

provisional translation

# Basic Plan on Ocean Policy

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# General Remarks

## (1) Relationships between the sea and us

The earth is the only planet in the solar system that has oceans – the mother of life – and we enjoy diverse relationships with them. Water is an essential substance for maintaining all life, and most of it is in the ocean which covers 70% of the surface of the earth. It circulates through the ecosystem, existing in various places around us, such as the oceans, glaciers, rivers, lakes, underground and in the atmosphere, and evaporation from the ocean plays an important role in sustaining this water cycle. The ocean, through interaction with the atmosphere based on its thermal capacity and its functions in thermal transport and water circulation, contributes to preventing sudden changes in temperature and to keeping most areas on the earth within a temperature range generally favorable for the habitation of living things. The ocean also has a great influence on the dynamics of the climate and weather of every region on the planet. Thus, the ocean is indispensable for supporting the variety of life on earth.

Japan is located to the east of the Eurasian Continent and in the west of the Pacific Ocean, consisting of more than 6,000 islands scattering widely over the sea. We have not only enjoyed benefits from the sea on land but also have actively utilized the sea throughout our history as a space for transportation and a site for obtaining food. Japan has developed economically first through overseas exchanges with the Eurasian Continent and at present through trade activities with countries all over the world. At the same time, however, the sea can sometimes constitute a significant threat to land where we live our daily lives. Natural disasters such as tsunamis and storm surges often cause significant damage in various parts of the world. Protecting life and property from such threats of the sea is extremely important for people living in coastal regions. Japan is one of the countries which have fought against such difficulties and have developed successfully.

The sea is, with its vastness and difficulty to gain access to, still a frontier for people. An intellectual appetite for investigating and clarifying the world under the sea has prompted people to conduct a variety of investigations and research and the results thereof have contributed significantly to the enhancement of our intellectual assets. Through such efforts, untapped energy and mineral resources lying underwater came to light, and further research has come to be required for developing and exploiting such resources. Since it

became clear that the sea has much to do with global environment changes including climate change, pursuing and clarifying principles concerning various phenomena in the sea has become necessary. The sea thus holds various issues to be clarified, closely connected to the future development of human beings.

In the last century, major changes occurred in the framework of international arrangements for various marine activities. The rapid advances in technology for exploration and exploitation of the sea prompted fierce competition for marine resources among maritime powers. Furthermore, as a new order of international society began to form following many countries achieving independence since the 1960s, most newly developing countries have called for an overall review of the conventional international customs concerning the management and use of the sea, which was based on the idea of *small territorial seas and large high seas*. In the midst of these changes in circumstances, the United Nations held the Conference on the Law of the Sea three times. The third conference (1973-1982), though originally convened to deal with the conflict over the use of the seabed underlying the high seas, developed into a conference that comprehensively addressed a wide range of problems of ocean space. After discussions over the course of nine years, the United Nations Convention on the Law of the Sea (UNCLOS) was adopted in 1982 and came into effect in 1994. The Convention, in addition to traditional, simple demarcation of territorial seas and high seas, introduced new concepts of marine zones based on their functions and intended uses, e.g. exclusive economic zones (EEZs) and continental shelves, and also introduced a multilayered management system for marine zones. As a result of this Convention, a new framework of international order of the sea emerged, in which coverage of high seas was reduced and freedom of activities on high seas was restricted, while coastal countries increased their powers. Now, new international norms for the sea are being formulated in various fields based on this new framework or for the purpose of supplementing it.

In addition, an increase of burdens due to population increase and expansion of economic and social activities has recently made environmental problems more and more serious on a global basis, as seen with global warming and accompanying frequent abnormal weather and natural disasters, depletion of the ozone layer and a decrease in biodiversity. These are extremely serious problems threatening the basis of our life. Therefore, the United Nations Conference on Environment and Development adopted the Rio Declaration on Environment and Development, which is based on “sustainable

development” integrating environment and development as inseparable parts, and “Agenda 21” as an action plan to realize sustainable development. Since then, international efforts for coping with global environmental problems have further been activated. The sea has, with its massive capacity and purification function, diluted and dissolved environmental load caused by human activities and has managed to maintain its favorable environment. However, environmental problems have become obvious even in the sea, as seen in sea-level high caused by global warming, expanding marine pollution, and disturbance of marine ecosystems. Considering the significant role that the sea has played in creating and maintaining the global environment, the relationships with the sea should be emphasized not only from the perspective of the marine environment but also from the perspective of the overall global environment.

We have to fully understand the significance of the sea accumulated through various relations therewith and squarely face these recently emerging problems to cope with them courageously. We shall lead the whole world to secure a peaceful future of human beings enjoying benefits from the sea, and at the same time, aim to establish a new Oceanic State with vast jurisdictional marine zones seeking the peace and safety of the sea under international cooperation.

## (2) Japan’s system to promote ocean policy

The sea has been familiar to Japan, which is surrounded by the sea. Japan has long been dependant on maritime transport for most of its distribution necessary for creating and developing regional industries and cultures. Furthermore, marine “seafood” products have been one of the major components of diet unique to Japan. The shipping industry and the fisheries industry, which have supported these, constitute Japan’s major marine industry even at present, but administrative measures for these industries have been taken separately as a part of policy on distribution, policy on food or other policies. Administrative measures have also been taken separately for various forms of marine exploitation, such as scientific research, sightseeing and leisure, mineral resources development, and reclamation and landfill, as in the case of measures for the shipping industry and the fisheries industry. In other words, these policies were all established from the perspective of how to use the “space” of the sea from the users’ standpoint, lacking the perspective of how to control the utilization from the viewpoint of managing the “space” of the sea. Under this system, the administration can ensure consistency and integrity for users. However,

considering that diversified marine exploitation activities have become congested amid vitalizing economic activities; various activities on land have come to have a measurable impact on the sea as well; and a variety of energy and mineral resources and marine microbe resources that have the potential to be utilized or industrialized in the future have been discovered, thus it is urgently required to establish a new system to plan and determine policy from the viewpoint of managing the “space” of the sea with due considerations to the possibility and capacity thereof. Such new system would be indispensable for sustainable and rational utilization of the sea.

In the meantime, the international society has also been actively taking measures for managing and exploiting the sea. UNCLOS, which Japan ratified in 1996, outlined a new framework of international order of the sea, and concrete efforts are still underway to formulate new norms in various fields based on this new framework or for the purpose of supplementing it. Also in international trends concerning development and environment, management and exploitation of the sea has been discussed. Japan needs to respond to these international moves, clearly showing its stance from the viewpoint of managing the sea.

Under such circumstances, the Basic Act on Ocean Policy was put into force on July 20, 2007 and Japan’s basic stance on ocean policy was clarified based on the Act. At the same time, the Headquarters for Ocean Policy was established within the Cabinet as a system to promote ocean policy intensively and comprehensively.

For realizing a new Oceanic State, marine-related parties in various fields, with the Headquarters for Ocean Policy as its core, are expected to collaborate and cooperate with each other to strategically promote ocean policy. This plan is to be the very base for that purpose.

### (3) Goals and period of this plan

The Basic Act on Ocean Policy aims to “contribute to the sound development of the economy and society of our State and to improve the stability of the lives of citizenry as well as to contribute to the coexistence of the oceans and mankind.”

In order to achieve such purposes, Japan has to firstly promote smooth and sustainable utilization of the marine zone where Japan can exercise its jurisdiction, while keeping a good balance with the preservation of the marine environment. To put it in another way, it is important for Japan to aim to realize “sustainable development,” as cited in the Rio

Declaration on Environment and Development, within our jurisdictional marine zones. It is also important for the government to make utmost efforts to give back obtained fruits to the citizens as much as possible.

Secondly, it is important that trade activities that support Japan's industry and citizens' life are maintained stably. For this purpose, marine peace and security need to be secured globally and Japan is required to play an active leading role for realizing this.

Lastly, Japan, as one of the developed countries, needs to contribute to coping with panhuman issues, such as realization of sustainable development in the sea and formulation of international order for using marine resources. Various regulations under UNCLOS concerning marine resources, such as EEZ, continental shelves and abyssal areas, have promoted orderly development by respective countries including maritime powers and have provided developing countries with opportunities to utilize such resources to achieve economic independence or catch up with advanced countries. Considering these facts, Japan, which possesses vast EEZ and continental shelves should not only pursue its own benefits but also endeavor to actively provide cooperation to activities for realizing sustainable development in developing countries and to positively participate in and contribute to international efforts for equitable and efficient utilization of marine resources.

Only through such efforts, Japan can be recognized to be working toward the realization of a new Oceanic State. Japan should aim to achieve these goals in the long run, but at present, Japan is about to take the first step for realizing a new Oceanic State. It is urgently required to make preparations, such as arranging conditions necessary for that purpose from the viewpoint of various marine-related sectors, checking and developing varied marine-related systems, and formulating a system to collect, compile and manage a variety of information to be the basis for promoting ocean policy. Taking these matters into account, this plan is to be established, seeing beyond five years later, when the plan is scheduled to be reviewed under the Basic Act on Ocean Policy.

The sea still holds many fields yet-to-be-defined scientifically and various phenomena in the sea mutually have close correlation. Therefore, in promoting ocean policy, it is important to give due considerations to the balance and collaboration between the ideas of "understanding the sea," "protecting the sea" and "exploiting the sea," by deepening knowledge on the sea, reflecting the results as necessary on measures for realizing sustainable use of the sea and thereby further enhancing these measures. Based on such recognition, the Basic Act on Ocean Policy stipulates the following six basic principles.

- (i) Harmonization of the development and use of the sea with the preservation of the marine environment
- (ii) Securing the safety and security of the sea
- (iii) Enhancement of scientific knowledge of the sea
- (iv) Sound development of marine industries
- (v) Comprehensive governance of the sea
- (vi) International partnership with regard to the sea

These are universal concepts that persons engaged in marine-related matters can all share into the future, but concrete policy goals for this plan to aim for in five years are also required. Therefore, the following three goals have been established.

#### Goal 1 Challenge to take the initiative in coping with panhuman issues in the sea

Global warming and accompanying abnormal weather seen in various parts of the world are urgent problems to be resolved for all human beings. Considering the significance of the role that the sea plays for the global environment, marine-related fields will hold the key to resolve these problems. The sea – abyssal seas and abyssal zones, in particular – are still frontiers for human beings where new discoveries can be expected in the future. However, due to restrictions in terms of scale and technology, systematic and planned marine surveys can only be conducted by countries with considerable scientific/technological capability and economic strength.

Therefore, it is extremely important for Japan to carry out leading activities in these fields and try to share obtained information in an appropriate manner, and thereby make a positive contribution to resolving environmental problems on a global basis and developing the wisdom of human beings.

#### Goal 2 Foundation for sustainable use of abundant marine resources and marine space

In Japan's territorial seas and EEZ, which are said to be the sixth largest in the world, and continental shelves, which can be extended beyond 200 nautical miles, there exist diversified rich living resources and a variety of energy and mineral resources that are expected to be utilized in the future.

For sustainable use of these resources and space, over which Japan has jurisdiction, it is

urgently necessary to formulate a system to ensure safety and security in using them, formulate a system to collect, compile and manage a variety of information, foster industries using resources in a planned manner, and develop various use/management-related systems such as measures for preserving the marine environment that will be needed in actually using such resources.

Goal 3 Contribution in the marine-related fields for realizing safe and secure lives of the citizenry

Japan depends on maritime transport for most of its energy resources, food and other goods indispensable for the lives of the citizenry and economic activities. Furthermore, a large portion of the population, assets and social capital is concentrated in coastal regions. However, very long maritime routes indispensable for Japan are exposed to the threat of pirates, armed robbers and maritime terrorists, and the surrounding marine zones and coastal regions face the threat of natural disasters, such as tsunamis and storm surges, along with the problems of smuggling, illegal immigration and intrusion of unidentified boats.

In order to protect citizens' lives, bodies and property from these threats and maintain or develop the lives of the citizenry and economic activities, a stable system for maritime transport needs to be secured and a system to secure freedom and safety for marine navigation needs to be developed and strengthened. Furthermore, it is urgently required to develop a management system responding to operation of ships, which has become more and more complicated and diversified, and to strengthen disaster-prevention countermeasures against marine-derived natural threats.

For successfully achieving these policy goals, Chapter 1 deals with basic policy for implementing measures based on the six basic principles stipulated in the Basic Act, Chapter 2 deals with ocean measures necessary to be promoted in a comprehensive and planned manner, out of 12 basic measures stipulated in the Basic Act, such as measures to be implemented intensively or measures to be implemented under close cooperation among related agencies, and Chapter 3 stipulates other matters necessary for promoting ocean policy.

# Chapter 1 Basic Policy of Measures with Regard to the Sea

## 1 Harmonization of the development and use of the sea with the preservation of the marine environment

Japan has only utilized the sea mainly for fisheries and maritime transport, but recently it has become clear that there exist various developable resources in surrounding marine zones, including energy resources such as methane hydrate, mineral resources such as polymetallic sulphides and cobalt-rich ferromanganese crusts, natural energy such as wave power and tidal power, and marine microbes.

In accordance with the increase of global population and each country's economic development, demand for food resources and energy and mineral resources is expected to grow globally. However, at present, conditions of fishery resources are deteriorating by and large and the restoration thereof calls for urgent attention. In addition, there are other problems, such as that the area and the amount of distribution of energy and mineral resources in surrounded marine zones are not clear and that extractive technologies are yet to be established for unconventional natural gas or metallic mineral resources.

For active development and use of such new marine resources, efforts should be made to realize sustainable use of reproducible resources and to develop necessary technology, make rational plans and prepare a required system, while giving due considerations to harmonization with the preservation of the marine environment.

The surrounding marine zones of Japan, which are said to be one of the three major fishing grounds in the world, hold extremely high productivity, but nearly half of fishery resources in these zones subject to resource evaluation at present are evaluated to be at a low level. As living resources are reproducible, these lowly evaluated resources need to be restored by promoting managing and resource restoration plans based on the total allowable catch (TAC) system and the total allowable effort (TAE) system and fishery resource restoration plan, enhancing fishing ground productivity, and strengthening coordination and cooperation with surrounding countries and regions. In addition to these measures for restoring fishery resources, prevention of bycatch of seabirds, sea turtles and other creatures is also important for preserving marine ecosystems.

Exploration and development of petroleum and natural gas resources expected to exist in the surrounding marine zones has been carried out mainly in limited parts at depths of up to

200m and there are still vast marine zones left unexplored. As risks are high for exploration and development of petroleum and natural gas resources, the national government needs to promote basic research, such as basic geophysical exploration and test boring, in a planned manner, while giving due consideration to the marine environment. Japanese companies have failed to participate in the opening of mines of oil-producing countries due to the lack of experience in exploring petroleum and natural gas resources in very deep waters. Therefore, when conducting basic research, consideration should be given especially to have them accumulate experience of exploration in very deep waters.

Furthermore, it has become obvious that there are methane hydrate, which is an unconventional natural gas resource, polymetallic sulphides, and metallic minerals such as cobalt-rich ferromanganese crusts in the surrounding marine zones. These resources are expected to be precious domestic resources for Japan, which depends on foreign countries for most of its energy and mineral resources, but at present, research or technological development thereof remains only at a fundamental stage and there is a concern that extraction of these resources might have a serious impact on the habitat environment of benthic organisms. Therefore, the programs for developing technologies, including those to assess the impact on the environment and to reduce such impact as much as possible, should be established in view of future commercialization, and at the same time, a cooperative system between the government, research institutes, private companies and other agencies needs to be built for steadily promoting and executing those programs.

Maritime transport volume has been expanding in accordance with global economic growth, and it has become more and more important to prevent marine pollution by ships and reduce pressure on the marine environment. Japan, as a country getting involved in nearly one-seventh of the total maritime transport volume of the world (in 2006), has to promote steady international efforts such as the prevention of spills of oil or toxic substances that cause serious damage to marine ecosystems, the appropriate measures for accidents and aftermaths, and the prevention of air pollution by ships. Japan should also develop technologies and make efforts positively so as to lead the international society for coping with new problems, such as for preventing impacts on ecosystems of aquatic organisms transported in the ballast water of ships and for reducing CO<sub>2</sub> emissions by ships traveling around the world.

## 2 Securing the safety and security of the sea

Holding vast jurisdictional marine zones surrounding its national territory, Japan depends on maritime transport for most of its goods, including energy resources and food, necessary for its economic development and stability of the lives of the citizenry, with a large portion of its population, assets and social capital concentrated in coastal regions. Due to such geographical, economic and social features, it is important task for the lives of the entire citizenry to secure the safety and security of the sea including navigation safety for ensuring marine interests such as freedom of navigation and marine resource development, which will be the basis for Japan's economic existence, as well as to cope with the threat of natural disasters.

Although Japan has endeavored to secure freedom and safety of navigation on maritime transport routes and to maintain stable order in the surrounding marine zones through strengthening cooperative relationships with related countries, it is worried, as issues concerning Japan's safety and security, that events that might damage Japan's marine interests and security might occur, such as intrusion of spy ships and other ships that possibly involved in crimes including smuggling, illegal immigration in the surrounding marine zones, acts to disturb navigation order, piracy acts and proliferation of weapons of mass destruction by maritime transport, and escalating activities of navy warships of neighboring countries. In order to cope with these problems, it is required to promote institutional improvement and strengthen the system for conducting effective and agile monitoring and crackdowns by reinforcing coordination among related agencies, steadily furnishing equipment and enhancing the performance thereof, and deploying and fostering personnel. In such processes, it is effective to gain cooperation from residents of coastal regions including islands. Furthermore, in order to prevent possible acts of damaging international port facilities, security measures need to be taken at ports under international cooperation based on the International Convention for the Safety of Life at Sea.

For Japan, which depends on maritime transport for most of its supplies including energy resources, it is extremely important to secure the safety of major maritime transport routes for transporting petroleum and other resources and the safety of transport of radioactive materials, while ensuring freedom of navigation on the sea, for protecting the overall safety of Japan including economic perspectives. Particularly in a marine zone including the Strait of Malacca and Singapore, which is an important maritime transport point, international coordination and cooperation need to be promoted actively for addressing problems of

pirates and terrorism, as well as for maintaining navigational aid facilities. Furthermore, not only for Japan's national interests, but also for responding to the international society's call for action to prevent piracy acts, terrorism on the sea, and proliferation of weapons of mass destruction by maritime transport, Japan should examine developing a system to prevent and crackdown on such acts on the high seas based on international law and take appropriate measures.

In spite of efforts having been made so far for securing navigation safety, a number of maritime accidents with casualties occur every year in the surrounding marine zones, and securing navigation safety and reinforcement of marine salvage still remains an urgent issue. Therefore, it is indispensable to develop safety standards to be followed by ships, with due consideration to changes in social demands concerning ships growing in size and speed, causes of maritime accidents and other matters, and to positively implement the safety standards through ship inspection. It is also necessary to build a safety management system, corresponding to current operation modes that have become more and more complicated and diversified, with ships becoming larger and faster, the number of foreign-flag ships increasing, and recreational activities by pleasure boats becoming popular, and to provide thorough instruction and supervision so that measures for preventing maritime accidents be taken in an appropriate manner. In the meantime, measures should be steadily taken for developing facilities to provide aid for maintenance of routes and navigation safety and for improving the maritime transport environment by utilizing new technologies such as the automatic identification system. Furthermore, improvements need to be made for the safety standards and the system on ship management by investigating and analyzing maritime accidents and their causes and mechanism.

Regarding marine salvage, strengthening of the on-site response capabilities by patrol vessels is important. In addition, it is required to enhance capabilities to promptly detect a maritime accident and identify a rescue site, to improve rescue skills and capabilities to immediately move to an accident site and respond to various types of rescue activities, and at the same time, to promote cooperation with other countries for searching and rescuing victims.

As Japan, which is under severe natural conditions prone to natural disasters such as earthquakes and typhoons, has a long coastline, with population and assets concentrated in coastal regions, it is vulnerable to shore erosion and marine-derived natural disasters and

such as tsunamis, storm surges and high waves. It is also pointed out that there is a possibility that storm surges may cause serious damage mainly in zero-meter zones due to a subduction-zone earthquake, sea-level rise caused by global warming and intensifying violence of typhoons. In order to protect citizens' lives, bodies and property and national territory from these marine-related natural disasters, it is necessary to steadily promote measures for preventing disasters, such as enhancing capabilities of seismic observation and tsunami prediction and developing coast protection facilities, measures for limiting additional damages, such as promptly providing warnings of tsunamis and storm surges and helping residents evacuate, and disaster-relief measures, such as enhancing functions of disaster-prevention facilities in coastal regions, strengthening the system to dispatch personnel to devastated sites and restoring devastated facilities. Countermeasures also need to be deliberated and implemented for developing coast protection facilities that can respond to situations possibly caused by sea-level rise due to global warming.

### 3 Enhancement of scientific knowledge of the sea

The sea still holds many fields yet-to-be-defined for human beings, and marine surveys and marine-related research and development on global environment issues and other issues on a global basis, countermeasures for subduction-zone earthquakes, and issues concerning stable securement of energy resources are to play a significant role. However, particular kinds of ships and other special facilities and long-term strenuous efforts are required for marine-related research and development and direct achievements cannot be obtained in a short period of time. For improving scientific knowledge concerning the sea, these features and Japan's present levels of science and technology should be taken into account, and marine surveys and marine-related research and development should be promoted strategically with a view to contributing to the world by creating new knowledge for various issues and realizing sustainable use of abundant marine resources and marine spaces and safe and secure lives of the citizenry.

Basic research that brings about a variety of knowledge and innovation should be carried out continuously, considering the importance of steady and earnest pursuit of truth and accumulation of trial and error results. As the "Marine-Earth Observation System", which employs Japan's original seafloor exploration technology that enables exploration of underwater seismogenic zones and seabed resources, was positioned as one of the "Key

Technology of National Importance” (Science and Technology selected by Council for Science and Technology Policy based on the 3<sup>rd</sup> Science and Technology Basic Plan), technological issues that should be studied strategically and intensively have been selected carefully. Steady efforts need to be made to promote studies on these issues and to achieve good results. Since marine-related phenomena are closely associated with each other, these various issues should be dealt with by combining wide-ranging research fields including humanities and social sciences, and it is also necessary to enhance research activities based on free thinking from the viewpoint of researchers.

Marine surveys have been conducted by methods most suitable for respective survey purposes, depending on administrative fields, such as fishery resource management, seabed resource development, global warming countermeasures, marine biodiversity conservation, maritime transport safety, and marine earthquake countermeasures. Based on survey purposes set by respective government-affiliated agencies, marine surveys should be enhanced mainly for marine zones for which sufficient data have yet to be accumulated, and at the same time, information-sharing should be further promoted under the coordination and cooperation of related agencies so that marine surveys can be conducted in a more efficient and effective manner. In order to lead the world in promoting marine surveys, ships and facilities with the most-advanced functions are necessary. At present, some of the ships and facilities are rather old and survey activities have been partly restricted due to recent soaring fuel prices. Therefore, information-sharing of survey plans and streamlining of surveys should be promoted, and development and operation of facilities and equipment need to be carried out in a planned manner, while flexibly responding to circumstances including changes in fuel costs, etc. Furthermore, for promoting comprehensive ocean policy, respective agencies have to collaborate and cooperate with each other to conduct marine surveys intensively on basic information necessary for management of the sea.

Various kinds of marine-related information obtained through marine surveys are now managed and provided independently by respective agencies according to their own purposes, but there have been strong demands from the industrial and academic fronts calling for convenience. It is also problematic that means to manage information are not necessarily the same among agencies. A system should be developed to integrate and provide marine-related information now dispersed among agencies, with a view to organizing such information efficiently and rationally in a user-friendly manner, as well as

to contributing to the development of marine industry, promotion of basic research and streamlining of marine surveys.

In the meantime, ensuring efficient researchers, engineers, and research supporters is indispensable for Japan to continuously advance its levels of marine science and technology in the future. However, young human resources who are expected to support future advancement are insufficient in frontier fields, and fostering promising successors is an urgent issue. It is highly required to ensure and foster young people who can pioneer in pursuing the most-advanced research and can also exercise leadership internationally.

Furthermore, challenges to unknown domains of the sea should be encouraged as actions arising from the intellectual appetite of human beings, which can prompt not only juveniles who will be responsible for the next generation but also the entire nation to deepen their understanding of and interest in the sea. Therefore, education and awareness-raising activities need to be enhanced so that juveniles who are to support the next generation can harbor dreams for the sea and spirits of challenge to the unknown.

As science and technology advance constantly, having a positive attitude to carry out new research with fresh ideas is indispensable for the future development of marine science and technology. Prompted by the enforcement of the Basic Act on Ocean Policy, various research systems and visions concerning research and development projects beyond the jurisdiction of related agencies have been proposed by economic organizations and academic circles. It is important also from the viewpoint of vitalizing marine-related research and development that these visions are discussed and proposed with new ideas in various fields and to be realized one by one from those highly possible. Marine-related development visions so far have often failed to be realized because related fields are too diversified and initial investment is too large. Under coordination of related agencies, feasibility and ripple effects of proposals concerning these new visions need to be clarified.

#### 4 Sound development of marine industries

Japan depends on maritime transport for most of its trade volume and nearly 40% of domestic transportation (more than 80% for industrial basic materials such as cement and steel products). Fishery products, which account for 40% of supply of animal protein for Japanese citizens, are extremely important food for realizing a well-balanced “Japanese-style diet.” Therefore, marine-related industries that support these, such as the

shipping industry, fisheries industry, shipbuilding industry and ship machinery industry, have been the basis for the sound development of Japan's economic society and the enhancement of the stability of the lives of the citizenry. The sound development of marine-related industries is also indispensable for harmonizing the development and use of the sea with the preservation of marine environment and securing the safety and security of the sea.

Marine industries are defined as the "industries bearing the development, use and conservation of the oceans" by the Basic Act on Ocean Policy. Trial calculations have been made on market size and other matters concerning marine-related industries, but official surveys on trends have never been conducted. In order to take various measures appropriately for promoting marine industries in the future, it is important to correctly analyze and understand marine industries as defined by the Basic Act on Ocean Policy. For that purpose, it is required to survey, compile and organize basic information concerning marine industries.

Looking at the current situations of major marine industries, amid intensifying international competition, the shipping industries in many maritime powers have strengthened the policy to enhance the international competitiveness of their own international shipping industries. The total number of ships operated overseas by Japanese companies has remained unchanged if flag-of-convenience ships are included, but the number of Japanese-flag ships hit a peak at 1,580 in 1972 and declined sharply to 95 in 2006, and the number of Japanese crew engaged in international shipping services decreased significantly from nearly 57,000 in 1974 to nearly 3,000 in 2006. The crew engaged in domestic shipping services also decreased in number from nearly 75,000 in 1975 to nearly 30,000 in 2006 and have been aging rapidly, with those aged 45 or over accounting for 64% of the total. The situation is serious from the viewpoint of ensuring stable maritime transport. In the fisheries industry, it is especially crucial to recognize that fishing boats are becoming older. It is urgently needed to develop competitiveness and carry out internal reform of these industries, which should continue to be the core for the development and use of the sea. For the shipbuilding industry and ship machinery industry to continue supplying high-quality products to markets steadily, it is also required to promote the establishment of safety/environment standards and technological development in parallel by fully utilizing Japan's high technological capabilities, and thereby strengthen the international competitiveness and reinforce the management base of these industries.

As economic development in the Asian region has increased the overall trade volume, selection has become more and more competitive with ports in other Asian countries which have increased the competitiveness. Under such circumstances, infrastructure should be improved for hubs of maritime transport networks, such as by developing facilities that can deal with larger containerhips and by simplifying port procedures.

Furthermore, it is important to actively make efforts to create new marine industries by taking advantage of abundant marine resources and a variety of vast marine spaces surrounding Japan. For this purpose, technological development should be promoted to facilitate use of the sea by various industries and marine-related technologies and information should be made more accessible. An innovation system should also be formulated under industry-academia-government collaboration and rational planning needs to be promoted for these related parties to establish clear goals, conduct surveys, research and development, and put them into practical use. From the viewpoint of revitalizing local communities, efforts should also be made to revitalize regional industries by making much of marine resources, such as through promoting marine leisure activities. Furthermore, regarding promising new resources, such as abyssal-benthic microbe resources, it is necessary to develop a required system while observing international trends.

For sound development of marine industries in the future, fostering and ensuring human resources is important. Marine industries should be made more attractive as a workplace and practical professional education on marine industries needs to be enhanced at high schools and universities for fostering human resources who lead marine industries of the next generation.

## 5 Comprehensive governance of the sea

The sea has various types of functions, such as supporting lives of living things on the earth including land areas, providing places for a variety of organisms to live and grow, as well as providing places for various human activities such as development and use of living resources and energy and mineral resources, maritime transport, and recreational activities, while holding beautiful beaches and uniquely harsh natural scenic beauties. Diversified marine-related phenomena actually relate closely with each other, as seen in certain acts and changes having impacts on other acts and phenomena. As the sea is vast but surely a limited space, if individual users act only based on their own interests, the optimum

conditions as a whole cannot necessarily be maintained. In addition, Japan's EEZ border seven nations and regions and include marine zones to which other neighboring countries also stake a claim. As the sea is a single mass of space covering the globe, an international perspective is indispensable for its governance. A comprehensive viewpoint is absolutely necessary for governing the sea, and at the same time, due consideration needs to be given to ensure proper enforcement of rights, fulfillment of obligations and international cooperation based on international rules concerning the sea, including UNCLOS.

From such viewpoint, the international society should endeavor to realize peaceful, equitable and sustainable development and use of the sea and marine resources. Japan should actively contribute to formulating a framework for ensuring coordination of related countries, forming international order of the sea, and preserving the marine environment, while seeking resolution based on international rules for the issue of the marine zones within Japan's EEZ and continental shelves where Japan and other neighboring countries both claim jurisdiction.

In the meantime, in its jurisdictional marine zones, Japan should make efforts as a nation responsible for governing them, so as to (i) keep the zones in appropriate conditions for sustainable use, (ii) clarify the possibility of future development and use of the zones and promote the realization thereof, and (iii) maintain order in using highly congested marine zones. For that purpose, Japan needs to positively take measures for preserving the marine environment by reducing pollutant load, developing and using marine resources in a planned manner, comprehensively collecting, managing, and providing various types of marine-related information, and carrying out monitoring, instructing and regulating activities in these marine zones. Generally, every single marine space is divided vertically and by time zones for the use of multiple users. Coordination among users is made based on laws and regulations or negotiations between parties concerned. When governing marine zones, such circumstances should be taken into consideration and the environment needs to be improved, where necessary, for smooth coordination of related parties' interests.

It is also necessary to consider the social and economic significance of each marine zone, how it is used at present, and to what extent it is important for the preservation of the marine environment. Coastal marine zones, in particular, are habitats for important fishery resources, with a wide variety of marine organisms living and growing. However, a considerable part of marine spaces and marine resources has already been utilized there and environmental pollution and disruption of ecosystems are serious worries. In addition,

measures for coastal marine zones, which border land areas, need to be implemented in connection with land areas, and it should also be taken into consideration that marine zones are used uniquely in regions, depending on different features of respective marine zones. Based on these, for governing coastal marine zones, efforts should be made to properly cope with issues that have become more and more serious in these zones. Such issues contain deliberations on and introduction of appropriate marine environment preservation measures, such as reduction of pollutant load from land areas; comprehensive measures for wastes drifting or washed ashore, along with countermeasures against their sources; and establishment of zones for protecting biodiversity of the sea, and also contain coast protection measures including countermeasures against coastal erosion caused by decreasing supply of sediment from land areas via rivers. Deliberations should be carried out on more effective means of governance, connecting coastal marine zones and related land areas. Appropriate measures need to be worked out based on the concrete contents of such deliberations.

As UNCLOS allows nations to set the breadth of continental shelves beyond 200 nautical miles, Japan needs to make efforts to set the outer limit of its territorial continental shelves appropriately. Furthermore, in order to protect Japan's interests in its EEZ and continental shelves, the government has to discuss a system and measures for promoting proper activities of foreign ships complying with international rules, such as UNCLOS, and take appropriate measures. The government also needs to properly govern islands scattered in the vast jurisdictional marine zones of Japan, while clarifying their significance in promoting Japan's ocean policy. At the same time, the government is required to promote voluntary development of islands through measures to facilitate settlement and employment of people by respecting innovative ideas of respective regions.

## 6 International partnership with regard to the sea

Japan is a maritime country that has vast jurisdictional marine zones surrounding its national territory, and future developments in the international order of the seas, including those concerning freedom of navigation, will have a significant impact on its national interests. For instance, in the East China Sea and other sea areas around our country, there are marine zones for which Japan's claims its jurisdiction over EEZ and continental shelves have conflicted with the claims of neighboring countries, causing difficulties in resource

development and other uses of the seas. In attempts to take appropriate measures for such problems and further to remove the root causes thereof, Japan must try to find solutions in accordance with international rules for the seas in order to secure its national interests as well as to ensure stable order in the surrounding marine zones.

Securing freedom of navigation and safety on the sea and achieving sustainable use of fishery resources are of great importance for the interests of Japan – a country dependent on international trade, a major fishing country, and a super consumer of fishery products. At the same time, these tasks should also be widely shared among members of international society. For these aims, Japan should promote partnerships and cooperation among related countries while taking into consideration various needs on a global scale, and should also take initiative in the process of establishing, developing and securing compliance with international order. It is also necessary to play an active role in enhancing partnerships in international society to tackle other related global issues, such as combating global warming and conserving biodiversity.

From the perspective of establishing and developing the international order of the sea, Japan believes that ocean disputes should be resolved under international laws and rules, and takes a stance of placing importance on the active use of third party bodies including international judicial authorities. To that end, it is crucial for Japan to disseminate this policy at home as well as to promote it throughout the world, and to provide positive support for the activities of the International Tribunal for the Law of the Sea and other international judicial authorities in charge of ocean issues.

As securing freedom of navigation and safety of the sea, which is the very basic order of the sea, is important for Japan, coordination and cooperation with other countries including neighboring countries need to be promoted. In particular, the marine zone from the Persian Gulf to Japan via the Malacca-Singapore Straits – the key transport route of crude oil to Japan – holds security-related problems such as incidents of piracy and navigation-safety-related problems such as serious congestion of ships. These problems should be resolved under cooperation of the international society, with full respect for the sovereignty of each coastal state and flag state. Recognizing that the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) is a pioneering countermeasure against piracy, we should actively promote activities based on this agreement, while calling for the participation of a greater number of countries. Furthermore, for ensuring navigation safety of the Straits, coordination and cooperation

between related countries should be promoted under a new cooperative mechanism that embodies the ideals of cooperation between coastal states and user countries. For the safety of transport of radioactive materials, which is of great importance in ensuring energy security, the relations of trust need to be strengthened with countries with concerns over transport thereof. In addition to these, Japan should proactively participate in establishing international agreements at the International Maritime Organization (IMO) and other organizations, conclude such agreements on countermeasures against terrorism and maritime transport of weapons of mass destruction as early as possible, and positively join in international cooperation.

While it has been pointed out that many fishery resources are at low levels, many countries have newly started fishing activities recently and this has caused competition with traditional fishing countries like Japan. Realization of sustainable use of finite major fishery resources has become an urgent issue for the international society. Japan needs to play a leading role in realizing sustainable use of major fishery resources, such as tuna, through utilizing multilateral regional fisheries management organizations. With regard to an international move to oppose the rational use of cetaceans, it is also important for Japan to make efforts to gain understanding and support of the international society widely for its basic stance to seek sustainable use of marine living resources. For the conservation and management of fishery resources in EEZs of Japan, China and South Korea, three countries need to enhance coordination and cooperation mutually with a view to appropriately managing resources in these zones including provisional waters.

As the sea, which covers 70% of the surface of the earth, has significant relations with changes in global environment such as climate change, principles concerning various marine phenomena need to be pursued and clarified for resolving global warming and other issues. Japan, as one of the major developed countries and maritime states, needs to promote surveys and research of the sea concerning global warming and climate change, while taking into account the prevention of disasters and reduction of damages, and should also make a contribution to the Intergovernmental Panel on Climate Change (IPCC) and play a leading role with a view to formulating more accurate forecasting models and developing basic science.

With regard to effective countermeasures against tsunamis and storm surges that have become more and more serious in accordance with the advance of global warming, Japan should positively take actions to support regional cooperation in the Asia-Pacific region,

provide real-time information on tsunamis to countries at risk of tsunami disasters, and help recovery from disasters by tsunamis and storm surges in foreign countries.

## **Chapter 2 Measures that the Government Should Take Comprehensively and Systematically with Regard to the Sea**

### **1 Promotion of the development and use of marine resources**

As Japan is a major fishing country and depends on foreign countries for most of its necessary energy and mineral resources, it is crucial to promote the realization of sustainable use of fishery resources and the development of energy and mineral resources. Many fishery resources are said to be at low levels and it is necessary to restore them through preserving the environment of fishing grounds and to introduce appropriate management measures. Regarding energy and mineral resources, it is needed to grasp their distribution in the surrounding marine zones, develop production technology and assess the impact on the environment to be caused by the development. It is also important to fully utilize other resources of the sea.

#### **(1) Conservation and management of fishery resources**

For sound development of the fisheries industry and stable supply of fishery products, sustainable use of fishery resources should be promoted with due consideration to the restoration thereof. Efforts should be made to embody the concept of *satoumi*, i.e. creating rich and beautiful marine zones and ensuring biodiversity while maintaining high biological productivity, by way of adding human work at coastal marine zones in harmony with the natural ecosystem.

##### **a. Enhancement of conservation and management measures of fishery resources and strict observance thereof**

In the surrounding marine zones, scientific surveys should be promoted to improve the accuracy of grasping the current conditions and trends and future predictive estimation of fishery resources so as to enhance conservation and management measures, such as those based on total allowable catch (TAC) and total allowable effort (TAE). With respect to conservation and management measures, resource restoration plans established for types of fish in urgent need should be promoted. In promoting the plans, it should be considered that additional types of fish are to be subject to TAE established for heightening the efficiency of the plans. Regarding resources for which the goals in the

plans have been achieved, a new framework should be introduced promptly to promote the stable maintenance of the achieved level and the rational use of such resources in a planned manner, based on the common awareness of related parties. Furthermore, coordination with neighboring countries and regions with which Japan shares resources should be strengthened so as to formulate more ideal relationships. In particular, for properly conserving and managing resources in EEZs of Japan, China and South Korea, the three countries need to enhance mutual coordination and cooperation to thoroughly observe each country's catch quota and total ship numbers and manage resources in provisional waters in an appropriate manner.

Coordination among related agencies also needs to be strengthened and the system should be enhanced to efficiently and flexibly crack down on illegal fishing in Japan's jurisdictional marine zones.

b. Preservation of the growing environment for aquatic plants and animals, increase of the fishing ground productivity

Surveys and research should be enhanced concerning seaweed beds, which are significant for egg laying and growing of fish and shellfish, and fishing grounds need to be developed, such as through placing artificial reefs and constructing egg-laying sites and fry-nurturing sites in coastal marine zones. Also in offshore marine zones, where fishery production has declined notably, measures should be taken to improve primary productivity and the development of fishing grounds, such as construction of egg-laying sites and fry-nurturing sites, should be promoted.

Seaweed beds, tidal flats, and coral reefs, which are significant for improving the productivity of fishery resources, should be preserved and restored. Support should also be promoted for publicly beneficial activities by private fishermen to maintain and manage seaweed beds, tidal flats, and coral reefs.

(2) Promotion of the development of energy and mineral resources

The development of energy and mineral resources is rather risky and technically difficult for private companies. Therefore, the government needs to take the initiative in carrying out basic surveys and promoting technological development, as shown below. Projects needs to be implemented in a planned and flexible manner, taking experts' opinions into account as needed, and the results should be transferred to private companies so that

resource development can be steadily promoted.

a. Petroleum and natural gas

Geological structures with promising petroleum and natural gas reserves stretch widely in Japan's surrounding marine zones but most of them have never been explored. Since 1961, Japan has succeeded only in two-dimensional geophysical exploration up to 120,000 km, three-dimensional geophysical exploration up to 6,000 km<sup>2</sup>, and primary boring of 27 piles. The three-dimensional geophysical survey vessel that was introduced in FY2007 should be fully utilized to conduct primary geophysical exploration intensively in less explored marine zones for the purpose of grasping the distribution of new reserves in the surrounding marine zones, and at the same time, to conduct fundamental surveys, such as primary boring, in the marine zones with higher possibility. Through these surveys, exploration technology is to be transferred to private engineers of Japan. The results of primary geophysical exploration and other activities should also be transferred to Japanese private companies.

b. Methane hydrate

A considerable amount of methane hydrate is estimated to prevail in such areas as Nankai Trough. If commercial production starts, methane hydrate can become a promising source of domestically produced energy of great importance for ensuring Japan's energy security in the future. However, production technology still needs to be further developed. Since 2001, the national project for technological development has been underway, and the on-shore production test conducted in the northern part of Canada in FY2006 succeeded in producing methane hydrate by decompression method. Therefore, while conducting surveys to grasp the distribution of methane hydrate, it is necessary to carry out production tests in the surrounding marine zones, evaluate economic efficiency, and establish technology to assess environmental impact of production and thereby systematically promote technological development required for commercial production in the future.

c. Polymetallic sulphides and cobalt-rich ferromanganese crusts

Polymetallic sulphides and cobalt-rich ferromanganese crusts, whose existence in the surrounding marine zones has become highly expected, can be stable supply sources of precious resources, such as copper, lead, manganese and cobalt. According to exploration

so far, it has been confirmed that promising polymetallic sulphides exist in the seas of Okinawa and Izu/Ogasawara, but sufficient information has yet to be obtained concerning the amount of deposit and its impact on the surrounding environment. Ore of cobalt-rich ferromanganese crusts has also been confirmed in the surrounding marine zones, but the details of its distribution remain as future tasks.

While conducting surveys to grasp the distribution of polymetallic sulphides in the surrounding marine zones, it is necessary to establish technology to assess the environmental impact of development, carry out basic surveys on the marine environment, develop mining technology, and thereby systematically promote technological development required for commercial production in the future. Regarding cobalt-rich ferromanganese crusts, necessary surveys should be promoted, based on the analysis of samples obtained so far.

#### d. Research and development of other resources

Regarding natural energy that exists within Japan's jurisdictional marine zones and is likely to be an energy source in the future, necessary measures should be discussed and taken, as one of the countermeasures against global warming. With respect to wind-power generation on the sea, efforts should be made to reduce costs for establishment, resolve technological problems for increasing durability, and establish methods to assess impacts on the environment. Concerning wave-power generation and tidal-power generation, while grasping international trends including those in countries where such generation has been put into practice, basic research for improving efficiency and economic potential should be promoted with due consideration to special features of seas around Japan.

## 2 Preservation of marine environment, etc.

The sea is a precious thing that enriches our life. We must pass on a well-preserved marine environment to our future generations through efforts to prevent the loss of marine biodiversity and avoid placing burdens on the marine environment that exceed the sea's purification capacity. In this respect and also for enabling the Japanese citizens to enjoy the bounties of the seas in a sustainable manner, as a treasury of living resources and source of scenic beauty and amenities, it is necessary to implement various measures to maintain a

well-preserved marine environment in accordance with the Third National Biodiversity Strategy revised in November 2007, including those for ensuring marine biodiversity and actively reducing environmental burdens on the sea. In particular, with regard to coastal marine zones where biodiversity should be ensured while maintaining high biological productivity, the concept of *satoumi* should be emphasized from the perspective of preserving the marine environment.

UNCLOS and other laws require all States to make efforts for preserving the marine environment. The marine environment including marine ecosystems has yet to be made clear, and once it is damaged, the recovery and restoration thereof would be extremely difficult. Therefore, from the perspective of forestalling harmful effects, precautionary measures should be taken as necessary and scientific knowledge concerning the marine environment, including marine ecosystems and marine pollutants, needs to be enhanced. It is also important to accurately understand the current conditions of the marine environment and flexibly review present management and use of the sea, according to the results.

Considering that the sea is the common asset of humankind, measures for preserving the marine environment should be promoted under international cooperation. In particular, it is highly needed to mutually collaborate with neighboring countries to manage the surrounding marine zones.

Efforts should also be made for enhancing scientific knowledge concerning the effect of CO<sub>2</sub> absorption by the sea to ease climate change and the impact of an increase of CO<sub>2</sub> concentration of seawater on the marine environment, so as to contribute to the preservation of the global environment.

#### (1) Efforts for ensuring biodiversity

For effectively ensuring biodiversity, measures should be taken intensively in key marine areas. For this purpose, marine zones crucial for ensuring biodiversity should be identified by collecting and compiling information on the natural environment obtained through various researches, and action plans for the biodiversity conservation should be drawn up according to features of respective ecosystems. In order to promote research activities by various entities and actions with due consideration to ensuring biodiversity, information on marine biodiversity should be compiled as the “marine natural environment information map” and be provided. For effectively ensuring biodiversity such as through protecting endangered species, measures should be promoted to protect creatures fully dependent on

the sea by preventing bycatch of seabirds, sea turtles and other creatures in fishing activities and preserving their habitats.

Seaweed beds, tidal flats, and coral reefs, etc. in shallow waters are significant for ensuring marine biodiversity and functions to purify the environment to preserve marine landscape but have been largely lost in the past. Therefore, protected areas stipulated in the Natural Parks Act, the Wildlife Protection and Hunting Law and other laws need to be improved and positive recovery and restoration measures for tidal flats, etc. which should be integrated with supplies of sediments and nutrient salts from terrestrial areas, should be promoted by fully utilizing a framework under the Act for the Promotion of Nature Restoration. With regard to coral reefs, it is highly required to promote the formulation of a preservation network in the Asia-Oceania region, in compliance with the resolution adopted at the International Coral Reef Initiative (ICRI) Meeting in Tokyo (in April 2007).

As one of the means to ensure the biodiversity and realize sustainable use of fishery resources, the government should, in accordance with the Convention on Biological Diversity and other international agreements, clarify how to establish marine protected areas in Japan under coordination between related ministries and appropriately promote the establishment thereof.

## (2) Efforts for reducing environmental load

At enclosed coastal seas such as inner bays, the habitat environment for organisms has been deteriorating, with pollutants, nitrogen and phosphorus from watershed areas piling up and red tides and anoxic water mass causing fish and shellfish to die. In order to improve the water environment and conserve ecosystems, the total pollutant load from factories and establishments should be reduced under the Total Pollutant Load Control System, and it is also required to comprehensively and systematically promote measures such as building the sewerage system, introducing advanced waste water treatment, addressing unspecified pollutants at urban zones and farmlands, and improving bottom sediments with overlaying sand. Goals of water quality should be reviewed according to the usage at respective marine zones, and the future process to achieve such goals should be clarified before implementing new improvement measures. Furthermore, by enhancing scientific knowledge on water quality, deliberations should be conducted concerning environmental standards to be established for preserving people's good health and living environment, with due consideration to the conservation of aquatic organisms, and a revision should be

made if necessary.

In recent years, wastes drifting or washed ashore have become a serious problem, hindering use of the seashore, deteriorating the environment and scenery as well as ecosystem, hampering navigation of ships, and causing damages to the fishing industry. Therefore, based on near-term measures established at the “Related Ministries Meeting on Wastes Drifting or Washed Ashore” in March 2007, respective measures should be promoted under coordination among related ministries. Specifically, countermeasures against the sources of wastes, including international actions, need to be promoted, by way of grasping the current conditions, reducing domestic wastes based on the Basic Plan for Establishing the Recycling-based Society, promoting understanding of related countries by utilizing the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP), strengthening international coordination with participation by NGOs and private companies, having policy talks with related countries, and providing and disseminating information to the citizens. In addition, based on the results of surveys conducted by related ministries, means should be established for grasping the situation of drifted wastes and collecting and disposing them in an effective and efficient manner, depending on the circumstances of respective regions. Appropriate support should be provided for local governments that have to dispose of masses of wastes having been washed ashore, and other measures to help regions suffering from great damages should also be taken steadily.

International society has become strongly aware of the necessity of stricter regulations on disposal of wastes in the sea. In response to such trends, surveillance and crackdown of marine environment crimes should be strengthened and the introduction of international rules, such as the London Protocol concluded in October 2007, should be promoted. Based on frameworks such as the National Contingency Plan on marine pollution by oil and noxious liquid substances, systems to control spilled oil and other pollutants need to be enhanced by properly arranging environmental information concerning coastal marine zones for enabling effective controlling activities, developing equipment to control and recover spilled oil, providing lectures and training to related agencies, and appropriately dealing with compensation in the case of an oil pollution incident.

(3) Promotion of continuous surveys and research for preservation of marine environment

Information on the marine environment presently retained separately by respective governmental agencies should be shared, and at the same time, information on biodiversity, such as information on migratory species like seabirds and marine organisms other than those for fishing, and information useful for clarifying and analyzing sources of offshore pollutants should be collected, organized and compiled by fully utilizing international frameworks such as the NOWPAP.

Efforts should also be made to promote observation using vessels for grasping the concentration of greenhouse gases on the sea and underwater, and research on mechanisms of CO<sub>2</sub> absorption by the sea and impacts on marine ecosystems caused by environmental changes such as rising sea temperatures.

In order to understand the impact of environmental load from land zones, it is also required to steadily promote studies, evaluation and forecast of the marine environment of the surrounding marine zones; surveys and analysis of sediment transport; and monitoring and surveys of bottom sediments and marine organisms.

### 3 Promotion of Development of EEZ and Continental Shelves

In Japan's EEZ and continental shelves, there exist diversified rich living resources and a variety of energy and mineral resources that are expected to be utilized in the future. Japan, which has jurisdiction over the use and development of these resources, needs to take measures to promote the development in a smooth and planned manner.

#### (1) Smooth promotion of development in EEZ and continental shelves

Japan's vast EEZ are affluent with living resources and the existence of various types of energy and mineral resources in its continental shelves has been confirmed. Japan should promote smooth development of these resources through exercising its jurisdiction in an appropriate manner. In the meantime, there have been problems in Japan's surrounding marine zones where Japan and other neighboring countries both claim jurisdiction. Japan should take measures for coping with these problems and seek a fundamental resolution thereof under international rules so as to ensure Japan's interests in these EEZ and continental shelves.

Based on the fact that UNCLOS allows nations to establish the outer limit of continental shelves beyond 200 nautical miles, Japan needs to conduct surveys on morphological and

geological features of sea beds and submit information concerning the extension of the “Commission on the Limits of the Continental Shelf” by May 2009. At the same time, the government should take all possible measures for the examination of the limits of Japan’s continental shelves carried out on the Commission and make utmost efforts to realize the appropriate outer limit.

In order to ensure Japan’s interests in its EEZ and continental shelves, it is also necessary to develop and strengthen a surveillance and crackdown system for appropriately exercising Japan’s jurisdiction over exploration and development. For this purpose, patrol vessels, ships and aircraft should be properly replaced and repaired and necessary personnel should be secured. Coordination among related agencies should also be enhanced. Furthermore, regarding the problem that exploration of mineral resources has been managed and scientific researches by foreign vessels have been conducted in these zones without Japan’s consent, the government should deliberate over institutional countermeasures to take appropriate actions.

For smoothly promoting development in Japan’s EEZ and continental shelves, various types of surveys and technological development should be enhanced and information obtained through these surveys should be managed and provided in a proper manner.

## (2) Promotion of systematic development of marine resources

### a. Living resources

Living resources can be reproduced, and if properly managed, they can be used in a sustainable manner. Regarding living resources existing in Japan’s jurisdictional marine zones, conservation and management should be promoted systematically, based on the “Basic Plan for Conservation and Management of Marine Living Resources,” which stipulates such matters as total allowable catch for major fishery resources, and said plan should be reviewed as needed, according to the changes in the conditions of resources.

Furthermore, based on the “Basic Policy for Development and Rational Use of Marine Fishery Resources,” efforts should be made to promote propagation and aquacultures, commercialization of fishery production at new fishing grounds, and corporatization of new fishery production methods at fishing grounds.

### b. Energy and mineral resources

Japan, lacking in resources in land areas, has depended on foreign countries for almost all of its demand for resources, but amid an upsurge of resource prices, nationalism over

resources has been growing rapidly in resource-producing countries. Such trends may cause troubles for Japan to secure stable supply of energy and mineral resources. As one of the countermeasures, Japan has tried to activate resource diplomacy to strengthen relationships with resource-producing countries. In addition to this, measures should be taken to secure stable original supply sources of resources that are immune to changes in other nations' resource policies. In this respect, it is extremely significant to carry out exploration and development of energy and mineral resources in the EEZ and continental shelves where Japan has jurisdiction over natural resources.

However, many technological problems have been left unsolved for developing energy and mineral resources in the sea. Therefore, the government should take the initiative in steadily promoting a full-scale exploration and development project by establishing clear goals and detailed schedules, with a view to realizing commercialization in the medium term. This would be appropriate as a national strategy.

With this awareness in mind, necessary policy resources should be invested intensively in immediately urgent subjects of exploration and development in the EEZ and continental shelves, i.e. petroleum, natural gas, methane hydrate, and polymetallic sulphides. For cobalt-rich ferromanganese crusts, future survey and development methods should be discussed. Such exploration and development needs to be promoted at the highest speed possible to gain achievements, as the current high level of resource prices is highly likely to be maintained in the mid-to-long term due to structurally tight supply-demand relationships in international markets. Therefore, regarding methane hydrate and polymetallic sulphides that have yet to be commercialized, commercialization in about ten years should be the goal. For achieving these goals, exploration and development is to be promoted in the following procedures.

With regard to petroleum and natural gas, two-dimensional geophysical exploration, three-dimensional geophysical exploration, and primary boring should be conducted in wide areas, while placing more emphasis on deeper marine zones. In particular, the three-dimensional geophysical survey vessel that was introduced in FY2007 should be fully utilized to significantly increase areas for exploration. Regarding methane hydrate, technological problems found through the on-shore production test in Canada should be reviewed within FY2008. Based on the results, the next step of the research shall be started in FY2009, and production tests in the surrounding marine zones are to be conducted with a view to realizing future commercialization.

Surveys on the amount of reserves and environmental effects of polymetallic sulphides should be conducted mainly in the seas of Okinawa and Izu/Ogasawara by FY2012, and problems for development should be clarified through reviewing exploration technology and metal recovery technology. Based on the results, the next step of the research should be started to develop technologies for realizing future commercialization. Regarding cobalt-rich ferromanganese crusts, survey and development methods should be discussed based on the analysis of samples having been obtained so far, and surveys should be conducted for picking up promising seamounts. Appropriate measures should also be taken for the maintenance and renovation of survey boats that have become considerably old.

For steadily promoting these measures, the “Plan for the Development of Marine Energy and Mineral Resources (provisional title)” shall be established within FY2008, under coordination of related ministries. This plan is to specify the processes of exploration and development and necessary technological development for achieving goals as concretely as possible, and clarify division of roles to be played respectively by the government, research institutes and private companies.

However, there are not a few uncertainties that determine the results of resource exploration and may significantly delay the entirety of the plan. Furthermore, the level of resource prices will affect the timing of commercialization. Therefore, the plan should be reviewed flexibly as necessary, based on circumstances such as the progress of exploration and the forecast of resource prices, so as to always maintain its appropriateness. It is also needed to consider how to improve the environment to transfer the results of exploration and development conducted by the government to private companies smoothly and how to have the government involved in private companies’ activities in the sea. Appropriate measures should be taken at an early stage.

## 4 Securing Maritime Transport

Securing efficient and stable maritime transport that can, in a timely and appropriately fashion, transport goods necessary for maintaining and enhancing economic activities and the level of the lives of citizenry is extremely important for Japan, which depends on maritime transport for a great deal of its trade and domestic transportation.

However, the number of Japanese-flag ships and Japanese crew engaged in international

shipping services has decreased significantly and personnel engaged in domestic shipping services have been aging and are expected to become scarce in the near future. Measures should be taken to deal with these uncertainties that may cause difficulties in securing maritime transport in future years.

In major routes between Asia and Western countries, the presence of Japanese ports is becoming relatively low, which may increase burdens of transport costs and time on domestic shippers. It is necessary to strengthen the international competitiveness of Japanese ports.

Serious maritime accidents due to ship troubles and navigational problems occur frequently and the environmental impacts from ships should be recognized as a global issue. Therefore, efforts should also be made for enhancing the quality of maritime transport, such as through improving security and giving due consideration to the environment.

#### (1) Enhancing international competitiveness of Japanese international shipping industry and securing Japanese-flag ships and Japanese crew members

Since around 1985, declining cost competitiveness due to rapid appreciation of yen and intensifying competition in the international shipping market have forced Japanese operators engaged in international shipping services to accept flag-of-convenience ships and foreign crew members, which significantly decreased the number of Japanese-flag ships and Japanese crew members.

At present, many maritime countries are strengthening measures to enhance the international competitiveness of their own international shipping industry. Japanese operators engaged in international shipping services still face difficulties in international markets, and the number of Japanese-flag ships and Japanese crew members has continued to be on a declining trend.

For Japan, which depends largely on maritime transport, such circumstances pose a serious problem from the perspective of securing maritime transport in an emergency. It is necessary to try to equalize international competitive conditions of the international shipping industry and to secure Japanese-flag ships and Japanese crew members.

Therefore, efforts should be made to establish a special tax treatment system, under which Japanese international shipping operators that try to increase Japanese-flag ships and Japanese crew members in a planned manner can select an income accounting method in

accordance with the total tonnage of owning Japanese-flag ships (tonnage tax). Under this system, it is aimed to increase the number of Japanese-flag ships by 100% in five years and the number of Japanese crew members by 50% in ten years, both from FY2008.

## (2) Fostering and securing crew members and other personnel

Fostering and securing crew members and other personnel engaged in the shipping industry is urgently necessary to avoid future shortage of aging crew members for domestic shipping services and to securely increase Japanese crew members engaged in international shipping services in a planned manner.

However, Japanese citizens are not so much interested in the sea nor highly evaluate the importance of marine-related occupations. Most domestic shipping operators are small-sized and working conditions are not so attractive for young people to seek a job in the shipping industry.

Therefore, it is necessary to stimulate young people's interest in the sea and deepen their knowledge and understanding. At the same time, in order to make the shipping industry more attractive for job-seekers, measures should be promoted to reinforce the management base through forming groups of operators, introduce a standard system to limit overtime work so as to enhance working conditions, and prepare a system to conclude the ILO Maritime Labour Convention. Furthermore, an environment should be arranged to enable retired Maritime Self-Defense Force officials and women with qualification to be employed as crew members.

For effectively fostering high-quality crew, the educational system needs to be reconstructed by reviewing the contents of on-board training of crew training courses and further improving the system for graduates of general universities and high schools to obtain marine-related qualifications. In addition, for enhancing skills and improving careers of crew after being employed, the environment should be arranged to help them obtain higher qualifications earlier or get transferred from small ships to larger ships and a new system should be created for qualifications concerning management of ships, etc.

## (3) Developing maritime transport bases

With respect to ports which work as maritime transport bases, their functions, including those as nodes between maritime transport and land transport, should be improved to provide users more convenient services.

In the field of international maritime transport, Japanese ports face intense competition with neighboring Asian countries, which have gained competitiveness in container shipping. Therefore, high-standard container terminals should be developed, which can handle cargoes smoothly, with deep long quays that can deal with recent container ships getting larger and larger. In response to increasing distribution of goods between Japan and neighboring Asian countries, ferry terminals with a high level of punctuality and promptness also need to be developed. Furthermore, port functions should be enhanced to meet the demand of larger ships that transport bulk cargoes such as iron ore and coal. In addition to these, various procedures concerning trades and the use of ports should be simplified and computerized to improve services and strengthen the security system.

In the meantime, regarding domestic maritime transport, distribution bases should be developed in accordance with respective regions' industry characteristics and transportation needs.

#### (4) Enhancing the quality of maritime transport

In order to realize safer and more environmentally friendly maritime transport with high quality, it is required that crew with proper skills are staffed on ships that meet safety/environment standards and that operation is managed appropriately by business operators.

Through talks at international organizations, various types of standards concerning designing, construction, operation, and dismantling of ships need to be continuously reviewed and revised. At the same time, inspections and audits should be conducted securely, and measures for educating on maritime safety and securing safety on shipping routes should be taken steadily. Furthermore, technological development should be promoted to deal with new problems, such as the selection of the most economically advantageous shipping routes, utilization of information that helps avoid navigational dangers, and the prevention of harmful impacts on ecosystems caused by ballast water discharged from ships.

## 5 Securing the safety and security of the sea

## (1) Efforts for securing peace and safety

Japan holds vast jurisdictional marine zones with a long coastline and scattered islands and depends on maritime transport for many goods necessary for economic development and stability of the lives of its citizenry. Marine interests which will be the basis for freedom of navigation and economically viable marine resource development are crucial for Japan to secure peace and safety. For securing marine interests, it is necessary to maintain order and ensure safety on the sea.

However, events that may damage Japan's marine interests and security have been occurring, such as intrusion of suspicious boats, smuggling and illegal immigration, illegal operation by foreign fishing boats, acts to disturb navigation order, serious maritime accidents and escalating activities of navy warships of neighboring countries. On maritime transport routes from the Middle East to Japan via the Strait of Malacca and Singapore, piracy acts and proliferation of weapons of mass destruction are of great concern. Appropriate measures, including enhanced cooperation with related countries, are required for these issues concerning the sea.

### a. Maintaining order in the sea

Institutional arrangement should be discussed and appropriate measures should be taken in order to prevent intrusion of suspicious boats and ships involved in crimes such as smuggling and illegal immigration and other acts to disturb navigation order in the surrounding marine zones. For strengthening effective and flexible surveillance and crackdown, systems need to be enhanced by arranging emergent and systematic replacement of ships and aircraft and establishing an emergency service system through further expanding the multi crew system for patrol crafts. At the same time, related agencies are required to strengthen smooth and close coordination by conducting exercises based on the manuals on joint strategies concerning suspicious boats and sharing information obtained through surveillance and monitoring of the surrounding marine zones.

In order to secure safety of maritime transport routes including the Strait of Malacca and Singapore, which is an important maritime transport point, cooperative relationships with related countries need to be strengthened and the capability of the Information Sharing Center, which was established based on the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia, should be enhanced by

providing support for its activities and fostering human resources. A system to prevent and crack down on piracy on the high seas also needs to be developed in accordance with international laws and appropriate measures should be taken.

With regard to the prevention of terror attacks against navigating ships and coastal facilities and the prevention of proliferation of weapons of mass destruction by maritime transport, the “Protocol of 2005 to the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation” should be concluded at an early stage, and for ensuring its effectiveness, a system needs to be developed to prevent and crack down on the use of weapons of mass destruction on ships on the high seas and transportation of such weapons by ship. Japan also needs to actively participate in maritime interception operation exercises under the Proliferation Security Initiative (PSI). Furthermore, for preventing proliferation of radioactive materials and terror against ships and port facilities, it should be investigated whether ships are actually taking appropriate countermeasures against terrorism, and capabilities of ports to examine cargoes should be further enhanced.

#### b. Making efforts concerning maritime transport safety

For preventing maritime accidents, measures should be promoted to secure zones for ship navigation by improving waterway designated to be developed and preserved, utilize the automatic identification system, make evaluation under the transport safety management system, review maritime traffic rules based on analysis of cases of maritime accidents, and enhance marine aids to navigation, in response to increasing maritime transport volume and larger and faster new ships. At the Strait of Malacca and Singapore, which is an important maritime transport point, Japan should participate in the “Cooperative Mechanism” – a framework of cooperation between coastal states and user countries – to promote cooperation for the maintenance of navigation aid facilities. It is also needed to improve the accuracy of typhoon forecasts and update electronic navigation charts more frequently. Furthermore, measures should be taken under cooperation with other countries to eliminate foreign ships that do not meet international standards.

In order to thoroughly secure maritime transport safety, efforts should be made for the diffusion of knowledge and the promotion of guidance and control, while seeking cooperation from private maritime accident prevention organizations.

For prompt and accurate marine search and rescue, the accuracy of drift forecasts should be enhanced and a mobile rescue system utilizing helicopters and an advanced emergency medical system backed by emergency medical technician should be improved. Coordination and cooperation with foreign rescue organizations also need to be strengthened for searching and rescuing victims. In addition, for coping with spillage of hazardous materials due to accidents, sufficient equipment should be prepared and enhanced training should be implemented

## (2) Countermeasures against marine-derived natural disasters

Japan is naturally and socially vulnerable to marine-derived natural disasters, such as tsunamis and storm surges, and has suffered from such damage repeatedly. In recent years, it is pointed out that global warming is highly likely to make storm surges and other disasters cause greater damage, and sufficient measures are urgently needed so as to protect lives and property of citizenry and the national territory from such marine-derived natural disasters.

Firstly, it is important to prevent disasters at the coastline as much as possible. In zero-meter zones and zones with a high risk of large earthquakes, coast protection facilities need to be newly established or renovated, seismic strengthening work should be performed for existing facilities, and closing of floodgates should be sped up by automation.

When a natural disaster is expected to occur or has actually occurred, the government needs to prevent expansion of damage by helping residents' evacuation and providing support for local governments' disaster prevention activities. For this purpose, it is important to monitor marine conditions all of the time and provide accurate information concerning tsunamis, storm surges and other disasters in a prompt manner. Therefore, efforts should be made to develop a system to monitor offshore tsunamis and high waves, install cable-type ocean-bottom seismometers, and improve the storm surge forecast model that reflects complicated landform of coastal zones. For reducing damage, not only the provision of information but also residents' appropriate evacuation based thereon is necessary. Efforts should be made to prompt local governments to issue appropriate evacuation instruction orders, present effective evacuation measures to residents, and conduct emergency drills.

As measures to support prompt recovery, for securing maritime transport in emergencies

such as a big earthquake, ports should be made earthquake-resistant with enough space for transshipping critical materials and a system should be improved to enable flexible dispatch of personnel and equipment from all over Japan. Prompt restoration of damaged facilities should be executed.

In addition to these measures, it is also significant to scientifically clarify the mechanism of disasters, including subduction-zone earthquakes such as the Tokai, Tonankai, and Nankai earthquakes, and earthquakes occurring in submarine active faults. The government should promote high-accuracy observation and research on the sea floor and in the earth crust, development of technologies related thereto, and seismic observation in focal zones of the next Tonankai earthquake by using deep-sea holes bored with the Deep Sea Drilling Vessel “Chikyu,” and thereby enhance capabilities to predict the occurrence of earthquakes and tsunamis. Considering the possibility of sea level rise due to global warming, deliberations should be conducted concerning appropriate coast protection facilities in the future and proper measures should be taken.

## 6 Promotion of Marine Surveys

Surveys necessary to understand current marine conditions and predict changes in the marine environment are indispensable for planning and actually implementing measures with regard to the sea. It is also important to prepare the observation system required for conducting marine surveys and to manage and provide information obtained through surveys appropriately so that such information is utilized for exploiting marine resources, developing marine industries, preserving the marine environment and carrying out various research activities. Furthermore, it is of great importance to positively conduct surveys and enhance the quantity and quality of information under international coordination so as to proactively contribute to the resolution of environmental problems on a global basis.

### (1) Steady implementation of marine surveys

As government agencies have to utilize the results of their marine surveys promptly, each of them needs to steadily conduct surveys respectively in the method most appropriate for respective policy issues. At present, the aging of marine survey ships, facilities and equipment needed for surveys deteriorates efficiency and partially restricts survey activities. They should urgently be replaced in a planned manner.

For realizing more effective and efficient marine surveys by respective agencies, required equipment, facilities, and analysis technologies should be innovated and utilization of satellites needs to be promoted. Coordination and cooperation should be sought among related agencies to make coordination to marine survey plans and share survey results and survey vessels and equipment. In such cases, efforts should also be made to obtain cooperation from universities, local governments, private companies and others.

(2) Collection and compilation of basic information necessary for the management of the sea

Basic information such as low-water line and bathymetric features necessary for the management of the sea has not been collected and compiled sufficiently. For collecting and compiling necessary basic information, marine zones and items to be surveyed need to be carefully reviewed to conduct marine surveys intensively, under coordination and cooperation among related agencies.

(3) Integration of marine-related information

Respective government agencies conduct various marine-related surveys, such as on bathymetric features and marine weathers, in accordance with their respective policy issues and accumulate obtained data. There are also charts, hazard maps for tsunamis and storm surges, port maps, natural park maps and information on fishery right areas. Such marine-related information is publicized separately by respective agencies depending on their own purposes. However, private companies, research institutions and government agencies that intend to use such information often complain that it is troublesome to search necessary information on specific marine zones or of specific types. Collected data and information are not always managed properly after once used for the original purposes and in some cases, they are not used sufficiently thereafter.

A system should be established to comprehensively manage and provide these pieces of information now scattered in respective agencies, so as to provide them for private companies and research institutions in a user-friendly manner and enhance effectiveness of marine surveys by respective agencies, with a view to contributing to the development of marine industries and the improvement of scientific knowledge. In the process, efforts made so far by agencies such as the Japan Oceanographic Data Center, which has carried out international services under the framework of International Oceanographic Data and

Information Exchange (IODE), should be utilized at a maximum to make the system effective and efficient, while seeking cooperation from universities, local governments and private companies as well. It should be ensured that collected and managed information is accumulated comprehensively over a long period of time.

#### (4) International coordination

In order to proactively contribute to the resolution of global environment issues and the creation of the wisdom of mankind, Japan should participate in the international projects such as the Argo project, the Global Earth Observation System of Systems (GEOSS) 10-year Implementation Plan, the Integrated Ocean Drilling Program (IODP), the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP), and the IODE, taking the initiative in conducting surveys and increasing enhancing information.

Data obtained through marine surveys conducted under an international framework or by Japanese and other countries' survey vessels in marine zones of respective partner countries should be shared and exchanged, from the perspective that scientific knowledge concerning the sea should preferably be enhanced widely throughout the entire international society.

## 7 Promotion of Research and Development of Marine Science and Technology

The field of research and development concerning marine science and technology is wide-ranging, including the field of humanities and social sciences. Therefore, it is important to combine diversified research fields to cope with various types of problems, and research activities need to be enhanced with free and creative ideas from the viewpoint of researchers. Marine-related research has a particularity in that it requires a large scale of investment and time for preparation of special research bases such as ships and supercomputers which are necessary for marine surveys and analysis of various phenomena and are available only for limited period of time. Furthermore, research often needs to be continued for a long term without bearing direct results in a shorter period of time. Considering these circumstances and the policy established by the Council for Science and Technology Policy, it is important to promote measures strategically with a long-term perspective.

## (1) Promotion of basic research

Basic research, which brings about diversified knowledge and innovation, is the very source for pursuing the truth of various phenomena and systematically developing scientific knowledge. Basic research concerning the sea, which still contains many unknowns, can only be realized based on steady and earnest pursuit of truth and accumulation of trial and error results, and it is important to foster innovative ideas that create discovery and invention free from the conventional framework of knowledge. In particular, basic research conducted by university researchers, etc. freely based on their unique viewpoints should be promoted with a long-term perspective so that they can continue diversified research and pursuit of universal knowledge free from the current of the times.

## (2) Promotion of research and development responding to policy issues

There are lots of policy issues that Japan is required to actively cope with, such as countermeasures against global warming which has become a global-scale problem; analysis of various impacts that changes in the ocean circulation and sea level rise due to global warming may have on the coastal regions, living resources and ecosystems; measures for massive underwater earthquakes and tsunamis that are supposed to occur in the near future due to the unique seafloor crustal structure; and the development of energy and mineral resources such as methane hydrate and polymetallic sulphides. It is said that in some fields Japan has yet to reach satisfactorily high technological levels. Therefore, it is necessary to promote research and development responding to policy issues intensively and strategically so as to cope with these issues in an appropriate manner.

Regarding measures closely selected based on the Science and Technology Basic Plan, such as the Marine-Earth Observation System utilizing Japan's original seafloor exploration technology that enables exploration of underwater seismogenic zones and seabed resources, efforts should be made to steadily achieve research goals and policy resources need to be allocated appropriately to strategically heighten technological levels in respective technology fields. Some independent administrative institutions, as entities responsible for research and development responding to policy issues, have conducted basic research on respective research and development issues on their own and have also played a significant role to provide research bases for basic research activities at

universities and other institutes. From the viewpoint of achieving research goals, their roles should be clarified and their research and development capabilities need to be further enhanced.

### (3) Development of research base

When promoting basic and fundamental research and research and development responding to policy issues at universities and other institutes, it is indispensable to develop a basic system, such as through improving ships and other equipment, fostering and ensuring researchers, engineers and research supporters, and strengthening the marine science and technology innovation system.

#### a. Improving ships and other equipment

For promoting marine science and technology, research bases such as ships and supercomputers used for various surveys needs to be provided in an appropriate manner, but research bases possessed by the government and independent administrative institutions are said to be insufficient in quantity. Research activities have been partially restricted by the aging of equipment and recent upsurge of fuel costs. Therefore, research bases should be improved in a planned manner so that their functions can be utilized sufficiently.

For utilizing such research bases as efficiently as possible, necessary research support systems should be ensured and sharing of research bases should be promoted. Furthermore, sharing of research results also needs to be promoted by making a database thereof and strengthening coordination of associations so as to promote individual research activities in a more effective manner.

#### b. Fostering and ensuring researchers, engineers and research supporters

Frontier fields are said to be suffering from shortage of human resources, particularly lacking in young researchers and engineers both in quality and quantity, and fostering successors is an urgent issue. In order to foster excellent young people who can exercise leadership internationally, a vibrant research environment should be created by providing opportunities to develop independence and play an active role. For this purpose, measures should be taken to enhance the mobility of human resources and ensure research funds and research institutions, and at the same time, to encourage young

researchers to actively apply for the research support system backed by competitive funds. It is also urgently needed to foster and ensure engineers and research supporters who support marine science and technology. In order to ensure excellent human resources into the future, a human resource development curriculum should be developed together with the industrial world that provides practical human resource development at high schools and universities, and the educational environment including equipment such as high schools' training vessels should be improved.

Furthermore, outreach activities by researchers and engineers need to be promoted and the government's measures should be explained in an easy-to-understand manner so as to stimulate juveniles' interest in the sea and marine-related research.

#### c. Strengthening the marine science and technology innovation system

In order to strengthen the innovation system in the field of marine science and technology to facilitate the use of the sea in various industrial fields, measures from wide-ranging perspectives should be promoted for securing diversity and continuity of basic research on marine science and technology, strengthening collaboration in different fields and improving education on intellectual property to reinforce full-scale industry-academia-government collaboration, facilitating the use of new technologies, building a regional innovation system based on marine science and technology, and promoting international standardization of new technologies. In the process, efforts mainly by private organizations should be promoted so that a vigorous network is formulated among related parties that enables sharing of problem consciousness and close exchange and collaboration.

### (4) Strengthening of coordination

#### a. Formulating a system to promote new visions

Establishment of the Basic Act on Ocean Policy has prompted industrial groups and academic circles to propose a variety of new visions concerning various research and development systems and research and development projects beyond jurisdictions of respective related agencies. These research and development visions, which generally relate to wide-ranging fields and require massive initial investment, often fail to be realized. Therefore, under coordination among related agencies, the necessity, feasibility and ripple effects of proposals concerning these new visions need to be clarified. Based

on the discussed cost-effectiveness and priorities among other measures, proposals need to be promoted one by one from those highly possible in a planned manner.

b. Implementing measures systematically based on prior evaluation

In order to promote marine-related research and development continuously, the government should establish promotion strategies concerning marine science and technology, mainly based on prior evaluation of measures, and implement them systematically. For this purpose, deliberations on promotion strategies concerning marine science and technology should be conducted, based on the policy of the Council for Science and Technology Policy, comprehensively at the Subdivision on Ocean Development of the Council for Science and Technology, which holds the power to submit recommendations concerning marine development to related ministers.

c. Making close coordination and exchange among related agencies

Fields of marine-related research are wide-ranging and each researcher now carries out research separately in his/her own field of study. Exchange between these researchers beyond their own fields will stimulate them intellectually and may create significant advances in their research. In order to convert their research results into concrete social and economic values, coordination needs to be made among related agencies including local governments, the industrial world, and the financial world. From this viewpoint, opportunities need to be created where wide-ranging related parties can meet together to mutually exchange opinions and information.

## 8 Promotion of Marine Industries and Strengthening the International Competitiveness

It is important to maintain and strengthen the international competitiveness of Japan's marine industries that support its economy and society, by introducing new technologies through promoting advanced research and development and fostering and ensuring human resources that will lead marine industries.

Furthermore, efforts should be made to promote the creation of new marine industries by fully utilizing Japan's abundant marine resources and marine space and to understand the whole of trends of marine industries.

## (1) Reinforcement of the management base

### a. Strengthening competitiveness

As the international shipping industry is now under intense competition on the one global market, Japan should take measures to introduce the tonnage tax system, which has been recognized to be the international standard. Aiming for realizing a level playing field on the international maritime transport market, efforts should be made to create an orderly competitive environment through negotiations under a framework such as the World Trade Organization (WTO) and the Economic Partnership Agreement (EPA).

For strengthening the competitiveness of boat fishing operators and domestic shipping operators, consisting mostly of small companies or self-employed business operators with relatively vulnerable management bases, their management culture needs to be reinforced by sharing ships, forming groups of management entities, introducing a more profitable operation/production system, and replacing current ships with new ships requiring less energy or personnel. New management stabilization measures that can reduce impacts of income fluctuations on fishery management should be promoted in order to create an environment that allows fishermen, who will be responsible for the stable supply of fishery products, to positively take actions to improve their management. Furthermore, for strengthening the international competitiveness of Japanese fishery products, their distribution system should be reconstructed, such as through elimination and consolidation of markets and entry of new buyers, and measures should be taken intensively at these local fishing ports so as to enhance production and distribution efficiency and improve quality and hygiene control.

With regard to the shipbuilding industry and ship machinery industry, which supply ships and other ship machinery products indispensable for the shipping industry and fisheries industry, it is important to maintain and strengthen the international competitiveness based on Japan's high technical capabilities so as to appropriately respond to various needs, such as the improvement of fuel efficiency, security upgrades, and reduction of environmental load. For this purpose, research and development needs to be promoted concerning technologies, such as energy conservation technology of ships and on-site production technology indispensable for enhancing productivity, and at the same time, efforts should be made to foster and ensure engineers. Utilizing its high technological capabilities, Japan should also work, on occasions such as the IMO

meetings, to establish international standards, including an index for CO<sub>2</sub> emissions to reducing emissions from ships engaged in international shipping business. Furthermore, Japan should promote international cooperation through occasions such as the Organisation for Economic Co-operation and Development (OECD) meetings so as to ensure a level playing field on the one international shipbuilding market and equalize the imbalance of supply and demand.

#### b. Introducing new technologies

For contributing to the reduction of management cost for the fisheries industry, measures should be taken to develop and introduce light-emitting diode fish lamps which are highly energy-conserving and can competitively cope with fuel price hikes, and develop cheap aquaculture feed that contains less fish meal in response to the upsurge of prices of fish meal. At the same time, for contributing to the creation of a recycling society, it is also required to promote the development and dissemination of technologies to efficiently utilize marine biomass such as through converting it into fuel and developing functional food.

In the shipbuilding industry and ship machinery industry, Japan will lead the world in establishing technology to assess fuel economy of ships in actual sea conditions, aiming to reduce CO<sub>2</sub> emissions from newly built ships by 30% by FY2013. In response to emission regulations to be tightened significantly, the development of ship engines that will reduce NO<sub>x</sub> emissions by 80% should be promoted, with a view to realizing commercialization by FY2012. Through these efforts, ships and ship engines superior both in terms of environment and economy should be developed and disseminated. In addition, it is also needed to develop ships for transporting natural gas hydrate, which requires less investment for building production facilities than liquefied natural gas, so as to create new demand for maritime transport.

#### c. Fostering and ensuring human resources

The most important thing in fostering and ensuring human resources is to make marine industries attractive enough for job-seekers. For this purpose, while steadily promoting measures to strengthen the competitiveness of marine industries, efforts should be made to clarify working conditions, improve the working environment such as through upgrading equipment standards for fishing vessels, and arranging an environment that enables upskilling and career progression after starting to work. Hands-on experience and

PR activities targeting juveniles are also needed to ensure new workers through deepening their understanding of the attraction and significance of marine industries. Additionally, an environment should be arranged for persons with experiences onboard to make much of such experience to be employed as crew members and for business operators with various know-how in different types of industries to newly start fishing businesses by utilizing local management resources.

Many skilled engineers and technicians are reaching their retirement age in the shipbuilding industry and ship machinery industry, and smooth handing down of technologies and skills is an urgent issue. Support should be provided for skill training for recruiters and mid-career workers and efficient training for backbone technicians, and industry, academia and government should cooperate with each other to foster and provide human resources who will play a leading role in various marine industry fields, such as maritime transport management, technology management, ship management and shipbuilding.

Furthermore, for fostering human resources with wide-ranging knowledge and technology who will lead marine industries of the next generation, practical professional education on marine industries needs to be enhanced through high schools and universities.

## (2) Creation of new marine industries

Industry-academia-government collaboration in marine-related fields should be promoted for contributing to the creation of new marine industries. The maritime transport industry, shipbuilding industry and other port-related industries have often created clusters founded on respective regions, together with universities and administrative organs, and industry-academia-government collaboration is rather easy through active information exchange and sharing of resources. Such clusters should be fully utilized to promote the creation of new marine industries. Efforts for local revitalization should also be promoted by utilizing marine resources in the coastal regions, such as through providing abundant seafood, preserving and developing the beautiful scenery of beaches, and promoting experiences of fishing activities and marine leisure activities.

It is also needed to prepare a management system of information obtained through various marine surveys for facilitating utilization thereof, and to promote measures for the use of marine space in various industry fields, including the establishment of technology

for offshore platforms that are excellent both in terms of security and economic efficiency. Regarding genetic resources of abyssal-benthic microbes, which have high potential for various related industries, as medicines and new materials may be developed in the future, Japan should examine international trends in handling such resources and determine its policy and prepare a system at an early stage.

### (3) Understanding of trends of marine industries

For grasping the effects of various measures implemented for marine industries and reviewing them, surveys should be conducted to understand the current conditions and trends of marine industries, with regard to indicators such as the size of industry and the number of employees.

## 9 Comprehensive Management of the Coastal Zones

Coastal zones refer to areas including land areas and marine zones with a coastline in-between. Their forms vary constantly, affected by waves and tides, forming beaches, shores, seaweed beds, tidal flats, and coral reefs. A variety of organisms live and grow there, and coastal zones also have various functions, such as being used for fishing, acting as a hub between the sea and the land for personnel and goods, and constructing coastal industrial zones. Furthermore, they provide people with opportunities to enjoy recreational activities and rich scenic beauty, such as the contrast of white sand beaches and green pine trees as has often been depicted in traditional Japanese paintings. However, at the same time, coastal zones are notably affected by the circumstances of land areas, as seen in worsening shore erosion caused by decreasing supply of sediment from land areas via rivers, and are used for various purposes in a congested manner.

For the appropriate management of coastal zones, the following measures should be promoted, based on the awareness that coastal zones are (i) areas to be treated in an integrated manner, including both land areas and marine zones; (ii) areas that are used for diversified purposes; and (iii) areas where various phenomena relate to each other, and where management should be carried out from a comprehensive standpoint so as to preserve proper conditions of the entirety of the zones. At coastal zones where problems such as shore erosion and water pollution have become obvious, necessary concrete measures should be taken to resolve those problems, while considering the conditions of

the zones as a whole.

(1) Management of coastal zones carried out in an integrated manner with land areas

a. Promoting efforts for comprehensive sediment control

In recent years, shore erosion has come to be observed nationwide, as the supply of sediment from land areas has decreased due to construction of dams at upriver districts and gravel-collection at river, and the longshore sand transport has changed in some zones due to newly built structures on the coast. As a result, precious national territory has decreased and beaches have become less preventive against storm surges and high waves. Adverse effects have thus occurred on natural environments and seashore landscapes.

Therefore, efforts should be made to restore beaches by way of controlling the sediment yield with sediment control facilities, promoting measures to appropriately remove accumulated sediment from dams, properly managing river beds by modestly controlling gravel collection at rivers, and constructing sand bypasses and detached breakwaters at eroded shores. Related agencies need to collaborate with each other to conduct research for understanding the movement of sediment and improving methods to estimate geomorphic changes and promote comprehensive sediment control from mountainous areas to coastlines.

b. Promoting measures to prevent red clay outflow in Okinawa and other zones

As a result of increasing outflow of red clay due to the development of land areas, regions such as Okinawa and Amami Islands are suffering from damages of deteriorated coral reefs and setbacks in sightseeing and recreational activities. In order to prevent outflows of red clay, measures should be strengthened to control the very sources such as farmlands by developing sand basins, and research and development on technology to prevent red clay outflow also needs to be promoted.

c. Properly managing nutrient salts and pollutant load and restoring and promoting cycles

In order to reduce the load of pollutants flowing down from land areas, wastewater treatment plants to be built and combined sewer systems need to be improved and water

purification should be promoted at irrigation and drainage facilities and rivers. In particular, at enclosed coastal seas, advanced wastewater treatment should be promoted and related agencies should cooperate with each other to promote countermeasures against not only point source load, such as drainage from houses, factories and other business establishments and livestock farms, but also non-point source load, such as urban zones and farmlands. They also need to promote measures to prevent reproduction of pollutant load by eliminating sludge and improving bottom sediments with overlaying sands. Efforts concerning the Total Pollutant Load Control should also be promoted in Tokyo Bay, Ise Bay and Seto Inland Sea. As seaweed beds, tidal flats, and coral reefs, which have decreased significantly since the high economic growth period, help purify water and ensure biodiversity, support should be provided for maintenance and management activities by fishermen and local residents.

At the same time, as nutrient salts, such as nitrogen and phosphorus, flowing down from land areas are indispensable for the growth of aquatic life including fish and algae, “forest cultivation for preservation of fishing grounds” needs to be promoted in accordance with the special features of respective regions. The project is expected to be effective for helping supply of nutrient salts and mitigation of water pollution. In marine zones containing too much nutrient salts, related agencies need to cooperatively discuss and promote formulation of an integrated nutrient salt circulation system that covers both land areas and marine zones, by way of building sewerage systems and introducing advanced wastewater management so as to improve water quality and by way of properly catching and using aquatic life.

#### d. Promoting countermeasures against wastes drifting or washed ashore

As wastes drifting or washed ashore partially originate from land areas, wastes flowing into the sea via rivers need to be reduced. Regarding prevention of so-called littering and illegal dumping and beautification of rivers, related agencies should cooperate with each other to strengthen educational activities to enlighten people and to tighten surveillance and control.

#### e. Creating nature-friendly seashore that is accessible to the people

The seashore, which is a precious place where various organisms live and grow, has formulated Japan’s unique culture, history and climate, with beautiful sand beaches and unique natural scenery. Therefore, distinguished natural scenic sites need to be properly

preserved as natural parks. When developing coast protection facilities, due consideration should be given to the preservation of scenic beauty and growing environments for living things so that the facilities should contribute not only to protection of the seashore from disasters but also to improvement of user-friendliness by ensuring access to the seashore and enhancement of living conditions of local communities. In addition, parks and green spaces should be developed by fully utilizing the seashore space.

## (2) Coordination of activities at coastal zones

At coastal zones which are used for various purposes in a congested manner, utilization is generally coordinated through negotiations among related parties with various different intentions, by way of acting in accordance with utilization coordination rules and opportunities for coordination based on laws such as local regulations of fishery coordination and local fishery coordination committees and establishing self-regulatory rules concerning marine leisure activities. However, troubles often occur in some regions because utilization coordination rules have not been established or widely disseminated among fishermen and marine leisure operators.

Therefore, efforts should be strengthened to promote the establishment of sea surface utilization coordination rules with due consideration to the conditions of local communities at coastal zones, improve access to information such as on local utilization coordination rules, widely disseminate such information to users including marine leisure operators, and thereby construct proper relationships concerning utilization of coastal zones.

## (3) Construction of a coordination system concerning coastal zone management

Diversified phenomena, closely related to each other, occur at coastal zones and each zone shows different features. Therefore, targeting land areas and marine zones specified appropriately as needed, related parties led by local governments should cooperate with each other to establish a system to share information on the conditions of the zones, the details of respective parties' activities, and relations between the diversified phenomena. By clarifying problems of each coastal zone and determining appropriate policies during such processes, they are supposed to promote efforts to realize their desirable future visions. When there are any persons, other than local governments and managers of marine-related facilities, who have useful information and knowledge through their daily activities, it is preferable to ask for their participation so as to cooperate with them and

share information.

In addition to efforts for resolving various problems, necessary deliberations should be conducted concerning desirable management based on special features of respective coastal zones with due consideration to the circumstances of local communities, and efforts should be made to establish consensus by clarifying the details of management and take appropriate measures.

Various types of information concerning coastal zones have not yet been accumulated sufficiently, and it is still needed to promote surveys and researches on conditions of coastal zones and relations between the diversified phenomena observed there. As utilization and the environment of coastal zones in particular are likely to change significantly in a short period of time, it is also necessary to dig up and utilize past data in a positive manner.

## 10 Preservation of the Islands

Islands scattered widely within vast jurisdictional marine zones of Japan play a significant role as one of the grounds to establish that zones, as well as in securing maritime transport safety, developing and using marine resources, and preserving the marine environment. Therefore, it is important to clarify the position of islands in promoting the government's ocean policy and implement preservation and management thereof in an appropriate manner.

Aging and population decrease have been advancing on many islands, and it is worried that communities with long histories are declining. Efforts need to be made for developing living environments as measures to revitalize islands.

### (1) Preservation and management of islands

#### a. Securing maritime transport safety

From the viewpoint of securing maritime transport safety and preventing disasters through ensuring weather forecasts across the nation, navigational aids such as lighthouses and meteorological/oceanographical observation facilities established on islands should be improved and managed properly.

Support should be provided for residents' marine salvage activities and a system should be developed to appropriately respond to residents' reports of maritime accidents

and crimes.

b. Supporting Development and use of marine resources

Bases for fuel transportation, refueling, and shelter in heavy weather should be developed on islands so that maritime activities concerning the development and use of marine resources and marine surveys and activities for managing various facilities supporting such activities can be carried out safely and steadily even in marine zones far apart from the mainland.

Furthermore, preservation and restoration of the environment and development of fishing grounds should be promoted at marine zones surrounding islands where seaweed beds, tidal flats, and coral reefs still remain in abundance and which serve as precious fishing grounds.

c. Preserving the natural environment in the surrounding marine zones

Islands which are isolated from other regions by the sea and where unique ecosystems have been nurtured are vulnerable to various human activities and introduction of alien species. From the viewpoint of ensuring biodiversity, monitoring of the natural environment and ecosystems should be continuously conducted so as to conserve and manage these precious ecosystems in a proper manner, and control of invasive alien species and preservation and improvement of habitat environments for seabirds and other organisms should be promoted.

In order to contribute to purifying water and ensuring biodiversity, efforts for managing seaweed beds, tidal flats, and coral reefs made by fishermen and local residents should be promoted so as to improve habitat environments of aquatic plants and animals and restore fishery resources.

For preserving distinguished natural scenic sites, underwater beauty, and natural seashores, the natural park system should be utilized properly, and measures should also be promoted to reduce outflow of red clay and nutrient salts from terrestrial areas, remove and transport wastes drifting or washed ashore outside the islands, and improve waste disposal facilities.

d. Establishing policies concerning preservation and management

Islands play a significant role as mentioned above. It is necessary to clarify the position of islands including uninhabited islands in promoting the government's ocean

policy and establish the “Basic Policy concerning Preservation and Management of Islands for Management of the Sea (provisional title),” which stipulates appropriate management systems, measures and schedules of implementation. In addition, basic information such as location data concerning islands should be prepared and preservation and management of islands should be promoted in accordance with respective regions’ economic activities, ecosystems, resources in the surrounding marine zones, and meteorological/oceanographical features, such as through improving coast protection facilities to prevent coastal erosion and taking aerial photos periodically.

## (2) Revitalization of islands

It is necessary to promote measures, in response to problems unique to islands, to facilitate settlement and employment by respecting innovative ideas of respective regions, with a view to promoting their self-sustaining development, stabilizing residents’ lives and enhancing welfare, and enabling those islands to continue playing a significant role in the government’s ocean policy.

For securing safe and stable transportation for islands, traffic networks should be developed and support should be provided to maintain navigation routes and air routes to and from islands and to enhance convenience. As fuel costs are relatively higher on islands than on the mainland, efforts to streamline distribution systems should be backed up. Advanced information and communications networks need to be constructed so as to eliminate digital divide with the mainland in accordance with the advancement of an advanced information society. Medical systems should also be developed and measures should be taken to ensure a system to provide appropriate medical care through sharing functions and promoting broad-based coordination among medical agencies. Furthermore, infrastructures need to be developed to improve the living environment of islands, such as through improving facilities to protect residents’ lives and property from natural disasters and ensuring prompt communication means to convey information to residents.

The key industry on islands, the fisheries industry, is in a disadvantageous position with regard to sales and distribution of fish catch, and the fishermen population has been decreasing and aging. Therefore, for revitalizing the fisheries industry on islands, support needs to be provided for fishermen to improve the productivity of fishing grounds. Support is also needed for efforts to introduce new local agricultural products unique to respective islands or to add higher values to those products. Measures to promote employment and

develop industries should also be taken through promoting attractive island sightseeing business that provides such opportunities as ecotourism that makes much of the natural environment affluent with unique seashore landscapes and rare marine organisms, recreational and medical activities, cruising business, experience-oriented long-stay sightseeing business under collaboration with the agriculture, forestry and fisheries industry, international cultural exchange. Furthermore, efforts should be made to develop social capital, such as roads, ports and infrastructure for the agriculture, forestry and fisheries industry, which will be the basis of industrial development of islands.

## 11 Securing International Coordination and Promotion of International Cooperation

Under the overall framework based on UNCLOS, efforts to further materialize and complement it have been actively made. Japan also needs to take measures positively regarding urgent issues, such as the establishment and implementation of international agreements by international organizations, marine-related activities under an international framework, resolution of marine-related conflicts, management of marine resources, preservation of marine environment, securement of safety of the sea, promotion of international cooperation concerning marine science and technology.

### (1) Formation and development of the order of the sea

In order to contribute to the formation and development of the order of the sea, Japan should positively join to establish various international agreements with regard to the sea. In the East China Sea and other sea zones around our country, there are marine zones for which Japan's claims its jurisdiction over EEZ and continental shelves have conflicted with those of neighboring countries, causing problems with those countries. In order to secure Japan, ensure its interests and further stabilize the order of the surrounding marine zones, the government should pursue fundamental resolutions to these problems based on international rules.

Some measures taken by a certain country in the sea within the scope admitted under international laws sometimes have significant impacts on measures that other countries are going to take. Taking such possibilities into account, Japan, in order to ensure its own interests in the sea, should positively join marine-related discussions at organizations such

as the United Nations and proactively participate in the formation of international agreements with regard to the sea at the IMO meetings and other opportunities so that UNCLOS and other international agreements should be implemented in an appropriate manner.

For contributing to the formation and development of the order of the sea, Japan should seek resolutions to marine-related conflicts based on international laws and other international rules. Japan should not only adopt the idea to actively utilize a third-party body such as international judicial bodies, but also disseminate such idea to other countries, and proactively support activities of international judicial bodies in the marine-related fields, including those by the International Tribunal for the Law of the Sea.

## (2) International coordination with regard to the sea

Japan should actively participate in international frameworks with regard to the sea and try to take the initiative in activities carried out under the coordination and cooperation of the international society. In particular, cooperation among related countries is indispensable for securing freedom of navigation and safety on very long marine routes, which are the very basis for ensuring the safety of Japan including economic aspects. In order to strengthen cooperative relations with these countries concerning maritime safety, the government should fully utilize various opportunities such as the ASEAN Regional Forum to materialize cooperation. The Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia aims to share information on pirates among Contracting Parties to strengthen cooperation for combating piracy while respecting coastal countries' sovereignty. Japan should support activities under this agreement and encourage other related countries to join the agreement. For securing transport of radioactive materials, which is of great importance in ensuring the energy security of Japan, the confidence-building need to be promoted through talks with countries with concerns over transport thereof. Furthermore, in response to international efforts concerning countermeasures against terrorism on the sea and maritime transport of weapons of mass destruction, efforts should be made to conclude the "Protocol of 2005 to the Convention for the Suppression of Unlawful Acts against the safety of Maritime Navigation" and the "Protocol of 2005 to the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf" as early as possible. Japan also needs to actively participate in training on maritime interception operation under the Proliferation

Security Initiative (PSI).

Japan should positively promote coordination with neighboring countries under the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) so as to preserve the environment of the Sea of Japan and the Yellow Sea. In order to respond to international efforts for the prevention of adverse impacts caused by aquatic organisms and pathogens transported in ballast water of ships, preparations should be made to accept the “International Convention for the Control and Management of Ship's Ballast Water and Sediments.” For contributing to enhancing qualities of crewmen in the Asian region, efforts for the “International Project for Jointly Training Asian Crewmen” should be promoted under industry-academia-government collaboration among Asian countries. Cooperation for countermeasures against poaching and smuggling between Japan and Russia also needs to be promoted to ensure the effectiveness of conservation and management of fishery resources in the Far Eastern marine zones. For this purpose, Japan should urge Russia to promote coordination and cooperation with neighboring countries as needed.

### (3) International cooperation with regard to the sea

Japan has so far provided international cooperation in various marine-related fields and should further promote international cooperation mainly with regard to the following common problems for the international society.

#### a. Fishery resources

Japan needs to play a leading role in introducing appropriate measures for the conservation and management of major fishery resources, such as tuna, and in ensuring the effectiveness of those measures at regional fisheries management organizations concerning such resources. In order to conserve and manage fishery resources especially in the surrounding exclusive economic zones of Japan, China and South Korea where the three countries share resources, each country needs to make efforts to thoroughly implement measures such as the catch quotas and total number of fishing vessels by country and strengthen coordination and cooperation for more appropriate management of resources in these zones including provisional waters. Furthermore, Japan should promote overseas cooperation for contributing to the development and promotion of the fisheries industry and international management of fishery resources.

#### b. Marine surveys and marine science and technology

Promoting marine-related surveys and researches is important to resolve global environmental problems. Therefore, observational research should be promoted with a view to assessing the impacts of atmospheric fluctuations in the Pacific Ocean and the Indian Ocean on the environment. Furthermore, in accordance with the GEOSS 10-year Implementation Plan, Japan should contribute to the observation and monitoring of global environmental changes and natural disasters and provide information useful in the process of determining countermeasures against global warming. Regarding marine surveys and information exchange which will be the basis of marine science and technology, Japan should actively promote cooperation for research projects implemented or supported by the Intergovernmental Oceanographic Commission (IOC), such as research projects under the World Climate Research Programme (WCRP) including the Argo project, the Integrated Ocean Drilling Program (IODP), the International Oceanographic Data and Information Exchange (IODE) and other research projects. Strategic science and technology cooperation in the marine-related fields for developing countries should also be promoted.

#### c. Marine environment

From the viewpoint of ensuring biodiversity, efforts for research on and preservation of the marine environment should be promoted under international cooperation, with regard to the protection of coral reefs and animals that move around wide areas. Cooperation between Japan and Russia should also be promoted concerning the conservation of ecosystems and sustainable use. To contribute to international cooperation to prevent negative effects caused by the moves of aquatic organisms, Japan should promote the development of processing equipment for ballast water. Furthermore, the government should promote the introduction of Japan's experience and system concerning measures for enclosed coastal seas to foreign countries.

#### d. Security measures for the sea and securement of navigation safety

Japan should provide support to related countries for enhancing their capabilities to cope with piracy acts and promote coordination and cooperation with maritime safety agencies of other Asian countries for strengthening control of smuggling and illegal immigration and countermeasures against terrorism. The "Cooperative Mechanism,"

which materializes how coastal states and user countries should cooperate with each other, is innovative from the perspective of strengthening navigation safety at the Strait of Malacca and Singapore. The Japanese government should promote the smooth initiation of the fund to be established under this mechanism and the preparation of navigation aid facilities, while seeking cooperation from domestic private companies. Furthermore, in order to enhance international coordination concerning port security, Japan should promote assistance for capacity-building and implement joint exercises.

e. Support for disaster prevention and marine salvage

In order to prevent disasters by tsunamis and storm surges, which are becoming more and more serious with the advancement of global warming, Japan should provide technical advice and support for information network activities to the Asia-Pacific region and take necessary measures that enable the prompt provision of information on tsunamis to countries in danger of being hit. For the conservation of mangrove in the Asia-Pacific region, which is expected to have a disaster-prevention function against tsunamis and storm surges, functional enhancement of the Mangrove Information Centre in Indonesia is to be completed by 2012.

In order to conduct marine salvage in a more smooth and effective manner, related countries should strengthen coordination and cooperation with each other by mutually exchanging information and implementing joint exercises, while making efforts to enhance the accuracy and mobility of maritime search and rescue technology.

## 12 Enhancement of Citizen's Understanding of the Sea and Fostering of Human Resources

In order for Japan to establish a new Oceanic State, it is necessary to construct a society where each one of the citizens has deep understanding of and interest in the sea and proactively participates as a member thereof. Therefore, efforts should be made to enhance citizens' interest in the sea, increase accurate knowledge and understanding among juveniles who will be responsible for the next generation, and foster and ensure human resources who will support a new Oceanic State.

(1) Measures to enhance interest in the sea

The government should publicize information concerning various measures they have taken with regard to the sea, including international agreements for realizing sustainable development and use, such as Agenda 21 and UNCLOS and other international commitments that show a framework of international order of the sea. Consideration should be given so that as much related information as possible can be observed at a time, and information should be transmitted through the Internet and official gazettes in an easily comprehensible manner. The government should also promote public opening of facilities that will help people's understanding.

It is also important to boost events related to "Ocean Day" and "Ocean Month" by seeking wider participation under cooperation with local governments and private organizations. These events should be utilized to provide people with opportunities to experience introductory boarding on training ships, study tours of various marine-industry-related facilities, work studies or beach cleaning campaigns, to carry out educational activities on marine safety and the preservation of marine environment, and to disseminate marine leisure activities and deepen people's understanding of the sea. Furthermore, a prize should be newly instituted to praise and widely introduce the achievements of persons who have contributed significantly in various marine-related fields.

With a view to increasing opportunities for the citizens to enjoy the sea, efforts should be promoted to revitalize local communities by utilizing respective regions' potential marine resources, such as seafood, beautiful seashore landscape, unique climate created by their own history and culture, and marine space suitable for marine leisure activities. Publicly managed beaches should be open to residents to the extent possible and efforts for disseminating marine recreation should be promoted such as through improving facilities to moor small boats and establishing utilization coordination rules at coastal zones.

While disseminating marine-related recreation, enlightenment activities also need to be promoted to raise environmental preservation awareness of recreational fishermen and users of pleasure boats concerning safety management and utilization of the sea.

(2) Efforts to increase understanding of the sea among juveniles who will be responsible for the next generation

School education and social education need to be enhanced so that the citizens, including juveniles who are responsible for the next generation, can deepen their correct knowledge

and understanding of the sea. Regarding school education, based on the purport of the Basic Act on Ocean Policy, high school curriculum guideline for the subject “Fisheries” needs to be reviewed promptly and practical education should be promoted through on-site practices. More training vessels need be equipped and improved at high schools. Furthermore, efforts should be made to see to it that marine-related education is provided properly in classes of social studies and science at elementary schools, junior high schools and high schools and to disseminate marine education such as through introducing practical examples of marine-related education. The government should also provide support for citizens’ learning activities concerning basic knowledge and various problems on the sea through promoting experience-oriented activities at fishing villages and ecotourism, and promote efforts by utilizing natural science museums including aquariums. Furthermore, outreach efforts should be promoted, with cooperation from academic circles and associations, so that the citizens can have marine-related dreams and excitement and feel the appeals of the sea.

### (3) Fostering of human resources who will support a new Oceanic State

Fostering competent human resources with necessary knowledge and capabilities is important, from the viewpoint not only of coping with various marine-related policy issues, but also of enhancing scientific knowledge and developing internationally competitive marine industries. As marine-related phenomena are closely related to each other, the key is to foster persons who have sufficiently wide-ranging knowledge and capabilities to understand such phenomena based on a comprehensive viewpoint in diversified fields as human resources who will support a new Oceanic State. For this purpose, curriculums should be enhanced at universities so as to promote interdisciplinary education and research, and internship and reeducation of people in the working world also need to be promoted under coordination with the industrial world.

## Chapter 3 Other Matters Necessary to Comprehensively and Systematically Promote Measures with Regard to the Sea

### 1 Effective implementation of measures with regard to the sea

Measures listed in the Basic Plan on Ocean Policy should be reviewed as needed, based on the opinions of the Councilors' Meeting. In order to properly respond to administrative needs, such as the management of the sea, and take measures in an effective manner, systems should be discussed and necessary measures should be taken based on discussion results.

### 2 Responsibilities of related parties and mutual coordination and cooperation

For enjoying benefits from the sea into the future, it is basically important for related parties to act harmoniously and cooperate with each other in using the sea. Based on such awareness, not only the national government but also local governments and marine business operators need to take the initiative, in cooperation with each other, in promoting various measures concerning the preservation of the marine environment, development and use of the sea, and securement of marine safety and other matters.

Local governments should, sharing roles with the national government, take measures to preserve a favorable marine environment, in accordance with respective regions' circumstances and characteristics, such as through promoting disposal of drifting wastes at beaches suffering from severe damage, and at the same time, endeavor to promote marine industries, such as the fisheries industry, which are the key industries of the region. It is also important that these measures should be promoted effectively under close coordination between respective departments. Marine business operators have to try hard to preserve the marine environment through environmental measures such as the development of technology to reduce environmental load, voluntarily manage fishery resources, and ensure efficient and stable maritime transport. The citizens and the NPOs are to make efforts to deepen their understanding of the sea through participating in marine-related meetings and events, interacting with marine business operators, and carrying out ordinary environmental

preservation activities such as the cleaning of the beach.

When planning and implementing measures with regard to the sea, opinions of the citizens and other related parties should be reflected in measures so that the aforementioned various efforts are promoted.

Considering the meaning of “Ocean Day,” which is a national holiday, special events on the day should be promoted, while seeking the participation of a larger number of people, through strengthening coordination among related parties and actively providing information, with a view to deepening understanding of the sea among a wider range of the citizens through marine-related activities carried out by various entities on the day.

### 3 Active publication of information concerning measures

Current conditions of the sea and how measures with regard to the sea are being implemented should be publicized through the Internet and other means as needed. Furthermore, conditions of the sea and measures actually taken should be compiled every fiscal year and publicized in an appropriate manner.