

The Action Plan To Conserve Coral Reef Ecosystem in Japan

**– For the Prosperity of Current and Future Communities
Derived from a Lasting Healthy Natural Environment –**



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Ministry of the Environment, Japan

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List of Abbreviations

CBD	Convention on Biological Diversity
COREMOC	International Coral Reef Research and Monitoring Center
ICZM	Integrated Coastal Zone Management
ICRI	International Coral Reef Initiative
ITMEMS	International Tropical Marine Ecosystems Management Symposium
JCRS	Japan Coral Reef Society
WG-APCRC	Working Group of Action Plan for Coral Reef Conservation
MAFF	Ministry of Agriculture, Forestry and Fisheries
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MOE	Ministry of the Environment
MPA	Marine Protected Area
PICRC	Palau International Coral Reef Center

Executive Summary

The Action Plan to Conserve Coral Reef Ecosystem in Japan

– For the Prosperity of Current and Future Communities Derived from a Lasting Healthy Natural Environment –

Coral reef ecosystem in Japan is in a seriously degraded status. In facilitating and accelerating conservation efforts, cooperation efforts among organizations are crucial.

The Action Plan to Conserve Coral Reef Ecosystem in Japan (hereafter referred to as “Action Plan”) was established in April 2010. It identifies fundamental themes on the conservation of coral reefs, and lays out major actions that are to be implemented within 5 years, with the participation of various organizations.

Goal and objectives

The Action Plan aims to promote conservation (including restoration) of the coral reef ecosystem, while balancing their sustainable use and sustainable development of the local communities. Three objectives and supporting actions to address the abovementioned goal are as follows:

- a. Establish networks and organize information infrastructure among various interested and responsible parties domestically and internationally, in order to promote conservation and sustainable resource use of the coral reef ecosystem,
- b. Contribute to the establishment of local socioeconomic framework that benefits from appropriate use and management of healthy coral reef ecosystems, and
- c. Encourage further reef conservation efforts, including establishment of Marine Protected Areas (MPAs).

Target Area

- Coral reefs and high-latitude coral communities in Japan.
- Coral reefs and related ecosystems such as seagrass beds, tidal flats, and mangroves.

Stakeholders to the Action Plan

The Action Plan was developed by the Working Group of Action Plan for Coral Reef Conservation (WG-APCRC) organized by MOE, in cooperation with other national and local government agencies and academic societies. All participating organizations in the Working Group will commit to the proposed actions from their respective sides; cooperate for concerted conservation efforts; and pursue raising more awareness and understanding of the issues regarding coral reef ecosystem among various people, such as those engaged in the local economic activities including agriculture, forestry, fisheries, tourism, and other relevant private companies; committees and economic groups; schools, public community centers; researchers and academic societies, NGOs, media, and visitors. It is expected that each of the involved group acknowledges their close relationship with the coral reef ecosystem and take action accordingly, including participating in the outreach, conservation and restoration activities.

Basic Policies

Three basic policies have been identified to pursue conservation efforts and sustainable use of coral reefs as follows:

1) Encourage Local Communities to Live in Harmony with Coral Reef Ecosystem

In order to slow down the degradation process of coral reefs while continuously receiving the ecosystem services, it is important to conserve the resources, and create a socioeconomic framework where people could continue to develop their communities with the natural blessings they receive from coral reef ecosystem.

2) Cooperative Efforts and Linkage among Organizations

For effective and smooth conservation efforts, facilitating cooperation among different ministries and agencies surely is a key to success. In local communities, it is necessary to promote implication and cooperation both in a community and among communities. In addition, coral reef ecosystem is fragile to climate change, which degradation and loss thereby is a worldwide concern. International cooperation and collaboration has become more and more important; for Japan, partnership among Asia-Oceania region is one of the essential ties.

3) Scientific Recognition, Preventive and Adaptive Attitude

Understanding coral reef ecosystems and awareness of its importance based on the scientific recognition is a vital part in balancing their conservation and sustainable use. Considering that life forms and ecosystems are dynamic, following are important based on the concept of “ecosystem approach”:

- Preventive attitude that provides measures at an early phase based on the existing valuable information, while continuously expanding scientific knowledge base.
- Adaptive attitude that allows us to capture changes in the ecosystems with appropriate monitoring programs, and reflecting the results flexibly in the review of current management and resource use schemes.

Taking Action

1) Framework for Conservation of Coral Reef Ecosystem

a. Promote cooperation among organizations for a community living in harmony with coral reef ecosystem

Promote cooperation among various local conservation groups and responsible organizations in different areas, and establish networks so as to share information on their efforts and common challenges.

b. International cooperation

Promote international cooperation by collaboratively working on the establishment of foundation for various regional activities in East Asia, including networks for Marine Protected Areas (MPAs) for coral reefs, effective management schemes, and remedial action against impacts from climate change.

c. Outreach and capacity building

Promote customized outreach and education programs and ecotourism activities that go along reef conservation in order to raise more awareness and understanding about the importance of coral reef ecosystem in the local communities, further encouraging those informed citizens to take action from their respective sides. Support capacity building of those engaged in the relevant fields, including training for environmental interpreters.

d. Collect and disseminate information and construct a framework of information

Continue the existing survey and monitoring programs that aim to capture the status and transition of coral reef ecosystem, as well as collect, analyze, and disseminate the information obtained through such programs.

2) Sustainable Use of Coral Reef Ecosystem

a. Appropriate management and use of biological resources

Promote balanced approach in performing appropriate resource management and conservation activities, in order to conserve coral reef ecosystem and at the same time use the fishery resources in a sustainable way. Raising awareness about the role and value of coral reef ecosystem as well as the significance of fisheries in the local economy and culture is important in fulfilling this goal.

b. Appropriate resource use for tourism

Support establishing local rules and resource management schemes regarding tourism (including ecotourism) through participation from various groups, in order to use local resources in a sustainable way while balancing local development and environmental educational activities.

3) Conservation of Coral Reef Ecosystem

a. Designation and management of significant areas

Pursue conservation efforts by establishing Marine Protected Areas for corals of biologically significant areas, along with provision of restoration projects and appropriate management schemes where necessary. In establishing MPAs, more effective conservation methods will be explored considering the connection of coral communities in different geographic areas.

b. Integrated watershed management connecting land and sea

Pursue conservation efforts by tackling point- and nonpoint source pollution from the land (i.e., sediment and polluted water), one of the factors negatively affecting coral reef ecosystem; and further coordinate integrated watershed management approach that considers the connection between land and sea.

c. Implement measures tackling different factors

Continue to support programs involving removal of crown-of-thorns starfish and coral reproduction, along with sharing information obtained from such efforts, and pursue effective cooperation among different organizations.

The Action Plan to Conserve Coral Reef Ecosystem in Japan

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1. Background

1) Value of Coral Reef Ecosystem

“Biodiversity” refers to the variation of intra- and inter-species as well as that of ecosystems. The rich biodiversity of the entire Earth sustains all lives on the earth. Coral reef ecosystems are one of the most important ecosystems from a global biodiversity view, accommodating a variety of coral species, fish, shellfish, and many other marine organisms; their rich biodiversity is comparable to that of the tropical rainforests.

For humans, coral reefs in the tropical and subtropical areas provide fishery and tourism resources, along with the protection from waves as reefs serve as natural breakwaters in shallow coastal waters. Coastal Residents have been blessed with a long-term relationship with the coral reefs, creating unique cultures involving foods and folk customs influenced by and derived from reefs. The functions and services provided by ecosystem(s) are collectively called “ecosystem services”, which have attracted interests of many researchers.

Although there may be a limit to fully quantify the ecosystem services, according to an estimate by the Ministry of the Environment (MOE), annual economic values of the ecosystems in coral reef region (Okinawa, and Amami- and Ogasawara islands) were calculated at minimum as 1) 239.9 billion JPY (2.8 billion USD) for tourism and recreation, 2) 10.7 billion JPY (123 million USD) for commercial fishery resources, and 3) 7.5 – 83.9 billion JPY (86.4 – 964.4 million USD) for coastal protection (1 USD = 87 JPY), respectively.¹ The estimate is presumably only a portion of the total value of the coral ecosystem services.

2) Status of Coral Reef Ecosystem

Twenty percent of all the coral reefs in the world have been already lost; another 15% is projected to be at risk in the coming 10 to 20 years, and 20% in 20 to 40 years.² Factors attributing to the loss of coral reefs are wide ranging, both by natural and manmade events. Coral reefs are also vulnerable to the climate change.³

In coral reef region (e.g., Nansei- and Ogasawara Islands), the ecosystems have been seriously impacted by the runoff of sediment (particularly red soil Aka-Tsuchi in Okinawa: iron-rich, oxidized soil) and polluted water from inland, overexploitation by fisheries and tourism industry, coastal development, outbreak of crown-of-thorns starfish, coral bleaching caused by the warmer ocean temperatures as a major factor, and disease such as white syndromes. Sekisei Lagoon in Okinawa, for example, has lost a lot of its high coral coverage which covered more than 50% since the designation of the area as a national park in 1970s.⁴ Fishery resources that are part of coral reef ecosystem are also declining at a rapid pace, due to the degradation of coral reefs and overexploitation; statistics show total catch of today as 1/3 to 1/5 of the peak yields in the old days.⁵

Some temperate coastal areas in higher latitudes with warm seawater (e.g., Kyushu, Shikoku, and Kii Peninsula) have coral communities as well. In recent years, these areas have also been under drastic change, in one way increasing its coverage due to warmer seawater, the other degrading due to discharge and outbreak of crown-of-thorns starfish. Some of these corals are unique to the temperate region, which might be vulnerable as their entire ecosystem goes through climate change, including being influenced by the increasing temperatures of seawater. Impacts on their ecosystem will surely affect coastal residents in the adjacent areas.

Various organizations have made dedicated efforts towards

¹ Based on an estimate by the Working Group on the Value of Coral Reefs.

<http://www.env.go.jp/nature/biodic/coralreefs/apc/index.html> (in Japanese).

² Wilkinson C (2008) Status of coral reefs of the world: 2008. Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre, Townsville, Australia, 296 pp. (<http://www.gcrmn.org/status2008.aspx>)

³ IPCC (2007) Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri RK and Reisinger A (eds)]. IPCC, Geneva, Switzerland, 104 pp.

http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

⁴ Sekisei lagoon Nature Restoration Committee 2007. Overall Plan for the Sekisei Lagoon Nature Restoration: protecting the Sekisei Lagoon, Our treasure. 69pp (in Japanese).

⁵ Agriculture, Forestry and Fisheries Division, Okinawa General Bureau, Okinawa Development Agency, Cabinet Office (ed). Annual statistics on agriculture, forestry and fisheries in Okinawa (in Japanese).

protection, conservation and restoration of the coral reef ecosystem; the local governments of Takegashima Island in Tokushima formed their nature restoration committees in 2005, so did Tatsukushi in Kochi and Sekisei Lagoon in Okinawa in 2006, tackling the issues based on the Law for the Promotion of Nature Restoration.⁶ In the International Year of the Reef 2008, a total of 180 events and conferences were held among NGOs, private sector, researchers, and government offices, aiming to increase the number of informed citizens and promote conservation activities. Although such occasions surely provided opportunities to stimulate interactions among various organizations, more linkage needs to be established for larger conservation efforts.

3) Role of the Action Plan

Cooperation among multiple stakeholders and coordination among various conservation efforts are keys to success. The Action Plan to Conserve Coral Reef Ecosystem in Japan (hereafter referred to as "Action Plan") identifies basic policies on the conservation of coral reefs, and lays out major actions that are to be implemented within 5 years, with the participation of various organizations.

Third National Biodiversity Strategy of Japan⁷ released in 2007 (pursuant to the Convention on Biological Diversity,

CBD)⁸ states that Japanese Government shall draft an action plan on the conservation of the coral reefs with the participation of various organizations, while reviewing ongoing conservation efforts and complying with existing laws and policies. Likewise, Basic Plan on Ocean Policy⁹ released in 2008, pursuant to the Basic Act on Ocean Policy¹⁰ enacted in April 2007, spelled out the establishment of an action plan to ensure the biodiversity of aquatic environment based on the unique characteristics of regional ecosystems in the areas of high biodiversity. This Action Plan was established pursuant to the abovementioned strategies and plans, and complying with local development plans (e.g. of Okinawa¹¹, Amami-¹² and Ogasawara Islands¹³). The Basic Act on Biodiversity¹⁴ enacted in 2008 states that local governments should establish, either their own or collaboratively, their biodiversity strategies that lay out basic plans regarding biodiversity conservation and sustainable use; this Action Plan will serve as a reference for these local strategies.

The Action Plan and its recommended actions, including establishing linkage among different conservation efforts, also go hand in hand with the international movement on the issue; CBD and International Coral Reef Initiative (ICRI)¹⁵ have pointed out the importance of networking conservation efforts for Marine Protected Areas (MPAs) and Integrated Coastal Zone Management (ICZM)¹⁶.

6 Law for the Promotion of Nature Restoration

http://law.e-gov.go.jp/cgi-bin/idxselect.cgi?IDX_OPT=2&H_NAME=&H_NAME_YOMI=%82%b5&H_NO_GENGO=H&H_NO_YEAR=&H_NO_TYPE=2&H_NO_NO=&H_FILE_NAME=H14HO148&H_RYAKU=1&H_CTG=1&H_YOMI_GUN=1&H_CTG_GUN=1 (in Japanese)

7 Third National Biodiversity Strategy of Japan

<http://www.biodic.go.jp/nbsap.html> (in Japanese)

http://www.biodic.go.jp/convention/nbsap_e.html (in English)

8 Convention on Biological Diversity, CBD

<http://www.mofa.go.jp/mofaj/gaiko/kankyoyoyaku/bio.html> (in Japanese)

<http://www.cbd.int/> (in English; CBD official website)

9 Basic Plan on Ocean Policy

http://www.kantei.go.jp/jp/singi/kaiyou/kihonkeikaku/080318kihonkeikaku_E.pdf (in English)

10 Basic Act on Ocean Policy

<http://law.e-gov.go.jp/announce/H19HO033.html> (in Japanese)

<http://www.mod.go.jp/e/topics/information/20/act.pdf> (in English, outline)

11 Okinawa Promotion Plan

<http://www8.cao.go.jp/okinawa/3/32.html> (in Japanese)

12 Amami Islands Promotion and Development Plan

http://www.pref.kagoshima.jp/_filemst_/45992/amasinkeikaku21-25.pdf (in Japanese)

13 Ogasawara Islands Promotion and Development Plan (for Fiscal Years 2009-2013)

<http://www.mlit.go.jp/common/000056283.pdf> (in Japanese)

14 Basic Act on Biodiversity

<http://www.biodic.go.jp/biodiversity/initiatives/docs/biodiversity.pdf> (in Japanese)

15 International Coral Reef Initiative, ICRI

ICRI is a partnership among governments, international organizations, and non-government organizations, that strives to preserve coral reefs and related ecosystems (including mangroves and seaweed beds). Japan has played a vital role in the establishment of the organization in 1994, and served as secretariat collaboratively with Palau between 2005 and 2007.

<http://www.env.go.jp/nature/biodic/coralreefs/icri/index.html> (in Japanese)

<http://www.icriforum.org/> (in English; ICRI official website)

16 Integrated Coastal Zone Management, ICZM

ICZM is a multidisciplinary process, based on the principle of sustainable management of coastal zones, that incorporates various people's ideas and efforts (including local stakeholders and decision makers) in order to achieve economic development, equality between and within generations, and effective management of the ecosystems in the area.



2. Goal, Objectives and Target Area

1) Goal and Objectives

The Action Plan aims to promote conservation (including restoration) and sustainable use of the coral reef ecosystem and sound sustainable development of the local communities. Three objectives and supporting actions to address the abovementioned goal are as follows:

- a. Establish networks and organize information infrastructure among various interested and responsible parties domestically and internationally, in order to promote conservation and sustainable use of the coral reef ecosystem,
- b. Contribute to the establishment of local socioeconomic framework that benefits from appropriate use and management of healthy coral reef ecosystems, and
- c. Encourage further reef conservation efforts, including establishment of MPAs.

2) Target Area

Coral reef ecosystems include all the coastal ecosystems in the tropics and subtropics that are formed on the accumulation of skeletons of reef-building corals, as well as bones and shells of other marine organisms on the sea bottoms over a long period of time. In Japan, such areas are found in the southern part (south of Tanegashima- and Yaku Islands in Kagoshima), and are referred to as “coral reef region” in the Action Plan. Japan is the northern limit of corals and coral reef distribution; other coral communities that can be found in higher latitudes than Kyushu area are collectively called “high-latitude coral community region” here, which are also part of the Action Plan (Figure 1).

Also taken into account in coral reef ecosystem are adjacent and associated sand beaches, seagrass beds, tidal flats, and mangroves. However, it does not include cold-water coral reefs and deep-sea coral reefs, such as precious corals used as jewelry.

3) Stakeholders to the Action Plan

The Action Plan was developed by the Working Group of Action Plan for Coral Reef Conservation (WG-APCRC) organized by the Ministry of the Environment (MOE), in cooperation with other national and local government agencies, and academic societies including Japanese Coral Reef Society (JCRS)¹⁷. All participating organizations in the Task Force will commit to the proposed actions from their respective sides.

In order to promote effective conservation efforts and proper use of coral reefs, raising awareness and encouraging action by many people are vital. Promotion of awareness and concerted efforts are highly recommended among the people engaged in the local economic activities including agriculture, forestry, fisheries, tourism, and other relevant private companies; committees and economic groups; schools and public community centers; researchers and academic societies; NGOs, media, and visitors. It is expected that each of the involved group acknowledges their close relationship with the coral reef ecosystem and take action accordingly, including participating in the outreach, conservation and restoration activities.



rich coral reef-Sekisei Lagoon-

¹⁷ JCRS, and its Reef Conservation Committee as a leading committee, developed “the Action Plan to Conserve and Restore Coral Reefs” in 2007, available through their official website.

<http://wwwsoc.nii.ac.jp/jcrs/> (official website for JCRS; in Japanese, has an English page)

<http://wwwsoc.nii.ac.jp/jcrs/index.html> (Action Plan, in Japanese)

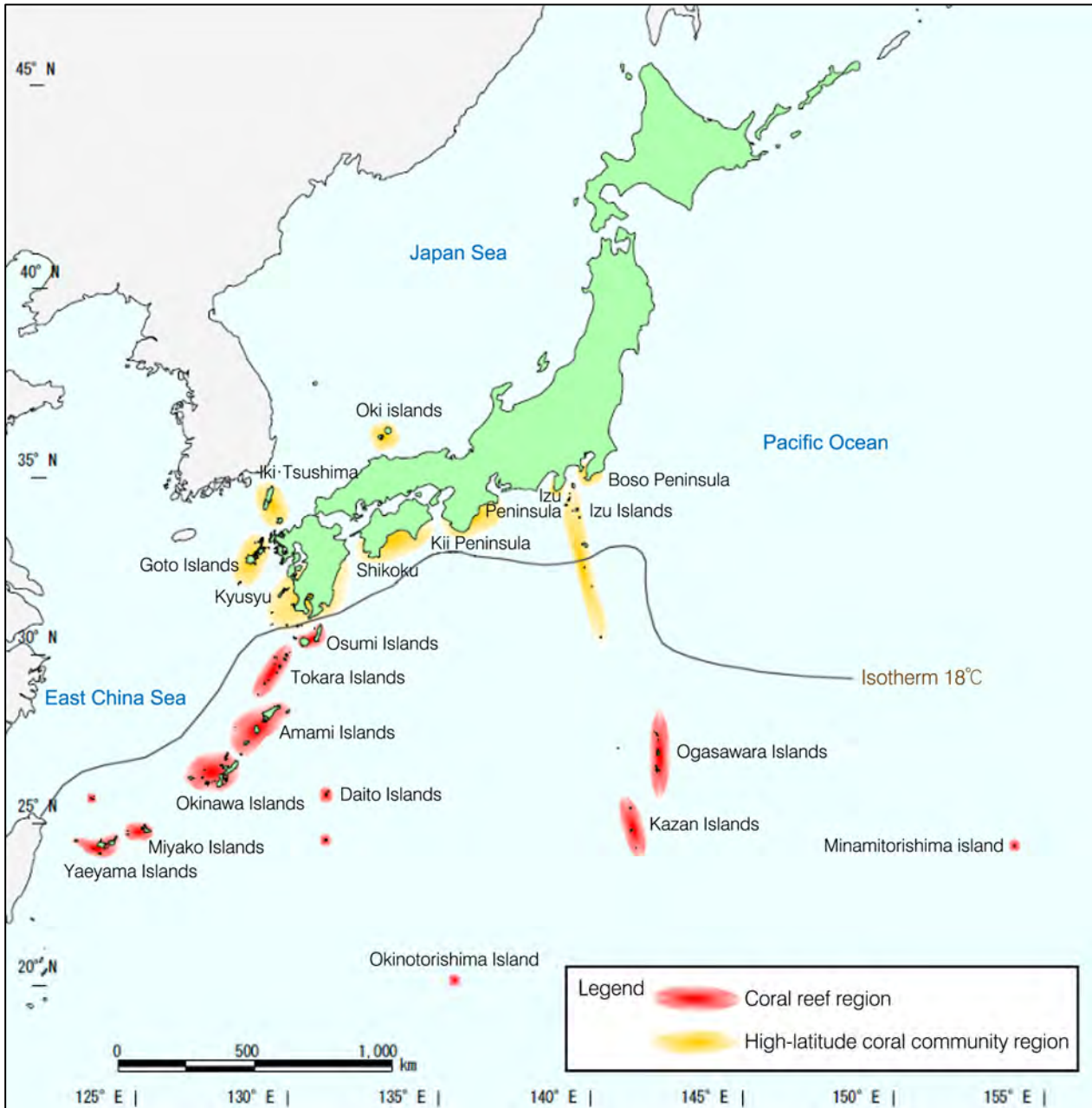
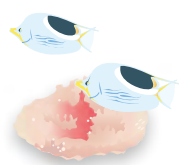


Figure 1. Major coral reef region and high-latitude coral community region in Japan.
 Curved lines in the figure are isothermal lines for a minimum average temperature of 18 degrees Celsius during winter season.
 (Created based on MOE and JCRS, 2004¹⁸)

18 MOE and JCRS (eds). 2004. Coral Reefs of Japan.



3. Basic Policies

Three basic policies have been identified to pursue conservation efforts and sustainable use of coral reef ecosystem as follows:

1) Encourage Local Communities to Live in Harmony with Coral Reef Ecosystem

In order to slow down the degradation process of coral reef ecosystem while continuously receiving the ecosystem services, we need to expand our schemes of conservation and sustainable use of the resources. At the same time, it is important to create a socioeconomic framework where people could continue to build their societies with the natural blessings they receive.

Basic Act on Ocean Policy, at the national level, upholds a principle to balance the development, utilization of resources and conservation of marine environment, and states that securing the marine biological diversity and conserving other healthy marine environment are the basis of the existence of mankind.

At the local level, development of comprehensive and well-planned management strategies on the conservation and sustainable use of biodiversity is expected, pursuant to the Basic Act on Biodiversity. Sound development of local communities should be thought after, along with the proper understanding of the value of coral reef ecosystem and appropriate resource use that nurtures local culture. Also, planning comprehensive strategies for the biodiversity of whole watersheds, from land to sea, should be encouraged.

2) Cooperative Efforts and Linkage among Organizations

Many different activities in terms of biodiversity conservation, including nature restoration projects, have been conducted since the issuance of National Biodiversity Strategy, with the coordination among various governmental agencies. Likewise, for effective and smooth conservation efforts for coral reef ecosystem, facilitating cooperation among different ministries and agencies surely is a key to success.

In Okinawa, for example, Okinawa Coral Reef Conservation Council¹⁹ was established in 2008, aiming to pursue sustainable reef use for the development of local community, as well as to link various groups, including local residents, fishermen, tourism industry, farmers, private companies both inside and outside Okinawa prefecture, teachers and other people engaged in education, researchers, NGOs, and responsible government agencies. Such linkage of different groups within a community is crucial, as well as establishment of networks of committees from different local entities. Connecting upland conservation activities with those in the marine environment is another important aspect.

Moreover, coral reef ecosystem is fragile to climate change, which degradation and loss thereby is a worldwide concern. International cooperation and collaboration has become more and more important. In particular, for Japan, partnership among Asia-Oceania region is one of the essential ties, where many people depend their daily lives upon coral reef ecosystem as resources and balance of conservation and use is a great challenge.



coral reef viewed from the air

3) Science Recognition, and Preventive and Adaptive Attitude

Understanding coral reef ecosystems and awareness of their importance based on the scientific recognition is a vital part in balancing their conservation and sustainable use, along with the local wisdom regarding how to live in harmony with nature. Through this approach, people can select better alternatives, and also draw attention of larger crowds to the importance and effectiveness of the

¹⁹ Okinawa Coral Reef Conservation Council
<http://coralreefconservation.web.fc2.com/index.html> (in Japanese)

conservation efforts. Coral reef ecosystem are deeply intertwined in our daily lives and societal values; understanding their significance in the cultural and societal dimension is as much important as understanding natural scientific data.

Life forms and ecosystems are complex and dynamic, which never cease to evolve; we would never be able to fully understand lives and ecosystems. With that in mind, a concept “ecosystem approach²⁰” has been adopted in the biennial Conference of the Parties to the Convention on Biological diversity, a basic concept to facilitate people and nature to live in harmony; Basic Act on Biodiversity adopted this concept as well.

Based on an ecosystem approach, following are important:

- Preventive attitude that provides measures at an early phase based on the existing valuable information, while continuously expanding scientific knowledge base (database).
- Adaptive attitude that allows us to capture changes in the ecosystems with appropriate monitoring programs, and reflecting the results flexibly in the review of current management and resource use schemes.



underwater view with thriving corals

²⁰ Ecosystem approach is a basic concept for an effective natural resource management that promotes biodiversity conservation and sustainable use of resources in an equitable way. It was adopted by CBD/COP5 in May 2000, and has 12 principles and operational guidelines. An ecosystem stands on the premises that people are part of ecosystem, and that ecosystems are complex and dynamic. It also upholds an idea that natural resource management should be planned with careful assessment of potential impacts, while adjusting strategies to changes in the ecosystems adaptively.
http://www.biodic.go.jp/cbd/pdf/5_resolution/ecosystem.pdf (in Japanese)
<http://www.cbd.int/ecosystem/description.shtml> (in English; description of Ecosystem approach on CBD website)



4. Taking Action

Individual actions recommended by WG-APCRC are organized under following 3 categories, all of which commit to conservation and sustainable use of the coral reef ecosystem within 5 years. Overview of the topics, including current situation and challenges, and direction of conservation efforts are shown, followed by proposed actions:

- 1) Framework for conservation of coral reef ecosystem,
- 2) Sustainable use of coral reef ecosystem, and
- 3) Conservation of coral reef ecosystem.

1) Framework for Conservation of Coral Reef Ecosystem

a. Promote cooperation among organizations for a community living in harmony with coral reef ecosystem

[Current Situation and Challenges]

Many local conservation committees have been established that provide linkages among various organizations (e.g., Okinawa Coral Reef Conservation Council, Uwa Sea Marine Resources Conservation Committee). Networking individual organizations with similar interests and experiences, as well as connecting such groups in different geographical areas and further sharing information within the networks, are vital in facilitating conservation efforts and sustainable resource use.

One of the challenges for continuous conservation efforts is that many local residents do not have direct contact with coral reef ecosystem in their daily lives; raising awareness that coral reefs provide benefits to the local community is a first step to bring back their interest. Creating socioeconomic settings where people could recognize such benefits in the local culture is also important.

[Direction]

Continuous activities by various existing conservation committees are encouraged, as well as establishing a new one where necessary. Cooperation are highly desirable among parties sharing similar challenges, or neighbor communities where their activities may affect adjacent areas. At the national level, the government will establish a

nationwide network that shares information about local challenges and existing conservation activities.

Outreach and educational activities are also vital in order to connect people and coral reefs in the local communities, including promoting proper use of reefs as educational, biological and tourism resources, as discussed later. Giving consideration to coral reef protection is also necessary while planning and building the infrastructure such as breakwaters for the safety and security of the local communities. Moreover, utilizing natural features of reefs in a positive way such as their function as natural breakwaters, in lieu of building manmade structures, should be considered in the infrastructure planning so as to pursue a harmonious living between man and nature. Through these attempts and efforts, two types of organizations should connect themselves and work together, the one engaged in the infrastructure development, and the other working for the reef conservation.



beautiful coral reef

[Proposed Actions]

Connect organizations for cooperation

- MOE will invite responsible ministries, agencies, and experts, and hold liaison conferences (provisional name "Working Group of Coral Reef Ecosystem Conservation") periodically to discuss issues regarding conservation and sustainable use of coral reef ecosystem, including sharing information on case studies beneficial for the local economy, and reviewing and giving feedback to the Action Plan.
- Through implementation of projects such as selected "the Biodiversity Conservation Promotion Support Projects",

the government will support biodiversity conservation and restoration activities initiated locally, including those in MPAs that are of high importance, and areas that are integral part of Ecological Network²¹.

➤ Okinawa Coral Reef Conservation Council, while pursuing reef conservation efforts, will connect themselves and strengthen partnership with various responsible and interested parties. The Council will also provide information and support to local conservation groups and projects. [Okinawa Prefectural Government]

➤ Okinawa Prefectural Government will draft a base plan for conservation, restoration, and utilization of coral reefs (provisional title “Okinawa Base Plan on Conservation, Restoration, and Utilization of Coral Reefs”) and promote such activities; will monitor growth and health of coral reefs; assess the contributing factors that are negatively affecting reefs, and come up with measures considering the unique features of the area.

Balance infrastructure development and reef conservation efforts

➤ Ministry of Land, Infrastructure, Transport and Tourism (MLIT) will pursue a balanced approach for infrastructure improvement and reef conservation, including promoting installation of underwater blocks that facilitate coral settlement, transplant and re-location of corals with substrates²².

b. International cooperation

[Current Situation and Challenges]

Since the launch of ICRI in 1994, an international framework aiming to protect coral reef ecosystems, Japan has contributed to many cooperation efforts with other international counterparts. In 2008, Japan hosted International Coral Reef Marine Protected Areas Network

Meeting / Fourth ICRI East Asia Regional Workshop, in order to facilitate linkage among the important coral reef networks in East Asia. Participants agreed to draft strategies for the Network, and to present the draft at CBD/COP10.

Some of the common challenges shared region-wide are how to manage fisheries and tourism in a sustainable way; establishment and effective management of networks for the important and representative coral reefs designated as MPAs, while considering ecological connectivity among different MPAs; developing measures to tackle issues regarding climate change and ocean acidification. Regarding the impact of climate change on coral reefs, “The Economics of Ecosystems & Biodiversity (TEEB)²³” released in September 2009, points out that current CO₂ concentration level in the air is sufficient to contribute to raise seawater temperature, further triggering ocean acidification and accelerating degradation and loss of corals.



ICRI East Asia Regional Workshop in Hoi An, Vietnam

[Direction]

Continuous efforts should be made to develop strategies on the regional network of MPAs for coral reefs and pursue proposed actions, along with collecting and organizing relevant information.

Recognizing that coral reefs are fragile to climate change, measures to reduce greenhouse gas emission at a global

21 Ecological Network is a physical and biological network that connects habitats and ecosystems, as well as to ensure maintaining and/or creating appropriate living space for organisms. Establishment of an ecological network is intended to provide environmentally stable and secure habitats for organisms, including endemic and endangered species, so that they could continue to exist, and in some case restore their population, aiming to ensure rich biodiversity of the nation in the future. Such network usually includes natural areas of great importance for conservation as core areas, along with other areas that qualify for conservation (Third National Biodiversity Strategy Part II, 1, a. Ecological Network).
http://www.biodic.go.jp/cbd/pdf/nbsap_3.pdf (in Japanese)

22 Re-location of corals with substrates refers to a technique that cuts out the reef substrate together with attached corals, and re-locate the whole structure.

23 “The Economics of Ecosystems & Biodiversity (TEEB)” was a project led by Germany and European Commission (EC), and focuses on global-scale researches on the biodiversity loss from the economical standpoint. TEEB is based at United Nations Environmental Programme (UNEP).
<http://www.teebweb.org/> (in English; TEEB official website)

level is also vital from the standpoint of coral conservation. In promoting improvement of coral reef restoration programs, designation of areas of high importance is essential as well as their effective management.



coral bleaching

[Proposed Actions]

- MOE will work together with other responsible countries to formulate ICRI East Asia Regional Strategy on MPA, and pursue proposed actions accordingly. Along with such international cooperative efforts, MOE will launch a project to develop a region-wide database on the MPAs, which will store information on coral reefs and associated ecosystems.
- MOE will support research and educational functions at Palau International Coral Reef Center (PICRC), founded by grant assistance of Japanese Government and serves as a node for coral monitoring and research in Micronesia Region.
- Through participation in ICRI and International Tropical Marine Ecosystems Management Symposium (ITMEMS)²⁴, MOE will contribute to international conservation efforts for coral reefs, including sharing information among other participating countries.
- JCRCs will work together with other relevant groups towards establishment of Asia-Pacific Coral Reef Society (provisional title), strengthening academic exchange within Asia and Pacific region.

c. Outreach and capacity building

[Current Situation and Challenges]

In order to encourage voluntary actions by all interested individuals, a first step is raising awareness in the local communities regarding the importance of balancing conservation efforts and sustainable use of coral reef ecosystem. Proposed activities include, but not limited to, environmental education in the local schools, nationwide public outreach through informative brochures and websites, environmental case studies gained through ecotourism activities incorporating conservation activities for local natural resources.

Another important dimension is capacity building of those engaged in educational and outreach activities, along with the education of instructors who specialize in training of people involved in the conservation and environmental educational activities.

[Direction]

Promotion of customized outreach and education efforts towards conservation activities is needed in order to raise more awareness about the importance of coral reef ecosystem in the local communities. Target audience includes not only residents in the community, but also visitors and other people outside the community yet interested in the issue. Proposed activities include outreach and environmental educational activities at schools and local public centers, nationwide public outreach, and ecotourism opportunities.

One should keep in mind that knowing is one thing, seeing is another; sometimes people must see and experience things for themselves. In facilitating newcomers to understand the importance of relationship between man and nature and their interactions, training of environmental interpreters is highly recommended.

In promoting ecotourism, business owners of such activities should provide training for guides to update their knowledge about the area and advanced guiding skills, as well as directly communicate with tourists about environmentally friendly rules and manners in the area.

²⁴ International Tropical Marine Ecosystems Management Symposium (ITMEMS) is an international forum for managers of coral reefs and associated ecosystems (including mangroves and seagrass beds), where people share their experiences and lessons. The symposium is held every 4 years, organized by ICRI as a leading organization.

Along with other conservation efforts, specialists are highly sought after, not only experts knowledgeable about coral reef ecosystem and engineers with special skills, but also those who have high communication skills and could facilitate “science communication²⁵”, i.e., serve as a mediator between experts and non-experts regarding scientific knowledge and their importance. Developing networks is also crucial where people can post and disseminate information about their conservation activities domestically and internationally, as well as facilitate linking people and enhancing their efforts in collecting and sharing of most updated information.



field trip for school children at neighboring seashore in Ishigaki island

[Proposed Actions]

- MOE, through their International Coral Reef Research and Monitoring Center (COREMOC) in Ishigaki, Okinawa, will plan exhibitions that highlight the value of coral reefs and call action for its conservation. Also, at various reefs including those in Iriomote-Ishigaki National Park, MOE will continue to plan and support nature-friendly field activities open to local residents and visitors.
- MOE will proactively plan and support nature observation events at national parks along coastal areas; review and improve upon the feedback conservation efforts and resource use at national parks with marine areas; provide essential information through brochures and websites; and promote outreach and education on proper marine resource use.

- MOE will promote the efforts of natural park guides and park volunteers to secure the appropriate use and conservation of natural parks.
- Through activities at COREMOC and other efforts based on the Act on the Promotion of Ecotourism enacted in 2007, MOE will support stakeholders in staying up-to-speed with the latest information and scientific knowledge, as well as improving their conservation skills.
- MLIT will support environmental educational and nature-oriented activities that are about and/or take place in natural coastal environments including coral reefs.
- Okinawa Prefectural Government will contribute to local conservation efforts by distributing their “Okinawa Coral Transplantation Manual”, “Tourism and Recreation Programs for Coral Reef Conservation”, and “Environmental Education and Outreach Programs for Coral Reef Conservation”²⁶ all developed in 2008; tips and case studies compiled in these publications may be used in planning their own activities.
- JCRS will continue their outreach and educational activities regarding reef conservation and restoration projects in various ways, e.g., through their Reef Conservation Committee, academic journals, and JCRS website.

d. Collect and disseminate information and construct a framework of information

[Current Situation and Challenges]

MOE has undertaken National Survey on the Natural Environment since 1973 aiming to collect their baseline information. Additionally, since 2003, MOE launched a program “Monitoring Sites 1000”, intended for a long-term observation at selected, representative ecosystems. Based on the analysis using the data obtained through the program (between Fiscal Years 2003 and 2007) on the status of coral reefs²⁷, difference in the changing pattern of coverage has been discovered between the coral reef

²⁵ Science communication refers to media of two-way interactions between experts and general public, where experts could explain scientific information in lay words to general public, and general public could also ask questions, and express their opinions.

²⁶ Okinawa Coral Transplantation Manual, Tourism and Recreation Programs for Coral Reef Conservation, and Environmental Education and Outreach Programs for Coral Reef Conservation

<http://www3.pref.okinawa.lg.jp/site/view/contview.jsp?cateid=70&cid=19664&page=1> (in Japanese)

²⁷ Based on the analysis of Working Group on the Analysis of “Monitoring Sites 1000”.

http://www.biodic.go.jp/moni1000/findings/reports/pdf/h20_coral%20reef.pdf (in Japanese)

region in southern Japan and the high-latitude coral community region. Recent studies have also shown ecological differences between these two distinct groups. Information on other organisms inhabiting coral reefs are being collected by various groups, however, such information has not fully been shared and utilized in terms of better conservation efforts and sustainable use.

Implementing effective studies and monitoring programs intended to capture the status and transition of coral reef ecosystem, and effective use of the obtained data, as well as accumulation and dissemination of scientific knowledge, are essential in setting appropriate conservation goals, reviewing the situation and effects of ongoing activities, and further improving our conservation efforts.

[Direction]

Monitoring programs and other researches on coral reefs at the national level should be continued and improved, while reviewing the obtained data and providing feedback to fill in gaps as for how to reduce negative effects on the reefs. Important findings from such analyses should reflect back in a more strategic monitoring planning and information collection systems.

In identifying other fields and areas of importance where less attention have been given or lack of information exists, developing networks is also important among research groups, museums, experts, and NGOs, and share their biological databases, research findings, and successful case studies. Providing study results through the networks and distributing manuals developed by local committees and governments to business owners and conservation groups are also useful in order to promote reef-friendly economic activities and conservation efforts with appropriate methods. Such efforts should facilitate and accelerate coordination, cooperation, and collaboration among different organizations.

The role of a hub organization(s) that enables sharing of accumulated scientific information domestically and internationally should be enhanced, along with training of human resources working in such facility.

Furthermore, in order to promote adaptive conservation and management approach that fits local environment, historical data on coral reef ecosystem, including those tracking the

changes in the ecosystems, should be collected; socioeconomic factors should be identified and analyzed that have triggered changes in coral reef ecosystem. To fulfill such goals, long-term and strategic monitoring programs should be developed at the local level, targeting different species and ecosystems.



manta ray *Manta birostris*

[Proposed Actions]

- MOE will collect and organize information on coral reef researches and conservation efforts and strengthen organizational and systematic structures, including the functions of COREMOC as a clearinghouse.
- MOE will fully utilize data from their programs such as National Survey on the Natural Environment and Monitoring Sites 1000, for further accumulating information on the status of marine ecosystems, including that of coral reefs, seagrass beds, tidal flats, sea turtles, seabirds, and marine mammals.
- MOE will analyze the status of coral reefs and identify gaps in the existing conservation efforts based on the materials from various sources, and reflect the results in planning more effective monitoring programs.
- From the standpoint of protecting wildlife and sustaining a healthy natural environment, the Ministry of Agriculture, Forestry and Fisheries (MAFF) will collect and organize scientific information on rare species, and develop conservation and management plans.
- Kagoshima Prefectural Government will launch a long-term monitoring program at fixed stations that periodically collects data on the coverage and growth of

corals, as well as on the outbreak of crown-of-thorns starfish.

➤ Okinawa Prefectural Government will assess the status of coral reefs in Okinawa, including remote island areas, using data from various sources such as MOE's National Survey on the Natural Environment and Okinawa's Reef Check projects; will organize information on the coral reefs, including changes in their distribution pattern and environmental changes in the surrounding areas, and utilize such data in the fields of conservation, restoration and utilization of resources.

➤ Okinawa Prefectural Government will collect information on the sedimentation of red soil, including launching a monitoring program at fixed stations to assess the impacts of sedimentation on coral reefs in coastal marine areas.



survey for monitoring

2) Sustainable Use of Coral Reef Ecosystem

a. Appropriate management and use of biological resources

[Current Situation and Challenges]

Appropriate management of fishery resources, an integral part of the coral reef ecosystems, and sustainable resource use are crucial for sustainable reef conservation. Fishery is dependent upon the harvests from the sea; for us to continuously receive blessings from the sea, it is vital for the industry to maintain a healthy marine environment and

biodiversity of coral reef Ecosystem. Basic Plan for Fisheries²⁸ endorsed by the Cabinet in March 2007 commits to the multi-faceted approach at local fishing villages and in the fishery industry itself, using their various functions and capabilities to conserve coastal natural environment and its biodiversity, and to pass down traditional cultural knowledge obtained through the interaction with nature.

People have long lived alongside the coastline of Japan, including in the areas close to the coral reefs; they have gathered shellfish and seagrasses/seaweeds, and nurtured their unique and rich culture interwoven with the coastal marine waters. Reflecting such relationship between man and nature, a new word and concept "Sato-Umi" (literal meaning: home sea) has been proposed in Japan and is being widely recognized to refer to such condition, where marine environment maintains high productivity as well as high biodiversity through some level of human intervention.

On the other dimension, the way people utilize coral reef ecosystem as biological resources have diversified over time, ranging from ornamental to pharmaceutical uses. Moreover, with other influencing factors such as climate change, coral reefs are going through drastic changes. Balancing appropriate management and use, while reflecting social and environmental changes, is a huge challenge.

[Direction]

Concept of Sato-Umi should be taken into account when planning and implementing appropriate use and conservation of the marine resources, including development and revitalization of fishing villages while utilizing their unique resources, and nationwide public outreach emphasizing the significance of fisheries and the roles and functions of fishing villages.

Aquaculture for fish, shrimps, and seagrasses/seaweeds that utilize coral reef ecosystem is regarded of great importance in providing stable supplies from the sea, and at the same time serves as a key industry in vitalizing fishing villages. However, such industry should always exercise caution, as excess feed and nutrients could negatively affect coral reefs. New ways of resource use such as for ornamental and pharmaceutical uses should always assess

²⁸ Basic Plan for Fisheries
<http://www.jfa.maff.go.jp/release/19/032001-03.pdf> (in Japanese)

the status and health of reefs as well, in compliant with the appropriate management.

In coral reef region, corals and the photosynthetic zooxanthellae that live inside corals provide food to other sea organisms in the tropic and subtropic areas, thus serving as a base for their ecosystems; recent studies have confirmed similar function in high-latitude coral community region, playing the role of biological producers in the food chain. Resource management planning should always take into account, not only benefits of reefs to humans, but also such role of reefs and coral communities as a base of food chain in their ecosystems.



Blessings from coral

[Proposed Actions]

- MOE will implement pilot monitoring programs on the coastal water quality and biological assessments, some of which call for public participation; draft a manual to adopt Sato-Umi concept and promote projects in the local communities based on the idea; disseminate Sato-Umi concept domestically and internationally (mostly within Asian region) through Symposiums and other public relations activities.
- MAFF will support conservation efforts, e.g., coral monitoring programs initiated by the local fishermen and residents, coral aquaculture including live culture of seedling, coral transplant, and removal of crown-of-thorns starfish; will provide technical support as well as disseminate information on the lessons learnt from excellent case studies.



A giant clam *Tridacna*

b. Appropriate resource use for tourism

[Current Situation and Challenges]

Tourism activities involving coral reef ecosystem have diversified over the years, from snorkeling and scuba diving in marine water that have been practiced regularly, to new types of activities including nature observation events walking on tidal flats during low tides; geographic areas used for such occasions have expanded accordingly. Some local communities place a large focus on such activities for their development and source of income; for instance, some of the local governments willingly accommodate school trips coupled with environmental educational activities in their areas. Such movement underscores that maintaining a healthy reef environment indeed contributes to the local economy. However, a drastic increase in the number of visitors, improper use of the resources, and expansion of resource use area without any rigid plans or rules are all affecting coral reef ecosystem and local communities negatively. Tourism is an industry that inherently depends on the unique features of local natural and cultural resources; their success and survival lie on the well-balanced conservation and sustainable use of the resources. Establishment of a good partnership between tourism industry and local residents are crucial in order to balance appropriate tourism and recreational activities and conservation of resources, as coral reefs provide major aquaculture grounds for local residents. At the national level, Act on the Promotion of Ecotourism²⁹ was enacted in April 2008, which was designed to promote ecotourism activities that highlight unique local features and

²⁹ Act on Promotion of Eco-tourism

http://law.e-gov.go.jp/cgi-bin/idxselect.cgi?IDX_OPT=1&H_NAME=%83%47%83%52%83%63%81%5b%83%8a%83%59%83%80%90%84%90%69%96%40&H_NAME_YOMI=%82%a0&H_NO_GENGO=H&H_NO_YEAR=&H_NO_TYPE=2&H_NO_NO=&H_FILE_NAME=H19HO105&H_RYAKU=1&H_CTG=1&H_YOMI_GUN=1&H_CTG_GUN=1 (in Japanese)

incorporate creative ideas from local residents, and go hand in hand with the conservation of the natural resources, while due consideration given to conservation of natural environment, promotion of tourism, (re-)vitalization of local communities, and environmental education and outreach. Basic policy on Promotion of Eco-tourism³⁰ have been compiled and was endorsed by the Cabinet in June 2008. At the local level, based on the Act, Kerama Area in Okinawa established Ecotourism Promotion Committee with the members from various organizations including people from Zamami- and Tokashiki Villages as leading groups. The Committee is working towards establishing rules for appropriate use of marine resources for ecotourism in the area in order to reduce negative impacts on the coral reefs.

[Direction]

Each local community should establish their own rules and management schemes, where necessary, using the community-based approaches, as for how to incorporate tourism in the reef use. Participants should include various responsible and interested groups, including people working in the tourism industry, fishermen, NGO groups, and experts; through discussions, further linkage among organizations should be tied, striving for concerted efforts.

While developing and implementing local rules, the concept of “carrying capacity” should also be incorporated so as to avoid excess resource use.



coral guide program by snorkeling

[Proposed Actions]

- MOE will promote plans and programs developed in compliance with the Act on Promotion of Ecotourism enacted in April 2008; will create awards for excellent ecotourism activities and best management practices (BMPs), and plan nationwide seminars on the issue; and accumulate and share information regarding better local resource use and effective conservation methods.
- MOE will support local communities that promote ecotourism activities based on the Act, as well as assist in drafting a basic plan on the development of vibrant yet sustainable local communities through re-discoveries of their unique features.

3) Conservation of Coral Reef Ecosystem

a. Designation and management of significant areas

[Current Situation and Challenges]

Designating the biologically significant areas as Marine Protected Areas (MPAs) has been recognized by the international community as one of the most important conservation measures. Specifically, the World Summit on Sustainable Development (WSSD, Johannesburg Summit in 2002)³¹ and CBD/COP7 (in 2004)³² both agreed to establish appropriate MPAs based on the scientific information, as well as to develop representative MPA networks by 2012. ICRI East Asia Regional Workshop is also working on establishing the ICRI East Asia Regional Strategy on MPA Networks.

Domestically, Basic Plan on Ocean Policy endorsed in March 2008 also state that the government should in accordance with CBD and other international agreements, clarify how to establish MPA in Japan under coordination between related ministries and appropriately promote the establishment thereof.

Japanese Government has already designated 40 to 50% of the coral reef (including high-latitude coral reef community) as some types of protected or conservation areas (mostly as national and quasi-national parks)³³, however, many of these

³⁰ Basic Policy on Promotion of Eco-tourism
http://www.env.go.jp/nature/ecotourism/basic_policy.html (in Japanese)

³¹ World Summit on Sustainable Development, WSSD
<http://un.org/summit/> (in English, official website for WSSD)

³² CBD/COP7 Decision VII/28, Protected areas
<http://cbd.int/decision/cop/?id=7765> (in English)

³³ For details, see “2) Overview of the protected area system for biodiversity conservation” in “Section 5. Status of biodiversity conservation” (Part 1, Chapter 2) in Third National Biodiversity Strategy (in Japanese). Sekisei Lagoon in Iriomote-Ishigaki National Park is the largest conservation area for coral reefs.

areas are in the ordinary areas of the parks, where little restriction have been applied. Amendment of both Natural Parks Law and Nature Conservation Law in 2009 strengthened their focus on the protection of marine areas; through such amendments, further protection of biological significant marine areas should be accelerated.

[Direction]

Habitats among shallow coastal waters, including coral reef ecosystem, are decreasing in size for various reasons, including coastal development. They are also degrading in quality due to the increase in sedimentation and excess nutrient runoff from the land. Coral protection and restoration are high priorities in such areas. Different measures should be applied to different factors, and appropriate MPAs established for corals of biologically significant areas. In designating MPAs, in particular when setting their locations and sizes, reef connectivity should be considered so as to ensure recruitment and dispersal of coral larvae, further implementing a more effective conservation schemes.



coral reef fringing a island

[Proposed Actions]

➤ MOE and other responsible ministries and agencies will promote establishment of MPAs for coral reefs using applicable regulations with clarification about MPA based on the Basic Plan on Ocean Policy. In establishing MPAs, relevant materials will be collected and analyzed, including coral distribution maps developed by national and local government agencies, information on the hot spots obtained from NGOs³⁴, study results on the rare coral species, and pattern of larval dispersal. Based on these

materials, important marine areas should be identified from the standpoints of both biodiversity and fishery resource management.

➤ MOE will separately discuss the whole conservation schemes of high-latitude coral community region and their associated ecosystems in the coastal areas, where ecological and social settings are different from coral reef region.

➤ Based on the amendment of Natural Parks Law and Nature Conservation Law, MOE will strengthen conservation efforts for marine environment by establishing more marine park areas, designating and potentially re-locating and resizing the national and quasi-national parks in marine waters, with due consideration given to the distribution pattern of core habitats for biodiversity conservation including seagrass beds, tidal flats, and coral reefs, as well as to the location and movement of ocean currents, and connectivity with the land.

➤ MOE will identify valuable coral reefs that meet criteria of the Ramsar Convention (Convention on Wetlands of International Importance especially as Waterfowl Habitat), and will pursue their registration under the Convention, as well as balancing proper conservation measures and sustainable use in the area.

➤ MOE will continue to support ongoing coral restoration projects in natural parks, including those in Sekisei Lagoon in Okinawa, Tatsukushi in Kochi, and Takegashima in Tokushima, as well as similar projects for the high latitude coral communities.

➤ Coral reef ecosystem within national parks where degradation has been recognized due to the events such as bleaching and outbreak of crown-of-thorns starfish, MOE will launch the programs for coral restoration and removal of the starfish. Sandy beaches used as the hatching ground for sea turtles will be cleaned up periodically, and monitoring programs will be established; moreover, where necessary, restricted entry area will be established for the vehicles. Through these activities, MOE will proactively pursue conservation, restoration and better management schemes for the marine ecosystems.

³⁴ Information on the hot spots refers to the information about biologically significant areas, where rich biodiversity is observed but also have many endangered species at risk, and require urgent conservation measures.

- MOE will strengthen conservation efforts for seabirds along the coastlines and marine areas; in particular, MOE will establish Wildlife Protection Area for the critical nesting and breeding grounds of seabirds.



Sekisei Lagoon Nature Restoration Committee

b. Integrated watershed management connecting land and sea

[Current Situation and Challenges]

Coral reef ecosystem have a close relationship with the adjacent land area, from where they receive sediments and nutrient discharge. These areas are ecologically inseparable, as some organisms need different habitats at different stage of their lives, from coral reefs in shallow waters, blackish mangrove areas, to even high up in the freshwater streams and rivers. At the same time, coastline is prone to environmental pollution, as people have extensively developed their residential and industrial areas along the flat coastal lands over a long period of time.

Sediment runoff and pollutant discharge are some of the major factors that negatively affect and degrade coral reef ecosystem. Not only pollutants from residential runoff, but also sediment runoff from agricultural lands, abandoned forests, and construction sites, as represented by the red soil problems in Okinawa, have become a growing threat to coral reef ecosystem. Coastal development in general is also attributing to the loss of coral reef ecosystem.



an affluent forest and abundant coral reefs

[Direction]

Integrated coastal zone management approach is necessary for coral reef ecosystem conservation that considers connection between land and sea through not only surface water, but also through groundwater. Promoting conservation programs for forests and agricultural lands will be beneficial for coral reef ecosystem in the adjacent shallow marine waters. Linking conservation efforts that were originally separately developed for upland and for underwater is becoming more and more important.

Depending on the scale, Environmental Impact Assessment (EIA) is necessary for the development projects based on the laws including the Environmental Impact Assessment Law. When a project is likely to affect local biodiversity, earlier mitigative measures should be provided prior to its launching, with due consideration given to the characteristics of the project.

[Proposed Actions]

- MOE and responsible ministries and agencies will cooperate in providing necessary measures against point sources that contribute to sediment runoff and pollution discharge in the marine national parks, where their natural scenic beauty and biodiversity are at risk.

- An amendment bill on the Environmental Impact Assessment Law has just been submitted by MOE to the National Diet, which added new procedures for proposed development projects that they should draft additional documents on environmental consideration at planning phase (i.e., provide environmental protection measures prior to launching a project), along with publicly release the

results of planned mitigation measures. MOE will closely monitor the status of the bill, while taking actions based on the idea of the bill where appropriate.

➤ MAFF will support local environmental protection projects that reduce sediment runoff, including slope modification and installation of sediment ponds at agricultural lands.

➤ MAFF will try to reduce residential runoff that negatively affects marine organisms by installing improved drainage systems in the upland areas.

➤ MAFF will promote conservation of biodiversity through an integrated watershed management approach, based on the understanding that forests, agricultural lands (Sato-chi/Sato-yama area), rivers, and shallow coastal water area (Sato-Umi area) are all connected and closely related.

➤ MLIT will continue its efforts regarding the treatment of night soil and domestic effluent by employing sewage systems and septic tanks. It will also take measures to improve water quality, including the introduction of sewage treatment facilities with advanced treatment, improvement of combined sewage systems, as well as measures to control non-point source pollution.

➤ Tokyo Prefectural Government will implement measures to reduce the impact of feral goats that excessively graze in upland areas in Ogasawara Islands, and minimize sediment runoff, including population control of goats and restoration of grasses and trees.

➤ Okinawa Prefectural Government will implement mitigative measures to tackle red soil runoff from development projects based on the Red Soil Erosion Prevention Ordinance, as well as draft a basic plan to minimize red soil runoff by effective point- and nonpoint source control projects.

➤ Based on the basic plan to minimize red soil runoff, The Cabinet Office and Okinawa Prefectural Government will establish comprehensive and well-planned measures, while comparing relevant techniques, and conducting pilot projects to effectively minimize sediment runoff and its negative effects to marine organisms.



red soil run off from river to sea

c. Implement measures tackling different factors

[Current Situation and Challenges]

Factors that are negatively affecting coral reef ecosystem are wide ranging and closely related, including coastal development, pollutant runoff from upland, inappropriate resource use, outbreak of crown-of-thorns starfish and other coral-eating gastropods, bleaching, and disease such as white syndrome.

Various organizations have worked on different issues, including removal of crown-of-thorns starfish and coral transplant projects; however, experience and information obtained from these efforts are yet to be shared among other groups.

Coral transplantation needs an extreme caution in the selection of transplant location, species and intra-specific strains. In some case, transplantation may cause disruption at species and even genetic level. Physical handling of corals also requires finest attention so not to damage the corals. Akajima- and Okinotori Island, Sekisei Lagoon in Okinawa, and Shikoku are exploring sexual reproduction and breeding of local corals to be used for the transplant, in order to protect parent coral population and avoid genetic disturbance from outside. Aquariums nationwide are also trying to establish coral reproduction methods.



transplanting coral

[Direction]

Experience and information need to be shared more among different organizations for a better conservation and collaboration efforts. Along with implementing short-term measures, in the long run, the mechanisms that trigger coral degradation and loss need to be identified, and effective measures implemented.

Existing technical manuals on the removal of crown-of-thorns starfish and coral transplant should be distributed more widely, as well as disseminate information on BMPs and case studies. Other conservation measures than transplant that are effective on coral restoration should also be discussed and explored.



grown coral after transplanting

[Proposed Actions]

Identification and analyses of major challenges, and implement measures

- MOE will facilitate discussion on the measures pertinent to climate change, including supporting studies observing resilience of coral reefs against climate change, based on the ICRI resolution on coral reefs and climate change.
- MOE will identify and analyze major factors affecting coral reefs, including other coral-eating organisms, mechanisms to trigger disease that tends to spread out, status of coral harvests and sand mining, and growth limits of corals affected by water pollution. MOE will strive to implement measures against these major threats.

Support for local communities

- MAFF will support conservation efforts, such as coral monitoring programs initiated by the local fishermen and residents, coral aquaculture including live culture of seedling, coral transplant, and removal of crown-of-thorns starfish; will provide technical support as well as promote lessons learnt from excellent case studies. (re-cited from 4. 2) a)

Measures against coral predators

- Where necessary, MOE will support projects involving removal of coral predators in the areas of high biodiversity importance including marine park areas designated by the Natural Parks Law.
- Ehime- and Kagoshima Prefectural Governments will remove crown-of-thorns starfish and other coral-eating gastropods in the high-coverage coral areas with priority conservation needs.
- Okinawa Prefectural Government will coordinate and share information with fishermen, tourism industry, and other responsible organizations, and support community-based conservation efforts.



coral predated by crown-of-thorns starfish

Reproduction and breeding of coral reefs

- Kagoshima Prefectural Government will launch coral transplantation projects using Coral Settlement Device (CSD) designed to settle corals, and support coral reproduction and breeding; will strengthen conservation efforts in the areas of high importance for recreational and tourism use, in order to create a better marine environment for coral recruitment and growth.

- MOE, MAFF, and Okinawa Prefectural Government will distribute relevant manuals, including “Okinawa Coral Transplantation Manual”, “Guidance on the Sexual Reproduction of Corals³⁵⁾”, “Manual on the Restoration of Corals using Coral Settlement Device (CSD) for Larvae Settlement³⁶⁾”, and “Manual for Restoration and Remediation of Coral Reefs³⁷⁾”.

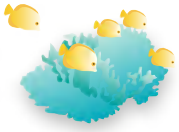
35 Guidance on the Sexual Reproduction of Corals: A Case Study from Okinotori Island, exploring coral breeding in a challenging environment. March 2009. Fishing Port Development Division, Japan Fisheries Agency.

http://www.jfa.maff.go.jp/j/gyoko_gyozyo/g_hourei/index.html (in Japanese)

36 Manual on the Restoration of Corals using Coral Settlement Device (CSD) for Larvae Settlement, Vol. I & II. March 2007 & March 2008. Naha Natural Environment Office, Kyushu Regional Office, MOE.

Vol. I <http://www.coremoc.go.jp/report/NRPS/NRPS2007b.pdf> (in Japanese, COREMOC website)

37 Manual for Restoration and Remediation of Coral Reefs. November 2003. Nature Environment Bureau, MOE.
<http://www.coremoc.go.jp/report/RSTR/RSTR2003a.pdf> (in Japanese, COREMOC website)



5. Review of the Action Plan and Feedback

A subcommittee of the Working Group of Action Plan will be formed as Working Group of Coral Reef Ecosystem Conservation (provisional name), continuing to be active for further discussion. Annual review of the Action Plan will be conducted at the meetings for checking the progress of proposed actions, and reflect the feedback in the ongoing efforts adaptively. In addition, in order to stay up-to-date with the relevant domestic and international movements, the Action Plan will be renewed approximately every 5 years; schedule for the reviews/renewals of other relevant strategies and plans, including National Biodiversity Strategy and Basic Plan on Ocean Policy, should be closely monitored, so as to facilitate the review and renewal of this Action Plan effectively and smoothly.

In reviewing the Action Plan, quantitative indicators such as the number of MPAs and their size will also be utilized to assess the progress of each proposed activity.

Other indicators should also be developed, in order to assess not only the status of coral reefs, but also the socioeconomic changes in the local communities. Difference between coral reef region and high-latitude coral community region should be taken into account in understanding and monitoring degradation and isolation process of the corals and tourism trends, and should reflect in the selection of indicators for each zone.



The Action Plan to Conserve Coral Reef Ecosystem in Japan

– For the Prosperity of Current and Future Communities Derived from a Lasting Healthy Natural Environment –

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Coral reef ecosystem in Japan is in a seriously degraded status. In facilitating and accelerating conservation efforts, cooperation efforts among organizations are crucial.

The Action Plan to Conserve Coral Reef Ecosystem in Japan (hereafter referred to as "Action Plan") was established in April 2010. It identifies fundamental themes on the conservation of coral reefs, and lays out major actions that are to be implemented within 5 years, with the participation of various organizations.

FOR ALL THE LIFE ON EARTH

Biodiversity



**Ministry of the Environment
Government of Japan**