

Environmental Management of the Bohai Sea in China

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The Bohai Sea is the largest enclosed sea in China and rich in marine resources. The economy along the coast of the Bohai Sea is developed rapidly and the economic zone around the Bohai Sea has already formed. With the marine exploitation and the development of industries along the coast of the Bohai Sea, the pressure on it is getting greater and greater. Since the Bohai Sea is a nearly enclosed sea area and has worse exchanging conditions of the water body, how to protect the marine environment is an important subject while the sea is developed. In recent ten years, China, from the Central Government to the local governments, has attached importance to the development and management of the Bohai Sea and has done much work in the marine environmental quality evaluation, monitoring, treatment and control. Obvious progress has been made in protecting the environment of the Bohai Sea.

The Bohai Sea is the largest enclosed sea in China with an area of 77,000 km² and a mean depth of 18 M, and rich in marine resources. Along the coast of the Bohai Sea the economy is developed rapidly and the economic zone around the Bohai Sea has already formed, which has got the title of gold necklace around the Bohai Sea. It has got five features in the marine development.

1. Ports Along the coast of the Bohai Sea, there are five ports open to the other countries and many middle and small sea ports, which is the highest in the density of ports along the Chinese coast. The handling capacity of the main ports is 170 million tons in 1988 making up over two fifths of the handling capacity of all the main ports in China.

2. Beaches The area of beaches along the Bohai Sea accounts for 60% of the land area of the coastal zone in this region, which is the largest in four sea areas in China. The beaches are suitable for developing the salt industry, sea water culture, animal husbandry and planting. At present the major usages of the beaches are the development of the sea salt industry and marine chemical industry. 60% of the Chinese sea salt come from the beaches of the Bohai Sea.

3. Sea water culture The conditions and foundation for sea water culture along the coast of the Bohai Sea are favorable and the output from sea water culture has come up to over

0.46 million tons a year in recent years making up 29% of the total output of the fisheries in this region, among which the output of prawn accounts for more than half of that of China.

4. Development of oil and gas In recent years the development of oil and gas has been carried out at speed, and three large oil fields, such as Shengli, Dagang and Liaohe have been already built along the coast of the Bohai Sea. The offshore oil exploitation has been conducted in an all-round way and two oil fields has been going into operation forming the first offshore oil and gas exploitation zone of China.

5. Coastal tourism The tourist resources along the coast of the Bohai Sea have local characteristics of their own. There the weather is pleasant. It is not cold in winter and not hot in summer. There are many excellent sand beaches with the title of gold beaches. And there are many colourful natural landscape beaches and humane landscapes, which are summer, holiday and tour resorts. The coastal tourism has great potentialities.

With the marine exploitation and the development of costal industries of the Bohai Sea, the environmental pressure on the Bohai Sea is getting greater and greater. Since the Bohai Sea is a nearly enclosed sea area and has worse exchanging conditions of the water body, it is an important problem to protect the marine environment while the sea is exploited and used and the regional economy is developed. In recent ten years, China, from the Central Government to the local governments, has attached importance to the exploitation management of the Bohai Sea and done much work in the environmental quality evaluation, monitoring, controlling and treatment. Great progress has been made in protecting the environment of the Bohai Sea.

A. Marine Environmental Survey and Monitoring of the Bohai Sea

The marine pollutant survey in a large scale and planned way in China began in the early 1970s. From 1972 to 1973 the first marine pollutant survey was conducted in the Bohai Sea area, and 210 survey stations were established in the range of 35 miles from the shore. It included tens of items, such as on hydrology, meteorology, water quality, bottom soil and organism pollution and obtained over 80,000 survey data. From 1974 to 1975 a comprehensive survey was made in the sea area far from the shore and 36 survey stations were established in the survey area. It included 12 items on water quality, 5 items on bottom soil and 2 items on biology and obtained more than 6,000 survey data. In 1976 a large scale comprehensive survey was made on hydrology, meteorology, water quality, bottom soil, planktons and benthonic organisms and obtained 50,000 survey data. Through the above mentioned surveys the pollutant baseline surveys of the Bohai Sea were basically accomplished and the

pollutant outline, sources, distribution and transportation of the Bohai Sea were understood better. These surveys showed that the coastal sea areas of the Bohai Sea were polluted in varying degrees and parts of estuaries and bays were polluted seriously, which were concerned by the governments and society. With a view to further understanding the marine pollutant characteristics and changing law and providing a scientific basis for the marine environmental management of the Bohai Sea the pollutant monitoring network of the Bohai Sea and the Huanghai Sea was formed in 1978. Since the October of 1978 the water body and bottom soil of the Bohai Sea have been monitored regularly in an all-round way and the sources from which the pollutant went into the sea also have been investigated in an all-round way. The monitoring items of the monitoring network include more than 30 items, such as on oil, heavy metals and organic chlorine pesticides, and the results are published in the Pollution Bulletin. The development and experience of the pollutant monitoring network of the Bohai Sea provide a basis for the late nation-wide marine pollutant monitoring network.

In March, 1983 The Law of Marine Environmental Protection of the People's Republic of China began to be put into effect and the efforts of marine environmental protection in China began to come into a new stage. In May 1984 The State Environmental Protection Administration and the State Oceanic Administration together established the nation-wide marine pollutant monitoring network that consisted of 4 regional monitoring networks of the Bohai Sea, Huanghai Sea, East China Sea and South China Sea, and the monitoring work was to be done on the basis of unified working plans and technological regulations. Thus the routine marine environmental monitoring system formed.

After putting the Law of Marine Environmental Protection of China into effect, China published successive special marine environmental protection laws and regulations, such as The Management Regulations against Polluting Sea Areas by Ships; The Environmental Protection Regulations regarding Offshore Oil Exploration and Exploitation and The Management Regulations regarding Marine Waste Dumping. Meanwhile, China State Oceanic Administration established departments (management districts) and contingents in charge of putting the laws and regulations into practice and the marine management in every sea areas including the Bohai Sea. It strengthened the technological means of marine monitoring and was equipped with some marine monitoring vessels, marine monitoring airplanes and relevant instruments, which conducted periodical and nonperiodical monitoring and survey cruises. Thus the work of marine environmental management gets onto increasingly completed legal and scientific track.

B. Environmental Quality Evaluation of the Bohai Sea

Through many times of investigations and studies for many years the environmental condi-

tion of the Bohai Sea has been already understood basically. At present the fundamental conclusion is that the water quality in the Bohai Sea is still in good condition and some parts of it, such as estuaries and bays where wastes are dumped are polluted obviously. The pollutants are mainly from the mainland. Most of pollutants into the sea are oil and organic pollutants, but mainly oil. The water quality in some bays has got up to the degree of enriched nutrition and red tides appeared in the Bohai Bay and Dalian Bay. Some bays are polluted in varying degrees by heavy metals and the Jinzhou Bay the most. But in recent years since the pollution treatment was paid close attention to, the coastal pollution condition is getting better year after year.

C. Problems and Countermeasures concerning the Environmental Management of the Bohai Sea

The environmental management work of the Bohai Sea in China has already got onto the normal track and obvious results have been obtained in protecting the marine environment. The major marks are that as a whole area of the Bohai Sea the water quality condition is still controlled efficiently and up to now it is still in good condition; the water quality in some parts of the coastal sea areas has been improved and their pollutant condition is getting better. In order to keep the environment healthy and further treat the pollution in some parts of coastal sea areas under the condition of increasingly developing the coastal industries and marine exploitation of the Bohai Sea, it is suggested that the management in the following aspects should be strengthened.

1. The control of the coastal pollutant sources should be further strengthened. As the pollutants of the Bohai Sea are mainly from the mainland, the management of the industrial pollutant sources should be strengthened and discharging the pollutants should be controlled strictly including the discharging concentration and sum of pollutants and ways of pollution. In view of oil as main pollutants the management of major estuaries, bays and oil fields should be specially strengthened so as to control the discharging of oil pollutants from the coastal industries, ships and offshore oil platforms. Through the management of pollutant contents the goal of controlling pollution will be gradually achieved. In addition, the ship dismantlement industry is developing and there are more than 30 ship dismantlement spots only along the coast of Liaoning Province with the abilities of over 0.3 million tons a year which form new pollution sources. Several events harmful to the environment and sea water culture caused by oil pollutants from the ship dismantlement industry happened, and should be paid attention to. The ship dismantlement industry should be further managed and rectified, and the ship dismantlement yards without conditions of anti-pollution should be closed.

2. The Environmental Monitoring and Survey System should continue to be consummated and developed. At present the key problem is that the monitoring technological means are not able to meet the needs, and especially the remote sensing and remote measuring system and communications system are comparatively backward. From now on the pollutant monitoring technology using the aviation and satellite remote sensing and the modernized communications equipment should be developed with emphasis, and the technology and equipment should be combined with conventional monitoring means to form a modernized marine environmental pollutant monitoring system.

3. The marine environmental protection and management should be strengthened. It involves varying legal, administrative and economic protection measures including drawing up regional regulations and protection work plans, establishing sanctuaries and waste dumping areas and perfecting institutions and contingents in charge of enforcing the law to protect the marine environment.

4. The treatment technology and ways against the marine pollution should be developed, in particular the retrieving and purifying technology to treat the marine oil pollution. The comprehensive treatment measures and technology should be developed for some parts of the Bohai Sea polluted sivamente.

5. The marine environmental data base and information system should be established, which should include the environmental resources, economic and social bases of the Bohai Sea, and the information processing, analysis and experts systems that can provide the information and consultation for making strategic decisions of the marine environmental management.

References

1. China Ocean Year Book 1986, China Ocean Press;
2. The Outline of Marine Pollutant Monitoring in China, 1989, Marine Environmental Sciences Vol 8, No.2;
3. The Outline of Pollutant Treatment Studies of the Bohai Sea and Huanghai Sea, 1987, Marine Environmental Sciences, Vol.6, No.4;
4. The Marine Environmental Condition and Relevant Problems in Liaoning Province, 1989, Marine Environmental Sciences, Vol 8, No.3;
5. The Primary Study on Mercury and Arsenic Pollution in Bottom Soil of the Bohai Sea, 1980, Marine Environmental Sciences, No.1;
6. The Primary study on Enriched Nutrition and Red Tides of the Bohai Bay, 1983, Marine Environmental Sciences,

Vol.2, No.2;

7. The Outline of Studies on the Environmental Quality Evaluation and Self Purification of the Bohai Bay, 1983, Marine Environmental Sciences, Vol.2, No.2;

8. The Sources and Impact of Oil Pollution in the Sea Area along the Coast of Cangzhou of the Bohai Bay, 1983, Marine Environmental Sciences, Vol.20, No.4;