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Recent Advances in the Management of Marine Protected Areas in the Philippines

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Abstract

This study presents recent advances in the management of Marine Protected Areas (MPAs) in the Philippine from the mid-1970s, when the first MPA was established, to the present. At present, there are over 1300 established and proposed MPAs in the country. More than 50% of these are less than 10ha in size. As a result, less than 2% of the country's reef areas are under some level of protection, which is believed to be too low for protective measures to have an impact. In terms of management, only 10-15% of established MPAs are effectively managed. Several challenges are posed by these major shortcomings. Two approaches have recently been initiated to address these. The MPA Support Network (MSN) was recently established to link various efforts and initiatives in managing MPAs in the different regions of the country. There are also recent efforts of developing schemes for truly science-based establishment of MPA networks.

Introduction

Marine Protected Areas in the Philippine have been established with a wide range of goals including the conservation and protection of fishery resources/ biodiversity, for cultural and historical purposes, for aesthetic reasons, and for research and educational concerns (Miclat and Ingles, 2004). For most (70%), however, the major objective is to protect resources within the MPA to enhance fisheries production in neighboring waters. As such, MPAs have become a popular tool in coastal resources management.

1. Review of the status of MPAs in the Philippine

The first marine protected areas in the country were established in the 1970's (Fig. 1). At the time, there were less than 20 MPAs. This number increased to about 70 in the mid-1980's, and increased further and at a more rapid pace in the next 20 years (Pajaro *et al*., 1999). In recent years, the estimated number of existing and proposed MPAs around the country is over 1300 (Aliño *et al*., 2007). About 60% of these are located in basins within the Visayan Seas Region (Fig. 2), which

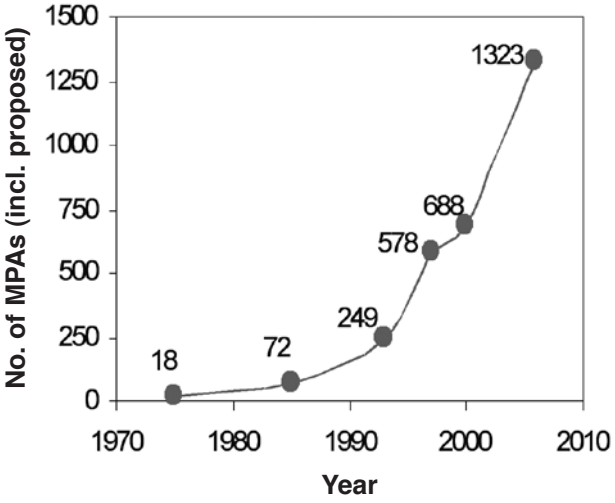

Fig. 1 Historical trend in the number of MPAs established in the Philippine. The most recent information includes proposed ones as well.

are among the most heavily-exploited fishing grounds in the country. Most MPAs in the country were initiated by community-level organizations (e.g., fisher's groups) and many continue to be managed by these same organizations. For this reason, over 80% of MPAs with known areas to date are less than 100ha in area; with close to

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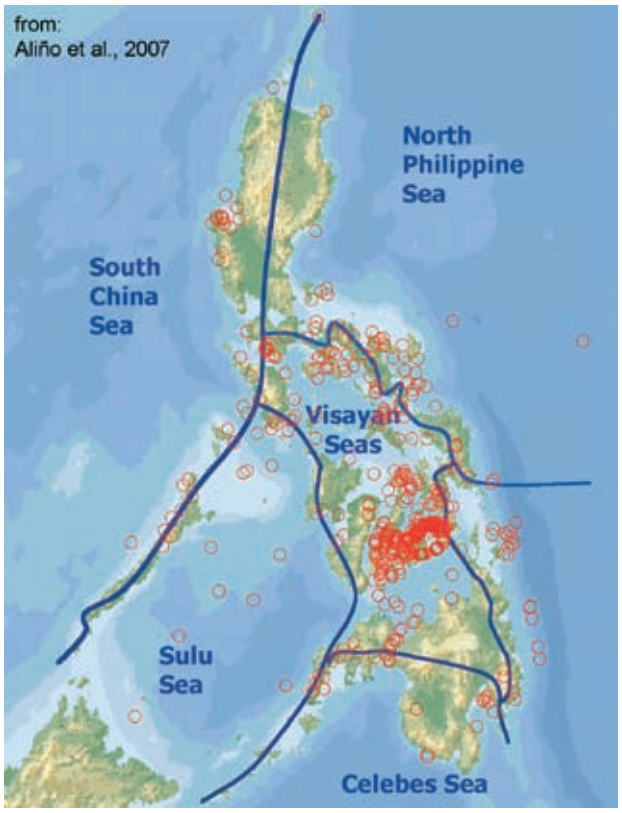

Fig. 2 Geograophical distribution of MPAs in the Philippines as of 2007 superimposed on a map showing the biogeographic regions of the country based on reef coral and reef fish assemblages

half of these being smaller than 10ha in size (Fig. 3). Hence, the cumulative area covered by existing marine protected areas presently amounts to only about 2% of the country's total coral reef area (27,000 km^2). This relatively small area, together with the low proportion (10-15%) of effectively managed MPA sites, would contribute little to the long term sustainability of fished stocks. It is thus necessary to improve management effectiveness as well as enhance the coverage in existing MPAs.

The following are the major challenges in the management of MPAs in the country (Aliño *et al*., 2007):

- Weak governance
- Weak law enforcement and prosecution system
- Lack of funds & logistical support
- Divergent interests of stakeholders
- Lack of coordination among stakeholders
- Poor incentive system
- Inadequate monitoring & assessment

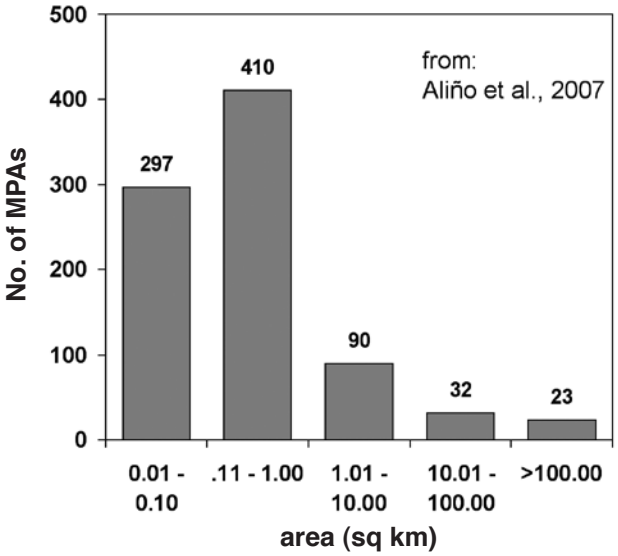

Fig. 3 The size distribution of MPAs (with known sizes) in the Philippines as of 2007.

2. How to improve effectiveness in management?

The Marine Protected Area Support Network (MSN) was recently organized to complement and link efforts initiated by previous programs, such as the Philippine Marine Sanctuary Strategy (PhilMarSaSt), the Philippine Archipelagic Agenda and the Philippine Coral Reef Information Network (Philreefs). The MSN is a multi-sectoral organization composed of the following member-organizations:

Government	Non-government organizations
Bureau of Fisheries and Aquatic Resources (BFAR) Protected Areas and Wildlife Bureau (PAWB) Philippine Council for Aquatic and Marine Research and Development (PCAMRD) Department of Local Government (DILG)	Haribon Foundation Conservation International Phils. World Wildlife Fund Phils. (WWF) ReefCheck Fisheries Improved for Sustainable Harvest (FISH) Philippine Environmental Governance Project (ECOGOV2)
Academic Institutions	**People's Organization**
The Marine Science Institute	Pambansang Alyansa ng Maliliit na Mangingisda at Komunidad na Nangangalaga ng Karagatan at Santwaryo sa Pilipinas* (PAMANA Ka)

*National Alliance of Small Fishers and Communities Managing Coastal Waters and Sanctuaries in the Philippine

The Network's major agenda for its MPA support role include:

1) Enhancing the capacity of MPA managers through

a. the conduct of management skills training and capability building;
b. enhancing the management structure by advocating multisectoral participation in the management and decision-making body;
c. facilitating and providing guidance in formulating fishery & habitat management plans;
d. establishing regular monitoring & evaluation activities stuitable for local capabilities;
e. adapting a response and feedback system to the local management process; and
f. facilitating long-term strategic partnerships with the public and private sectors

2) Establishing an incentive system for good MPA governance & performance

a. facilitating periodic reviews of governance (e.g., regional workshops) and ecological impact (e.g., compilation and publication of the Reefs Through Time series (Philreefs, 2003 and 2005).
b. highlighting good governance practices with recognition awards (e.g., Best Managed Reefs Award in 1998 - 2003, The MSN Awards Recognition 2007).
c. assisting in the leveraging of funds to sustain management efforts by:
   i. assisting in proposal writing for external grants; and
   ii. promoting active involvement of the private sector through corporate sponsorships (e.g., Adopt-a-Reef Program; Verde Island Integrated Conservation and Development Program – First Philippine Conservation Initiative).

3) Advocate for better "enabling" environments by

a. formulating sustainable financing mechanisms such as:
   i. user fees from eco-tourism and other activities;
   ii. fish landing fees to finance management activities;
   iii. fees from fishing gear registration and licensing as well as fishing concessions; and
   iv. fines and penalties to finance management plan
b. coordinating fishery management units (i.e., neighboring local government units with a common fishing ground):
   i. Incentives for adjacent LGUs to coordinate/collaborate; and
   ii. Pooling of resources, burden/benefit-sharing

3. How to enhance the coverage and effectiveness of existing MPAs

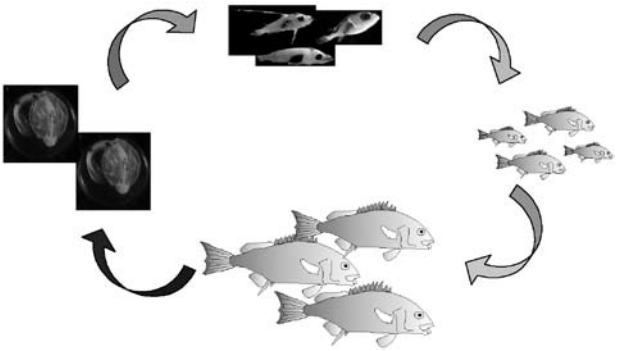

Fig. 4 Different life history stages of fish needing different habitats/ conditions.

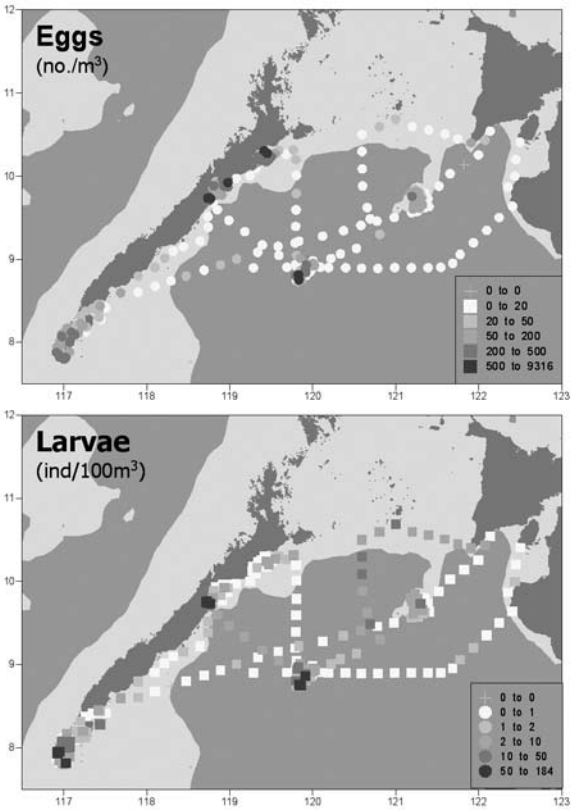

Fig. 5 Fish egg and larval densities in the Sulu Sea (April & October 2006) (from: Campos *et al*., 2007).

Fish and many other marine organisms inhabit different habitats during different stages in their life cycle (Fig. 4). Most coastal fish for example produce pelagic eggs and larvae (Leis, 1991) which may be carried by currents to juvenile and adult habitats located downstream. Ensuring the environmental health and maintaining the connectivity between such habitats is thought to be critical to sustaining production of local stocks that are heavily exploited.

Recent studies have investigated this connectivity (Campos *et al*., 2007). In the Sulu Sea results of circulation and dispersal modeling were compared with empirical distributions of fish eggs and larvae, larval assemblage composition, and larval ontogenetic distribution. Results show that egg and larval densities in the atolls and reef systems along Cagayan Ridge in the middle of the Sulu Sea are comparable to densities observed in embayments along the eastern coast of Palawan (Fig. 5). These suggest that the atolls may serve as a source of propagules for the latter areas during the Summer (Fig. 6a), but appear to be isolated during the SW-NE intermonsoon period (Fig. 6b).

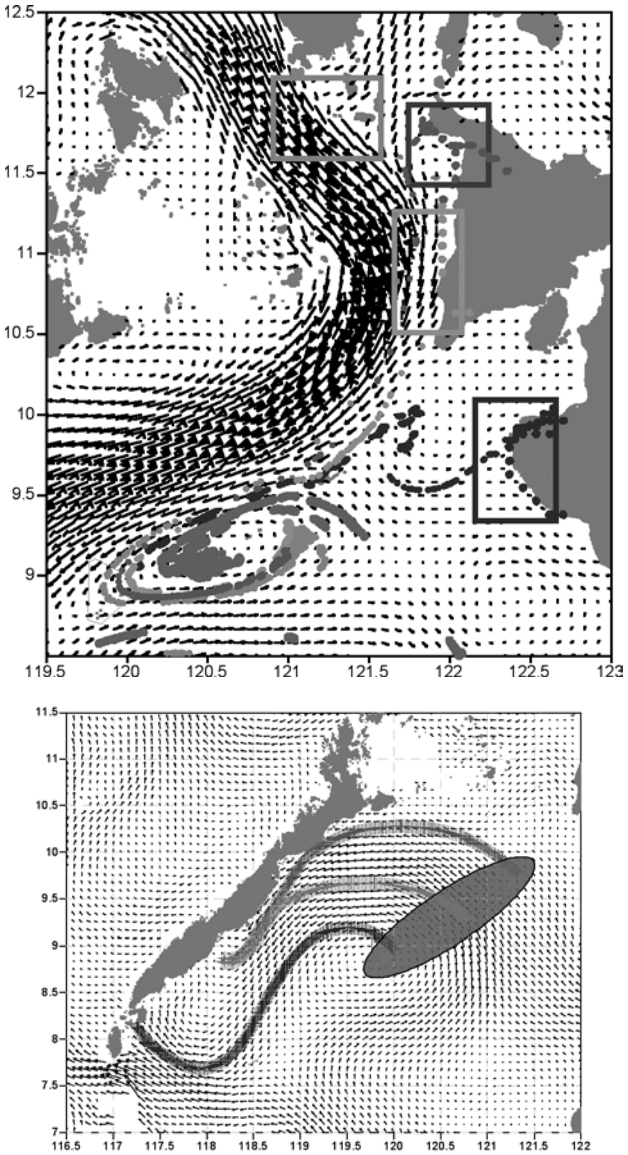

Fig. 6 (a) Potential dispersal of propagules in the Sulu Sea in April, and (b) modeled dispersal in October

In the shelf waters of the Bicol Peninsula, in the Philippine Sea, investigations have focused on the possible relationship between a weak but seasonally consistent upwelling feature off the western shelf (Amedo *et al*., 2002) and the productivity of coastal ecosystems (e.g., reefs) (Fig. 7). Interestingly, egg and larval concentrations show contrasting distributions which appear to be consistent from year to year, since these were observed in April 2001 (Campos, 2001) and also in April 2007 (Estremadura *et al*., 2007) (Fig. 8). Egg concentrations were highest on the western and eastern margins of the shelf, while larval concentrations were highest in the central portion of the shelf, in the vicinity of the "bump" on the shelf where the North Equatorial Current shifts towards the north-northwest, to eventually form the Kuroshio further north. The overall ontogenetic distribution of larvae suggests (Fig. 9) a dispersal towards the west of eggs and early larvae that are concentrated in the area of the shelf "bump". This implies that recruitment dynamics of stocks found west and east of Catanduanes are likely to be different.

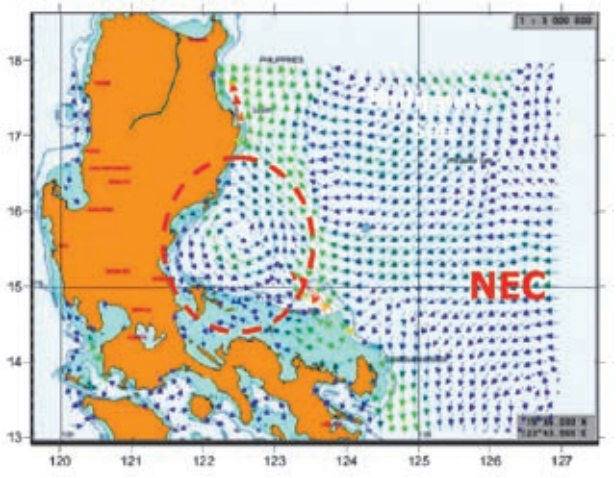

Fig. 7 Map of the Bicol Shelf in the Philippine Sea showing the general current direction in the Summer and the general location of the weak upwelling (Amedo *et al*., 2002) (From: Villanoy, 2007)

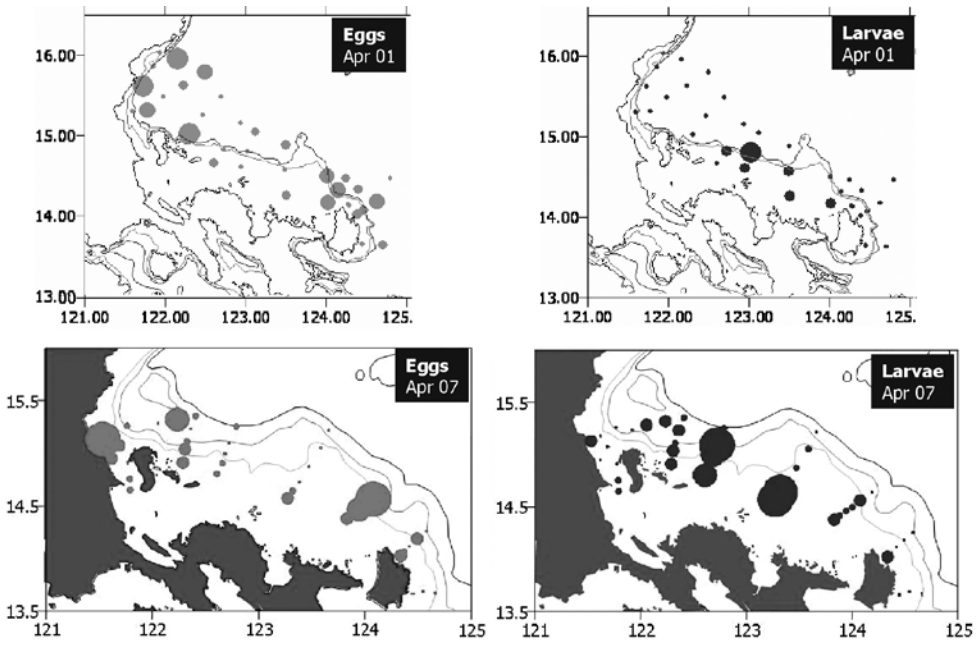

Fig. 8 Fish egg and larval density distribution on the Bicol Shelf in April 2001 (upper) and April 2007 (lower)

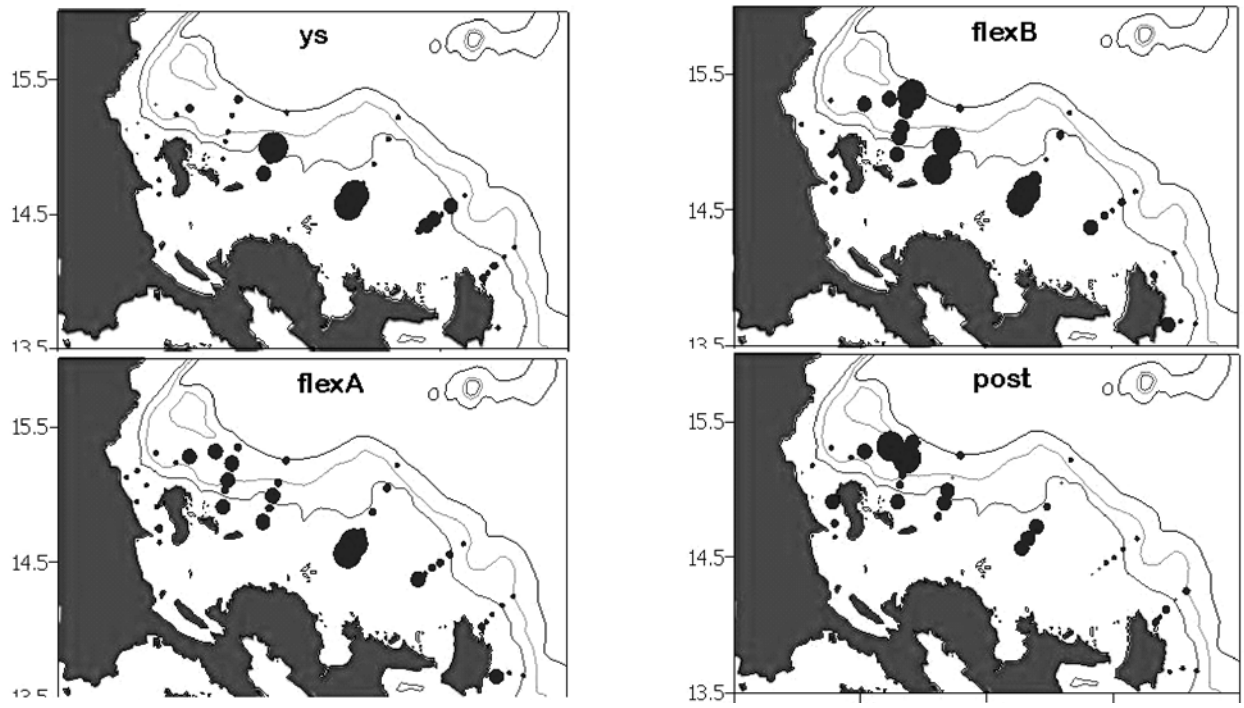

Fig. 9 The overall ontogenetic distribution of fish larvae on the Bicol Shelf during April 2007. YS = yolk sac larvae; flexA and flexB = flexion stages; post = postflexion larvae

With such information, the locations of specific areas which appear to be critical to the completion of the life cycle of local resource stocks may be determined and set aside for protective management.

The improvement of management practices in existing MPAs and the setting up of networks of ecologically connected (i.e., functional) ones constitute an approach that will elevate the use of MPAs in the Philippine from a popular to a strategic tool for more effective fisheries and coastal resources management.

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