

# Living with Bountiful Seas

- Marine biodiversity conservation and sustainable use, in Japan -



Ministry of the Environment, Japan



The Japanese Archipelago stretches north to south from subarctic all the way to subtropical climate zones. It is surrounded by various types of seas, from the waters off the country's northernmost island, which is visited by seasonal sea ice, to its southern seas, which are home to some of the world's most extensive coral reef ecosystems. Off the coast there are current rips that occur when the warm Kuroshio and Tsushima Currents collide with the cold Oyashio Current, forming rich fishing grounds. Shores where the coastlines are intricate and pocked by inlets have diverse ecosystems. The ecosystems at the mudflats, seagrass and seaweed beds, and coral reefs that form in shallow coasts adjacent to land are particularly rich in biodiversity. Seagrass and seaweed beds and coral reefs especially play a key role in maintaining biodiversity as spawning grounds and nurseries for many types of fish.

Being surrounded by the ocean, Japan is a country whose development owes much to the seas. The rich variety of seafood has been the major source of animal protein for the Japanese people and is at the heart of the

country's traditional culinary culture. Along the coasts where there have been communities of people for centuries, strong ties have been built up between people and the sea and these ties have helped form unique cultures. Now, however, due to the effects of human activity, the conditions for marine life are changing. A range of efforts are underway throughout Japan to conserve marine biodiversity and find approaches by which people may continue to receive the benefits that the sea provides well into the future.







## The Strategy for Conservation of Marine Biodiversity

### The formulation of the Strategy for Conservation of Marine Biodiversity

Marine biodiversity has degraded in recent years throughout the world. This has given rise to higher levels of interest in issues of marine biodiversity conservation in Japan. In April of 2007 the Basic Act on Ocean Policy, the aim of which is to promote marine-related measures in a comprehensive and systematic manner, was passed, and in accordance with this law, in March of 2008 a Basic Plan on Ocean Policy was decided. Following this, in March of 2010, the National Biodiversity Strategy of Japan 2010 was decided by the Cabinet.

In response to these legislative developments, Ministry of the Environment, in cooperation with other related ministries, is drafting the Strategy for Conservation of Marine Biodiversity, which shall outline basic policies and measures to promote the conservation and sustainable use of marine biodiversity in Japan. The Strategy is under consideration by a committee made up of experts, and is scheduled for finalization in March of 2011.

The aim of the Strategy is to conserve biodiversity that sustains the sound structures and functions of ecosystems and to use marine ecosystem services (i.e. benefits derived from the ocean) in a sustainable manner. To this purpose, the Strategy shall seek to: 1) reveal the main pressures on marine ecosystems based on scientific information, facilitate stronger partnerships among stakeholders, promote measures to resolve the problems through appropriate methods; and 2) establish marine protected areas and build networks connecting those protected areas through existing legal frameworks. The Strategy will also prescribe certain efforts, such as the creation of information infrastructures including information on significant marine areas and systems for cooperation, for biodiversity conservation.

### Promoting conservation with Marine Protected Areas

The "Plan of Implementation" adopted in 2002 at the World Summit on Sustainable Development called for the "the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012".

In Japan, there have been established many different types of marine protected areas (MPAs) according to specific purposes, such as Natural Parks, Nature Conservation Areas, Wildlife Protection Areas, Natural Seashore Conservation Areas, and designated areas of Natural Monuments for the environmental conservation, as well as Protected Waters, Coastal Areas for Marine Resources Development Areas, and Common Fishery Rights Areas for the sustainable fisheries resource management.

These management systems have developed out of processes of trial and error by various stakeholders for the conservation and sustainable use of the significant areas. It is thus important to continue conserving and managing MPAs under these existing frameworks.

Taking into account biologically significant marine areas as well as their relationships to existing MPAs, we will consider the optimal placement and zoning of MPAs and their networks to enhance effective conservation.



## Marine areas of the Shiretoko World Natural Heritage Site

- Marine Management Plan using the "Shiretoko Approach" -



Located at the easternmost tip of the island of Hokkaido, the Shiretoko Peninsula has rich primeval forests that are home to brown bears, Blakiston's fish-owl, and many other wild species. It is also the southernmost point at which the Sea of Okhotsk becomes

covered with sea ice. When the sea ice melts, the phytoplankton are bloomed profusely. These phytoplankton are eaten by zooplankton, which are eaten by fish, and the fish are eaten by seals, birds and other animals in a process that carries nutrients from the sea through the food chain onto land. Interrelationship between the land and the sea, and the rich ecosystems containing many rare species of wildlife were considered as having a outstanding value, and in 2005, the Shiretoko Peninsula, together with sea areas extending out three kilometers from its shore, was inscribed in UNESCO's World Natural Heritage List.

At the same time, sea areas surrounding the Shiretoko Peninsula are also good fishing grounds for salmon and walleye pollock. Hence, in becoming listed as World Heritage Site, it was requested to draft a marine management plan to ensure the conservation of the surrounding waters.

In 2007, Ministry of the Environment and Hokkaido government considered the recommendations of the World

Natural Heritage Site Scientific Council, and in cooperation with local fishers, drafted the Marine Management Plan. The resource management including no-fishing periods and areas, restrictions on fishing gears, resource surveys, which had already been in place by local fishers, were deemed effective from a scientific standpoint and incorporated into this plan. The "Shiretoko Approach", which strives for both of marine conservation and stable fisheries and seeks to scientifically evaluate the effectiveness of management not just through regulations but also self-imposed management by local fishers, has been internationally recognized as a good and pioneering approach to marine resource conservation and management.



sea ice



About 95 percent of Ohata-machi is covered with forest. The town once flourished as the home of the Hiba Arborvitae forest, known as one of the "three most beautiful forests in Japan", and as a squid fishing town. These industries, however, had declined gradually. Amidst these circumstances,

area residents thought seriously about local industry, and with the cooperation of experts, they began to survey and study squid fishing, adjacent seas, rivers and forests. The survey and study revealed that the community had been placing too much emphasis on squid fishing and ended up losing any degree of flexibility, and that valuable rocky shores were largely altered because of harbor "improvements". Furthermore, mountain forests were increasingly lost by logging, and the rivers were straightened to prevent flood, which seriously affected marine ecosystems. It became clear that forests, rivers, and the sea are mutually connected, and that for the region, it should be a priority that all three of these are maintained in healthy conditions.

In 1994, local fishers began to reforest in the upstream sites. The project has become part of the town's tree-planting festival since 1998.

Furthermore, at the request of community residents, the Ohatagawa River was restored very near to its original, natural state. After repeated discussions among residents, the Kinoppu Coast, which had been full of constructions, saw the removal of its concrete revetment, resulting in the restoration of the bountiful seashore of the past.

In 2001, Aomori Prefecture passed the regulations and the conservation plans were developed that incorporated conservation areas in order to conserve forests, rivers, and seas comprehensively on particular watersheds. Attempts are underway to replant endemic trees and to restore rivers and shorelines to more natural conditions. At present, community residents are monitoring conservation progress and working to educate others.



Seaweed picking



Kinoppu Beach after restoration

## Ohata-machi, Aomori Prefecture

- Restoration of forests, rivers and seas in the community with resident participations -



## Amamo seagrass fields in Tokyo Bay (Yokohama City)

- Amamo seagrass beds restoration with resident participations -



Tokyo Bay was once blessed with many shallow coasts, muddy flats, and abundant eelgrass beds full of small fish, but the majority of those have been lost due to development. To address the situation, efforts to restore eelgrass (Amamo) beds began in 2000 by citizens' groups in Yokohama City.

The following year, the Kanagawa Prefectural Fisheries Research Institute (the present-day Fisheries Technology Center) initiated fundamental research into eelgrass restoration. And the Amamo Revival Collaboration in Kanazawa-Hakkei, Tokyo Bay Area was formed with the participation of local residents and companies, the Yokohama City Fisheries Cooperative Association, local universities, and



Amamo Revival Collaboration

local administrative bodies. The Collaboration has since contributed greatly to the restoration of eelgrass beds. There is a division of labor in eelgrass bed restoration

programs. Surveys and research are headed by research institutions and NPO's, while website administration and the holding of educational events for area residents are conducted by the other members of the Collaboration.

At Nojima beach, where it was deemed that eelgrass could regenerate on its own, the Kanagawa Prefectural Fisheries Technology Center began a biota study with local residents. One of the findings of this study was that compared to a total of 39 species of fish found in the area throughout the year 2000, 48 species were found in 2006 and 69 species in 2008, showing an increase in variety.

Since 2007, the children that have participated in the eelgrass bed restoration program have released Japanese red seabream juveniles in eelgrass beds that they restored themselves. The eelgrass beds restored by the voluntary initiative of the residents are used for fishery resources enhancement. The efforts of the residents solidly link with the development of the local fisheries industry.



Release of Japanese red seabream juveniles

[photos: Takahiro Kudo, Kanagawa Prefectural Fisheries Technology Center]



The Japanese sand lances can be found in all areas of Japan except Okinawa, and Ise and Mikawa Bays are some of the largest fishing grounds for sand lance in Japan. Sand lances in this area are harvested mainly with trawl nets. Harvested sand lance juveniles are processed into food products, while

adult sand lances are used as feed in aquaculture, making the sand lances an important marine resource for the local seafood processing industry. However, there was a period of poor annual harvests from 1978, which were attributed coincidentally to increase of the catch and changing water temperatures, and the nearly 30 thousand-ton harvest recorded in 1974 had dropped to just 699 ton in 1982. Subsequent years saw an improvement from these critically low harvest levels, but the catches had been fluctuated. Therefore, the need for the resource management measures to maintain stable high catches was recognized.

These poor harvests prompted fishers operating in Ise and Mikawa Bays to hold talks. In addition to the official control measures, they decided the opening and closing dates of fishing seasons, operating days, and methods of operation based on scientific basis from resource surveys conducted by fishery research organizations. In the summer

months when water temperature is higher, sand lances burrow into the sand and aestivate. Because aestivation is a crucial part of the lifecycle, protected areas have also been set up so as not to disturb aestivating sand lances. These rules established through the consensus of the fishers are strictly adhered to. They have proven to be very effective, and in recent years poor consecutive harvests like those seen in the past have been averted.

In March of 2010, the Aichi Shirasu and Sandeel Trawlers' Union, along with 17 distributors and processors, obtained "Marine Eco-Label Japan".



Sand lance

\* The "Marine Eco-Label Japan" certification and labeling system of seafood began in 2007. This system aims to support fishers who actively engage themselves in resource management and to ensure marine ecosystem conservation and the sustainable use of fishery resources. Consumers can contribute to the environmental conservation by actively purchasing certified products.

## Sand lance fishery in Ise and Mikawa Bays

- Self-imposed management of sand lance resources by local fishers -



## Shiraishijima and Hinase in Okayama Prefecture

- Restoring fishing grounds by utilizing existing ecosystems -



The marine areas in Okayama Prefecture are predominantly shallow, with at least 85 percent of them having a depth of 20 meters or less. The nutrient-rich water flowing into the sea from rivers has, in the past, facilitated the formation of extensive mudflats and eelgrass beds where many marine species spawned, bred, and were nurtured. Up until the 1940s there were about 4,300 ha of eelgrass beds and 4,100 ha of mudflats, but by the 1970s, about 90 percent of that area had been lost due to land reclamation.



Eelgrass

A certain fisher once said, "Fishing is an industry in which we humbly accept the leftovers of benefits from the sea." In order to make fishery sustainable for the future it is important to restore ecosystems to their original states and maintain them. Based on these principles, environmental restoration projects were begun in Okayama Prefecture in the 1970s. With the help of fishers, the projects involved the seeding of eelgrass and the scattering of oyster shells from fishing vessels to improve seabed quality. The latter is based on such experience of the local fishers that marine life is richer in areas with oyster shell deposits. As a result, in 2007, eelgrass beds had recovered to 1,221 ha. Furthermore, there are ongoing projects to regenerate mudflats and improve the shallow coasts connected to the mudflats, as well as projects to generate and expand seaweed beds.

Mudflats and seagrass and seaweed beds serve as only one part of the habitats of marine species. It is important to conserve environments sustainable for each growth stage of fish so that juvenile fish can grow to adulthood and spawn. Therefore, a variety of habitats must be created within a given marine area, and projects are conducted in order to make ecosystems themselves richer by utilizing the inherent advantages of environment and biodiversity in the area.



Japanese horseshoe crab.

Harbor development began at the Nakatsu Mudflats in the 1960s and conservation groups within and outside the prefecture raised questions about plans drafted in 1999 to enlarge the harbor. In addition, the local residents seek for sustainable development in the area. In 2000, the Port and Harbor Division of Oita Prefecture set up the "Nakatsu Sea and Livelihood Committee" together with Nakatsu City and the residents. This committee held open discussions joined by local residents, members of the city council, local government officials, conservation groups, fishers, researchers, and publicly recruited committee members. The notable features of the committee are the fact that the administrative authority charged with managing the sea and rivers supports it officially, as well as the fact that the committee meetings allow participation from various stakeholders. In the 10 years since the committee's inception, they have conducted various measures including

zoning around the harbor, on-site wildlife surveys, and environmental conservation activities.

These meetings facilitated mutual understanding by sharing of information among administrative officials, fishers, local residents, and researchers. By joining activities to learn fisheries in mudflats such as the cultivation of laver, NPOs and local residents understood the life of fishing village and began to play a key role to transmit it to the public. On the other hand, fishers wanted to teach local residents about the area's traditional mudflat fishing techniques. In 2008, the traditional practice of Sasahibi small fixed net fishing brought back with support from the government.

\* sato-umi: In Japanese "sato" means areas where people live, and "umi" means the sea, and Sato-umi is defined as a coastal zone where the livelihoods of human-beings and the blessings of nature harmoniously coexist with coastal area eco-systems.

Nakatsu Tidal Flats



Japanese horseshoe crab

[photos: Mizube-ni asobu-kai MUSEUM]

## The Nakatsu Mudflats in Oita Prefecture

- A comprehensive coastal management and the conservation of sato-umi, the traditional production seascape -



## Nagatahama Beach on Yakushima in Kagoshima Prefecture

- Balancing the protection of sea turtles with local development -

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Nagatahama Beach located in the island of Yakushima, a World Natural Heritage Site, is the largest nesting site for loggerhead turtles in the North Pacific. The beach was incorporated into the Kirishima-Yaku National Park, and it was registered as a Ramsar Site as well.

Efforts to protect sea turtles in Yakushima are not entirely new: in 1982 the local municipality started monitoring of the turtles, and in 1985 the Yakushima Sea Turtle Research Society was formed. The Society took on a broad range of activities, including sea turtle habitat and population surveys, beach cleanup, the management of light-shielding forests, and environmental education. Sea turtles are extremely sensitive to light and the presence of people, and in 1995, in order to protect the turtles from unrestrained intrusion by tourists, the local community initiated sea turtle observation program.

However, since its inscription on the World Heritage list, the number of visitors during the egg-laying and hatching season has increased fourfold compared with pre-inscription levels, and as a consequence the individual efforts are becoming increasingly insufficient to deal with these pressures. In 2009, a community-wide, self-imposed set of

rules called the “Nagatahama Beach Sea Turtle Observation Rules” was formulated to protect the environment for sea turtles. These observation rules restrict unsupervised entrances to the beach at night from May to August, when eggs are laid and then hatch. The visitors are requested to join the sea turtle observation program during nesting seasons, and to attend prior lectures as well during the periods of hatching. The Yakushima Town Ecotourism Promotion Association was established to promote the ecotourism that contributes to local development while protecting the natural environments unique to Yakushima. The Association is studying ways to codify the observation rules into law using the Act on Promotion of Ecotourism in cooperation with Nagatahama Beach Sea Turtle Preservation Committee consisting of Ministry of the Environment, local administrative authorities, tourist associations, and civic groups.



loggerhead turtle



The Sekisei Lagoon in the Iriomote-Ishigaki National Park is Japan's largest coral reef. Despite its relatively high latitude, in terms of species variety of corals, it rivals Great Barrier Reef in Australia and the reefs in the Philippines. The Sekisei Lagoon forms one of the most important coral

reef ecosystems in the world, and also greatly contributes to the local economy and people's livelihoods, as it is used for commercial fishing and tourism. In recent years, however, the Sekisei Lagoon coral ecosystems have been threatened by bleaching events caused by high water temperatures, predation by crown-of-thorns starfish, as well as the influx of red clay runoff, domestic wastewater, and industrial wastewater. While some areas have shown steady signs of recovery, coral coverage dramatically decreased since the 1980s. In 2006, the Sekisei Lagoon Nature Restoration Committee, consisting of related parties in the area, scientists, and local government authorities, was formed to restore the bountiful Sekisei Lagoon of the past. In 2007, the Comprehensive Regime for the Natural Restoration of the Sekisei Lagoon was put together for the purpose of naturally restoring not only coral communities, but also for restoring coral reef ecosystems, including mangrove forests, seagrass

and seaweed beds, and mudflats. In the restoration project, the integrated coastal and land management is implemented to reduce red clay



Hoshisuna Beach front [photo: Mitsuhiro Ueno]

and wastewater runoff, and to improve modes of tourism. Monitoring coral communities and ocean conditions, and rehabilitation of coral communities using settlement devices are also conducted. Local fishery cooperatives have established no-fishing zones for major fish species such as parrotfish and groupers during spawning seasons as a way of managing fish resources. Furthermore, local diving associations, fishing cooperatives, local government authorities, and civic organizations that utilize the Sekisei Lagoon are, with the assistance from the central and prefectural governments, regularly controlling harmful crown-of-thorns starfish.

## Sekisei Lagoon in Yaeyama-gun, Okinawa Prefecture

- Integrated land and sea projects to restore coral reefs -

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*Front cover photos*

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