five sites from 1998 to 2010 will be 158.9 billion Won. MOMAF has also designated 422 sites (10,603.6km^2) as MPAs (Marine Protected Area) for restoration of fishing stocks. MOMAF has invested in artificial reefs for spawning areas and habitat of 181,035 ha from 1971. The total artificial reefs will be 306,751ha. Marine Ranch Program should be encouraged and implemented as scheduled and R&D for Marine Ranch Program should be reinforced.

(4) Aquaculture Program

As the government policy has changed from "catching business" to "feeding business," the aquaculture industry has got strong support from the government. The aquaculture in Korea

is an alternative to catches by fishing vessels. MOMAF's plan is that the rate of aquaculture to total products would increase from 27% in 2000 to 45% in 2030. However, the aquaculture business has polluted the marine environment. The aquaculture program should be reinforced and implemented as scheduled. However, R&D for eco-friendly aquaculture should be invested continuously.

(5) Prevention of Illegal Fishing

The illegal fishing is one of root causes in resources depletion and results in inefficiency of fisheries management policies. Although the government has addressed prevention of illegal fishing, a lot of illegal fishing occurs in the coastal and near seas in Korea: 3,291 cases in 2001; 3,102 cases in 2002; 2,067 cases in 2003; 3,673 cases in 2004. So high priority and investment should be given for prevention of illegal fishing

References

Birkland, T. A., *An Introduction to the Policy: Theories, Concepts, and Models of Public Policy Making,* M. E. Sharpe, Inc., 2001.

Cheong, S. M., Managing fishing at the local level: The role of fishing village cooperatives in Korea. *Coastal Management* 32: 191-202, 2004.

Cho, D. O., Sharing lessons on ICZM in the Asia Pacific region: Experiences of ICZM in Korea. In *Impacts of population and markets on marine environment: Perspective of the Asia-Pacific economies*, 22-35. Pukyong National University-University of Washington Joint Seminar Proceeding. Busan, Korea: College of Fisheries Science, Pukyung National University, 2001.

Cho, D. O., Lessons learned from Lake Shiwha Project. *Coastal Management* 33: 315-334, 2005.

Cho, D. O., Challenges to marine debris management in Korea. *Coastal Management* 33: 389-409, 2005.

Cho, D. O., Challenges to sustainable development of marine sand in Korea. Ocean & *Coastal Management*: 49:1-21, 2006.

Cho, D. O., Evaluation of the ocean governance system in Korea, Marine Policy, in press.

Cho, D. O., Economic development-its dependence on the marine ecosystem: Experience and lessons learned from Korea. In *The Regional Conference on Parliamentary Roles in Protection of Marine Environment and Sustainable Use of Marine Resources in the Yellow Sea*. UNDP/GEF Project entitled "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem." Qingdao, China, 2006.

Cho, D. O. and S. B. Olsen, The status and prospects for coastal management in Korea. *Coastal Management* 31: 99-119, 2003.

Choi, S. A. and S. W. Park, A *Study on Institutional Arrangement for Marine Protected Area in Korea*, Korea Maritime Institute, 2004.

Clark, T. W., *The Policy Process: A Practical Guide for Natural Resource Professionals*, Yale University, 2002.

Foster, F., M. Haward, S. Coffen-Smout, *Implementing integrated oceans management*: *Australia's South East Regional Marine Plan (SERMP and Canada's Eastern Scotian Shelf Integrated Management (ESSIM) Initiative*, Marine Policy;29:391-405, 2005.

Judfa, L., Changing National Approach to Ocean Governance: The United States, Canada, and Australia. Ocean Development and International Law; 34: 161-187, 2003.

Hoel, A. H., Marine biodiversity and institutional interplay. *Coastal Management*, 31:25-36, 2003.

Hong, S. Y. and Y. T. Chang, Integrated coastal management and the advent of new ocean governance in Korea: Strategies for increasing the probability of success. *The International Journal of Marine and Coastal Law*, 1997; 12(2):131-161.

Jung, N. K., S. T. Hwang, S. O. Im, The result of "The Project of Purchasing Marine Waste Pulled up during Fishing" in Korea. In *The 1st NOWPAP Workshop on Marine Litter*. 8-9 June 2006, Northwest Pacific Action Plan (NOWPAP) and Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC).

Kang, J. S., Analysis on the development trends of capture fisheries in North-East Asia and the policy and management implications for regional co-operation. *Ocean & Coastal Management* 49:42-67, 2006.

KEEI (Korea Energy Economic Institute). *A Study on Establishment of Private Oil Spill Response Corporation*, 1995.

Korea Coast Guard, *White Paper of Korea Coast Guard for 2005, 2005*.

Korea Fisheries Association, *Korean Fisheries Yearbook for 2005*, 2005.

KSEE (Korean Society for Ecological Economics). *The Re-Evaluating Report on the Comprehensive Joint Study Report on Environment Impact Caused by the Saemangeum Reclamation Project (the Part of Feasibility Study) by the Public and Government Joint Study Committee on the Environment Impact by the Saemangeum Reclamation Project in Korea (PGJSC),* 2000.

Lee, K. W., J. M. Gates, J. S. Lee, Recent Developments in Korean fisheries management. Ocean & Coastal

Management 49:355-366, 2006.

Lee, J. J., S. O. Kim and K. R. Ma. Debate on economic validity of the Saemangeum Reclamation Project. *The Korean Journal of Public Finance;* Vol. 15. No. 2: 199-284, 2001.

Meffe, G. K., L. A. Nielsen, R. L. Knight, D. A. Schenborn. *Ecosystem Management: Adaptive, Community Based Conservation*. Island Press, 2002.

MOCI, MOE, MOCT, MOST, PA, FA, MPA, MA, *Marine Pollution Prevention Plan for 5 Yeats* (1996~2000), 1996.

MOMAF, *Annual Report on Fisheries Industry for 2005,* 2005.

MOMAF, *White Paper on Marine and Fisheries for 1993~1997,* 1997.

MOMAF, *White Paper on Marine and Fisheries for 1996~2001, 2001.*

MOMAF, *White Paper on Marine and Fisheries for 2002~2003, 2003.*

NFFC (National Federation of Fisheries Cooperatives), *Guidelines for Survey of Damages Caused by Oil Spill Accident,* Oct. 1995.

PGJSC (Public and Government Joint Study Committee on the Environment Impact by the Saemangeum Reclamation Project in Korea). *The Comprehensive Joint Study Report on Environment Impact Caused by the Saemangeum Reclamation Project (the Part of Feasibility Study),* 2000.

Prime Minister, *Comprehensive Plan for Marine Environment Conservation* (2001~2005), 2001.

Pyo, H. D., *A Study on Standardization for Economic Analysis of Conservation and Development of Wetlands and Plan for Marine Environment Accounting Design*. the Ministry of Maritime Affairs and Fisheries in Korea, 2001.

Pyo, H. D., Re-evaluating Benefit-Cost Analysis of the Saemangeum Reclamation Project Appraised by its Research Council. *Ocean Policy Research* Vol. 17. No.1: 89-115, 2003.

Ryu J. G., J. O. Nam, J. M. Gates., Limitations of the Korean conventional fisheries management regime and expanding Korean TAC system toward output control systems. *Marine Policy*. in press.

Tang, Q. The Yellow Sea LME and Mitigation Action, p. 121-144 in: Hempel, G. and Sherman, K. (eds). Large Marine Ecosystem of the World – Trends in Exploitation, Protection and Research. Elsevier B. V. Amsterdam, Netherlands.

Wescott, G.., The development and initial implementation of Australia's Integrated and Comprehensive Oceans Policy. Ocean & Coastal Management 2000; 43:853-878.

Attachment-1 List of Government Agencies Relating to YSLME Governance

Name of Agency	Responsibilities Regarding YSLME
Congress • Committee on Agriculture, Forestry and Fisheries • Ocean Forums(informal)	• Legislation, deliver of government budget and settlement of government account on oceans including marine environment conservation • Support to establish oceans policies through workshops, seminars and expert presentations
Central Administrative Agencies • Ministry of Agriculture and Forestry - Subsidiary . Rural Development Administration	• Affairs relating to agriculture, foods farmland, irrigation, livestock, and the distribution of agricultural products . Reclamation of wetlands
• Ministry of Maritime Affairs and Fisheries - Subsidiary Organizations . The Korea Coast Guard . National Fisheries Research and Development Institute . National Oceanographic Research Institute . Regional MAF Offices	• Conservation of marine environment and marine safety inquiry - Public water management and reclamation - Coastal zone management - Coastal wetlands management - International and regional cooperation . Control of marine pollution . Research and training for the protection of the marine environment . Ocean observation, coastal survey and basic maps of the sea . Implementation of MOMAF policies
• Ministry of Construction and Transportation	• Comprehensive plan for the conservation, utilization and development of national territory and water resources • Construction of coasts and rivers • Reclamation of wetlands for industrial complexes
• Ministry of Environment Local Administration Agencies	• Preservation of the natural and living environment and prevention of environment of environmental pollution • Environment impact assessment(EIA) • Management of Marine Natural Parks • Implementation of national oceans policies for the marine environment and resources on the local level - Relevant Sub-organizations are in change of the local implementation • Decision-making under the authorities delegated by the central Government

Attachment 2 List of NGOs Registered to MOMAF

No.	Name	Major Activities*)	Telephone No. / E-mail
1	The Civil Federation for the Sea Preservation	- Survey and search for the cause of marine pollution - Education and enlightenment campaign	051)620-6332 (bsy-99@hanmail.net)
2	Headquarters of National Sea Resuscitation Campaign	- Coastal clean-up and floating education - Marine environment preservation campaign through removal of disposed fishing gear	02)752-9641 (babosae32@hanmail.net)
3	Network for Coastal Conservation	- Promote the solidarity and cooperation for the sustainable e coastal development	031)484-3301 (coastalkorea@hanmail.net)
4	Jeju Marine Environment Preservation Council	- Public inspiration of marine environment preservation	064)747-7316 (kyung28@msn.com)
5	Korean Society of Underwater Science and Technology	- Development of underwater science and related technology	02)421-8897 (cmas045@hanmail.net)
6	The Korean Society for Marine Environmental Engineering	- Research of theory and practical technology in the field of marine environmental engineering - Dissemination of research results	042)868-7265 (eghyong@yosu.ac.kr)
7	Rainbow Association	- Survey of marine pollution - Aerial monitoring of marine environment	02)458-0803
8	Union of National Movement for the Ocean Environment Campaign	- Preservation of marine environment through prevention campaign of marine pollution	02)391-0751 (91kimhj@hanmail.net)
9	National Solidarity for Ocean Conservation*)	- Preservation of marine environment through national campaign	02)356-4353 (ngoseoyo@kornet.net)
10	Korea Underwater Environment Association	- Underwater environment preservation campaign for the conservation of marine environment	02)485-4804
11	Korea Water Conservation Association*)	- Marine water quality preservation and ecosystem restoration for the security of water	02)725-9125
12	Corporation of Coast Environment Preservation Society	- Prevention of ecosystem for the enhancement of marine productivity and preservation of coastal wetlands and water quality	061)552-2310
13	Songeon Marine Research Centre*)	- Survey on the status of marine pollution - Development of marine technology	02)940-7189
14	Jigu Haeyang	- Survey on the status of marine pollution - Monitoring of illegal dumping of marine debris	02)434-6857 Jghy0513@naver.com
15	Global Green Life Network	- Monitoring of marine structures causing the marine pollution - Education and research for the preservation of marine environment	051)851-7510/2
16	Headquarters of Korea Coast Preservation Campaign*)	- Clean-up of coastal beach and marine environment preservation campaign for the prevention of marine pollution	02)810-3088 02)588-9468

* Translated by author

(As of May 1, 2006)

Attachment 3 Status of IMO Conventions

No.	Name of Convention	International		In Korea		No. of Contracting Parties
		Adopted	Effective	accepted	Effective	
1	IMO Convention	Mar. 6, 48	Mar. 17, 58	Apr. 10, 62	Apr. 10, 62	166
2	IMO Convention 1991 amendments	Nov. 7, 91	-	Dec. 22, 94	-	97
3	IMO Convention 1993 amendments	Nov. 4, 93	Nov. 7, 02	Apr. 5, 94	Nov. 7, 02	116
4	SOLAS 1974	Nov. 1, 74	May. 25, 80	Dec. 31, 80	Mar. 31, 81	156
5	SOLAS Protocol 1978	Feb. 17, 78	May 1, 81	Dec. 2, 81	Mar. 2, 83	109
6	SOLAS Protocol 1988	Nov. 11, 88	Feb. 3, 00	Nov. 14, 94	Feb. 3, 00	81
7	LL 1966	Apr. 5, 66	July.21, 68	July 10, 69	Oct. 10, 69	156
8	LL Protocol 1988	Nov. 11, 88	Feb. 3, 00	Nov. 14, 94	Feb. 3, 00	76
9	TONNAGE 1969	June 23, 69	July 18, 82	Jan. 18, 80	July 18, 82	145
10	COLREG 1972	Oct. 20,72	July 15, 77	July 29, 77	July 29, 77	148
11	CSC 1972	Dec. 2, 72	Sept. 6, 77	Dec. 18, 78	Dec. 18, 79	77
12	CSC 1993 amendments	Nov. 4, 93	-	-	-	8
13	SFV Protocol 1993	Apr. 2, 93	-	-	-	11
14	STCW 1978	July 7, 78	Apr. 28, 84	Apr. 4, 85	July 4, 85	150
15	STCW-F 1995	July 7, 95	-	-	-	5
16	SAR 1979	Apr. 27, 79	June 22, 85	Sept. 4, 95	Oct. 4, 95	85
17	STP 1971	Oct. 6, 71	Jan. 2, 74	-	-	17
18	SPACE STP 1973	July 13, 73	June 2, 77	-	-	16
19	INMARSAT C 1976	Sept. 3, 76	July 16, 79	Sept. 16, 85	Sept. 16, 85	90
20	INMARSAT OA 1976	Sept. 3, 76	July 16, 79	Sept. 16, 85	Sept. 16, 85	88
21	INMARSAT OA 1994 amendments	Dec. 9, 94	-	Feb. 2, 96	-	40
22	INMARSAT OA 1988 amendments	Apr. 24, 98	-	Dec. 20, 99	-	65
23	FAL 1965	Apr. 9, 65	Mar. 5, 67	Mar. 6, 01	May 5, 01	104
24	MARPOL 73/78 Annex I/II	Feb. 17, 78	Oct. 2, 83	July 23, 84	Oct. 23, 84	136
25	MARPOL 73/78 Annex III	Feb. 17, 78	July 1, 92	Feb. 28, 96	May 28,96	120
26	MARPOL 73/78 Annex IV	Feb. 17, 78	Sept. 27, 03	Nov. 28, 03	Feb. 28, 04	107
27	MARPOL 73/78 Annex V	Feb. 17, 78	Dec. 31, 88	Feb. 28, 96	May 28,96	125
28	MARPOL Protocol 1997 Annex VI	Sept. 26, 97	May 19, 05	-	June 29, 06	30
29	LC 1972	Nov. 13, 72	Aug. 30, 75	Dec. 21, 93	Dec. 20, 94	81
30	LC 1978 amendments	Sept. 12, 78	-	-	-	20

31	LC Protocol 1996	Nov. 7, 96	Mar. 24, 06	-	-	26
32	INTERVENTION 1969	Nov. 29, 69	May 6, 75	-	-	82
33	INTERVENTION Protocol 1973	Nov. 2, 73	Mar. 30, 83	-	-	48
34	CLC 1969	Nov. 29, 69	June 19, 75	-	-	42
35	CLC Protocol 1976	Nov. 19, 76	Apr. 18, 81	Dec. 8, 92	Mar. 8, 93	54
36	CLC Protocol 1992	Nov. 27, 92	May 30, 96	May 16, 97	May 16, 98	113
37	FUND Protocol 1976	Nov. 19, 76	Nov. 22, 94	-	-	32
38	FUND Protocol 1992	Nov. 27, 92	May 30, 96	May 16, 97	May 16, 98	98
39	FUND Protocol 2003	May 16, 03	Mar. 3, 05	-	-	15
40	NUCLEAR 1971	Dec. 17, 71	July 15, 75	-	-	17
41	PAL 1974	Dec. 13, 74	Apr. 28, 87	-	-	32
42	PAL Protocol 1976	Nov. 19, 76	Apr. 30, 89	-	-	25
43	PAL Protocol 1990	Mar. 29, 90	-	-	-	6
44	PAL Protocol 2002	Nov. 1, 02	-	-	-	4
45	LLMC 1976	Nov. 19, 76	Dec. 1, 86	-	-	50
46	LLMC Protocol 1996	May 3, 96	May 13, 04	-	-	21
47	SUA 1988	Mar. 10, 88	Mar. 1, 92	May 14, 03	Aug. 12, 03	134
48	SUA Protocol 1988	Mar. 10, 88	Mar. 1, 92	June 10, 03	Sept. 8, 03	123
49	SALVAGE 1989	Apr. 28, 89	July14, 96	-	-	52
50	OPRC 1990	Nov. 30, 90	May 13, 95	Nov. 9, 99	Feb. 9, 00	86
51	HNS Convention 1996	May 3, 96	-	-	-	8
52	OPRC/HNS 2000	Mar. 15, 00	-	-	-	13
53	Bunkers Convention 2001	Mar. 23, 01	-	-	-	9
54	AFS Convention 2001	Oct. 5, 01	-	-	-	16
55	BWM Convention 2004	Feb. 13, 04	-	-	-	6

(As of March 1, 2006)

Attachment 4 Acronyms and Abbreviations

MPPA (Marine Pollution Prevention Act)

MOE (Ministry of Environment)

EIA (Environment Impact Assessment)

MOCT (Ministry of Construction and Transport)

GESAMP (The United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution)

MOMAF (Ministry of Maritime Affairs and Fisheries)

KCG (Korea Coast Guard)

CBD (Convention on Biological Diversity)

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)

Ramsar Convention (Convention on Wetlands of International Importance Especially as Waterfront Habitat)

WHC (Convention Concerning the Protection of the World Cultural and National Heritage)

IUCN (International Union for Conservation of the Natural Resources)

WWF (World Wide Fund for Nature)

CMSC (Convention on the Conservation of Migratory Species of Wild Animals)

TDA (Transboundary Diagnostic Analysis)

RWG-1 (Regional Working Group for Investment Component)

SAP (Strategic Action Programme)

LDC 96 (1996 Protocol of London Convention)

NOWPAP (Northwest Pacific Action Plan)

GKU (Green Korea United)

KFEM (Korean Federation for Environmental Movement)

KFIAPC (Korea Fisheries Infrastructure Promotion Association)

KSA (Korea Ship owners Association)

KSA (Korea Shipping Association)

KPA (Korea Petroleum Association)

KMPRC (Korea Marine Pollution Response Corporation)

OSRV (Oil Spill Response Vessels)

KOWACO (Korea Water Resources Corporation)

RFSO (Regional Fisheries Supervision Office)

GOA (Government Organization Act)

Attachment 5 Survey for Governance Analysis of YSLME

The Yellow Sea Large Marine Ecosystem (YSLME) has been devastated continuously due to the fast economic development and increase of population in the neighbouring countries. The YSLME PMO is scheduled to conduct TDA and establish SAP in the near future. KMI is conducting YSLME Government Analysis for TDA and SAP.

This survey is a part of YSLME Government Analysis and the objects are to make rank of major policies based on the expert opinions.

2006. 6.

1027-4, Bangbae3-Dong, Seocho-Gu, Seoul, 137-851, Korea

Dong-Oh Cho

Coastal & Ocean Policy Research Department

Korea Maritime Institute

(□: 02-2105-2762 FAX: 02-2105-2779 □

E-mail: docho@kmi.re.kr, oceancho@hotmail.com)

Methodology for answer:

(1) The major policy and/or programs are as follow: (1) Stakeholders Participation in Decision-Making, (2) Institutional Reforms for Ensuring Coordination and Harmonization, (3) Recommendations for Marine Ecosystem Programs: National Legislation, (4) Recommendations for Marine Ecosystem Programs: National Plan, and (5) Recommendations for Sustainable Fisheries Resources Management. Please rank 1, 2, 3, 4 for each of the major policies and/or programs and particular programs.

(2) Please review the major and particular policies and programs and give any opinion and suggestions.

☐ Major policies and programs

List of policies and programs	Rank
1) Stakeholders Participation in Decision-Making	( )
2) Institutional Reforms for Ensuring Coordination and Harmonization	( )
3) Recommendations for Marine Ecosystem Programs: National Legislation	( )
4) Recommendations for Marine Ecosystem Programs: National Plan	( )
5) Recommendations for Sustainable Fisheries Resources Management	( )

☐ Particular policies and programs

1) Stakeholders Participation in Decision-Making

List of policies and programs	Rank
1) Mandatory Involvement in Decision-Making Process	( )
2) Enhancement of Partnership Program	( )
3) Expansion of Incentive Program	( )
4) Enhancement of Deregulation and Self-Management	( )
5) Enhancement of Honour Surveillance Program	( )

2) Institutional Reforms for Ensuring Coordination and Harmonization

List of policies and programs	Rank
1) Coordination of Dual Environment Management System	( )
2) Coordination among Stakeholders for Marine Ecosystem	( )
3) Coordination for Marine Ecosystem inside MOMAF	( )

3) Recommendations for Marine Ecosystem Programs: National Legislation

List of policies and programs	Rank
1) Enactment of "Marine Ecosystem Conservation and Management Law"	( )
2) Enactment of "Marine Environment Management Law"	( )
3) Enactment of "Land-Based Sources of Pollution Management"	( )

4) Recommendations for Marine Ecosystem Programs: National Plan

List of policies and programs	Rank
1) Reinforcement of Marine Environment Impact Assessment	( )
2) Comprehensive Plan for Marine Environment Management	( )
3) Ocean Dumping Management	( )
4) Special Area Management Plans	( )
5) Marine Debris Management	( )
6) Marine Sand Management	( )
7) Oil Spill Response Management	( )

5) Recommendations for Sustainable Fisheries Resources Management

List of policies and programs	Rank
1) TAC System	( )
2) Stock Assessment for TAC System	( )
3) MPA Program	( )
4) Marine Ranch Program	( )
5) Aquaculture Program	( )
6) Prevention of Illegal Fishing	( )

☐ Opinions and suggestions

Regional Governance Analysis for the UNDP/GEF YS LME Project

CHUNG, Suh-Yong

Division of International Studies,

Korea University

EXECUTIVE SUMMARY

Several issues need to be considered to realize effective regional governance in the context of the YS LME Project. As the TDA and other YS LME reports point out, the serious condition of the marine environment in the Yellow Sea necessitates a sound and urgent response by the region.

Several stakeholders are involved in the regional governance in the Yellow Sea region. While local governments' involvement remains low in regional governance, the role of the central governments of China and Republic of Korea has been critical. In China, the State Oceanic Administration has been involved in the YS LME Project more closely than any other related ministries and governmental bodies, such as the State Environment Protection Agency, the Ministry of Agriculture and others. In the ROK, both the Ministry of Foreign Affairs and Trade and the Ministry of Maritime and Fisheries Affairs are equally important, taking responsibilities for different aspects of regional governance. Future efforts in regional governance must include attempts to secure the participation of the Democratic People's Republic of Korea (hereinafter DPRK), as this is critical for the geographical completeness and effectiveness of regional efforts. Other stakeholders, such as NGOs and the private sector, have participated in regional governance less actively, although they may be more active in other realms. Among international organizations, the UNDP has been closely involved through the YS LME Project, and the UNEP and IMO seem to be relevant organizations to regional governance issues to some extent.

There are several cooperative mechanisms identified as relevant by this report in the context of the YS LME Project. Northwest Pacific Action Plan by UNEP seems to be more relevant to the regional governance in the YS LME Project context than any other cooperative mechanism such as PEASEA, IOC/WESTPAC, and GPA. More coordinating efforts are required to increase synergistic effects by utilizing other cooperative mechanism's achievements into the Yellow Sea region.

There are several important multilateral and bilateral treaties related to regional governance in the Yellow Sea region. The United Nations Convention on the Law of the Sea, the London Convention and its 1996 Protocol, MARPOL and the FAO Code of Conduct for Responsible Fisheries have relevance to the protection of the Yellow Sea marine environment. These instruments vary, however, in their levels of strictness and scopes of coverage. On the other hand, two bilateral treaties on environmental protection and fisheries also need to be considered in the regional governance context in the Yellow Sea region. While these two treaties have developed further detailed standards as well as cooperative institutions such as the Joint Fisheries Committee and the Joint Committee on the Environment, further coordination with other cooperative mechanisms and institutions is desirable to increase the overall effectiveness of regional governance.

Finally, this report suggests the establishment of the YS LME Commission after 2009. Further institutionalizing the YS LME Project's current efforts will ensure the continuity and effectiveness of regional governance. With assistance from the UNDP and the GEF, the YS LME Commission will ultimately become the central policy organization for the realization of an environmentally sound Yellow Sea region. To achieve this goal, the YS LME Commission will need to pursue action programs such as developing joint scientific research projects, strengthening legal institutions and partnerships, capacity building and financing.

ACRONYM

ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biodiversity
CBT	Clean Ballast Tanks
CEARAC	Coastal Environment Assessment Regional Activity Centre
CPUE	Catch Per Unit Effort
CSC	Commission Steering Committee
DINRAC	Data and Information Network Regional Activity Centre
DPRK	Democratic People's Republic of Korea
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
HNS	Hazardous and Noxious Substances
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IOC/WESTPAC	IOC Sub-Commission for the Western Pacific
IUCN	International Union for the Conservation of Nature and Natural Resources
JCEC	Joint Committee on Environmental Cooperation
KFEM	Korean Federation for Environment Movement
KMI	Korea Maritime Institute

KORDI	Korea Ocean Research and Development Institute
MAF	Ministry of Agriculture and Forestry (S. Korea)
MALITA	Marine Litter Activity
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
MEG	Multidisciplinary Expert Group
MERRAC	Marine Environmental Emergency Preparedness and Response Regional Activity Centre
MOA	Ministry of Agriculture (China)
MOCT	Ministry of Construction and Transportation (S. Korea)
MOE	Ministry of the Environment (S. Korea)
MOERI	Maritime and Ocean Engineering Research Institute
MOFAT	Ministry of Foreign Affairs and Trade (S. Korea)
MOMAF	Ministry of Marine and Fisheries Affairs (S. Korea)
MOU	Memorandum of Understanding
NFDRI	National Fisheries Research and Development Institute
NGO	Non-governmental Organization
NORDI	National Oceanographic Research Institute
NOWPAP	Northwest Pacific Action Plan
NPEC	Northwest Pacific Region Environmental Cooperation Centre
OILPOL	International Convention for the Prevention of Pollution of the Sea by Oil
PAH	Polycyclic Aromatic Hydrocarbons
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PGI	Pacific Geographical Institute
PMO	Project Management Office

POMRAC	Pollution Monitoring Regional Activity Centre
POP	Persistent Organic Pollutant
PSC	Project Steering Committee
RAC	Regional Activity Centre
RCU	Regional Coordinating Unit
ROK	Republic of Korea
RWG	Regional Working Group
SAP	Strategic Action Programme
SBT	Segregated Ballast Tank
SEPA	State Environmental Protection Administration (China)
SOA	State Oceanic Administration (China)
TDA	Transboundary Diagnostic Analysis
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WRI	World Resources Institute
WWF	World Wildlife Fund
YS LME	Yellow Sea Large Marine Ecosystem

I. Background of Assignment

1. To realize ecosystem-based, environmentally sustainable management and use of the YS LME, the UNDP/GEF YS LME Project focuses on identifying better ways of furthering national and regional commitments to international agreements such as the United Nations Convention on the Law of the Sea (UNCLOS), the FAO Code of Conduct for Responsible Fisheries, and the Global Programme of Action (GPA). This objective of the YS LME may be fulfilled by the preparation of the Transboundary Diagnostic Analysis (TDA) and Strategic Action Program (SAP) and the implementation of the SAP.

2. The YS LME project has completed its TDA, which identifies environmental problems, their root causes, and possible solutions (UNDP/GEF, 2007). The TDA serves as the scientific foundation for the SAP. One of the key roles of the SAP is that of identifying management strategies for interventions and actions towards 2020. As this requires policy recommendations for improving current relevant institutions at the national level, YS LME also conducted two national governance analyses in China (Xu, 2006) and the Republic of Korea (Cho, 2006). The two reports deal with issues of stakeholder analysis, institutional analysis, and legal and policy analysis.

3. Although national governance analysis may provide useful policy options to related states, the purpose of the YS LME project can be better achieved by identifying and understanding regional governance issues and finding practical and effective management options at the regional level through the preparation and implementation of the SAP. This is especially important in the Yellow Sea region because of the transnational nature of the Yellow Sea region as well as its unique geopolitical features.

4. The importance of conducting regional governance analysis was raised during the third meeting of the Regional Working Group for the Investment Component held in Dalian, China, 9-12 September 2006 (UNDP/GEF YS LME Project Working Group meeting reports). In the same meeting, the RWG-Investment agreed to conduct regional governance analysis, which was considered in the third RSTP meeting held in Jeju, ROK,

20-22 November, 2006 and approved in the third PSC meeting held in Jeju, ROK, 23-24 November, 2006 (UNDP/GEF YS LME Project PCS meeting reports).

5. The objective of regional governance analysis is to understand the underlying root causes of the Yellow Sea's ecosystem problems through the analysis of the political environment and to provide the basic foundation for identifying possible future interventions as part of the preparative work for the development of the Yellow Sea SAP.

II. Methods Used to Carry Out Assignment

6. In order to provide the basic foundation for identifying possible interventions at the regional level and increase understanding of current regional governance in the Yellow Sea region, this project is carried out using several methods.

A. YS LME Context

7. This report is written within the context of the YS LME project. As the current stage of the YS LME project is one of preparation of the SAP, this report's focus will lie in producing a report which will assist the YS LME in identifying policy, legal and institutional issues as well as future interventions at the regional level. To meet this objective, this report covers all previous and current products of the YS LME project. They include, but are not limited to, the report of TDA, the National Governance Analysis reports of China and the Republic of Korea, and the reports of the Regional Working Groups. This project also closely follows the preparations for the SAP so as to achieve the objectives of the UNDP/GEF YS LME Project as much as possible.

B. Legal and Political Analyses

8. Regional governance issues require social science-based analysis. While scientific considerations are valuable in conducting regional governance analysis, the main focus of this work will be on determining the most significant political and legal variables and their impact on the dynamics of regional governance and identifying future interventions required to improve regional governance.

9. In the legal field, international environmental law, the law of the sea, development law, and national legal institutions will be the primary subjects to be analyzed. Special attention will be given to relevant international treaties, including the Law of the Sea Convention, the London Convention, and the MARPOL Convention. Relevant bilateral treaties such as the bilateral fisheries treaty between China and the Republic of Korea may also be considered for analysis.

10. This study s political analysis will include the effects of traditional security issues on environmental regional

governance, as political issues have important implications in building a regional cooperative mechanism in the Yellow Sea region. In particular, the engagement of Democratic People s Republic of Korea (DPRK), a state that should be included to cover the complete geographical scope of the YS LME project, is also considered in this context.

11. Another important component of political analysis is to discuss the possible scenario of the evolvement of regional governance. This analysis will help to identify feasible future interventions for more effective regional governance. Analysis of the interactions of cooperative mechanisms such as NOWPAP, IOC/WESTPAC, GPA and PEMSEA with YS LME is conducted and may provide a basis for helping the YS LME project to find more effective ways of improving regional governance to address Yellow Sea marine environmental issues.

C. Analysis of Stakeholders

12. It is important to identify relevant stakeholders to have effective regional governance in this region. Central governments, local governments, international organizations, NGOs and other actors are considered. Particular emphasis is given to the status of stakeholders involvement in regional governance in the YS LME context and the merits and problems of this involvement.

D. Interviews

13. As important information and materials are not frequently available from secondary sources, both email and on-site interviews have been conducted to identify issues and collect valuable information and materials for regional governance analysis. Interviews were conducted with government and international organizations both in China and the Republic of Korea.

III. Major Environmental Problems in the Yellow Sea

14. In the Yellow Sea region, major environmental problems may be categorized into four different groups: pollution, ecosystem, fisheries and biodiversity. The YS LME Project has identified environmental problems according to these four areas.[1]

A. Pollution

15. The major issues identified within the category of pollution are eutrophication and contamination (UNEP/GEF, 2007).

16. Eutrophication results primarily from the increased concentration of nitrogen and phosphorus in marine waters. This is caused by excessive dissolved nitrogen from rivers and direct deposit from wastewater discharge. These shifting nitrogen, phosphate and silicate ratios are conditions under which blooms of potentially toxic micro-organisms such as dinoflagellates are expected to become more frequent. Excessive algal blooms that decrease water transparency have led to the creation of red tides. Eutrophication has also reduced diversity among algal and zooplankton species; newly dominant algae may have harmful effects on fish. In addition, excess organic matter created by eutrophication strains the supply of oxygen available for sustaining aerobic organisms in deeper waters (UNDP/GEF, 2007).

17. Various contaminants enter the Yellow Sea, largely through the disposal of household and industrial wastes. Some other volatile contaminants, such as hydrocarbons, enter the marine environment via atmospheric transport or wet/dry deposition.

18. A wide variety of contaminants are known to affect the Yellow Sea region. Faecal substances enter the Yellow Sea primarily through sewer discharges,

1 The following section has been written to provide a general overview on environmental issues in the Yellow Sea for readers without a technical background in marine environmental science. The main source of the discussions in this section includes the YS LME TDA. Those interested in an in depth analysis of the scientific and technical aspects of these issues may consult the TDA report directly.

often carrying faecal pathogens. These pathogens can cause possibly fatal diseases such as dysentery and typhoid. Humans are in danger of coming in contact with faecal matter by consuming contaminated water or seafood. Heavy metals are discharged into the Yellow Sea mainly via industrial activities. Metals that may pose serious threats to the marine environment and human health include lead, copper and mercury. These metals can pose a threat to the public health as well as reduce the value of seafood. While Persistent Organic Pollutants (POPs) are not regarded as an immediate threat to public health or the marine environment in the Yellow Sea region, they are of concern in the global context and could pose health risks to humans and/or animals. Polycyclic Aromatic Hydrocarbons (PAHs) come from petroleum refinery operations, the burning/incineration of solid wastes and metallurgical refining activities. These substances can cause mutations and cancer.

19. The problems caused by marine litter (floating, submerged and standing debris in the marine area) have become serious in the Yellow Sea region. Marine litter interferes with amenities such as beaches and can cause damage to marine vessels. Currently, little data is available to understand the exact impact of marine litter problems on the Yellow Sea environment.

20. The reasons for the serious pollution problems in the Yellow Sea region lie in inadequate controls over agricultural, industrial and municipal waste practices, limited investment in the infrastructure for waste management, rapid economic development in China, an inadequate balance in policies related to economic expansion and environmental protection, and inadequacies in contemporary policy priorities.

B. Ecosystem

21. The major issues identified within the ecosystem category are the increased frequency of harmful algal blooms, changes in species composition, changes in biomass or abundance, and loss of benthic habitat in coastal areas. (UNDP/GEF, 2007)

22. A significant increase has occurred in the annual rate of algal blooms. These blooms can cause increased mortality in mariculture stocks, thus reducing fishery yields and increasing the risk of toxic seafood consumption.

23. Significant changes in species composition have been identified in the Yellow Sea ecosystem. For example, changes in dominant groups of zooplankton on the ROK coast reflect

changes in food web dynamics that can affect organisms at higher trophic levels. In China, changes in the ratio of diatoms to dinoflagellates are likely due to the reduced ratio of silicate in Yellow Sea waters relative to other nutrients. As the majority of toxic algae and those that cause adverse effects on other marine organisms are dinoflegellates, this shifting ratio may become cause for serious concern in the Yellow Sea region. Furthermore, a sudden rise in jellyfish levels and change in benthic species composition and dominant species are other sources of concern.

24. Changes in the biomass and abundance of several key species have been identified. The abundance of zooplankton has increased on the side of the Yellow Sea bordering ROK while it has decreased on the side bordering China. On the Korean coast, a shift in the seasonal pattern of zooplankton has also been observed. Given that zooplankton and phytoplankton form the foundation of the entire marine food web, changes in their levels of biomass, abundance and species diversity can affect the entire food web and have consequences at higher trophic levels.

25. The reasons for the problems concerning the ecosystem in the Yellow Sea lie in overfishing, climate change partly associated with an increased concentration of carbon dioxide in the atmosphere, rapid coastal development, and an inappropriate legislative/regulatory balance between economic development and environmental protection. These are the results of the limited achievements of the Kyoto Protocol, weak enforcement of controls on fishing activities, and legislative and administrative weakness in facilitating adequate protection of the coastal zone within the context of economic development in the region.

C. Fisheries

26. The major issues in fisheries are declines in landings of many traditional commercially important species, increased landings of low values species including changes in dominant species, and unsustainable maricultural practices and their consequences. (UNDP/GEF, 2006)

27. The scale of fishing operations in the Yellow Sea has increased steadily in recent years. China and ROK s pooled percentage of total world fishing landings rose 10% from 8.85% in 1998 to 19.54% in 2004. The Yellow Sea fisheries industry appears relatively stable overall, despite short-term fluctuations that could be attributable to climate change or natural recruitment cycles. The Yellow Sea has yielded roughly 2.3 million tons

of wild fish, or roughly 2 tons/square kilometre, in recent years.[2] Catch per unit effort (CPUE) has increased significantly from 3200 kg per fishing vessel in 1986 to 17,200 kg in 2004. This could be a sign of either the vitality of Yellow Sea fishing stocks or an increasing zealousness in fishing efforts.

28. Although the overall yield from fisheries in the Yellow Sea appear to be fairly constant, landings of many traditional commercially important species have decreased, whereas landings of low value species have increased. The dominant species of fish in the Yellow Sea also appears to be changing. This is believed to be a direct effect of overfishing and overexploitation of certain fish species. For example, stocks of Pacific herring have declined substantially over time. The peak catch year for Pacific herring was 1972, with 180,000 tons caught. The causes of the Pacific herring's catch declines are thought to be overfishing and climate change. The annual catch of anchovies, on the other hand, has increased as a result of increasing stocks and increased fishing efforts. More than 1 million tons were caught in 1996 and 1997, making anchovy the largest single species fishery in China. Given that this figure exceeds the maximum annual sustainable yield of 0.6 million tons, the anchovy has also become a victim of overfishing.

29. The reasons for shifts in dominant species and landings of commercially important species lie in overexploitation of target fish species and climate change. These problems have been caused by the absence of a comprehensive and effective system of fisheries management, a lack of compliance assurance infrastructure, and poor recognition in the policy/public sector of the limits of sustainable natural resource exploitation.

D. Unsustainable maricultural practices

30. Mariculture has grown significantly in both China and Republic of Korea since the late 1980s. China's mariculture alone accounts for approximately 70% of the world's mariculture today. Yellow Sea mariculture has risen from 400,000 tons in 1985 to 4 million tons in 1997. Mariculture growth has resulted in increased production for all cultivated species except shellfish. Seaweed is the dominant species in overall production. The Transboundary Diagnostic Analysis (TDA) suggests, but does not state directly, that mariculture production

2 North Sea regions with similar bathymetry yielded roughly 6 tons/square kilometre catch, while Mediterranean Sea regions with far greater bathymetry yielded 4 tons/square kilometre.

rates have become unsustainably high. (UNDP/GEF, 2006)

31. Between 1995 and 2004, the area devoted to mariculture on the west coast of ROK has increased from 32,000 ha to 56,000 ha. Mariculture production has remained essentially unchanged during that time period, which suggests that the density of cultured organisms has decreased. China has not posted public data on this topic. However, projections suggest that the area devoted to mariculture in China rose from 400,000 ha in 1995 to 1 million ha in 2004. Total mariculture production in China appears to have grown by a factor of 2.25, which suggests that there has been no significant decline in farm density of cultured organisms. The main mariculture-related issues in China appear to be increased coastal area devoted to mariculture and the increasing proximity of mariculture farms along the coastal areas, which increases the threat of disease.

32. Reasons for unsustainable mariculture practices frequently lie in the combinations of over-intensive mariculture, overexploitation of natural habitats, and the consequences of the release of materials having adverse effects on the environment and human health concerns. These problems have been caused by a lack of comprehensive and cohesive legislative framework for coastal zone and maritime resource development, a lack of coordination among sectors, and deficiencies in the application of sound science to sustainable coastal development.

E. Biodiversity

33. The major problems in the Yellow Sea within the category of the biodiversity are habitat loss and degradation, the introduction of xenobiotic species, and the decline of endemic species. (UNDP/GEF, 2006) It is clear that anthropogenic, development driven habitat change and other activities have changed the biodiversity in the Yellow Sea. However, currently available information cannot provide a comprehensive appraisal of changes in biodiversity or quantify the socioeconomic costs of these changes.

34. Anthropogenic actions have significantly changed the coastal landscape of the Yellow Sea over the past few decades, resulting in habitat loss and degradation of many species. Land reclamation, for example, has turned 880,000 ha of the sea area into land. This is 37% of the intertidal area in China and 43% of mudflats in Korea. China and Korea both have aggressive plans to continue their land reclamation projects. Consequently, the majority of coastal wetlands and tidal mudflats will have

been reclaimed for land development purposes within the next decade. This will have the biggest impact on organisms in tidal flats, and will reduce the suitable areas for migratory birds to rest/feed. Increased mariculture has decreased marshlands by 30 % in the last 30 years, leaving a reduced habit for waterfowl/ migratory birds. Heavy erosion has occurred on roughly 2/3 of sandy foreshores due to sand mining of beaches and extensive agricultural activities on coastal plains. Species community structure and abundance of aquatic life in sandy and muddy shores have also been greatly altered, with some species (such as the endangered lancelet) no longer having viable habitats.

35. Foreign species have been introduced either intentionally for mariculture/ aquaculture purposes or unintentionally via ballast water and vessel hull transport. An integrated investigation of introduced species has not yet been conducted, but some examples exist: scallops, kelp, certain blue-green algae and Spartina angelica are among these introduced species. The introduction of foreign species is considered a significant problem within the field of environmental science and diminishes the integrity of an ecosystem.

36. The decline of endemic species, pollution's effects on organisms, and overexploitation of marine and coastal living resources could be addressed within the category of biodiversity. However, these issues are addressed in other relevant categories in this report.

37. The most significant causes of problems in the area of biodiversity lie in overexploitation of fisheries and loss of habitat, climate change, increased demand for seafood, engineering works on watercourses, and an inadequate balance between economic development and environmental protection. These have been caused by development in the absence of comprehensive and cohesive legislation to ensure concomitant environmental and biodiversity protection, poor enforcement of existing legislation and inadequate provisioning of public information.

F. Concluding observations

38. Most of the causes for the environmental problems in the Yellow Sea can be traced back to the following:

- Development being undertaken with limited consideration or understanding of environmental and biodiversity protection coupled with poor enforcement and inadequate public information

- An inadequate balance between

economic development and environmental protection

- Weakness in legislation and/or inadequate enforcement of legislation related to coastal zone management and protection

- Limited effectiveness of the environmental constituency on government policy

- Weak enforcement of controls on fishing activities, including illegal activities

- Deficiencies in policing and regulation of traditional natural resource exploitation practices and inadequate public information

- Limited application of research knowledge to assimilative capacity and coastal zone development

Limited and/or inadequate compliance assurance infrastructure (UNDP/GEF, 2006).

39. The current environmental problems in the Yellow Sea region are due to a few linked root causes. The common features among identified root causes of the Yellow Sea's environmental problems appear to be an inadequate balance between socioeconomic development and environmental protection, poor enforcement of existing environmental protection regulations, and ineffectiveness of the environmental lobby on influencing regional governments. According to the TDA, the most important interventions to incorporate into the Yellow Sea SAP are improvements to legislation and related regulations that take the need for balance between socioeconomic development and environmental protection into consideration. (UNDP/GEF, 2006)

IV. Regional Stakeholder Analysis

40. Since the nature of transnational environmental issues is complex, it is important to have related stakeholders involved in the process of addressing these issues. Frequently, in the global environmental governance context, governments, international organizations, NGOs, and related industries are considered key stakeholders.

41. In the Yellow Sea region, various stakeholders need to be considered. As the level of economic development, the political system, and cultural backgrounds are very different among the Yellow Sea coastal states, concerted efforts to address environmental stress in the Yellow Sea region require some effort. While a general understanding of the importance of the participation of all relevant stakeholders, such as governments, international organizations, NGOs and related industries, applies to the Yellow Sea region, the unique dynamics of this region require a thorough understanding of the stakeholders involved in regional environmental governance.

A. Governments

42. Governments are the most important stakeholders in regional environmental governance in the Yellow Sea region. Traditionally, the Chinese central government has exercised strong influence and control over domestic institutions, though there have been tensions between the central and local governments in policy implementation. In the Republic of Korea, the government plays an important and influential role in developing and implementing policies. While the National Assembly, NGOs and the private sector are important participants in policy development and implementation, the executive branch has proposed, prepared, controlled, and implemented the nation's main laws and regulations. In the DPRK, the Kim Jung-il regime is extremely authoritarian. It is difficult to recognize other important stakeholders in developing and maintaining policies in any kind.

a. China

43. The central government of China has increasingly participated in the

various regional efforts to deal with environmental problems including the marine environment in the Yellow Sea. As China has achieved fast economic growth, environmental issues have posed serious threats not only to Chinese society but also to the region as a whole.

44. Several Chinese ministries and agencies are concerned with the environmental issues involved in the regional governance context. The State Oceanic Administration (SOA) may be the most relevant government agency. The SOA is responsible for managing, developing and monitoring state level policy measures such as (Xu, 2006):

- Managing the territorial sea area
- Conducting function zoning
- Supervising marine environmental protection
- Managing investigation and monitoring activities
- Organizing scientific research on the environment
- Preventing and controlling pollution damages
- Monitoring marine environmental quality
- Developing a State Oil Spill Contingency Plan for offshore oil exploration and exploitation

45. The State Environmental Protection Administration (SEPA) also plays a significant role in protecting the Yellow Sea marine environment. Responsibilities of SEPA in the Yellow Sea environmental context include (Xu, 2006):

- Guiding, coordinating and supervising the integrated environmental protection of the marine environment
- Preventing and controlling pollution damages to the marine environment by the land-based pollutants and coastal construction projects
- Making a State Contingency Plan for marine pollution by land-based pollutants
- Establishing state Sea Water Quality standards as well as Pollutant Discharge standards

46. Although SOA and SEPA have different responsibilities concerning the marine environment in the Yellow Sea, their frequently overlapping roles have been a problem. For example, among the cooperative mechanisms for the protection of the marine environment in the Yellow Sea, which will be discussed

in far more detail in the later part of this report, SOA is actively involved in the YS LME Project while SEPA is representing China in NOWPAP. This lack of coordination poses problems in policy effectiveness at the regional level.

47. The Ministry of Agriculture (MOA) is also relevant to regional governance in the Yellow Sea, as it is responsible for fishery related matters in China. The MOA deals with not only management and control of fishery resources but also pollution incurred by fishing vessels. (Xu, 2006) On the other hand, the Ministry of Communications has a relevance to the protection of the marine environment as they are responsible for the marine pollution caused by vessels. (Xu, 2006) Other governmental bodies, such as the Navy and State Tourism Administration, are also involved in issues of regional governance to protect marine environmental issues in the Yellow Sea.

48. In ROK Ministry of Foreign Affairs does not participate in regional environmental issues in the Yellow Sea unless treaty related issues exist.

49. Jiangsu, Shandong and Liaoning provinces, the three provinces located on the Yellow Sea coast in China, primarily implement policy measures developed by the central government. The results of the interviews with Chinese local government officials demonstrated that the degree of their direct involvement in international activities remains low.

b. Republic of Korea

50. The ROK government has played an active role in international environmental cooperation. Cooperative efforts by the ROK government have been sought after the 1992 UNCED in various ways. Due to the active role of the ROK government, the first meeting of the Meeting of Senior Officials on Environmental Cooperation in Northeast Asia (NEASPEC) and the first Intergovernmental Meeting of Northwest Pacific Action Plan (NOWPAP) were held in Seoul in 1994. Since then, the ROK government has furthered its active leadership role in regional environmental cooperation. For example, it hosts the Regional Coordinating Unit (RCU) of NOWPAP in Busan (another office of the RCU is in Toyama, Japan) and the Project Management Office (PMO) of the YS LME Project in Ansan. On the Yellow Dust issues in Northeast Asia, the Korean government actively sought close cooperation among interested governments. This issue was stressed in the Joint Press Statement by the head of the governments of China, Japan and ROK in the 10th ASEAN + 3 meeting. (Office of the President, 2007)

51. Within the ROK government, there

are several ministries and other agencies concerning the marine environment. These include the Ministry of Foreign Affairs and Trade (MOFAT), the Ministry of Marine and Fisheries Affairs (MOMAF), the Korea Coast Guard[3], the National Fisheries Research and Development Institute (NFRDI), the National Oceanographic Research Institute (NORDI), the Korea Ocean Research and Development Institute (KORDI) and the Korea Maritime Institute (KMI).

52. Examples of other ministries and agencies which are related to marine environmental issues include the Korea Coast Guard, [3] the Ministry of Agriculture and Forestry (MAF), the Ministry of Construction and Transportation (MOCT), the Ministry of the Environment (MOE). [4]

53. Special attention must also be paid to the role of government agencies in international cooperation on marine environment issues. While the Ministry of Maritime and Fisheries Affairs is responsible for the majority of marine environmental issues, the Ministry of Foreign Affairs and Trade also plays an important role in international cooperation in marine environmental matters. Most cooperative efforts to address the marine environment in the Yellow Sea region are now in the development stage; their futures will be determined by negotiations. These negotiations include not only negotiations on legally binding treaties but other, non-binding cooperative mechanisms such as scientific cooperation, the development of partnership programs, and the search for the financial resources. Other non-marine environment diplomatic issues, such as a joint cruise effort by the YS LME, are also being considered. While joint cruise may be regarded as a solely scientific research activity, the results of the cruise might have important

3 As a subsidiary agency of MOMAF, the Korean Coast Guard is responsible for marine conservation and marine pollution response. For example, the Korea Coast Guard is an active participant in Northwest Pacific Action Plan (NOWPAP), supporting MERRAC's efforts to develop international cooperation against oil spills. However, the frequent overlapping of its activities with those of MOMAF needs to be addressed to avoid the creation of ineffective policy.

4 Particular attention needs to be paid to the Ministry of the Environment. According to the official distribution of government bodies' jurisdictions, the Ministry of the Environment only deals with non-marine environmental issues, but inland waters, the environmental quality of which are closely linked to the marine environment, are within its jurisdiction. Coastal marine environmental issues are mainly within the jurisdiction of the MOMAF and the Korea Coast Guard.(Cho, 2006)

implications on other politically sensitive issues such as maritime delimitation and marine security. As a result, both the Chinese and Korean governments have treated the joint cruise issue cautiously in light of its broader regional diplomacy context. This demonstrates that, although the Ministry of Marine and Fisheries Affairs specializes in the maritime issues, developing policies on the marine environment in the Yellow Sea often requires the active participation of the Ministry of Foreign Affairs and Trade.

54. The importance of local government in international cooperation efforts related to the Yellow Sea marine environment is minimal in the Republic of Korea. While local governments may be important players in implementing policies, their role in developing international cooperative projects remains limited. The results of interviews with Korean local government officials show that this is partly because limited budgetary resources are available for developing international projects. Another reason for the limited importance of local governments in the regional governance is that most issues concerning regional governance are addressed by the central government. Local governments mainly focus on the implementing policies according to national laws and regulations. (Cho, 2006)

55. Government affiliated bodies, including several research institutes such as the Korea Ocean Research and Development Institute (KORDI) and the Korea Maritime Institute (KMI), also contribute to regional activities by the ROK government, as they frequently participate in international negotiations and policy development. Their constructive roles are particularly important. While government officials work on a rotation basis, which leads to a high turnover rate of desk officers of specific issues, researchers are often assigned to follow up the specific issues. Therefore, scientist's involvement may guarantee the continuity of government projects.

c. Democratic People's Republic of Korea

56. As a hermit state, the DPRK's degree of involvement in any kind of international cooperative effort is extremely low. While the DPRK has gained much international attention due to its nuclear arms development, it has been reluctant to participate in building partnership with other states. However, as its nuclear arms development issues are on the path to resolution through constructive negotiations with regional states, the DPRK may increase its willingness to engage in international cooperative efforts. In this context,

the DPRK's participation in regional environmental protection efforts is more likely than before. While the degree of the DPRK's participation would likely be limited, the symbolic implications of its engagement in regional cooperation would be very high.

B. International Organizations

57. The role of international organizations in international environmental governance is a significant one. After the creation of the United Nations system, international organizations have played several important roles as follows (Porter & Brown, 1996):

- Setting the agenda for global and regional action, and determining which issues will be dealt with by the international community;
- Articulating the aggregate interests of groups in negotiations;
- Convening and influencing negotiations in regard to global and regional environmental regimes;
- Developing normative codes of conduct for various environmental issues;
- Influencing state policies on issues that are not under international negotiation.

58. In the Yellow Sea region, a few international organizations play a role in protecting the marine environment. Among them, the United Nations Development Program, the United Nations Environment Program and the World Bank (through the Global Environmental Facility) are more involved than other international organizations.

59. The above organizations participate in cooperative activities through regional cooperation mechanisms such as the YS LME Project and NOWPAP. Details of these two cooperative mechanisms are discussed later in this report.

60. The UNDP plays a critical role in developing cooperative efforts in this region. Among the five roles mentioned above, the UNDP seems to be most active in setting the agenda for global and regional actions and determining which issues will be dealt by the regional community. After the launch of the YS LME project, the YS LME project has helped the region, especially China and the Republic of Korea, to further increase the attention to the marine environmental issues in the Yellow. However, in playing the other four functions listed above, the UNDP faces limitations.

61. Present limitations to the UNDP's role

are most significantly impacted by the powerful impact of political and security issues in the Yellow Sea region relative to other parts of the world. This situation poses some difficulties in the UNDP's efforts to play its various environmental governance roles in the region. Another factor impacting the UNDP's effectiveness is the limited availability of financial resources. While the UNDP (through the YS LME Project) is currently having a positive impact on the region, it will face serious limitations in this regard when financial resources from the GEF expire.

62. The United Nations Environment Program's role in regional efforts to protect the marine environment in the Yellow Sea region is less significant than that of the UNDP. With limited financial sources and political influence on Yellow Sea coastal states, UNEP has faced limitations in carrying out the roles mentioned above except in a limited capacity through NOWPAP.

C. NGOs

63. NGOs have become significant stakeholders in international environmental governance. Frequently, NGOs have helped the global community understand serious environmental problems. This important role of increasing public awareness by NGOs is often carried out by demonstrations. Greenpeace and Friends of the Earth are good examples of these types of NGOs. On the other hand, NGOs also help the global community by providing policy alternatives. IUCN, World Resources Institutes and WWF publish various reports to increase understanding of global environmental issues and to exert influence over policy developments.

64. In the Yellow Sea region, however, the role of NGOs in regional environmental governance is limited. Although NGOs in the Republic of Korea are very influential in increasing public awareness and in influencing domestic policy, they have historically been an insignificant stakeholder in regional governance and continue to have a limited capacity in this realm. The case of the Korean Federation for Environment Movement (KFEM), the largest environmental NGO within Asia as well as the Republic of Korea, illustrates the limited role of NGOs in regional environmental governance. Because KFEM's activities have historically been domestic in nature, including challenging the activities of military and authoritarian regimes in Republic of Korea, its impact on transnational issues has been limited. However, KFEM has recently made an increased effort to understand the UN's role in regional environmental matters and has taken steps to expand its

activities in regional environmental issues such as Yellow Dust, waste dumping in the sea, and marine mammal protection (KFEM, 2006). These initiatives will increase the level of participation of Korean NGOs in international environmental issues, including the protection of the Yellow Sea marine environment.

65. Unlike activist NGOs, non-activist NGOs such as academic organizations have played significant roles in regional environmental governance. They frequently organize regional activities and play various important roles, such as reporting their research results and networking with policy makers. In this sense, their level of involvement in regional environmental governance is higher than that of activist NGOs.

66. The situation in China and the DPRK is very different. Given that both countries maintain socialist political regimes, it is very difficult for NGOs to play significant roles. (Xu, 2006) Most Chinese NGOs cannot be characterized as "activist" since they don't share many characteristics with activist NGOs like those found in ROK; no domestic NGOs of this kind are known to exist at all in the DPRK. This sometimes leads to deficiencies in public awareness on environmental issues. On the other hand, non-activist NGOs exist in China and the DPRK and cooperate with the governments closely.

D. Private sector

67. Since environmental problems are largely byproducts of various industrial activities, the involvement of the private sector in regional environmental governance is important to enhance the effectiveness of policies.

68. The Yellow Sea region is one of the most rapidly developing regions in the world. Major world ports such as Shanghai and Incheon are located along the coast of the Yellow Sea. Due to increased activity in the Yellow Sea, the likelihood of a major environmental accident will also increase unless effective cooperative efforts are made to control the heavy volume of trade in the region. The fishing industry has been growing rapidly, especially in China as previously discussed. Tourism is also becoming important in the Yellow Sea, growing rapidly along the coast. Oil and other heavy industries have also contributed to significant environmental stress in the Yellow Sea region. In particular, the oil industry along the Bohai Bay may be playing a role in damaging the marine environment in the Yellow Sea, as frequent oil related environmental problems in the Bo Hai Bay are reported. (Xu, 2006)

69. Despite the significance of various industries in the Yellow Sea, their involvement in regional environmental governance is very limited. They have been regarded as the targets of the implementation of various policy measures and remain outside the policy formation process.

E. Concluding observations

70. In the Yellow Sea region, greater effort is needed for more effective environmental governance by securing adequate participation from relevant stakeholders. The following may be considered:

- While there are only three states in the Yellow Sea region, governmental structures are very different among them. Therefore, careful efforts must be made to have relevant governmental bodies construct effective environmental governance in the Yellow Sea region.

- More active involvement of international organizations in regional efforts to protect the marine environment in the Yellow Sea is required.

- Given the different status of NGOs in each state, the proper role of NGOs must be identified and a constructive way of increasing their capacities and involvement in regional environmental governance should be determined.

- The limited involvement of the private sector could become a problem. Increased private sector participation will increase the effectiveness of regional environmental governance efforts.

V. Analysis of existing international cooperative mechanisms

71. There exist several international cooperative mechanisms which are related to Yellow Sea marine environmental protection. These include the UNDP/GEF YS LME Project, NOWPAP, IOC/WESTPAC, PEMSEA and GPA.

A. YS LME

72. The UNDP/GEF YS LME Project is one of the most relevant cooperative mechanisms pertaining to the Yellow Sea region. As a part of GEF's International Waters Program, YS LME was launched in 2004. While the YS LME Project does not play its role as an independent entity according to international law, it has significantly boosted international cooperative efforts in the region.

73. Major participants in the YS LME Project include the governments of China and the Republic of Korea, and related research institutions. Recently, YS LME has expanded its scope of cooperation by developing various partnership programs with international organizations, NGOs, universities and others. (YSLME, 2006)

74. The main objective of the YS LME Project is to prepare the Strategic Action Program for endorsement by participating governments. (YSLME, 2006) This will eventually help the Yellow Sea region increase the effectiveness of regional environmental governance, which will in turn help the region deal with environmental stress. As of this report's writing, the YS LME Project has completed the TDA and set regional targets which will become the basis for management and action via the SAP. The YS LME's first stage is scheduled for completion in 2009, with the endorsement of the SAP by participating governments.

75. An important feature of the YS LME Project relative to other existing international cooperative mechanisms is that only two governments are participating in it. As the main part of the Yellow Sea is shared by the coastlines of two states, the small number of participating states could increase the effectiveness of cooperation. Most YS LME meetings and documents have been attended and produced by a core body of personnel (government officials, experts,

and NGOs). As a result, a naturally formed epistemic community[5] has helped YS LME and the related governments secure easy access to experts and facilitated the use of existing resources.

76. At the governmental level, the central governments of both countries are more deeply involved in the YS LME Project than local governments. The key ROK ministries with an interest in the YS LME are the Ministry of Foreign Affairs and Trade and the Ministry of Maritime and Fisheries Affairs. While the MOFAT is concerned with general policy issues related to the marine environment in the Yellow Sea, the MOMAF is responsible for more detailed implementation activities, such as providing and arranging technical support. The level of participation of local ROK governments in the YS LME project is very low.

77. The State Oceanic Administration (SOA) is the main Chinese governmental body affiliated with the YS LME project. In addition, the Ministry of Agriculture, which is responsible for fisheries matters, is loosely related to YS LME activities. In contrast with the ROK's MOFAT, the Chinese Ministry of Foreign Affairs' degree of involvement is low except in occasional cases where security and treaty related issues are involved.

78. Furthermore, the involvement of China's local governments in regional environmental governance is minimal. This is a product of their lack of expertise and resources in carrying out international cooperative activities.

79. An important feature of the YS LME Project is that it depends heavily on experts to resolve various issues during the course of implementing Project objectives. Important technical decisions are often made via the discussions of experts in the five Working Groups. While the Project Steering Committee (PSC) is the ultimate decision-making body of the YS LME, it is rare that important decisions are made by PSC meetings. This bottom-up approach of the YS LME Project is certainly beneficial to its effectiveness.

80. While the participation of only two states in the YS LME project could be an asset, it could also be a serious barrier to its activities. Problems related to the Joint Cruise by the two countries are a good example. Although carrying out joint cruise activities is a critical part of the YS LME Project, tensions between China and Republic of Korea due to the political and security implications of the joint cruise have, as of yet, not been resolved. Unless this issue can be

5 For the definition of the epistemic community, see Peter Haas, Saving the Mediterranean (1989).

overcome, other cooperative activities may also be affected.

81. The participation of the DPRK is another issue that the YS LME project needs to resolve. As the DPRK is an integral part of the Yellow Sea region, YS LME needs to ensure a way of having the DPRK formally participate in the Project. This will increase the feasibility and completeness of current cooperative efforts.

B. NOWPAP

82. The Northwest Pacific Action Plan is one of the Regional Seas Program of the United Nations Environment Program. Since its first Intergovernmental Meeting was held in Seoul in 1994, NOWPAP has played an important role in stimulating cooperative activities among Northeast Asian states. (NOWPAP, 2007)

83. The Republic of Korea, China, Japan and the Russian Federation are the member states of the NOWPAP. While Mongolia attended the initial negotiations of the NOWPAP, it is no longer present at meetings. The DPRK, an important country due to its geographical location in the NOWPAP region, also does not participate in the NOWPAP.

84. Among the Yellow Sea states, China's State Environmental Protection Administration (SEPA) and the ROK's Ministries of Foreign Affairs and Trade and Ministry of Maritime and Fisheries Affairs participate in the NOWPAP. In the ROK, the specialized roles of participating ministries are similar to ones they play in YS LME.

85. The NOWPAP is a Regional Activity Centre (RAC) based institution. Four RACs are located in four different countries. The Special Monitoring and Coastal Environment Assessment Regional Activity Centre (CEARAC) is located in Toyama, Japan. The Northwest Pacific Region Environmental Cooperation Center (NPEC) currently hosts CEARAC. The main activities of CEARAC are to monitor and assess harmful algal blooms and to develop new monitoring tools using remote sensing skills. (CEARAC, 2007) The Data and Information Network Regional Activity Centre (DINRAC) is located in SEPA's Policy Research Center for Environment and Economy in Beijing, China. DINRAC's main objectives are the development of a region-wide data and information exchange network, promotion of regional cooperation and exchange of information on the marine and coastal environment in the NOWPAP region. DINRAC aims to ultimately become the clearinghouse of the NOWPAP region. (DINRAC, 2007)

86. The Marine Environmental

Emergency Preparedness and Response Regional Activity Centre (MERRAC) is based in the Maritime and Ocean Engineering Research Institute within the Korea Ocean R&D Institute (MOERI/KORDI) in Daejeon, Korea. MERRAC's main function is to develop regional cooperative measures in response to marine pollution incidents, including oil and hazardous and noxious substances (HNS) spills. (MERRAC, 2007) It is noteworthy that MERRAC's activities have been successfully completed through joint efforts of both UNEP and the International Maritime Organization (IMO). Recently, MERRAC also participated in work related to the land-based sources of marine litter. Lastly, the Pollution Monitoring Regional Activity Centre (POMRAC), based in the Pacific Geographical Institute (PGI) of the Far East Branch of the Russian Academy of Sciences in Vladivostok, Russia, is in charge of cooperative measures to address the atmospheric deposition and riparian/direct inputs of contaminants into the marine and coastal environment. (POMRAC, 2007) Recently, integrated coastal and river basin management and work on NOWPAP's marine environmental report have been added as new projects for POMRAC.

87. NOWPAP launched a new project, the Marine Litter Activity (MALITA), at its 10th Intergovernmental Meeting in 2005. (NOWPAP-a, 2007) Under the oversight of the Regional Coordinating Unit (RCU), the Regional Activity Centres and the four Marine Litter Focal Points are in charge of the implementation of MALITA. Since its launch, two MALITA workshops have been held. The purpose of this project is to increase public awareness about marine litter and to prevent and reduce marine litter in the Northwest Pacific region in line with the global theme of sustainable development.

88. NOWPAP may be regarded as one of the most institutionalized cooperation mechanisms in Northeast Asia. Its institutional development was furthered by the launching the Secretariat and the Regional Coordinating Unit (RCU) in 2004. However, if it is unable to resolve its lack of financial resources and the dearth of serious results of activities, NOWPAP may face serious challenges and competitors in the future.

89. NOWPAP could be utilized as an important cooperative policy vehicle for Yellow Sea marine environmental protection. Its geographic scope is more comprehensive than that of the YS LME project, covering most of the marine area in Northeast Asia, and can be a useful setting for the resolution of Yellow Sea issues in a broader context.

C. IOC/WESTPAC

90. The Intergovernmental Oceanographic Commission (IOC) started its regional project in the Western Pacific in 1965 and developed its Regional Committee for the Western Pacific in 1977. Later, this committee was transformed into the IOC Sub-Commission for the Western Pacific (WESTPAC) in 1989, based in Bangkok, Thailand.

91. As it is a regional subsidiary body of the IOC, IOC/WESTPAC performs its functions within the general policy and budgetary guidelines of the IOC. (IOC/WESTPAC, 2007) The primary objective of IOC/WESTPAC is to promote, develop and coordinate marine scientific research programs, ocean services and related activities. While pursing its objective, IOC/WESTPAC takes into account the specific interests and needs of the member states in the region. IOC/WESTPAC, if necessary, makes recommendations and proposals to the Commission and cooperates with regional subsidiary bodies of UN organizations. IOC/WESTPAC also provides general guidance and serves as a mechanism for member states for the formulation, evaluation and follow-up of proposals for activities aimed at strengthening national and regional capabilities in marine scientific research and the establishment of common institutions, services and facilities.

92. As of 2006, IOC/WESTPAC has twenty member states including France, United Kingdom, the United States, and seventeen Asian countries. The highest body of IOC/WESTPAC is the Session, which is held once every year.

93. IOC/WESTPAC is an expert-oriented organization, as it forms Task Teams to carry out specific assignments, establishes Groups of Experts and organizes technical meetings among the experts. Therefore, IOC/WESTPAC's outputs contribute to sharing information and knowledge related to relevant scientific research, which may have an influence on policy formation.

94. IOC/WESTPAC does not have any project directly related to the protection of the Yellow Sea region's marine environment. However, as the Yellow Sea shares many of the oceanic features of the greater Pacific Ocean, the results of the IOC/WESTPAC may be pertinent to issues in the Yellow Sea. In this sense, it is noticeable that IOC/WESTPAC has developed partnerships with YS LME, NOWPAP and PEMSEA.

D. PEMSEA

95. As East Asian seas are challenged by

serious environmental problems, twelve countries in East Asia, with the support of GEF, UNDP and IMO, launched the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA). For over a decade, PEMSEA has developed a number of activities through intergovernmental, interagency and multisectoral partnerships. These activities include integrated coastal management, subregional sea area and pollution hotspot management, capacity building, environmental investments, scientific research, an integrated information management system, coastal and marine policy work, work on regional mechanisms, risk assessment, regional networking, intellectual capital development, public mobilization, environmental investment and increasing political will on environmental issues.

96. The objective of integrated coastal management is to enhance sustainable development of coastal resources and the marine environment at the local level. (PEAMSEA, 2007) To achieve the goal, PEMSEA, in particular, emphasizes the important role of local governments in harmonizing environmental protection and development. Eight sites have been selected as demonstration sites, including the city of Nampo in DPRK. The major goals of each initiative include implementing organizational and legal arrangements, building local capacity to plan and manage coastal and marine areas, developing a 25-year strategic environment plan and short-term action plans, facilitating environmental investment by both the public and private sectors, installing an environmental monitoring program, training local people, and establishing partnerships and building awareness among NGOs and community organizations.

97. PEMSEA has selected demonstration sites such as the Bo Hai Bay, Saemankeum Reclamation Area, Manila Bay and the Gulf of Thailand, and has applied an innovative approach to the environmental management of sub-regional sea areas. The purpose of these activities is to create a common vision for semi-enclosed sea bordering areas in the region and develop and implement a collective strategy and environmental management program to achieve this goal. Capacity building is also an important component of PEMSEA. Government officials, technical personnel and researchers have participated in multi-focal training programs, which will help meet the demand for human resource development in coastal and marine environmental management.

98. PEMSEA emphasizes scientific research and cooperation among member states. It has established a Multidisciplinary Expert Group

(MEG) and has conducted case studies on ecosystem carrying capacity, the relationship between economic development and ecological benefits, the impact of maritime trade on endangered species, the transboundary impacts of national economic activities, and the socioeconomic benefits of integrated coastal management. The results of research conducted, along with other available data, are collected and managed in a database system. This serves as a foundation for effective decision-making.

99. The participation of civil society is also an important component of PEMSEA. Target civil society groups include NGOs, grassroots organizations, religious groups, environmental journalists and other stakeholder groups.

100. One of the unique components of PEMSEA is its emphasis on private-public partnerships. Encouraging private sector participation in PEMSEA initiatives has helped meet its demand for financial and technological resources. Waste prevention and management, environment related services, and information and technology are among the projects where private sector investments have been made.

101. PEMSEA makes efforts to strengthen coastal and marine policy in the PEMSEA region. A common strategy, action program, and long-term vision will be introduced for the seas of East Asia. Measures developed for adoption into national coastal policy include guidelines for the formulation and adoption of national coastal policy, model national coastal policy and model implementing legislation. This activity will involve policy level officials and regional and legal experts in PEMSEA s work. As national coastal and marine policy is strengthened, PEMSEA will aim to develop a regional mechanism to solve problems in the coastal and marine environment.

102. As PEMSEA is active in addressing issues in East Asian seas, it has important implications for the Yellow Sea region. As a part of the greater body of East Asian Seas, the Yellow Sea region may draw from the PEMSEA s experiences and results. That all three of the Yellow Sea s coastal states are members of PEMSEA is another benefit, because of the importance of DPRK s participation in the YS LME project in enhancing its effectiveness. In particular, ongoing projects in Bohai Bay, Nampo City, and the Saemankeum area (all are located in the Yellow Sea region but not addressed in the YS LME Project) may add synergistic effects to the existing activities of the YS LME Project.

E. GPA

103. Most sources of marine pollution originate from various human activities on land. One billion people live in the coastal areas surrounding the Yellow Sea, and many local economies also depend on these coastal areas. Despite the importance of addressing pollution in these coastal and in-land areas, the global community remained inactive on this issue until 1995, when the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and the Washington Declaration were adopted. In the next year, the GPA Implementation Plan was presented to the Commission on Sustainable Development. The GPA furthered its activities by establishing the UNEP/GPA Coordination Office in The Hague, Netherlands in 1998.

104. The objective of the GPA is to prevent the degradation of the marine environment from land-based activities by facilitating States' duty to preserve and protect the marine environment as set out by many international treaties, including the United Nations Convention on the Law of the Sea. (UNEP, 1999) The GPA provides recommendations to states on the following activities:

- Identifying and assessing problems
- Establishing priorities for action as identified by problem assessment
- Setting management objectives for high-priority problems
- Identifying, evaluating and selecting strategies and measures to achieve these objectives
- Developing criteria for evaluating the effectiveness of strategies and measures.

105. To help states undertake its recommended activities, the GPA provides three levels of capacity building and technical programs. Areas that the GPA focuses on are as follows:

- National Program of Action
- Physical Alteration and Destruction of Habitats
- Wastewater
- Financing
- Legislation
- Small Island Developing States
- Training
- Regional Seas

106. Within the Yellow Sea context, the GPA may be of assistance in providing a global scheme for addressing land-based pollution. As the GPA emphasizes the importance of utilizing the Regional Seas Programme, NOWPAP is expected to play a significant role in GPA efforts to develop schemes to address land-based sources of pollution in the region. However, as discussed above, NOWPAP s ability to meet the demands of the region is limited.

F. Concluding observations

107. While the YS LME Project is the most relevant cooperative mechanism in the Yellow Sea region, NOWPAP' s existence has significant relevance to the issues of the Yellow Sea marine environment.

108. Neither body has been able to secure the participation of DPRK. Given their short histories, they have not also produced tangible results concerning the formal participation of DPRK.

109. Political elements in the Yellow Sea region affect cooperative efforts to address marine environmental problems among coastal states.

110. While the importance of relevant stakeholders' participation in cooperative activities is well understood, their levels of participation vary.

111. IOC/WESTPAC, GPA and PEMSEA have only limited relevance in the Yellow Sea region. Further developments are needed to incorporate global or other regional initiatives effectively into current efforts in the Yellow Sea region.

VI. Analysis of existing legal institutions

112. International cooperative activities are implemented by legal institutions. As the implementation of international efforts is in the hands of states, domestic legislation is a decisive factor for the effective implementation of international institutions. Because interaction among states in the form of trans-boundary movement of goods, transnational transportation and transnational communication is increasing rapidly and states are obligated under international law to enact compliant domestic laws, international legal institutions are having a significantly greater impact on domestic legislation. As a result, understanding the international legal institutions of relevance to the Yellow Sea marine environment is a critical step in enhancing the effectiveness of regional efforts.

113. Those global and regional treaties that need to be given attention within the context of the Yellow Sea region marine environment are the United Nations Convention on the Law of the Sea, the London Convention and its 1996 Protocol, MARPOL, and bilateral treaties between Republic of Korea and China dealing with the marine environment and fisheries.

A. UNCLOS

114. The United Nations Convention on the Law of the Sea acts as the framework treaty governing maritime issues. It provides basic principles on the preservation of living resources, pollution, and regional cooperation. The basic principle of the Law of the Sea divides the world's marine area into smaller pieces, with different levels of sovereign jurisdiction in each portion.

115. Within its territorial seas, a sovereign state may exercise exclusive jurisdiction on marine environmental issues, no matter where the sources of the seas originate. The coastal state may enact and enforce relevant legislation to address issues pertaining to the marine environment. In contiguous zones, states may exercise the control necessary to prevent and punish infringement of its customs, fiscal, immigration or sanitary laws and regulations. While UNCLOS does not explicitly address the issue of pollution in the contiguous zone, states

may address pollution related activities if they are related to sanitary issues. UNCLOS also provides that coastal states have jurisdiction concerning the protection and preservation of the marine environment.

116. Marine areas outside of state jurisdiction are known as the "high seas." International law has developed unique principles in these areas. Only flag and port states may exercise jurisdiction concerning pollution in the high seas. Because of the greater legislative freedom that exists in the high seas, the current UNCLOS framework may not be effective in preventing and controlling environmentally harmful activities.

117. Under the UNCLOS, member states bear responsibilities to preserve and protect the environment. While states have the sovereign right to exploit their natural resources, this right is limited to an extent that does not harm the marine environment. States are required to take, individually or jointly as appropriate, all measures to prevent, reduce and control pollution of the marine environment from any source. States also shall take all measures necessary to ensure that their activities do not cause pollution-related damage to other states and their environments.

118. UNCLOS regulates different types of sources of pollution to protect the marine environment: land-based sources, marine vessels, and various installations and devices. States are required to prevent, reduce and control marine environment pollution resulting from the use of technologies or the introduction of alien or new species.

119. One of the features of the UNCLOS in addressing marine environmental problems is that it does not provide specific regulatory standards for the prevention, reduction and control of pollution. Instead, it urges states to cooperate, globally and regionally, with international organizations such as the International Maritime Organization in formulating and elaborating international rules, standards and recommended practices and procedures. UNCLOS also emphasizes the enactment of domestic laws and regulations which are consistent with international standards.

120. Under the UNCLOS, states that become aware of the imminent pollution-related damage of the marine environment are obligated to notify other states and international organizations that are likely to be affected by such damage.

121. In order to minimize the damaging effects of pollution, states are obliged to develop and promote contingency plans

for responding to pollution incidents in the marine environment. States are also required to promote studies, undertake programs of scientific research and encourage the exchange of information and data acquired about marine environment pollution. To this end, states need to participate in regional or global fact-gathering programs. A stringent set of rules, standards, and scientific criteria are also required to protect the marine environment. UNCLOS has provisions concerning technical assistance on this issue for developing countries.

122. To ensure the effective enforcement of international law and standards and relevant domestic laws and regulations for the protection of the marine environment, flag states, port states and coastal states are allowed to exercise their jurisdictions under the conditions provided by UNCLOS.

123. In conclusion, while UNCLOS has introduced a number of provisions to protect the marine environment, they are insufficient for developing detailed regulatory standards on their own. Rather, it leaves the task of preparing and enforcing international and domestic laws and regulations to international organizations and states. UNCLOS also lacks the enforcement measures to address states that violate its principles, decreasing its effectiveness in preventing, reducing and controlling pollution in marine areas.

124. UNCLOS serves as the legal framework for states in the Yellow Sea region. Both China and the Republic of Korea have developed detailed laws and regulations related to the marine environment, thereby meeting the obligations under the UNCLOS. However, the extent to which UNCLOS will be able to guarantee the development and enforcement of the effective standards required for pollution prevention, reduction, and control and other environmental issues in the Yellow Sea region remains undefined. This will depend on whether a well designed web of international and domestic legal institutions emerges through the development of regional environmental governance.

B. The London Convention and its 1996 Protocol

125. The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter is a global treaty to address the issue of marine dumping. Its purpose is to control all sources of marine pollution and prevent pollution by dumping wastes and other matter. The London Convention has been amended several times, most recently in 1996 with the adoption of the

1996 Protocol. (IMO, 2007)

126. Article 2 of the London Convention obligates states to take effective measures, both collectively and individually according to their scientific, technical and economic capabilities, to prevent marine pollution caused by dumping and to harmonize their policies with those of other states.

127. The London Convention uses a permit system to regulate sources of dumping-related pollution, categorizing wastes and other matter into three categories and regulating them accordingly. Annex I lists materials which are prohibited from being dumped in the sea; Annex II list materials which require special permits for dumping. All other materials require general permits for dumping.

128. Materials that are prohibited from being dumped in the sea under Annex I are as follows:

- Organohalogen compounds
- Mercury and mercury compounds
- Cadmium and cadmium compounds
- Persistent plastic and other persistent synthetic materials
- Crude oil and its wastes, refined petroleum products, petroleum, distillate residues, and any mixtures containing any of these, taken on board for the purpose of dumping
- Radioactive wastes or other radioactive matter
- Materials produced for biological and chemical warfare
- Incineration at sea of industrial wastes defined in paragraph 11 of Annex I.

129. Materials that may be dumped with a special permit under Annex II are as follows:

- Wastes containing significant amounts of arsenic, beryllium, chromium, copper, lead, nickel, vanadium, zinc, and their compounds
- Organosilicon compounds
- Cyanides
- Fluorides
- Pesticides and their by-products not covered in Annex I
- Waste and other materials which contain materials prohibited under the Annex I
- Waste and other materials which

contain de minimis levels of radioactivity

- Containers, scrap metal and other bulky wastes liable to sink to the sea bottom which may present serious obstacles to fishing or navigation

- Materials which, though of a non-toxic nature, may become harmful due to the quantities in which they are dumped, or which are liable to seriously reduce amenities.

130. Waste and other materials, dumping of which is not prohibited or requires a special permit, are allowed to be dumped in the sea with a general permit. The London Convention provides a guideline for issuing such permits.

131. The London Convention also provides provisions concerning the development of cooperation in the region as well as with other international organizations. Article 8 of the London Convention asks states to endeavour to enter into regional agreements consistent with the Convention. Article 12 states that nations should make efforts to promote measures to protect the marine environment against pollution caused by materials governed by the London Convention via competent specialized agencies and international organizations.

132. The Protocol to the Convention of Marine Pollution by Dumping of Wastes and Other Materials was adopted in 1996 and entered into force in 2006. The 1996 Protocol can be regarded as an amendment to the London Convention. It introduces the innovative approach of preventing dumping wastes and other materials in the sea with only limited exceptions. (IMO, 2007)

133. The 1996 Protocol strengthens prevention and control of the sources of dumping-related pollution by introducing a provision of general obligations. Article 3 of the 1996 Protocol emphasizes a precautionary approach, a polluter pay principle and an obligation not to transfer damage to others.

134. As mentioned above, the most innovative feature of the 1996 Protocol is its limited-exception ban on dumping. Article 4 of 1996 Protocol allows states to dump wastes and other materials only under Annex I with a permit. Those wastes and materials under Annex I are:

- Dredged material

- Sewage sludge

- Fish waste or material resulting from industrial fish processing operations

- Vessels and platforms or other man-

made structures at sea

- Inert, inorganic geological material
- Organic material of natural origin, and
- Bulky items primarily comprising iron, steel, concrete and similarly unharmful materials for which the concern is physical impact, and limited to those circumstances where such wastes are generated at locations such as small islands with isolated communities having no practicable access to disposal options other than dumping.

135. Dumping wastes and materials under Annex I requires a permit. States have an obligation to adopt administrative or legislative measures to ensure that their issuance of permits and permit conditions complies with provisions of Annex II. States can take further steps to prohibit wastes and materials from dumping.

136. The 1996 Protocol leaves open the possibility of extending its geographical scope of application to internal waters, which usually are not within the interests of international law. According to Article 7, states must apply the 1996 Protocol to control the deliberate disposal of wastes and other matter in marine international waters. States have the additional obligation of providing the IMO with information on legislation and institutional mechanisms regarding implementation, compliance and enforcement in marine internal waters.

137. In conclusion, the London Convention and its 1996 Protocol have served as a good regulatory basis for addressing the dumping of wastes and other materials in the sea. They provide not only related principles but also a detailed list of regulated wastes and materials. Strengthening regulations on the dumping of wastes and other materials by prohibiting dumping in general only with limited exceptions as well as expanding its geographical scope of regulation to internal waters through the 1996 Protocol will contribute to the increasing effectiveness of dumping regulation.

138. As a large part of the Yellow Sea region's pollution problems occur as a result of dumping, establishing an effective compliance mechanism to the London Convention and its 1996 Protocol will help the region prevent, reduce and control dumping-related pollution in the Yellow Sea. However, among regional states, only China is the member to both the London Convention and the 1996 Protocol. (IMO, 2007) The ROK is a member only to the London Convention, and the DPRK is not a member to either of the two treaties. Given that not all regional states are members to

the London Convention and the 1996 Protocol, efforts need to be made to ensure the full participation of the region's states in these two treaties.

C. 1973/1978 MARPOL

139. The 1973 International Convention for the Prevention of Marine Pollution from Ships and its 1978 Protocol aim to prevent marine pollution by ships from accidental and operational causes. Since the issue was first discussed in Washington in 1926, public awareness of the seriousness of ship-related pollution has been increased. The 1954 International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL) primarily addressed pollution from routine tanker operations and from the discharge of oily wastes from machinery spaces. As oil trade and development increased, further actions were required. After the Torrey Canyon accident of 1967, an international conference organized by IMO led to the 1973 adoption of the International Convention for the Prevention of Pollution from Ships. This convention was intended to address pollution via chemicals, harmful substances carried in package form, sewage, and garbage in addition to oil. However, this convention got little attention from the international community and faced the possibility of not entering into force. Consequently, the MARPOL Protocol was adopted in 1978, providing states more flexibility in observing their obligations than under the 1973 MARPOL. As a result, the 1973 International Convention for the Prevention of Marine Pollution from Ships, as modified by the 1978 Protocol (MARPOL 73/78), finally entered into force in 1983. (MOMAF, 2007)

140. To achieve its goal of regulating pollution from ships caused by accidents as well as routine operations, MARPOL 73/78 has six technical Annexes as follows:

- Annex I: Regulations for the Prevention of Pollution by Oil
- Annex II: Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
- Annex III: Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form
- Annex IV: Prevention of Pollution by Sewage from Ships
- Annex V: Prevention of Pollution by Garbage from Ships
- Annex VI: Prevention of Air Pollution from Ships.

141. The 1973 Convention maintained

the oil discharge criteria under the 1969 amendments to the 1954 OILPOL without substantial changes. It allows operational discharge of oil from tankers only when three conditions are met. Those conditions are:

- the total quantity of oil which a tanker may discharge in any ballast voyage whilst under way must not exceed 1/15,000 of the total cargo carrying capacity of the vessel;
- the rate at which oil may be discharged must not exceed 60 litres per mile traveled by the ship; and
- no discharge of any oil whatsoever must be made from the cargo spaces of a tanker within 50 miles of the nearest land.

142. Furthermore, in Annex I of the 1973 Convention, the maximum quantity of oil permitted to be discharged on a ballast voyage of new oil tankers was reduced from 1/15,000 of cargo capacity to 1/30,000 of the amount of cargo carried.

143. The 1978 Protocol amended Annex I extensively. Its segregated ballast tanks (SBT) requirement was strengthened and provisions concerning crude oil washing, clean ballast tanks (CBT) systems, and drainage and discharge arrangements were introduced or altered under the 1978 Protocol.

144. Annex II concerns the control of pollution by noxious liquid substances by providing four discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk. Approximately 250 evaluated substances have been cleared for discharge to reception facilities under the conditions provided by the MARPOL 73/78.

145. Annex III prevents pollution from harmful substances in packaged form. Unlike Annexes I and II, Annex III-VI are optional. Requirements for the issuing of detailed standards for packing, marking, labeling, documentation, storage, quantity limitations, exceptions and notifications of harmful substances are provided by Annex III.

146. Prevention of pollution by sewage and garbage from ships is addressed in Annex IV and V, respectively. Detailed requirements for the control of sewage and garbage from ships are provided by these Annexes. Annex V completely prohibits the dumping of all forms of plastic.

147. Annex VI was adopted in 1997 and entered into force in 2005. This Annex controls sulfur oxide and nitrogen oxide emissions from ship exhausts and bans the deliberate emission of ozone

depleting substances.

148. In conclusion, through a number of amendments to the 1973 Convention, in the form of MARPOL 73/78, marine pollution from ships has decreased. All three of the Yellow Sea's coastal states are members to all of MARPOL's annexes, except Annex VI by the Democratic People's Republic of Korea. (IMO, 2007) Therefore, it is important for each state to ensure the effective implementation of MARPOL 73/78 through domestic laws and regulations to address pollution from ships.

D. Biodiversity Convention

149. The Convention on Biological Diversity was adopted in 1992 and entered into force in 1993. The main objective of the Convention on Biological Convention is the sustainable use and equitable sharing of benefits of biological assets. Substantive provisions deal with measures for the conservation of biological diversity, incentives for the conservation and sustainable use of biological diversity, research and training, public awareness and education, assessment of the impacts of projects on biological diversity, regulation of access to genetic resources, and access to and transfer of technological and financial resources.

150. The Conference of Parties of the Convention of the Biological Diversity has developed five thematic work programs, addressing marine and coastal biodiversity, agricultural biodiversity, forest biodiversity, the biodiversity of inland waters and the biodiversity of dry and sub-humid lands. These programs have several common components as follows:

- establishing a vision for and basic principles to guide future work
- setting out key issues for consideration
- identifying potential outputs
- suggesting a timetable and means for achieving the outputs.

151. Other features of the Convention of Biological Diversity include an emphasis on the ecosystem approach, a review of Convention operations and development of a Strategic Plan, and cooperation with other biodiversity-related conventions, institutions and processes.

E. RAMSAR Convention

152. As wetlands are important regulators of water regimes as well as serving as habitats, which contain flora and fauna, the Convention on Wetlands of International Importance, more especially known as the Waterfowl

Habitat or RAMSAR Convention, was adopted in Ramsar, Iran in 1971.

153. To crystallize the importance of protecting wetland ecosystems, the Contracting Parties shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance. Each Contracting Party bears responsibility for the conservation, management and wise use of migratory stocks of waterfowl within the designated Wetlands. Furthermore, the Contracting Parties bears obligations of formulation and implementation of their planning to promote the conservation of the wetlands in the List, promotion of the conservation of wetlands and waterfowl, and of encouraging research and the exchange of data and publications.

154. While the RAMSAR Convention has contributed to the protection of important flora and fauna, which are in danger of extinction, it also has limitations as it lacks the extensive legal regulatory measures that are required to conserve the important wetlands.

F. Agreement on Environmental Cooperation Between ROK and China

155. Since it was signed in 1993, the Agreement on Environmental Cooperation between the government of the Republic of Korea and the government of the People's Republic of China has provided a bilateral cooperation framework for solving common issues between two countries. The Agreement falls under the jurisdiction of the Ministry of Foreign Affairs of Trade of the Republic of Korea and the Chinese State Environment Protection Administration (SEPA).

156. In adherence to the Agreement, China and ROK have conducted several cooperative activities such as the exchange of information, experts and government officials, joint seminars/symposiums and joint research. Areas of focus have included air pollution, water contamination, coastal and marine pollution control, control of hazardous wastes and regulation of the movement of hazardous wastes.

157. To maintain effective cooperation between the two governments, the Agreement established the Joint Committee on Environmental Cooperation (JCEC) between the government of Republic of Korea and the government of People's Republic of China. The JCEC is the primary organization responsible for the implementation of the Agreement. The majority of relevant ROK ministries and agents participate in the JCEC, including

the Ministry of Foreign Affairs and Trade, the Ministry of Environment, the Ministry of Fisheries and Marine Affairs, the Korea Meteorological Administration, and related research institutes. On the other hand, the State Environment Protection Agency is virtually the sole Chinese participant in the JCEC, with the Chinese Ministry of Foreign Affairs and Trade participating in limited terms.

158. Several important projects have been conducted under the JCEC. Seven of these projects are on-going, including the Joint Research of the Yellow Sea Marine Environment. At the most recent (12th) meeting of the JCEC, held in China in June 2007, commitments were made to carry out several new joint projects, including cooperation on response to problems associated with Yellow Dust, marine environmental protection in the Yellow Sea, cooperation in the development of environmental industries, and joint research on environmental technologies. (MOFAT, 2007a)

159. This bilateral treaty could serve as a solid basis for addressing comprehensive regional environmental problems, including the Yellow Sea marine environment, between Republic of Korea and China. However, the fact that SEPA remains virtually the sole Chinese participant in the JCEC could be a very serious limitation in yielding effective results from the cooperation-building efforts between the two states.

G. Treaties Concerning Fisheries

160. The issue of fisheries is one that merits careful discussion, as it has become a serious threat to the maintenance of a sustainable marine environment in the Yellow Sea as discussed above. The primary legal institutions related to the fisheries issue in the Yellow Sea region include the UNCLOS, the FAO Code of Conduct for Responsible Fisheries and the bilateral Fisheries Agreement between the Republic of Korea and China.

161. As in other environmental issues in the Yellow Sea, UNCLOS serves as a general legal guideline in fisheries issues. UNCLOS introduced an Exclusive Economic Zone (EEZ) for fisheries, breaking with historical conventions of dividing maritime areas into High Seas and Territorial Seas. Coastal states may extend their jurisdiction to the EEZ beyond their own territorial seas by obtaining rights to control EEZ living resources. In the EEZ, coastal states are obligated to conserve and manage living resources rather than simply exploiting them.

162. Article 61 of the UNCLOS states that the coastal states have obligations to

determine the allowable catch of living resources and to maintain or restore populations of harvested species at levels which will be able to produce the maximum sustainable yield in EEZs. States are required to share and consider relevant scientific data and evidence. Under Article 62, coastal states also need to utilize an EEZ s living resources optimally while allowing other states access to the surplus of the allowable catch through agreements and other arrangements and pursuant to the laws and regulations of the coastal states. Articles 63 to 67 address special species-related issues. The implication of extending coastal states jurisdiction over living resources in EEZs is the establishment of an effective legal basis for the prevention of overfishing by these states.

163. In territorial seas, UNCLOS allows coastal states to exercise sovereign rights over natural resources, including fisheries. On the other hand, in the high seas beyond the EEZ, all states have the right to engage in fishing under certain conditions provided by UNCLOS. At the same time, states also have an obligation to take necessary measures to conserve living resources in the high seas. To this end, UNCLOS urges states to establish regional or sub-regional fisheries organizations.

164. The FAO Code of Conduct for Responsible Fisheries is not a legally binding instrument, but provides guidelines to states. While UNCLOS is general in its nature, the FAO Code of Conduct is more detailed and specific concerning fisheries-related issues. It sets out principles and standards of behaviour for states related to the conservation, management and development of fisheries. As an instrument of reference for both FAO member and non-member states, the FAO Code of Conduct covers the entire process of capture, processing and trade of fish and fish products, fishing operations, aquaculture, research and the integration of fisheries into coastal area management. Geographically, while UNCLOS applies different rules to territorial seas, EEZs and the high seas, the FAO Code of Conduct treats fisheries in the high seas, within the EEZ, and in territorial waters in a uniform manner.

165. Article 6 of the FAO Code of Conduct is usually regarded as a provision which sets the outline of the Code. The principles stipulated in Article 6 are as follows:

- Conservation of aquatic ecosystems
- Promotion of food security interests
- Prevention of overfishing and excess

capacity

- Dependence on the best scientific evidence available for conservation and management decisions
- Application of the precautionary principle
- Development of further selective and environmentally safe fishing gear
- Maintenance of the nutritional value, quality and safety of fish and fish products
- Protection and rehabilitation of critical fisheries habitats
- Ensuring compliance with and enforcement of conservation and management measures and establishing effective mechanisms to monitor and control the activities of fishing vessels and fishing support vessels
- Exercising effective flag state control
- Cooperation with sub-regional, regional, and global fisheries management organizations
- Ensuring a transparent and timely decision making process
- Conducting fisheries-related trade according to established WTO rules
- Cooperation to prevent disputes and resolving disputes in a timely, peaceful and cooperative manner
- Promoting public awareness
- Ensuring safe and healthy fish facilities and fish farms
- Protection of fishermen and fish workers.

166. *The Republic of Korea and China's Bilateral Fisheries* Agreement for the Yellow Sea also deserves attention. This agreement articulates these states' agreement to conserve and manage living resources, manage fishing activities and promote cooperation on fisheries activities in accordance to UNCLOS in the EEZs of the two countries.

167. The following principles have been established for the countries' EEZs:

- Fishing vessels from each country need to acquire fishing permits from the other country within the EEZ of the other country.
- Fishing vessels are under obligation to observe the laws and regulations for the conservation of the marine environment of the other country while within the EEZ of the other country.

- Each coastal country reserves the right to enforce relevant measures to maintain fisheries within its own EEZ.

168. The Fisheries Agreement also instituted a unique system to deal with the two countries' overlapping EEZs. This overlapping area was designated as the Provisional Area[6] and was governed by a unique set of rules. (Y.H.Park, 2006) The Joint Fishery Commission was established to decide marine environment conservation issues and enforce measures to maintain fisheries order. Under the circumstance that one party was found to breach a decision of the Joint Fishery Commission, the other party had authority to alert the other party of this fact and call attention to the other party's act.

169. In conclusion, in the Yellow Sea, fisheries matters are mainly governed by the Fisheries Agreement between the Republic of Korea and China. This agreement reflects related provisions of the UNCLOS. On the other hand, the FAO Code of Conduct remains loosely applied and is not incorporated into any sub-regional cooperative mechanism.

6 Before June 30, 2005, a so-called Transitional Area also existed. This area was established in the area where the two parties could not agree on whether to apply the rules of the EEZ or of the Provisional Area. As a result, for a period of four years after the agreement entered into force, rules of the EEZ were not applied to the Transitional Area. However after June 30, 2005, this area became part of the EEZ of both countries and was henceforth governed by the rules of the EEZ.

VII. Recommendations for future interventions

170. Future interventions for the ecosystem-based, environmentally sustainable management and use of the YS LME require an understanding of various aspects of regional governance issues. Interventions suggested in this section are ones that may be adopted and pursued for implementation until 2020 in the YS LME project context. Different interventions may be required if the geographical and/or project scope is expanded or changed.

A. Stakeholders

171. This report's analysis has identified different levels of involvement among stakeholders within the current regional governance framework in each of the region s states. This is natural because each country has unique political, social and economic dynamics.

Table VII-1 Degree of Current Stakeholder Involvement in Regional Governance in the Yellow Sea region

	Central Gov.	Local Gov.	NGOs	Private Sector
China	very strong	weak	weak	weak
ROK	very strong	weak	weak	weak
DPRK	n/a	n/a	n/a	n/a

a. China

172. In China, the central government, especially the SOA, has been heavily involved in regional governance in the YS LME context. In the case of the local governments, more coordination among the local governments, along with capacity building for their contributing role in the regional efforts, is necessary. The weak participation of Chinese NGOs in regional governance is assumed to be the result of the relative weakness of civil society in China. While the participation of the private sector in regional governance is important, both the relatively small scale of industries and the public sector's domination of the private sector in Chinese social institutional dynamics has resulted in the weak participation of the private sector in regional governance.

173. In the Republic of Korea, central government agencies such as the Ministry of Foreign Affairs and Trade and the Ministry of Maritime and Fisheries Affairs play important roles in Yellow Sea regional governance. The results of interviews with Korean government officials demonstrated that the degree of participation of local government remains low as most transnational issues are decided by the central government. The strong influence of the central government over local governments may also play a role in local governments' relative unimportance as a player in regional governance issues. Although they are very influential in domestic environmental issues, ROK NGOs' limited capacity for handling transnational issues has limited their involvement in regional governance issues in the Yellow Sea. The ROK private sector is an important actor in the Yellow Sea region's marine environment, but has not been given the opportunity to become involved in regional governance.

174. Future interventions concerning regional governance stakeholders need to take the balance between reality and desired outcomes into consideration. The following table demonstrates the predicted participation levels of stakeholders in regional governance through 2020.

Table VII-2 Predicted Importance of Stakeholders in Regional Governance through 2020

	Central Gov.	Local Gov.	NGOs	Private Sector
China	very strong	medium	weak	medium
ROK	very strong	medium	medium	medium
DPRK	very strong	weak	weak	weak

175. In China, fragmentation and competition among ministries and agencies is much more serious than in Korea. Given the resources available to the YS LME, it may not be feasible to involve all relevant governmental bodies in YS LME regional governance. Instead, the involvement of China s most important government organizations, especially the SOA, should be sought. Additionally, continuous efforts to include other relevant central government bodies, such as SEPA and MOA, should be made. Local government may be also considered for inclusion in future regional governance measures. In particular, relevant provincial governments are in need of involvement in transnational efforts to some extent.

176. As it will take a relatively long time for Chinese NGOs to play a constructive

role in addressing environmental issues, it is not realistic to expect their strong participation in regional governance in the Yellow Sea. Instead, efforts should be focused on NGO capacity building.

177. The private sector, particularly large scale multinational corporations, should be involved more actively in regional efforts. Given the situation where limited resources are available to Chinese local governments, their involvement may increasingly provide adequate financial and informational sources to Chinese society.

b. Republic of Korea

178. In the Republic of Korea, cooperation among related ministries is welcomed. Due to its similarity in roles with its Chinese counterpart, the MOMAF seems to be the most appropriate body for future cooperative efforts. This does not mean that other ministries or agencies such as the Ministry of Foreign Affairs and Trade need to be excluded from cooperative activities. The Ministry of Foreign Affairs and Trade's influence in coordinating foreign policy measures among ministries makes it important for MOFAT to remain involved in general diplomatic and negotiation issues. The Ministry of Environment and the Korea Coast Guard could also be encouraged to participate in future cooperative efforts related to their missions.

179. In the Republic of Korea, policy implementation is effective due to the well established rule of law at the local government level. However, local governments' experience and capacity in regional governance is limited. Local governments' increased participation in regional governance may beneficial.

180. As the capacity of ROK NGOs in regional governance issues is not sufficient to warrant their active participation, the focus should be placed on the capacity building of NGOs in the regional governance context. However, they may be invited to participate more actively in domestic endeavours.

181. It is critical to develop a way of securing more active involvement from the ROK private sector. Due to the development of the market economy, public regulations may not address all the issues that the private sector brings up concerning the marine environment in the Yellow Sea region.

c. DPRK

182. Efforts must be made to secure the participation of the Democratic People s Republic of Korea's central government in the YS LME process. Given the DPRK's lack of engagement on many global and

regional issues, its expected level of involvement as a stakeholder in regional governance would be different from those of China and the ROK.

d. International Organizations

183. International organizations will remain an important stakeholder in regional governance in the Yellow Sea region. Given the unique geopolitical situation of this region as described above, international organizations can play an intermediary role in addition to their work on funding, agenda setting, information sharing, and capacity building. Among relevant international organizations, the UNDP will continue to play the most critical role. In addition, other relevant international organizations, such as the IMO and the UNEP, should also be encouraged to engage in regional environmental governance.

B. Cooperative Mechanisms

184. There are a number of international cooperative mechanisms concerning the Yellow Sea marine environment as discussed in the previous section. While each mechanism has its own role in the Yellow Sea region, the significance of each mechanism in the Yellow Sea differs among each other. The following chart demonstrates these differences:

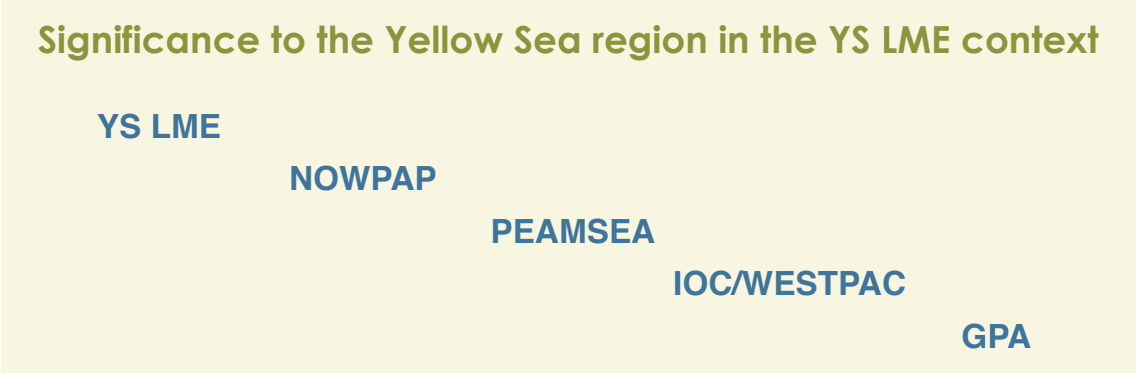


Figure VII-1 Significance to the Yellow Sea region in the YS LME context

185. The YS LME Project seeks to build close cooperative partnerships with relevant cooperative mechanisms. Partnerships should be developed based on the relevance of these mechanisms to the current and future activities of the YS LME. NOWPAP is the most important, relevant, and complementary mechanism to the YS LME Project. PEMSEA is less significant to the YS LME, although it plays an active role in the greater East Asia seas. However, its Bo Hai Bay, Saemankeum and Nampo City projects are very relevant to the YS LME.

Although IOC/WESTPAC has significant implications to the YS LME project, its recent relative inactivity has diminished its importance to Yellow Sea regional governance. Finally, the GPA needs to be utilized to acquire global experiences and networks to address land-based sources of pollution in the Yellow Sea.

C. Legal Institutions

186. Several global and bilateral treaties have been identified as relevant to the Yellow Sea marine environment by this report. However, they vary in terms of issue coverage, regulatory implications, etc. The following chart demonstrates the degree of effectiveness of these treaties in resolving issues in the Yellow Sea marine environment:

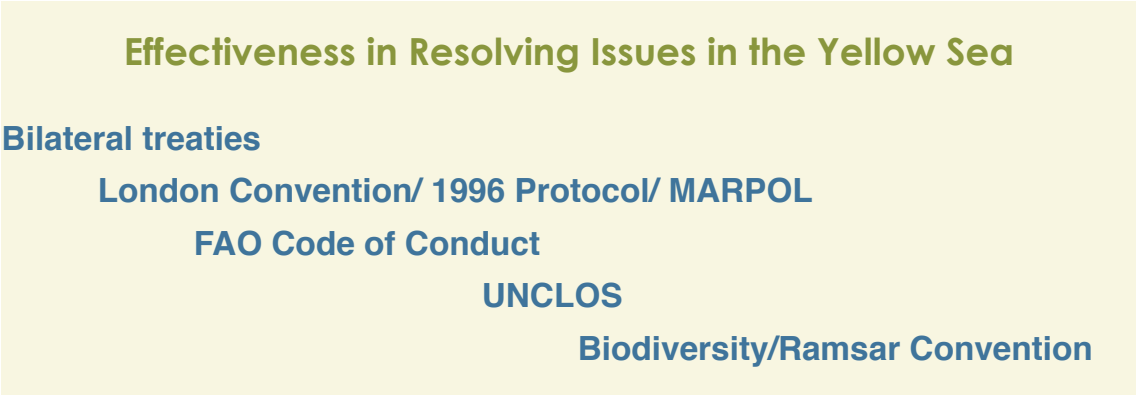


Figure VII-2 Effectiveness in Resolving Issues in the Yellow Sea

187. The following table demonstrates the effectives of the above treaties on the various marine environment issues in the Yellow Sea.

Table VII-3 Effectives of the above treaties

	Effectiveness of Legal Institutions
Pollution	strong
Biodiversity	medium
Ecosystem	weak
Fisheries	strong

188. For the purposes of the YS LME project, it may become problematic that different government ministries are in charge of each bilateral treaty and do not coordinate their efforts. In China, for example, the SEPA is in charge of the JECE, while the MOA deals with fisheries matters under each bilateral treaty and the SOA is the primary body involved in the YS LME. An efficient coordination mechanism among relevant ministries and agencies is needed.

D. Creating the YS LME Commission

189. Considering the complex issues analyzed in this report, it is desirable to create a YS LME Commission as a central mechanism to address the issues identified.

190. The current YS LME Project is set to finish in 2009, as it is a project-based activity implemented by the UNDP and GEF. However, further efforts are desirable to implement suggested policy measures through the SAP after 2009. Consequently, institutionalizing current efforts must be considered.

191. From 2009 to 2020, institutionalizing efforts may be divided into two stages. As the participating governments in current YS LME activities may not have the capacity to implement SAP's suggested policy measures on their own, financial and technical assistance from the UNDP/GEF will be needed through 2015. During this period, the current YS LME Project Management Office, which is to be transformed into the Secretariat, may focus on helping participating governments and other relevant stakeholders secure financial resources and increase their capacities in carrying out activities on their own.

192. Between 2016 and 2020, an institutionalized cooperative mechanism, the YS LME Commission, may start to carry out activities on its own. During this stage, UNDP/GEF may provide limited assistance only when necessary.

193. The YS LME Commission is to be a soft, non-legally binding, cooperation based institution. Due to the geopolitical characteristics of this region and the complex competitions and coordination difficulties among government bodies, it is unfeasible to establish a treaty based YS LME Commission at this time, but this may be a long term goal for the project. However, sufficient political will among participating governments should be secured to give the Commission sufficient authority and justification. This may be achieved in the form of a joint declaration or an MOU among the participating governments.

194. The basic institutional framework of the YS LME Commission will be similar to the current scheme of the YS LME Project. A YS LME Commission Steering Committee (CSC) will be created as a supreme decision making body. This Committee will include Representatives of each participating government and the Secretariat. China's SOA and one of ROK's MOFAT and MOMAF will be the Commission's primary players. The participation of a relevant DPRK ministry must also be secured.

195. A permanent Secretariat will be created to assist the CSC and coordinate various activities of the YS LME Commission, as the PMO currently does for the YS LME project. The Secretariat should be small but secure enough expertise to address the policy and scientific interests of the YS LME Commission. The location of the Secretariat will be desirably in Ansan, Korea where the current YSLME PMO is located. This will certainly ensure the continuity of the works of the YS LME Commission Secretariat.

196. Under the YS LME Commission, five Sub-Commissions will be established in the areas of Pollution, Ecosystem, Biodiversity, Fisheries and Socio-economic. Each Sub-Commission will be responsible for technical issues in its area and will be composed of experts in each field from participating countries.

197. The YS LME Commission must develop a mechanism whereby other related stakeholders, such as other international organizations, local governments, private sectors and NGOs can become involved. The degree of involvement of these stakeholders will be issue and/or country specific.

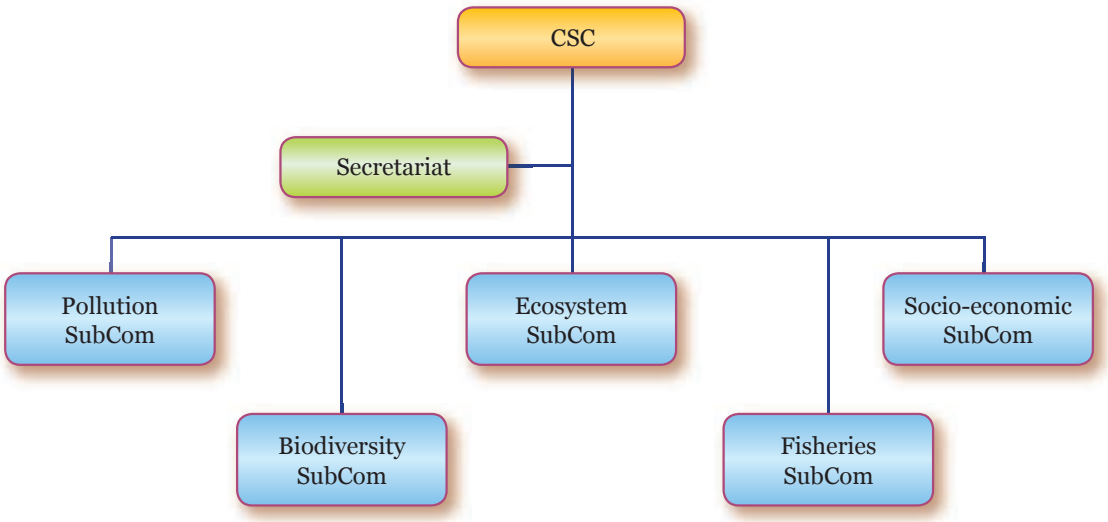


Figure VII-3 The structure of the YS LME Commission

198. The YS LME Commission may develop several action programs including the following:

- YSLME 1: Developing joint scientific research projects
- YSLME 2: Strengthening legal institutions
- YSLME 3: Strengthening partnership
- YSLME 4: Capacity Building
- YSLME 5: Financing

199. The YS LME Commission needs to continue and expand the activities of the current Working Groups of the YS LME Project through developing joint scientific research projects. Given the different characteristics of each issue area (pollution, biodiversity, ecosystem and fisheries), each Sub-Commission should identify its own realistic targets and timeline. Building a reliable scientific data system will pave the way for furthering policy coordination among regional states.

200. According to the recommendations of the TDA, the main sources of environmental stress in the Yellow Sea region lie in socio-economic factors. Therefore, the YS LME Commission should focus on improving the effectiveness of socio-economic institutions. Much may be done through strengthening legal institutions and partnerships with other cooperative mechanisms and related stakeholders, and increasing the capacities of local governments and NGOs.

201. Efforts to strengthen legal institutions at the regional level need to improve the implementation of existing global and regional treaties and standards. As discussed in the previous section, treaties and other international legal standards vary in their provision of detailed standards. They also differ in whether states in the Yellow Sea region are members to them.

202. In the case of the London Convention, its 1996 Protocol and MARPOL, efforts should be made to ensure full participation of the Yellow Sea states in these treaties. As these treaties provide detailed global standards for specific pollutants, effective implementation of these treaties by the Yellow Sea coastal states will lead to the greater effectiveness of regional efforts. This will also facilitate harmonization of the national environmental standards as coastal states develop and change their existing national standards in accordance to international treaty standards.

203. The FAO Code of Conduct for Responsible Fisheries may be a useful guideline for the management of fisheries in the Yellow Sea region. Although the FAO is not legally binding, efforts should be made by the YS LME Commission to incorporate suggested guidelines into YS LME states' national legislation. Furthermore, coordinating efforts should be made with the bilateral Fisheries Agreement between China and ROK in the YS LME Commission Context. This is particularly important because the SOA, the likely primary representative government body for the YS LME Commission, does not have jurisdiction over fisheries matters, which belong to

MOA.

204. UNCLOS, along with the CBD, may function as an overall legal framework for furthering regional standards in other areas of the YS LME Commission. The YS LME Commission should seek to prepare guidelines on matters not covered in detail by these treaties.

205. The two bilateral treaties between China and the ROK are important as ways of strengthening coordination with other YS LME Commission activities. In particular, the activities of the JCEC under the bilateral environmental agreement and the Joint Fisheries Commission under the bilateral fisheries agreement should be incorporated into those of the YS LME Commission so as to increase synergistic effects.

206. Other tasks related to the strengthening of legal institutions may be also considered. They include:

- Periodic review of the implementation of global and bilateral treaties
- Exchange of information on relevant domestic legislation
- Developing projects to harmonize domestic legislation according to the guidelines of relevant treaties
- Developing schemes to address disputes.

207. Strengthening its partnerships with other cooperative mechanisms and related stakeholders will increase the overall effectiveness of the YS LME Commission. As it is likely to maintain a small secretariat, partnerships with NOWPAP, PEMSEA and other cooperative mechanisms will complement the activities of the YS LME Commission. For example, the endeavours of the MERRAC of NOWPAP help the YS LME Commission address marine pollution, as the MERRAC has achieved effective cooperation on oil spills among NOWPAP participating states.

208. Furthering partnerships with relevant stakeholders should be also sought. Building partnerships with NGOs, interested private sectors, universities and other educational and research organizations will benefit the efforts of the YS LME Commission.

209. Analysis of this report along with other YS LME Project reports reveals the necessity of developing the capacities of local governments and NGOs for more constructive roles in Yellow Sea regional governance. Capacity building programs should be country specific and take differing circumstances into consideration. Examples of such

programs include the following:

- Increasing understanding of international/regional institutions
- Learning advanced management measures, and
- Development of cooperation abilities with related stakeholders.

210. Sound financing will be a critical element for the YS LME Commission. Even though it will be desirable for the YS LME Commission to receive financial assistance from the GEF through 2015, it should seek alternative financial sources to continue its activities after 2015. Possible contributions may be available from governments and the private sector.

Annex I. Interview Questions

The Yellow Sea is a common natural resource from which China, the DPRK and the ROK have yielded long-ranging benefits. Recent studies demonstrate that the Yellow Sea region may face serious environmental problems unless effective regional efforts are carried out to address serious environmental stresses in the region. The UNDP/GEF Yellow Sea Large Marine Ecosystem project was launched towards this end. The YS LME project is preparing a regional Strategic Action Program (SAP) which requires endorsements by two states, i.e. China and the Republic of Korea. It is crucial to identify key issues and problems in order to recommend policy measures for improved regional governance in the Yellow Sea region. In this context, the Regional Governance Analysis project team would like to conduct email and/or on-site interviews as follows:

1. To your knowledge, what are the multilateral and bilateral cooperative mechanisms relevant to the Yellow Sea marine environment?

2. What is your opinion on the YS LME project's effectiveness and usefulness in addressing important regional marine environmental issues and establishing a regional mechanism in the Yellow Sea region?

3. What improvements to the current regional cooperative mechanism that would be feasible given the unique constraints of the Yellow Sea region?

4. What are the key roles central and local governments should play within the context of the YS LME project?

5. What are your organization's roles in the context of the YS LME project?

6. Are there any bilateral cooperative mechanisms between China and the Republic of Korea AND between China and the Democratic People's Republic of Korea? How effectively are these mechanisms functioning?

7. To what extent do experts, research institutions and NGOs participate in the YS LME project in China?

8. What is your opinion on the effectiveness of the bilateral fisheries

agreement between China and the Republic of Korea?

9. To what extent do you think non-environmental issues such as territorial issues affect the effectiveness of the YS LME project in addressing marine environment issues?

10. How significant are local governments in the context of the YS LME project, in particular in the preparation and implementation of the SAP?

11. What are the major requirements of local governments which may be related to the YS LME project?

12. Provide any further ideas, if any, to improve the current regional governance system in the context of the YS LME project.

Annex II. List of Interviewees

[China]

1. Mr. Fengkui LIANG, Director, Department of International Cooperation, State Oceanic Administration

2. Professor Xiangmin XU, Dean, Law School, Ocean University of China

3. Mr. Dexin MENG, Director, Division of Marine Environmental Protection, Marine and Fishery Bureau, Liaoning Province

4. Mr. Jaijian Zhang, Deputy Director, Marine and Fishery Bureau, Jiangshu Province

5. Mr. Ennian XIE, Division of Environmental Protection, Marine and Fishery Bureau, Shandong Province

[Republic of Korea]

1. Mr. Dong-Shik WOO, Director, Marine Policy Bureau, Ministry of Marine and Fisheries Affairs

2. Mr. Won-Tae SHIN, Deputy Director, Marine Policy Bureau, Ministry of Marine and Fisheries Affairs

3. Ms. Gye-yeon CHO, Second Secretary, Environmental Cooperation Division, Ministry of Foreign Affairs and Trade

4. Mr. Kwang Ho PARK, Division of Maritime Affairs and Fisheries, Maritime Section, Jeollanam-do Province

5. Mr. Gyu Seok PARK, Agriculture, Fisheries Division, Jeollabuk-do Province

6. Mr. Cun-Ho AHN, Division of Maritime Affairs and Fisheries, Gunsan City, Jeollabuk-do Province

Annex III. Bibliography

Birnie, Patricia & Alan Boyle, International Law and the Environment (2nd ed., 2002)

Canfield, Jeffrey Lee, "The Independent Baltic States: Maritime Law and Resource Management Implications," Ocean Development and International Law Vol. 24 (1993)

Cho, Dong-Oh & Dong-Hyun Choi, Governance Analysis of YSLME: Korea's Case (2006)

Chung, Suh-Yong, "Marine Environment Protection in Northeast Asia and NOWPAP: Achievements and Challenges," Journal of the Korean Society for Marine Environmental Engineering Vol. 9 (2006) (in Korean)

Hinds, Lennox, "Oceans governance and the implementation gap," Marine Policy Vol. 27 (2003)

IOC/WESTPAC Consultative Meeting, "Progress, Current Status of IOC/WESTPAC Activities," 17-18 May, 2007 (IOC/WESTPAC-a)

Keyuan, Zou, "China's exclusive economic zone and continental shelf: developments, problems and prospects," Marine Policy Vol. 25 (2001)

Keyuan, Zou, "Implementing marine environmental protection law in China: progress, problems and prospects," Marine Policy Vol. 23 (1999)

Kim, Dangchoong et als., UN Convention on the Law of the Sea and East Asia (1996)

Ministry of Foreign Affairs and Trade, Press Release, the 12th Joint Committee on Environmental Cooperation between the government of Republic of Korea and the government of People's Republic of China, June 13th 2007, available in Korean, (www.mofat.go.kr) (MOFAT, 2007a)

Ministry of Marine and Fisheries Affairs of Republic of Korea, Introduction of the IMO Convention (available at http://www.momaf.go.kr/info/statistics/I_safety_view.asp?b_idx=4942&idx=43) (MOMAF, 2007) This paper is written in Korean.

Moller, T.H., et als., "Oil Spill Risks and the State of Preparedness in the Regional Seas," IOSC 2003 ID#118, The International Tanker Owners Pollution Federation Limited

Office of the President, Republic of Korea, "Korea-China-Japan Summit on the Sidelines of ASEAN+3: Press Briefing by Chief Secretary Baek Jong-chun," available at http://english.president.go.kr/cwd/en/archive/archive_view.php?meta_id=en_dip_2007&id=1c13de731e4e1777edd739d (visited on May 2, 2007)

Park, Choon-ho et als., The Regime of the Yellow Sea (1990)

Park, Yong-Hyun, "A Study on the New Fisheries Zone System in the South Korea-China Fishery Agreement (in Korean)," in Legal Research No. 22 (2006)

Porter, Gareth & Janet Welsh Brown, Global Environmental Politics (1996)

UNDP/GEF 2007, UNDP/GEF Project: Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem. Transboundary Analysis. 98pages

UNDP/GEF YS LME Project PCS meeting reports, available from www.yslme.org

UNDP/GEF YS LME Project Working Group meeting reports, available from www.yslem.org

UNEP GPA Coordinating Office, "Partners in Implementing the GPA Regional Seas," 1999 (UNEP, 1999)

Xu, Xiangmin, Report on Governance Analysis of the Yellow Sea (2006)

[websites]

Baltic Marine Environment Protection Commission website, http://www.helcom.fi/environment2/en_GB/cover/

FAO Code of Conduct for Responsible Fisheries website, http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm

GPA website, www.gpaunep.org

http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm

IMO website, www.imo.org (IMO 2007)

IMO, London Convention, available from www.imo.org

IOC/WESTPAC website, http://ioc.unesco.org/iocweb/index.php

NOWPAP website. www.nowpap.org

PEMSEA website, www.pemsea.org

UNDP/GEF YS LME Project website, www.yslme.org

UNEP Regional Sea's Programme website, http://ioc.unesco.org/iocweb/index.php

UNEP website, www.unep.org

Global Environment Facility
United Nations Development Programme

Reducing Environmental Stress
in the Yellow Sea Large Marine Ecosystem

UNDP/GEF Yellow Sea Project Management Office
c/o Korea Ocean Research and Development Institute
1270, Sa-2dong, Sangnok
Ansan City 426-744
Republic of Korea

Tel. 82-31-400-7829
Fax. 82-31-400-7826
www.yslme.org
For a copy of the publication, please contact the Project Management Office at info@yslme.org