

論文

우리나라 해양보호구역 관리제도의 문제점과 개선 방안

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1. Introduction

Korea is a peninsula country located in the northeast part of the Pacific Coast. Koreans have used marine ecosystem for various ways from ancient times and it has played important roles in Korean economy. In recent years, marine conservation is raising as a significant issue in Korean marine policy. On the one hand, as most maritime countries have undergone, Korean marine environment is suffering from a severe overexploitation and devastated fishing ground due to industrialisation in fishery and use of destructive fishing gears. On the other hand, there is an increasing demand for recreational activities in coastal and marine areas. However, good quality marine ecosystem is diminishing year by year because of increasing water contamination and failure in fish stock management.

The Korean government identified the necessity of marine ecosystem conservation relatively early, thus the government has designated several kinds of special areas including area for protecting fisheries resource, area for conserving natural ecosystem, controlled area for marine environment, national marine park, etc. since 1970s. This early trial was in name only but could not be developed as a national MPA system because of several obstacles and immature management.

Under these backgrounds, this paper reviews present status and problems of MPA management and after that, derives recommendations for successful implementation of national MPA system in Korea.

2. Korean MPAs

2.1 Overview

In Korea, concerns about the environment have emerged since late 1960s. The Green Belt system was born in early 1970s under the strict environmental preservation

policy. In the beginning stage, the system contributed to

environmental regulations. However, the system became a great burden on the local development and progress of urbanisation after late 1970s when the Korean economy entered a rapid growth period. The situation was similar in marine conservation. Since Hallyeo-haesang marine national park was established in 1968, the Korean government has introduced several type of special area for marine conservation including "Area for Fisheries Resource Protection" in 1975, but before long, pressure of economic growth debilitated the object of these conservation policies.

After that, marine conservation in Korea reached a new phase with Agenda 21 as a momentum in 1990s and proposals of the Agenda 21 have been raised as social issues which including protection of coastal area at national and international level; controlling and banning removal of hazardous waste at sea, protection of fish population and sustainable fishery, introduction of technologies for sustainable development, etc. Responding to Agenda 21, the Korean government has made a series of initiatives to apply the concept of integrated coastal management (ICM) at both national and local levels (Lee, 1998).

In early 2000s, the Ministry of Maritime Affairs and Fisheries (MOMAF) published a national ocean governance strategy plan, titled "the Ocean Korea 21", to give the public confidence in the health and productivity of ocean and to help Korea emerge as a leading sea power in the 21st century. The three basic objectives include 1) promoting the vitality of territorial waters, 2) developing a knowledge-based marine industry, and 3) achieving sustainable development of marine resources. In detail, "the Ocean Korea 21" proclaimed that the government should optimise national coastal management system by integrating smaller management systems and pursuing coastal maintenance projects to keep domestic seas healthy and productive.

2.2 Current MPAs in Korea

Due to the definition of IUCN¹⁾, there are largely seven categories of MPAs established in Korea.

1) Coastal and Marine National Park: this is the first type of special area adapted in Korean marine conservation system. There are four coastal and marine national parks (Hallyeo-haesang, 1968; Taean-haean, 1978; Dadohaesang, 1981; and Byunsan-bando, 1988). Since designation of four marine national parks the scenic beauty of the areas has been relatively well preserved. However, neither regulation nor control have been practically imposed on ecologically harmful activities within the marine park zone, so Korean marine national parks system could not contribute to ecological conservation and sustainable fisheries.

2) Area for Protecting Fisheries Resource: Initially, the Area for Protecting Fisheries Resource was designated for the purpose of protecting spawning ground and habitat of marine organisms based on "the Act on use of national land". From 1975 to 1982, a total of 10 sites have been designated covering 2,478 km² of marine area and 1,232 km² of land area. It seems to be failed because the areas were existed just banning the change of land uses without application of fishery regulations for more than 20 years. The main reasons were fisher's stout resistance and weakness of legal foundation. Finally, the government released some 77% of land area from designation in late 2004.

3) Area for Protecting Tidal Wetlands: The plan for the

Area for Protecting Tidal Wetlands was included in "the National Integrated Coastal Management Plan" which was published in 2000 to prohibit any significant alteration of its natural state. "The Act for Wetland Conservation" is clarifying that Area for Protecting Tidal Wetland can be designated by the Minister of the MOMAF where 1) the wetland maintaining pristine natural state or high biodiversity, 2) rare or threatened species are inhabited or using for migrating route, and 3) wetlands with special scenic beauty, topological or geological value. Until now, five sites and a total of 140.7 km² of tidal wetlands have been designated. This MPA is expecting to act as a key role in wetland ecosystem protection and the Korean government is investigating other wetland areas for additional designation.

4) Conservation Area for Marine Ecosystem: The Minister of the MOMAF also has an authority to designate 'the Conservation Area for Marine Ecosystem' based on the "the Natural Environment Conservation Act". The Article 18 and 60 of *the Act* prescribe the required conditions as ① an area, maintaining pristine natural condition or abundant biodiversity thus, contains high value for scientific research; ② an area which needs special conservation for maintaining natural state of geological or topological characteristics; ③ an area recognised as a high value of conservation site for habitats or migration route of threatened wildlife; and ④ an area which can represent diverse ecosystem or a sample site of a certain ecosystem. Since 2002, four sites and a total of 70.3 km² have been designated as this type of MPA.

1) To date, the most frequently accepted definition of a marine protected area is that originally developed in 1987 at the Fourth World Wilderness Congress in Denver, Colorado, and subsequently adopted by the World Conservation Union (IUCN) in 1988 at its 17th General Assembly (IUCN, 1988; Kelleher & Kenchington, 1992). According to this definition, a marine protected area is "Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment." (Kelleher & Kenchington, 1992, p.7).

5) Marine Area for Environmental Protection and (6) Specially Controlled Marine Area: Revised in 2000, Article 4 of "the Act for Marine Pollution Preservation" prescribes that the Minister of the MOMAF has an authority to designate "Marine Area for Environmental Protection" and "Specially Controlled Marine Area". The

former is applicable for the area of excellent marine environment so it needs continuous protection while the latter is applicable for the area of severely difficult to maintain / preserve marine environment so it needs immediate control. In Feb 2000, four sites of Marine Area for Environmental Protection and five sites of Specially Controlled Marine Area were designated at once, and there has been no additional designation yet.

7) Special Island: this is designated by the Ministry of the Environment where threatened species (both flora and fauna) are inhibited or excellent scenic beauty. The MOE conducted general investigation for ecosystem of 641 islands from 1998 to 2002 due to the sixth Clause of "the Special Act for Ecosystem Conservation in Dokdo Islets and Other Isles", and as a result, have been designated as Special Islands. Once an island is designated as the Special Island, all activities influencing ecology are restricted including new building, rebuilding or extending a building, land reclamation, felling, aggregate collection, grazing, wildlife capture / carrying in or out etc.

2.3 Problems in MPA management

Since the adoption of the Agenda 21, Korean government has promoted an ambitious marine conservation policy with the formulation of "the National Integrated Coastal Management Plan" and "the Ocean Korea 21" presented a blueprint for the advanced marine management system. The most that response to ecosystem conservation and protection of marine environment were appropriate and effective. However, there are still lots of weak points which hinder to achieve successive national management system of MPAs in Korea.

Firstly, a number of different acts are related for designation of different MPAs. For effective management, inclusive legislation is necessary. Secondly, many type of MPAs are developed but some MPAs are overlapping in both meanings and functions. Thirdly, there is no network system in MPA management. In addition, regulations for human activities at sea are not clearly defined and no MPA

has zonal division. "The Ocean Korea 21" contains market-based fishery management including TAC and ITQ but no-take-zones (or no fishing zones) are not considered as sustainable resource management tools. Next, there is no or weak monitoring system to analysis the effectiveness of MPA designation. Lastly, Korean MPAs are relatively small in size thus their ecological contribution within and adjacent area (spill over) are precarious.

3. Recommendations

3.1 Legal requirement for MPA designation

It is necessary to constitute a single coordinated legal system of nature conservation. All marine nations had being applied legal restriction for a certain activities in seawater for different purposes before they introduced MPA system for marine nature conservation. In this reason, generally MPAs have been designated and controlled by different legal basis. In case of the USA, MPAs are designed by: the Magnuson-Stevens Fishery Conservation and Management Act; the Endangered Species Act; the Coastal Zone Management Act; the National Marine Sanctuaries Act; the National Wildlife Refuge System Administration Act; the National Park Service Organic Act; Marine Mammal Protection Act; Clean Water Act; National Environmental Policy Act and so on.

In case of Korea, there is no comprehensive legal or institutional framework, which is commonly adopted for all type of MPAs. Instead, each sub-legislation has been enacted for each type of MPA. In addition, the absence of leading legal system causes social complications around MPAs when different acts are applied for different conflicting interests. For this reason, the Korean MPAs have been degraded as "paper parks" for a long time. Legislations applied in MPAs are including "The National Park Act" (to designate and manage National Park in marine area, "Prevention of Marine Pollution Act"(to prevent marine pollution and to respond to oil spills), "Naval Base Act" (to control marine activities in the Naval Base area), "Farmland Expansion Promotion Act" (to landfill coastal area for farmland expansion), "Fisheries Act" (to establish fishery policy and to give fishing licenses), "Fishery Resource Protection Act" (to designate fishery

resources protection areas), "Fishing Harbour Act" (to designate and manage fishing harbours), "Tourism Protection Act"(to designate & manage marine resort area), "Port Act" (to designate and manage ports and to establish port committees), "Marine Transportation Industry Promotion Act" (to promote coastal transportation), "Framework Act on Environmental Policy" (to establish environmental policy and "the Long-term Environmental Conservation Plan"), "Natural Environmental Conservation Act"(to designate natural ecosystem conservation areas and natural environment restoration areas, to establish natural environmental restoration plans, to survey the natural environment), "Water Quality Conservation Act" (to establish effluent standards), "Framework Act on Marine Development"(to establish Marine development policy and to establish marine development basic plan), and so on.

Current government research reports (Choi & Park, 2004; Nam et al., 2004) pointed the necessity of proper legislation system which unifying all sub-legislations to improve the quality of the management in the MPAs. However, legal framework for inclusive MPA legislation did not included in "the Act for Marine Environment Management", which was newly enacted in November 2006.

Special enactment for MPA management is global tendency in these days. The Australia has an exemplary experience about this. To promote a co-operative approach to the protection and management of the environment, the Australian government unified six pre-existing commonwealth legislations²⁾ and replaced them as one integrated legal authority, the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). This Act comprehensively covers MPAs and related matters in the Australia providing a national framework for marine protection.

In Republic of South Africa, not only MPAs but also all kinds of protected area are controlled based on "Protected Areas Act (Act no 57 of 2003)". The Government Gazette (2004) identifies the objective of this act as "to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its

2) Environment Protection (Impact of Proposals) Act 1974; Endangered Species Protection Act 1992; National Parks and Wildlife Conservation Act 1975; Whale Protection Act 1980; Wildlife Protection (Regulation of Exports and Imports) Act 1982; and World Heritage Properties Conservation Act 1983.

natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; and for matters in connection therewith".

3.2 Establishment of National authority for MPA management

A competent government authority which is responsible for the whole subjects of MPA is also required for integrated management and consistent policy implementation. In most marine nations, the existing government department hardly cover MPAs entirely because MPAs are implicated in several fields, generally fisheries, environment, and tourism. In this reason, the USA established 'The National Marine Protected Areas Center (the national MPA center)' as a united national system for MPA management, directed by the Executive Order 13158. The MPA Center is located within the National Oceanic and Atmospheric Administration (NOAA), an agency of the Department of Commerce. The goals of the Centre include developing the framework for a national system of marine protected areas, improving MPA stewardship and effectiveness and facilitating national and regional coordination of MPA activities.

In Italy, a national legal body, named the Servizio Difesa Mare, Ministero dell'Ambiente (the marine protection service of the ministry of the environment) is in charge of marine resource protection controlling the whole process of MPA establishment, and as of 2002, 15 MPAs had been established according to the process identified by the marine protection service. Italian government's central institute for applied marine research: ICRAM (Istituto Centrale per la Ricerca scientifica e tecnologica Applicata al Mare). Eight MPAs are managed by local management bodies, two are managed by national parks, one MPA is managed by NGOs, WWF Italy, and the remaining four are being managed temporarily by the local Coast Guide Offices named "Capitanerie di Porto" (Hoyt, 2005).

In Korea, the newly enacted "Act for Marine Environment management (November 2006)" declared reorganisation of existing "Korea Marine Pollution Response Corp", and establishment of "Marine Environmental Management

Corporation" which conduct inclusive affairs about marine environment. In this stage, it is not clear whether the new Marine Environmental Management Corporation will have responsibility about MPA management in Korea.

3.3 Establishment No-take MPAs for fisheries management

Since the dawn of history, marine fishery has long performed as the main food industry with agriculture in the Korean peninsula. The petroglyphes in Ulsan, which is the city located in south east part of Korean peninsula, show that the human beings in Bronze Age could catch lots of marine creatures including some kinds of whales. The main feature of the modern fisheries in Korea is mixed fisheries, multi species caught by multi fishing gears (Chae & Pascoe, 2005). This is closely related with diet custom of the Korean people and it is supported by natural conditions of the Korean coastal zone. In Korea, fisheries products contribute 39.2% in the total animal protein supply, which is on average 41.4kg per person annually (Pak & Joo, 2002).

Over-exploitation in fishing industry is a serious problem in Korean fishery. Recent fisheries statistics shows the decreasing tendency both in production and value of fish. In this point, the application of an ecosystem-based approach to fisheries and wider marine resource management is urgently required to promote more sustainable marine resource use. Since 2000, Korean government stresses creation of a "Marine Ranching Program" as a keynote of sustainable resource management policy. This program is effective for several settled species; however, it is not enough to cover the entire fish stock collapse around the Korean Peninsula.

Instead, a no-take MPA may function as a supplement of conventional fisheries management tools operating in Korea. TACs and other fisheries regulation aim to manage individual species, while Korean fisheries have mixed structure, multi-species caught by several gear types. According to Hilborn et al. (2004), marine reserves have some potential advantages for fisheries that are multi-species or on more sedentary stocks, or for which broader ecological impacts of fishing are an issue. In addition, MPAs can play a key role in securing healthy fishing ground under the inevitable situation of competitive resource use with Japan and China. Protected critical habitat and biodiversity can sustain or enhance fisheries by preventing spawning stock collapse and providing

recruitment to fished area (Rudd & Tupper, 2002). Thus, fisheries purpose MPA can contribute to not only stable supply of fisheries products but also acquisition of leading position in resource management among competitive international relationships.

3.4 Establishment of MPA Network

Marine ecosystem is not independent but fully interconnected and functions as a whole. Marine ecosystem consists of different type of marine habitats, for instance, sea cliffs, sand dunes, shingle, saline lagoons, saltmarsh, estuaries, sandy and muddy seashores, rocky shore, underwater sediments, seabed etc. and various flora and fauna are mutually interacted by food chain.

A Network of MPA is a set of MPAs within a biogeographic region, connected by larval dispersal and juvenile or adult migration. Networks are characterised by a coherence in purpose and by the connections between its constituent parts. By protecting marine ecosystems and their populations, MPA networks can reduce risk by providing important insurance for fishery managers against overexploitation of individual populations (Murray, et al., 1999). There is increasing evidence that a network of MPAs buffers against the vagaries of environmental variability and provides significantly greater protection for marine communities than a single reserve (NCEAS, 2001). Thus, a network of MPAs implies something greater than a collection of sites. Such networks, covering as small as 5% or as large as 15-20% of the coastline would protect a spawning stock biomass perhaps large enough to prevent fishery collapsed (Russ and Alcala, 1994).

Until recently, MPA policy in Korean has focused on protection of individual species and habitats but there is no plan for establishing MPA network. Considering the distinctive characteristics of each three-side marine environment around the Korean Peninsula, the effects of networking system is expected very important. In addition, Korean government also should prepare for taking the initiative of the East-Asian network of MPA, like "the Natura 2000 programme" in EU. Hereafter, MPAs will be the critical point in international agreement about both fishery and offshore marine water protection.

4. Summary and conclusion

Marine protected area is a new type of management system which answers the root causes of modern marine problems. The various economic benefits verify the necessity of MPA system and many marine nations fortify this with actual applications. This paper tried to diagnose current status of Korean MPA policy and to provide recommendations for successful marine conservation and coastal area management. To sum up, the Korea's marine conservation would seem to be rather weak and ineffectual with no powers to control some of the potentially most hazardous activities. The success of MPA is closely linked to social and institutional conditions. Through reviewing the experience of other marine nations, it is founded that legislation and central management system is important in the countries where application of MPAs is at an infant stage. Therefore, some recommendations have been suggested with a view to strengthening the legislation and administration. For example, it is necessary to constitute a single coordinated legal system of nature conservation. In case of Korea, there is no comprehensive legal or institutional framework, which is commonly adopted for all type of MPAs. Instead, each sub-legislation has been enacted for each type of MPA. In addition, a competent government authority which is responsible for the whole subjects of MPA was suggested for integrated management and consistent policy implementation. In addition, this thesis recommended establishment of no take marine reserve and its network system for fisheries management in Korea.

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