Evaluating the management effectiveness of three marine protected areas in the Calamianes Islands, Palawan Province, Philippines: Process, selected results and their implications for planning and management

Len R. Garces [a], Michael D. Pido [b,*], Mark H. Tupper [a], Geronimo T. Silvestre [c]

[a] Philippine Country Office, WorldFish Center, Laguna, Philippines
[b] Center for Strategic Policy and Governance, Palawan State University, Puerto Princesa City, Philippines
[c] Fisheries Improved for Sustainable Harvest (FISH) Project, Pasig City, Philippines

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ABSTRACT

Evaluating the management effectiveness of marine protected areas (MPAs) has been a continuing challenge in marine conservation in the tropics. This paper describes the process involved, the chosen indicators and the selected results of the evaluation of management effectiveness of three MPAs in the Calamianes Islands, Palawan Province, Philippines. The evaluation was a participatory process that involved several institutions: academe, an externally-funded project, local governments, national government agencies and research organizations. Twenty-three indicators were used for evaluation: six biophysical indicators that largely measured the status of capture fisheries and coastal habitats; eight socioeconomic indicators that largely assessed the economic status and the perceptions of coastal communities; and nine governance indicators that measured the various facets of MPA management. Key lessons learned indicate the need to correlate the perceptions of coastal stakeholders with scientific findings as some perceptions did not reflect the results of biophysical surveys. We illustrate that a multidisciplinary approach and engagement of key stakeholders provides a comprehensive assessment and consensus for measuring the success of MPAs.

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1. Introduction

Marine protected areas (MPAs) have received much attention in recent years as an alternative approach to traditional fisheries management (Roberts et al., 2001; Halpern, 2003; Mora et al., 2006). The primary goals of MPAs are to protect critical habitat and biodiversity, and to sustain or enhance fisheries by preventing spawning stock collapse and providing recruitment to fished areas (Roberts et al., 2001; Halpern, 2003). Establishment of MPAs has been practiced in the Philippines since the 1970s with more than 525 MPA sites legally established covering an estimated area of 104,176 ha (approximately 1041 km^2) (Wood, 2007). Many facets of MPAs are reviewed by various authors, such as challenges and opportunities (Aliño et al., 2000), creation and management (White et al., 2006a), and MPA networks (Aliño, 2010).

Despite the many potential benefits of MPAs to coastal management programs (Halpern, 2003), the majority of MPAs do not meet their management objectives (Mora et al., 2006). Management effectiveness refers to the extent to which MPAs are achieving the desired objectives for their establishment (Pomeroy et al., 2004). In order to improve the management of these MPAs, the project titled "Enhancing MPA Management Effectiveness for the Calamianes Islands MPA Network, Palawan Province, Philippines" was launched to develop, refine and test indicators of MPA effectiveness. The objective of the project was to assess the management effectiveness of a network of MPAs in the Calamianes Islands, northern Palawan, Philippines, using a suite of biophysical, socioeconomic and governance variables (indicators) appropriate to regional conditions that influence the performance of MPAs. The majority of the indicators were developed by the World Conservation Unions (IUCN) World Commission on Protected Areas (WCPA) and the World Wide Fund for Nature (WWF) in a joint initiative aimed at improving the management of MPAs (Pomeroy et al., 2004; Ehler et al., 2002).

In the tropical developing world, particularly the Philippines, few efforts have been devoted to evaluating the management effectiveness of MPAs. The lack of adequate biophysical, socioeconomic and governance data has made the evaluation difficult. The

* Corresponding author. Fax: +63 48 433 5303.
E-mail address: mdpido@yahoo.com (M.D. Pido).

integrative analysis of this information to provide concrete correlations between management actions and desired conservation outcomes of MPAs has not been well documented. Without an effective evaluation system, the support for establishing and maintaining MPAs may be limited as well as tracking progress and providing feedback will be more difficult. Earlier, Samonte-Tan et al. (2009) evaluated the management of the Coron Island Ancestral Domain, a protected area that is also situated in Calamianes, Philippines. Samonte-Tan and Sylvano (2006) provide a profile of Calamianes Islands that was partly used to describe some of the municipalities where the MPAs are located. This paper aims to: (1) describe the participatory evaluation process that involved several institutions in the consensual selection and field testing of 23 biophysical, socioeconomic and governance indicators to assess management effectiveness of three MPAs in the Calamianes Islands; and (2) highlight the key results of the evaluation in terms of their broader implication for MPA planning and management.

2. Methodology

Complementary methods/techniques were employed to undertake the participatory evaluation. During the "Project Start-up Meeting" held on 14–15 January 2008, the key research/ project partners were brought together. This was followed by the "Training Workshop on Enhancing the Management Effectiveness of MPAs in the Calamianes" held on 24–28 March 2008. Attended by 31 participants, the workshop enabled the participants to consensually select the final 23 indicators to be tested, and trained the evaluation team in the use of the MPA Guidebook methodology (Pomeroy et al., 2004; Ehler et al., 2002). From the nine MPAs that comprise the Calamianes Islands MPA Network, three MPA sites were selected for initial testing of the indicators: (1) Sagrada-Bogtong Marine Reserve; (2) Decalve Strict Protection Zone (Bintuan-Sangat Marine Park); and (3) Bugor-Sand Island Marine Protected Area. Basic site profile/characteristics and geographic location of these MPAs are given in Table 1 (Decalve Marine Protected Area Core Group, 2006; Bugor-Sand Island MPA Management Council, 2006; Local Government of Busuanga Municipality, 2006) and Fig. 1, respectively. These MPAs have varied habitats: Sagrada-Bogtong (392 ha) is predominantly mangrove, while Decalve (63 ha) and Bugor-Sand Island (125 ha) largely consist of coral reefs. All three sites have duly-approved MPA management plans and special enforcement teams have been established as well.

Methodologically, the evaluation of MPA effectiveness was a participatory process involving the MPAs local resident communities, selected stakeholders of local (municipal) government

(planning and agriculture offices in the municipalities of Busuanga, Coron and Culion) and national government (Department of Environment and Natural Resources, Bureau of Fisheries and Aquatic Resources, and Palawan Council for Sustainable Development) levels, an international research organization (WorldFish Center), a local academic institution (Palawan State University) and a foreign-funded project (USAID-funded Fisheries Improved for Sustainable Harvest [FISH] Project). The MPA Guidebook has a total of 42 indicators. The participatory selection of indicators during the workshop selected a suite of 23 indicators (six biophysical, eight socioeconomic, and nine governance) (Table 2).

The testing (primary data gathering) of selected indicators was undertaken from May to June 2008. Testing of biophysical indicators formed part of the annual monitoring of the FISH Project. Biophysical indicators were assessed using standard techniques, such as fish visual census for fisheries and line transects for marine habitats (e.g., coral reefs, mangroves and seagrass beds). Socioeconomic and governance indicators were assessed using household surveys (420 respondents) and key informant interviews or KIIs (28 respondents). A random sampling of household respondents was attempted at a 90% confidence interval. Respondents for the KIIs included: village officials, municipality officials, tourism people, law enforcement personnel, pearl farm workers, national government agency representatives, MPA managers, members of fisheries and aquatic resources management councils, and officials of fishing associations.

Four validation workshops were undertaken to solicit the stakeholders feedback concerning the results of household surveys and KIIs. The first community validation was conducted immediately following the data collection in each MPA site in May and June 2008. The second validation workshop on 9 September 2008 provided some highlights of the results for the three MPA sites. Participants included MPA managers and representatives from the Calamianes Islands MPA network. The third community validation workshop was held at each MPA site. More quantitative highlights of the FISH Project's biophysical monitoring, household survey and KII results were presented to the community. The fourth validation happened during the project final workshop in Manila from 12 to 13 March 2009. Selected results from these various activities are presented and discussed in the succeeding sections.

3. Selected results

Selected results are presented for the 15 indicators: three biophysical indicators that largely measured the status of capture fisheries and coastal habitats; six socioeconomic indicators that largely assessed the economic status and the perceptions of coastal

Table 1
Profile of three MPAs selected for evaluation in Calamianes Islands MPA network, Palawan Province, Philippines.

Municipality	Barangay (village)	Name of MPA	Year established	Ecosystems/ habitats	Total area (ha)	Number of households (2007)
Busuanga	Sagrada & Bogtong	Sagrada-Bogtong Marine Reserve	2006	Mangrove with patches of coral reefs and seagrass beds	392	441
Coron	Bintuan	Decalve Strict Protection Zone (Bintuan-Sangat Marine Park[a])	2004	Coral reefs with patches of mangroves and seagrass beds	62.61 (3164[a])	296
Culion	Libis Culango Jardin Tiza Balala Baldat Osmena	Bugor-Sand Island Marine Protected Area	2005	Coral reefs with patches of mangroves and seagrass beds	125	197

[a] This is the total area of Bintuan-Sangat Marine Park where Decalve Strict Protection Zone is situated.