1. Background

In the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP10) held in 2010, post-2010 targets (Aichi Targets) as well as Decision X/29 (Decision on marine and coastal biodiversity) were agreed. Following the results/decisions of COP10, it is expected that activities on conservation of marine biodiversity will be promoted in international/regional/national levels. Target 11 in Aichi Targets is that "10% of the world sea areas are designated as Marine Protected Areas (MPAs) by 2020". Following this decision, each NOWPAP member state might be working on selection and establishment of MPAs. To understand the current situation and challenges on monitoring and management of existing MPAs in each member state will be useful for future management of existing MPAs and future designing of new MPAs in the member states.

2. Objective

Objective of this activity is to prepare the regional report for conservation of marine biodiversity and sustainable use of marine ecosystem services in the NOWPAP region (Regional Report) in order to provide useful information for policy planning on marine biodiversity conservation of each member state. To contribute to the promotion of marine biodiversity conservation in the NOWPAP region, a workshop will be held to explore a new possibility and concept for conservation of marine biodiversity and sustainable use of marine ecosystem services.

3. Progress of tasks

3.1 Collecting information on existing MPAs and other related issues in the NOWPAP region

Information on selected MPAs was collected by expert of each member state and summarized as national report. The collected information was reported at the workshop held in March 2013. The national report was reviewed at the workshop and Expert Meeting held in August 2013. Based on the discussions at the workshop and Expert Meeting, additional information was provided from the experts.

3.2 Analysis on the status of MPAs in the NOWPAP region

Based on the information provided from the experts, CEARAC analyzed the current status including the characteristics and similarities/difference of national systems on MPAs among NOWPAP member states.

3.3 Organization of a workshop for discussing possibility of applying other concept for marine biodiversity conservation

CEARAC organized the joint workshop on marine biodiversity conservation and marine protected areas in the Northwest Pacific with NEASPEC on 13-14 March 2013. Experts on marine biodiversity and governmental officers in charge of marine biodiversity conservation from the NOWPAP member states participated in the joint workshop. The report of the joint workshop is attached for reference (UNEP/NOWPAP/CEARAC/FPM 11/Ref1).

3.4 Preparation of regional report

CEARAC has prepared the first draft of the regional report based on the national reports and the results of discussion at the workshop and Expert Meeting. The draft report is attached to this document. This first draft will be elaborated by CEARAC based on discussions in the 11th FPM and further reviewed by CEARAC FPs and experts on marine biodiversity followed by the final review of NOWPAP National FPs in accordance with the NOPWAP review procedure. The regional report will be finalized and published by the end of 2013.

4. Expected outcome

The regional report is expected to be used by policy makers of each member state in understanding the current situation and challenges of existing MPAs in the NOWPAP region, and in considering possible measures and directions for enhancing marine biodiversity conservation in the future.

5. Schedule

Future schedule of this activity is as follows:

Time		Actions	Main body
2011 After 2012	11-12 September	11th CEARAC FPM Review of the activity	CEARAC Secretariat and FPs
	September	Review of the draft regional report elaborated based on discussions in the 11th CEARAC FPM	FPs and experts
	October	Revising the regional report for review by NOWPAP National FPs including proofreading by native speaker	CEARAC Secretariat
	November	Review of the regional report	NOWPAP National FPs
	December	Publishing the regional report	CEARAC Secretariat

NOWPAP CEARAC

Northwest Pacific Action Plan
Special Monitoring and Coastal Environmental Assessment
Regional Activity Centre

5-5 Ushijimashin-machi, Toyama City, Toyama 930-0856, Japan
Tel: +81-76-445-1571, Fax: +81-76-445-1581
Email: webmaster@cearac.nowpap.org
Website: http://cearac.nowpap.org/

Regional Report on marine biodiversity conservation and sustainable use of marine ecosystem services in the NOWPAP region (Draft as of September 6)

First published in 2013
By the NOWPAP Special Monitoring and Coastal Environmental Assessment
Regional Activity Centre (NOWPAP CEARAC)
Established at the Northwest Pacific Region Environmental Cooperation Center (NPEC)
5-5 Ushijimashin-machi, Toyama City, Toyama 930-0856, Japan
Tel: +81-76-445-1571, Fax: +81-76-445-1581
E-mail: webmaster@cearac.nowpap.org
Website: http://cearac.nowpap.org/

Copyright© NOWPAP CEARAC 2011

For bibliographical purposes, this document may be cited as:
NOWPAP CEARAC 2013: Regional report on marine biodiversity conservation
and sustainable use of marine ecosystem service
in the Northwest Pacific Action Plan Region

Table of Contents

Preface

The NOWPAP region covers the temperate and subarctic zone and has a tidal flat and a deep sea. In such multiple environments, high marine biodiversity is maintained. However, the NOWPAP region is one of the most populated areas in the world. In the catchment area of the region, the total population was approximately 580 million in 2010. In addition, this region has faced various marine environmental problems such as eutrophication, coastal habitat loss and non-indigenous species with rapid economic growth. Various anthropogenic pressures threaten marine biodiversity in this region.

In 2010, the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10) was held in Nagoya, Japan. At the COP10, “Post 2010 Target”, namely “Aichi Biodiversity Targets” were adopted by the Contracting Parties. In Aichi Biodiversity Targets, marine biodiversity conservation is one of the important topics and Target 11 aims that 10 percents of coastal and marine areas are designated as marine protected areas (MPAs) in the world.

At the seventh meeting of the Conference of the Parties to the Convention on Biological Diversity (CO7), the definition of MPA was discussed and shown as “a marine and coastal protected area means any defined area within or adjacent to a marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including customs, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings”

Objectives of this regional report are to clarify the system and regulation on MPAs in each member state and to provide useful information for policy makers in order to consider future actions for marine biodiversity conservation as well as to clarify the monitoring and management status in each MPA and summarize the basic information for future activities on marine environmental assessment for marine biodiversity conservation.

Executive Summary

1. Introduction

The northwest Pacific region, where the NOWPAP region is located, is one of the biologically diverse marine areas in the world. The area includes various marine environments (e.g. the tropical region with coral reefs in the south and the subarctic zone covered with ice in winter in the north) and their associated ecosystems. These rich environments can allow a large number of marine species to inhabit there. It is reported that there are 22,629 species in Chinese waters (J.Y. Liu, 2013); 33,629 species in Japanese waters (Fujikura et al., 2010); and 9,534 species in Korean waters (Republic of Korea, 2009). According to Fujikura et al., there may be 155,524 species along the Japanese archipelago, and it is estimated that the number of marine species found in the NOWPAP region will increase along with the development of observation techniques.

Such diverse ecosystem in the NOWPAP region can nurture rich fishery resources. Figure 1 shows the world's fishery catch. The average catch in the northwest Pacific is 20 million tones, accounting for one-fourth of the world's total. The target fish includes various biota from low trophic level species, such as sardine which grazes phytoplankton, to high level predacious species, such as tuna and bonito.

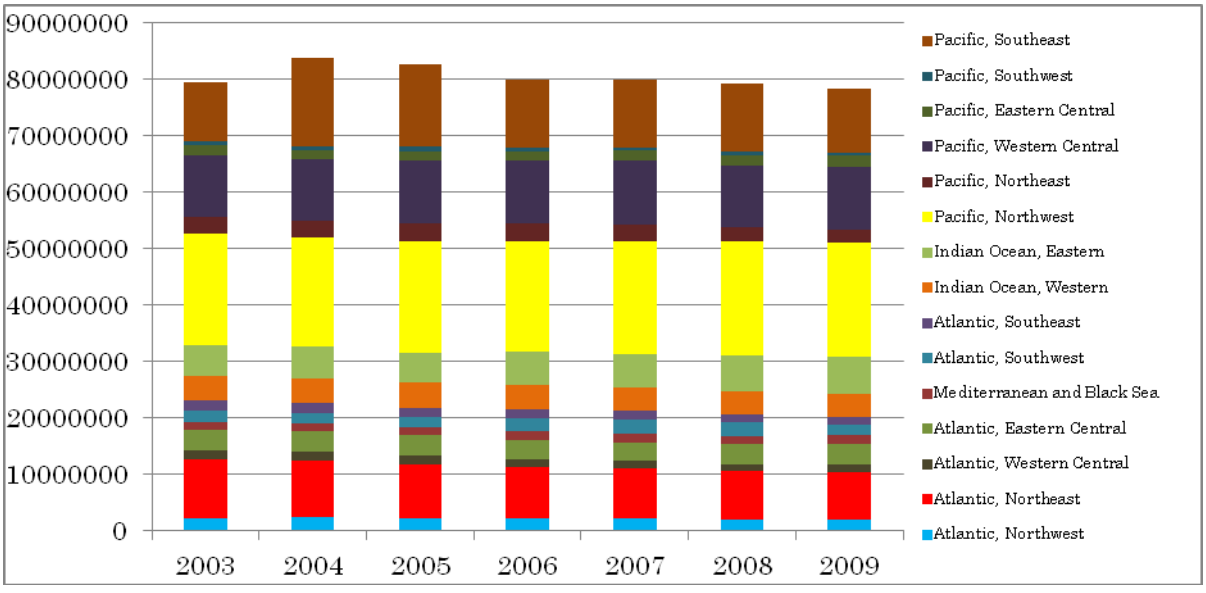


Figure 1. Fishery catch in the world.

Figure 2 shows the trend of the marine trophic level in this region. From 1980s to 1990s, the trophic level lowered temporarily due to the increased catch of sardine; however, the overall average is approximately 3.5, indicating successful transfer of energy.

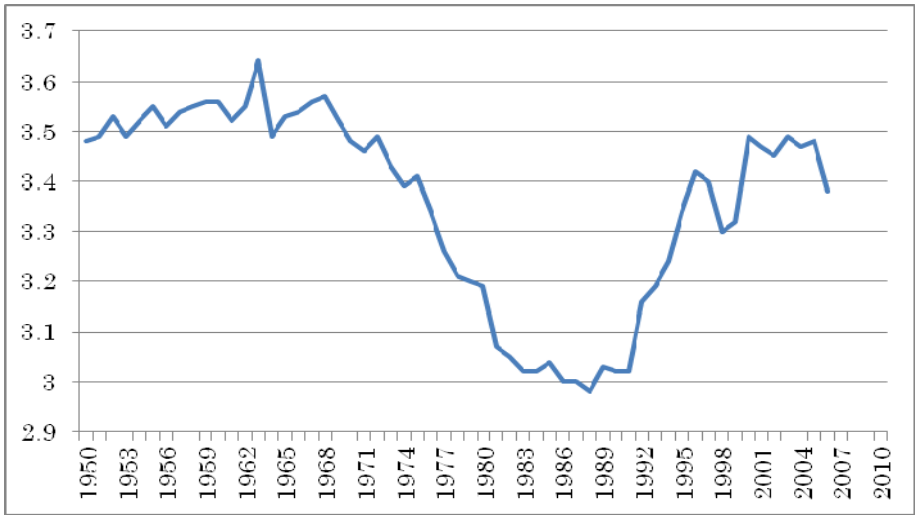


Figure 2. Marine Trophic Index in the northwest Pacific (source: Sea around us project)

Both figures are the evidences of the high biological diversity with rich marine organisms and resources in the NOWPAP region. However, this area is also one of the most populated in the world (Figure 3) and the economic growth in the surrounding countries is quite fast.

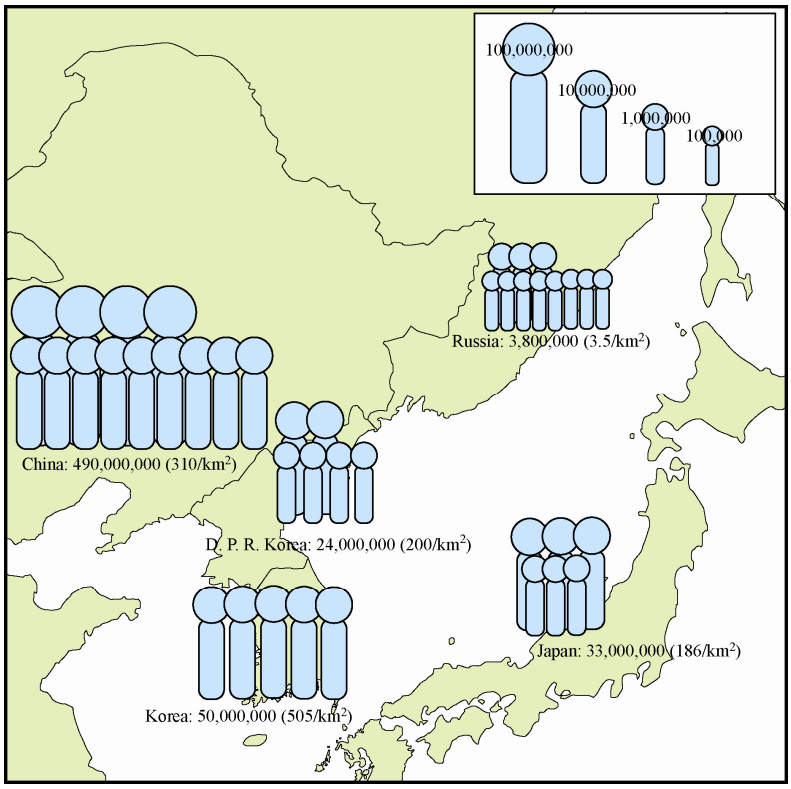


Figure 3. Population of the coastal areas in the NOWPAP region.

As a result, negative events such as eutrophication by excessive nutrient from land, harmful algal blooms and hypoxia have been observed and multiple anthropogenic pressures (e.g.

overfishing to support 6 billion people in the NOWPAP region) are threatening the health of the marine environment. Climate change is also affecting than other e one of the impacts to which affects ecosystem services and benefits which the marine area can provide. Figure 4 shows the change of the sea surface water temperatures in the past 100 years in the NOWPAP region. It is reported that the temperature in this region has increased at a faster pace than other marine areas. Warmer seawater may change the distribution of marine organisms and lead to the structural change in the marine ecosystem structure. It has been concerned that biological diversity of the marine environment may be lowered by seawater warming.

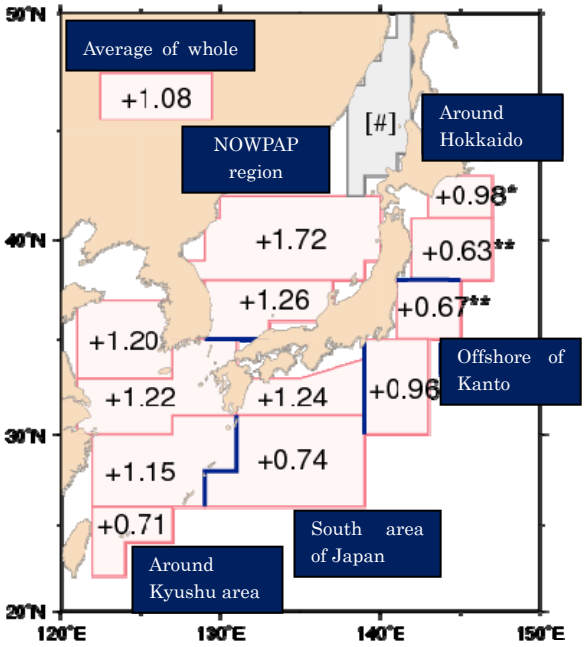


Figure 4. Change of the sea surface water temperature in the past 100 years in the NOWPAP region. (source: Japan Meteorological Agency)

While the NOWPAP region has high biological diversity in the marine environment, it has been threatened by multiple stressors. In order to conserve the rich marine ecosystem and its services and benefits in the region for the future, it is urgent to develop and implement appropriate management schemes. In particular, minimizing the environmental modification induced by anthropogenic causes and sustaining the optimum conditions of the environment for inhabiting organisms are essential.

2. Regional Overview on Existing MPAs in the NOWPAP Region

There are 87 MPAs (China: 20, Japan: 31, Korea: 22 and Russia: 14) in the NOWPAP region, and they cover the area of 40,900 km^2 (NOWPAP DINRAC 2010), accounting for 2.4 percent of the whole region. However, the reported MPAs include land areas; therefore, the percentage of

the marine coverage may be smaller.

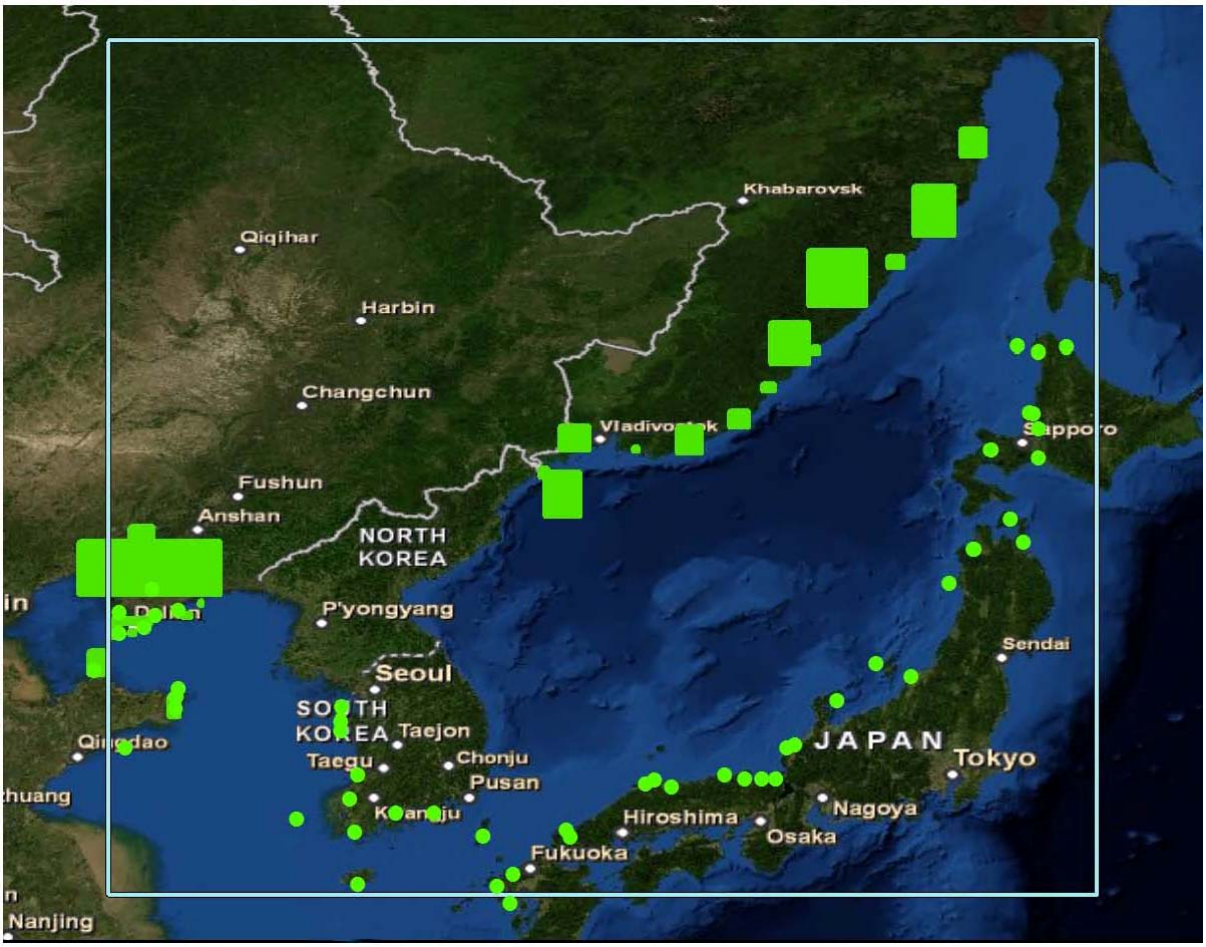


Figure 5 Location of MPAs in the NOWPAP region

(Source: NOWPAP DINRAC 2010)

2-1 Situation of MPAs in the NOWPAP region

In 2010, the tenth meeting of Convention on Biological Diversity (CBD COP10) was held in Nagoya, Aichi, Japan, and the Aichi Targets were adopted, which set post-2010 targets on biodiversity conservation. One of the Aichi Targets was on coastal and marine areas: By 2020, at least 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes (See http://www.cbd.int/sp/targets/). Agreeing the goals of the Aichi Targets, each member state enhances actions for marine biodiversity conservation.

NOWPAP DINRAC collected the latest information on MPAs in the member states and uploaded it on the website (http://dinrac.nowpap.org/NowpapMPA.php). The total number of

MPA changed to 277 (China: 84, Japan: 99, Korea: 29, Russia: 65), which has increased compared to the data in 2010, the time before COP 10, and the total covered area has become 67,483 km^2. The percentage of protected sea areas in the NOWPAP region is 4%, and there is still a huge gap between the current situation and the Aichi Target. To expand protected sea areas in the NOWPAP region, it is important to provide useful and latest information for policy makers in the NOWPAP member states.

In addition to expansion of MPAs, improvement of the management status in the existing MPAs is required. In this report, monitoring and management status in each member state is also introduced.

2-2 Criteria and purpose of MPA in the NOWPAP Member States

Among the four NOWPAP member states, only Japan sets clear definition of its MPAs. The definition is stipulated in accordance with existing national laws and regulations, characteristics of Japanese waters, and the status of utilization of marine areas as well as based on the definitions set in CBD COP 7 and International Union for Conservation of Nature and Natural Resources (IUCN). The Marine Biodiversity Conservation Strategy of Japan, formulated in 2013, states; “Marine areas designated and managed by law or other effective means, in consideration of use modalities, aimed at the conservation of marine biodiversity supporting the sound structure and function of marine ecosystems and ensuring the sustainable use of marine ecosystem services”.

In Russia, definitions on its MPAs have been under development by the Centre of International Projects of Ministry of Nature Resources. The draft concept defines, “specially marine protected areas (water areas) can be marine reserves planned for biodiversity protection and designated to be used in other aims, but not contradicting biodiversity protection, or sites where definite activities (for example, fishery or navigation) is limited or forbidden as it widely accepted that an ecosystem is especially vulnerable to these kinds of economic activities.”

Comparing these two definitions, in Japan, ecosystem services are stated as well as conservation of the natural environment, Russia puts priority on conservation of marine biodiversity as a reason of establishing MPAs. The difference may occur due to the difference of how to use coastal and marine areas in both states, and the different view on marine protected areas may also be reflected.

In case of China and Korea, they have not set own definitions but establish MPAs by their relevant national laws and regulations and definitions by COP 7 and IUCN.

Annex 1 is the list of laws and regulations which are utilized to justify establishment of each

MPA in the member states. Table 1 shows the relationship between MPA categories of IUCN and MPAs of each member state. As shown each state has designated MPAs to cover all IUCN categories. One of the characteristics in the NOWPAP region regarding MPAs, laws and regulations on sustainable use of fishery resources are basis for establishing MPAs in the category of sustainable use of natural resources (IUCN Category VI), as shown in China, Japan and Korea. Summary of situation and management of MPAs in each member state is explained in the following section.

[China]

There are three types of MPAs based on the national laws: “Marine Nature Reserve” to protect the natural environment and resources, “Special Marine Reserve” to protect marine biodiversity and ecosystem service function, and “Fisheries Genetic Resources Reserve” to protect important aquatic genetic resources and their survival circumstances, to promote sustainable development of fishery, to establish the protection network and to alleviate the adverse effect of human activity.

While other three member states utilize laws and regulations including terrestrial areas, China applies laws solely focusing on marine areas. Another characteristic is establishing “Fisheries Genetic Resources Reserves” which aim to sustainable use of ecosystem services, mainly fisheries resources. The total number of Chinese MPAs is 235 and the area is 206,700km^2, accounting for 4.28% of the national waters.

Another difference from the other member states is that while designation of MPAs is authorized by the national laws, each MPA is managed by relevant departments of local governments: “Marine Nature Reserve” is managed by maritime departments of local governments; “Special Marine Reserve” by local governments; and Fisheries Genetic Resources Reserve by fisheries department of local governments.

[Japan]

There are ten categories in Japanese MPAs set by its national regulations. “Natural Coastal Protected Zone” is set for conservation of the Seto Inland, Sea, so no MPAs are established in the NOWPAP region under this category. Also, only one area (Sakiyama Bay in Okinawa) has been designated as MPAs under Nature Conservation Area, so not relevant to the NOWPAP region. In case of Natural Habitat Conservation Area, which is included as one of the MPA categories, no marine areas has been protected by this category, so it should be kept in mind that relevant laws and regulations in Japan are not solely focusing on coastal and marine areas.

Applied laws and regulations which are basis of ten categories are authorized different ministries (e.g. Ministry of the Environment, Ministry of Economy, Trade and Industry, Ministry of Aquaculture, Forestry, and Fisheries of Japan, and Agency of Cultural Affairs) ; yet some areas

managed by local fisheries associations and fishermen are also designated as MPAs in Japan. In these areas, local fishermen actively involve the management and set no-fishing zones and/or closing period for sustainable use of fisheries resources of the areas. This type of area is recognized as areas with joint fishing rights and distributed almost all coastal areas in Japan. Majority of the current MPAs in Japan fall into this category.

The total number of MPAs in Japan is estimated 4,236; however, the marine areas managed by local fishermen have been re-examined periodically and therefore, the exact number of MPAs is unknown. Possibly more than 500 coastal and marine areas are designated as MPAs. The covered area is estimated 454,618km^2, accounting for 8.3% of the Japanese territorial water and its exclusive economic zone (EEZ). The total area of Japanese waters is approximately 4,300,000km^2.and the almost same size of coastal and marine areas in Japan has been designated as MPAs.

[Korea]

There are nine MPA categories in Korea. They are set by laws and regulating regarding national parks, natural monuments, and conservation of marine resources and so on. Because of application of variety of regulations, authorized ministries and agencies are different such as Ministry of Ocean and Fisheries, Korea Fisheries Resource Agency, and Cultural Heritage Protection Administration.

One unique characteristic of Korean MPAs is that wetland protection is put heavy importance and a number of wetlands on the west coast, areas facing the Yellow Sea and the East China Sea, have been protected. Also, small islands, scattered around the Korean waters are under protection of “Specific Islands” and 167 islands are designated as MPAs.

Same as Japan, Korea has established MPAs for fisheries resources protection and its sustainable use, and the total area of this category accounts for 30 % of the total Korean MPAs, which indicates that Korea puts values on sustainable use of fisheries resources.

The total number of Korean MPAs is 565 and the area is 10,003km^2, accounting for 14.1% of the Korean waters.

[Russia]

As mentioned before, In Russia, definitions on its MPAs have been under development and it is expected that there will be more MPAs established in accordance with existing and newly developed laws and regulations. At present, there are nine categories which can include forest parks and botanical gardens as MPAs; however, there are no such areas designated as MPAs yet.

Same as other member states, Russian MPAs has a category for sustainable use of marine resources; however, it aims to conserve the environment including terrestrial areas and wildlife

there. Different from other three member states, this holistic viewpoint is reflected by the concept of the draft outline of MPA definitions, which are under development, focusing on not only sustainable use of resources but also conservation and protection of wildlife. Constructing a future vision of sustainable use of marine resources, taking into account past and current utilization of coastal and marine areas, is not a basis of Russian MPA schemes.

Table 1 Categories on MPAs in the NOWPAP member states and relationship with IUCN MPA categories

Category of MPA by IUCN	China	Japan	Korea	Russia
Strict Nature Reserve (Ia): Strictly Protected Area	Nature Reserve	Nature Conservation Area	None	State Natural Reserve including biosphere State Natural Park
Wildness Area (Ib): Large unmodified or slightly modified area	Nature Reserve	None	Marine Ecosystem Protected Area	State Natural Reserve including biosphere State Natural Park
National Park (II): Large natural or near natural area	Special Marine Reserve	Natural Park	National Park	State Natural Park
Natural Monument of feature (III): Protected area aim to protect specific natural monument	Nature Reserve	Natural Monument	Marine Ecosystem Protected Area	Natural Park National Monument
Habitat and Species Management Area (IV): Protected areas aim to protect particular species or habitats	Nature Reserve	Natural Habitat Conservation Area Wildlife Protection Area Protected Water	Marine Ecosystem Protected Area Coastal Wetland Protected Area	Refuges of various significance
Protected Landscape and Seascape (V): Protected area where the interaction of people and nature	Nature Reserve Special Marine Reserve (Ocean Park)	Natural Park Natural Seashore Conservation Area	Marine Ecosystem Protected Area	Refuges of local significance
Protected Area with Sustainable use of Natural Resources (VI): Protected areas conserve ecosystem and habitats	Fisheries Genetic Resources Reserve	Coastal Fishery Resources Enhancement Area Designated Marine Area Common Fishery Right Area Protected Water Various Areas designated by Prefecture Government, Fishery Cooperative Groups of local fishers	Fishery Resources Conservation Area	Refuge of various significance (with limited activities) Dendrological Parks Bothanic Gardens Health improvement localities and resorts

2-3 Measures by the NOWPAP Member States on MPAs

At present, each NOWPAP member states has developed and implemented actions to promote conservation of marine biodiversity and/or expand the number/are of MPAs to achieve the 2020 goal of the Aichi Targets. The followings are some examples of each state,

In China, Ministry of Environmental Protection developed “China National Biodiversity Conservation Strategy and Action Plan (2011-2030)” in 2010 in cooperation with other ministries and agencies. This action plan sets 35 prior actions on biodiversity conservation including actions regarding conservation of coastal and marine biodiversity. Main estuaries and adjacent sea areas in Liaoning Province; main estuaries and adjacent sea areas in Shandong Province; and cold water mass in the central part of the Yellow Sea are major areas to promote environmental conservation, and other actions such as improvement of conservation and management of marine biodiversity in priority areas and strengthening of wetland protection in Bohai Sea and Yellow Sea have been newly developed and taken.

In Japan, based on formulated Marine Biodiversity Conservation Strategy, various actions to conserve marine biodiversity are actively promoted to achieve the Aichi Targets. Ministry of the environment has reviewed the current national parks to consider new establishment of marine parks and/or expansion of the current park areas. Also, scientific studies on marine biodiversity and ecologically and biologically significant marine areas have been initiated with target flora and fauna such as seagrass beds, coral reefs, planktons, and benthos. Their quantitative assessments and temporal and special variation are estimated, and the outcomes of the studies can be utilized to develop criteria to identify significant marine areas for marine species.

Reference: Scientific study for marine biodiversity conservation in Japan

"Integrated study on observation, evaluation and prediction of biological diversity in Asia" by Environment Research and Technology Development Fund of the Ministry of the Environment, Japan

1) Global quantitative evaluation and prediction of spatiotemporal trends on coastal biological diversity

2) Quantitative evaluation and prediction of spatiotemporal trends on biological diversity of seaweed

3) Quantitative evaluation and prediction of spatiotemporal trends on biological diversity of seagrass beds

4) Quantitative evaluation and prediction of spatiotemporal trends on biological diversity of coral reefs

5) Quantitative evaluation and prediction of trends on biological diversity of planktons in the surrounding sea area of Japan

6) Quantitative evaluation and prediction of spatiotemporal trends on loss of biological diversity of benthos

In Korea, the central government has considered establishing new MPAs and/or expanding current MPAs. At present, various monitoring programs are conducted to obtain data on marine biodiversity in order to set basis for establishing new MPAs, so new actions will be taken in the future based on the monitoring results.

Russia has also taken actions to establish new MPAs. At the same time of developing new MPA definitions by the Ministry of Nature Reserve, experts have selected potential MPA areas in the Russian waters.

3. Monitoring and management status in the selected MPAs in the NOWPAP region

It is quite difficult to understand the monitoring and management status of all MPAs in the NOWPAP region, it was decided to select ten MPAs (at least MPAs under each MPA category) in respective member states and conduct detailed studies of their current status. Table 2 is the list of selected MPAs in the NOWPAP member states.

Table 2 List of selected MPAs in the NOWPAP member states

Country	Selected MPAs	
	Category of MPA	Name of MPA
China	Marine Nature Reserve	Haiyang Qianliyan Island Marine Ecosystem Provincial Nature Reserve Yalujiang River Estuary Wetland National Nature Reserve Kongdong Islands Provincial Nature Reserve Changdao National Nature Reserve
	Special Marine Reserve	Zhifu Archipelago National Special Marine Reserve Jiaozhou Bay Wetland Provincial Special Marine Reserve Haizhou Bay National Ocean Park
	Fishery Genetic Resource Reserve	Rongcheng Bay National Fisheries Genetic Resource Reserve Rizhao Sea Area *Coelomactra Antiquata* National Fisheries Genetic Resource Reserve Rushan National Fisheries Genetic Resources Reserve
Japan	Natural Monument	Danjyo Guntou Islands Breading Habitat of Streaked Shearwater and Japanese Cormorant in Awashima Island
	Natural Park	Daisen-Oki National Park San'in Kaigan National Park Niseko-Shakotan-Otaru Kaigan Quasi National Park Genkai Quasi National Park
	Wildlife Protection Area	Kanmurijima-Kutsujima National Wildlife Protection Area Kosado-toubu National Wildlife Protection Area
	Coastal Marine Resource Development Area	Toyama Bay
Korea	Marine Protected Ecosystem Area	Sindu-ri Sand Dune Mun-Sum Oryuk-do
	Coastal Wetland Protected Area	Muan Suncheon Bosung Bulgyo Buan Julpo Bay Gochang Seocheon Jeung-do
Russia		Far Eastern Marine Nature Biosphere Reserve Lazovsky Sikhote-Alin Land of the Leopard

		Tumninsky Vostok Bay Moneron Island

Fig. 6 Location of selected MPAs in the NOWPAP member states

More detailed information of each selected MPA is shown in Annex 2. As shown in Fig 6, some selected MPAs are located outside of the NOWPAP region; however, most of them are scattered from the north to the south in the region with various marine environmental features: from the subarctic zone in Primorsky Krai in Russia to the subtropical zone such as a marine area with coral reefs in Okinawa in Japan and the marine area in Yellow Sea where big sea-level changes occur.

3-1 Monitoring status of the marine environment and marine species in the selected MPAs

Data on monitoring program is useful to understand the management of MPAs and conservation status of marine biodiversity in MPAs. Parameters used in monitoring are also

useful information to develop new assessment tools for marine biodiversity conservation in the NOWPAP region. Monitoring parameters used in the selected MPAs are shown in Annex 3. The following section explains the overview of each member state.

In China, monitoring on marine environment and marine species are conducted in most of the MPAs; however, parameters are different in each MPA. In the MPAs under the Marine Nature Reserve category are sea water temperature, salinity, COD and nutrient concentration are monitored as marine environmental parameters while phytoplankton is commonly monitored but no other marine species. In MPAs under the Special Marine Reserve, more parameters are set (water temperature, salinity, pH, DO, COD, nutrient concentration); however, these parameters are not standardized among protected areas. IN case of marine species, phytoplankton is the only common parameter and zooplanktons and benthos are monitored only in some protected areas. The situation is similar in the Fishery Genetic Resources Reserve, and only the sea water temperature and salinity are common and monitoring of other parameters such as pH, DO and COD is different among protected areas.

In Japan, there are no standardized monitoring programs taken in MPAs. Some MPAs area also designated as “Monitoring Site 1000”, which is established by the Ministry of the Environment to collect long-term data, and regular monitoring on seagrass beds and coral reefs are conducted there. However, no common monitoring parameters are set. In coastal areas where some MPAs are included, environmental monitoring for public waters is conducted frequently by local government, and other monitoring programs on environmental parameters and marine species (e.g. phytoplankton, zooplankton, macro-benthos, seagrass/seaweed) are regularly conducted by prefectural fisheries experimental stations.

In Korea, the national monitoring has been conducted since 2006 to improve understanding on marine biodiversity. The national waters are divided into eight areas and one of them is monitored with common parameters, so the whole monitoring is completed in every eight years. There are various monitoring parameters are set from physical, chemical and biological ones. Wetlands in Korean are divided into six areas on the east and south coasts, and the bottom environment, habitats and their distribution have been monitored. The second phase of the monitoring started in 2008.

In Russia, while monitoring programs set only in Far Eastern Marine area and Costok Bay with water quality, bottom layers, both phyto- and zoo- planktons, macro-benthos, seagrass/seaweed as parameters, there is no monitoring conducted in other marine protected areas.

As shown above, Korea has conducted national monitoring by the central government and collect information in an effective and efficient manner. So, it is expected that similar style of monitoring program is set in other member states collected information is accumulated and shared among in the NOWPAP region to promote conservation of marine biodiversity.

3-2 Management status of the marine environment and marine species in the selected MPAs

Since management actions of MPAs are basically set by each state's laws and regulations, it was also decided to compare them among the member states. The details are shown in Annex 4. In Russia, detailed management actions are not set by each law and/or regulation. Also, this study does not include observation of actual management actions and/or their effects, so the comparison is made only among the stated items.

In China and Japan, managers and his/her actions to take and prohibited actions in MPAs are clearly stated. Also, in both states, MPAs are required not only as areas where some actions are restricted and their conditions are observed, but also the places where public awareness on marine biodiversity conservation and MPAs is promoted and/or enhanced through outreach programs and ecological tourism activities. Prohibited actions in MPAs are basically such as transformation of land and harvest of plants and animals; however, various activities are possible to be taken under managers' permission.

3-3 Situation of protected species in the selected MPAs

Annex 5 is the list of target species for conservation in MPAS of each member states. It should be kept in mind that some target species are not endangered ones, but they are included in species for protection since harvest in the areas are prohibited. Endangered species are explained in the list.

4. New Concept for Marine Biodiversity Conservation and Sustainable Use of Marine Ecosystem Services

Through this study, it was found that each member state has been designating MPAs and promoting their management in accordance with national laws and regulations. Purposes and objectives of MPAs and their designated categories in the NOWPAP region are different based on the environmental features and utilization of the areas: while some MPAs are natural parks and monuments for conserving the geographical features and seascapes, others are protected areas for sustainable use of fisheries resources.

However, unfortunately, current monitoring programs and management status are not sufficient to achieve the purposes. Some member states have been review and enhance the current regulations and management practices. This movement should be applied to more MPAs and more effective and efficient management programs should be implemented to conserve marine biodiversity in the NOWPAP region. Managers' deeper understanding of the current situation is also the key. Then, actions taken by the Oslo and Paris Conventions for the protection of the marine environment of the North-East Atlantic (OSPAR) are a good example for enhancing MPA management. OSPAR has developed guidelines for self-evaluation of MPA management (OSPAR, 2007) which aims to enhance management effectiveness in MPAs and has applied them to existing MPAs. When such a managers' self-review tool a continuous improvement system is applied in the NOWPAP region, the MPAs can play a significant role for conserving marine biodiversity.

Along with expanding conserved and/or protected marine areas, collecting information on Ecological and Biological Significant Sea Area (EBSAs) has attracted more attention in the world. This is a new concept which basically developed to conserve marine biodiversity in open seas and deep seas where any state cannot manage as its MPA, and in CBD COP10, Contracting Parities were required to collect information on EBSAs along with achieving Aichi Targets. While EBSAs are potential areas to be designated as MPAs in the future, cooperation and coordination among related states are essential as they are to be set in open seas and/or deep sea. In case of OSPAR, some significant marine areas have already been selected in open seas and related states have been working on coordination for their joint management. CBD has also prepared for identification of EBSAs on an international scale.

Studies on EBSAs (e.g. collecting information and identifying potential areas) can also be an important factor in the NOWPAP region to move forward to conservation of marine biodiversity in this region. It is expected to initiate and/or implement activities on EBSAs in the NOWPAP region, and the current actions on EBSAs in the region are introduced in Section 4.1.

Considering MPAs as a tool for international cooperation, MPA networking is another

approach. There are two types of networking: one is connecting neighboring MPAs between/among multiple states, and another is networking important areas in a life history of migratory species (e.g. spawning and nursery grounds and feeding areas).

MPA networking is also effective for strengthening international cooperation. There are two types of MPA networking: one is to connect geographically neighboring MPAs between/among multiple states and the other is to connect MPAs which are important in a life history of species (e.g. spawning and nursery grounds, feeing areas). Such conservation systems have been applied in European frameworks such as OSPAR, the Helsinki Commission (HELCOM) and United Nations Environment Programme Mediterranean Action Plan for the Barcelona Convention (MAP). In Asia, UNDP/GEF Yellow Sea Large Marine Ecosystem Project (YSLME) has been promoting MPA networking in Yellow Sea in cooperation with China and Korea. IN addition, North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) initiated a new activity on MPA networking with its member states in 2013. The NOWPAP region is a semi-closed sea area which is surrounded by China, Japan, Korea and Russia, and international cooperation among the member states and MPA networking are essential for conservation of endemic marine species in this region.

MPA networking is one of the new approaches to be implemented internationally. Introduction of such new concepts and strengthening cooperation with other states and relevant national, regional and international organizations can help the NOWPAP marine area become more biologically-diverse and healthy.

The following section explains current and potential work of the NOWPAP member states to apply the new concept to the region.

4-1 Possibility on Applying Ecological or Biologically Significant Marine Areas (EBSA) to the NOWPAP Region

The basic concept of EBSAs is to promote information collection on ecologically and biologically significant areas and the major target areas are open sea and deep seas which are difficult to be managed by existing MPA frameworks. However, following COP 10 decisions, some states in the NOWPAP region have considered applying this concept or more initiated identification activities of EBSAs.

Japan has implemented a research and information collection for developing a scientific base and identifying EBSAs not only in the Japanese territorial waters and EEZ but also in Asian region with the fund by the Global Environment Research Program of Ministry of the Environment. The research aims to collect and harmonize information on various marine species including seagrass/seaweed, coral reefs, plankton and benthos and to implement

quantitative assessments and estimation of future temporal and special variation. Application of EBSA concept has been under consideration in the Ministry of the Environment and it is expected to identify EBSAs along the Japanese archipelago in the near future.

Russian experts have also initiated identification of EBSAs in its territorial water and EEZ. North Pacific Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas (EBSAs) was held in Moscow in 2013, and the following nine marine areas were selected as potential EBSAs in Far-east Russia.

1.Peter the Great Bay
2. West Kamchatka Shelf
3. South East Kamchatka Coastal Waters
4. Eastern Shelf of Sakhalin Island
5. Moneron Island Shelf
6. Shantary Island Self, Amur and Tugur Bays
7. Commander Islands Shelf and Slope
8. East and South Chukotka Coast
9. Yamskie Islands and Western Shelikhov Bay

Among the nine areas, Number 1, 4, 5, and 6 were agreed as EBSA candidates in the North Pacific in the workshop, and this decision will help promote EBSA identification in the area.

In China and Korea, there have not been any activities on EBSAs implemented yet.

The NOWPAP member states have established MPAs on their coastal areas and made more efforts to improve and expand them. On the other hand, no effective and efficient systems are developed yet to establish MPAs in off-shore areas aiming to promote conservation and sustainable use of marine resources. Therefore, it needs to be considered to apply EBSA concept to both coastal and off-shore areas in the NOWPAP member states. At the same time, international cooperation with neighboring states should be developed especially for off-shore EBSAs, and cooperative management by multiple states, which is implemented in OSPAR members, could be taken into consideration.

4-2 Possibility on Establishing MPA Network for Marine Biodiversity Conservation in the NOWPAP Region

National MPA networking has not been realized in any NOWPAP member states yet; however, YSLME has developed international MPA networking between China and Korea in Yellow Sea and the joint conservation framework is established. IN the western part of the NOWPAP sea area, China, Japan and Korea are sharing borders and their biota is similar. Also,

threats to marine biodiversity are almost same, so MPA networking among these states will be valuable for conservation of marine biodiversity. Russia and Japan could cooperate with each other in the northern part.

Korea has developed a network system to consolidate national MPA information. All information such as biota, management status and assessment results of MPAs are accumulated in Marine Protected Area Center in the Korea Marine Environment Corporation (KOEM). While the center conducts joint research activities with the National Oceanic and Atmospheric Administration (NOAA) and a research institute in Wadden Sea and other activities to raise public awareness. This is a good example to promote MPA networking in respective NOWPAP member states as well as among the member states.

5 Conclusion

In the NOWPAP region, while Japan and Korea have already established MPAs which are account for over 10% of their respective territorial waters, the total area of existing MPAs is approximately 4% when considering the size in the whole NOWPAP sea area. Therefore, it is necessary to expand protected areas for effective conservation of marine biodiversity in this region. The initial step is to accelerate relevant activities which each member state has implemented to increase protected areas. Then, it is necessary to deliberate application and identification of EBSAs.

At the same time, appropriate management of MPAs should be paid more attention. Some states have reviewed the current situation of MPAs by research activities, strengthening of monitoring, and consolidating of information, and moreover, initiated MPA networking. Using European efforts (e.g. OSPAR, HELCOM, and MAP) as good references, the NOWPAP member states should make more efforts to enhance MPA management in faster pace.

Categories of MPA and its brief summary in China

Category of MPA	Number	Covered area	Purpose	Laws and regulations	Authority	Appropriate sea area	Remarks
Marine Nature Reserve	171	128,000 km^2	To protect the natural environment and resources	Management Regulation of Marine Nature Reserve	Oceanic Administration in coastal provinces, autonomous regions and municipalities	1. Sea areas where conclude typical ecosystem 2. Sea areas where has high marine biodiversity or sea area where rare and endangered marine species naturally and densely distributed 3. Sea areas where marine natural remains with great scientific and cultural value are located 4. Sea areas, seashores, islands, coastal wetlands, estuaries and bays with special protection values 5. Sea area which call for special protection	
Special Marine Reserve	40	6,700 km^2	To protect marine biodiversity and ecosystem service function	Management Regulation of Special Marine Reserve	Local government	1. Sea areas where rare and endangered marine species are naturally and densely distributed 2. Sea areas where has representative natural ecosystem 3. Sea areas which is ecological sensitive and fragile area 4. Sea areas and islands with important value of marine rights, interests and special oceanographic hydrology 5. Sea areas and its surrounding waters with marine ecological landscapes, historic cultural relics and unique geological and geomorphologic landscape 6. Sea areas which is possessing important biological resources, mineral	Special Marine Geographic Reserve, Ocean Ecosystem Reserve, Marine Resource Reserve and Ocean Park are included in this category

Annex 1

						resources, petroleum resources, marine energy and so on.	
Fisheries Genetic Resources Reserve	24	72,000 km^2	To protect important aquatic genetic resources and their survival circumstances, to promote sustainable development of fishery, to establish the protection network and to alleviate the adverse effect of human activity	Interim Regulation on Fisheries Genetic Resources Reserve	Fishery administration under local governments at or above the country level	1. Breeding areas of protected aquatic species 2. Breeding areas where unique aquatic genetic resources mainly distributed 3. Breeding areas where fingerling of important aquatic species is distributed 4. Sea areas where genetic resources with great economic and heritage value mainly distributed	
Total	235	206,700 km^2	4.28 % of Chinese territorial sea is covered by these systems.				

Categories of MPA and its brief summary in Japan

Category of MPA	Number	Covered area	Purpose	Laws and regulations	Objectives of law	Authority	Remarks
Natural Park	86 (36 sites cover the sea area)	18,600 km^2	To protect outstanding natural scenery and promote its use	Natural Park Act.	This Act shall aim at the protection of the places of natural scenic beauty and also, through the promoted utilization thereof, at the contribution to the conservation and sustainable use of biological as well as to the health, recreation and culture of the people.	Ministry of Environment or local government	National Park and Quasi National Park are included.
Natural Coastal Protected Zone	91 (Sites are located only in Seto Inland Sea)	Unknown	To maintain the state of nature so that seashores and ponds, could be used for bathing, shellfish gathering and so forth in the future	Act on Special Measures Concerning Conservation of the Environment of the Seto Inland Sea	This law aims to promote the conservation of the Seto Inland Sea environment, by stipulating matters necessary for the formulation of effective plans and strategies for environmental conservation. It also provides special measures for restrictions on the installment specified facilities, prevention of damage from eutrophication and conservation of the natural seashore.	Local government	

Annex 1

Nature Conservation Area	1	1.28 km^2	To conserve the outstanding natural environment requiring particular conservation	Nature Conservation Law	Along with Natural Park Law and other laws for conserving the natural environment, this law aims that the people enjoy the blessing of the natural environment and sustain it for the future generation by securing biological diversity in the areas where particularly conservation of the natural environment is necessary and promoting other integrated conservation measures. It also aims to the contribution to provision of healthy and cultural lives to the people at present and in the future.	Ministry of Environment	The only one site is Sakiyama Bay located in Okinawa Prefecture
Wildlife Protection Area	3,888 (73 sites are designated by MOE and 3,815 sites are designate by prefecture covernments)	36,500 km^2 (Sea area is 2,950 km^2)	To protect wildlife	Wildlife Protection and Proper Hunting Act	This Act aims to implement activities for protecting wild life to promote proper hunting through preventing damages by wildlife on living environment, agriculture, forestry and fisheries industry and biological diversity as well as through preventing risks by using hunting equipment. It also aims that the people enjoy the blessing of the natural environment and the local communities make sound development through the	Ministry of Environment or local government	

					contribution to securing biological diversity.		
Natural Habitat Conservation Area	9	Unknown	To conserve national endangered species of wild fauna and flora	Act on Conservation of Endangered Species of Wild Fauna and Flora	This act aims to conserve the natural environment in a better way by preserving endangered wild life, while recognizing that wild life is an essential component of ecosystems as well as for rich life of the people, and thereby to contribute to provision of healthy and cultural lives to the people at present and in the future.	Ministry of Environment, Ministry of Economy, Trade and Industry or Ministry of Agriculture, Forestry and Fisheries	All sites are located in inland area, not cover sea area
Natural Monument	75	Unknown	To protect animals, plants, geographic feature and minerals of high scientific value	Act on Protection of Cultural Properties	The purpose of this Act is the contribution to cultural improvement of the people and advancement of the global culture by preservation of cultural assets and wise utilization of them.	Agency for Cultural Affairs or local government	11 sites cover the sea area
Protected Water Surface	55	29.5 km^2	To protect and cultivate aquatic animals and plants	Act on the Protection of Fishery Resources	Te purpose of this Act is to ensure the protection and culture of fishery resources, to maintain those advantages for the future, and thereby to contribute to the development of fishery.	Ministry of Agriculture, Forestry and Fisheries	
Coastline Marine Resource	31	309,900 km^2	To promote the streamlining of the development and	Marine Resources Development		Ministry of Agriculture, Forestry and	

Annex 1

Development Area and Designated Area			use of marine fishery resources through measures to promote the multiplication and aquaculture of aquatic animals and plants systematically	Promotion Act		Fisheries or local government	
Area designated by prefecture, fishery operator group	Unknown	Unknown	To protect and cultivate aquatic animals and plants, and to secure their sustainable use	Fishery Act Act on the Protection of Fishery Resources Fishery Cooperative Act	The purpose of these acts is to establish a basic fisheries production system in which fisheries adjustment organizations mainly consisting of fishery managers and fishery employees can be operated for systematic utilize of waters, to thereby enhance fisheries productivity and also to democratize the fishing industry.	Local government or fishery operator group	

Common Fishery Right Area	Unknown	89,587 km^2	To enhance fisheries productivity (protecting and cultivating aquatic animals and plants, and ensuring their sustainable use)	Fishery Act		Local government or fishery operator group	
Total	4,236	454,618 km^2	8.3 % of the Japanese territorial sea and exclusive economic zone is covered by these systems.				

Annex 1

Categories MPA and its brief summary in Korea

Category of MPA	Number	Covered area	Purpose	Laws and regulations	Authority	Remarks
Protected Marine Area (Marine Ecosystem Protected Area)	6	219 km^2	To protect and conserve the marine ecosystem, mainly sea areas are designated MPAs and managed by 10 year plan and survey	Conservation of Marine Ecosystem Act (Marine Ecosystem Conservation and Management Law)	Ministry of Ocean and Fisheries, Korea Marine Environment Management Cooperation	
Wetland Protection (Coastal Wetland Protected Area)	12	141.4 km^2	To protect and conserve the inland and tidal wetlands, human activities and anthropogenic influences would be minimized through 5 year plan and survey	Wetland Conservation Act	Ministry of Ocean and Fisheries/Ministry of Environment, Korea Marine Environment Management Cooperation	
Marine Environment Conservation	4	1,882 km^2	To enhance the sustainable usage of marine environments and understand the status of marine environmental quality, 5 year plan and periodic survey are prepared and performed	Marine Environment Management Act	Ministry of Ocean and Fisheries	
Fisheries Resource Protection	10	3,034 km^2	To enhance fisheries resources and sustainable	National Land Planning and Utilization Act	Ministry of Ocean and Fisheries, Korea	

(Fisheries Resource Protected Area)			usage of marine environment for fisheries industry	(Fisheries Resources Protection Law)	Fisheries Resource Agency	
Specific Island	167	10.5 km^2	To protect specific islands for their ecological value and significance	Special Law for Specific Island Conservation and Management	Ministry of Environment	
National Park	4	3,348 km^2	To protect significantly valuable natural resources from human activities and anthropogenic inputs and to provide natural resources for human welfare	Natural Park Act	Ministry of Environment, Korea National Park Service	
Ecosystem/Landscape Conservation	3	34.6 km^2	To protect well conserved ecosystem and landscape	Natural Environment Conservation Act	Ministry of Environment	
Wildlife Protection	166	207.8 km^2	To protect endangered living organisms and enlargement of those species	Wildlife Act	Ministry of Environment	
Natural Heritage	193	1,126 km^2	To conserve and protect natural monuments and special living in indigenous species	Cultural Heritage Protection Act	Cultural Heritage Protection Administration	
Total	565	10,003 km^2	14.1 % of Korean territorial sea area is covered by these systems.			

Annex 1

Categories of MPA and its brief summary in Russia

Category of MPA	Number	Covered area	Purpose	Laws and regulations	Authority	Remarks
State Natural Reserve including biosphere	Unknown	Unknown	The main objectives of the reserve is the preservation of intact ecosystems and the study of natural processes.	On Specially Protected Natural Areas		Zapovednik is an established term on the territory of the former Soviet Union for a protected area which is kept “forever wild”. It is the highest degree of environmental protection for the assigned areas that are strictly protected.
State Natural Park	Unknown	Unknown	Conservation, recreation and education	On Specially Protected Natural Areas		National parks are environmental, ecological and educational and research institutions, territory (area) of which include natural complexes and objects of special ecological, historical and aesthetic value, and which are intended for use in the environment, educational, scientific and cultural purposes and controlled tourism.
Natural Park	Unknown	Unknown	Conservation, recreation and education	On Specially Protected Natural Areas		Only local, municipality significance level
National Monument	Unknown	Unknown	To preserve small areas of natural objects (Grove, gorge,	On Specially Protected Natural Areas		

			breeding colony etc.)			
Refuges of various significance	Unknown	Unknown	To preserve some of the natural complexes and objects	On Specially Protected Natural Areas		The natural complexes and objects are limited to only certain types of economic activity.
Refuges of local significance	Unknown	Unknown		On Specially Protected Natural Areas		
Dendrological Park	Unknown	Unknown		On Specially Protected Natural Areas		
Botanic Garden	Unknown	Unknown		On Specially Protected Natural Areas		
Health Improvement Localities and Resort	Unknown	Unknown		On Specially Protected Natural Areas		
Total	Unknown	Unknown				

Overview of the selected MPAs in each member state

Country	Selected MPA	Characteristic and oceanic condition around MPAs
China	Haiyang Qianliyan Island Marine Ecosystem Provincial Nature Reserve	Qianliyan Island located in the southern Yellow Sea. The area of this reserve is 1,823 hectares, with core area 52 hectares, buffer area 207 hectares, experimental area 1,564 hectares. This island is abundant in bird resources and many kinds of rare birds and plants is found there, Among them, there are rare plants Japanese Camellia and medical plants honeysuckle, Chinese wolfberry and Radix bupleuri etc. With 20 marvelous peaks and fair stones, this island has a reputation for its scenic beauty. This sea area is abundant in rare seafood resources like Abalon, Holothurioidea etc. The annual mean temperature is 11.4˚C, range of seawater temperature from 5.2˚C to 29.1˚C, range of salinity from 30.17 to 38.8psu.
	Yalujiang River Estuary Wetland National Nature Reserve	Yalujian River is border between China and North Korea. In this MPA, 311 km2 of land area, 60 km2 of reed marsh, 242km2 of tidal flat and 466km2 of sea area are conserved. The annual mean temperature is 8.9˚C. This area has high tide range and the mean tide range is 4.6m.
	Kongdong Islands Provincial Nature Reserve	Kongdong Island is located offshore of Yantai City. The annual mean temperature is 12.5˚C. The mean sea surface temperature is 12.6˚C, and the mean salinity is 29.98psu.
	Changdao National Nature Reserve	Changdao Island locates between Bohai Sea and Yellow Sea and consists of 32 islands. The annual mean temperature is 11.9˚C. The annual mean SST is 11.5˚C, and the mean salinity is 31.33psu.
	Zhifu Archipelago National Special Marine Reserve	Zhifu Archopelago locates offshore of Yantai City. The annual mean temperature is 12.5˚C. The annual mean SST is 12.6˚C, and the annual mean salinity is 29.98psu.
	Jiaozhou Bay Wetland Provincial Special Marine Reserve	Jiozhou Bay locates in the southern Yellow Sea near Qingdao. The annual mean temperature is 12.5˚C. The transparency in the bay is between 0.5m to 6.0m.
	Haizhou Bay National Ocean Park	Haizhou Bay locates to the south of Yellow Sea. The annual mean temperature is 14.3˚C. SST in summer is 27.7˚C and in winter is 3.1˚C. The annual mean salinity is 30.69psu.
	Rongcheng Bay National Fisheries Genetic Resource Reserve	Rongcheng Bay is located at the tip of the Shadong Peninsula. The annual mean temperature is 11.1˚C. The annual mean SST is 13.3˚C, and the annual mean salinity is 31.75psu.

Annex 2

	Rizhao Sea Area Coelomactra Antiquata National Fisheries Genetic Resource Reserve	Rizhao Sea area is located between Jiaozhou Bay and Haizhou Bay. This area is habitat of Coelomactra Antiquata (Antiquw Mactra). The annual mean temperature is 12.7˚C, and the maximum current velocity is 1.2m/s.
	Rushan National Fisheries Genetic Resources Reserve	Rushan is located in the mouth of Jiaozhou Bay. The annual mean temperature is 11.7˚C.
Japan	Danjyo Guntou Islands	Danjyo Guntou Islands is located in Nagasaki Prefecture and consists of five islands. Around the islands Kuroshio and Tsushima Current are flowed, climate is temperate. Therefore, some kinds of southern plant are founded and northern limit of habitat of Cinnamomum daphnoides. This area is good fishery ground.
	Breading Habitat of Streaked Shearwater and Japanese Cormorant in Awashima Island	This island is located offshore of Niigata Prefecture. Most of island is rocky place and Streaked Shearwater and Japanese Cormorant use as their breeding area.
	Daisen-Oki National Park	This National Park is located in Shimane Prefecture. Tsushima Current flows around this National Park, various kinds of biota of the southern temperate zone make their habitat. In the shallow area, seagrass bed is formed. In the Daisen-Oki National Park, there are five marine park areas; Shimane Peninsula Marine Park Area (7 ha), Jyoudogaura Marine Park Area (2 sites, 20.8 ha), Shiro Marine Park Area (14.8 ha), Kuniga Marine Park Area (7.3 ha) and Ama Marine Park Area (7.6 ha).
	San’in Kaigan National Park	This National Park covers the coastline of Kyoto, Hyogo and Tottori Prefecture. Tottori dune is characteristic place in this National Park. In the San’in Kaigan National Park, there are five marine park areas; Goshiki-hama Marine Park Area (20.7 ha), Toyooka Marine Park Area (7.6 ha), Takeno Marine Park Area (9.9 ha), Hamasaka Marine Park Area (2 sites, 19.2 ha), and Uratomi Marine Park Area (9.8 ha).
	Niseko-Shakotan-Otaru Kaigan Quasi National Park	This Quasi National Park is located in the western side of Hokkaido Prefecture. Its oceanic condition is subarctic environment. However, Soya Warm Current flows offshore of Quasi National Park, temperate and subarctic biota are found.

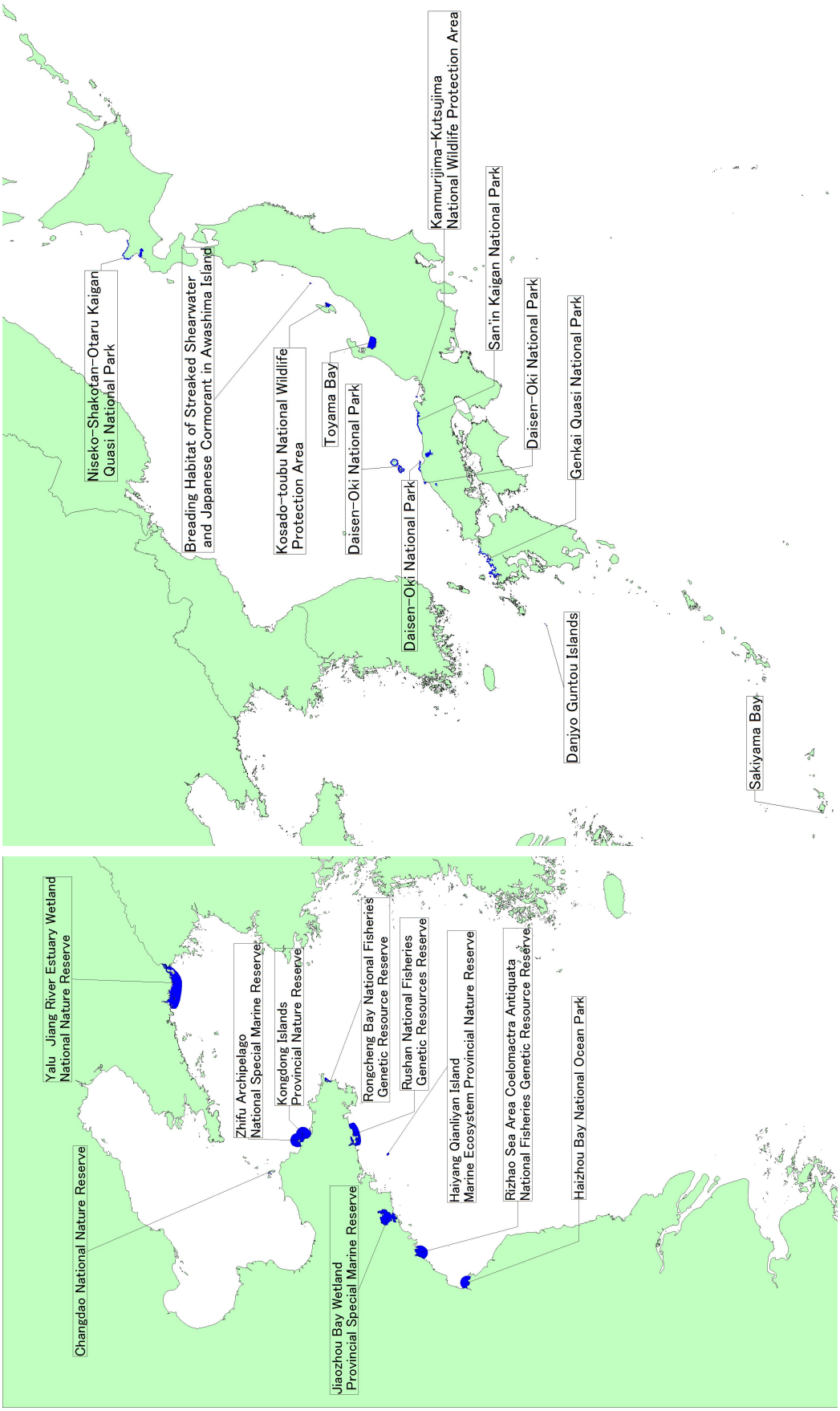
		In the Niseko-Shakotan-Otaru Kaigan Quasi National Park, there are two marine park areas; Shakotan Peninsula Marine Park Area (3 sites, 28.9 ha) and Otaru Coast Marine Park Area (3 sites, 14.7 ha).
	Genkai Quasi National Park	Genkai Quasi National Park is located northern part of Kyushu Island. Tsushima Current flow offshore of the park, therefore ocean condition is temperate environment. Around the park, Finless Porpoise and Common Dolphin are found. In Genkai Quasi National Park, there is one marine park area; Genkai Marine Park Area (5 sites, 45.5 ha).
	Kanmurijima-Kutsujima National Wildlife Protection Area	This MPA is located offshore of Kyoto Prefecture. These Islands are biggest habitat of Streaked Shearwater in Japan. In addition, many birds, such as Swinhoe's Storm-petrel listed up to the Red List of Japan form their habitat. These islands belong to temperate zone.
	Kosado-toubu National Wildlife Protection Area	Sado Island is located offshore of Niigata Prefecture. The climate of this area is temperate zone.
	Toyama Bay	Toyama Bay is located in the middle of Japan and one of the deep bays in Japan. Surface water is influenced by Tsushima Current. In the other hand, under 300m depth, deep water which water temperature is under 2˚C is occupied.
Korea	Sindu-ri Sand Dune	This MPA is located in the west coast of Korea (Taean, Chungchoengnam) and faced to Yellow Sea. This MPA is the largest coastal sand dune of Korea and famous for its unique landscapes and colony of sand dune plant. It has approximately 4km in length and 1 km width of sand. It's surface sediment dominated by well-sorted sand and muddy sand.
	Mun-Sum	This MPA is located in Jeju Island (Seoguipo, Jeju). Munsum MPA is famous for its unique coral community and endemic marine organisms such as sea cockscombs and sea weeds in Korea. This MPA consists of Munsum Island, Bamsum Island and Supsum Island. This area is rocky shore habitat and sand bottom.
	Ohryuk-do	This MPA is located in the southeast coast of Korea near Busan. Ohryuk-do MPA is famous for pristine landscape including cliffs, rocks and organisms. It consists of Bangpae Island, Songkot Island, Suri Island

		and Deungdae Island, etc.
	Muan	This MPA is located in the southwest coast of Korea (Muan, Jeollanam). Muan tidal flat is parts of Hamhae Bay. This area has been designated as the first Coastal Wetland Protected Area in Korea because of the geological primitiveness, biodiversity. This MPA was designated Ramsar Site in Jan. 2008.
	Suncheon	This MPA is located in Suncheon Bay in south coast of Korea. Suncheon Bay tidal flats are inner parts of Yeoja Bay located in south-central part of Korea. This area has been designated for habitat conservation of migratory birds such as hooded-crane Grus monacha and huge colony of reed.
	Bosung Bulgyo	This MPA is located in the south coast of Korea (Boseong, Jeollanam). This MPA is distinct for its mud dominated sediment composition and provides huge habitats for blue spotted mud hoper Boleophthalmus pectinirostris and Malaysia clam Tegillarca granosa.
	Buan Julpo Bay	This MPA is located in the west coast of Korea (Buan, Jeollabuk). It has a primitive ecosystem and variety of halophyte such as Phragmites communis, Suaeda japonica, Suaeda asparagoides.
	Gochang	This MPA is located in the west coast of Korea (Gochang, Jeollabuk). This MPA is designated by its natural primitiveness, high biodiversity, high abundance of macrobenthos and habitats for birds. Gochang tidal flat is a main producing place of Manila clam Ruditapes phillippinarum.
	Seocheon	This MPA is located in the west coast of Korea (Seocheon, Chungnam). Various macrobenthic organisms and commercial species live in this area due to its primitive habitat and high heterogeneity of sediment composition. This MPA is comprised of two part; one is designate along the coastal line and the other is designate adjacent Yoobu Island.
	Jeung-do	This MPA is located in the offshore islands in the southwest of Korea (Shinan). This MPA is comprised of two are; one is the area around Jeungdo Island, the other is around Byeongpungdo Island. Before designation as a MPA, some parts of Jeungdo has been designated to UNESCO-MAB Biosphere reserve in May 2009.

Russia	Far Eastern Marine	Total area 64 316.3 ha, including 63,000 - sea area. 4 plots waters with different levels of protection, the 12 islands, the coast of the Gulf. The eastern section covers an area of 45,900 hectares, south - 15,200 hectares, north - 216.3 hectares, West - 3000 ha. The purpose of the reserve - the preservation of the richest on the composition of the coastal fauna and flora and their natural environment, as well as the island fauna and flora of the Gulf of Peter the Great, conduct scientific research and provide education in the field of marine nature.
	Lazovsky	Lasovsky Zapovednik encloses 120,989 hectares, surrounded by a protected area of additional 15 thousand hectares. Length of borderlines is runing 240 km, of that 36 km along the seacoast. The objectives of the creation of the reserve are: the preservation and study of natural systems liana coniferous and deciduous forests of southern Sikhote-Alin, protection and recovery of populations inhabiting the rare and valuable animals, especially the mountain and spotted deer.
	Sikhote-Alin	401,428 hectares, including 2,900 hectares in sea area. In UNESCO classification it is shown as an object including the most important or considerable habitat for conservation of biological variety, including endangered species of exclusive world value from the point of view of science and protection.
	Land of the Leopard	Preservation of the Amur leopard and the whole natural complex. Total area more 280 000 ha.
	Tumninsky	143 100 ha. The main object of protection - the eastern forest macro-Sikhote-Alin, adjacent to the coast of the Tatar Strait. Among the protected species - the Amur tiger, white-tailed eagle, Steller's sea eagle, golden eagle, fish owl, the osprey, mandarin duck, merganser, spruce grouse, black crane, black stork, Far stork, peregrine falcon.
	Vostok Bay	The reserve was established in 1989 to preserve the marine flora and fauna of the East Bay for research, development of biological principles, organization and development of plantations of mariculture. Area is 1820 ha. The main problem - the study of genetic differentiation of populations and species of marine animals, the genetic basis of speciation analysis of the adaptive significance of protein polymorphism, heterozygosity for

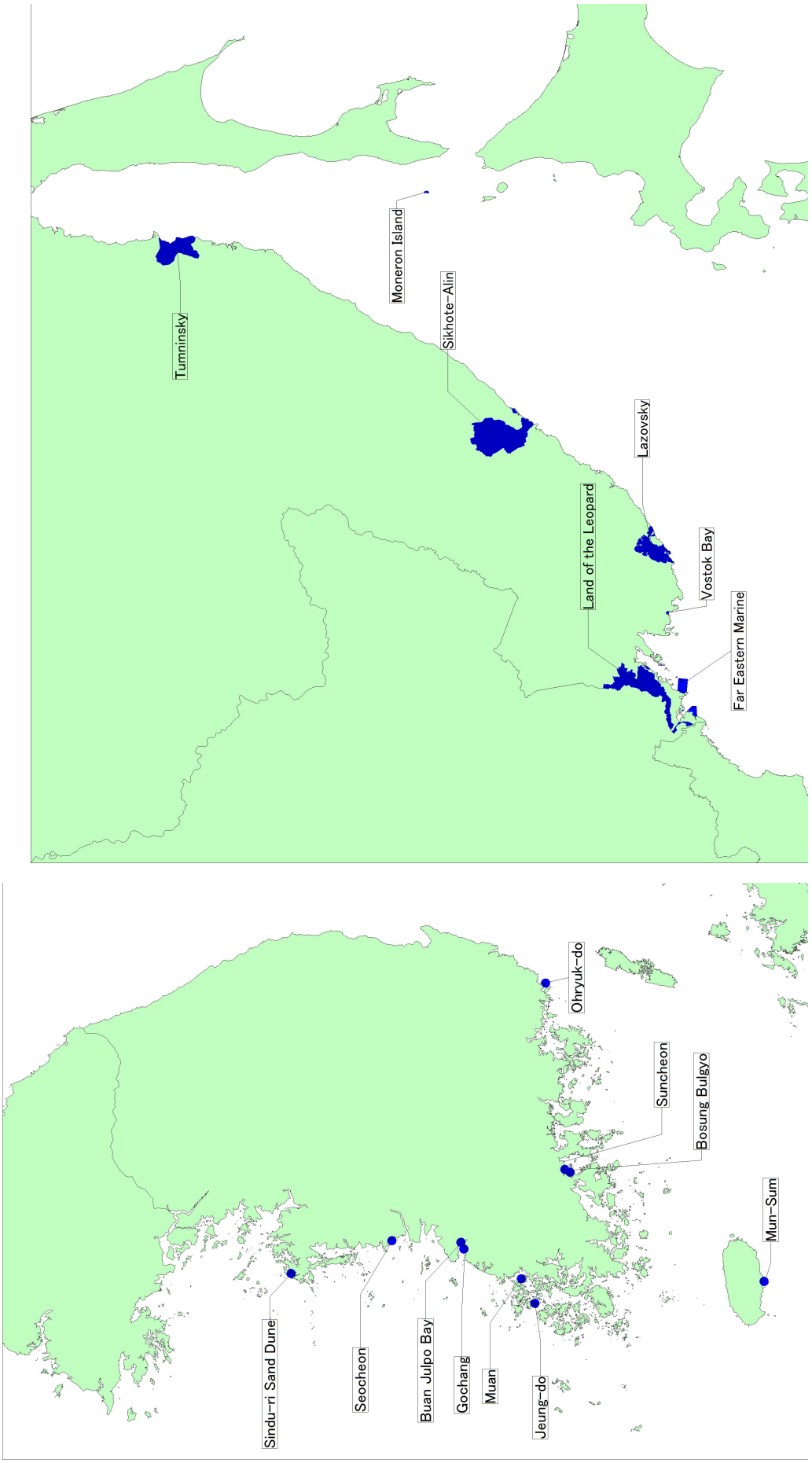
		enzyme conjugate loci with the variability of morphological characters, the study of genetically effective population size, ecological and genetic monitoring of populations.
	Moneron Island	Biodiversity hotspot, high diversity of benthic communities. Intact marine ecosystem. Sponges and bryozoans aggregations, red hydrocorals. North boundary of abalone (Haliotis) range. Density of abalone has bid amplitude between years which is caused by natural factors. The only rookery of Steller's sea lion in the southern part of Sea of Okhotsk (boundary water mass between Sea of Okhotsk and the Sea of Japan).The highest density of zooplankton. A branch of the Kuroshio Current causes high biodiversity of the area. High density of marine flora and zooplankton is a result of local upwelling. High diversity of fish species and benthic organisms. Moneron island and smaller island contain large seabird colonies. Nesting area for many species of birds connected with the marine realm. There is no human activity in the area now, except for occasional tourism. If this situation remains unchanged, the Moneron shelf will not degrade. The area is currently protected under Russian national law for its biodiversity values.

Annex 2



Location of selected MPAs in China (left), and in Japan (right)

Annex 2



Location of selected MPAs in Korea (left), and in Russia (right)

Monitoring parameters in MPAs of the NOWPAP member states

Country	Category of MPA	The selected MPA	Monitoring parameters on marine environment (ME), bottom environment (BE) and marine species (MS)
China	Marine Nature Reserve	Haiyang Qianliyan Island Marine Ecosystem Provincial Nature Reserve	ME: temperature, sea surface temperature (SST), salinity MS: none
		Yalujiang River Estuary Wetland National Nature Reserve	ME: chemical oxygen demand (COD), phosphate, inorganic nitrogen, oil and grease MS: phytoplankton, benthic animal
		Kongdong Islands Provincial Nature Reserve	ME: phosphorus, chlorophyll a, inorganic nitrogen MS: phytoplankton
		Changdao National Nature Reserve	ME: pH, dissolved oxygen (DO), phosphorus, inorganic nitrogen MS: phytoplankton
	Special Marine Reserve	Zhifu Archipelago National Special Marine Reserve	ME: pH, DO, COD, phosphate, oil and grease MS: phytoplankton
		Jiaozhou Bay Wetland Provincial Special Marine Reserve	ME: pH, DO, COD, inorganic nitrogen MS: phytoplankton, zooplankton, benthic animal
		Haizhou Bay National Ocean Park	ME: pH, DO, COD, phosphorus, ammonium MS: phytoplankton
	Fishery Genetic Resource Reserve	Rongcheng Bay National Fisheries Genetic Resource Reserve	ME: temperature, SST, salinity MS: phytoplankton, benthic animal
		Rizhao Sea Area *Coelomactra Antiquata* National Fisheries Genetic Resource Reserve	ME: pH, salinity MS: phytoplankton
		Rushan National Fisheries Genetic Resources Reserve	ME: salinity, pH, DO, COD, phosphorus, ammonium, nitrate, nitrite MS: phytoplankton

Annex 3

Japan	Natural monument	Danjyo Guntou Islands	ME: none MS: none
		Breading Habitat of Streaked Shearwater and Japanese Cormorant in Awashima Island	ME: none MS: seabirds with video camera, Streaked shearwater
	Natural park	Daisen-Oki National Park	ME: none MS: seaweed, seagrass
		San'in Kaigan National Park	ME: none MS: seaweed, seagrass
		Niseko-Shakotan-Otaru Kaigan Quasi National Park	ME: none MS: none (If trouble is happen, monitoring will be conducted)
		Genkai Quasi National Park	ME: none MS: none
	Wildlife protection area	Kanmurijima-Kutsujima National Wildlife Protection Area	ME: none MS: birds
		Kosado-toubu National Wildlife Protection Area	ME: none MS: none, only regular patrol
	Coastal marine resource development area	Toyama Bay	ME: water temperature, salinity, water color, transparency, pH, turbidity, DO, COD, nitrate, ammonia, nitrogen, phosphate, silicate, chlorophyll a, BE: temperature in sediment, color of sediment, grain size, ignition loss, sulfide, COD MS: phytoplankton, zooplankton, macrobenthos, seaweed, seagrass

Korea	Marine Ecosystem Protected area	Sindu-ri Sand Dune Mun-Sum Oryuk-do	ME: water temperature, salinity, pH, DO, COD, suspended solids, particulate organic carbon, total organic nitrate, silicate, dissolved inorganic nitrate, dissolved inorganic phosphate, chlorophyll a
	Coastal wetland protected area	Muan Suncheon Bosung Bulgyo Buan Julpo Bay Gochang Seocheon Jeung-do	BE: grain size, TOC, TN, CaCO3, heavy metals MS: Microbiological parameters; total cell number, distribution of heterotrophic bacteria, molecular-based phylogenic analysis, bacterial community analysis by pyrosequencing Phytoplankton; chlorophyll a, species composition, cell number, diversity index, dominant species Zooplankton; seasonal and spatial biomass, species composition/community analysis, diversity index, cluster analysis Benthic organisms; number, species composition Ichthyoplankton; non-vertebrates, vertebrate
Russia		Far Eastern Marine Nature Biosphere Reserve	ME: water temperature, salinity, water color, transparency, pH, turbidity, DO, COD, nitrate, ammonia nitrogen, phosphate, silicate, chlorophyll a, heavy metals BE: temperature in sediment, color of sediment, grain size, ignition loss, sulfide, COD MS: phytoplankton, zooplankton, macrobenthos, seaweed/seagrass
		Lazovsky Sikhote-Alin	ME: none MS: none ME: none MS: none

Annex 3

		Land of the Leopard	ME: none MS: none
		Tumninsky	ME: none MS: none
		Vostok Bay	ME: water temperature, salinity, water color, transparency, pH, turbidity, DO, COD, nitrate, ammonia nitrogen, phosphate, silicate, chlorophyll a, heavy metals BE: temperature in sediment, color of sediment, grain size, ignition loss, sulfide, COD MS: Phytoplankton, Zooplankton, Macrobenthos, Seaweed/Seagrass
		Moneron Island	ME: none MS: none

Management status in each MPA category in China

Category of MPA	Authorities of management	Contents of management
Marine Nature Reserve	Oceanic administration in coastal provinces, autonomous regions and municipalities	- Implementation of polices, regulations and laws that are related to marine nature protection - Enacting of detail regulations and rules, and centralization of the administration of all activities - Drafting of overall construction planning of nature reserve - Installation of landmarks, makers and relevant protection facilities - Organization and implementation of the works of basic investigation, monitoring and surveillance - Organization and implementation of scientific researches and ecosystem restoration - Public awareness on marine nature protection
Special Marine Reserve	Local people's government at or above the country level	- Working out and implementing the management regulation - Organizing the facility construction of supervision, scientific research, tourism, propaganda, management and the protection - Organizing and conducting the routine patrol management - Organizing and enacting the ecological compensation project as well as ecological restoration and protection plan, practicing the measures of restoration and ecological compensation and protection - Organizing and managing the ecological tourism activities - According to relevant technological index, the management institution of Special Marine Reserve should conduct the status investigation regularly including the extents of socio-economic conditions, exploration of resources and ecological environment work of monitoring, surveillance and assessment
Fishery Genetic Resources Reserve	Fishery administration under local governments at or above the country level	- Setting special protection period to crucial growth and breeding stages including breeding and larval growth period of major protected objects - In charge of the regular work of aquatic genetic resources reserves

Annex 4

Regulations in each MPA category in China

Category of MPA	Actions which are forbidden	Actions which need permission
Marine Nature Reserve	- Moving, relocating or damaging landmarks, marker and relevant protection facilities - Illegal collecting and fishing marine organisms - Illegal quarrying, sand excavation and exploring mine - Other behavior damaging protected objectives and nature environment and resources	- To build facilities with the permission of authorities - Inspection, scientific tourism and teaching practice - During relative protection period, activities can be implemented except hunting or injuring protected objects
Special Marine Reserve	- Hunting and collecting bird egg - Cutting the mangrove, excavating coral and damaging coral reef - Use of explosives, poison and electricity to fishing - Directly discharging pollutant to the sea - Collecting, Processing and selling the products of mineral, wild flora and fauna illegally - Moving, staining and damaging the protection facilities	- Scientific research - Ecological tourism - Propaganda - The status investigation including the extents of socio-economic conditions, exploration of resources - Ecological environment monitoring
Fishery Genetic Resources Reserve	- Fishing, blasting operation and other activities damaging ecological resources and environment during special protection period - Reclaim land from lakes and sea or undertake sea reclamation - To build new outlet	- Survey on aquatic resources, scientific research - Tourism - Teaching practices and film shooting - Engaged in construction project in reserves

Regulations in three classes of area in Marine Nature Reserve

Area	Regulations
Core area	Activities that are harmful or adverse to reserve are forbidden except investigation, observation and scientific researches approved by management authorities.
Buffer area	Activities such as fishery production, tourism, scientific research and teaching practice are permitted in limited time and sphere after being approved by management authorities.
Experimental area	Proper explorations can be executed under the unified planning and conduction of the reserve management authorities.

Management status in each MPA category in Japan

Category of MPA	Authorities of management	Contents of management
Natural Park	National Park: Ministry of Environment Quasi National Park: Local government	- Formulating park plans concerning the regulation or works for the protection or utilization of the National Parks or Quasi-national Parks - Deciding and executing the works based on the Park Plan - Maintaining the cleanliness of facilities such as the roads, picnic grounds, camping grounds, ski slopes, swimming areas, and other public use sites located in National and Quasi-national Parks - Planning and executing measures to ensure the diversity in the ecosystem and creature in the natural parks for conserving the scenic beauty of the parks
	Park management organizations	- Managing and preserving natural scenic beauty - Maintaining and managing the facilities within the National or Quasi-national Park including repairs. - Collecting and providing information/materials concerning the protection of the National or Quasi-national Park and promotion their proper use. - Offering appropriate advice/guidance concerning the protection of the National or Quasi-national Park and promotion their proper use - Studying and researching the protection of the National or Quasi-national Park and promotion of their proper use.
Natural Coastal Protected Zone	Ministry of Environment, local government	- Formulating basic plans and strategies on conservation of water quality and natural scenery to promote the conservation of the Seto Inland Sea environment - Formulating prefectural plans and strategies for conservation of the Seto Inland Sea environment based on the basic plans - Reducing discharges of phosphorus and other designated substances to the public water areas for preventing damage by eutrophication - Designating areas for conservation of natural beaches

Annex 4

		- Promoting establishment/improvement of facilities for conservation of water quality in the Seto Inland Sea such as sewages, treatment facilities of wastes, dredging of sludge, monitoring and measurement of water quality
Nature Conservation Area	Ministry of Environment	- Conducting baseline surveys on landscape, geographical conditions, vegetation and wild life every 5 years, which is necessary to formulate measures on conservation of the natural environment - Formulating basic policies on conservation of the natural environment - Formulating conservation plans for Nature Conservation Areas - Formulating and Implementing plans on preservation and recovery of ecosystem based on the Conservation Plan
Wildlife Protection Area	Ministry of Environment or local government	- Formulating management plans on specific wildlife - Implementing Conservation of wildlife in Wildlife Protection Areas - Designating closed season of hunting in Special Protection Areas
Natural Habitat Conservation Area	Ministry of Environment	- Designating National Endangered Species of Wild Fauna and Flora - Understanding the situations/conditions of wild fauna and flora - Formulating integrated measures to conserve endangered species of wild fauna and flora - Implementing integrated measures to conserve endangered species of wild fauna and flora
Natural Monument	Agency of Cultural Affairs	- Installing equipment for management such as signs, markers and boundary fences - Restoring natural monuments - Conserving the Environment - Conducting researches for preservation
Protected Water Surface	Ministry of Agriculture, Forestry and Fisheries, and Local government	Formulating management plans - Summary of marine fauna and flora to be increased, increasing methods and its facilities - List of marine fauna and flora of which hunting is restricted or

		prohibited, and details of the restriction or prohibition - List of fishing gear and/or fishing boats by which hunting is restricted or prohibited, and details of the restriction or prohibition
Coastline Marine Resource Development Area, and Designated Area	Ministry of Agriculture, Forestry and Fisheries, and Local government	Formulating development plans of coastal marine resources - List of marine fauna and flora to be increased and/or cultured and goals - Matters of breeders, stock and seedling of marine fauna and flora - Matters on development and improvement of fishery production and relevant facilities - Matters on conservation of growing environments of marine fauna and flora- Matters to promote increase and culture of marine fauna and flora - Monitoring of water contamination - Concluding an agreement on resource management - Lists of marine areas to be targeted in the agreement, marine resources and types of fishing - Managing methods of marine resources - Duration of the agreement - Measures/Punishment for violation of the agreement - Other matters stipulated in the Ordinance of the Ministry of Agriculture, Forestry and Fisheries
Area designated by prefecture, fishery operator group Common Fishery Right Area	Local government and Fishery association	Fishery management by a fixed gear fishery right, a demarcated fishery right or a common fishery right Resource management by setting closed areas and seasons by local government and fishery associations

Annex 4

Subarea in National Parks and Quasi National Parks

Natural Park	Special Zone	Zones to preserve scenic beauty of natural parks. There are three categories.	
		Class I	Priority Zones which possess important scenery next to Special Protection Zones. Preserving scenic beauty of the zones is necessary.
		Class II	Zones where special coordination with agriculture, fishery, and forestry activities is necessary
		Class III	Zones where ordinary agriculture, fishery, and forestry activities do not give impact on preservation of their scenic beauty
	Special Protection Zone	Special Protection Zones in Special Zones	
	Marine Park Zone	Marine Zones to preserve seascapes	
	Use Coordination Zone	Zones to promote preservation and appropriate use of scenic beauty of natural parks	
	Ordinary Zone	Other areas in natural parks	

Regulations in each category of MPA

MPA categories	Actions which need permission
Natural Park (National Park and Quasi National Park)	Special Zone 1. Constructing and/or renovating structures and/or building extensions 2. Felling trees 3. Damaging trees in the designated areas by Minister of the Environment 4. Mining minerals and/or quarrying 5. Influencing the change and/or volume of water in rivers, and/or lakes 6. Discharging wastewater by installing facilities to lakes and/or wetlands and/or waterways to them in the designated lakes and wetlands by the Minister of the Environment and their surrounding areas (1kilometers) 7. Installing advertising materials 8. Collecting and keeping stones and rocks and others in open areas, which are designated by the Minister of the Environment 9. Land filling and/or digging marine areas 10. Developing land and changing its landscape 11. Collecting and/or damaging designated alpine flora by the Minister of the Environment 12. Planting and/or sowing seeds of non-indigenous plants which are designated by the Minister of the Environment as potential harm to preservation of the scenic beauty in the designated areas by the Minister 13. Hunting, killing and/or damaging designated alpine fauna by the Minister of the Environment, and/or collecting and/or damaging their eggs

	14. Releasing non-indigenous fauna which are designated by the Minister of the Environment as potential harm to preservation of scenic beauty in the designated areas by the Minister 15. Changing colors of roofs. walls, fences, bridges, steel towers, water lines and/or others 16. Entering designated areas by the Minister of the Environment in wetlands and relevant areas during the permitted season 17. Using vehicles, horse-drawn carriages and/or motor boats, and/or landing aircrafts in the designated areas by the Minister of the Environment, expect for roads, fields, rice and vegetable fields, farms and/or residential areas 18. Besides the abovementioned actions, taking any action which is potential harm to preservation of scenic beauty of Special Zones and which is designated by the Ordinance
	Special Protection Zone (In addition to 1, 2, 4, 5, 6, 7, 9, 10, 15, and 16 in Special Zone) 1. Damaging trees 2. Planting trees 3. Releasing fauna 4. Collecting and keeping materials in open areas 5. Having a bonfire 6. Collecting and/or damaging plants other than trees, and/or collecting fallen leaves and branches 7. Planting plants other than trees and/or sowing seeds 8. Hunting and/or damaging/killing fauna, and/or collecting/damaging their eggs 9. Using vehicles, horse-drawn carriages and/or motor boats, and/or landing aircrafts in the areas expect for roads and fields 10. Besides the abovementioned actions, taking any action which is potential harm to preservation of scenic beauty of Special Zones and which is designated by the Ordinance
	Marine Park Zone (In addition to 1, 4, and 7 in Special Zone) 1. Hunting, damaging/killing and/or collecting tropical fish, coral, seaweed and/or other fauna and flora under permission by the Minister of the Environment or the Agriculture, Forestry and Fisheries in the designated areas by the Minister of the Environment 2. Land filling and/or diking marine areas 3. Changing the form s of sea bottom 4. Mooring things 5. Discharging wastewater by installing facilities 6. Using motor boats during the designated seasons in the designated areas by the Minister of the Environment 7. Besides the abovementioned actions, taking any action which is potential harm to preservation of scenic beauty of Marine Park Zones and which is designated by the Ordinance

Annex 4

Nature Conservation Area	1. Constructing and/or renovating structures and/or building extensions 2. Changing landscape by residential development and/or reclamation 3. Mining minerals and/or quarrying 4. Land filling and/or diking water areas 5. Influencing the water level and volume of water in rivers and/or lakes 6. Felling and/or damaging trees 7. Collecting and/or damaging plants other than trees, and/or collecting fallen leaves and branches 8. Planting trees 9. Hunting and/or damaging/killing fauna, and collecting and/or damaging their eggs 10. Releasing fauna 11. Having a bonfire 12. Disposing and/or leaving wastes 13. Collecting and/or keeping things in open areas 14. Using vehicles and/or horse-drawn carriages, and/or landing aircrafts 15. Besides the abovementioned actions, taking any action which is potential harm to preservation of the natural environment in the Wild Life Conservation Areas and which is designated by the Ordinance
	Special Zone (In addition to 1-5 above) 1. Felling trees 2. Damaging trees in the designated areas by the Minister of the Environment 3. Planting and/or sowing seeds of non-indigenous plants which are designated by the Minister of the Environment as potential harm to preservation of the natural environment in the designated areas by the Minister 4. Releasing non-indigenous fauna which are designated by the Minister of the Environment as potential harm to preservation of the natural environment in the designated areas by the Minister 5. Discharging wastewater by installing facilities to lakes and/or wetlands and/or waterways to them in the designated lakes and wetlands by the Minister of the Environment and their surrounding areas (1kilometers) 6. Using vehicles, horse-drawn carriages and/or motor boats, and/or landing aircrafts in the designated areas by the Minister of the Environment, expect for roads, fields, rice and vegetable fields, farms and/or residential areas 7. Besides the abovementioned actions, taking any action which is potential harm to preservation of the natural environment in Special Zones and which is designated by the Ordinance

	Special Marine Zone 1. Constructing and/or renovating structures, and/or making extensions 2. Changing forms of the sea bottom 3. Mining minerals and collecting stones and rocks 4. Land filling and/or diking marine areas 5. Hunting, damaging/killing and/or collecting tropical fish, coral, seaweed and/or other fauna and flora under permission by the Minister of the Environment or the Agriculture, Forestry and Fisheries in the designated areas by the Minister of the Environment 6. Using motor boats during the designated seasons in the designated areas by the Minister of the Environment 7. Besides the abovementioned actions, taking any action which is potential harm to preservation of the natural environment in Special Marine Zones and which is designated by the Ordinance
	Ordinary Zone 1. Constructing and/or renovating structures and/or making extensions, and the scale of which exceeds the standard stipulated by the Ordinance of the Ministry of the Environment 2. Changing the landscape by residential development and/or reclamation 3. Mining minerals and/or collecting stone and rocks 4. Land filling and/or diking sea areas 5. Influencing the water level and/or the volume of water in rivers and/or lakes
Wildlife Protection Area	1. Hunting of fauna and/or collections of bird eggs 2. Feeding fauna and selling them 3. Hunting fauna by the methods using explosive materials, poisons and others, which are stipulated by the Ordinance of the Ministry of the Environment
	Special Protection Zone 1. Constructing and/or renovating structures and/or making extensions 2. Land filling and/or diking water areas 3. Felling trees 4. Taking any action which is potential harm to the protection of fauna in the designated areas: national designated protection areas by the Minister of the Environment and prefectural designated protection areas by the respective governors
Natural Habitat Conservation Area	Managing Zone 1. Constructing and/or renovating structures and/or making extensions 2. Changing landscape by residential development and/or reclamation 3. Mining minerals and/or collecting stone and rocks

Annex 4

	4. Land filling and diking water areas 5. Influencing the water level and the volume of water in rivers and/or lakes 6. Felling trees 7. Hunting wild fauna and flora which are designated by the Minister of the Environment as necessary for inhabitation and growth of endangered national wild life 8. Discharging wastewater by installing facilities to lakes and/or wetlands and/or waterways to them in the designated lakes and wetlands by the Minister of the Environment 9. Using vehicles, horse-drawn carriages and/or motor boats, and/or landing aircrafts in the designated areas by the Minister of the Environment, expect for roads, fields, rice and vegetable fields, farms and/or residential areas 10. Hunting wild fauna and flora, which are designated by the Minister of the Environment, and others 11. Releasing fauna and flora and/or planting and/or sowing seeds of flora, which are designated by the Minister of the Environment as potential harm to inhabitation and growth of endangered national wild life 12. Dispersing materials which are designated by the Minister of the Environment as potential harm to inhabitation and growth of endangered national wild life 13. Having a bonfire 14. Observing wild life by the methods which are designated by the Minister of the Environment as potential harm to inhabitation and growth of endangered national wild life
Natural Monument	When recognized its necessity for preservation of natural monuments, certain actions are restricted and/or prohibited and/or necessary facilities are installed in designated areas.
Protected Water Surface	High-level land-filling and/or dredging, and any constructing actions in waterways and/r rivers, which may influence the water level and the volume of water
Coastline Marine Resource Development Area, and Designated Area	Developing area 1. Changing forms of sea bottom by excavation and/or other actions 2. Any action which is potential harm to increase of fisheries production by promoting increase/culture of marine fauna and flora, and which is stipulated by the Ordinance Designated marine area 1. Excavation of sea bottom, installment of any structure and/or any other action which may reduce/terminate benefits of fishing grounds, and which is stipulated by the Ordinance

Management status in each MPA category in Korea

Category of MPA	Contents of management	Regulation
Protected Marine Area (Marine Ecosystem Protected Area)	Baseline Plan and monitoring (every 10 year)	Commercial usage, Human activities
Wetland Protection (Coastal Wetland Protected Area)	Baseline Plan and monitoring (every 5 year)	Commercial usage, human activities, reclamation, restoration of wetland
Marine Environment Conservation	Baseline Plan and monitoring (every 5 year) Categorization of marine environment	Marine environment usage except purpose of each category
Fisheries Resource Protection (Fisheries Resource Protected Area)	Central and local government monitor the proper usage of land and sea area	Monitoring especially proper use of land area and discharge of land-based discharge to marine environment
Special Island	Central and local government monitor marine environment	Usage of islands and modification of landscape
National Park	Basically authority prohibit all human activities except guided activities	All human activities prohibited except climbing, tracking and traditional life style
Ecosystem/landscape Conservation	No information	No information
Wildlife Protection	No information	No information
Natural Heritage	No information	No information

The Protected Species in MPAs in China

Name of MPA	Protected species
Haiyang Qianliyan Island Marine Ecosystem Provincial Nature Reserve	Japanese camellia Japanese honeysuckle (*Lonicera japonica thumb*) Barbary wolfberry (*Lycium barbarum L*) Chinese thorowax (*Bupeurum scorzonerifolium willd*)
Zhifu Archipelago National Special Marine Reserve	Marine biological resources
Rongcheng Bay National Fisheries Genetic Resources Reserve	*Chlamys farreri, Anthocidaris crassispina*
Rushan National Fisheries Genetic Resources Reserve	*Tegillarca granosa*
Jiaozhou Bay Wetland Provincial Special Marine Reserve	*Grus japonensis, Grus grus, Cygnus cygus, Aquila chrysaetos*
Yalujiang River Estuary Wetland National Nature Reserve	*Glycine soja* (wild soybean) **First-class protected animals**: *Ciconia ciconia, Ciconia nigra, Aquila chrysaetos, Aquila heliacal, Grus japonensis, Grus leucogeranus* **Second-class protected animals** (30): *Cygnus Cygnus, Platalea leucorodia* Endangered animal: *Larus saundersi*
Haizhou Bay National Ocean Park	Marine biological resources
Kongdong Islands Provincial Nature Reserve	*Saxidomus purpurarurs* *Apostichopus japonicas* *Haliotis discus hannai*
Changdao National Nature Reserve	*Grus japonensis, Grus leucogeranus, Cygnus Cygnus, Aquila heliacal* *Aquila chrysaetos, Aegypius monachus* 11 species of birds are protected and 39 species are first-class and second-class protected wild animals
Rizhao Sea Area Coelomactra Antiquata National Fisheries Genetic Resources Reserve	*Coelomactra antiquata*

Annex 5

The protected species in MPA in Japan

Name of MPA	Protected species
Danjyo Guntou Islands	Streaked Shearwater (*Calonectris leucomelas*) Japanese murrelet (*Synthliboramphus wumizusume*)
Breading Habitat of Streaked Shearwater and Japanese Cormorant in Awashima Island	All species in MPAs
Daisen-Oki National Park	**Animal**: *Spirastrella insignis*, *Haliclona (Reniera) cinerea*, *Callyspongia elegans*, *Halocordyle disticha*, *Plumularia setacea*, *Solanderia secunda*, *Dendronephthya* Kukenthal, Melithaeidae Gray, Acanthogorgia Gray, *Ellisella rubra*, *Euplexaura* Verrill, Actiniidae Rafinesque, *Stichodactyla tapetum*, *Oulastrea crispate*, *Tubastraea faulkneri* Wells, *Dendrophyllia arbuscula*, *Alveopora japonica*, *Psammocora profundacella* Gardiner, *Palythoa tuberculosa* Esper, *Myriopathes japonica*, *Lodictyum axillare*, *Lepidozona coreanica*, *Acanthopleura japonica*, *Acanthochitona defilippii*, *Cellana grata*, Trochidae, *Lottia dorsuosa*, *Astralium haematragum*, *Lunella coronatus coreensis*, *Hipponix conica*, *Cypraea* (*Purpuradusta*) *gracilis* Gaskoin, *Echinolittorina (Granulilittorina) radiate*, *Murex troscheli*, *Pyrene punctata*, *Epitonium japonicum*, Aplysiidae Lamarck, *Chromodoris orientalis* Rudman, *Arca navicularis* Bruguière, *Lithophaga curta*, *Septifer virgatus*, *Sporochnus radiciformis*, Balanidae Leach, *Capitulum mitella*, *Pachygrapsus crassipes* Randall, *Oedignathus inermis*, *Oxycomanthus japonicus*, *Lamprometra palmata*, *Certonardoa semiregularis*, *Gorgonocephalus eucnemis*, Ophiurida, *Styela clava* Herdman, *Chromis notata*, *Goniistius zonatus*, *Pterogobius elapoides*, *Pterogobius zonoleucus*, *Cirrhilabrus temminckii* Bleeker, *Thalassoma cupido*, *Rudarius ercodes*, *Takifugu niphobles* **Plant**: *Ulva pertusa* Kjellman, *Ulva intestinalis* Linnaeus, *Ulva conglobata* Kjellman, *Microdictyon japonicum* Setchell, *Cladophora* Kützing, *Chaetomorpha* Kützing, *Caulerpa okamurae*, *Codium* Stackhouse, Bryopsidaceae Bory de Saint-Vincent, *Sphacelaria yamadae* Segawa, *Dictyota dichotoma* Lamouroux, *Zonaria diesingiana* J. Agardh, *Anthogorgia* Verrill, *Dictyopteris* J. V. Lamouroux, *Sphaerotrichia divaricata* (C. Agardh) Kylin, *Ishige okamurae* Yendo, *Leathesia* S. F. Gray, *Myelophycus simplex* (Harvey) Papenfuss, *Scytosiphon lomentaria* (Lyngbye) Link, *Colpomenia* (Endlicher) Derbès & Solier, *Carpomitra costata* (Stackhouse) Batters, *Chorda asiatica* Sasaki & Kawai, *Sargassum horneri* (Turner) C. Agardh, *Sargassum hemiphyllum* (Tuener) C. Agardh, *Sargassum thunbergii* (Mertens ex Roth) Kuntze, *Sargassum yendoi*, *Sargassum ringgoldianum*, *Myagropsis myagroides*, *Sargassum nigrifolium*, *Sargassum macrocarpum*,

	Sargassum piluliferum, *Sargassum patens*, *Sargassum siliquastrum*, *Dichotomaria falcata*, Corallinaceae Lamouroux, *Delisea japonica*, *Caulacanthus ustulatus*, *Hypnea charoides*, *Peyssonnelia caulifera*, *Ahnfeltiopsis flabelliformis*, *Chondracanthus* Kützing, *Portieria hornemannii*, *Schizymenia dubyi*, *Polyopes affinis*, *Grateloupia* C. Agardh, *Plocamiaceae* Kützing, *Gracilaria* Greville, *Chrysymenia wrightii*, Champiaceae Kützing, Ceramiaceae Dumortier, Delesseriaceae Bory, *Dasya sessilis*, *Leveillea jungermannioides*, *Chondria crassicaulis*, Symphyocladia Falkenberg, Laurencia J. V. Lamouroux
San'in Kaigan National Park	**Animal**: *Callyspongia confoederata*, *Aglaophenia whiteleggei*, *Solanderia secunda*, *Aurelia aurita*, Melithaeidae Gray, Euplexaura Verrill, Actiniidae Rafinesque, *Acanthopleura japonica*, *Aplysia kurodai*, Doridiidae Rafinesque, *Sporochnus radiciformis*, *Tropiometra afra macrodiscus*, *Oxycomanthus japonicus*, Astropectinidae Gray, Ophidiasteridae Verrill, Asterias Linnaeus, *Plotosus japonicus*, Pomacentridae, *Pterogobius elapoides*, *Pterogobius zonoleucus*, *Enneapterygius etheostomus* **Plants**: Cladophora Kützing, Chaetomorpha Kützing, *Caulerpa okamurae*, Codium Stackhouse, Dictyota J. V. Lamouroux, Dictyopteris J. V. Lamouroux, Ishige Yendo, Colpomenia (Endlicher) Derbès & Solier, *Chorda asiatica*, Myagropsis Kützing, Scinaia Bivona-Bernardi, Corallinaceae Lamouroux, Delisea J. V. Lamouroux, *Ahnfeltiopsis flabelliformis*, Chondracanthus Kützing, *Schizymenia dubyi*, Plocamium J. V. Lamouroux, Chrysymenia, Martensia K. Hering, Acrosorium Zanardini ex Kützing, Symphyocladia Falkenberg, *Phyllospadix iwatensis*
Niseko-Shakotan-Otaru Kaigan Quasi National Park	**Animal**: Halichondria, *Aglaophenia whiteleggei*, *Plumularia setacea*, *Moerisia horii*, *Solanderia misakinensis*, Actiniidae Rafinesque, *Haliplanella lineata*, *Metridium senile*, *Rhizopsammia minuta mutsuensis*, *Beroe cucumis* Fabricius, Ischnochitonidae Dall, *Cryptoplax japonica*, Mopaliidae Dall, Trochidae, Littorinidae Children, Aplysiidae Lamarck, *Septifer virgatus*, *Hydroides ezoensis*, *Chthamalus challengeri*, *Diodon holocanthus*, Diogenidae Ortmann, *Botryllus primigenus*, *Botryllus tuberatus*, *Aulichthys japonicus*, Syngnathidae, Pholidae, Liparidae, *Aptocyclus ventricosus*, Agonidae **Plant**: *Ulothrix flacca*, Monostroma Thuret, Cladophora Kützing, Chaetomorpha Kützing, *Urospora penicilliformis*, *Codium fragile*, Bryopsis, Ectocarpus Lyngbye, *Ralfsia fungiformis*, *Dictyota dichotoma*, *Dictyopteris divaricata*, *Sphaerotrichia divaricata*, Leathesia, *Dictyosiphon foeniculaceus*, *Coilodesme japonica*, *Punctaria latifolia*, *Scytosiphon lomentaria*, Colpomenia, Desmarestiaceae, *Chorda asiatica*, *Cystoseira hakodatensis*, Sargassum C. Agardh, Palmaria Stackhouse, Corallinaceae Lamouroux, *Bonnemaisonia hamifera*, *Trailliella introcata* Batters,

Annex 5

	Gloiosiphoniaceae, *Ahnfeltiopsis flabelliformis*, *Tichocarpus crinitus*, Chondracanthus Kützing, Chondrus Stackhouse, *Schizymenia dubyi*, Prionitis J. Agardh, Grateloupia C. Agardh, *Neodilsea yendoana*, *Hyalosiphonia caespitosa*, Dumontia J. V. Lamouroux, Gracilaria Greville, *Chrysymenia wrightii*, *Champia parvula*, Lomentaria Lyngbye, *Antithamnion nipponicum*, Ceramium Roth, Psilothallia F. Schmitz, Delesseriaceae Bory, Heterosiphonia Montagne, *Neorhodomela aculeate*, *Enelittosiphonia stimpsonii*, *Chondrai crassicaulis*, Laurencia J. V. Lamouroux, *Phyllospadix iwatensis*
Genkai Quasi National Park	**Animal**: *Lytocarpia Kirchenpauer*, *Aglaophenia whiteleggei*, *Solanderia secunda*, *Melithaea flabellifera*, *Menella rigida*, *Euplexaura erecta*, *Anthoplexaura dimorpha*, *Tubastraea faulkneri*, *Dendrophyllia coarctata*, *Balanophyllia ponderosa*, *Hydnophora pilosa*, Acropora Oken, *Sabellastarte japonica*, Comatulida, *Linckia laevigata*, *Certonardoa semiregularis*, *Patiria pectinifera*, *Kyphosus vaigiensis*, *Petroscirtes breviceps*, *Ditrema temminckii*, Pomacentridae, *Hypoatherina valenciennei*, **Plant**: *Halimeda discoidea*, Codium, *Dictyota dichotoma*, *Anthogorgia bocki*, *Dictyopteris pacifica*, *Ishige sinicola*, Corallina, *Plocamium telfairiae*, *Champia parvula*
Kanmurijima-Kutsujima National Wildlife Protection Area	*Calonectris leucomelas*, *Oceanodroma monorthis*, *Synthliboramphus wumizusume*, *Falco peregrines*, *Columba janthina*
Kosado-toubu National Wildlife Protection Area	No information
Toyama Bay	Sea cucumber (May 1 – October 31) Gelidium (September 1 – October 31) Ayu (December 1 – June 15) *Chionoecetes japonicus* (June 1 – August 31: male, All year: female)

The protected species in MPA in Korea

Name of MPA	Protected species
Sindu-ri Sand Dune	No information
Mun-Sum	*Dendronephthya suensoni*, *Dendronephthya castanea*, *Dendronephtya molli*, *Dendronephthya putteri*, *Dendronephthya alba*, *Dendrophyllia cribrosa*, *Dendrophyllia micrantus*, *Plumarella spuinosa*, *Euplexaura crassa*, *Plexauroidea reticulate*, *Verrucella stellata*, *Tubastraea coccinea*, *Plumarella adhaerans*, *Plexauroidea complexa*, *Antipathes japonica*
Ohryuk-do	No information
Muan	**Endangered species**: Chinese Egret, Spoon-billed Sandpiper, Eastern Curlew and Buzzard
Suncheon	Huge colony of Reed (*Phragmites communis*), Habitat of Hooded Crane (*Grus monacha*) Endangered species: March Crab (*Sesarma intermedium*), Eurasian Spoonbill (*Platalea leucorodia*), Black-faced Spoonbill (*Platalea minor*), Bean goose (*Anser fabalis*), Wooper swan (*Cygnus cygnus*), Hooded crane (*Grus monacha*), Baikal teal (*Anas formusa*), Eurasian oyster catcher (*Haematopus ostralegus*), Far eastern curlew (*Numenius madagascariensis*), Saunders' gull (*Larus saunders*)
Bosung Bulgyo	**Endangered species**: Black-faced spoonbill (*Platalea minor*), Bean goose (*Anser fabalis*), Wooper swan (*Cygnus cygnus*), Hooded crane (*Grus monach*), Baikal teal (*Anas formusa*), Eurasian oyster catcher (*Haematopus ostralegus*), Far eastern curlew (*Numenius madagascariensis*), Saunders' gull (*Larus saunders*)
Buan Julpo Bay	No information
Gochang	No information
Seocheon	**Endangered species**: Eurasian oyster catcher (*Haematopus ostralegus*), Whooper swan (*Cygnus cygnus*), Mongolian plover (*Charadrius mongolus*), Asian dowitcher (*Limnodromus semipalmatus*), Eurasian curlew (*Numenius arquata*), Far eastern curlew (*Numenius madagascariensis*), Spotted greenshank (*Tringa guttifer*), Terek sandpiper (*Xenus cinereus*), Dulin (*Calidris alpina*)
Jeung-do	No information

Annex 5

The protected species in MPA in Russia

Name of MPA	Protected species
Far Eastern Marine	Far Eastern trepang, Japanese scallop, Pacific needlefish, Giant octopus, King crab, Large-scaled rudd, Japanese sandfish, Eastern rockfish, Sea calf, Chinese egret, Spoon-bill, Island cricket, Japanese yew, omatsu, Boston ivy, Tiger and nodding lilies, Schlippenbach's rosebay, Caltrop goral. The largest number of species of animals and plants inhabits subtidal zone, located on the lower boundary of the littoral zone to a depth of 200 meters, including public water reserve of more than 200 species of macro-algae and 200 species of fish, 300 species of bivalve and gastropod molluscs, 200 species of marine worms, about 100 species crustaceans, 40 - echinoderms, and numerous other groups Coldwater - boreal-Arctic and warm water - subtropical and even tropical marine invertebrates. In the waters of the reserve were met by tropical sharks and sea snakes.
Lazovsky	List of vascular plants of Lazo Reserve, is not yet complete, with over a thousand species. Flora lower plants and bryophytes are virtually unknown. Indented coastline, varied terrain coast are the reason that in the Lazo Reserve, as in any other land reserves of the Far East, are richly represented groups of animals are attracted to the seaside habitats. Among the reserves of the extreme south of Primorye Lazo allocated and the fact that it is best to keep the population of large animals, their species composition is almost suffered a loss due to human influence. The fate of a mountain, spotted deer, tiger illustrates this very clearly. Regional groups (community) of vertebrates. The composition of the inhabitants of the rocky seashore in the Lazo Reserve: on Kekura and coastal cliffs are small, up to three to five dozen nests, colonies of cormorants Ussuri, and the individual are known to nest on the island of Petrova. Absent-mindedly, without forming large clusters, nests in the same places as the spectacled guillemot. Belopoyasnyh colony of swifts nest were placed in vertical and horizontal crevices, rocky niches account for sometimes several thousand individuals (Litvinenko, Shibaev, 1971).
Sikhote-Alin	Wild dappled deer, Amur tiger, Amur wood cat, goral, Manchuria hare, raccoon dog, paleheaded chiffchaff, rock thrush, grosbeak
Land of the Leopard	The National Park marked species, the protection of which is of international significance, indicator species whose habitats are threatened, and rare and endangered species. Currently, about 40 rare and endangered species require urgent conservation measures, 10 of them are

	classified in the first category of protection adopted in the PRC and 23 are protected in accordance with Russian legislation. Apart from tigers and leopards in these places there are species such as black bear, brown bear, ungulates (spotted deer, musk deer, roe deer, Goral and wild boar),and the lynx, the Far Eastern leopard cat, fox, badger, hedgehog, raccoon dog, speakers , otters, bats and shrews, Manchurian hare, squirrel, chipmunk, 7 species of amphibians and 12 species of reptiles. In the south-west Primorye lives 65 species of mammals. The highest value for the conservation of the natural complex are species listed in the Red Data Book of IUCN and Russia. For the fauna of the world most serious situation is currently developed with the preservation of the Far Eastern leopard subspecies. According to the last census (2013) in the south-west Primorye 48-50 leopards inhabit. This - the last center of the living subspecies of the big cats on the planet.
Tumninsky	Among the protected species - the Amur tiger, white-tailed eagle, Steller's sea eagle, golden eagle, fish owl, the osprey, mandarin duck, merganser, spruce grouse, black crane, black stork, Far stork, peregrine falcon.
Vostok Bay	The total number of marine and terrestrial organisms than 2600. The most abundant species of large invertebrates represent Lena bivalves (sea scallop Patinopecten yessoensis, Pacific mussel Mytilus trossulus and mussel Gray Crenomytilus grayanus), belly-legged shellfish (littoriny Littorina brevicula, L. mandshurica and others nutsella Nucella heiseana), cephalopods molluscs (octopus octopus conispadiceus, squid Todarodes pacificus), echinoderms (black and gray sea urchins Strongy-locentrotus intermedius, S. nudus, flat sea urchins Echinarachnius parma, Scaphechinus mirabilis, sea cucumber Stichopus japonicus, starfish - Patiria Grebe shkovaya Patiria pectinifera and Amur star Asterias amurensis), crustaceans (grass shrimp Pandalus kessleri, king crab Paralithodes kamtschatica). Vegetation is represented by an abundance of sea grasses (eelgrass Zostera marina, Z. asiatica, phyllospadix Phyllospadix iwatensis), brown algae (Sargassum Sargassum miyabei, kelp Laminaria japonica), green algae (Ulva Ulva fenestrata), etc. World presents a wide variety of fish species. Among the most valuable - a pass-Sim salmon, smelt, catfish and smelt, perch, mackerel, pelingas (kefalevye)
Moneron Island	The flora of the island is peculiar. Most of treeless spaces covered by so-called "grape" meadows, where the grass, reaching 2-2.5 m in height, entwined vines of wild grapes. In July and August the meadows blooming bluebells, daisies and umbrella. The island is also found viburnum, rowan, rose hip wrinkled, various species of willow, mulberry, velvet Sakhalin, small-leaved maple, stone

Annex 5

	birch, green alder, common Kuril bamboo. In the eastern part of the island has a small depression, which, if protected from the cold north-westerly winds, increasing Ayan spruce. There are breeding colonies of seabirds that live mainly not on the island, and on the islets and rocks surrounding it, which is associated with the penetration of the island of carnivorous mammals (fox, sable). Have the greatest number of black-tailed gull and puffin rhinoceros. Also inhabit the northern storm petrel, Ussuri Cormorant, Pelagic Cormorant, Pacific sea gull, etc. In some parts of the coast arrange rookery sea lions and seals. The influence of the warm Tsushima Current determines the existence in the waters around the island of subtropical species of mollusks (such as Abalone) redkoiglyh sea urchins, sea stars and multipath