

# Key Recommendations for MPA Management in Korea

Dong-Ryul Chae<sup>\*†</sup>

\* Gyeongnam Development Institute, 248 Yongji-ro, Changwon-shi Gyeongsangnam-do, 641-728, Korea

## 우리나라 해양보호구역의 효과적 관리를 위한 정책 제안

채동렬<sup>\*†</sup>

\* 경남발전연구원

**Abstract** : The purpose of this paper is to overview Korean MPA, to figure out the problems of current system and to give policy suggestions for effective management for Korean MPAs. Results show that different types of MPAs are established based on different legislations but there is no effective control system for integrated management. In addition, Korean government can not use the function of MPAs due to the insufficient regulation for harmful activities within MPAs. Finally, this paper recommends four policy suggestions for effective management of Korean MPAs: legal requirements of MPA designation, establishment of national authority for MPA management, application of no-take MPAs for fisheries management and establishment of MPA network.

**Key Words** : MPA(Marine Protected Area), MPA management, MPA network, Function of MPA, No-take MPA

**요 약** : 본 연구의 목적은 우리나라의 해양보호구역 제도를 개관하고 제도의 문제점을 도출한 후 해양보호구역의 효과적인 관리를 위한 대안을 제시하는 것이다. 연구결과, 우리나라에는 다양한 법률에 기인해 여러 형태의 해양보호구역이 존재하고 있으나 이를 통합적으로 관리할 수 있는 제도는 마련되지 못한 실정이며 보호구역내 유해행위의 규제에 대한 규정이 미흡하며 해양보호구역의 기능을 제대로 활용하지 못하는 것으로 나타났다. 이들 문제점을 해결하기 위한 방법으로 해양보호구역 지정 및 관리를 총괄하는 단일법률의 제정, 국가차원의 전담 관리기구 조직, 어업금지 해양보호구역 설정 및 해양보호구역 네트워크 구축 등 네 가지의 정책이 제안되었다.

**핵심어** : 해양보호구역, 해양보호구역 관리, 해양보호구역 네트워크, 해양보호구역의 기능, 어업금지 해양보호구역

## 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 raised as a significant issue in Korean marine policy. On the one hand, as in most maritime countries marine environment in Korean is suffering from a severe overexploitation and devastated fishing ground due to industrialization 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, marine ecosystem of good quality is diminishing year by year because of increasing water pollution and failure in fish stock management.

The Korean government identified the necessity of marine

ecosystem conservation relatively early, thus the government 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 and 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

† Corresponding author : drchae@gndi.re.kr, 055-239-0190

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 urbanization 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 types 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 were raised as social issues 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 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, which was reorganized in 2008 as Ministry of Land, Transport and Marine Affairs; MLTM) 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 included 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 optimize 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 IUCN<sup>1)</sup>, there are largely five

categories of MPAs established in Korea.

(1) Coastal and Marine National Park: this is the first type of special area adopted in Korean marine conservation system. There are four coastal and marine national parks(Hallyeo-haesang, 1968; Taean-haean, 1978; Dadohae haesang, 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 has been practically imposed on ecologically harmful activities within the marine park zone, so Korean marine national parks system can not contribute to ecological conservation and sustainable fisheries.

(2) Area for Protecting Fisheries Resources: 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 km<sup>2</sup> of marine area and 1,232 km<sup>2</sup> of land area. It seems to be failed because the areas existed only to ban 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" clarifies that Area for Protecting Tidal Wetland can be designated by the Minister of the MLTM where 1) the wetland maintaining pristine natural state or high biodiversity, 2) rare or threatened species inhabited or was using for migrating route, and 3) wetlands with special scenic beauty, topological or geological value. Until now, 11 sites and a total of 218.25 km<sup>2</sup> of tidal wetlands have been designated. This type of MPA is expected 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 MLTM also has an authority to designate 'the Conservation Area for Marine Ecosystem' based on the "the Act for Conservation and Management of Marine Ecosystem". The Article 25 of the Act prescribes the required conditions as 1) an area, which is maintaining

*features, which has been reserved by law or other effective means to protect part or all of the enclosed environment."* (Kelleher and Kenchington, 1992, p.7).

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 and 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

pristine natural condition or abundant biodiversity, 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 70.37 km<sup>2</sup> have been designated as this type of MPA.

(5) Special Island: this is designated by the Ministry of the Environment where threatened species(both flora and fauna) inhabits or excellent scenic beauty exists. The MOE conducted general investigation into 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, these islands have been designated as Special Islands. Once an island is designated as the Special Island, all activities influencing ecology are restricted including building, rebuilding or extending a structure, 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” has presented a blueprint for the advanced marine management system. Most that response to ecosystem conservation and protection of marine environment have been appropriate and effective. However, there are still lots of weak points which hinder to achieve successful national management system of MPAs in Korea.

First, a number of different acts are related for designation of different MPAs. For effective management, inclusive legislation is necessary. Second, many types of MPAs are developed but some MPAs are overlapping in both meanings and functions. Third, 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 analyze the effectiveness of MPA designation. Lastly, Korean MPAs are relatively small in size, so their ecological contributions within the area and in adjacent area(Spill over) are precarious.

## 3. Policy recommendations

### 3.1 Legal requirement for MPA designation

It is necessary to constitute a single coordinated legal system of nature conservation. All marine nations have been applied legal restriction for 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 types 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), “Marine Environment Management 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 environment restoration plans, and 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 and Park, 2004; Nam et al., 2004) pointed the necessity of proper legislation system which unifies all sub-legislations to improve the quality of the management in the MPAs. However, legal framework for inclusive MPA legislation was not included in “Marine Environment Management Act”, which was newly enacted in January 2007.

Special enactment for MPA management is global tendency in these days. Australia has an exemplary experience about this. To promote a cooperative approach to the protection and management of the environment, the Australian government unified six pre-existing commonwealth legislations<sup>2)</sup> 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 the 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<sup>3)</sup> 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 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 covers MPAs entirely because MPAs are implicated

in several fields, generally fisheries, environment, and tourism. For this reason, 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. As of 2002, 15 MPAs had been established according to the process identified by the marine protection service. 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 January 2007, the Korean government newly enacted the “Act for Marine Environment management” and declared re-organization of existing “Korea Marine Pollution Response Corp”, and establishment of “Korea Marine Environment Corporation(KOEM)” which conducts inclusive affairs about marine environment. After that, Marine Protected Area Center was established in February 2010 as one department of KOEM based on the Act for Marine Environment management. However, the Korean MPA center is insufficient to perform the role as national authority for managing MPAs. The national authority for MPA management means that one independent organization which is invested with complete authority about MPA establishment, management and so on.

### **3.3 Establishment of No-take MPAs for fisheries management**

Since the dawn of history, marine fishery has long existed as the main food industry with agriculture in the Korean peninsula. The petroglyphs 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 and Pascoe, 2005). This is closely related with diet custom of

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.

3) The Government Gazette No. 26311, Republic of South Africa (28, April, 2004)

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 41.4 kg per person annually (Pak and Joo, 2002).

Over-exploitation in fishing industry is a serious problem in Korean fisheries. Recent fisheries statistics show 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 regulations 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 issues. 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 and 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 many different types of marine habitats, for instance, sea cliffs, sand dunes, shingles, saline lagoons, saltmarshes, estuaries, sandy and muddy seashores, rocky shores, underwater sediments, seabeds 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 characterized 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 does (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 can protect a spawning stock biomass large enough to prevent fishery from being collapsed (Russ and Alcala, 1994).

Until recently, MPA policy in Korea has focused on protection of individual species and habitats but there is no plan for establishing MPA network. Considering the distinctive characteristics of three-side marine environments around the Korean Peninsula, the effects of network systems are expected to be very important. In addition, Korean government should also prepare for the initiative of the East-Asian network of MPA, like "the Nature 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 tries to diagnose current status of Korean MPA policy and to provide recommendations for successful marine conservation and coastal area management. To sum up, the marine conservation in Korea seems 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 found that legislation and central management system are important in the countries where application of MPAs is at an infant stage. Therefore, some recommendations have been suggested with a view of 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 types 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 has been suggested for integrated management and consistent policy implementation. In addition, this paper recommends establishment of no take marine reserve and its network system for fisheries management in Korea.

## References

- [1] Chae, D. and S. Pascoe(2005), Use of simple bioeconomic models to estimate optimal effort levels in the Korean coastal flounder fisheries, *Aquatic Living Resources*, 18, pp. 93-101.
- [2] Choi, S. and S. Park(2004), Directions to improve management systems about marine protected areas in Korea, Korea Maritime Institute, Seoul, Korea, p. 136.
- [3] Hilborn, R., K. Stokes, J. Maguire, T. Smith, L. W. Botsford, M. Mangel, J. Orensanz, A. Parma, J. Rice, J. Bell, K. L. Cochrane, S. Garcia, S. J. Hall, G. P. Kirkwood, K. Sainsbury, G. Stefansson and C. Walters(2004), When can marine reserves improve fisheries management?, *Ocean & Coastal Management*, 47, pp. 197-205.
- [4] Hoyt, E.(2005), *Marine Protected Areas for Whales, Dolphins and Porpoises: A world handbook for cetacean habitat conservation*, Earthscan, London, p. 492.
- [5] IUCN(1988), *International Union for the Conservation of Nature and Natural Resources, Proceedings of the 17th Session of the General Assembly of IUCN and 17th Technical Meeting*. San Jose, Costa Rica, 1-10 February, 1988. Gland, Switzerland.
- [6] Kelleher, G. and R. Kenchington(1992), *Guidelines for Establishing Marine Protected Areas, A Marine Conservation and Development Report*. IUCN, Gland, Switzerland. p. 79.
- [7] Lee, J.(1998), Policy issues and management framework of Chinhae Bay, Republic of Korea, *Ocean & Coastal Management*, 38, pp. 161-178.
- [8] Murray, S. N., R. F. Ambrose, J. A. Bohnsack, L. W. Botsford, M. H. Carr, G. E. Davis, P. K. Dayton, D. Gotshall, D. R. Gunderson, M. A. Hixon, D. A. McArdle, J. C. Ogden, J. Roughgarden, R. M. Starr, M. I. Tegner and M. M. Yoklavich(1999), No-take Reserve Networks: Sustaining Fishery Populations and Marine Ecosystems, *Fisheries*, 24(11), pp. 11-25.
- [9] Nam, J., J. Choi, K. Yook and H. Choi(2004), A study on establishment of integrated management system for coastal and marine protected area in Korea, Korea Maritime Institute, Seoul, Korea, p. 234.
- [10] NCEAS(2001), *Scientific Consensus statement on Marine Reserves and Marine Protected Areas*, The National Center for Ecological Analysis and Synthesis, pp. 1-8.
- [11] Pak, M. and M. Joo(2002), Korea's fisheries industry and government financial transfers, *Marine Policy*, 26(6), pp. 429-435.
- [12] Rudd, M. A. and T. M. Tupper(2002), The impact of Nassau Grouper Size and abundance on scuba diver site selection and MPA economics, *Coastal Management*, 30, pp. 133-151.
- [13] Russ, G. R. and A. C. Alcala(1994), Sumilon Island Reserve: 20 years of hopes and frustration, *NAGA, The ICLARM Quarterly*, July, pp. 8-12.

---

Received : 2012. 05. 15.

Revised : 2012. 06. 15. (1st)

2012. 06. 22. (2nd)

Accepted : 2012. 06. 25.