Japanese Environmental Law and Ocean Resources

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INTRODUCTION

Japan's tremendous industrial growth in the past two decades has placed considerable strain on the ocean environment surrounding its shores. At the same time, the food, energy, and material demands of a burgeoning population and expansive industrial base have rekindled interest in the ocean as a supplier of increasingly scarce resources. Difficulties arise, however, when man attempts to use an area of the sea for mutually exclusive purposes. This Article chronicles some of Japan's experiences in managing ocean resources; it explores techniques for both harvesting the ocean's bounty and for minimizing the deleterious effects of industrialization.

Part I of this Article discusses the classification of ocean resources and outlines the scope of jurisdiction of individual nations over each resource. Part II describes Japan's approach to ocean resource management. Part III recounts Japan's experiences with the cultural fishing industry. Finally, Part IV outlines the problems presented to the fishing industry by water pollution, particularly by red tides. It is hoped that this examination will engender a better appreciation of the difficulties encountered in balancing simultaneous demands for both the utilization and conservation of ocean resources.

I
OCEAN RESOURCES AND JURISDICTION

"Ocean Resources" in this paper refer to marine resources, deep seabed resources, underground resources of oceans, and living resources in the sea, on islands, and in the ocean. Each of these broad categories of resources is composed of numerous elements. Marine resources, for example, encompass energy derived from the sea, including wave and tide power, heat-exchange energy (derived from changes in ocean temperatures), and wind power, in addition to sea water itself. Deep seabed re-

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sources include items physically found on the ocean floor, such as manganese nodules. Underground resources include minerals such as petroleum, natural gas, coal, copper, and tin.[1] Finally, living resources include fish, crabs and other shellfish, and mammals. Species endangered by overexploitation, such as whales, are an important element of this category.[2]

Legal jurisdiction over these four classes of ocean resources varies with the type and location of the resource in question. Marine resources within territorial waters are under the jurisdiction of the nation which has jurisdiction over those waters. That nation is responsible for the environmental protection of the sea. Jurisdiction over marine resources outside of territorial waters is determined by international customary law and relevant bilateral and multilateral treaties. The mining of deep seabed resources normally takes place on (or under) the high seas. Hence, such activities are controlled by international law. Underground resources in the ocean present delicate problems for nearby nations. As a general rule, resources located and mined on the continental shelf are covered by the jurisdiction of the nation contiguous to the shelf. That nation is responsible for applying environmental law to this area. Living resources fall under domestic and international law, even within territorial waters.[3] Only close cooperation and communication among concerned nations can preserve and promote living resources.

In addition to the distinctions noted above, the United Nations International Commission adopted a number of laws relating to oceans and ocean resources in 1958. The Law on Territorial Waters recognized the

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1. It is the method of recovery rather than the nature of these resources that qualifies these minerals as a "sea resource". In some cases these minerals may also be recovered under the sea from land bases such as mines.

2. In addition, the ocean itself can also be considered a "resource" in geopolitical terms, since it contributes to the security of nations. This is particularly true for an island nation such as Japan.

3. Under the establishment of the 200-mile Exclusive Economic Zone (EEZ), the coastal state has two primary responsibilities in the management and conservation of the living resources within its EEZ:

First, the coastal state is under a duty, taking into account the best scientific evidence available to it, to ensure through proper conservation and management measures that the living resources of the EEZ are not endangered by overexploitation. The coastal state must maintain or restore populations of harvested fisheries at levels which produce a "maximum sustainable yield."

Second, the coastal state is to promote the objective of "optimum utilization" of the living resources within its EEZ, which is a more flexible concept than "full utilization." To this end, the coastal state shall determine the allowable catch of the living resources within its EEZ and its own capacity to harvest the allowable catch.

If a coastal state sets an allowable catch at levels above that which the coastal state has the capacity to harvest, it must grant access to other states to harvest the available surplus. *See* L. SOHN & K. GUSTAFSON, THE LAW OF THE SEA 123-25 (1984). Under such circumstances, Japan could not send ships to fish in the EEZ's of the nations concerned without permission from their governments.

jurisdiction of adjacent coastal nations over incidents occurring within their territorial waters and confirmed the principle of innocent passage for vessels of all nations. The Law of the High Seas confirmed freedom of navigation on the high seas and affirmed the traditional jurisdiction of the flag nation for incidents involving seagoing vessels. The Law of Marine Resources established rules to preserve marine resources in international waters. The Law of the Continental Shelf recognized the right of coastal nations to exploit mineral resources on the continental shelves extending to 200 miles.[4]

II
JAPAN'S APPROACH TO OCEAN RESOURCE MANAGEMENT

A. Marine Resources as Energy

Marine resources as energy sources include the utilization of wind, waves, and tides. Along with studies on the effective utilization of nuclear, solar, and geothermal energy, the study of these marine energy sources has been promoted in Japan as the most important current energy issue since the first energy crises of the 1970's.

To diversify its sources of energy, Japan is developing the use of wave energy, ocean thermal energy, and currents. Several government organizations, such as the Self-Defense Agency's Technical Research and Development Institute, the Maritime Safety Agency's Navigation Aids Department, and the Research Development Corporation of Japan have developed technology that uses air turbines to generate electricity from waves. In 1974 they came out with the first practical application of wave energy, a device to operate a small 10-watt generator for use on channel buoys. The Science and Technology Agency allocated funds to develop large-scale generation of electricity from waves and directed the Japanese Marine Science and Technology Center to take charge of the project. Tests for practical application of the world's first large-scale seawave power generator began in Yura Port, Yamagata Prefecture, on July 1979, aboard the experimental ship *Kaimei.*

Research on ocean thermal energy—that is, generating electricity by exploiting the temperature difference between the ocean's sun-warmed surface water and its cold water deeper down—was initiated by the Ministry of International Trade and Industry in the Sunshine Project. The Project, which is being coordinated by the Ministry's Agency of Industrial Science and Technology, seeks to develop technologies to tap solar and geothermal energy, to extract hydrogen from water, and to liquify coal.

4. Tomotaka Ishimine, *Ocean Resources: An Analysis of Conflicting Interests,* in ECONOMIC GROWTH AND RESOURCES: PROBLEMS RELATING TO JAPAN 389 (Shigeto Tsuru ed. 1978).

To promote such studies, a law concerning the development and introduction of alternate energy sources was promulgated on May 30, 1980.[5] This was followed by the establishment in October 1980 of the New Energy Development Organization, designed to play a leading role in developing new energy sources.

Since sea water is a source of living resources, it should also be considered a basic marine resource in itself. It is, needless to say, important to take urgent measures to reduce marine pollution along the sea coast and in domestic waters that carry discharged harmful materials into the ocean; discharges from ships at sea should also be diminished. To this end, Japan has taken appropriate measures to prevent industrial and nonindustrial activities from causing any harmful hazards. Regulated activities within this sphere include plant and fish nurseries, petroleum refineries, and related facilities such as floating marines, docks, and structures for the exploitation of oil and gas.

B. Deep Seabed Resources

The United Nations Convention on the Law of the Sea,[6] which was adopted in April 1982, covers various legal issues relating to the exploration and exploitation of deep seabed mineral resources. Japan signed the Convention in February 1982, as did several other industrialized nations, and then passed implementing domestic legislation.[7]

C. Underground Resources

With the exception of several petroleum and natural gas projects off the coast, Japan is not heavily involved in the exploitation of underground resources in the ocean; Japan has few underground resources in and around its territory, and the continental shelf contiguous to its land is relatively small. Japan, however, founded a national corporation, *Shinkai Shigen Kaihatsu* (Deep Sea Resources Development Company), in September 1982, to promote the exploitation and utilization of deep sea resources. The Agency of Natural Resources and Energy is thus making efforts to develop deep seabed mining resources.

D. Living Resources

Protection of living resources is the subject of the Convention on International Trade in Endangered Species of Wild Fauna and Flora,[8] also known as the Washington Treaty. Japan was severely criticized by

5. An Act Concerning the Development and Introduction of Alternate Energy Sources, Law No. 71 of 1980.

6. United Nations Convention on the Law of the Sea, Dec. 10, 1982, U.N. Doc. A/Conf.62/122, 21 I.L.M. 1261.

7. Act for Temporary Measures relating to Deep Seabed Mining, Law No. 64 of 1982.

8. Mar. 3, 1973, 27 U.S.T. 1087, T.I.A.S. No. 8249, 993 U.N.T.S. 243.

other nations for its delay in signing and ratifying the Treaty. However, in 1980 Japan joined the Convention and implemented domestic enabling legislation[9] and related rules and regulations, which became effective on December 1, 1987.

In December 1987, the Japanese Environmental Agency drew up guidelines concerning procedures to be followed for this Act. As reported in the media, a number of traders who made illegal transfers of endangered species were arrested during the past year. Despite the various enforcement problems that remain, the situation in Japan today has changed considerably from what it was even a year ago.

Whales, dolphins, and cultural fish (those fish that are farmed) are examples of the dilemmas and developments concerning living resources in Japan. Japan has been criticized by many members and nonmembers of the International Whaling Commission for its whaling operations.[10] Japan acknowledges the environmental concerns that have been raised. However, whaling involves very delicate issues of Japanese customs and local economies where small-scale whaling has been a way of life for several centuries. The Japanese Government intends to uphold her policy of whaling for purposes of research and investigation.[11]

Similarly, Japan has been criticized for the treatment of dolphins by Japanese fishermen at Iki Island. There is tension, however, between the outpouring of sympathy for these mammals in Japan itself and the role that dolphins play in the traditional way of life of these Japanese fishermen.

1. Cultural Fishing

Cultural fishing has been widely adopted in Japan. The history of salmon and trout hatching and releasing stretches back almost 100 years. For the last twenty years the scale of hatching and releasing has increased sharply due to technical innovations. For example, 49 million baby white salmon were released in 1985, compared with 18 million in 1975, and 5 million in 1965. As a result of this increase, the production of domestic cultural fishing products along the sea coast or in inland waters reached approximately 170,000 tons in 1985. This is almost 81% of the total salmon and trout production of Japan. In comparison, in 1975 the amount of cultural fish was 75,000 tons, which represented 44% of the total amount of fish harvested for the year. This means that the 1985 production of cultural fish was more than double the production in

9. An Act Concerning the Regulation and Transfer of Species of Wild Fauna and Flora, Law No. 58 of 1987.

10. *See, e.g., Japan's Commissioner Quits Whaling Group Over a Vote,* N.Y. Times, June 27, 1987, at A28, col. 4.

11. *See Japan to Kill 300 Whales for Research Purposes,* San Francisco Chron., Sept. 28, 1988, at A22, col. 5.

1975. Similar results have been achieved with red snapper, sole, tiger shrimp, *Watari* crab, scallop, abalone, and sea urchin.

III
REPRODUCTION OF MARINE RESOURCES

A. An Overview

About eighty different species of fish and shellfish are cultivated in Japan by a number of fishery culture centers. These culture centers, which are established by the national and prefectural governments, play an important role in the reproduction of fish and shellfish to be supplied to consumers, in the study of the mass production of fish, and in the diffusion of new cultivation techniques among centers.

The most difficult problem in the reproduction process is sustaining the baby fish prior to release in the rivers or in the ocean. In general, the volume of production is rather small when compared to the number of fish that are released. To make production successful, innovative techniques for reproducing and sustaining young fish must be developed. Successful production is closely related to the quality and quantity of the water and other natural surroundings.

Considering these facts, it is easy to understand why the cultural fishing industry is considered as important as the natural fishing industry. Although serious problems remain, the Japanese cultural fishing industry may be a good model for solving our ocean resource problems.

B. Problems Facing Cultural Fishing

Water pollution is the most serious problem facing the cultural fishing industry. The various causes of water pollution include red tides, oil and chemical materials discharged from ships or land facilities, and sea-related construction.

Red tides are considered the most important pollution problem because of the serious damage they inflict on marine resources, including spontaneous and cultural fish. Red tides are defined, according to natural scientists, as a phenomena of changing color of sea water by abnormal multiplication of microorganisms. Briefly, red tides occur from the abnormal multiplication of certain species of microorganisms (caused by eutrophication); this multiplication results from an imbalance in the seawater environment leading to destruction of several species of microorganisms, which in turn induces the rapid multiplication of other species, causing the red tide. The exact relationship between the red tides and their causes still remains unknown. However, enough is known that scientists, concerned citizens, administrators, and lawyers consider the prevention of eutrophication in the sea water as the most important target for immediate improvement.

IV
THE EFFECTS OF RED TIDES AND OIL AND CHEMICAL POLLUTION ON CULTURAL FISHERIES

A. Red Tide Damage

Red tides were first reported on a large scale around 1957 in the Seto Inland Sea. Since then the red tides have spread over the entire area of the Sea and have caused very serious damage to fisheries. As a result of the frequent occurrence of red tides, groups of fishermen brought two cases against several corporations and prefecture governments asking for compensatory damages. Although these cases are still pending in court, the main issues involved concern the causes of the red tides. This includes establishing the legal causation between the occurrence of red tides and certain discharged materials (including nitrogen, phosphorus, and human waste which was discharged into the sea by local governments in the 1950's and 1960's). To establish this legal causation in court, however, is quite difficult, not only in the legal sense but in the scientific sense as well. In addition to these difficulties, the court is currently considering the legal responsibility of central and local governments under the Natural Compensation Act[12] and the tort liability of ten defendant companies.

In recent years, red tides primarily have occurred in the Seto Sea (Setonaikai), in the waters of Osaka Bay and Tokyo Bay. The tides have caused serious damage to fishery production. Red tides in these areas have become more widespread, prolonged in duration, and varied with respect to cause. Because of these dangerous situations, concerned government officers and citizens have sought urgent and effective countermeasures against the occurrence of red tides and their serious consequences. In addition, concerned people have sought technological innovations for the anticipation and prevention of red tides.

According to a scientific study,[13] red tides began to be reported on a large scale in the Seto Inland Sea of Japan in 1957. At that time, the deepest parts of Osaka and Hiroshima Bays in the Inland Sea were not included in the report. In 1965, however, the red tides spread over the entire Inland Sea and caused serious damage to fisheries. In particular, there were twelve red tide cases reported, of which eight cases involved serious damage. In 1966, the occurrence of red tides in the Inland Sea sharply increased to sixty cases.

As the result of this massive occurrence, the yellowtail (*Hamachi*) culture was seriously injured. In 1972, it was reported that the most severe case occurred in the Harima Nada, off the coast of Kobe City, in the Inland Sea area. The red tides killed about 14 million yellowtail fish,

12. Law No. 125 of 1947.
13. Tomotoshi Okaichi, *Red Tides and Fisheries Damages*, 29 EISEI KAGAKU 1 (1983).

a loss estimated at 72 billion yen (approximately $553 million).[14] Similar damage occurred successively in 1977, 1978, 1979, and 1982 in the Harima Nada sea-area in the Seto Inland Sea.

Yellowtail fish culture started in the late 1960's, at about the same time as the occurrence of red tides. The fish culture along the sea coast has been an important industry in Japan. The yellowtail fish is merely one example of this industry's products. The growth of the cultural fishing industry reflected increased consumer demand and the introduction and innovation of new culture techniques. As the Harima Nada red tide disaster shows, the early 1970's became a turning point for recognition of the red tides as a grave environmental problem on a national scale and not just a matter affecting the fishermen in the stricken area.

B. Countermeasures Against Red Tides

In 1970, Japan promulgated The Water Pollution Prevention Act, which covers general water pollution issues. To strengthen the regulation of water pollution in the Seto Inland Sea, Japan later adopted an Act entitled Special Measures for the Conservation of the Environment of the Seto Inland Sea. This special statute requires the central government to draw up a fundamental plan addressing preservation of the water quality and natural beauty of the Inland Sea of Japan. The statute also requires the local governments (encompassing thirteen prefectures) to take temporary countermeasures against water pollution in the Sea.

A variety of conservation measures were adopted in the Act. One measure requires prefectural governors to carry out a wide variety of environmental conservation measures. Another establishes a permission system for the installation of specified types of facilities. A third creates an areawide total pollutant load control program in order to improve the water quality of the Inland Sea. The prefectural governors concerned were to formulate plans for the areawide total pollutant load control in accordance with a basic policy set forth by the Prime Minister. The target of this policy was to reduce the areawide total pollutant load by the end of 1984. Studies are still being conducted in order to formulate a new policy aimed at reducing the pollutant load.

To prevent eutrophication in the Inland Sea, another measure of the Act provides guidance targeted to reduce the discharge of phosphorus and its compounds by 1986. In response to a recommendation of the Inland Sea Environmental Conservation Council, which consists of governors of the relevant prefectures, the Director-General of the Environment Agency instructed the governors to formulate guidelines that would lead to a reduction in phosphorus and its compounds by 1989. The formulation of these guidelines is under way.

14. Assuming $1 U.S. = 130 Yen.

The preservation of natural seashores was also a target of the Act. In response to this objective, concerned prefectures enacted ordinances designating the particular seashores to be preserved. By December 1985, seventy-seven districts had been so designated.

Finally, the Act stipulates that concerned prefectural governors must give full consideration to the peculiarities of the Inland Sea in permitting or approving reclamation projects. Such reclamation projects are another cause of serious environmental hazards in the area. Since the passage of the Act concerning Special Measures for Conservation of the Environment of the Seto Inland Sea, 2,444 applications for reclamation covering a total area of 5,242 hectares were licensed or approved. This included 154 applications covering an area of 185 hectares in the one year from November 2, 1984, to November 1, 1985.

The most important measure to combat the occurrence of red tides is the improvement of the sewer system along the coast of the Sea. Under the Fifth Five-Year Sewer Improvement and Construction Plan, a total of 439.7 billion yen (approximately $3.4 billion) was invested in thirteen prefectures in 1984, with particular emphasis on the improvement of sewer systems. This includes public sewer systems and drainage basin sewer systems.

Moreover, several concerned organizations have discussed related countermeasures such as the construction of waste treatment facilities for treating waste oil from ships, the monitoring of ships, and the continuation of water pollution research. Although these organizations have promoted the countermeasures stated above, and the situation of the red tides has consistently improved, the occurrence of red tides still continues on a large scale.

C. Red Tides Litigation

It is as important to discuss litigation brought by fishermen harmed by the red tides as it is to discuss legislative and administrative countermeasures against red tides. Two lawsuits have been filed. The first case was brought in the Tokushima District Court on January 23, 1975 by forty-two fishermen and by a fishery company which raises yellowtail fish in Naruto City in the Tokushima Prefecture.[15] The second case was brought in the Takamatsu District Court on July 10, 1975 by seventy-two fishermen and fishing corporations in several towns in Kagawa Prefecture.[16] The two prefectures are located in Shikoku Island. The first case was later transferred to the Takamatsu District Court and is now being reviewed jointly with the second case.

15. Litigation No. 212.
16. Litigation No. 164.

The defendants include fourteen corporations (including the central government of Hyogo Prefecture, which has administrative authority over the jurisdiction of the sea water concerned), Takamatsu City and Okayame City (which were dumping human waste in a central part of the Harimanada Sea in the Island Sea until around 1973), and ten companies engaged in the production, refining, and processing of iron, chemicals, fertilizers, petroleum, plastics, and coke.

The plaintiffs seek compensation for fishery damage caused by defendants' joint tort action. The plaintiffs assert that the defendants are jointly liable for damages in tort under the National Compensation Act[17] and articles 709 and 719 of the Civil Code.[18] They allege that the defendants' discharges of nitrogen and phosphorous in the forms of factory runoff and human waste induce abnormal multiplication of microorganisms in the sea water, which leads to red tides. Plaintiffs suffered greatly from the injury to the yellowtail fish caused by the occurrence of red tides in the Harimanada Sea area between the middle of July and the end of August 1972.

In addition to monetary damages, plaintiffs seek an injunction against ten defendant companies to prevent the discharge of nitrogen and phosphorous from the defendants' factories. This request is based on the fishery right of article 709 of the Civil Code. In support of their request for an injunction, plaintiffs allege that defendants continue to discharge large amounts of nitrogen and phosphorous from their factories. They further allege that the defendants have taken no measures to counteract the occurrence of red tides, despite knowledge that the Harimanada Sea area has been seriously contaminated, that the scope and number of red tides had sharply increased, and that the damage to the area's fisheries had greatly increased. Finally, plaintiffs allege that if defendants continue to discharge nitrogen- and phosphorous-laden water from their factories, prolonged and large-scale red tides will reoccur, the Harimanada Sea area will become a dead sea, and the value of the fisheries will be entirely lost.

The defendants argue that the causes of red tides cannot be attributed merely to factory discharges and human waste. They claim that there are several other causes which should be taken into consideration in this litigation, such as natural disasters, the significant distance between the discharge points and the red tides area, and self-contamination within the cultural fisheries sea area. In addition, defendants argue, the plaintiffs have failed to present a clear causal link between the death of yellowtail fish and the occurrence of red tides.

17. Law No. 125 of 1947.
18. Law No. 89 of 1986.

Currently, both parties continue to present arguments supported by a multitude of data acquired by scientific studies and observations concerning the specific character of the sea in the Harimanada area, the causes of red tides, and the relationship between the red tides and the fishery damage.

This case presents several very difficult legal and scientific issues. Resolution should await the arrival of a credible and widely accepted theory concerning the causal link among the occurrences of red tides, nitrogen, and phosphorous in the discharged water, and the massive death of yellowtail fish. Nevertheless, although the casual link has not been decisively demonstrated, the court is required to resolve the case. The link between red tides, discharges, and yellowtail deaths is left as a matter of probability within the discretionary power of the court.

D. Oil and Chemical Materials

Oil and chemical materials, which are discharged from vessels and land facilities, are another significant cause of fishery damage. Tankers have caused the most serious oil pollution casualties. Routine surveys conducted by the Maritime Safety Agency reveal that although the number of tar balls washed ashore at fixed observation points in Japan has decreased in the last several years, the number of tar balls drifting off the nation's coast is still increasing. On the other hand, the occurrence of other maritime pollution found in waters around Japan has not significantly increased. According to the Maritime Safety Agency, there were 877 cases of maritime pollution in 1986. Of the 877 cases, 569 cases (65%) were caused by oil. In 1985, there were 871 maritime pollution cases, of which 628 (72%) involved oil pollution. Of these 628 oil pollution cases, 475 cases were caused by ships, 192 cases were due to careless handling, and 119 cases were due to deliberate discharge; as many as 299 of these oil pollution cases occurred in Tokyo Bay and Ise Bay alone. In 1984, the total number of maritime pollution cases was 981, of which 704 (72%) were oil pollution cases.

Marine pollution can be prevented by international cooperation as well as by domestic countermeasures. The International Maritime Organization (IMO) plays an important role in promoting international cooperation. In response to preventive actions by IMO member countries, Japan enacted the Marine Pollution Prevention Act in 1970[19] and amended it in 1978. The Act calls for the implementation of measures for the prevention of marine pollution. At the same time, the marine transport structure was changed to accommodate more efficient transportation systems, such as larger oil tankers. Tankers carrying harmful chemical substances began to appear as well. In the wake of these devel-

19. Law No. 136 of 1970.

opments, Japan acceded to a new package of treaties on marine pollution control called the 1978 Protocol to the International Convention for the Prevention of Pollution by Ships of 1973.[20]

Numerous preventive measures against oil and chemical spills were taken under the Act relating to the Prevention of Marine Pollution and Marine Disaster. Under this Act, enforcement controls on the discharge and incineration of oil and wastes were implemented, inspections to ensure compliance with technical standards for the construction and equipment of ships were initiated, and guidance on the prevention of marine pollution was made available through lectures. Improvements were made to waste oil recovery and treatment systems. Purification measures for ports and harbors and their surrounding sea areas were adopted and studies on marine pollution prevention techniques were promoted. Finally, a rigorous control and supervision program governing illegal discharges of oil and other chemical waste was initiated, which paid particular attention to the sea areas where oil pollution frequently occurs.

In view of the enormous damage caused by oil tanker spills, Japan signed the International Convention on Civil Liability for Oil Pollution Damage[21] in 1969, and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage[22] in 1971. Japanese legislation includes the Oil Pollution Compensation Law, which fully reflects the spirit of these two conventions. Under the Conventions and the Compensation Law, calls were made for the imposition of absolute liability on tanker owners, with the ceiling of such liability set within a maximum limit; owners of tankers with an oil cargo capacity of more than 2,000 tons should be obligated to carry liability insurance. In addition, the victims of oil pollution, if not fully compensated by the shipowner under liability insurance, should receive the unpaid balance from an international fund established under the International Fund Convention, provided that the unpaid amount does not exceed the maximum amount.

The protocols for revision of the two conventions were adopted at the international conference held at IMO headquarters in 1984. The principal revisions incorporated in the protocols include an increase in the amount to be charged to shipowners and the amount to be compensated by the international fund, and to extension of the Conventions to vacant tankers and exclusive economic zones. Studies on appropriate domestic action are under way in Japan.

20. Convention for the Prevention of Marine Pollution from Ships and Aircraft, Feb. 15, 1972, 932 U.N.T.S. 3, 11 I.L.M. 262.

21. Nov. 29, 1969, 973 U.N.T.S. 3, 9 I.L.M. 45.

22. Dec. 18, 1971, 11 I.L.M. 284.

The government subsidizes relief projects to fisheries for oil pollution damage caused by unidentified sources; such damage constitutes a considerable portion of all oil pollution destruction. In 1984, the total amount of relief outlays stood at 169 million yen (approximately $1.3 million) in a total of forty-six cases.

Large-scale development projects also cause marine pollution; such projects include the construction of a floating airport, a floating marine station, or power station on the water front. In these cases, an environmental assessment process, countermeasures, and monitoring systems geared toward the execution of countermeasures are required.

V

CONCLUSION

Considering the rapid expansion of the world population, the importance of breeding fish as a source of protein cannot be overstressed. Marine resources will be considered the most important sustainable natural resource for human sustenance. For this reason, it is important to restore our coastal and ocean waters for our own and future generations. We should also keep in mind the important role of cultural fish when promulgating environmental laws and regulations aimed at improving the natural surroundings for marine resources. We must encourage exchanges of technical information on fish breeding, promote new studies in this area, and seek mutual cooperation not only within Japan and among governments but also among concerned scholars in this field.

As we have seen in previous sections, there are several serious problems that can destroy these living resources. In addition, we have limited knowledge of the causal link between these problems and living resources, such as the relationship between red tides and fishery resources. More time and effort must be devoted to establishing a clear causal link between fisheries damage, red tides, and water discharged from factories. The prevention of eutrophication in sea water is the most urgent task, in addition to reducing ocean pollution caused by discharged chemical materials. The Japanese experience provides a good example of attempts to resolve the tension between the demands of an expanding population and the need to conserve natural resources.