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Third Meeting of the Regional Working Group for the Investment Component
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Final Report on Governance Analysis

The objective of the Governance Analysis is to understand the underlying root causes of the Yellow Sea's environmental problems, through the analysis of the whole political and social environments that affect environmental problems. The Governance Analysis consists of three analytical works: Stakeholder Analysis, Institutional Analysis, and Legal/Policy Analysis.

Two Governance Analysis studies, one study for China and one study for Korea, were conducted from March to August 2006. The results of the studies will contribute to the development of the regional Transboundary Diagnostic Analysis (TDA), providing both the information about the root causes and the basic foundation for identifying possible future interventions.

Consultants from the Korea Maritime Institute and the Law School of Ocean University of China were contracted individually to prepare the Governance Analysis for Korea and China, respectively. The draft final reports are attached hereafter. During the 3rd RWG-I Meeting, the consultants will present summary analyses, highlight major findings, and provide recommendations for future interventions.

After reviewing the reports and presentations, participants will discuss the information presented, particularly the root causes of the ecosystem problems, and suggest how certain notable data and information could be included in the TDA. Participants will also discuss how the recommendations and management implications could be included in the regional Strategic Action Programme (SAP).

Report on Governance Analysis of the Yellow Sea

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Contents

Chapter One Implementation progresses

From April to May 2006 we conducted surveys on five groups of stakeholders on the Yellow Sea's ecological problems. We visited the relevant institutions and individuals in Beijing, Liaoning, Shandong and Jiangsu and conducted questionnaires meanwhile.

The first group of stakeholder is governmental departments related to marine affairs. We have visited 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, Huangdao District Oceanic and Fisheries Bureau and conducted questionnaires..

The second group of stakeholder is coastal enterprise. We have visited some enterprises and factories, e.g. marine transportation, sea food processing, marine biological pharmacy, marine chemical industry, coastal shipbuilding, seawater utilization and seashore tourism and conducted questionnaires. The enterprises answering our questions are listed here: Qingdao Harbour Company, Rongchen Xinshan Fishery Company, Qingdao Aohai Marine Pharmacy Factory, Qingdao Electric Power Plant, Qingdao Shipbuilding Factory, Qingdao Guankai Seafood Restaurant, Qingdao Seashore Tourism Group.

For the third group of stakeholder, coastal residents, we have visited several communities and downtowns in Qingdao and conducted questionnaires in Lihaihuanyuan community, Xiangganglu community, Taidong downtown and Xianggangzhonglu commercial streets in Qingdao .

Fishermen community is the fourth group of stakeholder. We have visited 5 fishery villages in Weihai, Yantai and Qingdao and conducted questionnaires.

Non-governmental organization is the fifth group of stakeholder. We have contacted with several NGOs by email and phone and visited 2 NGOs, one is the Chinese Society of Oceanography in Beijing, the other is Shandong Society of Oceanography in Qingdao and conducted questionnaires.

For each group of stakeholders, we designed and delivered five kinds of questionnaires (see Annex 1A, 1B, 1C, 1D and 1E). We delivered 50 questionnaires to governmental departments and received 46 questionnaires as feedback. We received 35 questionnaires from coastal enterprises while delivered 50. We delivered 310 pieces to coastal residents and received 302. We received 32 pieces from fishermen while delivered 40. We delivered 20 pieces to NGOs and received 10 pieces. In general, the most of stakeholders visited are pleased to answer our questionnaires except for enterprise staffs. Many enterprises refused our visit request and did not accept our questionnaire.

According to the data and information we obtained, we completed analysis

on the Yellow Sea stakeholders and the results are shown in the following sections.

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

There are 8 major ports located in 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 was 60,668m and the number of 10000-tonnage class berths reached 170 (2004 data). Dalian Port and Qingdao Port's cargo throughput are respectively over 100 million ton every year. In 2005, Dalian Port's cargo throughput reached 120 million tons and 2.651 millions standardized containers. In 2005, Qingdao Port's cargo throughput reached 180 million tons and 6 millions 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 mariculture area in the Yellow Sea reached 963,204 ha in 2004, in which fish culture area accounted for 18,823 ha, crustacean culture area was 132,791 ha, shellfish culture area was 643,574 ha, macro algal culture area was 47,905 ha, and the other was 120,111 ha. The gross benefit of mariculture in the Yellow Sea reached 352.3×10^6CNY in 2004. There are several typical mariculture areas in the Yellow Sea, i.e. Dalian mariculture area, Changhai mariculture area, Changdao mariculture area, Sanggouwan Bay mariculture area, Daxiawa (Rizhao) shrimp mariculture area, Guanbei mariculture area and Rudong mariculture area and so on.

The total catch of marine fish was 3.17 million tons in the Yellow Sea in 2004 (SOA 2005). The major harvest species are Japanese anchovy, porgy, spotted mackerel, hairtail, pomfret and yellow croaker. Compared with 1950's, the catch of fishery fishing has been declining rapidly and the body weight and length of fished individual becomes smaller and smaller.

2.1.3 Coastal tourism

The coastal tourism is developed in the Yellow Sea region. There are about 29 coastal scenic spots in Liaoning, Shandong and Jiangsu provinces in the Yellow Sea coastal region. Major of them are Dalian coastal scenic spot, Lushun

scenic spot, Penglai scenic spot, Yantai coastal scenic spot, Weihai coastal scenic spot, Qingdao coastal scenic spot and East-west island scenic spot. Tourism income of from the 3 coastal provinces was 55.5 billion CNY in 2004（including some coastal cities of the Bohai Sea）(SOA 2005). The domestic tourist's contribution of them was 47.1 billion CNY while the inbound tourist's contribution (include tourists from Taiwan, Hongkong, Macau and foreign countries) was 8.5 billion CNY. In which, 1.6 million inbound tourists visited the major coastal cities in the Yellow Seain 2004 and the inbound tourism income of coastal cities were 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 exclusive salt pans and mixed salt pans (with shrimp culture). The salt pan areas are mainly located in Piziwo, Jingou, Donggou, Qinduizi in Liaoning Province; Yantai, Weihai, Jiaozhou Bay in Shandong Province; Lianyungang, Nantong in Jiangsu Province.

The seawater desalination is preliminary developing in the Yellow Seacoastal areas. Changdao county and Weihai Municipality have respectively one seawater desalination factory. The desalinated seawater is used as drinking water.

The minor use of seawater is as cooling water of electrical power plants and some factories in coastal cities, e.g. Qingdao, Weihai. The warm and cold water discharged into the coastal waters has differrent temperature than the coastal waters and causes the chang of the dominant species.

2.2 Identification of stakeholders

The stakeholders in this paper refer to the institutions/population whose benefits are affected due to the ecological changes of the Yellow Sea or due to other institutions' (population's) utilization activities in the Yellow Sea.

The stakeholders of the Yellow Sea are divided into 5 groups: 1) 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 the utilization and protection activities in the Yellow Sea through drafting and enforcement of laws and regulations. These department's activities affect other stakeholders' interests in the Yellow Sea. There are four levels of marine management departments in China: 1) ministry level, 2) provincial level, 3) municipal level and 4) county level. However the ministries and provincial departments have the major responsibilities according to China laws, therefore we focused on analysis

at ministry and provincial management departments.

2.2.1.1 The ministry departments related to marine management

There are four main ministry departments related to marine affairs i.e. A) State Oceanic Administration (SOA), B) State Environmental Protection Administration (SEPA), C) Bureau of Fisheries Management, Ministry of Agriculture (BOF), D) Maritime Safety Administration (MSA). Table 1 shows their marine-related responsibilities and other detailed information.

2.2.1.2 The provincial departments related to marine management

The provincial departments related to marine management mainly include:

- Liaoning province: Oceanic and Fisheries Bureau of Liaoning province, Environmental Protection Administration of Liaonong province, Liaoning Maritime Safety Administration. Table 2 shows marine-related responsibilities and other detailed information.
- Shandong province: Oceanic and Fisheries Bureau of Shandong province, Environmental Protection Administration of Shandong province, Shandong Maritime Safety Administration. Table 3 shows marine-related responsibilities and other detailed information.
- Jiangsu province: Oceanic and Fisheries Bureau of Jiangsu province, Environmental Protection Administration of Jiangshu province, Jiangsu Maritime Safety Administration. Table 4 shows marine-related responsibilities and other detailed information.

2.2.1.3 The coastal governmental departments related to marine management

The coastal governmental departments related to marine management mainly 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 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. 2)Sea Area Use Management Law of the People's Republic of China	1) Fisheries Law of the People's Republic of China. 2)Marine Environmental Protection Law of the People's Republic of China.	1)Environmental Protection Law of the People's Republic of China. 2) Marine Environmental Protection Law of the People's Republic of China 3)Environmental Impact Assessment Law of the People's Republic of China	1) Maritime Traffic Safety Law of the People's Republic of China. 2)Marine Environmental Protection Law of the People's Republic of China. 3)Regulation on the prevention of pollution from vessels of the People's Republic of China

Internal marine-related sections		1)Section of Policies, laws, Regulation and Programming; 2)Section of Sea Area Use Management; 3)Section of Marine Environmental Protection; 4)Section of Science and Technology; 5)Section of International Cooperation	1)Integrated Office; 2)Section of Policies, Laws and Regulation; 3)Section of Planning; 4)Section of Boats and Port; 5)Section of Resources and Environmental Protection; 6)Section of Mariculture; 7)Section of Market and Process; 8)Section of Ocean Fishery; 9)Section of International Cooperation;	1)Section of Policies, laws and Regulation; 2) Section of Science, Technology and Standards; 3)Section of Pollution Control; 4)Section of Nature and Ecology Conservation; 5)Section of Environmental Impact Assessment Management; 6)Development of Environmental Supervision; 7)Office of Marine Environmental Protection 7)Section of International Cooperation	1)Section of Laws and Regulation; 2)Section of Planning and Basic Construction; 3)Section of Navigation Management; 4)Section of Vessels Supervision; 5)Section of Sailor Management; 6)Section of Vessel Inspection 7)Section of Navigation Mark and Mapping; 8)Section of Safety; Administration; 9)Office of Environmental Protection 10) Office
Subordinate agency related to the Yellow Sea		North China Sea Branch	Fisheries management and Fishing Harbor Superintence of Yellow Sea and Bohai Sea(FMFHSYB)	Environmental Monitoring Center 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. 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
Uper 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 Chaapter 3	See Chapter 3
Administrative waters	Intertidal zone and, Waters between coastal line and 12nm territorial line in the Yellow Sea	Coastal waters(the boundary was not decided)	Port, nevagation line, freshwater etc.
Major supporting laws	1)Marine Environmental Protection Law of the People's Republic of China 2) Sea Area Use Management Law of the People's Republic of China 3)Fisheries Law of the People's Republic of China"	1) Marine Environmental Protection Law of the People's Republic of China 2) Environmental Protection Law of the People's Republic of China	1) Maritime Traffic Safety Law of the People's Republic of China 2)Regulation of vessels' pollution prevention of the People's Republic of China"
Inter departments	1)Section of Policy, Laws and Regulations; 2)Section of Planning and Finance; 3)Section of Sea Area Use Management; 4)Section of Marine Environmental Protection; 5)Section of Fishing Port Supervision; 6)Section of Fishery; 7)Marine Surveillance Section	1)Section of Policies, laws and Regulation; 2)Section of Science, Technology and Standards; 3) Section of Pollution Control; 4)Section of Nature and Ecological Conservation; 5)Section of Environmental Supervision; 6)Section of International Cooperation	1)Section of Navigation Management; 2)Section of Vessels Supervision; 3)Section of Pollution Prevention; 4)Section of Laws and Regulation

Subordinate agency related to the Yellow Sea		Liaoning Fishery Harbor Superintendenc	Environmental Monitoring Center of Liaoning province	Dalian Office and Dandong Office
Contacting Information	Address	2 Taiyuanbeijie R.d., heping district, Shenyang	34 Shandong R.d., Yuhong district, Shenyang	25 Changjiang R.d., 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 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 Sea Area of Shandong 3) Responsible to utilization and protection of fishery resources of Shandong .	1)Guiding, coordinating and supervising marine environmental protection cross 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, the ports, and rivers of costal cities in Liaoning province. 2)Supervising pollution from vessels, and inspecting vessels and marine facilities.
Administrate waters	Intertidal zone and, Waters between coastal line and 12nm territorial line in the Yellow Sea	Coastal waters(the boundary was not decided)	Port, nevagation line, freshwater etc.
Major supporting laws	1)Marine Environmental Protection Law of the People's Republic of China 2) Law of Administration on the Use of the Sea Area of the. People's Republic of China 3)Fisheries Law of the People's Republic of China"	1) Marine Environmental Protection Law of the People's Republic of China 2) Environmental Protection Law of the People's Republic of China	1) Maritime Traffic Safety Law of the People's Republic of China 2)Regulation of vessels' pollution prevention of the People's Republic of China"

Internal marine-related departments		1)Section of Policy, Laws and Regulations; 2)Section of technology and international cooperation ; 3)Section of Sea Area Use Management; 4) Section of Marine Environmental Protection; 5) Section of Fishery.	1)Section of Planning and Finance; 2)Section of Policies, laws and Regulation; 3)Section of Science, Technology and Standards; 4) Section of Pollution Control; 5)Section of Nature and Ecological Conservation;	1)Section of Transportation Management; 2)Section of Vessels Supervision; 3)Section of Pollution Prevention; 4)Section of 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 R.d., Jinan	12 Zhijinshi R.d., Jinan	21 Wuxia R.d., 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 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 marine environmental protection of Shandong 2) Supervising the utilization of sea area of Shandong 3) Responsible to utilization and protection of fishery resources of Shandong	1)Guiding, coordinating and supervising marine environmental protection cross 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, the ports, and rivers of costal cities in Liaoning province. 2)Supervising pollution from vessels, and inspecting vessels and marine facilities.
Administrative waters	Intertidal zone and, Waters between coastal line and 12nm territorial line in the Yellow Sea	Coastal waters(the boundary was not decided)	Port, nevagation line, freshwater etc.
Major supporting laws	1)Marine Environmental Protection Law of the People's Republic of China 2) Law of Administration on the Use of the Sea Area of the. People's Republic of China 3)Fisheries Law of the People's Republic of China"	1) Marine Environmental Protection Law of the People's Republic of China 2) Environmental Protection Law of the People's Republic of China	1) Maritime Traffic Safety Law of the People's Republic of China 2)Regulation of vessels' pollution prevention of the People's Republic of China"
Internal marine-related departments	1)Section Of Policy, Laws And Regulations 2)Section Of Planning And Finance 3)Section Of Sea Area Use Management 4)Section Of Fishery 5)Section Of Marine Resource And Environmental Protection 6)Section Of Technology And Education	1)Section Of Planning And Finance; Section Of Policies, Laws And Regulation; 2)Section Of Science, Technology; 3)Section Of Pollution Control; 4)Section Of Nature And Ecological Conservation; 5)Section Of Environmental Management; 6)Section Of Environmental Supervision; 7Section Of Environmental Monitoring	1)Section Of Navigation Management; 2)Section Of Vessels Supervision; 3)Section Of Pollution Prevention; 4)Section Of Laws And Regulation

Subordinate agency related to the Yellow Sea		1)Section of Fisheries management of Jiangsu 2)Jiangsu Fishery Vessels Superintendence	Environmental Monitoring Center of Jiangsu province	Lianyungang Office, Yancheng Office, Nantong Office.
Contacting Information	Address	90 Xinmofan R.d., Nanjing	70 Beijingxi R.d., Nanjing	1 Beijingxi R.d., Nanjing
	ZIP	210003	210013	210013
	Tel.	025-83581200	025-83305768	—
	Website	www.jsof.gov.cn	www.jshb.gov.cn	www.js-msa.gov.cn

2.2.2 Coastal enterprises

Coastal enterprises are the main contributors of marine economy, which afford different products by using different kinds of resources from the Yellow Sea. Due to inappropriate utilization activities in the Yellow Sea, coastal enterprises are the main responsible parties of the Yellow Sea protection.

According to the classification system of marine industry in the China Marine Statistical Yearbook 2005, the 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.

Liaoning province and Shandong province are located in the coastal area of both The Yellow Sea and Bohai Sea. It is difficult to distinguish the Yellow Sea's contribution from the overall statistical data of each province. So the following data include the Bohai Sea's contribution too. Even now the statistical data is able to indicate a rough trend of the Yellow Sea utilization.

The total output value of marine industry reached 1514.94×10^8CNY in 2004. The coastal tourism is the most important which accounted for 1/3 of total. After tourism is marine transportation and marine shipbuilding, both of them accounted for 1/3 of total. The other accounted for the remainder.

Table 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

For marine salt industry along The Yellow Sea, Shandong's output is the most important, its' contribution reached 59% in salt field area, 73% in salt production and 81% in output value in 2004. See Table 6 for detailed information.

Table 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

For marine chemical industry along The Yellow Sea, Shandong's product was less(23.5×10^4ton) but its output value was the most(84.51×10^8CNY) in 2004. See Table 7 for detailed information.

Table 7 Marine chemical industry of three coastal provinces of The Yellow Sea in 2004 (From SOA 2005)

Region	Output(×10^4ton)	Employees (individual)	Output value （×10^8CNY）
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 Pharmaceutical refers to the production of biochemical medicine, health care medicine and gene bacterin by taking useful element from marine livings. It includes gene, cell, enzyme, zymosis medicine, gene bacterin, new bacterin, bacterin seed; aminophenol for medicine, antibiotic, vitamine, miniecologic medicine; blood products and substitute, preparation for diagnosis, preparation for blood type, shadowing reagents for X-ray, diagnosis preparation for patient, biochemic medicine made of animals liver. In 2004, Jiangsu's output value was the most, about 14.67×10^8CNY, which account about 50% of total The Yellow Sea region. See Table 8 for detailed information.

Table 8 Marine Biological Pharmaceutical industry of three coastal provinces of The Yellow Sea in 2004 (From SOA 2005)

Region	Employees(individual)	Output value （×10^8CNY）
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 is the production of electric power by using marine energy, such as 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. Up to now, there is only production of electric power by using cooling seawater in Shandong and Jiangsu. In 2004, Shandong and Jiangsu's output value of marine electric power were respectively 31.26 ×10^8CNY and 37.89 ×10^8CNY. See table 9 for more information.

Table 9 Marine Electric Power industry of three coastal provinces of The Yellow Sea in 2004 (From SOA 2005)

Region	Employees(individual)	Output value （×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 desalination of seawater and utilization of seawater in industry production, urban life and anti-fire. In 2004 this industry provided 12,200 job opportunities in Shandong and 27.55×10^{8}CNY of output value. See table 10 for more information.

Table 10 Marine Seawater Utilization industry of three coastal provinces of The Yellow Sea in 2004 (From SOA 2005)

Region	Employees(individual)	Output value （×10^{8}CNY）
Liaoning	_	_
Shandong	12200	27.55
Jiangsu	700	8.64
Total	12900	36.19

2.2.2.6 Marine Shipbuilding industry

Marine shipbuilding industry covers ship repairing and ship building. In 2002 three coastal provinces along the Yellow Sea repaired 9461 ships and built 766 new ships (Table 11). The total output value of this industry reached 262.54 ×10^{8}CNY which ranked third of all marine industries.

Table 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 （×10^{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

Marine engineering architecture industry contains the constructing of port, coastal electricity station, coast, dyke, etc. The total output value of this industry reached 101.16 $\times 10^8$CNY in 2004 (Table 12). Shandong's contribution accounted for 50%.

Table 12 Marine engineering architecture industry of three coastal provinces

of The Yellow Sea in 2004 (From SOA 2005)

Region	Employees (individual)	Output value（$\times 10^8$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

Marine transportation industry has been developed along the Yellow Sea. There are 7 major ports along the Yellow Sea. The berth number of coastal ports of the Yellow Sea has increased to 360 till 2004 and 170 of them are the 10,000 ton class berths (Table 13). In 2004, these ports handled 56,422$\times 10^4$ tons cargo and 8,970.3$\times 10^4$tons standardized containers and transfered 1,351$\times 10^4$ passengers (Table 14).

Table 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 berth(#)	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 14 Passengers and cargo transportation of three coastal provinces of The Yellow Sea in 2004 (From SOA 2005)

Region	Cargo handled (10^4tons)	Passenger Departure and Arrival ($\times10^4$individual)	International standardized containers handled		Marine transport vessels (tonnage)	
			Containers (#)	Weight ($\times10^4$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 is the foreigners' expense for transportation, sightseeing, accommodation, diet, shopping, entertainment etc in the nine coastal cities along The Yellow Sea. The total inbound tourism receipts reached 98,526×10^4US$ in 2004. Dalian ranks first with 35,000×10^4US$ and Qingdao second with 29,182×10^4US$.

Table 15 Inbound tourism in coastal cities of The Yellow Sea in 2004 (From SOA 2005)

Province	City	Foreigners (individual)	International tourism receipts（$\times10^4$US$）
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

Fishermen are one of users of the Yellow Sea. They get lots of benefits through mariculture and fishing activities. With the large shallow waters, flat intertidal zone, high primary production and original habitat of many living resources, the coastal waters of The Yellow Sea is quite suitable for maricultured. The shrimp, crab, scallop, clam oyster, abalone, sea urchin, sea cucumber, fish and macro algae are extensive cultured in the area. In 2004, the total fishermen population reached 239×10^4 persons which accounts for about 5% total residents of three coastal provinces. Shellfish and algae mariculture are the most important in mariculture area and products. See table 16 for more information.

Table 16 Fishery and mariculture area of three coastal provinces of the Yellow Sea in 2004 (From SOA 2005)

Region	Fishermen ($\times10^4$ 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 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($\times10^8$CNY)
	Fish	Crustacean	Shellfish	Algae	The 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

There are about 4.4×10^7 residents living in the coastal provinces of the Yellow Sea. They get lots of benefits, such as food, sightseeing, good air and living necessities. On the contrary, ecological degradation in the Yellow Sea is also harmful to the life of coastal residents. So they are major participators of protecting the Yellow Sea.

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

Table 18 Coastal resident and living area of The Yellow Sea in 2004 (From SOA 2005)

Province	City	Population($\times10^4$ individual)	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 organization

2.2.5.1 Academic consulting organizations

Chinese Society of Oceanography

Chinese Society of Oceanography (CSO) is an academic and public-welfare social incorporated association voluntarily organized by the ocean scientists, technologists and the sea-related units. It is an important social force in the development of the course of ocean science and technology of China. Registered in the Ministry of Civil Affairs and established in July 1979, CSO is

attached to State Oceanic Administration and under the professional guidance of Chinese Association for Science and Technology. CSO has 12 branches and 9 professional committees with 8000 individual members and 180 incorporated members. The scope of CSO`s task is: to carry out ocean scientific and technological exchange; to organize the marine scientists and technologists to participate in the ocean policy making, ocean development strategy, ocean development planning and laws and regulations of the sea, and to provide advice for decision-making; to undertake evaluation of the ocean projects, verification of the results of the research projects, to edit the ocean literature and popularize the knowledge on ocean science.

CSO has got many prizes. In 1999 and 2002, it was awarded “Advanced Corporation for Popularizing Knowledge” by Ministry of Science and Technology of China, Ministry for Propagandizing of China, and Chinese Association for Science and Technology ; it was awarded “ Advanced Society” by Chinese Association for Science and Technology in 2001; in 2002, it was awarded with two “excellent organizer” for organizing “academic exchange activities of reducing natural hazard” and “academic exchange activities of preventing plant diseases and insect pests” by Chinese Association for Science and Technology; and it was awarded “ excellent organizer in Xihu Lake expo” for organizing “International Asia and the Pacific Environmental Remote Sensing meeting”

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

Chinese Society of Oceanography and Limnology

Chinese Society of Oceanography and limnology (CSOL) is an academic and public-welfare social incorporated association voluntarily organized by the ocean and limnology scientists. CSOL is attached to Institute of Oceanography, Chinese Academy of Sciences and 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 with 8000 individual members. The scope of CSOL`s task is: to carry out ocean and limnology scientific exchange; to provide advice for the state development strategy of ocean and limnology, to organize ocean and limnology scientists to participate in scientific development policy and strategy and laws and regulations; to edit the ocean literature and popularize the knowledge on ocean science. By far CSOL have held 150 academic meeting with oceanological and limnologic topic.

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

There are some general organizations which organize aperiodically academic and consulting activities on marine affairs, such as Chinese Society of Environmental Protection, Chinese Society of Environmental Science, 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 (Chinese name: Da Hai Huang Bao Gong She), Qingdao Travel Club (Chinese name: You Shan Wan Shui) at bbs.qingdaonew.com. The members with different careers but they often gather online and discuss environmental protection issues, such as the jellyfish bloom in Jiaozhou bay in the beginning of August in 2006. They participate in many public-welfare activities to popularize knowledge of environmental protection and help to strengthen consciousness of environmental protection.

2.3 Analysis on the relationship among different stakeholders

2.3.1 The relationship among different governmental departments related to marine management

2.3.1.1The relationship between oceanic and fisheries administrative systems

On behalf of the central government, the State Oceanic Administration manages major marine affairs, such as sea area utilization, marine environmental protection, marine rights and interests maintenance, 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 is responsible the Bohai Sea and the waters north from 35^0N in the Yellow Sea while the ECSB is responsible the waters south from 35^0N in the Yellow Sea and East China Sea.

On behalf of central government, Bureau of Fisheries Management, Ministry of Agriculture (BOF, MOA) takes charge of utilization of fishery resources and environmental protection of marine fishery waters. As the subordinate department of BOF, MOA, Fisheries management and Fishing Harbor Superintence of Yellow Sea and Bohai Sea takes charge of utilization and protection of fishery resources and environment in the Bohai Sea and The Yellow Sea.

In provincial levels，one comprehensive department subjected to provincial government is responsible both marine and fisheries affairs at the coastal waters (<12nm from coastal line). There are three provincial departments along The Yellow Sea i.e. Oceanic and Fishery Department of Liaoning, Oceanic and Fishery Department of Shandong, Oceanic and Fishery Department of Jiangsu.

In addition, the local oceanic and fishery departments receive technical guide from both SOA and BOF,MOA. So the administrative conflicts between SOA and BOF, MOA are easy to be solved at provincial and other local levels.

2.3.1.2 The inter-relationship in environmental protection system

In the environmental protection systems, State Environmental Protection Administration (SEPA) is responsible for guiding, coordinating and supervising national environmental protection with focus on land, water and air. At the provincial level, there are three environmental protection bureaus subjected to provincial governments i.e. Environmental Protection Bureau of Liaoning, Environmental Protection Bureau of Shandong, and Environmental Protection Bureau of Jiangsu. They receive technical guide from SEAP. These provincial environmental protection administrations take charge of guiding, coordinating and supervising provincial environmental protection.

2.3.1.3 The inter-relationship in maritime safety system

In Maritime Safety systems, Shandong, Liaoning and Jiangsu maritime safety administrations are directly under the management of State Maritime Safety Administration in financial, personnel and technical affairs. These three provincial maritime safety administrations take charge of guiding and supervising principal maritime safety administration.

2.3.1.4 The relationship among oceanic, fisheries, environmental protection and maritime safety administrative systems

As departments related to marine management, the oceanic and fisheries systems, environmental protection systems and maritime safety system respectively take charge of their own responsibility, and cooperate with each other. At present, the responsibilities of each department are complicated and some of them are intercrossed and they often have disputes in some marine affairs esp. on marine environmental pollution.

Take marine environmental protection as an example. SEAP system takes charge of guiding, coordinating and supervising marine environmental protection, and marine pollution prevention due to land-sourced pollution and coastal construction. SOA system takes charge of guiding and supervising marine environment, including organizing marine environmental survey, environmental monitoring, environmental appraisal and marine scientific research. And it handles marine environmental pollution accidents, takes charge of marine pollution prevention during coastal construction and waste treatment. NMSA system is responsible for supervising and handling environmental pollution due to vessels in its administrative waters. BOF, MOA takes charge of supervising marine environmental pollution due to fishery vessels, protecting fishing areas, and looking into and handling fishery pollution accidents. Because the marine pollution activities often occur and pollutant often diffuses among the different administrative waters Therefore, more than one system usually have responsible to a pollution event. These systems have the tradition that contend for power and profit not cooperate with each other. So the conflicts among these four systems occur frequently.

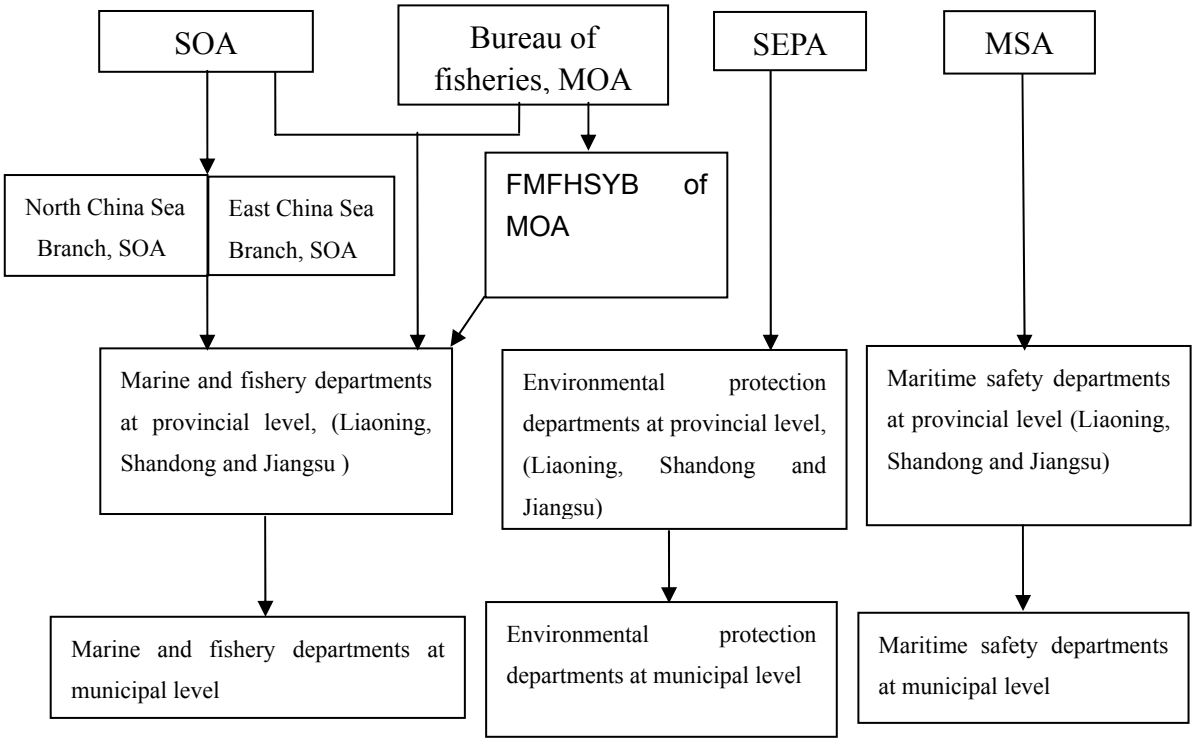

Figure 2.1 Relationship among departments related to marine management

2.3.2 Relationship between departments related to marine management and coastal enterprises

On one hand, the above four governmental departments guide, coordinate and supervise coastal enterprises' utilization activities in the Yellow Sea, and at the same time they draft national laws and regulation related to marine management. On the other hand, they check and punish those coastal enterprises with illegal activities. But nowadays it is difficult for ministry departments to fulfill effective supervision due to some problems such as regional protectionism, low cost for breaching of law, and weak enforcement capacity etc. In addition, some coastal enterprises lack social responsibility and only pay attention to their own development; hence they often neglect the damage from their utilization activities on marine environment and resources of the Yellow Sea.

2.3.3 Relationship between governmental departments and fishermen

The relationship between governmental departments and the fishermen mainly include the following aspects such as management of mariculture waters, application of mariculture technologies. According to marine function zone and

mariculture planning, governmental departments conduct mariculture management scientifically.

In recent years, it is difficult to manage mariculture areas and it has become the poorest part in administration on the use of sea area. The main reasons are as follows: First, most fishermen still consider mariculture area as their own or ancestors' legacy. Second, parties engaging in mariculture are complicated and change frequently. Third, local governments have not exerted their full influence on management of mariculture area. Forth, the administrative regulations on mariculture have lagged behind practical situation. Moreover, nowadays there is a large number of people transformed fishing to mariculture after fulfillment of the strategy on protection of marine fishery resources, but fewer mariculture areas available.

2.3.4 Relationship between coastal enterprises and fishermen

With rapid development of marine economy and urbanization of coastal areas, the relationship between coastal enterprises and fishermen has become worse which indicated the strong conflicts between industrial pollution and environmental protection. The direct loss due to more industrial pollution is the maricultured loss. The discharged waste diffuse to nearby maricultured waters and exceed the environmental capacity of the maricultured waters. Therefore, besides the illegal waste discharge, the legal waste discharge also does harm to the mariculture species and deteriorate the water quality and sediment quality in the maricultured area. This kind of problem like that often occur because the current marine function zoning and marine development plan does not consider the environmental impact assessment.

In addition, pollution from ports and vessels is another noticeable aspect. For example, many mini-sized and medium-sized ports have not equipped with the disposal facilities of sewage and garbage, so directly waste discharge into sea become another pollution source. It is obvious that those behaviors have brought direct influences to fishermen in the Yellow Sea.

2.3.5 Relationship between non-governmental organizations and other stakeholders

In China, non-governmental organizations, especially those academic ones have been playing an important consulting role for government in utilizing and protecting marine environments of the Yellow Sea. They encourage and organize their members the most of whom are marine scientists and technologists to participate in drafting the state ocean policy, ocean development strategy and planning, laws and regulations, and to provide suggestions for

decision-making. However, the non-governmental organizations are a few and their sound is weak and their contribution is very limited.

2.4 Analysis on results of questionnaire

For each of five stakeholders, we designed different questionnaire with about 20 questions for each. The questionnaires are in Chinese. Their English versions are listed as annex 1-5.

We designed 3 common questions in five kinds of questionnaires, including What are major threats on The Yellow Sea environment? Who is the responsible party for environmental destruction of The Yellow Sea? and Whose suggestion is easily accepted by government for marine decision-making? According to statistical results, many interviewee believe that industrial pollution and living sewage from residents are the major threats to The Yellow Sea environment, which account for 35% and 25% respectively (Figure 3.1). Meanwhile, 40% and 34% of interviewee think that coastal enterprises and government departments should be respectively responsible for environmental destruction of The Yellow Sea (Figure 3.2). These result show one conflict, i.e. 25% of interviewee know that the living sewage from their kitchen and toilet do harm to the Yellow Sea ecosystem, however they are not aware of their responsibility for the environmental pollution they think government should be responsible instead of them. Only 6% of interviewee thinks they own should be responsible for the environmental pollution (Fig 3.2).

More than 90% of interviewee said they never gave suggestions on marine policy-making to governments, yet 61% of them think scientists played a very important role in marine policy-making (Figure 3.3). Actually the coastal enterprises play important role in marine policy-making too but the most of interviewee do not know this fact.

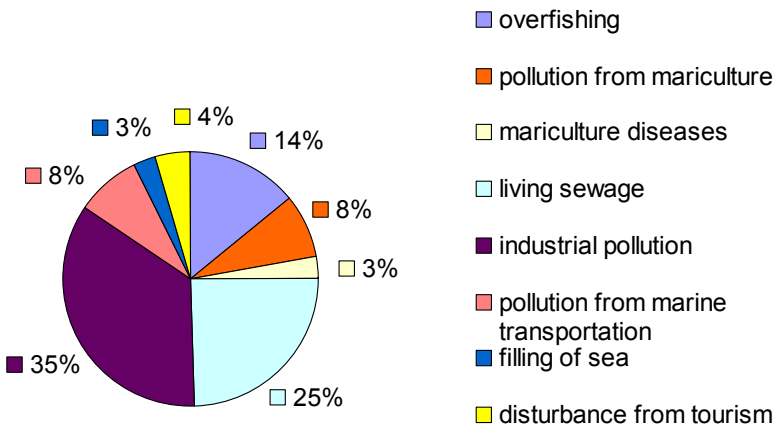

Figure 3.1 Major threats against the Yellow Sea Ecosystem

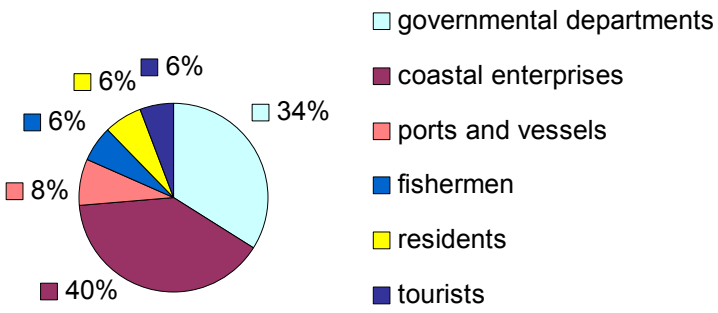

Figure 3.2 Who is the responsible party for environmental destruction of Yellow Sea

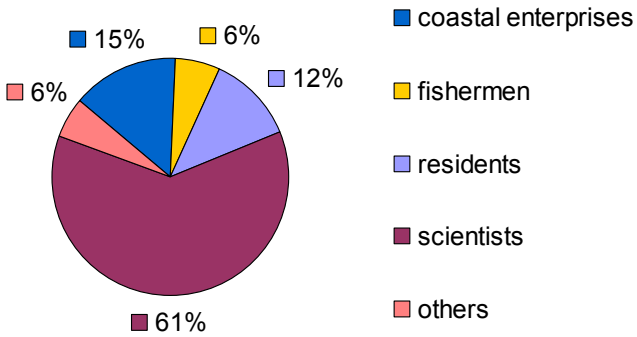

Figure 3.3 Whose suggestion is easily accepted by government for marine decision-making

2.4.1 Analysis on government department questionnaire

When asked about attitude of local governments on marine exploitation and protection, 49% of interviewed officials think that exploitation is as important as protection, and 31% confess exploitation is superior to protection in practice (Figure 3.4). To our surprises, only 6% believe exploitation policies conform to laws, and 82% think there are some conflicts (Figure 3.5). So here comes the conclusion that there are some contradictions between current marine exploitation policies and laws and this situation should be paid much attention on.

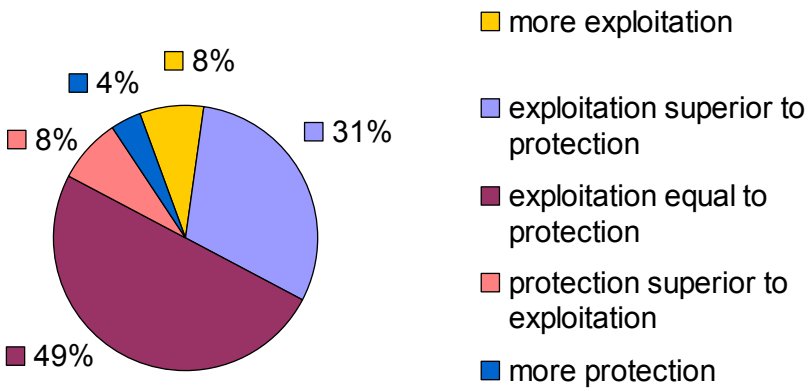

Figure 3.4 Officials assessment on tendency of marine policies

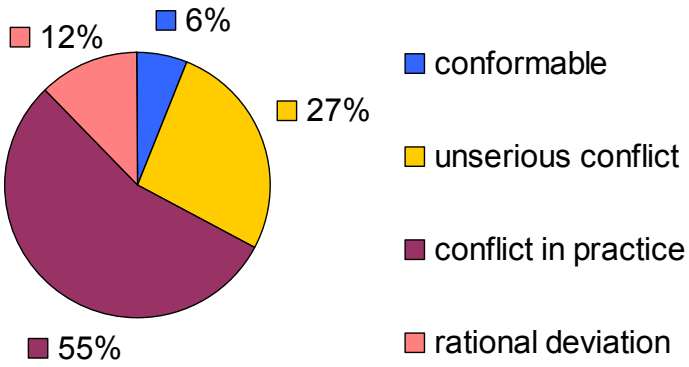

Figure 3.5 Relationship between Laws and Policies

When it comes to implementation of present laws, 29% of interviewees agree that it is better and 71% express their dissatisfaction and disappointment (Figure 3.6). In addition, 51% think that current laws need to be more concrete, 22% hope that more severe punishment measures should be made (Figure 3.7). It indicates that current legal systems should be improved to regulate utilization of The Yellow Sea.

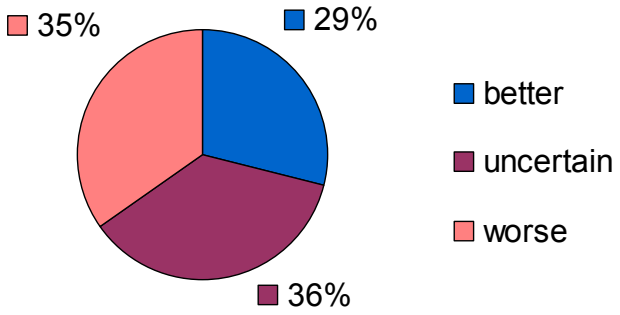

Figure 3.6 Implementation of current laws and regulations

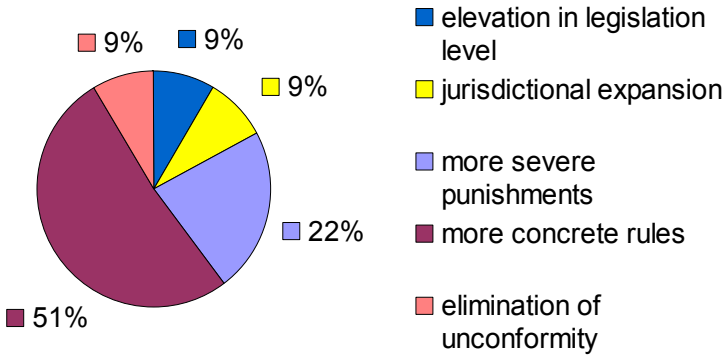

Figure3.7 Suggestions on improvements of current laws and regulations

As far as the difficulties of the Yellow Sea administration are concerned, 56% of interviewees think that poor cooperation among governmental departments is the main problem and 16% consider escaping from supervision to be another problem (Figure 3.8). Following the last question we can see from Figure 3.9 that there are a lot of reasons for administrative difficulties such as poor administrative system, economic interests, local protectionism, inappropriate laws and policies etc.

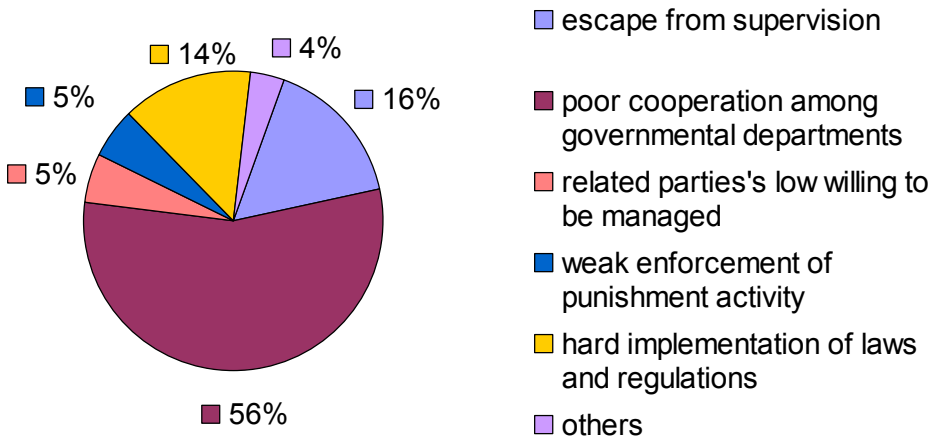

Figure 3.8 Management difficulties in the YS

In addition, althe most half of participants think there are certain overlap in powers range among various governmental departments, conflict of jurisdiction and benefit among three coastal provinces and 9 coastal cities. So we suggest that one effective coordination system should be established among various departments and various coastal provinces and cities

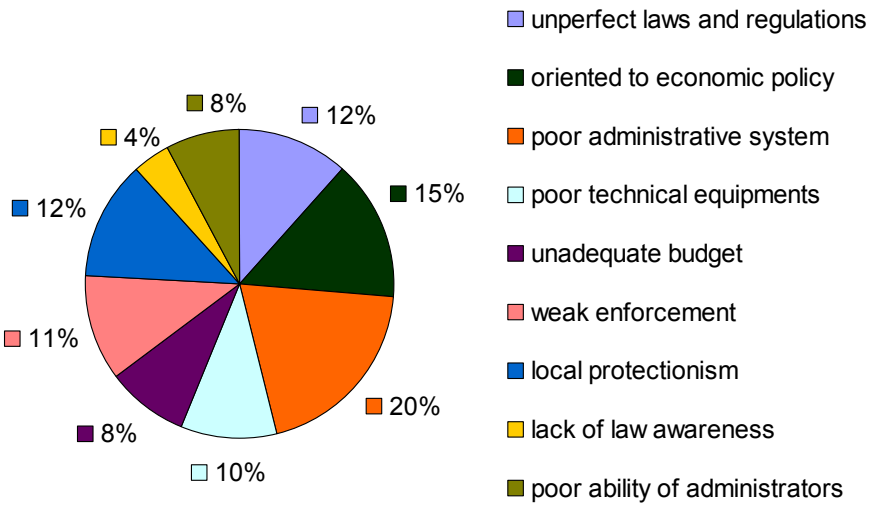

Figure 3.9 Reasons of management difficulties in the YS

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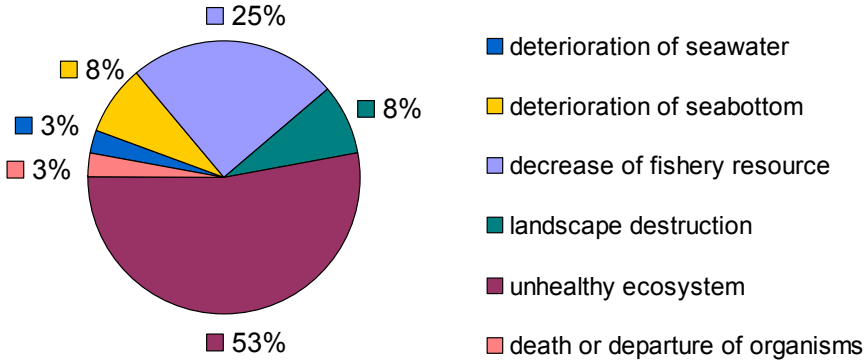
2.4.2 Analysis on coastal enterprises questionnaire

Though It is difficult for us to conduct that survey because many enterprises refused our survey request, we still obtain some valuable data. We feel the most enterprises practitioner are quite sensitive to the problem of pollution and

environmental protection.

53% of interviewees think the health loss of the Yellow Sea ecosystem is the major influence from coastal enterprise activities. 25% think their enterprise activities cause the decrease of fishery resources (Figure 3.10). In fact, 74% of them are aware that environmental deterioration of The Yellow Sea would affect their enterprises' income as return (Figure 3.11).



Figures 3.10 Impact of enterprise activities on the YS ecosystem

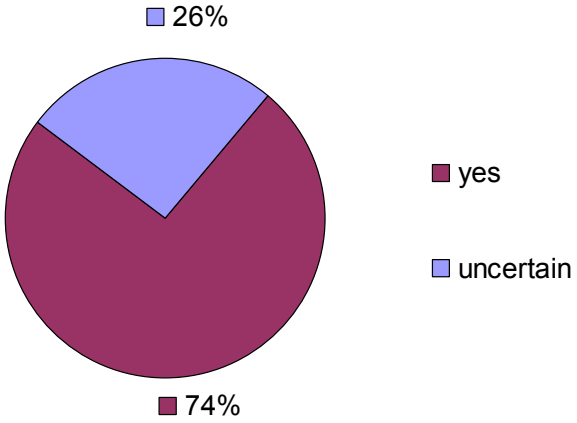


Figure 3.11 Impact of environmental deterioretion in the YS on the coastal Enterprises

Concerning attitudes on present laws related to utilization of sea, 46% of interviewees think their enterprises would not be influenced even under stricter rules and 34% are uncertain (Figure 3.12). On the other hand, 89% of them stress that they would obey rules and policies as far as possible and 11% recognize that they occasionally disobey when facing with unreasonable rules (Figure 3.13). Regarding the practical actions to protect The Yellow Sea, only 14% express positive responses and 60% are uncertain. (Figure 3.14)

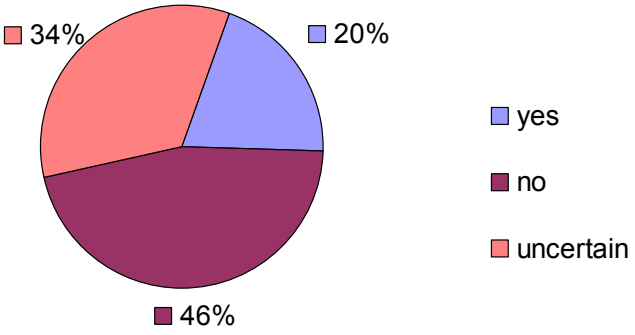


Figure 3.12 Whether enterprise's benefit will be affected under stricter rules

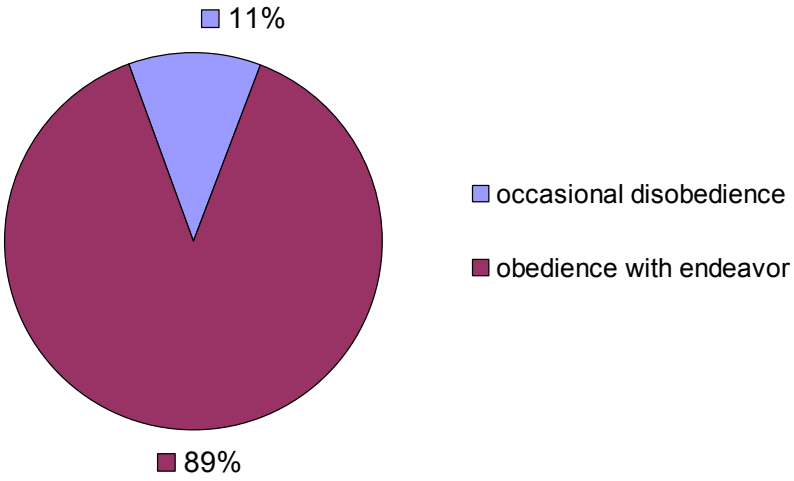


Figure 3.13 Enterprises' attitude on unreasonable rules

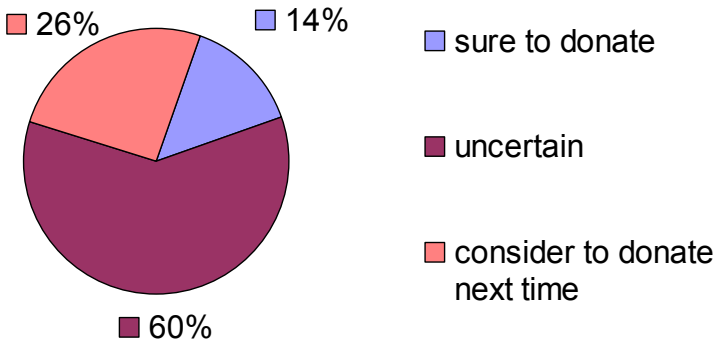


Figure 3.14 Donation willing to protect the YS ecosystem

2.4.3 Analysis on fishermen questionnaire

When answering the question of who ever damaged their benefit, 69% of interviewees selected coastal enterprises and 15% choose ports and vessels (Figure 3.15). It shows there is interest conflict between fishermen and coastal enterprises. And 47% recognized they own maricultured activities affect on the wild species and 31% express their disinterest on the impact from maricultured activities (Figure 3.16).

Regarding attitudes on protection of The Yellow Sea, 87% of interviewees expressed the positive responses and only 3% disinterested it (Figure 3.17). It shows their strong concern to ecological environment of The Yellow Sea.

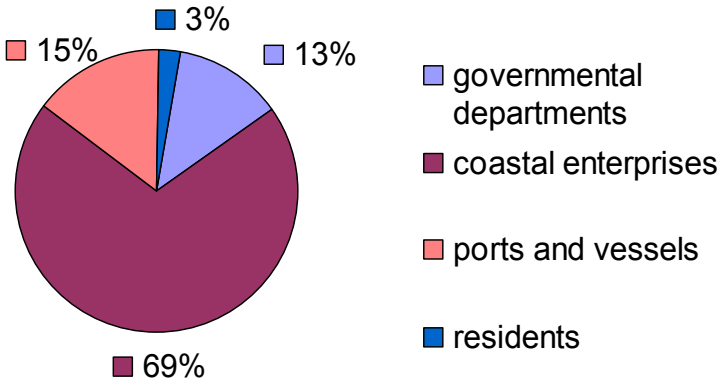


Figure 3.15 Responsible party who ever damaged fishermen benifits

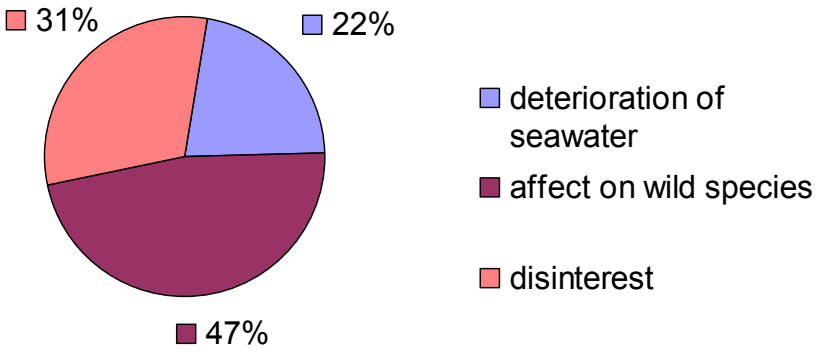


Figure 3.16 Influence on YS by Their Mariculture

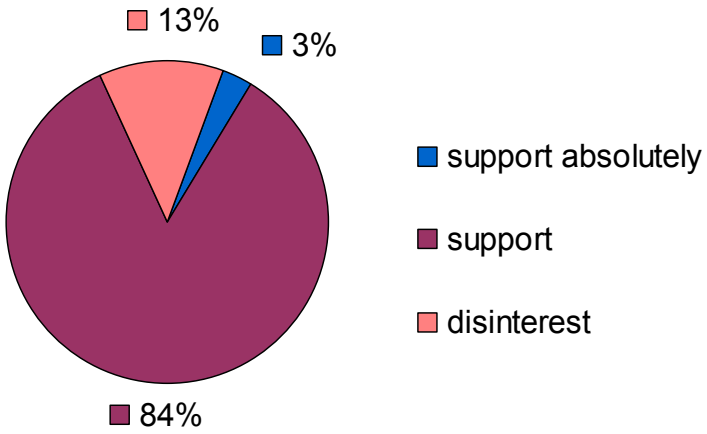


Figure 3.17 Fishermen's attitudes to protection of the YS

2.4.4 Analysis on coastal residents questionnaire

When assessing the work of governmental department, 54% think law enforcement is insufficient, 17% express governmental department lack cooperation and 14% think governmental department is partial to the enterprise. On the contrary only 11% express governmental department protect public benefit (Figure 3.18).

When facing destroying activities of ecological environment of the Yellow Sea, 34% of interviewees think they will dissuade the destroyers, 31% choose to keep silent, 19% think they will report them to governmental departments, 12% prefer to disclose them to media (Figure 3.19).

Regarding individual destructive behaviors to The Yellow Sea, 52% of interviewees consider littering on seashore as destructive behavior, 31% people worry about the usage of phosphorus detergent (Figure 3.20).

When replying whether they are willing to work as volunteer in protecting ecological environment of the Yellow Sea, 90% of interviewees say they are willing to participate in these activities, 10% say they do not want to participate or they are not sure to do so(Figure 3.21). This indicates the most of coastal residents have strong willingness to protect the Yellow Sea.

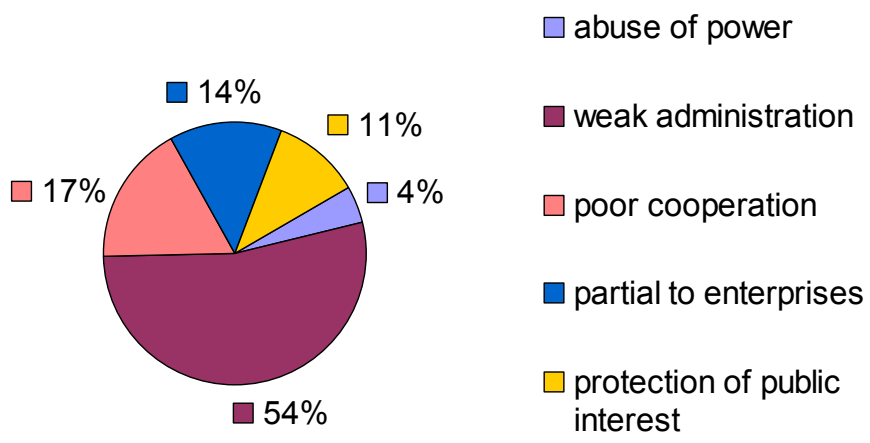


Figure 3.18 Assessment on governmental departments' performance

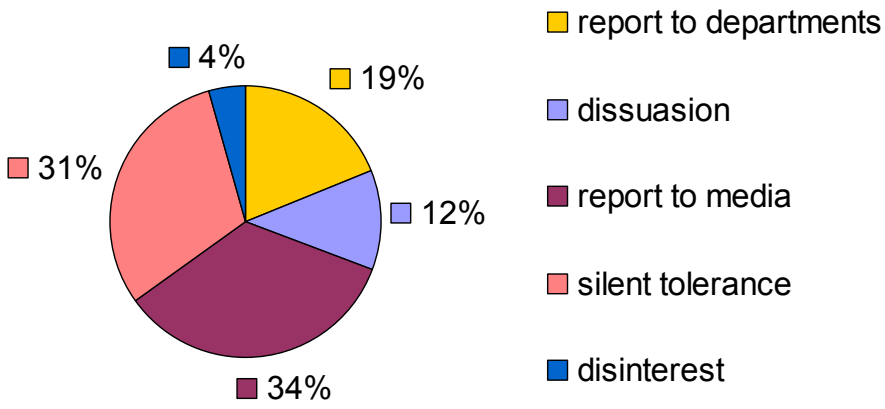


Figure 3.19 Residents' attitudes on destructive activities to the YS

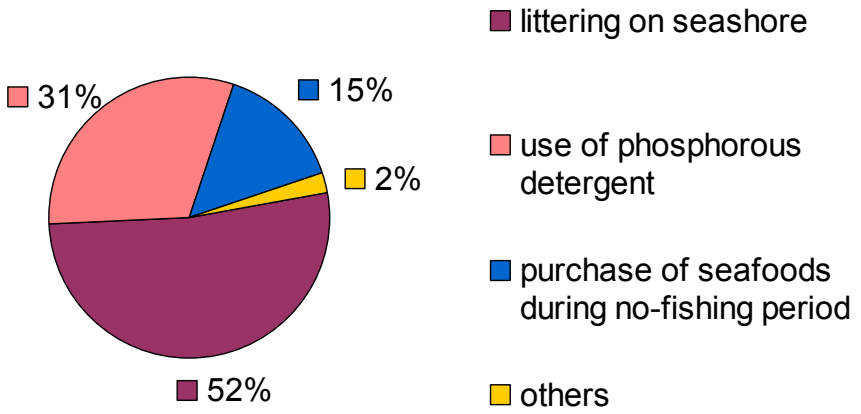


Figure 3.20 Individual destructive behaviors to the YS

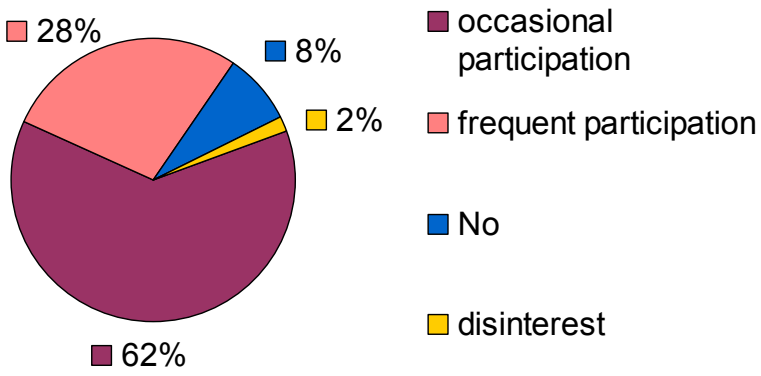


Figure 3.21 Residents' attitudes on volunteer activities to protect the YS

2.4.5 Analysis on non-governmental organizations questionnaire

There are a few non-government organizations along the Yellow Sea, we contacted with 5 NGOs and delivered 10 pieces of questionnaires and only received 10 pieces as feedback. Because the effective questionnaires are too less so we did not conduct the statistical analysis. All of interviewees show their organizations' strong enthusiasm on protecting the Yellow Sea. Through our talks with these NGOs, we find their activities are supported by general public and management departments.

2.5 Plan for encouraging all stakeholders, especially public to participate in protecting health of The Yellow Sea ecosystem

2.5.1 Rationale and Objectives

There are about 44 million residents living along the coastal area of the Yellow Sea in China. Their activities could strongly affect the health of the Yellow Sea ecosystem and damage its services consciously or unconsciously. It is vital to improve their awareness of how to protect 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 a homepage and internet forum on protection of The Yellow Sea ecosystem

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

Responsible Agency: Ocean and Fisheries Bureau of Qingdao

2. Prepare brochures and posters on “Protect Health of The Yellow Sea Ecosystem--Our Responsibility”

3. Conduct communication, presentation and 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 main coastal cities of the Yellow Sea (e.g. Lianyungang, Qingdao, Dalian, etc.).

Topic: The Yellow Sea biodiversity and us

Responsible Agency: Ocean and Fisheries Bureau in each coastal municipality

3.2 World Environment Day (June 5)

Conduct activities to encourage awareness of environment protection of the Yellow Sea at main public places of main coastal cities.
- Dissemination of brochures and posters
- Face to face discussion
- Conduct investigation by questionnaires

It may require some donation from companies or enterprises

Responsible Agency: Environmental Protection Administration in each coastal municipality

3.3 World Ocean Day (July 18)

Carry out activities for public awareness on protection of the Yellow Sea at beaches attractive to tourists in Qingdao, Dalian and Lianyungang Cities

- Disseminate brochures and posters
- Face to face discussion
- Conduct investigation by questionnaires

It may require some donation 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 harbors, mariculture sites etc., to see current status of the coastal areas.

Date: the last Sunday in August

Responsible Agencyt: Ocean and Fisheries Bureau in each coastal municipality

3.5 Associated activities during Ocean Festival of Qingdao

Conduct campaigns to increase public awareness at Wusi Square, Qingdao

- Disseminate brochures and posters
- Face to face discussion
- Conduct investigation by questionnaires

Topic: Protect The Yellow Sea, Hand in Hand

The detail arrangement will be determined together with Office of Ocean Festival of Qingdao. It may require some donation from companies or enterprises

3.6 Associated activities during Dalian International Fashion Festival

Conduct campaigns to increase public awareness at Xinghai Square, Dalian.(2 days)

- Disseminate brochures and posters
- Face to face discussion
- Conduct investigation by questionnaires

Topic: Fashion and Ocean

The detail arrangement will be determined together with Office of Dalian International Fashion Festival. It may require some donation 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 1 day, total 3 days)

- Disseminate brochures and posters
- Face to face discussion
- Conduct investigation by questionnaires

Topic: Environmental Health of Community and Island
The detail arrangement co-organized with Office for Summer Festival of Lianyungang. It is better to find sponsor to these activities.

3.8 Associated with TV media of Liaoning, Shandong and Jiangsu Province to hold a knowledge competition about The Yellow Sea.
Responsible Agency: the State Oceanic Administration,
the Yellow SeaLME PMO
Time: March—June

4 Public participation in oceanic scientific research activities

4.1 The open day of university and institute

Invite local residents and students to visit universities and institutes. The detail arrangement will be made together with National Marine Environment Monitoring Center, First Institute of Oceanography, SOA and Yanchen wetland nature reserve.
Give information about oceanic scientific research to the local residents. Let them know the value of ocean.

Time: 1 university / institute 1day
Invite Person: local residents and students
Responsible Agency: Ocean and Fisheries Bureau in each coastal municipality

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

Time: 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 volunteer's training bases and about 50 volunteers could be trained every year.

5.2 Select 1 local community in each coastal city (Dandong, Dalian, Yantai,

Weihai, Qingdao, Rizhao, Lianyungang, Yanchen, Nantong etc) as volunteer's training bases and about 20 volunteers could be trained every year.

6 Submit suggestions to local governmental system

6.1 To 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 is to cultivate the consciousness of the youth to protect ocean. This course could be conducted at seaside, such as beaches, islands.

6.2 Public hearings should be held by local governments prior to the start of projects relating to the ocean. At the same time, the 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.
- 100,000 local residents and 50,000 students will be involved in the public awareness activities.
- 630 volunteers will be trained to conduct public awareness activities of the marine environment protection in their local communities in main cities along The Yellow Sea in 5 years. And form a system of continuously training volunteers.
- Oceanic education courses will be started in the primary schools and middle schools in coastal cities.
- Local residents are involved in the discussion and establishment of projects related to the ocean by public hearings.

2.5.4 Expected budget

The plan will last 3 years, total budget is about 300,000CNY.

Annex 1-5 Questionnaires

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

Questionnaire for Governmental Departments Related to Marine Affairs

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

We sincerely appreciate you for answering the following questions which will take several minutes of yours.

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 Living 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 to 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 Do you think whose interests are considered when drafting marine development plan or program?

A Central government B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea 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 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea 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 How do you think what is policy tendence 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 How do you think what role 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 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 Do you think what are the main reasons for the above difficulties?

A Unperfect law and policy and not match the actual situation
B Economic benefits prior to environmental benefits
C Unperfect 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 weak awareness of marine protection

and law obey

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 are jurisdiction conflict and benefits conflict among coastal provinces and cities along the Yellow Sea?

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

20 Do you think what roles U.N. 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 officials, fishermen, coastal enterprises, coastal residents, and non-government organizations' concerns on the Yellow Sea ecosystem, and to provide data for governance analyze on The Yellow Sea, we conduct this questionnaire.

We sincerely appreciate you for answering the following questions which will take several minutes of yours.

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?

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F Coastal reclamation G 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 to 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 Do you think whose interests are better considered when drafting marine development plan or program?

A Central government B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea in the past 20 years?

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D Protection prior to development E Orientated to protection

9 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea next 10 years?

A Orientated to development B Development prior to protection

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D Protection prior to development E Orientated to protection

10 How do you think what is the 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 How do you think what role 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 What kind of ways 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 Which kinds of ways do your enterprises affect the Yellow Sea ecosystem?

A Discharge liquid pollutant B Discharge gas pollutant

C Discharge solid pollutant D Make noises 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 your enterprises' activities?

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 your enterprises' activities?

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 affects on your enterprise' development?

A Yes B No C Uncertain D Unconcern

17 If strictly enforcing laws and regulations, will your enterprise's development be affected?

A Yes B No C Uncertain D Unconcern

18 Does your enterprise observe the unperfect regulations and rules?

A Observe sometimes B Not observe accidently C Try our best to observe

D Try our best to elude E Other_____

19 What is your concern during the government management activities to your enterprise's utilization of sea area?

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

Questionnaire for Fishermen along the Yellow Sea

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

We sincerely appreciate you for answering the following questions which will take several minutes of yours.

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 Living 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 ecosystem environment of The Yellow Sea?

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6 Who are responsible to 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 Do you think whose interests are better considered when drafting marine development plan or program?

A Central government B Coastal provincial and municipal governments

C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other_____

8 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea 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 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea 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 How do you think what is the 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 How do you think what role 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 As mariculture practitioner, what kind of method do you prefer to select for your long-term benefits?

A Chase massive mariculture to achieve more benefits in a short term

B Negotiate with neighboring mariculture practitioners and both keep at suitable mariculture quantity and both reduce some profit.

C Chase multi-species mariculture mode and keep at 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 strong do your mariculture activities affect the Yellow Sea ecosystem?

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

15 What's the relationship between mariculture disease spread and mariculture quantity?

A Some relationship B No relationship C Hard to confirm

16 Do you think whether the current laws, policies and management measures for the Yellow Sea are reasonable or not?

A Reasonable, fully consider mariculture practitioners' benefits

B Relatively reasonable, partially consider mariculture practitioners' benefits

C Not reasonable, ignore mariculture practitioners' benefits

17 What is your attitude to strengthen ecosystem protection 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 is the most thing influencing 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, do you think what problems are there in government management departments at present?

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

Questionnaire for Coastal Residents

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

We sincerely appreciate you for answering the following questions which will take several minutes of yours.

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 Living 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?

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6 Who are responsible to ecosystem environment damage of The Yellow Sea?

A Governmental departments B Coastal enterprises C Ports and ships

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G Tourists H Other_____

7 Do you think whose interests are considered when drafting marine development plan or program?

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

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D Protection prior to development E Orientated to protection

11 How do you think what role 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 Whether or not detergent in your kitchen does influence environment of the Yellow Sea?

A Yes B No C Unconcern

13 Do you think whether littering garbage at coast does influence ecological environment of the Yellow Sea?

A Yes B No C Unconcern

14 Do you think whether purchase of illegal marine living organisms, such as coral, fish in no-fishing period, do encourage activities of damaging ecosystem?

A Yes B No C Unconcern

15 What activities did you carry out against the destroying activities of 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 activities have positive feedback?

Reporting to management departments: A No taking action B Taking action, destroying behavior have been stopped

Dissuading destroyers: C No positive reply D Temporarily stop the destruction action

Reporting to media: E Yes, positive reply F No any reply

17 How do you assess the behavior of 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 protection 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)

Questionnaire for NGOs along the Yellow Sea

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

We sincerely appreciate you for answering the following questions which will take several minutes of yours.

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

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F Coastal residents G Tourists H Other_____

7 Do you think whose interests are better considered when drafting marine development plan or program?

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C Coastal enterprises D Mariculture practitioners

E Fishing companies F Coastal residents G Other____

8 How do you think what is the tendency of national policies between the

development and protection of the Yellow Sea in the past 20 years?

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D Protection prior to development E Orientated to protection

9 How do you think what is the tendency of national policies between the development and protection of the Yellow Sea next 10 years?

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C Development and protection are equal

D Protection prior to development E Orientated to protection

10 How do you think what is the 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 How do you think what role 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 What are main purposes of your organization for conducting activities?

A Provide a communication platform for craft brother

B Propagandize scientific knowledge to public

C Promote social reputation D Protect ecological environment

E Strengthen public awareness of environment protection

13 Does your organization often organize activities aiming at ecological environment protection?

A Once each month B At least 5 times each year

C Once each year D Aperiodically

14 What are the target people that your organization's activities aim mainly at?

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 to improve ecological environment condition of The Yellow Sea through organizing activities?

A Yes, very confident B Confident C Uncertain D Unconcern

18 Do you think what are the main problems regarding government departments' management activities in the Yellow Sea?

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

Chapter Three: Institutional Analysis

Since 1970s, marine environment management was proposed in a program, China pays close attention to establish a rational supervision and management system in the light of national conditions. Now a comprehensive marine environmental supervision and management system has been established. Major players in national marine environment management fall into four categories: the legislative bodies, namely the National People's Congress and its permanent body, Standing committee; the central government, namely the State Council and its subordinate organizations; local governments; and the general public and NGOs.

The Constitution divides China administratively into provinces, autonomous regions and centrally administered municipalities. Under the province or the autonomous region are autonomous prefectures, counties and cities. Generally, the highest legislative authority in China is the National People's Congress (NPC) and its Standing Committee. The 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. 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 last decades, many local laws and regulations have been adopted that have relevance for aquaculture and aquaculture products. This overview, mainly addresses those laws and regulations adopted by the central government.

The members of 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, which indicate the change of China's national environment policies. Before 1980s, government agencies' main function was to promote economic production. As a result, much of the government investment went to developing maritime transportation, fisheries, sea salt making and coastal mining, etc. Along with the development of society, Chinese government gradually realized the significance of marine environment protection, and gradually took marine evironment protection and marine resources conservation as one of the major concerns in recent two decades.

Local governments include those of provincial, municipal and county level governments and their agencies. They are required to implement the national policies and laws, and given a certain level of flexibility to modify the policy during the implementation process if necessitated by local circumstances.

Local governments are also participants to promote national marine environmental protection management by making recommendations. With on-going economic structural reform, local governments in coastal areas are given higher level of autonomy with regard to local economic and social development Programs.

Chinese Constitution, laws and regulations encourage general public to participate in marine environment and resources protection. A common legal requirement is that government should encourage and reward institutions and individuals who have made remarkable contributions to protect and improve the marine environment and resources. As governments and their agencies are held responsible for pollution prevention and environmental protection, the role and function of the people's organizations, NGOs, industries and private sector in marine environment management are still evolving.

3.1 Governmental agencies and their responsibilities related to Yellow Sea marine environment management

Governmental agencies related to Yellow Sea marine environment management include the Central Government and the local governments of different levels. The Central Government and its subordinate organizations play the dominate role in the Yellow Sea management; while the local governments execute the policies, strategies and regulations made by the Central Government.

3.1.1 Departments of Central Government with ocean-related functions

- State Oceanic Administration 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 Important Governmental Agencies Related to Marine Environment Protection

3.1.2.1 State Oceanic Administration

The State Oceanic Administration was established with primary mandates

for oceanographic survey and research in 1964. During the 1984 governmental restructuring, its mandates 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, the State Oceanic Administration took the responsibility to organize relevant departments to draw up basic marine laws, regulations and policies; hold national marine development programmes; layout marine use zonation; hold coastal zone survey and management in addition to its traditional role. In 1988, the State Oceanic Administration was placed within the framework of the Ministry of Land and resources. After the adoption of Sea Area Use law, the State Oceanic Administration was required to review and issue permits for sea area use and levy the use fees.

3.1.2.2 State Environmental Protection Administration

The State Environmental Protection Administration plays a lead role in overall environmental management. It also undertakes an interagency consultation and coordination in national environmental policy. Specially, the State Environmental Protection Administration is in charge of preventing and managing 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.

3.1.2.3Maritime Traffic Safety Administration under the Ministry of Transportation

The Ministry of Transportation was held responsible in 1960s for ensuring safety at sea, and for managing ocean-going vessels and port development. In 1970, the Ministry of transportation's mandates included prevention and control of marine pollution by ship sources. In 1984, it was specified in the modified mandates to undertake shoreline use planning, 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 deserves to be put on the agenda. Thus, in 1998,the Ministry of Transportation was charged with the responsibility to develop contingency plan against oil spill from shipping accident. In the 1998 government reconstruction, the Harbor Superintendency under Ministry of Transportation renamed as the Maritime Traffic Safety Administration under Ministry of Transportation.

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

Fishery Administration was held responsible for management of fishing activities and fishery resources conservation in the early 1980s. In 1984, the Fishery Administration incorporated into its management responsibility environmental impacts of fishing vessels and preservation of fishery biological balance through fishery nature reserves, fishing area and seasonal closures. The Fishery Administration was also in charge of issuing permits of

aquaculture production. The characteristics of environmental protection and biological preservation have become more apparent in the mandates of Fishery Administration over 1980 and 1990. The Most significant change in Fishery Administration's mandates is the shift of emphasis from fishing production promotion to the control of fishing efforts for sustainable fishery development.

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

China's marine environment management is a mix of central government and local government responsibilities. Under the supervision of the People's Congress and it's Standing Committee at different levels and with administrative coordination separated according to relevant provisions of laws and regulations, the central and local governments divide up their responsibilities into function zones, pollution sources and natural resources. The central government and local governments carry out environmental protection laws in cooperation with each other.

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, and the "Department Function Mandates of the State Council". The departments and their detailed responsibilities as related to managing the Yellow Sea are listed below in Table 1.

Table 1. Agencies and Their responsibilities as related to managing the Yellow sea environment

Agencies	Responsibility
State Oceanic Administration (SOA)	● Manage the sea area use of the Yellow sea inside the territorial line and issue Sea Area Use Certificate at state level; ● Conduct function zoning of the Yellow Sea at state level; ● Supervise the marine environmental protection of the Yellow Sea, and manage the investigation and monitoring activities of the Yellow Sea at state level; ● Organize scientific research on environment of the Yellow Sea; ● Prevent and control pollution damages to the Yellow Sea incurred by marine construction projects and sea dumping; ● Organize state-level marine environment monitoring and supervision network in corporation with relevant

	departments; ● Evaluate marine environment quality at regular intervals; ● Manage marine integrative information system; ● Develop State Oil Spill Contingence 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 the integrated environmental protection of the Yellow Sea; ● Prevent and control pollution damages to the Yellow Sea by land-based pollutants and coastal construction projects; ● Compile State Environment Quality Bulletins (including the Yellow Sea); ● Make State Contingence Plan for marine pollution accident incurred 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 incurred by vessels (not including fishing and military vessels); ● Settle pollution accidents incurred by vessels (not including fishing and military vessels); ● Monitor and supervise port water environment; ● Make State-level Contingency Plan to cope with oil spilling accident incurred by vessels. ● Punish vessels that engage in illegal transportation of dangerous wastes through the Yellow sea within jurisdiction of China.

<table>
<tr><td rowspan="2">Fishery Bureau of Ministry of Agriculture (BOF)</td><td colspan="2">● Monitor and supervise the condition of fishing ports and fishing zones in the Yellow Sea;
● Supervise and control pollution to the Yellow Sea incurred by fishing vessels;
● Assist in investigation and settlement of fishery pollution accident incurred by vessels (not including fishing and military vessels) and in Charge of settlement 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 of rare and endangered species;</td></tr>
<tr><td>Fishery Management and Fishing Harbor Superintendence of Bohai Sea and Yellow Sea of the Ministry of Agriculture (FA & FHS of Bohai and Yellow Sea)</td><td>● Manage oversea fisheries affairs;
● Take charge of important fishing grounds and fishing ports;
● Supervise and mange 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 Fishermen’s legitimate rights and their interests;
● Settle fishery disputes;
● Maintain navigational safety and order of fishery communication.
● Register fishing Vessels</td></tr>
</table>

State Development and Reform Commission	● Carry out the strategy of sustainable development; ● Study and formulate plans for resource conservation and comprehensive utilization; ● Participate in the formulation of ecological improvement plans ● Put forward policies of resource conservation and comprehensive utilization, and coordinate the solution of major issues of ecological improvement and resource conservation and comprehensive utilization; ● Coordinate environmental protection.
State Tourism Administration	● Organize investigation and evaluation of tourism resources; ● Direct planning and develope important tourism regions; ● Conduct tourism statistics.
Ministry of Water Works The People's Liberation Army	● Monitor the quantity and quality of water of rivers, lakes and reservoirs; ● Review and approval of the pollution loading capacities of water bodies with proposal for the limit of the limit of total wastewater discharge.
Environment Protection Department Of Navy	● Supervise and control pollutant discharge from military vessels. ● Settle pollution accidents incurred 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 the 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 on marine environmental protection, and improve marine environmental quality within their jurisdiction; ● Take effective measures to relieve or mitigate damage under 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 and 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, coastal shelter belts, as well as gardens and greenbelt in the coastal cities and towns; ● Establish local nature reserves; ● Conserve and manage fishery resources and 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.
Government 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

Non-governmental Agencies	● Be obliged to protect the marine environment and report or file charges against anyone who pollutes or damages the environment of the Yellow Sea
Including: Chinese Society of Oceanography Chinese Society of Oceanography and Limnology China Environment Society; Oceanographic Society; China Zoology Society; China Wildlife Protection Society; China Zoological Park Society.	Nongovernmental bodies in China play a somewhat different role from the more autonomous, activist ones in other countries; and their contribution to marine environment protection in China is primarily through research, monitoring and public information. They probably have a substantial potential role in raising public awareness of the importance and threats to China's marine environment ● Conduct scientific research on environmental protection and monitoring of the Yellow Sea ● Be advisory agencies on marine environmental protection

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 a large amount of work has been done in the marine environment surveys and research, which started in offshore areas with surface observation of the sea and later expanded to deep-sea regions by means of aerospace remote sensing and underwater detection, as well as surface observation. As early as in the period 1958-1960 a national comprehensive survey of China's offshore waters was made; later, from 1980 to 1986, a comprehensive survey of coastal zones and shoals resources was conducted nationwide, along with the launching of a number of pilot projects on the comprehensive development and utilization of coastal zones; and from 1988 to 1995 a general investigation

of the country's island resources and an experiment on their comprehensive development were carried out. In recent years China has made further efforts to promote the investigation and exploration of marine resources and the marine environment, search actively for new exploitable resources, study new techniques and methods of marine resources exploitation and protection, train technical personnel in marine development and protection, and spread oceanographic knowledge among the general public in order to rouse the whole nation to protect the marine environment.

On the basis of a multidisciplinary oceanographic research setup, which consists of 15000-some research personnel, China has a series of achievements to its credit 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 more attention paid to the study of the inshore shelf marine environment, China has established a multidisciplinary marine environment research system with regional characteristics. Under the direction of the marine development strategy and the support programs and plans for the development drawn up by relevant state departments, marked progress has been made in recent years in many aspects of marine environment. These achievements have provided scientific directions and references for the promotion of offshore fishing and oil and gas exploitation, protection of the marine environment, and reduction and prevention of marine disasters.

China makes vigorous efforts for the development of oceanographic technologies, building up an oceanographic technology system focusing mainly on the marine environment, exploration and exploitation of marine resources, and general marine engineering, and covering more than 20 technological fields. The country has now turned its attention to implementing a marine high-tech program, a program for tackling key problems in marine science and technology and one for marine development by reliance on 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 program for tackling key problems in marine science and technology centers on fields directly related to modern marine development, such as sustainable exploitation of the resources and environment of coastal zones, desalinization of seawater, exploitation of marine energy and comprehensive utilization of seawater resources. In 1996 government departments concerned jointly formulated the National Plan for Implementing the "Program for Marine Development by Reliance on Science and Technology" in the Ninth Five-Year Period (1996-2000) and to the Year 2010, which focuses on research, development and dissemination of the technologies of marine reproduction and mariculture, fine processing of marine biological resources, exploration and extraction of marine pharmaceuticals and exploitation of chemical resources in seawater. Through implementation of this plan, China hopes to

foster marine technology enterprises, improve the productivity of the marine industries.

China has basically evolved 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, training large numbers of technical and managerial personnel. The mass media is also used in China to inform young people about marine topics and educate the people living in 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 Center has been established in China in the wake of the progress in the past dozens of years in this field; it provides comprehensive information services for ocean development, oceanographic research and marine environmental protection.

To give a further boost to marine technology, offshore development and marine environment protection, the Chinese government has worked out the Medium- and Long-Term Program for the Development of Marine Science and Technology, the Marine Technology Policy (Blue Paper) and a number of concrete development plans. The main tasks for marine technology development in the future are: To strengthen research into basic marine science; tackle the key technologies of marine resources exploitation and environmental protection; promote the application of marine technologies to marine industries; improve marine resources development and service support for marine disaster prevention and reduction; improve marine environmental protection; and narrow the gap between China and the developed countries in marine technology.

3.3.2. Marine environment Monitoring

The basic task of marine pollution investigation and monitoring is to grasp the baseline situation of marine environmental pollution and its long-term tendency to change, evaluate marine environmental quality and provide 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. No matter needs or benefits, it emphasizes on the collaboration and coordination of different units. At Present the environment of the Yellow Sea are monitored by state and local agencies, universities, research institutes, dischargers, and volunteers.

While the routine marine environmental monitoring has been undertaken mainly by the Agencies under Oceanic Administrations, Environmental Protection Administrations, Fishery Administrations. In this connection, the Oceanic Administrations handling marine environmental quality monitoring; the Environmental Protection Administrations taking care of monitoring land-based

discharges and coastal marine environment quality; Fisheries are responsible for monitoring fishery waters. Each of them publishes the respective annual assessments concerning the state of the marine environment. Each of them has a network of monitoring stations across the country, named as, State Marine Environment Monitoring Net, State Coastal Marine Environment Monitoring Net, and State Fishery Water Monitoring Net. Although it is required by the State Council that the former should include the later 2 nets, yet there is still more way to go before major participants in the networks actually share resources and monitoring results in order to fulfill their common objectives.

3.3.3 Major Agencies and their responsibilities as to monitoring of the Yellow Sea Environment are listed as following:

3.3.3.1 Agencies in Oceanic Administration System

(1) State Marine Environment Monitoring Center (Under the State Oceanic Administration)

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

b. Take charge of the organization, technology and information management of state marine environment monitoring system; handle the affairs of State Marine Environment Monitoring Office; in charge of the estimate and forecast work of marine environment quality; compile the State Marine Environment Quality Communique.

c. Manage the professional organizations engaging in marine environment monitoring, pollution monitoring, ecosystem monitoring and land-based pollution monitoring and provide technical support to those organizations; organize the major state marine environment investigation and make experiment on the professional monitoring work.

d. Take the estimate and forecast work of natural disasters such as red tide and seaice.

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

f. Offer technical support to marine environment and ecosystem monitoring and supervision implementation; manage the data-base of oil-spilling and the data-base of pollution damage incident; invest and monitor major marine pollution damage, compile the technical report of major marine pollution damage incident; offer scientific evidence for marine pollution damage arbitration.

g. Carry through the science and technology study and international cooperation in the realm of marine environment monitoring.

（2）North China Sea Marine Environment Monitoring Center (under the North China Sea Branch of the State Oceanic Administration)

North China Sea Marine Environment Monitoring Center mainly takes charge of the following duties: Monitor and manage the marine environment of north China Sea; maintain the marine environment monitoring net of North China Sea; evaluate the monitoring work on marine environment regularly; issue the announcement on the quality of marine environment.

Besides that, it also takes part in the construction of marine project, exploration of marine resources, and marine environment protection in coastal provinces and cities.

（3）Marine Environment Monitoring Station of coastal Provinces, municipalities and counties (under the oceanic departments of relevant governments)

3.3.3.2. Agencies in Environmental Protection Administration System

(1)Environment Monitoring Center of China (under the State Environmental Protection Adinistration)

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 the 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. Responsible for the quality guarantee and quality control of monitoring in the State Environment Monitoring System; take charge of the Quality Supervision and Test Center on Environment Monitoring Apparatus under the SEPA.

f. Take charge of the monitoring related technical and businesslike work in some major project assigned by the SEPA, such as total control of pollutant.。

g. Write the Environment Quality Report of Coastal Sea Areas and Water Quality Weekly Report of Bathing Beach 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.

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

(2) Coastal Environment Monitoring Central station (under the Environment Monitoring Center of China)

Responsible for daily management of environment monitoring network of coastal sea areas.

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

Monitor the marine environment in Coastal area of the Yellow Sea

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

Monitor the marine environment in Coastal areas within their jurisdiction

3.3.3.3. Agencies in Fishery Administration System

(1) Yellow Sea Fisheries Research Institute

(2) Fishery Water Environment Monitoring Station of coastal Provinces, municipalities and counties (under the Fishery Management Departments of relevant governments)

Chapter Four: Legal and Policy Analysis

4.1 Legal Status on Marine Environment protection of the Yellow Sea

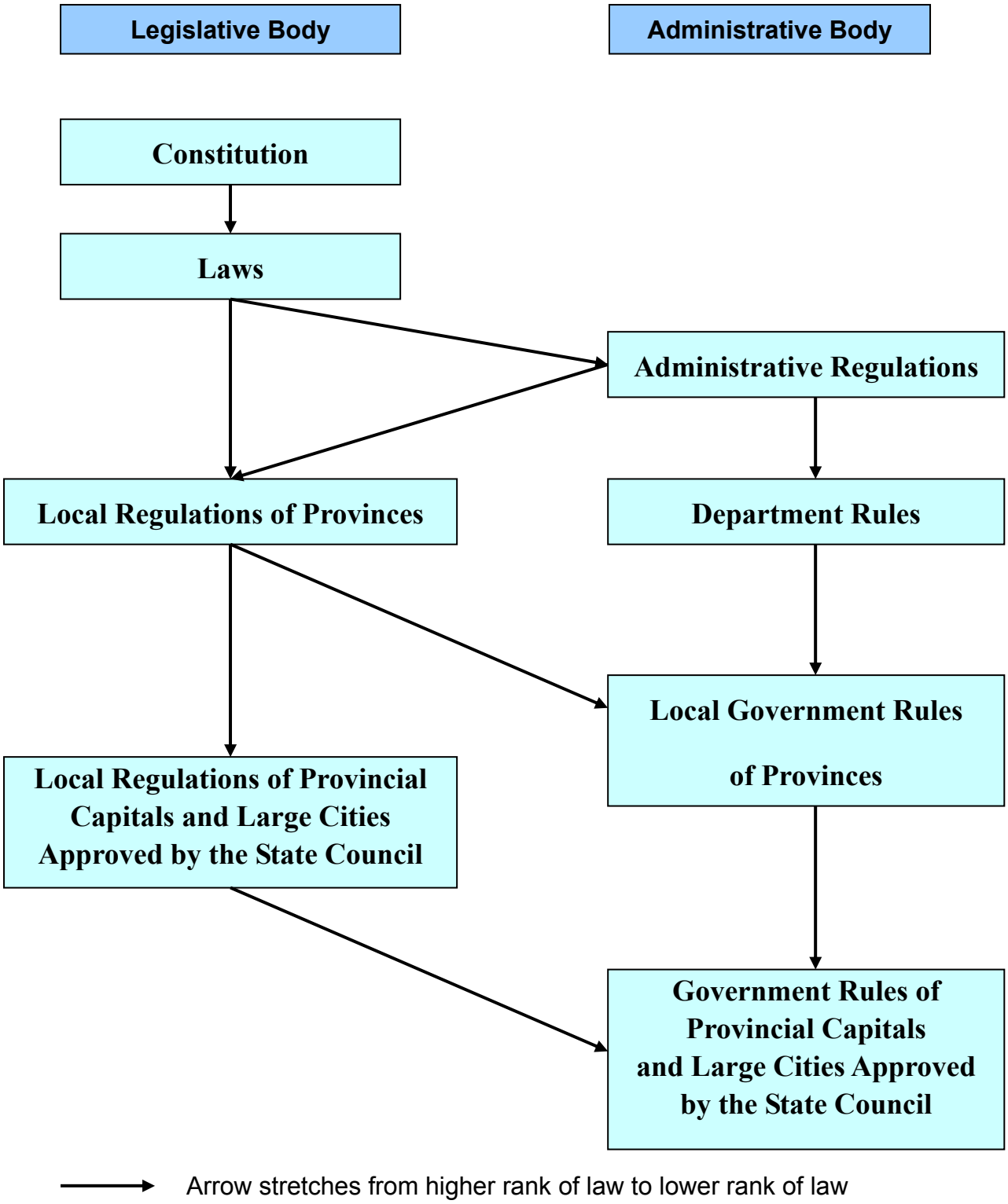
4.1.1 The Hierarchy of Chinese Laws

Marine environment protection law and policy is an integral part 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 the 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, and it is the foundation of other laws. It also provides a legal basis for the profound changes in China's social and economic institutions and significantly revises governmental structures and procedures. The next rank lower than the Consitution is the basic national law, which was legislated by the NPC or its Standing Committee. Besides the NPC and its Standing Committee, the provincial People's Congress and People's Congress of provincial capitals and large cities approved by the State Council have the right to make Local Regulations according to their local circumstances. And in order to implement the Constitution and national laws, the State Council has the right to make Administrative Regulations, and the Departments subordinate the State Council are able to make Department Rules. And in order to implement laws and local regulations, the provincial government and government of provincial capitals, autonomous regions and large cities approved by the State Council can make local government rules.

As China is a unitary state, vertically national laws are superior and override local laws made by local people's congress and people's government. And local laws must consistent with the national laws; laws of lower rank must consistent with laws of higher rank. This is the case in laws related with marine environment protection. However, in accordance with the "Environment Protection Law" (1989), provincial governments may establish their local standards for discharge of pollutants for items not specified by national standards. With regard to items already specified by the national standards, they may set local standards that are more stringent than the national standards and report them to the competent authority of the central government (Article 10). That is to say, in environmental law field, law of lower

rank establishing more stringent discharge standards than law of higher rank is not seen as the violation of law.

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


Legislative Body
Administrative Body
Constitution
Laws
Administrative Regulations
Local Regulations of Provinces
Department Rules
Local Government Rules of Provinces
Local Regulations of Provincial Capitals and Large Cities Approved by the State Council
Government Rules of Provincial Capitals and Large Cities Approved by the State Council
Arrow stretches from higher rank of law to lower rank of law

4.1.2 Development of Legal System on Marine Environment Protection

Although several administrative regulations were passed on environmental pollution in China, it was only after the 1972 Stockholm Conference that environment protection was put on the agenda of the Chinese government. In 1973, the first national conference on environment protection was held. And as the result, the State Council issued “Provisional Rules on the Prevention and Control of Coastal Marine Pollution ” the next year. It is the first administrative law on marine pollution in China, which provided more detailed rules on the ship-based pollution. In 1978, a provision on environmental protection was first put into the Constitution. In 1979, the basic law for environmental protection, the “Environmental Protection Law ”, was promulgated on a trial basis, as is consistent with Chinese practice, and formally entered into force 10 years later in 1989. It represented the beginning of the establishment of the legal framework of environmental protection in China. In 1980s, it came to the most active period in Chinese environmental legislation. The “Marine Environmental Protection Law” (1982) and the “Water Pollution Prevention and Control Law” (1984) were past in this stage. During the same period of time, attention was also given to environmental protection in other laws, e.g. the “General Principles of Civil Law” (1986) provides civil liability for damages caused by environmental pollution (Article 124); the “Fisheries Law” (1986) incorporated the concept of resources conservation; the “Wild Animal Protection Law” initiated the protection of wild endangered animals. In 1990s and 2000s, marine environmental legal system developed rapidly in China. In 1997, the Criminal law incorporated a section “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 the state ownership of sea and marine resources in China. As supplement of laws, many regulations and rules have been adopted and have played important roles in the management of marine environment. Coinciding with domestic development of legal 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 and Rules 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 takes the harmonization of economic construction, social development and environmental protection as the basic policy in China. The Environmental Protection law stipulates that government organizations at various levels, all units and individuals have the obligation to protect the environment. Marine environment is an important part protected by this law. For example, Article 2 of the law 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 purpose of protecting the marine environment and resources, preventing pollution, maintaining ecological balance, ensuring human health and promoting maritime developments, China adopted Marine Environment Protection Law in 1982. It is a special law on protecting marine environment in China. Article 2, section 1 of the law provides: This Law applies to the internal sea and territorial sea 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. This Law also applies to the discharge of harmful substances and the dumping of wastes beyond the sea areas under the jurisdiction , but causing pollution to such areas.

The stipulation of this law is harmonious with concerning international

conventions and customary rules. As for provisions on vessel, the law is harmonious with the International Convention on Civil Liability for Oil Pollution, 1969. At the same time, the law has also taken into consideration of the standards stipulated in MARPOL 73/78 and its Annex I. The provisions on dumping wastes at sea has referred 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 on the 13th conference of the 9th National People's Congress in 1999 and became effective as of April 1st, 2000. The significant characteristic of this amendment is 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." This article shows to the international society that China is serious in the implementation of international conventions, which is favorable to perfect our domestic institutions on marine environmental protection. The Marine Environment Protection Law as amended covers:

- Supervision and management of marine environmental protection (Chapter Ⅱ)
- Marine ecological preservation (Chapter Ⅲ)
- Land-based pollutants (Chapter Ⅳ)
- Prevention of pollution from coastal construction projects (Chapter Ⅴ)
- Prevention of pollution from offshore construction projects (Chapter Ⅵ)
- Dumping of wastes (Chapter Ⅶ)
- Prevention of pollution from vessels (Chapter Ⅷ)

The Marine Environment Protection Law as amended provides for the 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 platform, vessel, and the coastal unit likely to cause marine pollution;
- Marine nature reserve;
- Report of quantity, type, content and installation of discharge;
- Permit for discharge;
- Dumping permit and zoning; and

- Damage compensation.

These provisions have adopted sustainable development principle and incorporated some proven and innovative concepts and practices such as: “total quantity control” of contaminant discharges based on measured environmental carrying capacity, marine zoning, improved interagency coordination, the use of market mechanism and better implementing mechanism.

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, the people's governments at or above the county level may grant licenses to use state-owned water surfaces and tidal flats to state and collectively-owned units to develop aquaculture. 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 must be protected and cannot be used as aquaculture grounds. Licences can be revoked if water surfaces and tidal flats are neglected for a period of 12 months without a proper reason (this includes the situation in which water surfaces and tidal flats have a stocking quantity below the local standard). 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. The State draws plans for the use of water surface areas and defines those areas of water surface and intertidal zone or mudflats for aquaculture purpose. Units or individuals, who wish to use those designated areas, must apply for an aquaculture permit through the competent fisheries administration at or above the county level, and the aquaculture permit will be granted by the people's government at the same level to allow using the area for aquaculture activities.

4.2.1.5 WildLife Protection Law

The Wildlife Protection Law was adopted in 1988 and amended in 2004. It’s aim is to save species of wildlife, which are rare or near extinction. The Law is implemented by the Regulations for the Protection of Aquatic Wildlife (1993), which grants the fishery administration the responsibility of managing precious or endangered species of aquatic wildlife. The transportation of such species out of a county, the import or introduction of such species from abroad, as well as their export, require 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 the 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 the regular monitoring of aquatic wildlife resources, the designation of aquatic nature reserves and the issuance of special catching licences and domestication and breeding licences.

4.2.1.6 The 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, seeks to protect the production of agriculture, forestry, animal husbandry and fishery as well as human health, and 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 means of transport from animal epidemic areas, are, on entry or exit, subject to quarantine inspection. They need to 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 took effect on 1 September 2003, expands EIA requirements from individual construction projects to government planning for the development of – *inter alia* – 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, they are:

- 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.

Marine living resources protection regulations are as follow:

- 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 (1993)
- 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 regulations matched with the law, the concerning departments of the State Council which exercise the right of supervision and management to marine environment in accordance with law, have drafted and issued some administrative rules, for example:

- 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 Harbor.
- Procedure Provisions on Punishing Oil Polluters in Ship Casualties
- Procedure 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
- Procedure Provisions on Working Out and Ratifying the Emergency Plan for Oil Spilling in Marine Oil Exploitation
- A Guideline for Choosing and Monitoring Marine Dumping Area
- Rules on the Collections 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
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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 Congress of Coastal areas have drafted and issued some local regulation and administrative rules of local government. For instance:

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 Permit
- 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 *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 Enhance the Development of Coastal Shallow Seas and Tidelands
- Regulations of Jiangsu Province on the Management of Harbor
- 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 illegal use of labor 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 Rresources
- 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 *Fisheries law of the People's Republic of China*
- Supplement for the *Implementation Provisons 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 *Water law of the People's Republic of China*
- 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 Harbor

Shandong Province

- Implementation Provisions of Shandong Province on *Fisheries Law of the People's Republic of China*
- Circular of Bureau of Fisheries Management Management on approving and Issuing the Cultivation Permit of Coastal Waters, Shallow Seas and Tidezones 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. Now a comprehensive regime of marine environmental quality standards have been developed to guide marine pollution monitoring and environmental quality assessment.

For instance:

- Sea Water Quality Standard(adopted in 1986 and amended in 1997)
- Quality Standard for Fisheries Waters(adopted in 1979 and amended in 1989)
- Integrated Waste Water Discharge Standard (became effective as of 1998)
- Standard of Waste Water form ship sources (1983)
- Standard of Oily Sewage Discharge for Offshore Petroleum Exploitation Industry(adopted in 1885)
- Liaoning Provincial Waste Water Direct Discharge Standard in Sea Areas.

According to stipulations of law, environmental quality standard and

pollutants discharging standard are compulsory ones. In case of a violation of the laws and environmental standards, liabilities should be investigated and fixed.

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 adequate to regulate all legal relationships only by means of marine environmental legislation. It is necessary to be supplemented by provisions on environment protection in other laws, regulations and rules, of which the laws are as follow:

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

The regulations and rules are:

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

Each of the laws or regulations has some provisions to safeguard or improve the ecological environment and marine environment for living, and to prevent and control marine pollution. Legal system of marine and coastal environment protection in China is an integrated entity. It ensures that there is not only laws to be observed, but also regulations and rules to be enacted.

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”

The Plan was accomplished 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 situation 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 the implementation. The Plan has 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 the period. Provinces, municipalities, cities and relevant agencies subordinate to the State Council should make their respective detailed implementing plans according to local characteristics situations. Local governments and departments should have major environment protection

projects included in the annual plan for national economic and social development and 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 the supervision on the enforcement of environmental laws. The harmonious cooperation among ministries and local governments should be strengthened and major environment issues across boundaries and zones should be promoted to achieve the objectives of the “Tenth Five-year Plan”.

4.2.2.2 National Sea Functioning Zones

The Coastal Zones Functioning was headed by SOA under the Ministry of Land and Resources in September 2002. The functioning of coastal waters is to divide the oceans into various function zones according to location, natural resources, environment conditions and demand of development and utilization. The sea functioning zones are to provide scientific basis for the utilization and management of the seas and the protection of marine environment so as to guarantee national economic and social development. The sea functioning zones include inland waters, territorial sea, contiguous zone, EXCLUSIVE ECONOMIC ZONE, continental shelf and other sea areas within the jurisdiction of China. The sea functioning zones define the seas into ten main function zones including port and navigation zone, fishery resource utilization and conservation zone, mineral resource utilization mining zone, tourism zone, marine resource utilization zone, marine energy utilization zone, construction projects zone, marine conservation zone, specific-purpose zone and reserved zone. Attached with various zones, main functions of key ocean areas are defined. The State Council commented on the sea functioning zones that it is the foundation for ocean utilization, management and environmental protection, such zoning plans have legal forces and should be strictly implemented.

4.2.2.3 National Coastal Water Environmental Functioning Zones

SEPA organized the task and completed the coastal water functioning zones in 1999. It involved general situation of Chinese coastal waters, social economic status and environment quality of coastal waters. It also deals with methods, schemes, implementation, and management measures of environment functioning zones. The national coastal water functioning zones were drawn from eleven provinces, municipalities and cities on the basis of local coastal environment functions. There were 651 coastal environment function zones, of which 80 were of Level I, 268 Level II, 73 Level III and 230 Level IV. In order to strengthen the management of coastal environment function zones, SEPA constituted Management Measures of Coastal Environment Function Zones in 1999. The functioning zones form the basis of regulations on marine environmental protection by national and local governments. It supports the task to take marine environmental protection into the plan of national economy and social developments. The functioning zones are major approaches for environmental protection administrations to monitor

the environment according to the regulations. It is significant for China to implement the basic national policy and to achieve the objectives of national environmental protection by partitioning the coastal environment function zones and administer them 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 dwell on marine industries including marine fishery, maritime transportation, offshore oil & natural gas, coastal tourism, shipbuilding, sea salt & chemistry industry, seawater desalination & utilization, marine pharmaceuticals. The Guidelines introduced the status of Chinese marine economy and existing problems, and confirmed the task and direction of marine industries. It also designed the district layout of marine economy and clarified main measures for marine resources conservation and economic developments. While distributing the guidelines, the State Council emphasized that: “Being a depository of abundant living resources, oil and gas, and minerals, the oceans are significant to develop marine industries that are in turn fundamental to rational development of coastal economies and industrial structures so as to maintain fasting 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 Dec, 21, 2000. It briefs the achievement and problems in the ecological protection of China. By giving out the main cause of ecological damage in China, it puts forward the guideline, basic principle and target of ecological environment protection in China, of which, marine environment protection is an important part. The enhancement of legal system and performance of international treaties as well as 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 3, 2006 by the State Council, which briefs the currents situations and problems in the protection of living resources in China and put forward the guideline, principles and objective of future actions. It puts forward a series of protection and enhancement actions, such as (1) the Protection of Important Fishery Resources; (2) the enhancement of fishery resources; (4) the management of responsible fishing; (5) the construction of nature reserves; (6) the rescue of endangered species; (7)the domestication and raising of endangered species; (8) the management of utilization of endangered species; (9) the monitoring and controlling of alien species; (10) the prevention and treatment of water pollution and ecological disasters; (11) ecological compensation of construction; (12) the restoration of water ecological environment; (13) Promote Scientific aquaculture. Some guarantee measures are also addressed: (1) To establish and Perfect effective and harmonious

management mechanisms; (2) To establish and Perfect multi-sources investment mechanisms; (3) To enhance construction of legal system and execution teams; (4) To promote the participation of the whole society; (5) To improve the science and technical condition and globalization.

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

The Decision of the State Council on Practicing Scientific Development Theory and Enhance Environmental Protection was adopted on February, 14, 2006 by the State Council. It requires that governments at all levels should realize the importance of environmental protection and take the scientific development theory as guideline in environmental protection. It also requires that the development of society and economy should be harmonious with environment, and important problems should be solved in time, the management should be enhanced in environmental protection.

4.2.3 Current Legal Approaches on Prevention and Control of Marine Pollution

China carries out the policy of putting prevention first and combining prevention with control in managing existing marine pollution. While endeavoring to make a success in the protection of marine biological resources and the prevention and control of marine pollution, China have drawn up a series of regulations, rules on the control of land-sourced pollution, ship-sourced pollution, pollution from oil drilling, pollution from coastal and marine projects and ocean dumping, China has enhanced the monitoring, surveillance and control of marine environmental condition.

4.2.3.1 Prevention and control of pollution to marine environment by land-based pollutants

About 80% of 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 on prevention and control of land-based pollution; Law on the Prevention and Control of Water Pollution and its detailed regulations for implementation have played important roles in controlling and decreasing the pollutants discharge carried by the rivers; Water and Soil Conservation Law and its detailed regulations for implementation deal with the prevention and treatment of soil erosion, protection and rational utilization of water and soil resources ,thereby the pollution and damage to marine environment by the surface runoff have been abated; Agriculture Law ,Administrative Regulation on Pesticide, Provisions on Pesticide Registration and Rules on Safe Use of Pesticide are also involved directly or indirectly the marine environmental protection through the protection of agriculture resources and environment ,management on pesticide production

and use. Marine Environmental Protection Law has a special chapter titled Prevention of Pollution to the Marine Environment by Land-based pollutants, which has principled provisions on discharge of domestic sewage and industrial sewage, disposal and handling of solid wastes on the beach and so on. Besides, China has formulated some special regulations and necessary rules and standards on control of land-based pollution. A series of legal approaches have been adopted to prevent and control land-based pollutants. Such as:

(1) Concentration and total pollution load control

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

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

(2) Pollutants discharge report and registration

Any units or individuals that discharge land-based pollutants into sea should report to the competent department, and register both the discharging and treatment facilities. They also should report the types, quantity and concentrations of the pollutants discharged under normal operation conditions and provide relevant techniques and data on pollution control. And they should report timely when there is great change of pollutants discharge in kinds, quantities and density.

Any unit and person who discharges land-based pollutants and refuses to report or makes 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 and be fined.

(3) Collection of pollutants discharge fee

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

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

(4)Treatment of pollution within a prescribed time

Enterprises or institutions that caused serious pollution to marine environment or discharged land-based pollutants exceeding the standards or failed to accomplish the pollutant 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 on time, or they should be ordered to stop and close down or switch to other

production.

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

(5) On-the-spot inspection

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

Any violators who refuses on-the-spot inspection or employ trickery in response to such an inspection should be ordered by the environmental protection departments to correct and may be fined.

(6) Report of pollution accidents

Any units or persons involved in events that has caused or may result in pollution should immediately circulate a notice to the units and residents who may suffer from the pollution, report to the local environmental protection departments and subject to investigation and handling. If the environment may be polluted seriously and the residents' life and properties 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 has caused an accident by land-based pollutants to the marine environment and results in grave economic losses should be fined 30% of that calculated on the basis of directly economic losses by the environmental protection departments, but such a fine should not exceed the maximum of RMB yuan 200,000.

Anyone who discharges land-based pollutants and incurred serious marine environmental pollution and damage should bear the compensation liability.

Any violators who has caused serious pollution and damage accidents by discharging land-based pollutants, and results in serious losses of public or private properties or the personnel death, the persons who have direct responsibilities should be investigated and affixed with the responsibility for a crime.

4.2.3.2 Prevention of Marine Environmental Pollution By Coastal Projects

In order to prevent marine environmental pollution by coastal construction projects, a chapter is incorporated in the Marine Environment Protection Law: Chapter IV, which contains 5 articles. For enforcement of Environmental Protection Law and Marine Environment Protection Law, China has also drafted the Regulations on Prevention of Pollution to Marine Environment by Coastal Construction Projects. Besides, there are some other laws, regulations

and rules on it. For example, The Environmental Impact Assessment Law provides the basic principles and legal approaches. The Management Measures for Environmental Protection of Construction Projects, The Regulation on the Check-for-acceptance upon the Completion of Environmental Protection Facilities of Construction Projects provides some special procedures. Now a series of legal approaches have be adopted in this aspect, for example:

(1) Environmental Impact Assessment for coastal construction projects

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

Anyone who builds 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 local People's Government above County level, and be fined not less than 50,000 yuan and no more than 200,000 yuan; or be ordered to have it removed within a certain period of time by local People's Government above County level in accordance with the 1imits of authority of administration.

(2) Environmental Protection Installations Being Designed, Built and Commissioned Simultaneously with the Principle Project

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

Anyone who puts into commission or use of coastal construction project without completing the construction of environment protection installations or environment protection installations not up to the 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 no more than 100,000 yuan.

(3) On-the-spot inspection

The environmental protection administrative departments of governments at or above county level, pursuant to the limits of their authority for the projects, can bring together related departments to conduct on-the-spot inspection for coastal construction projects. The inspected parties must report the situation

accurately and provide necessary information. The inspectors have obligation to keep related technical and business secrets. Any violator refusing or obstructing 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 and may be fined.

4.2.3.3 Prevention of Marine Environmental Pollution By marine Projects

To prevent and control pollution and damage to marine environment by marine projects, the Marine Environmental Protection Law has a special chapter, ChapterVI, with 8 articles. Article 13, 14, 19, 24, 28 and 31 of the Marine Environmental Protection Law are also applicable to environmental protection and management in marine project. In order to enforce the Marine Environmental Protection Law, competent departments of the State Council have issued some special regulations, measures and standards. For example, the Regulation on the Exploitation of Offshore Petroleum Resources in Cooperation with Foreign Enterprises, Implementation Measures of the Regulations On Environmental Protection in Offshore Oil Exploration and Exploitation, Discharge Standards of Oily Waters for Offshore Oil Exploitation, Rules on the use of oil dispersant in marine oil exploration and exploitation, Procedures on drafting and approval of the Emergency Plan of marine oil exploitation and exploration. Besides, the Mineral Resource Law and its implementation details also include some provisions that are applicable to this aspect. At present, the major environmental protection approaches in this aspect are:

(1) Environmental Impact Assessment for marine projects

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. Then report to the Environmental Protection Department for record 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, fisheries and 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. The equipment and facilities should be inspected by the Vessels Inspection Agency of China, proved to be up to standard, and then granted a certificate of their effectiveness.

(3) Wastes treatment

Residual oil, waste oil, oily mud, oily garbage, and other noxious liquid or residues should be recovered, and 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 nautical miles 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 platform should comply with the Interim Management Method of the Discard of Marine Oil Platform .

(4) Fishery resources protection

When 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 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 the 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 against seepage, leakage and corrosion and be kept in good conditions through regular inspection so as to prevent oil leakage accidents.

(6) Control the 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 indeed unrecoverable by recovery measures.

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

c. In such an emergency that oil spills cannot be recovered and may cause a fire or a serious threat to the safety of human life and properties, whereas, using chemical dispersant can mitigated pollution and prevent accident from expanding, the dispersant may be used without previous report, that is an 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 sea caused by offshore oil exploration and exploitation and submit the plans to the State Environmental Protection Administration for record. Enterprises, institutions or

operators should have the ability to meet emergencies with regard to the prevention and control of oil pollution accidents, to work out emergency plans, and to provide with oil-recover facilities as well as oil enclosure and elimination equipment and materials commensurate with the scale of offshore exploration and exploitation in that it is engaged.

(8) On-the-spot inspection

Functionaries of, and persons designated by 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 provide with accurate information and state the facts.

4.2.3.4 Prevention of Marine Environment Pollution by Vessels

In order to prevent marine environment pollution by vessels, the Marine Environment Protection Law stipulated it as a special chapter. Article 14,21,31and 33 of Environment Protection Law are also applied to this aspect. There are other provisions in the Law on Territorial Sea and Contiguous Zone, Maritime Traffic Safety Law and other 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 have been adopted in this aspect.

(1) Installation of anti-pollution equipment

Any oil tankers with a gross tonnage of 150 tons and above and other vessels of 400 tons and above 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 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 and above or any other vessel of 400 tons and above should provide an Oil Record Book and oil spilling contingency plan. Any vessels carrying more than 2,000 tons of oil in bulk 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 of 150 tons gross tonnage and above or any other vessels of 400 tons gross tonnage and above must be conducted in compliance with relevant state standards and regulations, and accurately recorded in Oil Record Book.

The discharge of hold-washings and other residues by vessels carrying noxious or corrosive goods must be conducted in compliance with the state regulations for vessel sewage discharge, and be accurately recorded in 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 passage the territorial sea of China must hold concerning certificate and take special prevention measure. It is prohibited to discharge waste water containing high concentration of radioactive matter into sea. Any discharge of waste water containing low concentration of radio-active matter into the sea with actual necessity should be carried out radioactive inspection 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

No vessel is allowed to dump garbage into port waters. Vessels carrying harmful cargoes or dusty bulk cargoes must not freely wash decks or holds or 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 sea 3 mile away from land. Waste without crumbling treatment should dump into sea 12 mile away from land.

Vessels should make true reserve 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

Bunkering, loading or unloading oil, vessels must observe the operation instruction and take effective measures to prevent oil spills. Oil tankers must take accurate record of the operation in 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 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 case pollution has raised 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 case any vessel is involved in a marine accident that has caused, or is likely to cause, a serious pollution to the marine environment, the Maritime Traffic Safety Administration has the power to take measures to avoid or minimize such a pollution.

4.2.3.5 Prevention of Marine Environment pollution by Dumping

In order to control waste-dumping at sea and to prevent pollution from dumping, Prevention of Pollution to Marine Environment by Dumping of Wastes is taken as an especial chapter in the Marine Environmental Protection Law. In order to enforce the Marine Environmental Protection Law, China has drafted some administrative regulations and rules, such as: Regulations On the Dumping of Waste at Sea, Measures for Implementation of the Regulations On Dumping of Wastes at Sea, Classification Standard and Assessment Procedure for Dredged Dumping at Sea, etc.. A Series of legal approaches have been adopted in this aspect.

(1) Wastes classification

Wastes are classified into three categories, in term of 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 and the third category refers to those wastes unlisted in neither Annex 1 nor Annex 2. Wastes dumping is controlled based on the categorization. Dumping of the first category of wastes is banned, expected for emergencies where land treatment can put people's health at high risk. In such cases, dumping can be conducted in a designated sea area by a specific method, after an emergency permit is obtained. Wastes in the second category only can be dumped when a special permit is issued. Dumpage of the third category, that are light poisonous or nonpoisonous wastes, 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. Temporary dumping area is designated as a one-off dumping area for special waste. The designation of dumping areas is made by 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 of dumping

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 the quantity, location of dumping and name of vehicles, type of waste as well as the dumping method. A unit, after granted a dumping permit, must carry out dumpage 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 variety of marine ecological environment and development of science and technology, the competent authority may replace or cancel the permit. Dumpage of foreign wastes is prohibited within the 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 harbor 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 relevant military department for verification. If cargo's actual load does not conform to what is specified in the Dumping Permit, the vessel is not be allowed 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 vessel that is to be dumped for supervision and examination, and the vessel should provide facilities for the inspection officers to perform their official duties.

(6) Record and Report

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

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

China's Fisheries Law was brought into being in 1986, and as a consequence of it and its implementation regulations, China's fisheries management improved markedly along 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 were adopted. They encompass fisheries administration, fishing resource conservation, aquaculture enhancement, post-harvest processing, fishing vessel control, fish trade and environmental control. As the 1986

Fisheries Law of China 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". And with the establishment of the Exclusive Economic Zone, the conservation of fishery resources and marine ecosystem 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 2004, and its implementation regulations are yet to be enacted. The Amended Fisheries Law together with other regulations and rules established the fishery management regimes in China, e. g. the "regulations on the Management of Fishing Licences", "regulations on the Collection of the Proliferation and Maintenance fee for the Chinese Prawn if the Yellow Sea and the Bohai Sea", "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", "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 fishing effort should be lower than the recruit of fish stocks, the fishing quota in China jurisdictional waters is to be set by the Bureau of Fisheries Management of the Ministry of Agriculture and approved by the State Council. The Fisheries laws also requires that the fishery administration of the State Council should organize stock assessment and scientific surveys to provide scientific base for determination of Total Allowable Catch. Because of wanting of 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 individual that intends to engage in offshore and distant water fishing must first apply to departments of fishery administration for fishing licenses. Fisheries authorities at various levels are responsible for the approval of fishing licenses. Licenses for large trawler and purse seiner, fishing under agreements with other states, and 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 holder must conduct fishing operations in accordance with the type of license issued.

As to the Yellow Sea, the offshore fishing (within the Motor Trawler restricted Line) license are granted by the fishery authorities of it's coastal counties or municipalities, distant fishing (outside the Motor Trawler Restricted Line) licenses are granted by the Fishery Management and Fishing Harbor Superintendence of Bohai Sea and Yellow Sea of Ministry of Agriculture.

4.2.4.3 Collection of Resources Fee

The Collection of resources fee started with a single species(Chinese Prawn), and later developed to cover all fish stocks. The 1997 Resources fee Measures specified the application of the measures, the adjustment to the fee from various types of fishing according to vessels engine power and fishing grounds. The use of resources fee is limited to fisheries programs:70% for resources proliferation and 30% for resources maintenance.

4.2.4.4Closed fishing seasons, closed fishing areas and Summer Moratorium

Closed fishing areas approach has been carried out 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” in 1955. The trawler restricted zone was set up with a line 17 coordinates close to China’s coast, and motor trawler are not allowed to fish at the western side of the western waters. Since then, trawling has been banned within all the 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, more and more conventional species such as Chinese Prawn, large and small yellow croaker, herring, jellyfish, have been protected in protected zones. Some coastal provinces also set up seasonal conservation zones for fish stocks to spawn and breed.

Since 1995 China has practiced a new midsummer moratorium system--every year during July and August fishing is banned in the sea areas north of 27 degrees north latitude. From 1998 and each subsequent year, the fishing closure was extended both in area and duration, including a large section of the South China Sea. At present the closed zone have been extended to cover all China’s fishing ground and lasted up to three months.

4.2.4.5Fishing Capacity Control

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

At the same time, to ease the pressures on capture fisheries and to release the excessive fishing capacity , China has promoted aquaculture, fish product processing and alternative employment.

4.2.4.6Promotion of responsible Fishing Practices

The Fisheries management authorities at state and provincial levels should designate criteria for specially protected species. The criteria include the allowable catch of such species, restricted fishing zones/seasons, banned or restricted fishing gear and methods, minimum mesh sizes, as well as other measures for the general protection of these species. The inclusion of a wide

range of offences address the threats affecting the sustainability of fishery resources. At the same time, the severe penalties help to achieve responsible fisheries in China.

4.2.4.7Fishery Resources Enhancement

Article 28 The Fisheries Law Provides that, fisheries management departments of governments above county levels should conduct integrated plan for fishery waters within their jurisdiction, and take measures to enhance fishery resources. More than 10 resources restoration station have been established in the coastal areas, and billions of fingerlings of prawns, crabs and fishes have been released in the China Seas. The next three paragraphs give some detailed information on the proliferation work done by Liaoning, Shandong and Jiangsu Provinces along the Yellow Sea.

Liaoning Province: According to statistic, in recent 20 years, one hundred billion fingerlings of prawn have been released in the Yellow Sea in Liaoning Province. This measure brought about 12 billion CNY benefits to the province and greatly improved the fishermen's income, and more important, it ensured the multiply of the prawn species in China. Aquaculture researcher in Liaoning Province did experiments on prawn proliferation release as early as 1984. After 20 years of hard work, they finally mastered the biological nature and life habit of prawn. In recent years, Liaoning Province spent several billion yuan annully to release 1cm-3cm long fingerlings of prawn to the sea, and the highest amount of release reached to 21billion fingerlings.

Shandong Province: In 2006, People's Government of Shandong Province held the "Proliferation Release Ceremony on Fishery Resources in the Yellow Sea and Bohai Sea" in Laizhou Bay. 1915 billion fingerlings have been released, including 18 million fingerlings of jelly fish , 100 thousand fingerlings of *paralichthys olivaceus*, 250 thousand piece of blue crab and 800 thousand fingerlings of common shrimp. In 2006, more money will be spend on fishery proliferation in Shandong Province, and the species used for public release continue to increase. Accoding to estimate, the increase amount of all kinds of fingerlings can reach to 13 billion fingerlings this year in the whole province, and the total capital used in the Shandong Fishery Resources Restoration Plan will be 120 million RMB this year. In order to improve normative management of proliferation release and reach the goals of scientific proliferation, high efficient proliferation and equity proliferation, a series of measure have been taken to ensure efficient implementation of proliferation project in Shandong, including further perfect the management system of proliferation, establish all kinds of proliferation technology regulations for every species, and strengthen the management and protection to fingerlings after the release, etc.

Jiangsu Province: In Feb. 2006, in Lvsi Fishing Ground at latitude 32°08'312" north and longitude 121º39'076" east, the 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 is the second jellyfish proliferation release made by the Fishery Headquarter in Lvsi Fishing Ground since last May. Successful implementation of jellyfish proliferation release can effectively restore the coastal jellyfish resource, therefore bring a hope of harvest to many fishermen.

4.2.4.8 Fishery Environment Protection

To protect the ecological environment of fishing grounds, the Water Quality Standards of Fishing Grounds have been drawn up by the Chinese government and the 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 sequence of measures have 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 multilevel setup for the protection of the fisheries environment has been established by the state and coastal management authorities, including some monitoring stations at and above the provincial level around the country and a number of marine life protected areas in major fishing grounds.

4.2.5 Ownership of sea space in China

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

The Chinese Constitution explicitly provides that mineral resources, water, forests, mountains, grassland, unreclaimed land, beaches and other natural resources are owned by the State, that is, by the whole people, with the exception of the forests, mountains, grassland, unreclaimed 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) reconfirmed the state ownership of sea spaces and the State Council exercises the ownership on behalf of the state. The Law requires the competent ocean departments of the State Council to prepare national marine functional zonation scheme in consultation with other concerned departments of the State Council and coastal provincial and municipalities governments. The Ocean Administrations above county level prepare local marine functional zonation scheme. And the coastal land use planning, urban planning, port planning and sectoral development planning, such as that of aquaculture, salt-making and marine tourism should be consistent with the scheme. The sea users

should get the registered rights by making Sea Use Assessment and apply to Oceanic Administration for permit. In addition, sea area use right may be obtained through bidding and auction. Sea users, except that in special lines should pay a fee to the state treasures. The Law on the Use of Sea Areas promotes the rational utilization of China's sea by bring them under one umbrella with an integrated management approach and thus establishes a fundamental system in the use and environmental protection of China's sea.

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 on marine environmental protection and actively takes part in global and regional marine environmental protection affairs, which include joining relevant international organizations, signing, acceding to and implementing relevant international conventions and treaties. China's international obligations prevail in case that national legislation differs from them. Following is a list of international treaties 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

The efforts of 1958 and 1960 UN conferences on the legal regimes for the territorial sea and the contiguous zone, fishing and high sea living resource conservation, and the continental shelf led to the negotiation for a new convention that would deal with all aspects of 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 Dec. 10, 1982. The Convention came into effect on Nov. 16, 1994. Under the 1982 UNCLOS Convention (Art. 192), a basic obligation of a coastal nation is to protect and preserve the marine environment. The Convention adopts a basic principle of international law that 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.15, 1996, China became a party to the 1982 UNCLOS Convention. And the Convention was affective in China on Jul. 7, 1996.

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

Chinese government deposited the instrument of accession on January

30, 1980. At the same time Chinese government stated that Taiwan's signature and accession to this convention is illegal and invalid for its usurping the name of China.

This convention came into force in China on April 30,1980.

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

China acceded to it on September 27,1986.

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

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

Chinese government deposited the instrument of accession on February 23,1990

This convention came into force in China on May 24,1990.

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

Chinese government deposited the instrument of accession to it on February 23, 1998.

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

4.3.1.6 International Convention on Oil Pollution Preparedness, Response and Cooperation, London,1990

Chinese government deposited the instrument of accession to it on March 30,1998.

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

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

Chinese government deposited the instrument of accession to it on November 14,1985.

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

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 20,1994.

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 20,1994.

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 20,1994.

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

The Protocol was adopted on November 7,1996, but not effective yet.

This protocol has been signed by Chinese representative, but not ratified by Chinese government.

4.3.1.12 Protocol of 1978 Relating to the International Convention for the

Prevention of Pollution from Ships, London, 1978

China government deposited instrument of accession to the protocol on July 1,1987. The appendix 1 of "MARPOL 73/78" came into force on October 10,1983 and the appendix 2 came into force on April 6,1987 in China. China acceded to the appendix 5 "MARPOL 73/78" on September 21,1988, which came into force in China on January 1, 1989.

4.3.1.13 Agreement for the Implementation of the Provision of the United Nation 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 6, 1996. At the same time, Chinese delivered an understanding memorandum 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 8,1988.

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

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

Chinese government ratified the Treaty on October 31,1990, and deposited the instrument of accession on February 28.

This convention came into force in China on February 28.

4.3.1.16 Basal Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Basal, 1989

China signed the Basal Convention on March, 22, 1990, and ratified it on September 4,1991. China acknowledged the secretariat of this convention that the organ in charge of this convention in China is The State Environment Protection Administration.

This convention came into force in China on August 20,1992.

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

The Chinese representative signed the Amendment, but Chinese government hasn’t ratified this amendment.

4.3.1.18 Convention on Biological Diversity, Rio de Janeiro, 1992

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

This convention came into force in China on December 29,1993.

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

China acceded to the Convention on January 3,1992.

This convention came into force in China on July 31,1992.

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

Chinese government deposited the instrument of accession on January 8,1981.

This convention came into force in China on April 8,1981.

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

Chinese government deposited the instrument of acceptance on July 7,1988.

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

This amendment became effective to China as of January 1, 2000

4.3.1.23 Cartagena Protocol on Biosafety to the Convention on Biological Diversity

China signed this protocol on August 8,2000.

China government deposited the instruments of ratification on June 8,2005

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 29,2004

4.3.1.25 Stockholm Convention on Persistent Organic Pollutants

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

China government deposited the instruments of ratification on August 13, 2004

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

China government deposited the instruments of accession on January 5, 1999

This protocol become effective to China as of January 5,2000

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

This amendment was adopted by acquiescence on January 7,1986, and become effective to China as of January 7, 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

China government deposited the instruments of accession on January 5, 1999.

This protocol become effective to China as of January 5,2000

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

China government deposited the instruments of accession on July 7,1988. This amendment has not become effective yet.

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)

China government deposited the instruments of ratification on July 7,1988. This amendment has not become effective yet.

4.3.1.31 The Agreement on Cooperation in Environment between the Government of People's Republic of China and the Government of the Republic of Korea was signed on October 8, 1993.

4.3.1.32 The 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 4,2002）
- Plan of Implementation of the World Summit on Sustainable Development （passed on September 4,2002）
- Monterrey Consensus（passed on March 4,2002）
- Global Programme of Action for the Protection of the Marine Environment from Land-based Activities （passed on November 3,1995）
- The Montreal Declaration on the Protection of the Marine Environment from Land-based Activities（passed on November 30,2001）
- Code of Conduct for Responsible Fisheries（passed on October 31,1995）
- International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing（passed on 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 always conscientiously fulfills its duties and contributes its share to international marine environment protection. Several laws of China 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, Article 40 of the Wild Animal Protection Law* provide that if an international treaty regarding environment and wild animal protection concluded or acceded to by the People's Republic of China contains provisions differing from those contained in the laws , the provisions of the

international treaty shall apply, unless the provisions are those to which the People's Republic of China has announced reservations. Article *23 of the Fisheries Law* provides that any person engaging in fishery operation in the sea areas under the jurisdiction of other countries, related international conventions, bilateral agreements and laws should be observed. 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 almost designated a competent department for each convention (See following list). China has put the issue of rational utilization and protection of marine resources and the marine environment into the overall, cross-century plans for national economic and social development, and has adopted the sustainable development of marine programs as a basic strategy.

China government has always supported and actively participated in various forms of marine-related activities promoted by the United Nations. China has joined nearly 20 international organizations, including the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC), Scientific Committee on Oceanic Research (SCOR), Commission on Maritime Meteorology (CMM), International Maritime Organization (IMO), UN Food and Agriculture Organization (FAO), North Pacific Marine Science Organization (PICES), and Pacific Conference on Science and Technology (PACON).

China has also taken part in global oceanographic activities, including the GSMMP (global studies and monitoring of marine pollution), the TOGA (tropical ocean and global atmospheric project), the WOCE (world ocean circulation experiment), the JGOFS (joint global ocean flux study), the LOICE (land-ocean interaction in the coastal zone), and the GLOBEC (global ocean ecosystem dynamics), making positive efforts to promote worldwide oceanographic cooperation. China joined the Working Group on Marine Resources Conservation of the Asia-Pacific Economic Conference and other regional organizations, as well as the Global Ocean Observation System (GOOS) initiated by the UNESCO/IOC and other international organizations, and helped to initiate and organize the Northeast Asia Ocean Observation System. China has engaged in extensive scientific cooperation in marine projects with dozens of countries, including the United States, Germany, France, Canada, Spain, Russia, the DPRK, the ROK and Japan, and resulted in fruitful achievements.

China has made strenuous efforts to foster cooperation in marine living resources protection on the principles of equality and mutual benefit. As to the Yellow Sea China has entered into a fishery agreement with P.R 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* and the *Agreement on the Conservation of Migratory Birds and Its Habitat between the People's*

Republic of China and Australia.

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 delimitation, environmental control, marine scientific research, economic and commercial activities, transfer of technology and the settlement of disputes relating to ocean matters, it is a constitutional document in maritime affairs.

Requirements of the *United Nations Convention on the Law of the Sea* 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 gives basic obligations to prevent, reduce and control 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 (articles 207 - 212). ● The *LOS Convention* 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.	● China ratified the Law of the Sea in 1996. In order to implement the convention, China enacted the *Law on Exclusive Economic Zone and Continental Shelf* in1998. 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 have the freedom of navigation and overflight in the exclusive economic zone of China. ● China has acceded to more than 40 international conventions and signed a series of bilateral agreements. ● China amended the *Marine Environment Protection Law* in 1999, The amended *Marine Environmental Protection Law*

● In the management of living resources, the coastal State is to determine allowable catches and promote optimal use of the resource. ● The terms "as qualified by relevant environmental and economic factors" appearing in Article 61(3) provide 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 such that they can produce harvests at maximum sustainable yield levels. ● The Convention, in Article 61(4), encourages attention to incidental bycatch concerns by calling for consideration of associated or dependent species so that their reproduction is not seriously threatened.	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 of conducting total pollution discharge control system and oil spill emergence response plan have been added into the Law and the articles on legal responsibilities have been improved. ● China amended the *Fisheries Law,* which extends that the licensing system covers fishing activities conducted in China's EXCLUSIVE ECONOMIC ZONE and joint fishing zones under China's bilateral fisheries agreement are also subject to the licensing system. It adds two new requirements to the licensing system. One is to require that fishing be conducted in conformity with the fishing quota specified in the license. The other is to require large and medium-sized fishing vessels to fill logbook. 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 Convention aims to prevent marine pollution but focuses on controlling the dumping at sea of wastes generated on land.

Requirements of 1972 London Convention	Performance of China
● The Convention includes a list of substances for which dumping is prohibited (Annex I) and other lists for which dumping may be authorized by permit. These are Annex II lists, i.e., substances that need a special permit before they can be dumped at sea and the Annex III list of substances that require a general permit before they can be dumped at sea. ● The 96 Protocol significantly changes the 1*972 London 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 I. 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 London Convention for those countries	● Chinese government deposited the instrument of accession to the Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter on November 14,1985. This Convention came into force in China on December 15,1985. ● The State Oceanic Administration is responsible for the implementation of this Convention. ● The State Council issued the *Management Regulation on Dumping of Waste at Sea*. ● The *Amended Marine Environment Protection Law* incorporated 7 articles in this chapter. Besides a series of rules have been issued in this aspect. China has carried out a series of measures such as the (1)wastes classification; (2) classification of dumping areas;(3) permission of dumping; (4) verification of loading wastes; (5) supervision and examination; (6) record and report of dumping activities. ● In order to harmonize China's measures with the requirements of the 1996 Protocol, the Chinese government is considering revising the *Management Regulation on Dumping of Waste at Sea.* ● So far, China has designated about 40 dumping areas for dredged materials of the third category and four areas for midair oil discharge.

that have agreed to become contracting parties. The *1972 Landon Convention* requires Contracting Parties take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the 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.	Thousands of dumping permits have been issued and the monitoring of the environmental quality of dumping areas is enhanced. Besides, it 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. ● The North China Sea Branch of State Oceanic Administration People's Republic of China is responsible for the administration on sea dumping of three provinces and one city in North China Sea area, supervises and administers the wastes dumping activities in this area in the light of its function endowed by the law and according to the provision of the law. Under the administration, some enterprises and individuals who offended the regulations were investigated and punished severely. Then some peccancies such as dumping without admission, dumping not in designated area and conditions etc. were controlled efficiently. 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 and amongst them 6 temporary sea dumping areas are under declaring of formal sea dumping areas. During the 2000-2004, the North China Sea Branch authorized 484 copies of sea dumping license and the 1.8940 $\times 10^8$ 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 was subsequently modified by the Protocol 1978 relating thereto, which was adopted in 1978. This Convention is the most important global treaty for the prevention of pollution from the operation of ships; The 1978 MARPOL Protocol absorbed the 1973 MARPOL Convention and the combined instrument is referred to as the International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and it entered into force on 2 October 1983.

Requirements of MARPOL73/78	Performance of China
● The convention requires states to provide reception facilities for the disposal of oily waste and chemicals. It covers all the technical aspects of pollution from ships, except the disposal of waste into the sea by dumping, and applies to ships of all types. The Convention includes regulations aimed at preventing and	● Chinese government deposited instrument of accession to the Protocol on July 1,1987. The Annex I of "MARPOL 73/78" came into force on October 10,1983 and the Annex II came into force on April 6,1987 in China. China acceded to the Annex V on September 21,1988, which came into force in China on January 1, 1989. ● China has adopted a series of laws, regulations and rules in the control of marine pollution from ships, and some legal approaches have been adopted in this aspect for example: (1) Installation of anti-pollution equipment (2) Preparation of Anti-pollution documents (3) Control of waste water discharge. (4) Control the discharge of radioactive substances from nuclear powered vessels and vessels carrying such substances. (5) Ballast water treatment. (6)Garbage treatment. (7)Loads Restriction (8) Vessel pollution accidents treatment. ● At present, oil-water separators have been installed on board of all ships, and oil-polluted water treatment equipment, including emergency treatment equipment, has been installed at all sea-ports, which can treat tens millions tons of oil-polluted water from vessels and recover 1million-some tons of waste oil a year. ● In 1983 April, China promulgated the national standard *Standard of Shipping Pollutant Discharge* , including standards of shipping sewage with oil discharge (oil tanker ballast water, cabin washing water and cabin bottom sewage), shipping life sewage discharge and

minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. ● It established the requirements in the design and equipment of ships; ● It establishes system of certificates and inspections; ● Annex I (Oil) Annex II (Noxious Liquid Substances) Annex III (Harmful Substances in Packaged Form/ Freight Containers/ Portable Tanks) Annex IV (Sewage) Annex V (Garbage) Annex VI (on the	shipping waste discharge. These discharge standards are identical to the shipping discharge standards regulated in the international pollution prevention convention(MORPOL73/78). ● In 1997 September, the Ministry of Communication promulgated *The Regulation on Water Safety Supervise and Administrative Punishment* . ● In 1993, the Ministry of Communication promulgated *The Administrative Regulation for Environmental Protection of Communication Industry*. The regulation clearly prescribed the functions of institution and main executives of the ministry, maritime system, shipping check, all levels of local administration of communication department, enterprise institution of communication, general station of environmental surveillance, all levels of project and statistic department, all levels of administration of communication department. In addition, the regulation prescribed the prevention of new pollution, the control of the source of pollution, science research, design and education, encouragement and punishment. ● In 1990 June, the Ministry of Communication promulgated *The Administrative Regulation of Environmental Protection of Communication Construct item*, then *The Environmental Protection Design Criterion of Port* and *The Environmental Protection administration Criterion of Port.* ● In 1986, The Shipping Inspection Bureau of the Communication Ministry promulgated *The Pollution Prevention Criterion of Sea Ship Structure and Facility*. In 1982 December, the Communication Ministry promulgated *The Communication Ministry Environmental Surveillance Working Regulation* with the detailed rule of it. ● In the light of its situations, the maritime bureau of the government of China in every port carried out the national law, regulation and criterion above, and formulated nearly 100 items of administrative provisions and detailed rules. ● Port State Control Inspection is an import measure for prevention of marine pollution from ships. China adopted the Tokyo Memorandum of Understanding on Port State Control 1993, in April 1994 in Beijing. The MOU calls for Port State Control (PSC) which enables

Prevention of Air Pollution from Ships)	the control of foreign ships in port to ensure ships do not have structural or operational deficiencies before sailing. This jurisdication supercedes shipowners, classification socities, and even the ship's flag-state. Enables signatory countries to inspect ships in port to check compliance of ship safety and disposal of oil. In June 1998 in Korea, a listing of ships which have been detained due to deficiencies in their safe performance is made public to member countries on a monthly basis. ● China promulgated the amended *The Regulation of Shipping Safety Inspection （1997）* on 5th November 1997, which has been the most important national rule of steering PSC inspection in China. At present, there are 200 PSCO in China, and the examinants are trained in the fields of basic knowledge, knowledge renovation and professional knowledge every year. The excellent and advanced examinants were assigned to Tokyo Mou to take part in training such as Follow ship training and Advanced training regularly. By the end of 2003, the maritime administration institutions of 44 ports authorized by Maritime Safety Administration the People's Republic of China had developed PSC inspection. The PSC inspection of China have attracted extensive recognition of international shipping circle.

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.

Requirement of CBD	Performance of China
● It 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. to develop national	● China signed this convention in June, 1992 and ratified it on January 5, 1993, becoming one of the earliest countries to ratify the CBD. China signed *Cartagena Protocol on Biosafety to the Convention on Biological Diversity* on August 8,2000 and ratified it on June 8,2005. ● In order to harmonize and strengthen the implementation of the CBD, the Chinese Government established a National Coordination Committee, which was headed by the State Environmental Protection Administration and composed of 22 ministries

strategies for the conservation and sustainable use of biological diversity; 2. to integrate the conservation and sustainable use of bio-diversity in to sectoral and cross-sectoral programmes and policies; 3. to establish a monitoring and early-warning system to alert governments and the public with potential threats to biodiversity; 4. to identify activities likely to have a significant adverse impact on the conservation of bio-diversity; 5. to integrate considerations of the sustainable use and conservation of bio-diversity into national decision making; 6. to introduce the requirement of	and departments including Ministry of Foreign Affairs, State Development and ReformCommission, 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, and the working group established the Convention Implementation Office. The working group holds meeting every year to develop the annual work program and carry out series of activities in many forms. ● A series of policies, regulations and strategies have been established. For example, *The China Biodiversity Conservation Action Plan* determined the national target of "protecting the wild-species of particular importance for biodiversity". The *National Planning on Conservation of Wild Animal and Plant and Nature reserve Construction* states that, by 2030, 60% wild animals and plants under national protection maintain restored and increased populations; and by 2050, 85% wild animals and plants under national key protection. The *Outline on Action Plan of Conservation of Aquatic Biological Resources of China* states that gene bank and cell bank shall be established, and germplasm resources shall be conserved for the aquatic wild animals under national key protection such as Chinese sturgeon, Dabry's sturgeon, mullet etc. The *Planning of Medium and Long-term Development of Oceanic Science and*

environmental impact assessment to proposed projects likely to adversely effect bio-diversity; 7. to adopt economic, social and scientific measures necessary to ensure conservation of bio-diversity, including both *in-situ* conservation and *ex-situ* preservation.	*Technology* plans to establish the genetic resource gene bank for the important marine lives in sea area under Chinese jurisdiction and in the deep sea of ocean and carry out the relevant research of molecular biology. ● Both the *Wild Animal Conservation Law* and *Regulation on Protection of Wild Plants* encourage the *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 the specific relevant plan for implementing national targets. The *Marine Environment Protection law* has a Chapter, "Marine Ecosystem Protection" requires the construction of marine nature reserves and control of invasive alien species.

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, not one species protected by CITES has become extinct as a result of trade since the Convention was implemented.

Requirement of CITES	Performance of China
● It requires the member states adopt domestic legislation to implement CITES at the national level. ● CITES works by subjecting international trade in specimens of species covered by the Convention to be authorized through a licensing system. The covered species fall into three categories:	● Chinese government deposited the instrument of accession to CITES on January 8,1981.This convention came into force in China on April 8,1981. ● 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 the CITES on behalf of Chinese Government, and is responsible for the management work of the import and export of wild animals and plants of China. It examines and approves the import and export permit for wild animals, plants and their parts or products.

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 has asked other CITES Parties for assistance in controlling the trade. ● Each Party to the Convention must designate one or more Management Authorities in charge of administering the licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.	● Customs transact the import and export procedures and are responsible for the treatment of smuggling and illegal behavior of import and export of wild animals and plants. ● Management Office of Import and Export of Endangered Species established 17 offices and three inspection stations in major domestic port cities. Chinese Academy of Sciences established Scientific Commission of Endangered Species, which served as a scientific consulting institution for import and export management. ● The international trade of wild animals and plants are under the management of *Wild Animal Conservation Law*, *Forest Law and 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). ● The competent authorities involved are State Forestry Administration and Ministry of Agriculture, State Fishery Administration, Ministry of Commerce and General Customs Administration. ● Since the *Administrative Licensing Law* became effective on July 1, 2004, the legislative structure for nation's executing CITES shall be perfected further by the enactment of the *Regulation on Management of Import and Export of Endangered Wild Animals and Plants.*

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 intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Requirements of the Ramsar Convention	**Performance of China**
● The *Convention* requires its	● China acceded to this convention on January 3,1992 and brought it into force on July

contracting party designate suitable wetlands within its territory for inclusion in a “List of Wetlands of International Importance”. ● The Contracting Parties should designate at least one wetland to be included in the List and should formulate and implement their planning so as to promote the conservation of the wetlands included in the List. ● The Convention promotes contracting parties to consult with others about the implementation of obligations arising out of the Convention, particularly those regarding transboundary wetlands, international watercourses, and conservation of wetlands species.	31,1992. China has established work institutions for its implementation. The State Forestry Administration is responsible for the organizing and coordinating work in the mplementation of Convention; Ministry of Agriculture, Ministry of Water Resources, Ministry of Land and Resources, SEPA and State Oceanic Administration are responsible for the works within their respective responsibilities. Local governments establish management institutions corresponding to the central government and are responsible for the specific work of protection and management of the local wetlands under the operational guides of various competent authorities of central government. ● Chinese government has taken a series of actions to implement the Wet Land Convention. a) The State Forestry Administration together with other 16 ministries/committees promulgated the *National Wetland Conservation Action Plan for China,* which put forward guiding principles and action programme for wetland conservation. b) The *National Programme for Conservation of wild Fauna and Flora and Improvement of Nature Reserves for China* has been launched to identify the priority area of wetland conservation and its development emphasis; c) The State Forestry Administration, which was appointed by State Council as a focal agency, in cooperation with other 10 sectors has completed the National Programme of Wetland Conservation Planning for China. This indicates that Chinese government has determined to conserve and restore ecological system of wetland through engineering measures. d) The six-year national inventory on wetland resources has been completed, which will provide systemic base for decision making in the field of scientific and rational conservation and wise use of wetlands.

	e) Construction and management of wetland nature reserves has been strengthened, and by June 2002, total of 353 wetland nature reserves have been established with an area of protected natural wetland of 16 million ha. Total of 33 nationally protected waterfowl species have been put into secure protection in these reserves. f) International cooperation has been strengthened. So far 30 wetland sites have been designated as the wetlands of international importance with an area of 3.46 million ha. A number of international cooperation projects are under successful implementation. Seventhly, a large-scale and nation-wide campaign of education and publicity on conservation of wetland and waterbirds has been undertaken, that leads to improved social awareness on wetland awareness. ● Following is the wetland in the "List of Wetlands of International Importance" along the coast area of the Yellow Sea: 1. Shanghai Chongming Dongtan Natural Protection Area is in the eastern part of Chongming island which is a low level alluvial island, Chongming Dongtan. Under the alluvial action of mud and sand of Yangtze River, the Chongming Dongtan formed abroad fresh water and brackish wetland, tide channel and shoal of littoral zone, and there are many croplands, fish cultured ponds, crab cultured ponds and bulrush ponds in which there were exuberant fenny vegetation and abundant benthic animal, so in the area of Pacific and Asia, it is the best stopover in spring and autumn and important wintering region of migratory birds. 2. Dafeng Elk Natural Protection Area is a typical Yellow Sea Shoal with abundant biodiversity, so it has significant ecologic, social and economic values. 3. Jiangsu Yancheng Protection Area is in the

	western coast of Pacific and Jianghuai plain, which has 582 km coastal line, and expansive silty tide shoal formed the largest shoal wetland in the coastal area of China, which bred lots of organism, ensured the migration of millions of birds and met the wintering safety of endangered species such as red-crown crane etc.

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) aimes at providing a global framework for international co-operation in combating major incidents or threats of marine pollution.

Requirement of the *OPRC 1990*	Performance of China
● Parties to the OPRC convention 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 also required to have oil pollution emergency plans or similar	● China acceded to OPRC on March 3, 1998, and brought it into force on June 30,1998 ● According to the revised *Marine Environmental Protection Law*, 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 the contingency plans to deal with nation-wide major vessel oil spill accidents on the sea and report to the State Environmental Protection Administration for record. ● The State. 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 record(Article 18). ● Vessels must be equipped with appropriate anti-pollution equipment; and damage to the marine ecological system may result in an order to make restoration and a fine of RMB 10,000 (US$ 1,215) to RMB 100,000 (US$12,150) (Article 69 and 76);

arrangements which must be co-ordinated with national systems for responding promptly and effectively to oil pollution incidents. ● Ships are required to report incidents of pollution to coastal authorities and the convention details the 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 and provision is made for the reimbursement of any assistance provided. ● The contracted parties are	● In 1995, Maritime Safety Administration the People's Republic of China required the *Shipping Oil Pollution Emergency Reaction Plan* of shipping in order to carry out the provisions of MARPOL73／78 convention and supervised it in efficient conditions. In addition, in the ports of Dalian, Tianjin, Shanghai, Ningbo, Xiamen and Guangzhou, the Communication Ministry developed research, made "6 ports oil spillover emergency reaction plan" and equipped a set of pollution cleared facility by use of the funs and loans of environmental funds trying out periods(1992-1994) of the World Bank. The achievement was checked and accepted in 1995. ● In 1996, the Communication Ministry invested more than 5.8×10^7 RMB to construct *Northern Sea Region Shipping Oil Spillover Prevention Demonstration Engineer* in Yantai, which is the realization of the fourth article of OPRCl990 in practice. This engineer had been checked and accepted by the end of 2001, which can react the oil spillover emergency in Chengshantou channel, Laotieshan channel and Changshan channel etc.. In addition, the engineer also provided oil spillover emergency inspection, satellite photography disposal, oil spillover emergency information disposal, oil spillover clearing facility and emergency reaction training etc.. In 2001, the Communication Ministry invested 10×10^7 RMB to establish special oil spillover emergency center in Qinghuangdao, which will tackle the problem of oil spillover emergency resource store and emergency information support then make the oil spillover emergency plan in the special water area. ● In the bases of actualization of the *Shipping Oil Pollution Emergency Reaction Plan* and compiling of *Northern Sea Region Shipping Oil Spillover Emergency Reaction Plan*, Maritime Safety Administration the People's Republic of China finished the compiling of *Sea Shipping Oil Spillover Emergency Reaction Plan* and shipping oil spillover emergency plan in every sea region in February 2000, which were issued by

required to develop detailed plans for dealing with pollution incidents, the establishment contingency plan for oil pollution and the establishment of stockpiles of oil spill combating equipment and the holding of oil spill combating exercises.	Communication Ministry with coalition of State Environmental Protection Administration of China and went into effect on 1st April 2000 synchronous with the effective date of amended *Marine Environmental Protection Law* . In addition, the *Port Pollution Emergency Plan* was made in Shanghai and Shenzhen, which was supported by the local government vigorously and fostered the practice of oil spillover emergency plan in the whole country. On June 2000, Maritime Safety Administration the People's Republic of China held the salvation and oil spillover emergency reaction manoeuvre in Guangdaong, Hongkong and Macao, which got great success and provided oil spillover emergency reaction the valuable experiences in the future. ● Presently, China has established relative perfect sea shipping oil spillover emergency system, including sea shipping oil spillover emergency of China, sea oil spillover and port pollution emergency plan, shipping pollution emergency plan, oil port and facility pollution emergency plan. The establishment of sea shipping oil spillover emergency system and implementation of pollution emergency plan improved the emergency reaction ability against sea shipping oil spillover accident and alleviated the marine environmental pollution and damage by paroxysmal shipping pollution accident. ● In the early morning of 14th November 2000, a Chinese oil ship "Dehang 298" crashed with Norway ship "Bowcecil" and sank. "Dehang 298" loaded 200 tons of heavy diesel oil, part of the oil spilled and polluted sea area. Then Maritime Safety Administration of Guangdong promptly started up *South Sea Area Oil Spillover Emergency Plan*, Maritime Safety Administration of Shenzhen and Guangzhou organized the preparation of pollution clearing facility, setup oil enclosure hurdle at scene, calling out 38 salvation ships and pollution clearing ships to get the oil spillover under control in that afternoon. This emergency reaction reclaimed more than 40 tons of polluted oil, more than 30 tons of moisten

	oil and prevented the continuous spilling effectively. The sunk ship was salved on 20th November and the spilled oil was purged effectively. The practice of emergency plan of sea area shipping oil spillover is successful and efficient. ● At the same time of strengthening national legislation of oil spillover emergency and improving system of oil spillover emergency, China intensified the international coalition in Northern and Western Pacific area and associated with Japan, Russia and South Korea to make *Environmental Protection Action Plan of Northern and Western Pacific area*. In order to strengthen the environmental protection in Yellow sea area, China intensify the association with neighbor country, the bilateral agreement was under discussion, which will exert active function in protection of Yellow sea area.

4.3.2.8. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)

The Convention was crafted to maintain flexibility for safe transboundary movements of waste among nations with existing environmental protection programs, and to prevent the shipment of waste 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 waste 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.

Requiremet of the Basel Convention	Performance of China
● It adopts obligations of prenotificati on to and approal by, importing as well as transit	● China signed the Basel Convention on March 22, 1990, ratified it on September 4, 1991, and brought it into force on May 20, 1992. ● The Competent Implementation Department of China is the State Environmental Protection Administration. ● A series of laws and regulations are related to this convention. The *Law on Prevention of Environmental Pollution Caused by Solid Waste provides that* (Article 58), transit of dangerous waste passing through the territory is forbidden. The

countries, and defines the information required in prenotification 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	*Marine Environment Protection Law* and *Regulations on the Control over Dumping of Wastes into the Sea Waters* established a procedure under which prior informed consent is required before wastes may be dumped in the seas 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 that involves the Maritime Traffic Safety Authorities, with the aim of safeguarding, *inter alia*, the environment and human health. The competent authority in this connection, the State Oceanic Administration receives the applications for dumping operations and 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 finished the dumping operation. ● 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 ships, 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 Administrations of the arriving port for approval. (b)The owner or the 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 organs concerned 24 hours before its arrival at the port (before exiting the previous port if the voyage takes less than 24 hours). (c) Upon entry into ports, the ship, the crew and the passengers, cargoes and other goods are subject to an inspection carried out by the Maritime Traffic Safety Department of China, China's Customs General Administration, Border Checking Departments of Health Quarantine Departments of China and China's Quarantine Departments of Animal and Plant. (d) If owner or agent of the ship has completed the formalities for entering the port, the people concerned can leave the ship and cargoes can be loaded on or off the ship as soon as it arrives at the port. However, if the formalities have not been completed before

	entry into the port, nobody 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 the China. (e) In addition, the ship owner or the agent must complete exit formalities within 4 hours before the ship exits the port. The relevant inspection organs confirm that the formalities have been met by signing the "*Ship Exiting Formalities Certificate*", and 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. ● *Regulations Governing Supervision and Control of Foreign Vessels* [1] provided that (a) the master or owner of a vessel must, a week prior to its expected arrival at the port, submit the required forms to the Maritime Traffic Safety Administration through the vessel's port agent for completion of entry formalities, and must report, 24 hours in advance of her arrival (or on her departure from the last port of call if the voyage takes less than 24 hours), the vessel's ETA, fore and aft drafts on arrival to the Maritime Traffic Safety Administration through the port agent. The Maritime Traffic Safety Superintendent Department of the port gives approval for entry into the port. (b)Vessels carrying grade I highly hazardous cargoes must, three days prior to the estimate time of arrival, apply to the Maritime Traffic Safety Administration through their port agent for endorsement, with the descriptive names, properties, packing, quantity, place of stowage stated in detail and a booklet of Description of Dangerous Materials attached. The vessel must not enter the port, discharge the cargoes or make transit unless 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. ● A number of illegal trans-boundary movements of hazardous wastes and other wastes were discovered by the customs administrations and environmental protection bureaus in the coastal regions in recent years. Those cases were reported to the Secretariat of the Basel Convention. The wastes involved in those cases were mostly returned to the exporting countries. The wastes which did not return were properly

[1] 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.

	disposed according to the requirements of the Basel Convention and Chinese law.

4.3.2.9. Stockholm Convention on Persistent Organic Pollutions (POPs)

To protect environment and public health, the Chinese Government actively participated in the negotiations and the formulation of the Stockholm Convention on POPs and signed on May 23, 2001. In fact, China was among the first signatory parties. In June 2004, the National People's Congress of China ratified the convention.

Requirements	Performance of China
● The Stockholm POPs Convention requires all Parties to stop production and new uses of intentionally produced POPs, with limited country-specific and general exceptions. ● All new manufacture of PCBs is banned, and Parties are to 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 is also required to implement rigorous controls on sources of POP byproducts to reduce releases. The Treaty also includes requirements for safe handling and disposal of POPs in an environmentally sound manner. ● The Treaty also includes	● Before accession to the Convention, China has carried out a lot of work for preventing POPs pollution. For instance, the State Environmental Protection Administration began to conduct survey of production, distribution, use, import and export, stockpile, obsolete waste and emission of pesticidal POPs in 1999. Currently, the investigation is being completed, which will be conductive to the prevention work. ● The development of the *National Implementation Plan (NIP)* is a prevention measure. ● A series of strategic research are being carried out to mobilize all social power for the prevention of POPs. ● Moreover, substantial work has been done in terms of international cooperation on POPs control and reduction. On May 2003, GEF council approved 11million USD full-size project with 60 percent of co-financing from Italy, Canada etc, assisting China to develop the National Implementation Programme and building her capacity to implement the Stockholm Convention on POPs. More importantly, GEF has approved PDF-B grants for preparation of two demonstration projects on PCB management and disposal, and alternatives to Chlordane/Mirex in termite control, which are supposed to be in parallel to NIP formulation. They have been designed to mobilize 20 million USD

provisions restricting trade of POPs for which uses or production continue to exist and bans all export of POPs, except for environmentally sound management once there are no longer any uses allowed. ● In addition, a strong financial and technical assistance provision in the agreement will provide support to developing countries and countries in economic transition to assist them in implementing the obligations under the Treaty. ● Finally, the Treaty includes a science-based procedure to allow for the addition of other chemicals to the agreement.	from GEF, bilateral/multilateral resources, government fund as well as private sector in particular. Besides these two projects, China is going to launch more demonstration activities on some other areas, such as alternatives to DDT, management and disposal of hazardous waste and medical waste, as well as disposal of pesticidal stockpile/wastes. ● Through the convention negotiation and the development and implementation of projects under the POPs Convention, a domestic technical supporting network has been established, whose members come from organizations of environmental protection, agriculture, public health, construction, as well as related industrial sectors, association, institutes and plants. These experts in POPs production, distribution, use, alternatives, research and development and environmental protection policies have provided great support on 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 that has been 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.

Requirement of the CLC	Performance of China
● It requirement is that the ship owner is strictly liable	● China deposited the instrument of accession on January 30,1980, and brought it into force on April 30,1980. China is also a member of its Protocol

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; ● 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 fault. ● The contracted states should guarantee that ships going in or out their ports equip	developed in 1992 and its amendment in 2000. ● All the laws on pollution control and natural resources protection have provisions on liability and compensation, of which civil liabilities include eliminating dangerous or harmful conditions, restoring original situation, and monetary compensation; administrative liabilities, such as warning notice, fine, suspending operation, and closing down. For example: ● 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 that: "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. If a party refuses to accept the decision on the settlement, it may bring a suit before a people's court. The party may also directly bring a suit before the people's court. (Article 41)" ● The *Marine Environment Protection Law* specifies that: "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,

relevant insurance and financial certificates	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." ● About the insurance of vessels, the *Marine Environmental Protection Law* stipulates that: The State should establish and put into practice responsibility system of civil liability compensation for vessel-induced oil pollution, and establish vessel-induced oil pollution insurance, oil pollution compensation fund system 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 0n Prevention of Pollution of Sea Areas by Ships provides that the *CLC convention* is applicable to ships sailing in international lines and oil tankers with a gross tonnage of 2000 tons or more(Article 13). And the *Maritime Traffic Safety Law* under revision will establish a mandatory ship insurance system in China. ● More than 200 million tons of oil are transported each year in China. The Shanghai Maritime University reports that between 1973 and 2000, there were 29 serious accidents involving oil tanker spills. Seven involved foreign tankers, which paid an average of 8.3 million yuan (US$998,000) in compensation. However, of the 22 spills involving Chinese tankers, payment was made in just nine cases. Each paid an average of only 1.5 million yuan (US$184,000)

4.3.2.11 The International Convention for the Regulation of Whaling

China acceded to the International Convention for the Regulation of

Whaling in 1980 and banned commercial whaling in 1986.

All species of whales are listed in the *Directory of Protected Wild Animal of China. China stpped whaling in the early 1980s.*

4.3.2.12. 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 the major legal documents concluded, including *Rio Declaration on Environment and Development* and *Agenda 21*. China has actively engaged to implement Rio Declaration and Agenda 21 since the Rio Summit. A number of important new policies, plans and laws were made for carrying out the Rio principles and Agenda 21 after the Earth Summit. The major developments and progress made since 1992 are the following:

1) Chinese Government adopted the *Te*n *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 Chinas Population, Environment and Development in the 21st Century (China's Agenda 21)* on 25 Feb. 1994, which is a far-reaching comprehensive and operational strategic plan. According to *China's Agenda 21*, the strategy of sustainable development of China consists of three integrated parts - sustainable economy, sustainable society and sustainable environment and natural resources. The Agenda states that the China's sustainable development is based on the sustainability of natural resources and ecological environment. It calls for to protect the life supporting capacity of the nature and solving the major ecological problems. It 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 increase international cooperation in the fields of greenhouse gas control, save 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 China's marine programs.

(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

4.3.2.13 Code of Conduct for Responsible Fisheries

China has already incorporated the requirements of the Code into it's domestic laws, regulations and policies.

4.3.2.14 Agreement on Fisheries between the government and the government of the Republic of Korea (Sino-Korea Fishery Agreement)

China and Republic of Korea are situated on opposite side of the Yellow Sea. They share the fisheries resources of the Yellow Sea. Because the depletion of fish stocks aggravated the competition for resources, which calls for effective measures to ensure the long term utilization of the 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 fishery management regime based on the International Convention on the Law of the Sea framework, and promoted cooperative exploitation and conservation of the shared fisheries in the Yellow Sea..

According to the Agreement, a Joint Fishery Committee consisting of on representative and several members appointed by each party, and a scientific committee was formed. A PROVISIONAL MEASURES ZONE was established in the middle of the Yellow Sea as a joint fishing zone, and the current fishing pattern zone is free to fish by both parties. Two Transitional Zones situated on the eastern and western sides of the PROVISONAL MEASURES ZONE, and was converted to EXCLUSIVE ECONOMIC ZONE management Zone in 2005.

In June 1999, The Ministry of Agriculture of China adopted the *Provisional Regulation on Foreigners and Foreign Vessels in the Jurisdictional Waters of PRC* aiming at regulating foreign fishing in China's EXCLUSIVE ECONOMIC ZONE. It set forth a range of rules to regulate fishing operations, and surveys on marine living resources, and fisheries-related activities conducted by foreigners and foreign vessel 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, and it set down standard procedures for Chinese enforcement authorities to follow when dealing with fisheries violations by foreigners or foreign vessels.

In order to enhance the EXCLUSIVE ECONOMIC ZONE enforcement, the Bureau of Fisheries Management of China issued the *Management Measures on EXCLUSIVE ECONOMIC ZONE Fisheries Surveillance Patrolling*, setting out the surveillance patrol, the duties of fisheries authorities, and the requirements on vessels that are 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 *Provisional Measures on the Management of the PROVISONAL MEASURES ZONE and TRANSITIONAL ZONEs of the Sino-Korean Fisheries Agreement.* The Bureau of Fisheries Management of the Yellow And Bohai Sea is the competent authority to take charge of the China-Korea PROVISONAL MEASURES ZONE and TRANSITIONAL ZONEs. It also laid down detailed regulations on the application of fishing permits, requirements on logbooks, vessels markings, and templates for required forms.

From the 2001 to 2005, the Bureau of Fisheries Management of China issued about 9171 permits to Chinese fishing vessels to fish in the TRANSITIONAL ZONE of Korea side, and got a total harvest of 103000ton, and issued 6000 permits for Korean vessels to fish in the TRANSITIONAL ZONE of Chinese Side.

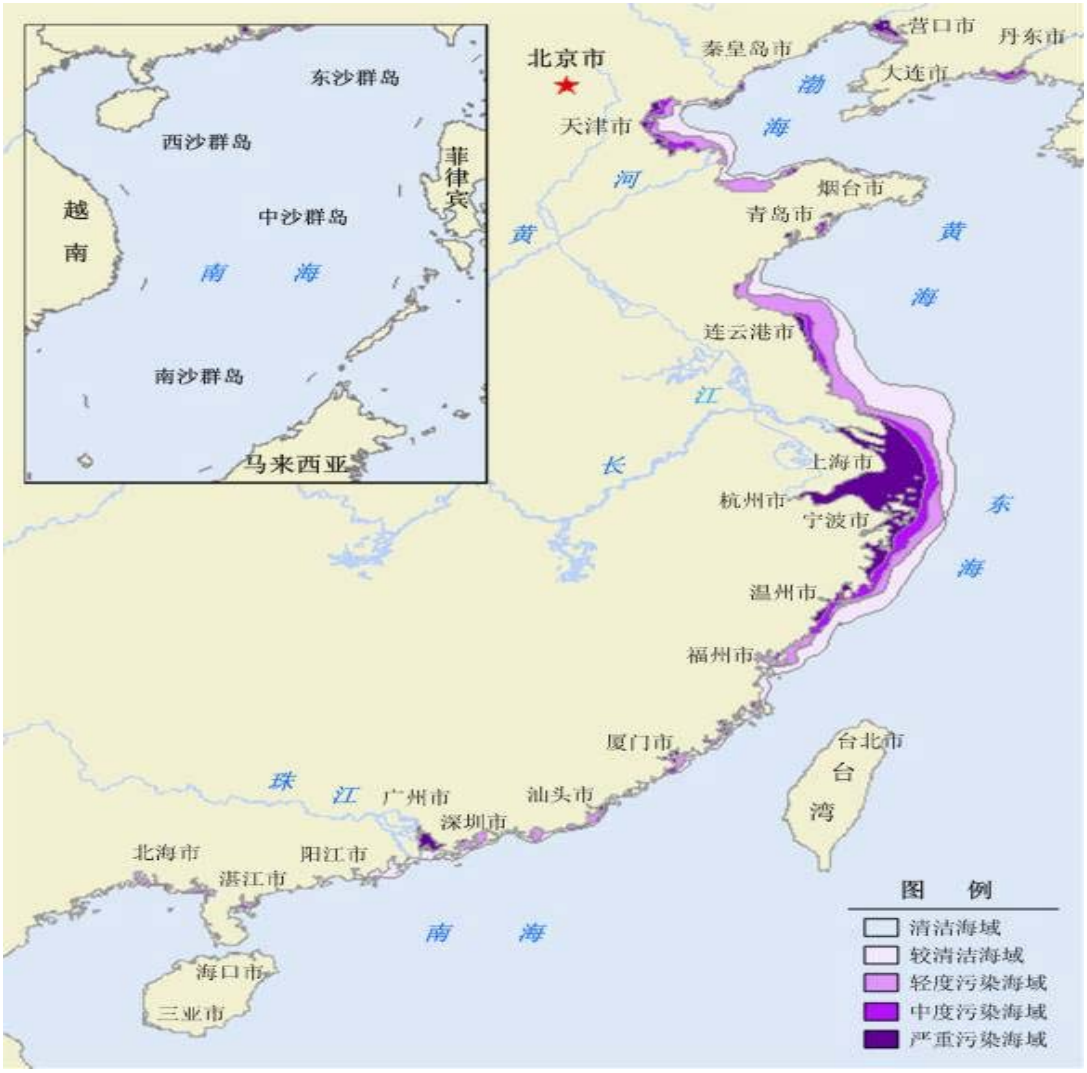
Chapter Five Synthesis analysis

China has officially attached great importance to the marine development and protection, and enacted more than 20 laws and a range of regulations and rules. Almost every of the international conventions to which China is a contracted party has an implementing department and detailed domestic implementing provisions in China. But the practice of marine environment protection in China is still unsatisfactory.

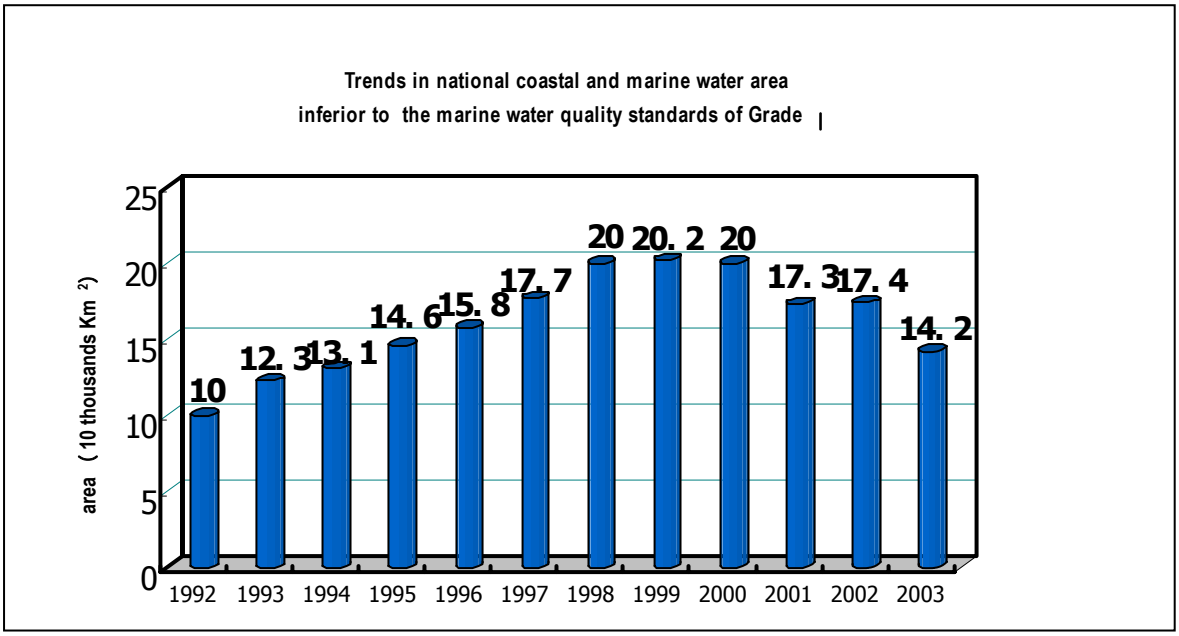
5.1. Threat of the Yellow Sea Large Marine Ecosystem

5.1.1 Pollution

According to *China Coastal Water Quality Report* 2005, the pollution of coastal water has not been alleviated, and about 139000km^2 sea area did not the requirement of the Seawater Standard.



The sketch map of national coastal water environment condition[2]



Trends in national coastal and marine water area inferior to the marine water tandard of Grade I3

As to the Yellow Sea, in 2005, about 43000km2 sea area did not the requirement of the Seawater Standard, of which, 3000 km2 was seriously polluted, 4000 km2 was polluted to medium extent, 14000 km2 was lightly polluted. The seriously polluted areas were distributed along the Yalujiang River Estuary, Jiaozhou Bay, and Jiangsu Province, with major pollutant being inorganic nitrogen, and phosphate. With respect to marine pollution, land-based pollutants account for about 90%，the rest of the pollutants are from sea–based activities such as maritime culture, petroleum and gas development, dumping, and etc.

Sea water Quality of the Yellow Sea(2003～2005) km^2

Year	Clean	Lighted 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

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

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

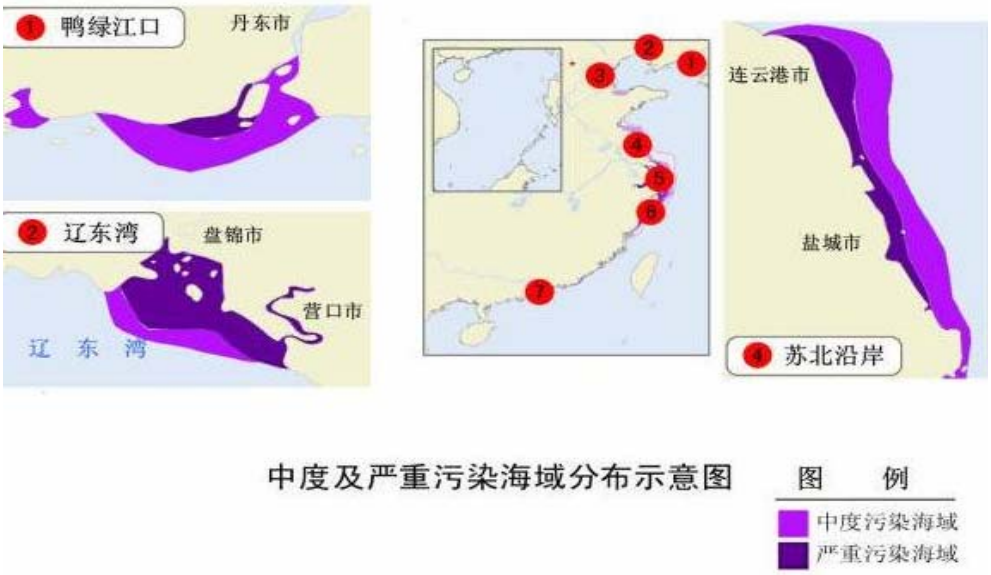
2005	21 880	13 870	4 040	3 150	42 940

5.1.2 Overfishing

To say frankly, beside pollution, the biggest threat of China's marine ecosystem is over-fishing. The Yellow Sea was once one of the most intensively exploited in the world. Today, the major fisheries are at an extremely low level (the average total catch is 200,000 tons) compared with 3 decades ago. They are no longer economically sustainable. There was a major change in catch composition from the 1960s to. Larger sized and commercially important species, such as yellow croaker and hairtail were replaced by smaller-bodied and low value forage fish, such as anchovy. The Japanese anchovy is presently believed to be the most abundant species in the Yellow Sea, with a potential catch of 1/2 million tons a year. The stress of overfishing 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 overfishing, with destructive fishing practices. These impacts are increasing.

5.1.3 Loss of biodiversity

According to statistics, Approximately 37% of the intertidal areas existing in the Chinese portion of the Yellow Sea in 1950 have been reclaimed to date. 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 and it is predicted that future loss of inter tidal areas willoccur at an increasing rate due to the combined effects of reclamation and reduced accretion. It is estimated that at least 2 000000 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 are also present during southward migration when perhaps 1 000000 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 fond for many years. Whales, dolphin, seals, sea lions that were common in this area are seldom seen at present.



5.2 Reasons

5.2.1. Low personal income

According to the Environmental Kuznets Curves, there is a systematic relationship between income changes and environmental quality. The Environmental Kuznets Curves implies that some environmental degradation along a country's development path is inevitable, especially during the take-off process of industrialization. Second, it suggests that when a certain level of per capita income is reached, economic growth helps to undo the damage done in earlier years. If economic growth is good for the environment, policies that stimulate growth (trade liberalization, economic restructuring, and price reform) should be good for the environment.

As a developing country with a population of 1.3 billion, China faces an enormous task to feed more than one quarter of the world’s population on 7% of the world’s arable land. China’s over-ridding national policies call for economic development to meet the basic and growing needs of its huge population. In the past 2 decades, China has experienced tremendous economic growth. But much of China’s rapidly growing industry, coal mining and cement, paper, and chemical production, still rests on outdated, inefficient, or polluting technology. Industrial energy efficiency overall is much lower than that of the developed nations. China's fast economic development was based on high input, high energy consumption and low output. According to statistics, Land-based pollution is the major sources of marine pollution.

Lifestyle changes meant that the number of China’s households grew almost three times as fast as its population during 1985-2000 because average household size declined dramatically. Reduction in household size alone led to 80 million more households in China from 1985-2000, an increase

exceeding the total number of households in Russia and Canada. Smaller households use resources less efficiently.

To address overfishing, China has commenced a five-year vessel-scrapping program funded at $33 million per year -- serious money in China. The program aims at delicensing and scrapping a total of 30,000 ships, or 6,000 vessels each year, thus reducing the overall capacity of China's 440,000-ship fishing fleet by about 7%. During 2002, the program's inaugural year, China scrapped and withdrew the licenses of 5,000 ships. A related regulation mandates that new fishing vessels cannot be built unless the new unit will replace and inherit the license of an existing vessel. A corollary policy to the vessel-scrapping program is China's efforts to reduce its tally of active fishermen. By confronting over-employment in fisheries, however, the Bureau of Fisheries comes face to face with China's overall unemployment and underemployment problems, which are particularly acute for farmers and semi-skilled workers. Although the Bureau of Fisheries Management has kicked off programs aimed at shifting fishermen from wild catch to aquaculture or fish processing work, these programs are relatively small and under-funded. Apparently, scraping together a budget for the vessel-scrapping program exhausted much of the Bureau of Fisheries Management' bureaucratic capital.

The increasing mobility of China's labor force also contributes directly to the oversupply of fishermen and consequent overfishing. The Bureau of Fisheries Management hopes to deter additional poor farmers from becoming fishermen, but admits, "This is a problem for us; we cannot really keep them out." Although skilled workers such as fishing vessel captains can be monitored and controlled through mandatory licensing and training regulations, back-of-the boat labor is almost impossible to control. Average income for a fisherman ($500-$800 per year) is still as much as double what a farmer might earn. As long as that gap exists, there will be demand for work in the fishing industry, creating a dilemma for conservationists here.

The summer fishing moratoria do not reduce overall fishing capacity. After the summer moratoria, fishing becomes more intense as fishermen try to catch as many fish as possible in the shorted period of time using more efficient gear. An immediate, massive, and sweeping fishing effort often depletes the recovered fish stocks in a very short time and exert great stress on the resources. Fishing effort as a whole is still much higher than the reproduction of fish stock and over fishing still exists the main threat to the sustainability of fish stocks. As to the Yellow Sea, one important issue should be noted. Most the fish stocks spawn and grow in the China's part under the protection of moratoria, and swim to the Korea part to winter. Under the present Sino-Korea Agreement, it is not fair for Chinese fisherman to get their share.

5.2.2 Relatively poor education and rich administration

In the fourth meeting of the 10th National People's Congress of the People's Republic of China (NPC) and the fourth meeting of 10th National

Committee of the Chinese People's Political Consultative Conference (CPPCC) in 2006, two groups of data drew the attention of people, one is about the cost of administration which has increased for 87 times, the other is tuition of education, which has increased 25 times from the beginning of reformation to 2005. The reason of increased cost of tuition is the increased cost of administration that occupies 1/4 to 1/3 of the total revenue of finance. The government has no enough money to increase the investment of education. Heretofore It has been reported that the tuition of education has increased 20-25 times since the end of 1980s, but in fact the income of residents only has increased for 2.3 times.

At present the education subsidy system including loan and scholarship has been established, but it has not solved the problem of needy students radically. In the light of the investigation data of United Nation Educational Scientific and Culture Organization (UNESCO), the average public expenditure of China on education is 1/4 of the average of developing country, which is ranked No.145 among countries and regions of the world. In September of 2003, after carefully reviewing the education situation of China Tomashevsky, the education right reporter of the United Nation Human Right Committee, figured that the scale of education outlay of China is not only startling low in GDP, but which merely occupy 53% of state budget, the other part of disbursal is paid by family.

One result of the under investment of state on education is that most of the students choose the majors which may bring imminent profit to them, very few student choose marine policy and law as their major. For example, the Ocean University of China, the most famous sea-related university in China, pays a great attention on research and education in marine policy and laws, but because of lack of fund, research on marine policy and laws is difficult to go on. Without the support of basic research and theory, the laws, policy, which cost a lot money and labors to draft and enforce, have very low effects.

At present marine environment protection and resources conservation law is not an important part of the curricula at any level in the nation's schools. There is a need to expand the curricula to include marine environment protection law, to develop teaching manuals and materials, and to provide for specialized training for teachers.

5.2.3 Conflicts among governmental departments

Legislation for the public, to ensure the benefit of the nation and the rights and interests of citizen is the core of legislation. But at present, sectoral interests are expanding and are cutting off the interest of nation and public by enacting laws, regulations and rules. In the mind of many governmental officials, the administrative power endowed by laws are their special right to get profit.

Corruption in legislation has become a serious problem in China. Every

administrative department wants to enlarge its interest by legislation, by issuing regulations, rules and standardized documents to meet their own demand. The enlargement of department interest may incur conflicts of different department in administration, thus destroy the public's interest. In practice, every department likes to manage lucrative issues. Although in recent years, government has invested a lot in management of marine environment, many difficulties still exist. Thus the benefits of civilian were divided amnong different administrative departments. And the administrative department strived for charge project but shifted off the responsibility if accidents happened.

Legal system of marine environmental protection and resources management is still sectoral by nature, and marine development projects of various sectors, e. g. fisheries, ports, hard minerals and energy industries are required under sectoral laws and regulations. The "*Sea Area Management Law*" has set up an integrated regime in the use of the sea by requirement of "zoning" and "sea area use assessment". While in nature, the "Sea area use Management Assessment" has almost the same content and function with the existing "Environment Impact Assessment". At present, before the approval of any project using sea areas, the constructor must prepare 2 similar "Assessments", which is a great cost in both money and time. While, in reality, the two "Assessments" are approved by authorities very easily. Because the relative authorities have established some assessment agencies under their control and recommended them to the constructors. In this way the use of 2 "Assessments" is a way to collect money.

It is also reported that many sea –related authorities are preparing regulations or rules for their sectoral management. For example, the State Oceanic Administration are preparing the *"Regulations on the Monitoring of Marine Environment*", "*Rules on the Protection of Marine Special Protected Areas"*, the Bureau of Fishery Management are preparing the "*Regulation on the protection of Fisheries Waters*". In addition to the "*Rule of costal environmental protection*" enacted by the State Environmental Protection Administration, the major marine environmental protection authorities have their own "space" in legislation.

In order to protect their own interest, information among the administrative authorities are blocked. Although Article 6 of the *Regulations Concerning Prevention of Pollution Damage to the Marine Environment by Land-based Pollutants* provides that, Units and individuals should register to the environmental protection administrations of their land-based pollutant discharge details and copy to the oceanic administrations. While from 2005, the oceanic administrations have focused their efforts on the monitoring of land-based pollution, which was a great cost and repetition. And the conflict between the State Environmental Protection Administration and the State Oceanic Administration sharpened.

The conflicts among different authorities can be seen in many aspects. For example，According our interview with governmental officials, almost all

governmental officers are indifferent in other departments activities except that directly affect their interests.

The "*Blue Bohai Sea Action Programme*" is conducted by the Environmental protection authorities, and the 908 scientific research program is conducted by the Oceanic authorities, the "fishing vessel crashing program" is conducted by the Fishery authorities with little cooperation with other department. In local provinces, even regulations may be adopted without the participation of some administrative departments.

5.2.4 Conflict between the central government and local governments

The Sea Area Use Management Law stipulates that, units and individuals must register if they use the sea. According to Article 18 of this law, sea area use more than a a certain limit should be apporved by the state level authorities, and the sea area use fee should be collected as into state treasure. In order to shed of the law, many local authorities divide a large project into some small projects, so their use of sea ares may fall in the limit provied by the law, and may be approved by local authorities. In this way, the state treasur has lost a lot.

5.2.5. Lack of transparency and public participation

Transparency and participation can be improved in two main ways: (1) wider publication of the basic information, proceedings and outcomes of the management process and (2) allowing higher degrees of involvement of stakeholders in decision-making. Publications of management-related information could take various forms. In this aspect, many laws have special requirements. For example: The *Environment Protection Law* And *Marine environment Protection Law* clarify that 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* clarifies and strengthens the requirements affecting the establishment, expansion or renovation of business facilities, and applies similar requirements to the drafting of government plans. The Law also strengthens trends towards higher technical standards and will require increased attention to compliance by investors, business operators, construction companies, technical consultants and governmental departments. Moreover, Article 5, 11 and 21 of this law stated explicitly that encourages units concerned, experts and public participating in the environmental impact assessment process by proper way. For planning which has the potential to generate adverse environmental impact to or affect the public environmental benefits, the Environmental Impact Assessment report draft should consulted with concerned units, experts and public in form of seminar, hearing or other appropriate forms before the planning submitted for permission; For

construction project which has the potential to generate adverse environmental impact to or affect the public environmental benefits, the Environmental Impact Assessment report draft should consulted with concerned units, experts and public in form of seminar, hearing or other appropriate forms before the construction application submitted for permission.

Despite the provisions of laws, the public's right to access to information of environment and resource management cannot be guaranteed. Although the government has established some website on the management of environment and resource, some pivotal management data are confidential, the public cannot get it at all. In the environmental assessment, public opinions are seldom collected and considered. In the process of drafting management regulations only the advices of some related department are heard, the voice from public is neglected.

There is a need for both formal and informal public education, and for in service training efforts for government personnel, to convey the importance of marine environment. There should be efforts to popularize scientific information, produce TV programs, films, and suitably illustrated books.

5.2.6 Lack of stable and qualified managerial and technical staff.

Although the change of political power is critical to the elimination of corruption and low efficiency, and is important for economy increase, a stable administrative group is the guarantee of making and implementing continuous policy, reasonably use the resource and facilitating long time development. Each department director, section chief and common missionary are the advocators of policy, the initial drafter and policy executors, they are seriously selected to put in one governmental position and carry out management tasks, which need special knowledge in one field. Most of them are elites. Because of promotion and job changing, some of them do not stay more than 3 years in position commonly. The frequent change of the managers of department leads to less investment into long-term ecological protection and without the sense of responsibility.

The existing managerial staffs of the marine environmental protection are unqualified. Most have not received technical training to meet the needs of marine environmental protection. There is a great need to provide incentives to obtain well-trained staff and to reward them for the effective use of their abilities.

5.2.7 Weak enforcement of law

Although China has made a great effort in legislation to protect marine environment, there are still many problems in the enforcement of law.

For example:

(1) China has adopted measures to control fishing vessels and has

reissued fishing licences. To improve the effectiveness of its fisheries laws and regulations, China has established a Fisheries Law Enforcement Command in 1999, which is part of China's 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 it EEZ. To formalize the enforcement procedure, China has adopted the Measures on Fisheries Administration and Enforcement Vessels, and increased personnel in law enforcement. While, illegal, unreported and unregulated fishing presents 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. The good news is that these boats don't have the range to fish far offshore and decimate stocks there. The bad news, of course, is that overfishing along the coast is intense. The small mesh of some fishing nets graphically demonstrates the situation. In the absence of sufficient sizable fish for an economical catch, fishermen are try to grab everything they can. Looking at the net of the anglers in the photos below, one expert wittily asked if they were fishing for zooplankton, since the mesh of the nets is so small4.

(2)Pollution is still very serious in China's coastal area. As spare labor has retreated from fishing, Moving labor from the fishing industry and into fish farming becomes a cornerstone of China's fisheries policy. Aquaculture

[4]From: http:// www.usembassy-china.org.cn/english/sandt/estnews

continues to boom. Production of farmed fish has grown annually in the high single digits, and now constitutes more than 60% of China's total fish production. Fish farming by itself, however, cannot solve all the problems of China's fishing industry. Aquaculture is capital-intensive, and China is already starting to exhaust appropriate sites and freshwater supplies available for fish farming. Pollution from fishing farm has become an important source.
The under investment of state in infrastructure in environmental protection result the insufficient of sewage treatment installations in many coastal cities. And the sewage have be been discharged into the sea directly and seriously polluted the marine environment. Because of lack of capital to update technique, old techniques and equipment are still used in many factories, discharge of low standard sewage is still a serious problem.

5.2.8. Small cost for illegal waste discharge

According to the Marine Environmental Protection Law, local governments should be responsible for ocean environment in their regions respectively, but some phenomenon, such as local governments enshield and connive the harmful activities, often happen.

For coastal enterprises In China, the punishment for illegal waste discharge activities is quite low, maximum 200,000 CNY. While the waste treatment fee per year is about hundreds or thousands of punishment. For example, some large-scale enterprises often spend more than 100,000 Yuan on waste treatment every day, which is so high that they would rather accept punishment than run waste treatment facilities. On the other hand, many punishment measures are difficult to be carried out. For example, ministry departments have the power of closing those enterprises which violate laws seriously according to relevant rules, but they have no rights such as cutoff of water and electricity, revoke of licenses and demolishment of machine, and they lack supports from other management departments which have more practical and effective rights.

5.3 Countermeasures

5.3.1 Establish a committee to Promote cooperation of China, PR. Korea, and R Korea

The world is increasingly connected, China’s environmental problems spill over to other countries, which are increasingly affected through sharing the same planet, atmosphere, and oceans with China. In turn, other countries affect China’s environment through globalization as well as through their own

environmental pollution and resource exploitation. Environmental damage that places economic, social and health burdens with which China is ill-equipped to cope. China must take effectives measures – through policy and legislation, to seek cooperation or support in economic development from developed countries, especially developed neighbors. With the increases of individual income, the environmental will better in nature.

China and the R. Korea have enjoyed effective cooperation for a long time. According to statistics, the trade between the R. Korea and China was more than 100bilion US dollar in 2005. About 330000Chinese Young People are working in Korea, mostly from Coastal areas. The young Chinese people are doing laborious jobs in factories, and their payment and living standard is much lower than local people.

There are also a lot of Korean studying and doing business in China, about 50000 are in Qingdao. Korean People have high income in Qingdao and enjoy much higher living standard than local people.

A committee may enhance the cooperation of China, PR. Korea, and R Korea, Chinese people may learn more high-techniques, and Korean may do bigger business in China.

5.3.2 Promote construction of infrastructures

We all know that the construction and post operation of large- scale coastal and marine projects have adverse environmental impact. They may pollute the sea-water and damage the ecological system for a short period. While, if well managed these impact may be controlled. In a long run, these projects will bring benefit to people and be favorable to human environment.
At present, three nuclear power plants are under construction in Haiyang, Rushan and Shidao and a large petrol-chemical plant is built along the Jiaozhou Bay. All these projects are in the coastal areas of The Yellow Sea. These projects have brought a lot of jobs for local people and promoted the development of related industries. The incomes of many people have increased, and their living standard has been improved. The electricity supply from the nuclear power station may alleviate the tension of energy requirement in this area and improve the environmental condition. If the petrol-chemical plant strictly follows the environmental standards in its operation, it will be favorable for the environmental protection of Jiaozhou Bay.
So it is strongly recommended that government establish more infrastructures such as nuclear power plants, tide power plants, deep sea culture bases, etc..

5.3.3 Perfect liability compensation and punishment institutions

A liability, compensation and punishment system has already been established in China. The laws on pollution control and natural resources protection have provisions on liability, compensation and punishment.

Generally speaking, legal liabilities provided by those laws are three categories. They are civil liabilities, such as eliminating dangerous or harmful conditions, restoring original situation, and monetary compensation; administrative liabilities, such as warning notice, fine, suspending operation, and closing down; and criminal liabilities which is referred to the provisions of Criminal Law. At present the punishment of illegal dischage is relative, the amount of fine should be increased to an effective level.

By the way, there is no provisions on the liability of the administrative department. So many department want to enlarge their administrative power by legislation, while if they can not fulfill their commitment, no punishment will be given. So related provisions should be added in the laws on the liability of administrative departments.

5.3.4 Establish a challengable public participation system in legislation

The draft of a legislation should be independent from the beginnging. The draft of marine environmental protection related laws and regulations should be entrusted to special institutions directly by the State Council while not each special department. In the legislation, the opinion from the public should be heared.

5.3.5. Review existing legislation, to guarantee their consistency and eliminate conflicts and sectoral interests.

First, in practice, the real situation changes fast than legislation, Second, confilts often exist among current laws and regulations. So laws and regulations should be regularly reviewed and revised to meet new demand and deliminite confilts.

For this purpose, an academic institute should be entrusted directly by the State Council to conduct investigation and darft laws and regulations.

5.3.6 Enhance transparency and openness in the marine management

A disclousure institutuion should be established for improtant management issues, such as the Sea Area Function Zoning, Environmental Impact Assessment, issurance of Sea area use Permits and Fishing license ect.

5.3.7 Increase investment in marine policy and management research and education

The state should pay more attention on the basic research and education in Marine Policy and Managent , especially in the traning of personels who master both natural characterstics of the sea and knowledge of management.

Management officials of coastal areas should be regularly trained in marine sciences, laws and policies.

Fishingmen should be convened and educated regularly especially in non-fishing seasons.

5.3.8 Establish a comprehensive committee on maritime affairs

A Comprehensive Committee should be established to deal with important maritime Affairs and harmonize the relationship of different administrative departments. The establishement of a comprehensive committee is very importat for comprehensive management of the sea. The Comprehensive Committee should be responsible to check the information collected by different sectors and promote collaboration between different departments, and unify all sectoral marine monitoring forces together.

The Comprehensive Committee ‘s functions are mainly in 2 parts:

（1） Unify all the enforment force on the sea

（2） Unify all the monitoring institutions of the sea

5.3.9 Put the fisheries enforcement force into the line of public service

At present the fisheries enforcement force is out of the line of public services, and the state has no allocation in finance for them. Most of their salary and welfars are from fine. If all the illegal activities had been eleminated, they will have no money to live on. So the Fisheries enforcement force must be put into the line of public service.

5.3.10 Take effective measures to enhance the effect of state actions and programms

So far, China has conducted a series of actions and programs, such as the “Biodiversity Protection Action Plan”, “Protection and Conservation of Aquatic Biological Resources”, “Blue Bo Hai Sea Action Action Plan”, etc. But the effects of these actions is not distincitive. How to improve this situation is still to be studied.

5.3.11 Establish related standards

For example : Aquaculture Water Standard and Healthy Marine Ecological System Standard etc.

5.3.12 To protect the Marine Natural Preserves together with development of economy

Marine Nature Preserves tak about 10% of China territoral Sea , they boast plenty of resources and is of great importance to the state economy development. Reasonable use of the resources in marine nature preserves should be encouraged, and this principle should be incoorporated in related laws and regulations.

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Governance Analysis of YSLME: Korea's Case

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Contents

I. Background of Assignment

The Yellow Sea Large Marine Ecosystem (YSLME) is one of the largeest 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㎢ 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: 1) Overexploitation and illegal fishing have greatly depleted the stock of fisheries in the YSLME; 2) Land-based pollutants have degraded the water quality, reduced the biodiversity and productivity, and have been the major causes of Harmful Algal Blooms (HAB); 3) 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; 4) Recent sand mining in the coastal waters has degraded valuable habitats and has resulted in coastal erosion; 5) Marine debris, such as derelict fishing gear and styrofoam, remain in the water and surface for the long time, damaging the marine environment, and causing maritime accidents in the Yellow Sea; 6) The demand for use of the ocean as a place to dump landfill waste has increased and degraded water quality of Yellow Sea; 7) 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 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 that there would be an intensive coastal development for agriculture, industrial complexes, ports, and coastal cities in implementation of the National Economic Development Plans. So, 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 wetland were lost due to reclamation or filling for expanding of agriculture land or making industrial complex. They said that more than 40% of total wetland was 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 MOMAF (1998), the total area of Korean coastal wetlands diminished by 30-40% since 1987, and only 2,393 square kilometers of wetlands was left in the west and south coasts. Also the decentralization of administrative power and responsibility gave regional governments strong incentives to reclaim for regional economy development and tax income.

Together with high demand for intensive coastal development, the pressure to reclamation of wetlands will be continued. The Saemanguem Reclamation Project, which is

under development to build a dyke of 33 km, to create a 28,300 ha of land by reclamation of Saemangeum Wetlands and Estuary for rice production, and keep freshwater in the estuary of 11,800 ha for agriculture, is a good example.

3) Declining of 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, redtides and mass mortality of marine organisms. Since 1991, coastal water quality measured by COD 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 have occurred mostly by oil-tankers, and the major cause has identified as carelessness of 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 of Nearshore Fisheries

Total fisheries products have decreased continuously from the peak of 3.5 million ton in 1994. The problems are that all kinds of fisheries products, such as ocean fishing vessel, coastal fishing vessel, aquaculture, and fresh water, have been 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 redtides 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 the peak of 138% in 1980.

5) Decreasing of Fisheries Population

Despite strong government policies and support, fisheries population and fisheries employment have continually decreased. The main reasons are the deterioration of living condition and reduced income of fisheries. Fisheries 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) Limit of Public Access

There are many forecasts that coastal tourism would increase rapidly as income increase and work hour decrease, which would require public access to the coastal zone. However, public access is limited seriously due to unplanned development and low recognition for public access. Designated places for tourism by laws 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 harbors, fishing harbors, 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 harbors, and 415 fishing harbors 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 on the coastal lands. 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 been increased rapidly with an increase in income and leisure hours. Inland tourism is limited due to traffic jams, crowds of travelers, and inconvenient facilities. Coastal tourism is an emerging industry due to its opposite nature to 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 environmental-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, the problems are that most local governments want and plan large tourism facilities in their area without considering the impacts on the coastal ecosystems.

2. Socio-Economic Data

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

Korea coastal lands have been very densely used. Total 22 industrial complexes, 25 coastal cities, 50 harbors, 415 fishing harbors are sited in the coastal zone. Most of the chemical complexes and steel factories are situated in the coastal land. In addition all shipbuilding docks and many power generators are situated in the coastal land. About 33% of total population lives in the coastal land in Korea. Forecasting is that coastal population will increase to 40% of total population and coastal GDP will increase to 50% of total GDP in 2030.

Korea coastal waters have been also densely 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.

So the "Socio-Economic Data" shows much pressure to 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 ◦ Publcized Area - Land - Sea	㎢ ㎢ ㎢	 99,915 6,196	- Natural Environment Consecration 5,093 ㎢(82.2%) ※ Fisheries Resources Consecration Area 2,953㎢(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 ㎢ (33% of land shore line)
5) Desingnated	ea	51	- International port 28, Coastal port 23
6) Fishering 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 Familily	Area (㎢)	Population Density (person/㎢)	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, Autonomousc 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(㎢)	
		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)

(Unit : case, ㎘)

	`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	

<Table II-5> Ocean Dumping

(Unit: thous. Ton)

	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

<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)	Transparency (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

(Unit: ton)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Q'ty.	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

(Unit: vessels, ton)

		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

<Table II-9> Vessels by Province

(Unit: vessels, ton)

		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

<Table II-10> Number of Fishermen by Province

(Unit: 1,000 persons)

		2000	2001	2002	2003	2004
No. of Persons		140	137	128	125	122
Province	In-cheon	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

<Table II-11> Fisheries Income

(Unit: 1,000won)

	2000	2001	2002	2003	2004
Fisheries Income	10,078	11,087	10,165	10,741	11,959

<Table II-12> Fisheries Consumption per Capita (kg)

(Unit:kg/year)

	2000	2001	2002	2003	2004
Total	36.8	42.9	44.5	44.7	-

<Table II-13> Exports and Imports of Fishery Products

(Unit: $1,000)

	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

<Table II-14> Economic Importance of Fisheries (GDP Contribution)

(Unit: Thousand million won, %)

	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

3. Preliminary Governance Analysis

The purpose of the "Preliminary Governance Analysis" is to have a basic understanding of governance issues in the Yellow Sea's environmental problems. It consists of four components: Biodiversity Component; Ecosystem Component; Fisheries Component; Pollution Component. Generally each component consists of its Problems, Impacts (environmental impact or socio-economic impact), causes (immediate causes (technical causes), underlying causes, root causes), and Governance Analysis. The result of review of the "Preliminary Governance Analysis" is as follows.

(1) Clear Definition of Four Components

The "problems" of four components are not clearly distinguished based on the definition of four components. For example, "Habitat Loss" and "Habitat Conversion" of "Biodiversity Component" had better to move to the problems of "Ecosystem Components." "Habitat Conversion" of "Biodiversity Component" and "Habitat Modification" of "Ecosystem Components" had better united. There it is suggested that the "Preliminary Governance Analysis" should be reviewed with one large concept.

(2) Clear Definition of "Problems"

It is not clear whether the "Problems" of each component are limited to the natural and physical phenomenon or it includes the 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 the management practices. If the "Problems" of each component include the management practices, then the existing "Problems" should be re-analyzed. This project has analyzed so many problems of the management practices for YSLME.

(3) More Practical Model

The structure of "Preliminary Governance Analysis" is so theoretical that it is useful to understand the basic problems of 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) Factor of Governance Analysis

In this project, the Governance Analysis is conducted by grouping (1) Stakeholders Analysis, (2) Institutional Analysis, (3) Legal and Policy Analysis, which was very useful in analysis the broad governance analysis. So it is suggested that the governance analysis of the "Preliminary Governance Analysis" is sub-grouped into (1) Stakeholders Analysis, (2) Institutional Analysis, (3) Legal and Policy Analysis.

(5) Governance of Biodiversity Component

In addition to the result of the existing "Governance of Biodiversity Component," followings are the general analysis of Governance of Biodiversity Component conducted in this project: Weak management due to lack of relevant law or program; No comprehensive survey on marine biodiversity due to low priority on marine environment.

(6) Ecosystem Component

In addition to the result of the existing "Governance of Ecosystem Component," followings are the general analysis of Governance of Ecosystem Component conducted in this project: Low priority to marine ecosystem due to high priority on terrestrial ecosystem; Weak management due to lack of relevant law or program; Low recognition on marine ecosystem of NGOs and publics, such as sand, wetland, coastal waters.

(7) Fisheries

In addition to the result of the existing "Governance of Fisheries Component," followings are the general analysis of Governance of Fisheries Component conducted in this project: Illegal fishing by domestic and foreign vessels; Over-Exploitation; Assessment of Fisheries Stocks.

(8) Pollutant

In addition to the result of the existing "Governance of Pollution Component,"

followings are the general analysis of Governance of Pollution Component conducted in this project: Weak management on land-based sources of pollutant due to dual system on environment management; Dense development in the coastal land due to the socio-economic benefits together the local government's incentive for development.

III. Stakeholder Analysis

1. Overview

The most general definition of stakeholders is, "Anyone who wants to be." 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 stakeholder's interests, decision-making process and means, and ability of decision-making in YSLME Governance are as shown in Table III-1.

<Table III-1> Summary of Stakeholders in YSLME Governance

Stakeholder	Interest	Decision-making process/means	Ability to make or influence decision
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 geneal assembly.	- Legally authorized for legislation, annual national budgeting and settlement of account.
Central Government	- Secure their own ministries' goal. - MOCT : Construction-o riented - MOMAF : Dual function (development and conservation) : fisheries promotion, port construction, marine environment conservation. - MAF : Agriculture (reclamation for peddy	Policy issues filing→ Inter-vice-ministerial meeting→ Inter-ministerial meeting→ decision.	Ministers are members of cabinet which decides high policies.

[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.

	field). - MOE : Environment-oriented.		
Industry	- Secure their own interests mostly through representing organizations(associations, corporations)	- Paitipation in the 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 electional
NGOs	- Conservation of environment to be endowned to next generations	- Demonstration - Protest campaign - Outreach program	- Solidation 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

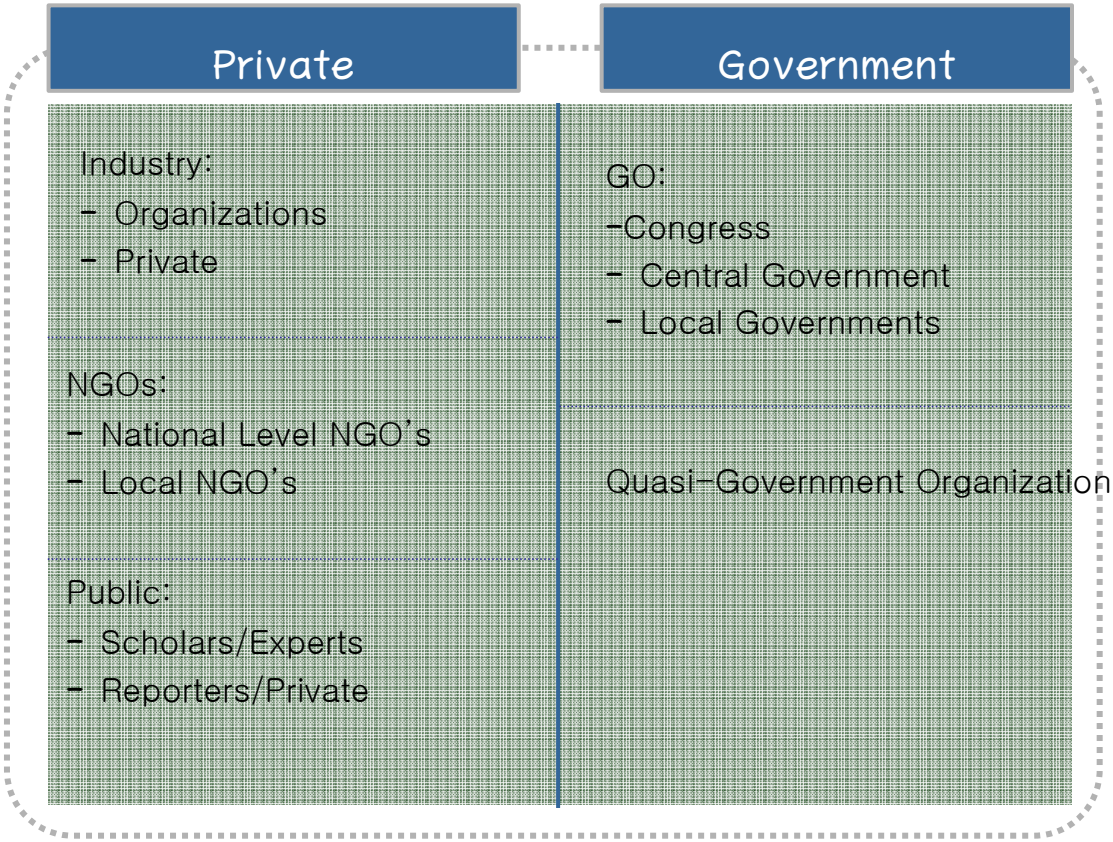
YSLME stakeholders can be divided into the government sector and the private sector in Korea. The government sector can be divided into GO (Government Organizations) and Quasi-Government Organizations. GO are stakeholders, which make decisions on YSLME, and can be divided into congress, central government 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. The scholars, researchers, experts, and reporters are representative of the public.

<Fig. Ⅲ-1> Structure of Stakeholders



3. Governments

Governments sector as stakeholders on YSLME can be classified into 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 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 the government budgets.

Although MOMAF is in charge of marine environment and resources management, MAF, MOCT, and MOE have strong effects on especially marine environment and 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 managements. The research institutes and universities are in charge of suggestion of policy recommendations and R&D on marine environment and resources management.

However, MOMAF is the most responsible government organization for 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 government support to 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 such as providing information to enhance environmental NGOs voluntary activities on environment 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 itsecology. 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 conducted by five consecutive development plans. But 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 kilometer 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? MAF [query: what is this], 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: 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 indigenous people whose daily individual live 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, beautiful scenery for beach tourism and field education sites for young people.

5. Industry Representatives

1) Fisheries Industries

(1) Fisheries Cooperatives[2]

Representing the fishing industry are three cooperatives: National Federations of Fisheries Cooperatives; Regional Fisheries Cooperatives; Fishing Village Cooperatives. The fishing village cooperative was founded in 1962 after the central and regional

[2] So-Min Cheong, Managing Fishing at the Local Level: The Role of Fishing Village Cooperative in Korea. *Coastal Management*, 32:191-2002, 20045.

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 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: 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 exploitation 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

[3] NFFC has three business: (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.

fishing grounds was restricted to members of the regional fisheries cooperative. Restricted access and user fees, however, generated discontent among fishing village cooperative members.

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 common 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. So they might prefer more free access to strict restriction. One of the alternatives to solve this problem is to accelerate the development of marine ranch 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 Shipowners' 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 labor 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: [query: why did you change the numbering here?] (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 Shipowners' 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 aninteresting 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 VLCC [spell out] 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 of 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. 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.

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 own 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 Environment·Transportation·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 got 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 the 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 directly 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 opposition demonstrations when they oppose the public policies or their interests are not properly considered in the policies. As democratization is developing fast in Korea, most stakeholders tend to have frequent

opposition demonstration in these days. 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, the mass-media have 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

Gary K. Meffe says that the task of resource conservation is too large and too important for the government alone. The experiences of many successful planners and managers strongly indicate that even when agencies own and manage 70% of a watershed, they cannot manage those lands without the support and involvement of the local communities (Gary K. Meffee et. al., 2002). More than a half-century ago, Aldo Leopold put people squarely into the conservation equation. He recognized that effective conservation requires understanding of how people relate to one another and how they relate to the land. Gary K. Meffee etal. have defined and described ecosystem management as an endeavor tied directly to an understanding and appreciation of human nature and their value systems.

Marine environment and resources management is not an exception. The task of sustainable development of the marine environment and resources is too large for the government alone, so all the stakeholders, especially the community, resident, and the public, should actively participate in the whole process of the management.

The task of this chapter of this study is to “devise a plan to encourage a wide range of stakeholders, especially the general public to participate in the relevant actions in protection of the marine and coastal environment and sustainable use of marine and

coastal resources,." [citation needed] However, the task is too large for researchers with limited time and resources to present the whole program or plan, and we believe it is a long-term project to be conducted continuously. Therefore, we have conducted a literature review of effective programs, and held workshops and interviewed various stakeholders to find out about these programs. Although some programs, which are suggested here, are effective in onlycertain situations, we think there are great policy implications that can apply in other areas.

1) Involvement in Decision-Making Process

Although decision-making process, such as feasibility studies, public hearings, experts committees, and meetings, are arranged by the government sector, the active and positive involvement of the general public in the process can be effective to get support from the stakeholders. Until now, it cannot be denied that much of the decision-making process have been somewhat formal.

If various stakeholders participate and discuss in the process and can agree with issues and alternatives, then the support can be stronger and more positive. So involvement of stakeholders in the decision-making process should be mandatory.

2) Partnership Program

The partnership program is a program conducted by an agreement among stakeholders with shared authority and responsibility. One example of a successful program in the marine environment in Korea is marine debris monitoring by NGOs with support from MOMAF and KMI researchers. The NGOs conduct marine debris monitoring with technical and financial support from researchers and MOMAF and conduct training workshops to learn lessons and experiences through case studies of monitoring debris in the field. In the workshop, all the participants including the central and local government officials are talking and discussing the status, problem, and alternative policies on marine debris and thereby many government policies have been adopted.

3) Incentive Program

The incentive program is an alternative which gives financial or policy incentives to stakeholders, who supports the policy, instead of penalties. The aim of this program is to

have stakeholders participate voluntarily.

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 are as Table – 000. 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 − Making as project guide − - Supervising the project
Local municipals	− Making a locality estimate − Supervising the project
The fisheries cooperative union	− Purchasing marine wastes 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

(unit : thousand Won, ton)

	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.

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

(Unit : thousand Won, ton)

	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.

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: [change this list](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) It has not considered various characters of area, fisheries, 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) Honor 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.

Honor Fishing Surveillance: The government designated 1,429 persons as "Honor Observers for Fisheries Resources Protection" and 408 fishing vessels as "Honor Surveillance Ships."

Honor Marine Environment Guard System: Korea 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 Honor Marine Environment Guard.

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 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

[4] Dong-Oh Cho, Evaluation of the Ocean Governance System in Korea, *Marine Policy*, in press.

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).

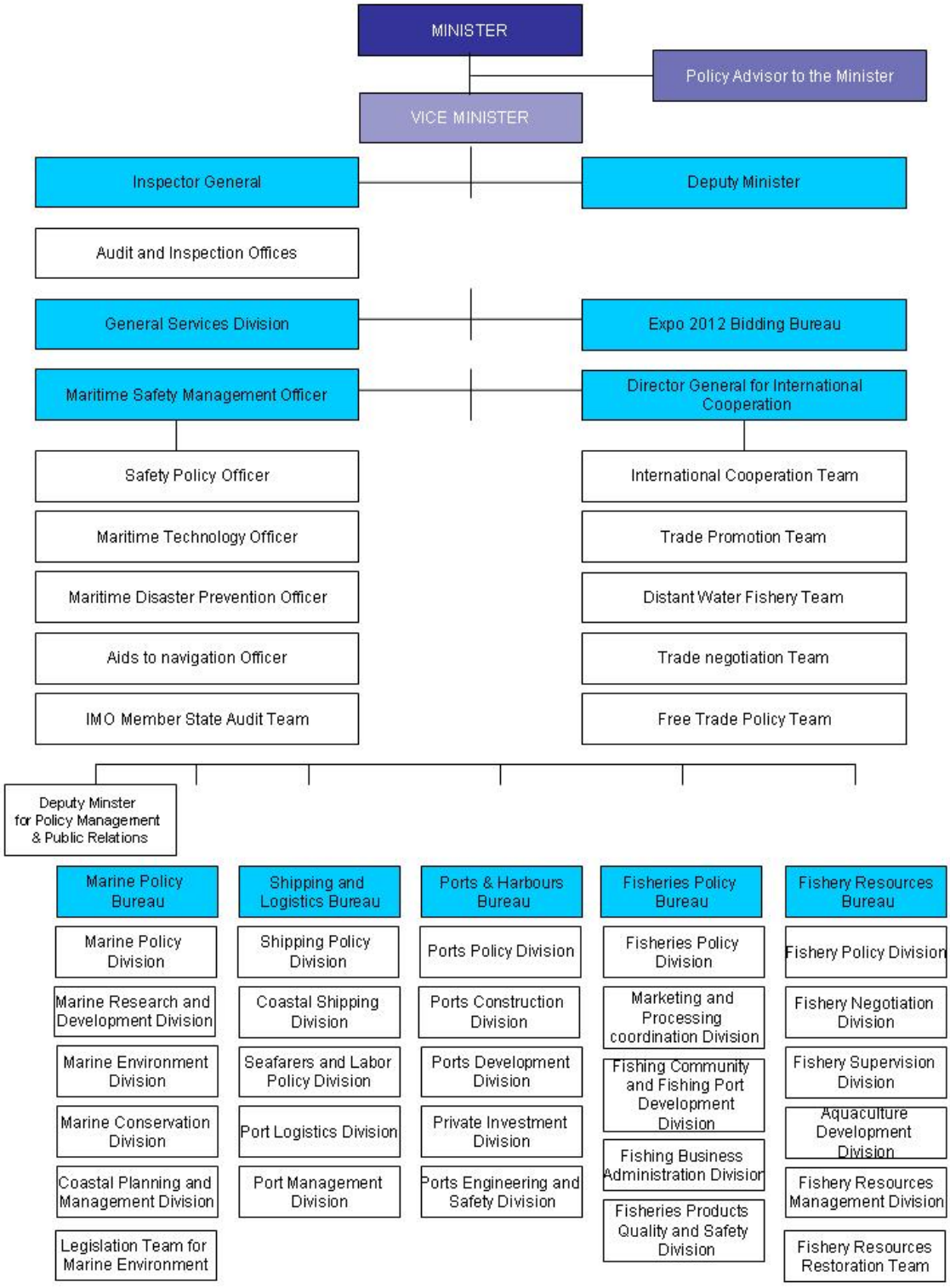
Together with the establishment of MOMAF, the Korean government revised the Government Organization Act (GOA) mandating MOMAF to be in charge of the oceans policies as follows (Article 44): (1) The Minister of MOMAF is in charge of function of fisheries, shipping, ports, marine environment preservation, oceanographic research, marine resources development, marine science technology research and development and maritime safety and judge; (2) The NMPA, which is in charge of the function of police and oil response at sea, is under the Minister of MOMAF.

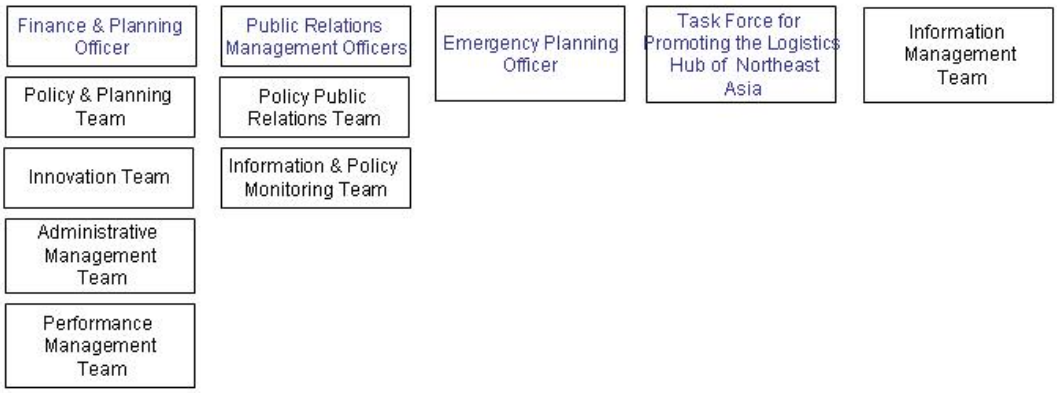
Under the GOA, most of the ocean-related government agencies together with their authorities, such as MPA with shipping and port management, FA with fisheries management, NMPA with maritime law enforcement, Maritime Safety Tribunal with maritime accident investigation and judgment, and National Oceanographic 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.

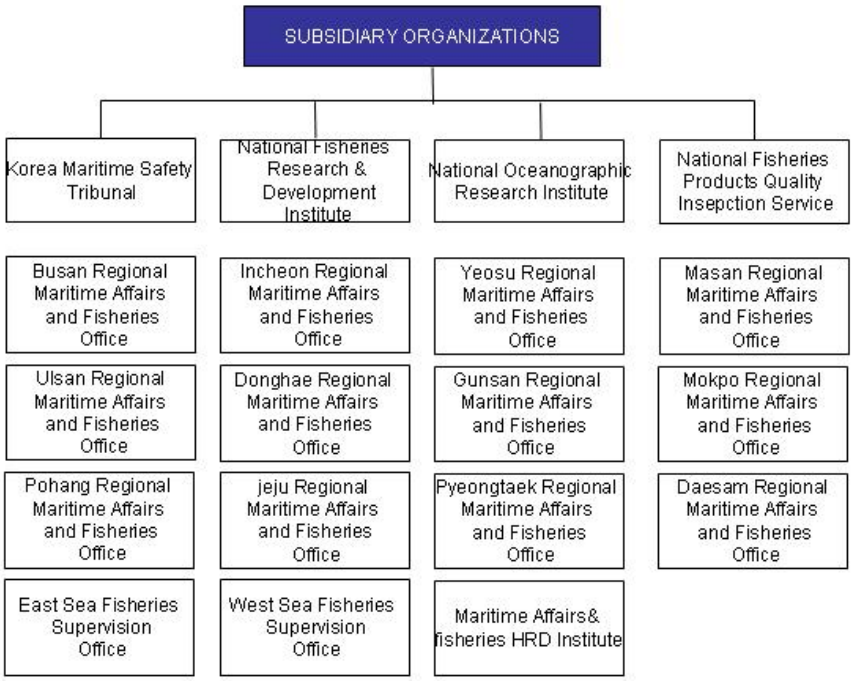
However, the revised GOA does not make any demarcation of ocean spaces. So other ocean-related government agencies, such as MOE and MOCT, claim that authorities of MOMAF are geographically limited to the sea beyond the coastline. As a result, various laws and programs on the coast have not been integrated 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




Finance & Planning Officer
Public Relations Management Officers
Emergency Planning Officer
Task Force for Promoting the Logistics Hub of Northeast Asia
Information Management Team
Policy & Planning Team
Policy Public Relations Team
Innovation Team
Information & Policy Monitoring Team
Administrative Management Team
Performance Management Team


SUBSIDIARY ORGANIZATIONS
Korea Maritime Safety Tribunal
National Fisheries Research & Development Institute
National Oceanographic Research Institute
National Fisheries Products Quality Insepction Service
Busan Regional Maritime Affairs and Fisheries Office
Incheon Regional Maritime Affairs and Fisheries Office
Yeosu Regional Maritime Affairs and Fisheries Office
Masan Regional Maritime Affairs and Fisheries Office
Ulsan Regional Maritime Affairs and Fisheries Office
Donghae Regional Maritime Affairs and Fisheries Office
Gunsan Regional Maritime Affairs and Fisheries Office
Mokpo Regional Maritime Affairs and Fisheries Office
Pohang Regional Maritime Affairs and Fisheries Office
jeju Regional Maritime Affairs and Fisheries Office
Pyeongtaek Regional Maritime Affairs and Fisheries Office
Daesam Regional Maritime Affairs and Fisheries Office
East Sea Fisheries Supervision Office
West Sea Fisheries Supervision Office
Maritime Affairs& fisheries HRD Institute

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 underto Ministry of Commerce & Industry in 1955, reorganizing the Coast Guard Authority belonging to 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 (use commas between items in list): 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; 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, hydrographic 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 are 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 Korea 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 firstly 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. So 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 harbors.While land suitable for ports, harbors, shipbuilding yards, etc. is created by the reclamation of public water along the coast, 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 complex 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 the Environment 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 complicate 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 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: (use commas between items in list) 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 & harbor 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; 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. Recommendations for Institutional Coordination

1) Dual Management System for Environment Management

Under the Government Organization Act (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[5] in 1997, while all the other

[5] At present MOMAF is enacting "Marine Ecosystem Conservation and Management Law"

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.

2) Coordination among Government Agencies for Marine Ecosystem

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.

Generally the controversial issues, which are related to multiple central governments, have been solved by establishment of an ad hoc committee under the Prime Minister. For example the Korea government established "the Water Quality Improvement Task Force Team" for coordination of water quality issues, of which members consisted of related central governments, local governments, and experts. So it is recommended to establish a ad hoc committee for sustainable development of marine ecosystem, of which members include relevant central government agencies, such as MOMAF, MOE, MOCT, and MAF, local governments, experts, NGOs, and the public.

Marine Sand Management Case: Although the GOA mandates MOMAF to be in charge of marine environmental management, it does not define the authorities over certain resources, including marine sand. Therefore, MOMAF could not strongly object to the dredging of sand in the coastal waters. Therefore, MOMAF initiated revisions to 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 authority of MOE.

It has been difficult for MOMAF to establish an effective program to limit sand mining in the coastal waters, such as strengthening the criteria for environmental impact

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for marine ecosystem and living resources management.

assessments, monitoring the impact of the marine environment caused by sand mining, levying environment costs and preventing illegal sand mining.

However, the voice of the construction industry and other government agencies, such as MOCT, are powerful, and the development system for marine sand has long been established. Until now, the government has viewed the demand for aggregate very important to economic development policies in Korea. So, the Korean government has emphasized the need to supply aggregate efficiently and has established a very strong system of supply of marine sand.

As opposition against sand mining gets stronger, many local governments have not permitted mining in the coastal water within 12 kilometers from shore. In 2003, however, MOCT started to revise the Exclusive Economic Zone (EEZ) Act to be able to mine in the EEZ under the jurisdiction of MOCT. The original EEZ Act prohibited mining sand in the EEZ. Under the revised act, the mining firms can apply for permits to MOCT, not to local governments and the only obstacle for mining in EEZ is under the Ocean Use Consultation.

Since the revision of the act, the number of permit applications for mining in the EEZ has increased rapidly, but most of mining sites are just outside of 12 kilometer from shore. Since the revision of the act, the number of permit applications for mining in the EEZ has increased rapidly, but most of mining sites are just outside of 12 kilometer from shoreline.

3) Coordination for Marine Ecosystem inside MOMAF

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 Harbors Bureau, Fisheries Policy Bureau, Fishery Resources Bureau, Maritime Safety Management Office, National Oceanographic Research Institute, Maritime Safety Tribunal, and KCG.

However, 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.[6] The representative policies

[6] There are Marine Policy Division, Marine Research and Development Division, Marine Environment Division, Marine Conservation Division, Coastal Planning and Management

conducted by the bureau are integrated coastal zone management, wetlands management, reclamation policy, special area management, marine debris management, marine sand management, and research and development (R&D) of oceans.

However, the function of coordination of the Marine Policy Bureau is weak because the hierarchical level of the bureau is same as the other bureaus, such as Shipping and Logistics Bureau, Ports and Harbors Bureau, Fisheries Policy Bureau, Fishery Resources Bureau, Maritime Safety Management Office. So it is necessary to level up the Marine Policy Bureau and give more power of function of coordination for Marine Ecosystem Management.

Division and Legislation Team for Marine Environment under the Marine Policy Office.

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 Kores's EEZ while local governments are mainly in charge of fishery management in the coastal areas. 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 fishery industry by strong government support together with the economic development. By the 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 ton 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 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. By the result, the rate of domestic fisheries products to domestic consumption has decreased continuously from the peak of 138% in 1980. In 1990 Korea exported fisheries products 1,058,000 tons (1.5 billion dollars) whereby 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 been fundamentally changed from growth in quantity to sustainable development of fisheries resources to as Korea entered OECD and WTO. The Korea government has established various programs and policies, such

as TAC System, Marine Ranch Program, Aquaculture Program, and Buy-back Program to restore the fisheries stock and sustainable fisheries. However, the scientific assessment of fisheries resources, which is most important factor for sustainable fisheries management, has not been conducted effectively due to lack of agreement between neighboring countries on transboundary fisheries and illegal fishing by domestic and foreign fishers.

2) License System: Traditional Fisheries Management[7]

The license system to limit to 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 decided. 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.

[7] 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
Southwestern sea Danish seine	37	Plaice, angler, shrimp
Southwestern 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 an off-shore case, the minister of MOMAF is the decision maker for fishing permits, but within their 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-shore (Ryu, et. al., 2006).

4) TAC System

Since the mid-1970s, Korea has been faced with depletion of fishing stocks in coastal and off-shore waters due to overexploitation and indifferent management of fishing stocks by fishers and 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 consideration. The Committee for TAC and the Central Committee for Fisheries Co-ordination, whose members come from academia, the business section 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 Ranch

The fishing ground for Korea fishing vessels has been reduced worldwide as most coastal countries have declared an EEZ and strictly implemented sustainable fishing policies. Also the fishing resources in the coastal ground of Korea have been reduced rapidly because of overexploitation and illegal fishing.

So 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

(units: billion Won)

	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

The economic benefit of Tongyoung marine ranch will be 3,300 ton 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: (use commas between items in list) 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: (use commas between items in list) collection of deposits; seabed plowing; 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 Programme

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. So there were voices in the early 1990s that fishing capacity in the coastal and near sea 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.

So the government first established "Coastal & Near Sea Fishing Structure Coordination Plan" in 1993, of which major contents were 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 installment
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 and already diminishing resource. In addition, this illegal fishing results in further resource depletion and reflects an inefficiency of fisheries management policies.

So MOMAF, the Ministry of Government Administration and Home Affairs, and te

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: (use commas between items in list) 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.

2. Biodiversity

1) Overview

While MOE is in charge of biodiversity and ecosystem in Korea, MOMAF is in charge of most of 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 for marine ecosystem based on the act, however, until now MOE has addressed terrestrial biodiversity and ecosystem and not marine ecosystem. “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 on marine biodiversity and ecosystem.

There is rich biodiversity in Korea comparing its small land 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 to exist: 18,029 species of animal life; 8,271 species of plant life; 3,528 species of etc. The Wildlife Fauna and Flora Protection Law designates 221 species for endangered species. The data and information on habitat in Korea are mostly limited to the habitat of mountains and those on marine ecosystem are poor.

There are three oceans, East Sea, South Sea, and Yellow Sea, which have quite different characteristics in biodiversity and ecosystem. It is expected that rich marine biodiversity is in the three oceans. However, until now any comprehensive survey of marine living resources except fisheries has not conducted. And also, until recently there have not established any management program or policy for marine biodiversity.

So now 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.

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 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 in 1993 and incorporated most of CITES in the "Wild Fauna and Flora Protection Law." Korea government has designated 221 species as endangered species as of 2005 and managed to conserve them based on the act. Also many wildlife animal and plant things have been designated as "Ecosystem Destructive Wildlife Animal and Plant," however, non of marine living resources has designated as "Ecosystem Destructive Wildlife Animal and Plant."

NFRDI of MOMAF is in charge of marine CITES: Regulation on permit of fishery transplant; Regulation on prohibition of whale catch.

Recently 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 interests on CITES and submitted many proposals. Korea is in the situation to arrange domestic institutes and strengthen resources in response CITES.

<Table Ⅴ– 5> Government agencies and related laws 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 want to import or export internationally endangered species should get 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)

NFRDI of MOMAF is in charge of marine CITES: Regulation on permit of fishery transplant; Regulation on prohibition of whale catch.

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. Korea has not ratified as of 2006.

(4) Ramsar Convention (Convention on Wetlands of International Importance Especially as Waterfront Habitat)

Ramsar Convention was adopted in 1971 at 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; (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; (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 kilometers 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 at UNESCO and its goals are to preserve and protection 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, however, has not designated any site as natural heritage, and is planning to designate "Jaeju Island" as natural heritage.

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 national strategy in response to International Convention on Marine Living Resources Diversity'; (iii) Securing national right on marine living resources.

Major programs of the Plan are as follows: (i) Comprehensive status survey of structural factors of marine living resources diversity; (ii) Designation and establishment of conservation plan of protective target of marine living resources; (iii) Establishment of Comprehensive Marine Living Resources Diversity Management Plan; (iv) Establishment of Marine Living Resources Museums.

"Marine Ecosystem Conservation and Management Law" has following provisions related to CBD and CITES.

Article 38 (Establishment of Marine Living Resources Management Plan and

International Cooperation): (i) Marine Living Resources Conservation Plan; (ii) items for implementation of International Convention on biodiversity.

Article 39 (R&D for Marine Living Resources Diversity): (i) survey and restoration of structure and function of marine ecosystem; (ii) classification of marine living resources; (iii) R&D for marine living resources; (iv) regulation on development.

Article 41 (Marine Living Resources Diversity Management Contract): contract on marine living resources management.

Article 42 (Limit on Import and Export of Marine Living Resources): (i) permit of international trade of species which could impact to marine ecosystem and marine living resources; (ii) species to be prohibited to import and export; (iii) methodology of import and export, quantity, area, business, etc.

3. Ecosystem

1) Overview

Until recently the marine ecosystem in Korea has been destructed seriously due to 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 redtides. The problem is that demand for ocean use and development will be continued for economic and social incentives for development. However, until recently the government program and policy or laws on marine ecosystem has not been addressed for marine ecosystem.

In 1999 MOE and MOMAF revised “Natural Environment Conservation Law,” which mandates MOE and MOMAF in charge of terrestrial and marine natural living resources respectively. However, the act does not address the marine ecosystem. So MOMAF and Congress are enacting “Marine Ecosystem Conservation and Management Law” for conservation and management of sustainable marine ecosystem. The law is independent and separated from “Natural Environment Conservation Law” and, if enacted, will be under MOMAF.

The wetlands and marine sand are the important habitat and factor of marine ecosystem. However, until recently the wetland and marine sand management has been development-oriented. So MOMAF and MOE enacted “the Wetland Conservation Act” in 1999 and struggles 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 construction industry

have established a strong development system on sand mining and have strong voices for sand mining.

The water pollution is described in depth in next section. And overexploitation of fisheries is described in previous section.

2) Marine Ecosystem Conservation and Management Law

If enacted, MOMAF will be in charge of "Marine Ecosystem Conservation and Management Law." And MOMSF 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 "Marine Ecosystem Conservation and Management Law"

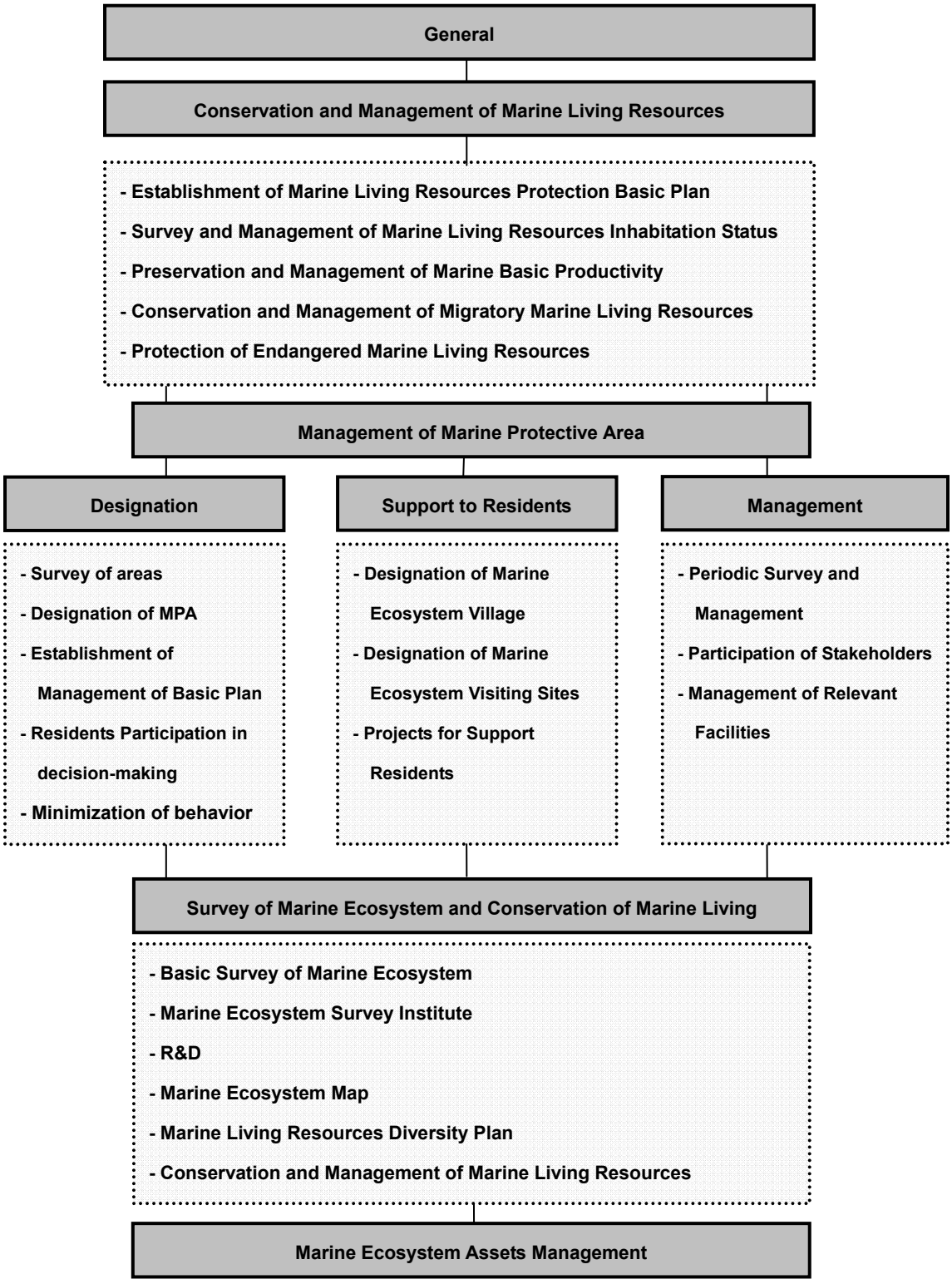
Establishment of Marine Living Resources Conservation and Management System: To establish and implement a comprehensive plan for conservation and management of marine living resources and maintaining marine basic productivity, prevention of extermination of marine endangered species, and conservation of marine endangered species.

Designation and Management of "Marine Protective Area": To designate and manage areas, which have value particularly to conserve, as "Marine Protective Area" 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 Center

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[8]

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

[8] Dong-Oh Cho, Challenges to Sustainable Development of Marine Sand in Korea, *Ocean & Coastal Management* 49, 2006.

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 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 Geoscience 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 kilometer 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 charge 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 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; 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 also supply 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 Coast Guard (KCG), which is a branch agency of MOMAF.

3) Wetland Management

(1) Reclamation Trend

South Korea is 99,291 square kilometers. 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 kilometers), a territorial sea including tidal mudflats (71,000 square kilometers), EEZ (286,543 square kilometers) and a continental shelf including the EEZ (345,000 square kilometers). Also, Korea has a long coastline, stretching for 11,542 kilometers. This comes from a much 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 kilometers per thousand square kilometers. Some 83% of Korea's 2,393 square kilometers 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 larger 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 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 1990s to present, although the scale of reclamation has decreased, considerable wetlands have been still reclaimed.

<Table Ⅴ– 6> Reclamation of coastal wetlands since the early 1900s

(Unit: ha)

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).

(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: (use commas between items in list) position and scale of expected reclamation areas; land use plan of expected reclamation area; need for reclamation and reclamation methodology; impacts caused by the reclamation and policy alternatives; feasibility study on the reclamation. The First Basic Public Water Reclamation Plan was from 1990 to 2000, where 459 sites totaling 960 square kilometers were planned to be reclaimed.

A private entity or a local government can request for the reclamation of 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 totaling 390 square kilometers. MOMAF, however, accepted only 186 sites totaling 38 square kilometers. Comparatively, in the First Basic Public Water Reclamation Plan established by MOCT, there were 459 sites of 960 square kilometers.

One of 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 wetland and thereby to preserve endangered wildlife and biodiversity.

By the Wetland Conservation Act, MOMAF has designated important sites as “the 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 kilometers 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 kilo meters 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 as industrialization and economic growth, ocean dumping has been increased continuously. Also there have been occurred about 300 cases of oil spill every year as vessel traffic increases in the coastal waters. They imposed cumulative impacts on coastal environment and caused serious problem, such as eutrophication, redtides, and mass mortality of marine organisms. Since 1991, coastal water quality measured by COD 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 declining of water quality and increasing of nitrogen and phosphorus, the number of red-tides occurrence increased continuously.

The sources of coastal water pollution can be divided into two: land-based and sea-based sources of pollutant. Korea government ratified most of 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 pollutant have not been effectively managed. The Marine Pollution Prevention Act (MPPA), which includes MARPOL and ocean dumping, is the major law on preventing marine pollution from vessels and ocean dumping. However, MPPA has weak regulation on land-based sources of pollutant. MOMAF is now revising the law very

much changing the name of the law into “Marine Environment Management Law” addressing land-based sources of pollutant and reinforcement of marine environment impact assessment.

The Water Quality Conservation Act (WQCA), which is under the charge 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 issues in Korea. As industrialization and population growth in the coastal zone, and dense aquaculture in the coastal waters, huge quantities of marine debris have generated and flow into the coastal waters.

2) International Instruments

The Korea government ratified most of international instruments on marine environment, such as UNCLOS, MARPOL 73/78, 972 London Convention, and OPRC, all of which are implemented by national relevant laws.

(1) UNCLOS

- Adoption: Adopted in April 30, 1982 and effective in Nov. 16, 1994.
- Ratification: Korea ratified in Jan. 29, 1996 and effective in Feb. 28, 1996

(2) MARPOL 73/78

- Adoption: Adopted on February 17, 1978 and effective on October 2, 1983.
- Ratification: Korea ratified on July 23, 1984, effective on October 23, 1984 and incorporated into MPPA (Marine Pollution Prevention Law)
- Major Contents: Prevention of pollution from ships

(3) 1972 London Convention

- Adoption: Adopted in Nov. 13, 1972 and effective in Aug. 30, 1975
- Ratification: Korea ratified in Dec. 21, 1993 and effective in January, 1994; Incorporated into MPPA

- Major Contents: Prevention of dumping waste from ships

(4) OPRC

- Adoption: Adopted on November 30, 1990 and effective on Mary 13, 1995
- Ratification: Korea ratified on November 9, 1999 and effective on February 9, 2000
- Major Contents: Establishment of national oil spill response system and international cooperation for large oil spill

3) Domestic Relevant Laws

The Korea government ratified most of international instruments on marine environment, such as UNCLOS, MARPOL 73/78, 972 London Convention, and OPRC, all of which are implemented by national relevant laws.

While there are many laws related on land-based sources of pollutant, MPPA and WQCA are the major law for preventing pollution and improving quality of the coastal waters quality. However, both the law are ineffective for the coastal water quality.

(1) National Land Basic Law

- Objective: Effective use and management of national land resources including ocean resources
- Responsible Government Agency: MOCT

(2) CZM Act

- Objective: National CZM Plan; Regional CZM Plans; Shoreline Enhancement Plans
- Responsible Government Agency: MOMAF

(3) Public Water Management Law

- Objective: Permit of use of public water, commission, and compensation; Regulation on prohibition of wastes dumping, etc
- Responsible Government Agency: MOMAF

(4) Public Water Reclamation Law

- Objective: Establishment of "Public Water Reclamation Basic Plan"
- Responsible Government Agency: MOMAF

(5) Natural Park Law

- Objective: Designation of natural park including marine park
- Responsible Government Agency: MOE

(6) Environment Policy Basic Law

- Objective: Environment Conservation Plan; Polluters Pay Principles; Precautionary approach for prevention of pollution
- Responsible Government Agency: MOE

(7) Waster Quality Conservation Law

- Objective: Permit of end-pipe discharge; permit of total quantity of pollutant; wastes-sewage treatment facilities
- Responsible Government Agency: MOE

(8) Waste Management Law

- Objective: Waste Management Basic Plan
- Responsible Government Agency: MOE

(9) Sewage Management Law

- Objective: Sewage Management Basic Plan
- Responsible Government Agency: MOE

(10) MPPA

- Objective: Comprehensive Marine Environment Conservation Plan; Prevention of pollution at sea

- Responsible Government Agency: MOMAF

4) Marine Environment Management Policy

(1) Marine Environment Management Policy

In 1995, before the establishment of MOMAF, MOE was in charge of marine environment management mainly by MPPA (Marine Pollution Prevention Act) and WQCA (Water Quality Conservation Act). However, MOE could 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 a short time period of rapid economic development. MOE established a 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. MOE enforced WQCA for water quality on land strictly but not for ports and coastal waters mainly due to lack of resources and low priority on marine environment.

Other government agencies, such as MOCT and MOAFF, were in charge of marine environment management; (use commas between items in list) MOCT based on “Public Water Management Law” and “Public Water Reclamation Law”; MOAFF based on “Public Water Reclamation Law.” However, there, their primary interests on coastal waters were development-oriented, such as reclamation of wetland and coastal waters and so their roles on marine environmental conservation were weak.

Together with its establishment and revising GOA, which mandates MOMAF to be in charge of marine environment management, MOMAF took over MPPA from MOE and “Public Water Management Law” and “Public Water Reclamation Law” from MOCT. Also MOMAF established the “Marine Environment Management Division,” the “Marine Environment Conservation Division,” and the “Coastal Zone Management Division” under the Marine Policies Office. MOMAF has challenged marine environmental management programs, which are quite different from that of before MOMAF.

(2) Comprehensive Plan for Marine Environment Conservation

Before establishment of MOMAF, the marine environmental protection plan was mainly limited to oil spill response from vessels based on MPPA. However, after its

establishment, the Korean government tried to establish a more comprehensive marine environmental preservation plan to prevent and mitigate the land-based sources of pollutants. In 1996, the government established 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. MOMAF started to establish those plans and 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 followings: (use commas between items in list) 1) prevention of land-based sources of pollutants; 2) improvement of coastal water quality and preservation of marine ecosystem; 3) strengthening of international cooperation and preservation of global environment; and 4) strengthening of marine environment infrastructures. In addition, more will be invested for the “Third Comprehensive Marine Environment Preservation Plan for 2006~2010.”

(3) 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.

Due to population growth,industrialization and development in coastal areas, much land-based sources of pollutant flow into the coastal waters and degrade the marine environment. However, MOE did not revise MPPA to prevent the land-based sources of pollution because of the urgent issues on the land environment mentioned above.

So MOMAF is revising the law greatly to reflect the above and 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 MEM (Marine Environment Management Law).

5) 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 land 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) Institution

MOE, MOCT, and MOMAF are in charge of land-based sources of pollution. However, coordination among central governments is poor; MOCT is in charge of supply of water; MOE is in charge of quality of water.

(2) MOE

As of yet, the end-pipe discharge criteria are regulated based on the Water Quality Conservation Law.

- "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) MOMAF

The Marine Pollution Prevention Act regulates that such seriously polluted area might be designated as a Special Management Area. Before the establishment of MOMAF, the Special Management Marine Area was under the authority of MOE, and MOE designated the coastal waters of Ulsan, Busan, Masan and Kwangyang as the Special Management Marine Area. The Marine Pollution Prevention Act 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 Marine Pollution Prevention Act from MOE, MOMAF has monitored, surveyed and forecasted the carrying capacity of the Special Management Area and the total land-based and sea-based pollutant flowing into the area. And through long discussion with major stakeholders including local governments, MOMAF has established Special Area Management Plans for the coastal waters of Ulsan, Busan, Masan, Kwangyang and Shiwha-Incheon, totaling 1127.61 square

kilometers of sea and 1065.15 square kilometers 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 "Total Pollution Loads Management System" at Masan Bay introducing the following (use commas between items in list) : Goal of water quality, target sources of pollution, total discharge allowable quantity of pollution; Expansion of sewage treatment facilities; Strict regulation on discharge.

Also MOMAF has revised the Marine Pollution Prevention Act to designate such valuable areas as fishery resources conservation areas as the Environment Conservation Area. MOMAF designated the Bay of Kamak, Hampyung, Wando-Doam and Deugryang as the Environment Conservation Areas and established the management plan, totaling 1172.41 square kilometers of sea and 1718.40 square kilometers 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) Major Issues

- Not designated any government agency as responsible for coastal zone integrated environment management
- Management by end-pipe discharge control
- Unified application of discharge criteria not considering carrying capacity of coastal waters
- Water quality management system oriented for land environment
- No policy priority for management and poor coordination
- Poor management not considering diverse input of land-based sources of pollution

6) 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.

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.

Ocean dumping: 552 tons in 1988, 1,068 tons in 1990, 1,990 in 1992, 3,291 tons 1994, 5,014 tons in 1996, 9,749 tons in 2004.

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" ((3,165km^2, depth: 80m).

- Established "Comprehensive Plan for Land-Based Waste Ocean Dumping"
- Total quantity of ocean dumping to be reduced by 50% by 2011
- Ocean dumping of livestock waste water to be prohibited by 2012
- Ocean dumping areas to be changed in a certain period of time

7) 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

(Unit: ton)

Year	1999	2000	2001	2002	2003	Total
Quantity	1,135	12,687	10,798	10,112	11,917	46,649

(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 output 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.

8) Oil Spill Management

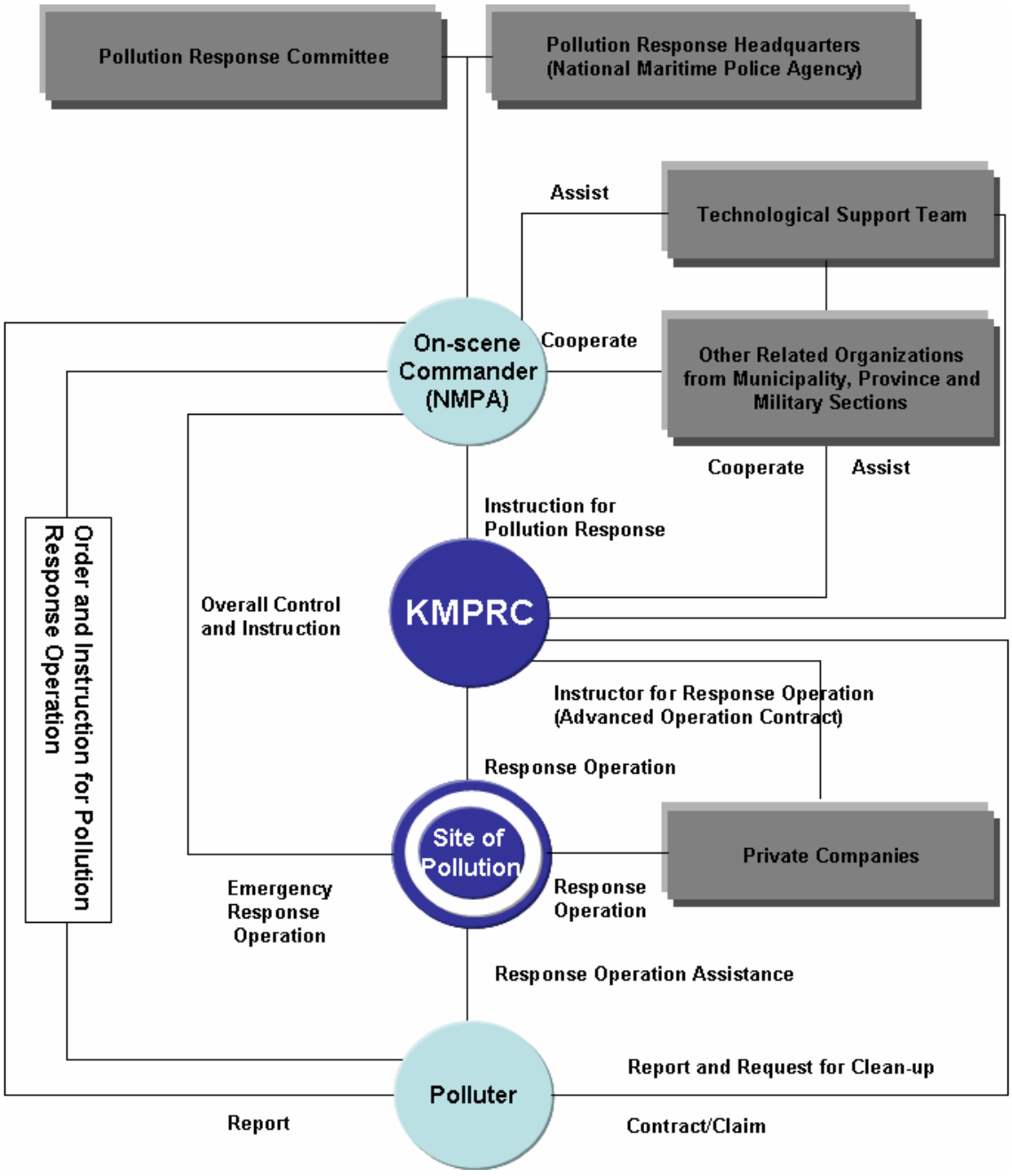
With the increased activities of cargo transported by ships, Korean coastal waters have suffered continually from oil spill accidents, approximately 300 cases annually. During the period of 1991 through 1998, total of 3,100 cases of oil spill accidents took place, discharging 42,500 kiloliters of oil. 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 liters. 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.

So 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 Korea government ratified the OPRC in 2000 and has tried to cooperate with neighboring nations throughout the Northwest Pacific Action Plan (NOWPAP) to respond to big oil spill accidents.

<Fig. Ⅴ – 2> Oil Pollution Response System in Korea



9) CZM Program

Korea has a small land area, dense population and poor natural resources, but achieved successful economic development over the last four decades, all of which forced dense development in the coastal zone. The majority of the nation's chemical

industries, steel factories, shipbuilding yards and of course port facilities are all located on the shorefront along the west and south coast. Predictions are that the coastal population will increase from its current one-third of the total to 40% or more by 2030.

Like other industrialized nations, Korea experienced major problems with economic development and dense population in the coastal zone. So coastal zone management (CZM) was necessary for sustainable development in the coastal zone in Korea. This was impossible, however, without any single strong super-agency in charge of ocean governance. Many central and local governments had conflicting interests for developing the coastal zone, more than 40 laws existed, and many governmental programs were conducted there.

So since its establishment in 1996, MOMAF has struggled to prioritize the establishment of the Integrated Coastal Zone Management (ICZM). During the process of enacting the Coastal Zone Management Act, most of relevant government agencies, even including MOE, opposed the law for fear of losing some of their authority in the coastal zone. The strongest opposition came from MOCT because many laws which applied in the coastal zone were under MOCT and their goals and objectives were quite different from those of the Coastal Zone Management Act.

At first MOMAF tried to introduce a zoning system to the Coastal Zone Management Act. However, because of strong opposition from other agencies, MOMAF introduced a planning system that has weak mandates for the management of coastal resources and does not conflict with any other laws under other government agencies. The Coastal Zone Management Act was enacted in 1999. Although the ICZM Act has very weak mandates for the management of coastal resources, it has the following basic management directions through “the National ICZM Plan,” which was established in 2000: (1) future development and conservation priorities; (2) designation of conservation areas; (3) direction of pollution load management; (4) identification of scenic areas and sites where public access is considered a priority; (5) identification of sites where readjustments to existing coastal development plans are as necessary.

As mentioned above, the Second Basic Public Water Reclamation Plan for the period of 2001 to 2011 called for reclamation projects on 355 sites totaling 390 square kilometers, however, MOMAF, accepted only 186 sites totaling 38 square kilometers based on the National ICZM Plan.

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 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 following reasons: (1) the short history of marine ecosystem management; (2) the short history of NGO; (3) the lack of culture of discussion among stakeholders; (4) 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, Honor Fishing

Surveillance Program, and Honor 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 on 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. By 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 environment management from the Ministry of Environment (MOE) and public water management and reclamation policy from the Ministry of Construction and Transportation (MOCT). So, 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 charge of MOE based on the Water Quality Conservation Act. The coastal water quality management, however, is under the charge 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.

Despite of MOMAF, there are still other government agencies, such as MOCT and MAF, who have strong incentive and power for development of marine ecosystem. Also the local governments have shown strong incentives for development of marine ecosystem 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 Harbors 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 above mentioned laws, the fisheries policy in Korea has been growing in quantity of fishery industry by strong government support together with the economic development. By the result, the catch of fisheries of Korea ranks twelfth in the world and the export of fishery among primary industry ranks the top 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, 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 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 Korea

government has established various programs and policies, such as TAC System, Marine Ranch Program, Aquaculture Program, and Buy-back Program to restore the fisheries stock and sustainable fisheries. However, the scientific assessment of fisheries resources, which is most important factor for sustainable fisheries management, has not been conducted effectively due to lack of agreement between neighboring countries on transboundary fisheries and illegal fishing by domestic and foreign fishers.

(2) Biodiversity

While MOE is in charge of biodiversity and ecosystem in Korea, MOMAF is in charge of most of 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 for marine ecosystem based on the act, however, until now MOE has addressed terrestrial biodiversity and ecosystem and not marine ecosystem. “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 on marine biodiversity and ecosystem.

The data and information on habitat in Korea are mostly limited to the habitat of mountains and those on marine ecosystem are poor. Also, until now any comprehensive survey of marine living resources except fisheries has not conducted. And there have not established any management program or policy for marine biodiversity. So now 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 destructed seriously due to 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 redtides. However, until recently the government program and policy or laws on marine ecosystem has not been addressed for marine ecosystem. In 1999 MOE and MOMAF revised “Natural Environment Conservation Law,” which mandates MOE and MOMAF in charge of terrestrial and marine ecosystem and natural living resources respectively. However, the act does not address the marine ecosystem. So MOMAF and Congress are

enacting “Marine Ecosystem Conservation and Management Law” for conservation and management of sustainable marine ecosystem. If enacted, the law will be under MOMAF.

The wetlands and marine sand are the important habitat and factor of marine ecosystem. However, until recently the wetland and marine sand management has been development-oriented. So MOMAF and MOE enacted “the Wetland Conservation Act” in 1999 and struggles 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 construction industry have established a strong development system on sand mining and have strong voices for sand mining.

(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. Also there have been occurred about 300 cases of oil spill every year as vessel traffic increases in the coastal waters. They imposed cumulative impacts on coastal environment and caused serious problem, such as eutrophication, redtides, and mass mortality of marine organisms.

Since 1991, coastal water quality measured by COD 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 declining of water quality and increasing of nitrogen and phosphorus, the number of red-tides occurrence increased continuously.

Korea government ratified most of 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 pollutant 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 charge 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 relevant government agencies, especially MOE.

So 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) Stakeholder's 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 have been suggested in this review. Survey by questionnaire for priority rank among the five policy areas and 23 recommendations of each policy area was 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) Stakeholder's 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 Honor 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 Management 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 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 Program

Partnership Program such as Marine Debris Monitoring by NGOs with support from MOMAF and KMI should be expanded to other areas. For example: to fisheries area.

(3) Expansion of Incentive Program

Incentive Programs such as purchase of marine debris collected by fishermen can be expanded to other areas. For example: to fisheries area.

(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 Honor Surveillance Program

Honor Surveillance Program, such as Honor Fishing Surveillance and Honor 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," of which object is to fill the 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 occurred by the dual environment 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 incentive and power for development of marine ecosystem. 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 a "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 same as the other bureaus, such as Shipping and Logistics Bureau, Ports and Harbors Bureau, Fisheries Policy Bureau, Fishery Resources Bureau, Maritime Safety Management Office.

It is necessary to level up the Marine Policy Bureau to be able to coordinate major issues on 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 "Natural Environment 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"; reinforcement of marine environment impact assessment, all of which should be implemented with priority. 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 "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 "Relevant Government Agencies Meeting" concluded that the enactment should be postponed and instead MOMAF should establish and implement "Comprehensive Action Plan for Prevention of Land-Based Sources of Pollution" including policy and budget.

However, MOMAF has limited effect on control of land-based sources of pollutant without relevant law. So "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 "Environment Impact Assessment Act," which, however, has not considered the characteristics of marine environment and ecosystem. The representative examples are port dredging, marine sand mining, and wetlands and coastal waters reclamation.

So "Marine Environment 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 "Third Comprehensive Marine Environment Preservation Plan for 2006~2010," which will include the most important and basic policy for marine environment and ecosystem. 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 environment 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 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, totaling 1127.61 square kilometers of sea and 1065.15 square kilometers of land, of which the main objectives are to regulate the land-based pollutant. MOMAF also designated the Bay of Kamak, Hampyung, Wando-Doam and Deugryang as the Environment Conservation Areas and established the management plan, totaling 1172.41 square kilometers of sea and 1718.40 square kilometers of land. However, 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 Plan" 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 includes followings: (i) statistics of marine debris, such as generation,

collection, and disposal of marine debris; (ii) program for prevention of marine debris; (iii) program for collection and disposal of marine debris; (iv) partnership monitoring among government, NGOs, and researchers; (v) 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 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.

A "Comprehensive Marine Sand Management Plan" should be established, which include followings: (i) demand and supply of marine sand; (ii) long-term monitoring on marine sand; (iii) reinforcement of environment impact assessment on marine sand mining; (iv) reinforcement of "Ocean Use Consultation" on marine sand mining; (v) 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 Coast Guard (KCG) of MOMAF established NCP in 2000 and RCPs for twelve major coastal waters from 1999 to 2002. And then Korea government ratified the OPRC in 2000 and has tried to cooperate with neighboring nations throughout the Northwest Pacific Action Plan (NOWPAP) to respond to big oil spill accidents. However, Marine Pollution Prevention Act (MPPA) has not any 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. And the conventional fisheries management has been proved to be limited effect on the fisheries industry and resources management. So, in 1995, the government has established 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 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 been 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 following should be conducted: (i) All the neighboring countries of YSLME should conduct TAC system at the same time and same level; (ii) 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; (iii) 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 (i) preservation of fisheries resources, (ii) protection and preservation of marine ecosystem, and (iii) marine environment 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. So MPA should be integrated and reinforced by unification of laws and government agencies.

(3) Marine Ranch Program

As fisheries resources have been depleted due to overexploitation and illegal fishing, MOMAF has enforced the marine ranch program, such as artificial reefs, artificial seaweed beds, and algal forest. The investment for marine ranch program of five sites from 1998 to 2010 will be 158.9 billion Won. 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. 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.

VII. Suggestions for the Future Works

The work of "Governance Analysis of YSLME: Korea's Case" was too large and wide in its scope to conduct fully considering its time limit and resources. So the authors had to conduct the analysis in macroscopically not microscopically. Especially it was difficult to conduct assessment of individual programs or policies. If conducted, the authors could suggest problems that the programs have and lessons that can be shared for expansion to other areas.

The authors are suggesting that further micro analysis on at least Stakeholder Analysis, Institutional Analysis, Legal and Policy Analysis; Fisheries, Biodiversity, Ecosystem, Pollution could contribute to establish SAP after TDA. Also the authors wonder the result of "Governance Analysis of YSLME: China's Case." Comparing and analysis of the both cases to find the common factors and lessons to be shared are also future works.

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<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 - Pblic 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	◦ Preservation of the natural and living environment and prevention of environment of environmental pollution ◦ Environment impact assessment(EIA) ◦ Management of Marine Natural Parks

☐ Local Administration Agencies	◦ 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

(as of May 1, 2006)

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	・Underwater environment	02)485-4804

	Association	preservation campaign for the conservation of marine environment	
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 Center*)	· 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	Headqyarters 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

<Attachment 3> Status of IMO Conventions

(As of March 1, 2006)

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	Dec. 9, 94	-	Feb. 2, 96	-	40

	amendments					
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

<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 Shipowners 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)