

## Symposium Proceedings

# Marine protected areas and integrated management of coastal and ocean resources

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### Abstract

We compile common ideas on integrated management of coastal and ocean resources. Marine protected areas for seeking balance between biodiversity and sustainable use, adaptive management to avoid risk arisen from uncertainties.

Key words: Eco-tourism, fisheries management, co-management, Shiretoko World Heritage, sustainable development goals, payment for ecosystem services

There are two measures of fisheries management: input control regulates fishing opportunities, while output control regulates the amount and quality of fisheries landings. The idea of marine protected areas (MPAs) is one of the input controls. The idea of MPAs can have a variety of definitions, from no-take zones to areas where the impact of fisheries is weaker than the neighboring areas (Table 1).

**Table 1.** Categories of MPAs in Japan (1–4: Simard 1995, 5–6: Takahashi 2004).

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Nature Park Law (1957, 1970)

- 1) Ordinary area – Seto Inland Sea, Shiretoko
- 2) Marine parks – 64 Sites, 2690.1 ha

Nature Environment Protection Law (1972)

- 3) Marine Special Area – 1 site (Sakiyama Bay 128 ha)

Law of Fisheries Resource Conservation (1951)

- 4) Fisheries conservation area – 120 sites including inland areas

MPAs defined by other area – based management measures

- 5) Voluntary fishing-ban area – Shiretoko, Kyoto, Aichi, etc.  
ca. 30% of > 1161 sites (Yagi et al. 2010: Marine Policy)
- 6) UNESCO's MAB (Man and the Biosphere Program) Biosphere Reserve

– Yakushima & Kuchinoerabujima 183.25 ha

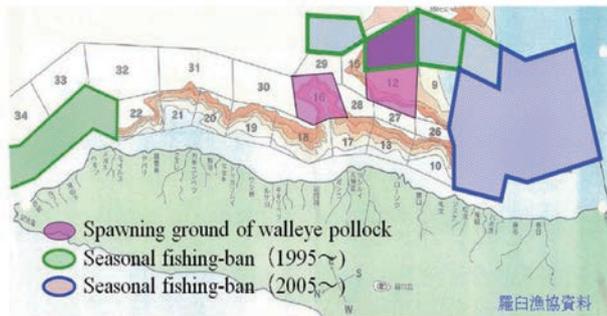
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Management bodies of MPAs also vary, governed either by the government or by fisheries cooperative associations (FCAs). World Heritage Sites have usually been managed by the government as a Member State of World Heritage Convention, whereas bottom-up control is encouraged in biosphere reserves. Both top-down regulation with legitimacy and bottom-up management by local stakeholders are important in any category of MPAs. OECD (1998) defined co-management as “a process of management in which government shares power with resource users, with each given specific rights and responsibilities relating to information and decision-making”.

Co-management of coastal fisheries is common in Asian countries and others. In Japan, fisheries co-management is based on the territorial use rights for fisheries (TURFs) and spatial overlap between a variety of fisheries. Japanese local fishers belong to local FCAs and regulate their own fishing gears, season and fishing ground in operation by themselves (Makino et al. 2009), utilizing an array of good practices of fisheries co-management (Matsuda et al. 2010). Such examples include the fishing grounds surrounding the Shiretoko Peninsula, which was inscribed a World Natural Heritage site in 2005 (Fig. 1); the snow crab fisheries in Kyoto Prefecture. which succeeded in stock recovery and received

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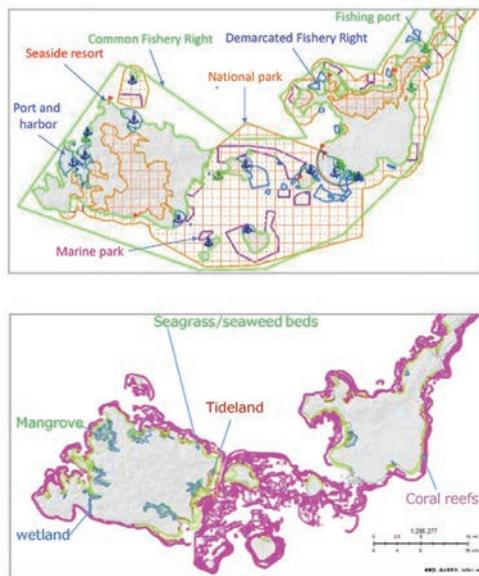
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**Fig. 1.** Autonomous MPA in Shiretoko World Heritage Site (Makino et al. 2010).

the first Marine Stewardship Council (MSC) certification among Asian fisheries. Furthermore, fish-breeding forests are traditional practices based on local ecological knowledge related to ecosystem-based fisheries management. All the aforementioned ideas comprise the Satoumi concept (Yanagi 2007).

More recently, conflicts of fishers with other new stakeholder groups have arisen. Leisure or eco-tourism including whale-watching and recreational snorkeling in coral reefs (Fig. 2), offshore wind farms; restoration movements of seagrass beds as payment for ecosystem services (PES) are typical examples of such conflicts. In Japan, fishers and Fisheries Agency of Japanese Government hesitate to develop an integrated coastal management framework because common fisheries rights or TURFs have existed throughout the Japanese coasts (Matsuda et al. 2012).



**Fig. 2.** Map showing different coastal areas and uses in Sekisei Lagoon between Ishigaki and Iriomote Islands, Okinawa, Japan, drawn by Japan Coast Guard Database (<http://www4.kaiho.mlit.go.jp/CeisNetWebGIS/>).

We investigated conditions that promote collaboration between fishers and other marine stakeholders including eco-tourism, offshore wind farms, activities of payment for ecosystem services, seabed mining in offshore areas, and other development in coastal and offshore areas. In some offshore wind farms, fishers receive benefit from wind farm operation and recognized that the impact of wind farms on fisheries resources is negligible or even enhance fisheries resources. It is effective for fishers, who have a deep understanding of marine ecosystems, to seek engagement with other marine activities on conservation of marine ecosystems. However, Japanese fishers usually negotiate with other fishers, but they are not familiar with collaboration with other marine sectors such as eco-tourism and wind power companies.

One of traditional ecosystem-based fisheries management in Japan is fish-breeding forest. Japanese fishers and their families have paid attention to plantation of backyard forests, despite lack of scientific evidence how forest to improve fishing ground (Matsuda et al. 2016). Recent global communities such as UN encourage to seek comprehensive activities for sustainable society and to use the Sustainable Development Goals (SDGs). The purpose of fisheries management is not only for stock enhancement of natural resources and for improvement of fisheries yield, but for prevention of hunger, gender inequality, handicaps of minorities, climate change effects. The UN organizes the Ocean Conference to enhance interlinkage between marine issues and other SDGs. Both Illegal, Unreported and Unregulated (IUU) fisheries and artisanal fisheries in small island developing countries are key issues in the Ocean Conference. In Chile and other south American nations, artisanal fisheries are prioritized in coastal zones under co-management and bigger fishing vessels operates in offshore areas under top-down management (Matsuda et al. 2010). This is another case of area-based fisheries managements.

Also in the case of seabed resources of heavy metals, area-based management is used to seek balance between conservation of benthic biodiversity and wise use of manganese nodules (Wedding et al. 2013). Heavy metal developers defined seabed areas for mining exploration and “Areas of Particular Environmental Interest” that are protected from mining. If there is a positive relationship between heavy metal rich areas and rich biodiversity areas, it is difficult to explore all mining resources but we can make a spatial planning to develop some areas for mining and to conserve the other areas for biodiversity conservation. In the deep sea areas in the Area Beyond National Jurisdictions (ABNJ), the International Seabed Authority manages the area-based management plan under the international legally-bound instrument determined by United Nations. Even in the exclusive economic zone (EEZ) or the continental shelf of a

country, some environmental impact assessment for exploration of seabed mining is needed based on an international standard, whereas it is not restricted by ILBI. ISO (International Organization for Standardization) standard for seabed mining may be useful for the exploration of mines within EEZ and the continental shelf.

In conclusion, we seek balance between sustainable use and biodiversity conservation based on co-management that consists of top-down and bottom-up control, in a variety of marine resources. Therefore, stakeholder participation is important for consensus building. Area-based management is a key concept of integrated marine management. Collaboration between fishers and other sectors are also important and fisheries yield is a part of total ecosystem services from marine ecosystems. To avoid risks arisen from uncertainties and serious disasters, adaptive management is useful. Capacity building and education are important for making sustainable society.

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