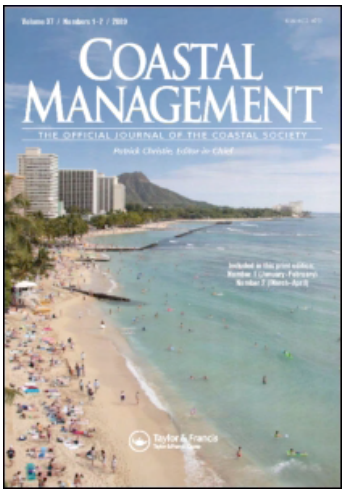

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Scaling Up Local Government Initiatives Toward Ecosystem-Based Fisheries Management in Southeast Cebu Island, Philippines

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The Philippines adopts a highly decentralized approach to coastal management. Each municipal authority exercises management powers and responsibilities over their 15-km municipal waters. Nevertheless, in some areas like Southeast Cebu in Central Philippines, coastal resource management practices of a single municipality have been working toward scaling up the geographic scope to achieve the desired results of ecosystem-based management by expanding from a single municipality to a much broader collaboration at the intermunicipal scale. Such cooperative undertakings focus on activities that jointly address the major resource threats in each of the municipal jurisdictions, such as degradation of key coastal habitats, overfishing, and dwindling fish stocks. This article presents the management strategies, outcomes, and lessons of an intermunicipal collaboration that is starting to work and shows that local governance systems can be expanded to address the conservation needs of a broader ecosystem and scale.

Keywords coastal management, ecosystem-based management, intermunicipal collaboration, local governance, marine protected

Introduction

The Southeast Cebu initiative on ecosystem-based management (EBM) in the Philippines represents an inter-municipal partnership in an attempt to address the interrelated political, institutional, socioeconomic, cultural and environmental concerns plaguing a common fisheries ecosystem. This article details the evolution of coastal resource management practices in the municipal waters of a single municipality as management and governance

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arrangements expand to take into consideration a fisheries ecosystem covering multiple municipalities. In particular, this analysis details the initial steps toward EBM starting from municipal level marine protected areas (MPAs) with an emphasis on scaling up to MPA networks with a facilitating inter-municipal governance structure. How the EBM strategy was used to address common issues that needed to be collectively addressed by a group of municipalities in Southeast Cebu, is explored. The process was catalyzed by the Coastal Conservation and Education Foundation (CCEF), a nongovernment organization providing technical assistance and capacity building activities for local leaders and reef and fisheries managers.

The Southeast Cebu Fisheries Ecosystem

Southeast Cebu, in the Central Visayas, Philippines, traverses an irregular coastline of about 118 km. It is bounded on the east by the Cebu/Bohol Strait, a body of water separating the islands of Cebu and Bohol with more than 158.6 km^2 of coral reefs. The strait is relatively deep, with a maximum depth of about 306 m. It straddles the eight coastal municipalities of Southeast Cebu with more than 1,250 km^2 of combined municipal waters (Figure 1).

In 2003, a comprehensive study on fisheries identified seven fisheries ecosystem in Central Visayas considered as discrete due to fishing gears, target species, and ecosystem distribution (Green et al., 2004). Within each ecosystem are a variety of habitats such as mangroves, coral reefs, seagrass beds, mudflats, sandy beaches, and others. The area has high levels of marine biodiversity and fisheries production (Green et al., 2004)

The population in the eight municipalities of 252,000 (NSO, 2007) is growing at more than 2.0% annually and has a low Human Development Index (HDI) rating, which means that a majority of the people have lower life expectancies, education levels, and standard of

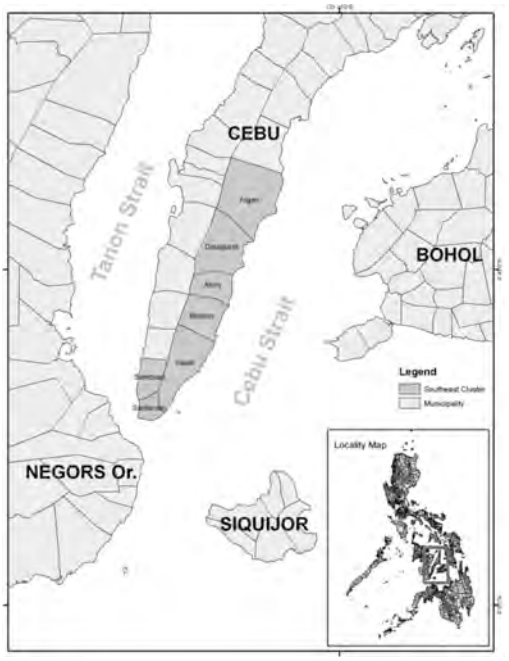

Figure 1. Location map of Southeast Cebu municipalities facing Cebu Strait in Central Visayas, Philippines.

living than the national average. Municipal fisheries provide livelihood to many families, second only to farming, with over 5,500 municipal fishers being very dependent on the Cebu/Bohol Strait fisheries (Green et al., 2004).

Problems and Opportunities that Precipitated the EBM Approach

The primary resource threats in each of the municipalities are degradation of key coastal habitats, overfishing, and dwindling fish stocks. Coral reef habitats are in a highly degraded state, with 75% of the reefs having poor coral cover (less than 25% living coral cover substrate) and no sites found to be in excellent condition (Green et al., 2004). Likewise, illegal large-scale commercial fisheries using bagnet, purse seine, and trawl vessels are operating in these coastal waters as indicated by the catch composition. Fishing boats larger than 3 gross tons are supposed to remain outside the municipal waters, which extend to 15 km from shore. During consultative processes hosted by CCEF, many artisanal fishers have noted commercial fishing intrusion into municipal waters as a very significant concern. The Philippine Bureau of Fisheries and Aquatic Resources (BFAR) catch statistics show that commercial fisheries production has been increasing since the 1970s until the 2000s. On the other hand, the municipal water area in the Cebu/Bohol Strait covers 3,838 km^2, comprising 97.6% of the total area compared to only 95 km^2 or 2.4% area beyond the municipal waters boundary.

The intrusion of commercial fishing into municipal waters became the primary issue of concern as identified by municipal leaders, resource managers, and municipal fisherfolk groups. It was believed that improved coastal law enforcement by a group of municipalities would help to address this priority concern.

Definition of Ecosystem-Based Management

Realizing that they shared similar issues and a common resource base, the municipalities collectively agreed to integrate municipal coastal management efforts through an inter-municipal collaboration system. This allowed them to expand beyond their municipal boundaries to a broader alliance at the fisheries ecosystem scale. Thus, the municipalities began to plan at an ecosystem level that considers as its goal a more productive fishery for the benefit of all stakeholders with legal claims.

Eight municipalities participate in the Southeast Cebu cluster. This cluster was formed based on considerations of similarities in their marine ecosystems (main coral reef, seagrass, and mangrove systems), their history of collaboration with one another, and shared fishing stocks. Ecosystem-based management became the framework to manage this nearshore area and several management actions were initiated. The definition of EBM that best represents the consensus in Southeast Cebu about what EBM attempts to accomplish follows:

> Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors. . . (COMPASS, 2005)

In practice, the management of Cebu/Bohol Strait fisheries ecosystem in Southeast Cebu illustrates a novel approach in fisheries management by scaling up municipal coastal

management initiatives to an inter-municipal scale. This approach, which is implemented together with a local nongovernmental organization (NGO), the Coastal Conservation and Education Foundation (CCEF), is working toward the overall management goal of sustaining coastal management through integrated governance and guided by key concepts of integration, multi-stakeholdership, and consensus building.

Incentives that catalyzed movement toward EBM in Southeast Cebu emerged from earlier coastal management projects that set up informational databases at the municipal level. One was the fisherfolk database system that encouraged the registration of fishermen and gears within the cluster of municipalities. A foreshore database was also developed and used by the inter-municipal cluster in its planning decisions. Thus, the multi-municipal government approach was partially triggered through these efforts to share information and resources to enhance coastal law enforcement and to improve implementation of coastal management programs in each municipality. A final and significant incentive in Southeast Cebu was the growing commitment to improving the quality of MPA management, to increase fish biomass and living substrates in these MPAs, and to ultimately increase fish catch.

The Policy and Institutional Framework

The ecosystem-based management approach in Southeast Cebu unites key actors in their pursuit of coastal resources management and departs from the traditional conceptual framework that emphasizes area-based and micro-concerns. This is well supported by the state policy espoused by the Philippine Constitution that provides, to wit: "Local government units may group themselves, consolidate or coordinate their efforts, services, and resources for purposes commonly beneficial to them."

One of the fundamental principles advanced in the 1987 Constitution is local autonomy. In its fullest sense, local autonomy refers to the decentralization of governmental powers from the central government to that local government unit (LGU) or political subdivision established by law, namely: provinces, cities, municipalities, and *barangays*.

In consonance to this basic principle is the Constitution's specific reference to LGU alliances, as stated in Article X, Section 13 thereof: "Local government units may group themselves, consolidate or coordinate their efforts, services, and resources for purposes commonly beneficial to them in accordance with law."

LGU alliances can be done without new legislation. The neighboring LGUs simply have to agree among themselves. But the consolidation contemplated is merely in "their efforts, services, and resources," and not in their corporate personality. The resultant consolidation would not be a new corporate body (Bernas, 2007).

The same constitutional provision is reflected in the Local Government Code (LGC) of 1991 (Republic Act 7160). The LGC has granted genuine and meaningful local autonomy to municipalities through a system of decentralization from the national government to the local government units whereby the latter were given more powers, authorities, and responsibilities in the management of their municipal waters. This includes the mandate for innovative and collaborative partnerships through appropriate ordinances in order to contribute funds, real estate, equipment, and other kinds of property and appoint or assign personnel as may be agreed on by the participating municipalities through a Memorandum of Agreement. Specific statutory support for the broad range of the powers with the local government units is found under the general welfare clause, that is, Section 16 of the Code, which states that: "Every LGU shall exercise powers expressly granted, those necessarily

implied therefrom, as well as powers necessary, appropriate, or incidental for its efficient and effective governance, and those which as essential to the promotion of the general welfare."

The LGC in Section 33 thereof further explains the cooperative undertakings among local government units. In particular, "Local Government Units may, through appropriate ordinances, group themselves, consolidate, or coordinate their efforts, services and resources for purposes commonly beneficial to them." To operationalize this edict, the same section further provides that "the local government units involved may, upon approval by the sanggunian (municipal council) concerned after a public hearing conducted for the purpose, contribute funds, real estate, equipment, and other kinds of property and appoint or assign personnel under such terms and conditions as may be agreed upon by the participating local units through Memorandum of Agreement."

Shortly thereafter, the Philippine Fisheries Code (Republic Act 8550) adopted the concept of integrated coastal management (ICM) for the management of fishery and aquatic resources by municipalities and/or cities. ICM is essentially a broad and dynamic process that requires the multi-stakeholder involvement in the management of shared coastal resources and is a precursor for EBM in the Philippines (Courtney et al., 2000; Christie et al., 2007). Thus, under the Philippine Fisheries Code (PFC), the LGUs that share or border such resources may group themselves and coordinate with each other to achieve the objectives of integrated fishery resource management in areas such as bays, lakes, and gulfs that straddle several municipalities.

An important rule expressed in the PFC is the primary jurisdiction of the municipal/city government over the management, conservation, development, protection, utilization, and disposition of all fish and fishery/aquatic resources within their respective municipal waters. Moreover, this jurisdictional rule is extended to contiguous fishery resources such as bays, which straddle several municipalities, cities, or provinces.

The PFC proposes the creation of Integrated Fisheries and Aquatic Resources Management Councils (IFARMCs) in bays, gulfs, lakes, and rivers and dams bounded by two or more municipalities. These IFARMCs shall serve as the venues for close collaboration among LGUs in the management of contiguous resources.

Another legal act that supports LGU alliance formation is the National Integrated Protected Areas System (NIPAS) Act. Under this Act, protected areas are established in areas with rare and endangered species of plants and animals and related ecosystems, including marine areas. Management and control of a NIPAS area is placed under the control of the Department of Environment and Natural Resources through the local Protected Areas Management Board for each established protected area. The NIPAS Act provides an additional legal framework to attain EBM.

The above review outlines the legal mandate municipalities have to coordinate coastal and fisheries management. Municipalities must coordinate with other institutions such as the Bureau of Fisheries and Aquatic Resources, Department of Environment and Natural Resources, community organizations including the *bantay dagat* (sea wardens), and private sector groups. The provincial government also plays a key role in ensuring coordinated policies by cluster municipalities (Eisma et al., 2005). The existing legal framework does not expressly mention ecosystem-based management *per se*; however, there are modes provided for the adoption of EBM as a management framework for contiguous fishery resources. Autonomous power is given to municipalities to adopt this form of management. To summarize, Table 1 demonstrates the strengths and weaknesses of current laws and regulations relative to EBM.

Table 1
Current laws related to EBM and their strengths and weaknesses

Statute	Strengths	Weaknesses
Local Government Code	Inter-LGU mechanisms for collaboration on EBM	Non-mandatory for LGUs to enter into cooperative undertakings
Philippine Fisheries Code	Mentions management of shared, single resource system in an integrated manner	No direct reference to EBM
NIPAS Act	Establishment of protected areas in biogeographic zones and related ecosystem, including marine areas	Management of protected areas with PAMB, which adds another layer of governance to the existing LGUs

Evolution of EBM Process and Overall Results to Date

In 2004, CCEF, together with the eight municipalities, began implementing in Southeast Cebu the Local Governance for Coastal Management Project with financial support from the David and Lucile Packard Foundation. This project used a two-track approach to address broader fisheries management issues while addressing "on-the-ground" delivery of coastal resource management activities. Prior to 2004, the *Coastal Resource Management Project* (CRMP) supported by USAID (operated from 1996 to 2004) enhanced the capacity of the municipalities to implement coastal management as a basic service. Thus, these municipalities began implementing coastal resource management (CRM) plans with a focus on the establishment of MPAs and fisheries management. The municipalities have achieved in varying degrees key CRM benchmarks that include:

- Adoption and implementation of a multi-year CRM plan providing overall framework and direction in managing the coastal resources of the municipality/city
- Coastal environmental profile developed through secondary data compilation and baseline assessment (e.g., participatory coastal resource assessment, rapid assessment, scientific surveys) of coastal resources and socioeconomic and environmental conditions
- Annual programming and budget to sustain local CRM plans and programs, with trained staff and operating municipal/city CRM office
- CRM-related organizations in the form of People's Organizations, Fisheries and Aquatic Resource Management Councils, or Technical Working Groups, formed and active
- Shoreline/foreshore management measures planned

The municipalities have likewise initiated some of the following CRM best practices within their CRM plans: municipal water delineation, functional MPAs, mangrove protection, improved fisheries regulations and management, passing local legislation identified in the CRM plan, coastal law enforcement, coastal environment-friendly enterprise development, revenue generation, and multi-institutional collaboration for CRM. These benchmarks and tools are considered the minimum that a municipality should implement if it adopts coastal and fisheries management as a basic service (DENR-CMMO, 2003).

Table 2
Key steps and activities for initiating EBM in Southeast Cebu

Year	Key intervention
1996	Coastal Resources Management Project implemented in key areas in the Philippines, including South Cebu
2002	Local Governance for Coastal Resource Management of CCEF started implementation of key CRM activities
Jun 2004	Municipal fishing gear inventory conducted in Southeast Cebu
Oct 2004	A series of municipal fisheries forum conducted in each LGU
Dec 2004	A cluster-wide fisheries forum with all municipalities participating
Apr 2005	Signing of the Memorandum of Agreement between the eight LGU
Jun 2005	Creation of TWG tasked to come up with 3-year Action Plan for cluster
Mar 2006	Creation of cluster management committee and program coordinator
Jun 2006	Adoption of cluster financial plan and formation of cluster secretariat
Dec 2006	Formation of MUSCLE (Municipal Seaborne and Coastal Law Enforcers)
Dec 2007	Action plan assessment and planning
Oct 2008	Creation of IMPACT (Integrated MPA C Team)

As a first step toward EBM, a municipal fishing gear inventory was conducted to identify fishing activities in Southeast Cebu. This was followed by a series of municipal fisheries forums to identify fishing activities, issues, and possible fisheries management interventions at the ecosystem level (Table 2).

To facilitate "scaling up" of resource management and governance at a broader geographic scope, the eight coastal municipalities decided to sign a Memorandum of Agreement (MOA) and create the Southeast Cebu Coastal Resource Management Council in 2005. The MOA expressly mentioned the need to scale up governance to inter-municipal collaboration considering the common Cebu Strait fisheries ecosystem. The Council is tasked to oversee and monitor agreed EBM programs, review and unify municipal policies, and implement and generate resources for joint coastal law enforcement and other EBM activities.

The primary EBM tools used in Southeast Cebu, which are also commonly applied coastal management approaches, include: fisheries and habitat management, foreshore management, and coastal law enforcement. Marine protected areas (MPAs) have been established in the eight municipalities. Presently, there are 22 MPAs in over 300 ha with no-take areas covering 0.24% of the total combined municipal waters. The municipalities and involved organizations such as CCEF are still studying the adequacy of the number and size of MPAs in these areas. Incremental increases on the size and number of MPAs have been agreed on in recent discussions. These serve as an ecological blueprint for future conservation activities of the cluster toward EBM. These MPAs are mostly managed by fisher's organizations in coordination with the municipal governments. The Council provides a venue for MPA managers to meet and discuss pressing concerns regarding management of MPAs at the municipal level. Through the Council as well, a functional information database on the level of management effectiveness of the MPAs is being developed. Based on the MPA Management Rating System developed by CCEF, most of the MPAs have increased their management rating to Level III by the third year of implementation. This rating system is applied in the Philippines to aid MPA managers in

evaluating their performance in terms of management, implementation, and enforcement (White et al., 2006; Lowery et al., 2009).

Fisheries management tools such as limits on effort through fisher registration including their boats and fishing gears are in place. Regulations restricting compressor fishing, banning of commercial fishing, and regulating docking of commercial fishing vessels were collectively agreed to be legislated in each municipality's municipal waters. Finally, in order to deter further intrusion of commercial fishing boats, joint law enforcement has been maintained in the municipal waters of Southeast Cebu. Each municipality contributes to the enforcement operations across the Cebu/Bohol Strait with municipal enforcers providing active surveillance and ensuring immediate prosecution of illegal fishing violations.

The Southeast Cebu experience illustrates an approach to EBM through the integration of community-based MPA management activities, formation of MPA social networks, coordinated enactment of uniform fisheries regulations, and cross-boundary law enforcement operations. The initial results of the ecosystem approach are essentially improved coordination among managers and other stakeholders, reduction of conflicts, and improved learning about what sorts of management initiatives work best in different contexts (Lowry et al., 2009).

The Southeast Cebu Coastal Resource Management Council: Moving Forward

A coordinating body for all identified programs of the eight municipalities was formed through the Southeast Cebu Coastal Resource Management Council. It is composed of mayors and vice-mayors of eight municipalities and functions as a policymaking and supervising body. A complete set of officers led by a chairman is elected among the vice-mayors of the municipalities who shall hold their positions for three years co-terminus to their term of office as elected officials.

To assist the Council, a management committee and a secretariat, composed mostly of technical staff from each municipality, was organized. In addition, a technical and legal advisory group coming from government agencies such as the Department of Environment and Natural Resources, BFAR, and Philippine National Police, as well as NGOs such as the Environmental Legal Assistance Center and the CCEF, provide specialized support to the Council. The Council often calls on any of these government agencies and/or NGOs for technical input, legal advice, logistical support, and other forms of technical assistance. The management committee headed by an executive director administers the day-to-day activities of the Council while the secretariat serves as the record keeper and financial manager. Both the management committee and secretariat have provided an effective coordination and feedback mechanism to the respective municipalities.

The Council, although still young and evolving, has become a venue for the discussion and resolution of important issues and activities, such as the banning of compressor fishing; protection of critical habitats from foreshore development; the reduction of fishing effort through fisherfolk, fishing gears, and boat registration, regulating controversial and destructive fishing gear (e.g., modified drift gill nets), and strict enforcement against intrusion of commercial fishing into municipal waters; considering other externalities such as the oil seismic surveys along Cebu Strait; regulating municipal tourism activities; and creating social networks among MPA managers. It has also re-energized earlier municipal coastal management initiatives with MPAs now effectively managed, municipal seaborne and coastal law enforcers (MUSCLE) formally organized with an institutionalized

incentive scheme, and with over 30 commercial fishing violators apprehended during joint law enforcement operations in April 2005.

Biophysical monitoring of MPAs likewise involves direct participation of resource user and municipal technical staff in estimating fish abundances and substrate composition in MPAs. The monitoring activity is conducted by trained fishwardens in the cluster along with technical staff of CCEF. The activity gathers data on fish species, fish abundance, and on the status of the coral reef substrate.

Education programs have been put in place to encourage policymakers and to enhance management planning decisions. Participation in joint trainings to build capacities of municipal technical staff and community MPA managers from the eight municipalities in MPA Rating and monitoring, fishing vessel registration, financial management, teambuilding and leadership, and proposal making are good indicators of the level of involvement and understanding of local stakeholders in the EBM process. Thus, EBM has enabled cost sharing and commitment for the joint management of Southeast Cebu marine waters and fisheries.

The Ecosystem Governance Arrangements

Regular Council meetings and joint actions pave the way for adaptive learning and management. For instance, to respond to the growing need to increase the capacity of law enforcers, the Council has conducted a series of coastal law enforcement training courses for fishwardens and police enforcers. Coastal law enforcement operation plans have been reviewed and revised to ensure effective conduct of enforcement activities against commercial and illegal fishers. Prosecution of illegal fishing cases has been difficult and is being addressed with the retention of a full-time lawyer by the Council to specifically handle their illegal fishing cases. Procedures are in place for regular planning meetings to refine rules such as banning of compressor fishing activities in the entire Cebu Strait. The municipalities have become committed to EBM and the Council as an institution created to realize EBM drivers such as addressing specific threats to overfishing by commercial fisheries and increasing knowledge of ecosystem dynamics (Lowry et al., 2009).

Transparency and participation are assured through continuous dialogue and periodic meetings among Council members. Conflicts between resource users and regulatory agencies are also resolved during Council meetings. One conflict involved the restriction of municipal fishermen only being allowed to fish inside the municipal waters of their municipality. Through the Council, the eight municipalities agreed to allow municipal fishers to fish in all municipalities within the Cebu Strait fisheries ecosystem.

Recurrent costs of ecosystem management in Southeast Cebu include: Council meetings, law enforcement patrolling, apprehension, and training. These are funded from outside donor sources and contributions from each municipality's internal revenue allotment or budget allocation for coastal management activities. Each municipality contributes about US$900 annually for the Council's operations. This source is generally self-sustaining because each municipality automatically appropriates local funds to support activities of the Council such as joint enforcement and legal services for prosecution of violators.

Conflicts among resource users over access and appropriation rules and those between users and enforcers regarding compliance issues are addressed through the Council. Municipal or subsistence fishers have preferential rights over reef resources within municipal waters while commercial fishers have access only to resources beyond 15 km. The nearshore reef resource users within municipal waters must preferably be municipal residents if required by local ordinance. Community organizations are also given preferential fishing privileges. Access rights such as these are established through municipal legislation with

the requisite public participation in the form of consultations and public hearings initiated by the Council. The procedures set have attained a considerable degree of legitimacy because conflicts are usually resolved and parties are able to arrive at commonly agreed solutions.

The Southeast Cebu ecosystem-based approach has shown that when municipalities decide to "scale up" resource management and integrate governance arrangements there is a resulting increase in stakeholder participation and learning. Local MPA managers are now skilled in implementing strategic MPA management activities with increasing capability in monitoring and enforcement. Information is generated that is utilized to refine MPA management plans and set fisheries management policies. The ecosystem approach has improved information dissemination and created cost-sharing strategies among the municipalities sharing the common fisheries ecosystem.

Similarly, the inter-municipal collaboration in Southeast Cebu has provided a model framework for cooperative undertaking in fisheries and habitat management, foreshore development inventory, and coastal law enforcement. With the Council's successful implementation of planned functions, there has been increasing institutional commitment as shown by increases in the budgetary allotments by each municipality that enables it to adequately finance joint coastal law enforcement activities including the repair of a shared boat. Likewise, in a socioecological survey it has been shown that mayors collaborating to improve sanctuary management are positively correlated to MPA economic benefits to community (Christie & Pollnac, 2009).

The council has also opened a venue for the provincial government to downstream support for coastal management at the inter-municipal levels. It also helps fill the gap for weak formal institutions and the three-year turn-over of municipal mayors (Christie et al., 2007). Recent political transitions in 2008 have not affected cluster management programs with the smooth transition, stability, and continuity of the Council and its functional committees.

Impacts on Ecosystem Conditions

Habitat conditions were expected to improve within the area as threats on coral reefs and associated habitats were addressed through improved law enforcement. It was hypothesized that live hard coral (LHC) cover would increase. Our analyses, however, yielded variable trajectories of LHC cover and in 4 to 7 years of biophysical monitoring patterns noted were: (1) significant increase ($p \leq .05$, $F > 5.8$, $DF \geq 2$) in % LHC observed in 5 out of 22 (23%) MPAs, (2) a marginally significant decrease ($p = .058$, $F = 4.74$, $DF = 2$) in Guiwanon Marine Sanctuary, (3) a significant decrease in Arbor Marine sanctuary, and (4) no significant changes in %LHC between years for the MPAs (Table 3).

Our results suggest that length of protection time and initial %LHC may play a role in %LHC increase, with the assumption that the level of enforcement is strict. Three out of six MPAs monitored within 5 to 7 years with %LHC below 40% showed significant increase. In contrast, the other three MPAs with 42 to 59% LHC during the initial monitoring did not show any significant increase. The rest of the MPAs within the ecosystem had 3 to 4 years of monitoring (70%). This may explain the absence of %LHC improvement in the rest of the 68% MPAs. The significant decrease and marginally significant decrease in %LHC in Arbor and Guiwanon Marine Sanctuaries, respectively, may be due to variable enforcement. However, the three MPAs that showed significant increase within the 3 years of monitoring may yield useful lessons that management can draw on. Further, an overall test using each MPA as a replicate, comparing %LHC between initial and the most current monitoring values, did not show any significant outcomes. This implies that the positive

Table 3
Statistical test results for comparisons in coral cover between years within MPA

Marine protected area (MPA)	Years tested	Test	p/H	F	DF	post hoc: Tukey's test
Bagacay Marine Sanctuary	2005–2008	1-ANOVA	NS			
Guiwanon Marine Sanctuary	2005–2008	1-ANOVA	0.006	13.67	2	2006 = 08 < 05
Taloot Marine Sanctuary	2005–2008	1-ANOVA	NS			
Bulasa Marine Sanctuary	2005–2008	1-ANOVA	NS			
Talaga Marine Sanctuary	2005–2008	1-ANOVA	0.002	19.96	2	2006 < 08 < 05
Binlod Marine Sanctuary	2005–2008	1-ANOVA	0.003	18	2	2007 < 06 = 05
Poblacion Marine Sanctuary	2005–2008	1-ANOVA	NS			
Tulic Marine Sanctuary	2005–2008	1-ANOVA	NS			
Bogo Marine Sanctuary	2005–2008	1-ANOVA	NS			
Langtad Marine Sanctuary	2005–2008	1-ANOVA	0.044	5.48	2	2008 < 05; 05 = 06; 06 = 08
Casay shoal Marine Sanctuary	2005–2008	1-ANOVA	0.044	5.48	2	2008 = 06 < 05
Balud-Consolacion Marine Sanctuary	2003–2008	1-ANOVA	NS			
Casay Marine Park and Sanctuary	2003–2008	1-ANOVA	NS			
Cawayan Marine Park	2006–2007	1-ANOVA	NS			
Daanglungsod-Guiwang MS	2005–2008	KW	0.041	8.23	3	2006 < 08 <07 < 06
Poblacion Marine Sanctuary	2002–2008	1-ANOVA	NS			
Arbor Marine Sanctuary	2005–2008	1-ANOVA	0.008	6.36	4	2006 = 05 < 08; 04 = 07 = 08
North Granada Marine Sanctuary	2006–2007	1-ANOVA	0.000	36.56	2	2005 = 06 < 07
Gawi Marine Sanctuary	2005–2008	1-ANOVA	0.065	4.45	2	
Sumilon Island Fish Sanctuary	2005–2008	1-ANOVA	NS			
Pasil Marine Sanctuary	2003–2008	1-ANOVA	NS			
Colase Marine Sanctuary	2004–2008	1-ANOVA	0.004	10.59	3	2004 = 08 < 05; 05 = 06; 08 = 06 = 04

Significance level = 0.05. Legend: LHC = Live hard corals; NS = not significant; ANOVA = Analysis of Variance; KW = Kruskal-Wallis Test.

effects of MPA management on habitats take several years for habitats to recover and improve, especially at larger spatial scales for slow growing hard corals. Measures that include regular monitoring and enforcement along boundaries, strict observance of rules and regulations, and increased awareness of the resource users and communities is therefore essential.

Similarly, target fish density showed variable patterns: (1) 59% of the MPAs are at status quo, that is, no significant changes were observed within the 4 to 7 years of monitoring; (2) 27% showed significant decreases ($p \leq .05$, $F > 5.48$, $DF \geq 2$); and (3) 14% (3 MPAs) showed significant increase in target fish density (Table 4). This status quo in target fish abundance further confirms the patterns seen in %LHC abundance, that positive management effects may take several years (5 to 7 years) within an MPA.

In addition, the few MPAs that showed significant increases are those monitored 5 to 7 years and with high %LHC (initial mean; 47.8–58.3%). The decreases in fish abundance must be interpreted with caution because it is likely that these are products of sampling artifacts; for example, counting a school of fish on one transect line and not on other replicates during an underwater visual census. This needs to be verified by doing further analysis; for example, testing MPA effects on fish guilds or at specific trophic groups. Decreases may also be a reflection of areas with breakdowns in management, such as those areas with occasional poaching. It is likely that a number of factors will play a role in target fish abundance recovery and improvement aside from management. Fish life history, behavior, and mobility in the initial stocks left prior to protection, habitat conditions, and oceanographic currents and larvae behavior are some factors (Abesamis et al., 2006; Meyer & Holland, 2005; Alfonso et al., 2008; Kaunda-Arara & Rose, 2004; Cowen et al., 2006).[1]

Key Lessons on EBM for the Future

The implementation of EBM in Southeast Cebu is a well-coordinated effort founded on the idea that "what one municipality does affects the others." It focuses on activities working toward scaling up the geopolitical scope to achieve the desired results in fisheries ecosystem management by expanding to a broad collaboration at the inter-municipal scale. It demonstrates a deliberate, collective action by municipalities motivated by local autonomous powers to manage their combined municipal waters. Instead of limiting themselves to very local concerns, the municipalities have expanded their perspectives to a broader scale of management. An important contributing factor to this transition from singular action to a multi-municipal initiative is the advanced municipal coastal management programs in place. Application of tools that lead to EBM such as MPAs, fisheries regulations, foreshore management, coastal law enforcement, and sharing information have made EBM more accessible.

To conform to the current legal-institutional regime in the Philippines, the municipalities created the Council of Vice-Mayors and Mayors through a Memorandum of Agreement (MOA). Although there are uncertainties, lack of oversight authority, and means of accountability of the Council and it is not uncommon that interagency agreements such as MOAs have no true permanency and are effective only as long as agencies intend to honor them (Batongbacal, 1997), it is a large step in a new direction. Despite new initiatives on inter-municipal collaboration on several fronts there is still a lack of recognized intergovernmental coordination mechanisms or to establish procedures for administrative and fiscal accountability (Lowry et al., 2005). Nevertheless, the Southeast Cebu municipalities are fully committed and willing to collaborate and cooperate in fisheries ecosystem management as

Table 4
Statistical test results for comparisons in target fish abundance between years within MPA

Marine protected area (MPA)	Years tested	Test	p/H	F	DF	post hoc: Tukey's test
Bagacay Marine Sanctuary	2005–2008	1-ANOVA	NS			
Guiwanon Marine Sanctuary	2005–2008	1-ANOVA	0.058	4.74	2	2008 < 05, 05 = 08, 06 = 08
Taloot Marine Sanctuary	2005–2008	KW	NS			
Bulasa Marine Sanctuary	2005–2008	1-ANOVA	NS			
Talaga Marine Sanctuary	2005–2008	1-ANOVA	NS			
Binlod Marine Sanctuary	2005–2008	1-ANOVA	NS			
Poblacion Marine Sanctuary	2005–2008	1-ANOVA	0.001	29.37	2	2005 < 06 = 08
Tulic Marine Sanctuary	2005–2008	1-ANOVA	NS			
Bogo Marine Sanctuary	2005–2008	1-ANOVA	0.001	28.86	2	2005 < 06 < 08
Langtad Marine Sanctuary	2005–2008	1-ANOVA	NS			
Casay shoal Marine Sanctuary	2005–2008	1-ANOVA	NS			
Balud-ConsolacionMS	2003–2008	1-ANOVA	0.000	17.25	4	2003 < 05 = 06 = 07< 08; 06 = 08
Casay Marine Park and Sanctuary	2003–2008	1-ANOVA	0.000	29.24	4	2003 < 05 = 07 = 08 < 06
Cawayan Marine Park	2006–2008	1-ANOVA	NS			
Daanglungsod-Guiwang MS	2005–2008	1-ANOVA	NS			
Poblacion Marine Sanctuary	2002–2008	1-ANOVA	NS			
Arbor Marine Sanctuary	2002–2008	1-ANOVA	0.009	5.8	4	2008 = 07 = 06 = 05 < 04
North Granada Marine Sanctuary	2004–2008	1-ANOVA	0.001	14.61	4	2004 < 05 = 07 = 08 < 06
Gawi Marine Sanctuary	2005–2008	1-ANOVA	NS			
Sumilon Island Fish Sanctuary	2005–2008	1-ANOVA	NS			
Pasil Marine Sanctuary	2004–2008	1-ANOVA	NS			
Colase Marine Sanctuary	2004–2008	1-ANOVA	NS			

Significance level = 0.05. Legend: LHC = Live hard corals; NS = not significant; ANOVA = Analysis of Variance; KW = Kruskal-Wallis Test.

shown by their consistent participation in the monthly Council meetings and their continuous budgetary allocation for the Council. These serve as crucial first steps toward EBM.

Having established the norms on working together as a whole for the fisheries ecosystem, priority programs of the Council are still considered works in progress. The current priority programs of the Council are fisheries and habitat management, foreshore management, and coastal law enforcement as stated in the three-year Council Action Plan adopted in 2008 (SECebuCouncil, 2008). Fisheries regulations on the use of fish aggregating devices along with the establishment of mariculture activities and other fisherfolk livelihood options are now planned to enhance fisheries management. Fish catch and fishing gear monitoring will provide data to inform fishery management. Plans are also underway to enhance financial sustainability of MPAs by promoting them as ecotourism destinations with resource user fees. This will address the need for logistical support for MPA management activities (i.e., guardhouse, mooring buoys, patrol boats, etc.). More focus will also be given to setting controls on foreshore development. The Council has created the Foreshore Management Task Force to facilitate multi-agency consultation, implement foreshore regulations, and conduct education. The Council also plans to improve the capacities of law enforcers to conduct monitoring, control, and surveillance of illegal fishing activities, including commercial fishing violations.

To effectively implement the planned actions, human capacity must be improved through technical training and education. One of the most frequently cited reasons for not implementing policies through government units at provincial and local levels is that they lack the "capacity" to carry out the required tasks (Cohen & Petersen, 1999; Grindle, 1997; Lowry et al., 2005). Thus, appropriate training has become a major activity of the assisting NGOs and the government to enable the ability to perform technical and skilled tasks.

Another lesson being learned is that law enforcement activities must be integrated across the entire Cebu/Bohol Strait to curb illegal commercial fishing. And, despite early successes of the cluster efforts to apprehend illegal fishers, there are still limitations on resources to conduct a full-scale enforcement covering the fisheries ecosystem by the joint enforcement team. One solution is to ensure that the *bantay dagat* (local volunteer) enforcers continue to be vigilant in their respective municipal water jurisdictions and that their surveillance stays alert to apprehend illegal fishers in their own areas. The best reminder of the need for vigilance is the overfishing caused by commercial and illegal fishers, which directly and adversely affects the livelihood of the marginal fishermen who are primarily dependent on the resources therein.

What is further needed is to create enabling conditions for the Council to build its capacity toward EBM. Organizational strengthening is obviously required more specifically to the implementing arms of each cluster programs—the municipal coastal law enforcers (MUSCLE) and the integrated MPA coordinating team (IMPACT), to improve its performance in facilitating coordination and convening fisheries ecosystem planning. Lowry et al. (2005) refer to organizational strengthening as strategies to alter management systems in ways that improve performance of specific tasks. Strategies for strengthening organizations are deemed to include "improving recruitment and utilization of staff, introducing better management practices, restructuring work and authority relationships, improving information and communication flows, upgrading physical resources, and decentralizing and opening decision making processes" (Turner & Hume, 1997; Lowry et al., 2005).

Inherent gaps are also apparent due to the limited scientific approach in MPA networking. The 22 MPAs established in Southeast Cebu did not consider overarching principles of MPA network design to maximize biological and social benefits. Thus, further research is commencing to determine whether MPAs are adequately protecting a representative suite

of critical reefs and associated habitats as well as ensuring ecological connectivity between such MPAs.

Another link to build the fisheries management system will be for the Council in Southeast Cebu to become institutionally connected with other municipalities and inter-municipal clusters across the Cebu/Bohol Strait. Thus, for wider coverage of the Strait, integration with the Bohol municipalities is slated in the 3-year action plan starting 2009 (SECebuCouncil, 2008).

Building sustainable ecosystem-based management will require continuing resources. The Council intends to set a revenue-generating strategy to ensure program continuity. Developing adequate resources for joint management actions, as in local coastal management, requires both increased revenue streams and setting priorities (Lowry et al., 2005). Because support from provincial and other government agencies for the Council vary and sometimes depend on the goodwill between mayors and the agency heads, financial alternatives are required. Now, there is still heavy dependence on the internal revenue allotment of each municipality.

A final lesson relates to the need for transparency in decision-making. The Council has endeavored to hold public hearings and meetings to ensure community participation and transparency of planning and management activities. Community participation is required for EBM to prosper. As exhibited by a survey of *barangay* officials, it is deemed important that MPA management is coordinated with other *barangays* to maximize MPA benefits to community. It is now incumbent on the Council to engage community stakeholders in decisions for the management of the common fisheries ecosystem. It is important that consultations and dialogues should be conducted down to the *barangay* (the smallest political unit) level. *Barangays* and People's Organizations such as fishermen's associations are thus considered as a vital component of any EBM regime because these often ensure the effectiveness of planning and program design so that implementation of any strategy or plan that may be formulated at the higher governance level is locally acceptable.

Finally, inter-municipal indicators for EBM that are now being developed. These so-called aspirational indicators include percent of habitats protected vis-à-vis the area of municipal waters, proximate spacing between MPAs based on increasing connectivity between MPAs, improved monitoring and streamlined municipal monitoring processes to make one MPA monitoring effort, and increased usefulness of collected monitoring data.

Conclusions

The Council is now moving toward EBM in Southeast Cebu by scaling up their municipal-level coastal management efforts. The Southeast Cebu fisheries ecosystem provides livelihood to many marginal fishers. Major threats to the resources have mandated a more concerted effort by the eight municipalities to manage each of the municipal waters and their resources. With a common resource base, the municipalities collectively agreed to integrate municipal coastal management efforts to address commercial and illegal fishers initially through an inter-municipal collaboration system. Buttressed by existing laws, the inter-municipal collaboration catalyzed by an external change agent allowed them to expand beyond their municipal boundaries to a broader collaboration at the fisheries ecosystem scale. Such inter-municipal governance arrangements can certainly adjust and expand to the ecosystem scale required to reach the ends of EBM. To ensure collaboration and collective responsibility, a coordinating body for all identified programs of the eight municipalities was formed and is now at the forefront of EBM efforts in Southeast Cebu. Initial positive impacts are being exhibited at the institutional level and through

ecosystem conditions. However, there is still much capacity and resource building needed. For the Council's management decisions to have a wider impact, technical and institutional capacity must be expanded to advance its goal of sustaining the management of coral reefs, associated habitats, and fisheries through a fully participative and integrated governance system to cover the entire ecosystem.

Note

1. The target reef fish families monitored include: surgeonfishes, fusiliers, groupers, snappers, emperors, jacks, sweet lips, spine cheeks, goatfishes, parrotfishes, rudderfishes,

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