Chapter 5 Development of measures for conservation and sustainable use of marine biodiversity

This chapter describes the direction in which measures will be developed for the conservation and sustainable use of marine biodiversity. Unless otherwise stated, the measures described in this chapter will target marine areas under the jurisdiction of Japan.

1. Improvement of baseline information

(1) Improvement of scientific information and knowledge

To effectively implement measures for conservation and sustainable use of marine biodiversity, it is important to appropriately assess the current state of marine biodiversity and grasp the problems that may possibly occur in the future. For such continuous assessment, constant observation of changes in the marine environment must be done as the basis, and scientific data on biodiversity must be improved. From the observed data, basic research on taxonomy and ecology should be enhanced, and scientific data on marine ecosystems should be accumulated. It is desirable for such scientific knowledge to be shared widely among all the relevant entities in the country. In addition, based on this knowledge, the direction of management and use of natural resources should be decided as a social choice. Such scientific acknowledgement and adaptive management is also the basis of the ecosystem approach that was agreed upon as a strategy for integrated management of biological resources at the Convention of Biological Diversity. It is internationally important for such scientific knowledge to be shared and utilized in decision making.

In Japan, various marine surveys are implemented by different governmental organizations to serve their political objectives. The Basic Plan on Ocean Policy, therefore, aims for the steady and effective implementation of each marine survey and the unified management and provision of each data source. Upon organizing such management and provision system, the Plan intends to make maximum use of already existing measures such as those carried out by the Japan Oceanographic Data Centre (JODC), which functions as the Japan branch for the International Oceanographic Data and Information Exchange (IODE). To this end, relevant government agencies, research organizations and the like are now working to share the information obtained in their own marine survey and at the same time improving the registered information to promote the use of the Marine Information Clearing House.

As an international scientific cooperation, the Convention for a North Pacific Marine Science

Organization (PICES) was established in March 1992 to promote marine research and collection of relevant information in North Pacific seas. The present members consist of Japan, the United States, Canada, China, South Korea and Russia, and the collection and exchange of scientific information among the experts of the relevant organizations is being promoted.

To supplement scientific data on biodiversity in Japan, the Fisheries Research Agency and prefectural governments have been making elaborate marine observations or fish stock surveys in the marine areas surrounding Japan. They have acquired much knowledge, especially on the major fishing species (52 species, 84 communal groups) from reports such as the stock evaluation results that are released annually. Other than this, a certain amount of data has been accumulated on seaweed beds, tidal flats, coral reefs, sea turtles and sea birds from various surveys. They include the "National Survey on the Natural Environment" and "Monitoring Sites 1000" (which constantly follows the changes in representative ecosystems) led by the Ministry of the Environment for many years. The release of existing information related to marine natural environment is under way as well.

Concerning information on marine biodiversity, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) is building a database which will serve as the Japan base of the Ocean Biogeographic Information System (OBIS), one of world's largest database systems that provides information on the diversity and occurrence of marine organisms.

On the other hand, most of the information on marine organisms and ecosystems is accumulated in places such as research organizations of local governments and experimental fishery stations. It is important to continuously accumulate information at these local levels. However, from such various pieces of information, discussions must be held to establish a method to efficiently collect and share or utilize the necessary information that should be known at the national level. This should be done from the perspective of conserving and sustainably using marine biodiversity. From these discussions, efforts will be made to collect the necessary types of information by receiving cooperation from the relevant governmental agencies, researchers, citizen groups and so on.

When compared with land species, information on marine species is limited. However, the information on rare marine species must also be organized, and this will be done by utilising the information that has been accumulated on marine organisms. Thus, via cooperation with the relevant organizations, measures will be promoted. These measures will include a discussion on methods to evaluate the scarcity of marine organisms and the target species that will be apt for such evaluation.

Surveys and research necessary for measures will be promoted. These will include further systematic understanding of the function and change in the divisions of the sea in the open ocean ecosystems as explained in the previous chapter. There is a need to promote research that elucidates topics such as the function of various organisms and ecosystems, the interrelationships between organisms and their surrounding environments, and the connection between biodiversity and the evolution of organisms. To achieve this, it is important to improve the knowledge on distinctive ecosystems and search for organisms in areas about which there is still particularly limited information. These areas include the sea below the mesopelagic zone, the hydrothermal sea floor, the deep ocean floor, and the undersea crusts. Furthermore, studies should also be done on factors that affect marine environments and that have unclear effects, such as the effect of artificial noise on marine organisms.

To implement the measures necessary for marine biodiversity such as conservation, to check the effects of those measures and to react adaptively, changes in marine ecosystems must be observed, and monitoring must be encouraged. Through survey programs such as Monitoring Sites 1000, data on the natural environment such as data on biota of shallow water ecosystems (seaweed beds, tidal flats, coral reefs, etc.) will be improved continuously. At the same time, data on sea turtles, sea birds, marine mammals and so on will be collected and organized. In addition, the marine environment will be continually monitored to evaluate the state of marine pollution.

Furthermore, if information that has not been collected continuously turns out to be important in detecting changes in marine biodiversity, a method to monitor such information will be examined, and efforts will

be made to accumulate it. And to monitor the extensive ocean in an effective and efficient manner, an effective mode of cooperation involving various social entities such as local public organizations, fishermen, local citizens, and NGOs will be considered, in addition to cooperation among governmental agencies.

(2) Identification of marine areas of particular importance for conserving biodiversity

Effective conservation measures must be taken as necessary from the viewpoint of preventing damage to ecosystems, especially in high-priority marine areas for conservation of biodiversity. It is therefore essential to clearly identify the marine areas of particular importance for conserving biodiversity in the seas surrounding Japan.

Thus, marine areas that are important in terms of conserving biodiversity will be identified according to the ideas such as the "scientific criteria for the identification of ecologically or biologically significant marine areas in need of protection" stated in the decision of the 9th Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD-COP9) and the "Vulnerable Marine Ecosystem" by the Food and Agriculture Organization of the United Nations (FAO).

In the process, efforts will be made so that the ecosystems that are typical of each body of water will be selected without omission. This will be done by making maximum use of current scientific knowledge and taking into account the zoning and characteristics of the previously mentioned ecological and marine zones around Japan. It is important to keep in mind that many things are still unknown about marine organisms and ecosystems, and identifying all the highly important marine areas is difficult. In the future, it will be important to check the identified marine areas as necessary, as scientific knowledge on marine biodiversity improves further.

Many marine organisms are dependent on specific or multiple ecosystems, habitats and nursery grounds. Thus, upon identifying Marine Protected Areas, it is effective to focus on such ecosystems. The utilization of potential index species will also be considered. As described previously, coastal and shallow water zones including land especially form a complex ecotone (transition zone) with the terrestrial area, and sandy beaches, seaweed beds, tidal flats, and coral reefs are important as spawning grounds and habitats for fries. Also upon identification, the continuity between land and coastal or shallow waters should be considered.

In the open ocean, shallow waters such as seamounts are important habitats and growing places for organisms. Although not much is known about the organisms that live in the deep sea, it contains places with unique ecosystems such as the chemosynthetic ecosystem at hydrothermal vents and cold seeps, cold water coral communities, deepwater sponge communities, and deepwater bryozoan communities. As for water bodies, plankton flourish at transitional regions where two ocean currents meet or at upwelling currents where lower currents rise, and they serve as an important feeding area for fish and sea birds. However, the flow and strength of ocean currents change with changes in the global climate. Thus the size and location of such transitional areas change, and it may be difficult to grasp them as a marine area. However, their functions should be recognized.

2. Identification of factors influencing marine biodiversity and implementation of measures to reduce them

To appropriately progress with the conservation of marine biodiversity, the cause of specific problems and the related entities who shall take charge of conservation must be identified. While improving the cooperation between the relevant parties, the best method and process to solve the problems must be found, and policies must be executed to realize them.

(1) Balanced development and conservation of the sea

Upon implementing development projects, the "Environment Impact Assessment Act" requires the effects on the environment (including those that occur after the development) to be researched, predicted and assessed beforehand. The results must be used with appropriate care to ensure environmental conservation. Also, as described in the Basic Act on Biodiversity, it is important for ecosystems to be considered at earlier stages of conservation (such as the formulation of upper layer plans) prior to implementing individual projects and making policies.

In recent years, various measures have been taken to balance both the environment and development. Water environment improvement projects include effective utilization of dredged gravel from channel maintenance for regenerating and creating tidal flats, and modifying seafloor pits, a cause of blue tides. Fishways, habitats and nursery environments for organisms have been provided or improved to secure the upstream and downstream continuity of rivers. Managing sediment by promoting the creation of artificial slits in sediment trap dams, conserving and restoring coastal environments including sandy beaches, and using methods to limit the spread of thermal discharges from power plants and the like are among other measures. The technologies that have been accumulated through such measures must continuously be used. Furthermore from now on, it is important to develop new technologies including the effective utilization of natural functions such as the ability of nature to clean itself.

Also, there would to be new developments and technologies, like the development of sea bottom resources and the utilization of natural energy sources such as wave power and tidal

power. The impacts these will have on the environment must be assessed beforehand and technology to minimize the impact must be developed along with appropriate planning.

For marine areas that are important for conserving biodiversity and require protection, it is also effective to set regulations by establishing protected areas and promote nature restoration measures to restore lost ecosystems.

(2) Reducing marine environment pollutants that degrade quality of ecosystems

1) Pollution from land-based sources and activities

To prevent pollution in public water areas including coastal waters, regulations such as the effluent standard targeted at specified facilities, the total pollutant load control in designated water areas, and countermeasures for municipal effluent are prescribed based on the "Water Pollution Control Act" (established in December 1970). In addition, local public governments have set additional and expanded regulatory standards on effluent by setting ordinances that suit the situation of the local area, and this has been a large factor in encouraging countermeasures. Also to treat municipal and industrial effluents appropriately, wastewater treatment plants such as sewer systems and septic tanks are being installed and maintained.

From the perspective of biodiversity, among the various environmental standards established based on the Basic Environment Act, the "water environment standard related to the conservation of aquatic organisms" is described as a desirable objective to be maintained to conserve aquatic organisms, a component of the "living environment" (which includes flora and fauna and their habitat that are deeply related to human life). From now on, adoption of new indicators including the perspective of objectives such as the "amenity of the area for organisms" and the "diversity of aquatic organisms" will be considered for water environment standards, in addition to the current indicators indicating good water quality or the state of water quality pollution.

Also efforts will be made not only to reduce the inflow of pollutions, but also in measures such as those to preserve or restore tidal flats which have high purification capacities.

Further, a system with a perspective that considers the effects that chemical substances have on the ecosystem is introduced in the "Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc." (established in October 1973). For the future, it is important to progress with a comprehensive program against chemical substances. This program includes appropriate research and assessment on the effects on ecosystems and the management of chemical substances from this perspective. Efforts will be made to improve scientific knowledge and collect information, and necessary regulations will be implemented reflecting the results of risk assessment.

2) Pollution from marine based sources and activities

To prevent marine pollution, the disposal of ship oils, hazardous chemicals and waste, and the ocean dumping of waste have been regulated by the "Act on Prevention of Marine Pollution and Maritime Disaster" (enacted in December 1972). This law incorporates international laws such as the "1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumpling of Wastes and Other Matter, 1972 (London Convention)," "International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)," and "International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)." In addition, measures have been taken based on the "National Emergency Plan for Preparedness for and Response to Oil Pollution Accidents" which was made

to meet the requirements of the OPRC. This includes the organization of a system and preparation for countering pollution accidents, creation and update of information maps that include information on coastlines that are most vulnerable to being severely affected by pollution accidents. Considering the negative effects on marine organisms by ship bottom paints that contain organic tin compounds such as tributyltin (TBT), the need for global regulations on the use of such paints has been recognized in the IMO with the leadership of countries including Japan. The "International Convention on the Control of Harmful Anti-Fouling Systems on Ships" (AFS) was adopted in 2001 and came into effect in 2008. Based on this convention, paints that do not comply with this convention are banned on every foreign ship that enters any port of Japan. Appropriate regulations will be implemented hereby with these conventions and laws.

Considering the difficulty in operating deepwater development, countermeasures against possible accidents that may cause pollution are extremely crucial and the method of implementing them should be established beforehand.

(3) Appropriate management of fishery resources

Various regulations and management measures have been taken to conserve and manage fishery resources appropriately. For major fish species, regulations on items including fishing gear, methods, areas, periods and Total Allowable Catch (TAC) have been made under national laws such as the "Fisheries Basic Act" (enacted June 2001), "Fishery Act" (enacted in December 1949), "Act on the Protection of Fishery Resources" (enacted in December 1951) and "Act on Preservation and Control of Living Marine Resources" (enacted in June 1996). Fishers have also been implementing measures for conservation and management autonomously. Measures aiming for the sustainable use of fishery resources have been taken by fishers in autonomous agreements of various forms nationwide. For


写真提供：愛知県水産課

species that require urgent stock recovery, Stock Recovery Plan with comprehensive measures including reduced fishing effort, conservation of fishing grounds and active cultivation of resources have been conducted. Some of such autonomous measures may be considered as Marine Protected Areas, and it is important to promote the further development of these measures. In addition, the active release of juvenile organisms and creation of fish reefs and breeding grounds have been conducted for many fishery species to sustain and recover their resources, and enable their sustainable use. Bearing in mind matters such as genetic diversity and effects on non-targeted species, it is crucial to aim for the restoration of resources by promoting such resource management in a comprehensive way. It is also effective to establish a cultivation method that combines fish and shellfish cultivation and seaweed cultivation together. This is because it stabilizes the material cycle of carbon, nitrogen and the like. To achieve both sustainable fishery and conservation of marine wildlife, it is important to promote adaptive management based on scientific knowledge and limit the damage done to fisheries while sustaining the organism population.

In coastal areas, a reduction in the environment's ability to produces fishery resources is becoming a problem. This is caused by a decrease in and degradation of the quality of ecosystems such as seaweed beds, tidal flats, coral reefs, and sand banks. To realize a sustainable fishery system, it is necessary to produce, protect, restore, and create fishing environments including seaweed beds and tidal flats. The depopulation and aging of fishers weakens the structure of fishery production and also adversely affects the management of coastal environments. Thus, the revival of fisheries, especially in geographically disadvantaged areas such as isolated islands and peninsulas, is a crucial task.

Also for the open ocean and high seas, it is important to enable appropriate conservation and sustainable usage of fishery resources based on scientific evidence through frameworks such as regional fisheries management organizations implemented by the relevant countries.

(4) Eradication and control of alien species that trigger disturbance of ecosystems

As a countermeasure against alien species, the "Invasive Alien Species Act" was enacted in 2004 and the Invasive Alien Species covered by this law have been regulated and controled. Also, some alien species that are naturalized in the wild, including some edible shellfish, are listed as requiring caution, without legal regulation. People's understanding and cooperation toward appropriate handling of such species (based on the three principles for preventing damages caused by alien species) have been called upon widely in the public. Indigenous species may also cause adverse effects on the ecosystem, just as an alien species will when, for example, it is released in places other than its original habitat. Careful consideration is also required in considering methods to increase fishery resources. It is important to consider the effects on genetic diversity and stock community upon formulating a release plan, producing juveniles, and actually releasing them. Disseminating the various existing guidelines is also an effective means to control the release and transplant of organisms.

To prevent alien species that are transferred in ship ballast water from disturbing the marine ecosystem, the "International Convention for the control and management of Ships' Ballast Water and Sediments" was adopted in 2004 at the International Maritime Organization (IMO). Japan is actively participating in discussions for the enactment of this convention, and national discussions will continue to meet the requirements. Japan will also continue to be actively involved in international discussions to minimize problems caused by the invasion of alien species attached to ships.

(5) Countermeasures and adaption against climate change

The impacts on ecosystems and biological resources from global warming (rise in seawater


写真提供：NPO法人サスティナブル・コミュニティ研究所

temperatures and levels, and changes in ocean currents), ocean acidification, and deliberate manipulation of the global environment (geo-engineering), done as a countermeasure against global warming, still remain unknown. Thus the progress of international research and development to elucidate their mechanisms is urged.

Furthermore, it is of utmost importance for countries around the world to cooperate in promoting measures to reduce emissions of greenhouse gases (measures to mitigate global warming) under international frameworks such as the Framework Convention on Climate Change. However, upon implementing these mitigation measures, the possible impact on ecosystems and biological resources must be considered as well.

In addition to the measures to mitigate global warming, adaptation toward the projected effects from global warming must be considered. Coastal and island ecosystems such as coral reefs are suggested to be highly vulnerable to climate change. Thus it is important to promote effective and adaptive conservation management including the identification of especially important marine areas with consideration paid to nature's ability to cope with environmental changes, and reducing other anthropogenic stress to the area.

3. Implementation of measures appropriate for characteristics of individual marine areas

(1) Coastal area

Being areas most strongly linked with human activity, coastal areas have traditionally been

the main subject of conservation measures. The importance of these areas shall not change hereafter and such measures should be further improved. Relationships among multiple affecting factors should be considered and thus the establishment of cooperation among various relative parties such as the state, local public organizations, businesses, fishermen, citizens, research organizations, and academic experts is important. In addition, coastal areas are strongly related with terrestrial areas by features such as rivers, and especially in estuaries, where the water is brackish and a unique ecosystem is found. Thus it is important to implement an integrated conservation approach by expanding the perspective to the whole watershed.

In Japanese coastal areas, fishery activities such as shellfish gathering and the collection of seaweeds have taken place since ancient times. And even today, fishery is an important mode of living for humans to acquire the rich blessings of nature (ecosystem services) from the ocean. Stable fishery production requires rich ecosystems that produce the fishery resources continuously. Therefore, comprehensive management is important to both conserve the ecosystem and to sustainably

use the biological resources for the area. It is also important to create rules upon the use of coastal and shallow waters including coastlines for recreational use.

Considering the connection with terrestrial areas, artificial countermeasures for rivers with perspectives solely on disaster prevention will enhance safety. However, the countermeasures may reduce the supply of nutrients and sediments to coastal ecosystems, which may lead to the reduction of tidal flats and sand beaches. Thus the effects in downstream areas must be considered for measures targeting river areas. Independent of their size, wetlands in shallow water areas including seaweed beds, tidal flats and coral reefs sometimes play an important role in transferring and dispersing shellfish and crustacean larvae and juvenile fish. Therefore, the mechanisms and interrelationships among such wetlands must be acknowledged based on scientific knowledge. And with this knowledge, it is necessary to protect the remaining seaweed beds, tidal flats and coral reefs and reconstruct, remediate or create habitats that strengthen the interrelationships among the organisms. The current state of pollution by chemical substances must be grasped and the inhabiting and growing situation of organisms in area that has been under development must be checked. In addition, the threshold value of organisms that represent the ecosystem for resistance against major chemical substances must be obtained, and, to support the functions of habitat and growing grounds that had been lost in the past, measures must be implemented including reconstruction, remediation, and creation.

As for floating and washed up debris, the situation of severely polluted areas and

nationwide status, elucidation of the cause, and collection and treatment methods and countermeasures that suit the local need have been considered through various types of research. On July 2009, the "Act for the Promotion of the Clearing of Coastal Drifting Debris" was enacted. Based on this act, various entities are now collaborating to implement comprehensive and effective countermeasures against coastal debris. The knowledge and other data compiled from past experience will be used actively and measures that are necessary for the smooth treatment of debris and effective prevention of it will be implemented under cooperation with the relevant parties.

In enclosed waters, exchange of seawater with the open ocean is generally limited because of the physical shape of such areas, allowing pollutants to accumulate there easily. Therefore, once polluted, enclosed waters require a long time to recover. Enclosed waters are also the place where human activities are concentrated, in areas including ports, fishing ports, fishing grounds, aquaculture grounds, places to collect industrial water, and beaches for sea bathing. Also in some areas, especially on the Pacific coasts, the land is heavily populated by people and contains a lot of industry. So far, enclosed waters have been covered by the Water Pollution Control Act and Interim Law for Conservation of the Environment of the Seto Inland Sea, and numerous measures including the Total Pollutant Load Reduction and countermeasures for eutrophication have been applied. With the help of such measures, severe pollution has decreased today. However, the achievement rate for meeting these environmental standards has levelled out at 70%-80% in recent years. In some marine areas, an anoxic water mass has been observed and it is hindering the use of industrial water and affecting the survival and growth of aquatic organisms. Also the habitats for organisms have deteriorated by eliminating tidal flats and seaweed beds, and in some areas, ecosystems including fishery resources have deteriorated. Thus, it is important to have integrated management of pollutant sources and adjustments in the water area usage that include the concept of Sato-umi (achieving high productivity and conservation of biodiversity with human interaction while harmonizing with natural ecosystems) and a smooth material cycle in local areas.

(2) Open ocean

For activities that utilize the open ocean such as ship navigation, ocean dumping, offshore fishing, and energy and resource development, appropriate management and environmental consideration is important. Care must be taken to protect marine areas that are important for the protection of biodiversity. The majority of regulations concerning ocean dumping from ships, fishing, and the like are established under international frameworks. Thus cooperation with the relevant countries and international organization is also essential.

The Sea of Japan and East China Sea are heavily affected by land activities. The two seas are important supplying grounds of fishery resources for Japan. On the other hand, marine debris and pollutants from various countries tend to accumulate there, making collaboration and cooperation among the regional countries crucial. Examples of such frameworks include the "The Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region" (NOWPAP) by the United Nations Environment Programme (UNEP), and the "Partnerships in Environmental Management for the Seas of East Asia" (PEMSEA) by the United Nations Development Programme (UNDP). These cooperation frameworks are important in protecting and sustainably using the marine environment beyond national boundaries and also as an aim to coordinate measures among the relevant parties.

4. Improvement of Marine Protected Areas and enhancement of their networking

Setting up a Marine Protected Area is an effective protective measure that implements some kind of regulation or management in marine areas that are important for securing marine biodiversity and ecosystem services from a precautionary point of view.

Target 11[21] of the Strategic Plan for Biodiversity 2011–2020 (Aichi Targets), which was decided in CBD-COP10, states that by 2020, at least 10% of coastal and marine areas shall be conserved through systems of protected areas and other effective area-based conservation measures. To achieve this target, those marine areas of particular importance must be identified based on the reasoning stated before. Then, Marine Protected Areas must be established appropriately after consideration of the goals and actual need for establishment

21 Strategic Plan for Biodiversity 2011–2020 (Aichi Targets) Target 11: By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, shall be conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.

and management. In the process, understanding among the stakeholders must be deepened by providing sufficient information and ensuring discussion. Under the cooperation of the relevant entities, Marine Protected Areas should be established and managed by the appropriate entities and systems that meet the goals of such protection.

Furthermore, considering international goals, other than identifying a marine area of particular importance for conserving biodiversity, and clarifying the need to protect and manage such marine areas, it is important to consider setting numerical targets as necessary.

(1) Promotion of establishment and enhancement of management

In Japan, the establishment of areas, regulations and management to maintain marine organisms, ecosystems, or relevant ecosystem services has been done for each individual objective, and various measures have been implemented. Therefore, the actual form of these Marine Protected Areas must first be grasped and then the system must be applied in a more appropriate manner from the viewpoint of biological diversity. In doing so, as is described in the IUCN's Protected Area Management Categories, the ecosystem, usage patterns, and other characteristics of the target area must be considered, and a system appropriate for the protected area must be applied according to the individual goals of management. In addition, effective conservation and sustainable use of biodiversity by appropriately zoning the target area is effective as well.

Precautionary conservation by setting up Marine Protected Areas is especially effective for ecosystems in coastal and shallow waters


写真提供：神奈川県水産技術センター

including land areas. Such ecosystems including sandy beaches, brackish waters, seaweed beds, tidal flats, and coral reefs provide various important functions such as acting as spawning and growing grounds for various organisms, and production grounds for rich fishery resources; cleaning water; and providing places for people to come into contact with nature. These areas are important in conserving biodiversity; however, at the same time they are subject to high human pressure.

Currently 40 to 50% of seaweed beds and coral reefs are designated as protected areas, mainly as National Parks and Quasi-National Parks. However, the majority belong to "Ordinary Zones in National and Quasi-National Parks" where regulations are loose. In addition, only up to 10% of tidal flats are designated as protected areas. Thus, there is a need to expand protected areas, review zoning within the existing protected areas, and establish areas with stronger regulations as required. From such need, the Natural Parks Act and Nature Conservation Law were revised in 2009, and the system for Marine Park Area and Marine Special Zone was formulated. From now on, areas such as National and Quasi-National Parks and Nature Conservation Areas will be designated and re-allocated according to their importance, and those such as Marine Park Areas and Marine Special Zones will be further designated. Especially for Marine Park Areas in National Parks, the goal is to double the size of those areas from the current 2,359 ha (in 2009) to around 4,700 ha by the end of 2012.

Also to identify areas where there is to be sustainable use of fishery resources, and to strike a balance between their use and conservation, detailed zoning based on the life history of the target species must be done. In doing so, along with scientific advice from academic experts, knowledge, techniques, and systems on relationships between the sea and humans that have been cultivated in the area should also be used.

In addition, identifying a Marine Protected Area itself does not solve the problem, and the actual implementation of effective measures must be secured. In any Marine Protected Area, continuous monitoring for adaptive management and revision of measures based on their review is extremely crucial and the framework for such system must be established. In addition, the way this system is overseen must be reviewed and discussed for appropriate management.

Also for effective management, collaboration and cooperation among the various relevant actors is essential. Such actors include the relevant governmental agencies, local residents, fishery and recreational users, and those whose activities on land could affect the marine areas. It is effective to promote measures such as nature restoration and management as Sato-umi within such cooperation.

To enhance conservation and sustainable

use of biodiversity in cooperation with various relevant actors, it is desirable to set up a cooperation system that suits the individual areas. Examples include creating management plans to share the management policy and methods, creating a cooperation system by the relevant local actors to implement and oversee adaptive management, and forming an open system for scientific reviews. To this end, especially for Marine Park Areas in National Parks, the coordination of a consultative body consisting of relevant actors for cooperation is being promoted.

In addition to enhancing the identification and management of Marine Protected Areas, from the point of view of biodiversity, it is important to discuss the criteria and method used to evaluate the effects of such Marine Protected Areas for adaptive management. Thus research must be promoted.

(2) Enhancement of networking

At the 2002 World Summit on Sustainable Development (WSSD), the "establishment of representative networks of marine protected areas by 2012" was adopted in the Johannesburg Plan of Implementation. However, the decision adopted in CBD-COP10 relevant to "Marine and coastal biodiversity" indicated the need for further efforts to achieve the goals of the plan. Also, Target 11 of the Strategic Plan for Biodiversity 2011–2020 (Aichi Targets) calls for 10% of coastal and marine areas to be conserved through "ecologically representative and well-connected systems of protected areas" and other measures.

The IUCN describes a "Marine Protected Area Network" as "A collection of individual marine protected areas or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve." Also in CBD-COP9 the "scientific guidance for selecting areas to establish such representative network of marine protected areas" was adopted as an Annex[22]. Five properties and components were identified as being required for a network: they must be ecologically and biologically important areas; have representativity; have connectivity; have replicated ecological features; and be adequate and viable sites.

As already mentioned, upon designating Marine Protected Areas, Japan should consider, from a broader point of view, developing a system for effective ecosystem networks. This can be done mainly by utilizing suitable existing systems, and combining and effectively locating Marine Protected Areas that suit the objective and target of protection.

For example, in a designated area, combining different protected areas set for various management reasons under a single management plan or several but sufficiently harmonized management plans could be distinguished as one form of network. At the Shiretoko World Natural Heritage Site, National Parks were expanded to secure the conservation of marine ecosystems. In addition, to allow both conservation and stable operation of fisheries through sustainable fishery resource use, the management plan was made to include resource management such as the establishment of no-take areas by local fishers and fisher groups. In Japan, the party in charge of management is made clear in frameworks such as the fishery right system, and such voluntary measures by fishers and others are effective. Thus, it is important to combine such voluntary measures with conservation measures taken on the scientific basis of ecological or biological integrity.

Furthermore, on a larger scale, it is important to effectively locate Marine Protected Areas by applying suitable systems. Along with identifying marine areas of particular importance, the distribution of current protected areas will be grasped, and the form of the network will be discussed and created. For example, for migratory birds, appropriate conservation of multiple habitats that are used along the migratory route is important, and the viewpoint for a network of protected areas is necessary. Also, along with the development of such measures, the system of Marine Protected Areas should be discussed continuously from the perspective of conserving biodiversity that supports the structure and function of a sound ecosystem, so as to utilize ecosystem services in a sustainable manner. If necessary, the revision of already existing systems and establishment of new systems shall be considered.

On the other hand, the Programme of Work on Protected Areas (PoWPA)[23] identified that a network of protected areas provides social connection between parties with the collaboration of others. This collaboration includes an exchange of ideas and experiences, scientific and technical cooperation, capacity building, and cooperative action. Thus, both at governmental and non-governmental levels, it is important to establish and maintain a collaborative system to manage protected areas at various levels.

Internationally from the point of view of social cooperation, utilizing the frameworks such as "International Coral Reef Initiative" (ICRI), "Partnership for the East Asian-Australasian Flyway," "Conventions and Agreements for Protection of Migratory Birds" and "Ramsar Convention," Japan will take the lead in areas such as conserving coral reefs based on the ICRI East Asia Regional Strategy on MPA networks, wetlands including seaweed beds and tidal flats, and migratory birds.

5. Facilitation of public acceptance and involvement of various actors

The Basic Act on Biodiversity and Basic Act on Ocean Policy clarify the responsibility of local governments, business operators and

22 UNEP/CBD/COP/DEC/IX/20 Annex II
23 UNEP/CBD/COP/DEC/VII/28

citizens[24] along with the responsibility of the State. In detail, local governments are required to implement policies according to the natural and social condition of their area, while citizens are required to recognize the importance of biodiversity and the blessing from the oceans and make voluntary efforts for conservation and sustainable use of biodiversity. These various actors should endeavour to conserve and sustainably use biodiversity according to their duties.

To ensure society is aware of the importance of conservation and sustainable use of biodiversity, and to urge various actors to take voluntary actions, activities such as active enhancement of public promotion and environmental education are necessary. In implementing this, this should not be limited to a simple transfer of knowledge, for interaction with nature is essential. Opportunities must be created for citizens to experience for themselves and participate in conservation measures. For biodiversity in the ocean, efforts will be made in public relations and opportunities will be created for citizens to learn the current situation regarding marine biodiversity and the various values it has along with the need for its conservation. This will be done by communicating scientific information, scientific knowledge, and examples that could be used for conservation with the cooperation of the related actors. Such actors include academic experts, fishers, people in the education field, NGOs, and shipping agents who have knowledge and experience. Organizing information about marine areas of particular importance for conserving biodiversity, rare marine species and the like is also effective in making the public aware of the importance of biodiversity.

In addition, it is important for the various relevant parties to collaborate with each other and voluntarily implement measures for conservation and sustainable use. Various measures are being implemented. They include a civilian survey where academic experts and NGOs who are knowledgeable about the local nature become the core and are joined by citizens who are interested in the local conservation of biodiversity. Promoting such measures is important. Also by using and publicizing the results widely, this may lead to a greater understanding of biodiversity. Therefore, efforts will be made to support such actions by means of formulating supporting centres based on the "Act for the Promotion of Biodiversity Conservation Activities" (formulated in December 2010) so that local activities that may conserve biodiversity will be continued or expanded. In addition, fishers are knowledgeable and experienced about the sea and marine organisms. Based on this wisdom, resources are managed from a mid- to long-term perspective by not using some resources now to avoid a drastic drop in aquatic resources and degradation of the environment. Such traditional knowledge and experience of fishers should be respected. Then, a system that heightens the understanding and induces cooperation among all the relevant parties must be created for the conservation and sustainable use of marine biodiversity. To enhance the management of Marine Protected Areas and networking, collaboration and cooperation among the various relevant actors will be promoted by organizing a place for local meetings and so on.

In addition, it is important to create a system that allows not only governments but also businesses and citizens to include measures for conserving and sustainably using biodiversity in their social activities, and allow cooperation and active participation by those stakeholders. The certification system for environmentally friendly products is one effective method that utilizes an economic system. In the field of agriculture, forestry and fishery, a project to add value to the products that had been made with consideration on the lives of organisms has started. For example, for aquatic resources, the Marine Stewardship Council (MSC) and Marine Eco-Label (MEL) are certification systems that are led by private organizations to promote the market distribution of aquatic products produced from sustainable fisheries. To ensure the value of biodiversity is appropriately evaluated in economic activities and social life, and to trigger actions in the local area responsible for conservation, such certification systems that appropriately reflect the value of biodiversity in the products must be promoted. At the same time, the producers must participate in this system. In addition, measures to produce brands that add value to local environmentally friendly products and ecotourism that sustainably use the local resources are also essential. Furthermore, it is important for consumers to be able to select such products while understanding the meaning behind them. Thus, publically promoting such products and systems is important as well.


写真提供：神奈川県水産技術センター

24 The Basic Act on Biodiversity states this as the "Responsibility of Citizens and Private Bodies" (Article 7)