Socioeconomic and Governance Monitoring of Marine Managed Areas: A Work in Progress

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Abstract. Traditionally Marine Managed Areas (MMAs) have been established to achieve biodiversity conservation goals (e.g. protect endangered species, increase fish populations); yet increasingly social, economic and cultural objectives are being incorporated into MMA planning. To understand the effects on human communities from including socio-economic objectives in MMAs goals, a cross-site study was designed to examine the socioeconomic and governance effects of MMAs in four countries (Belize, Brazil, Fiji and Panama) as well as ecological factors influencing these outcomes. A socioeconomic and governance monitoring survey is being conducted in each of the MMA coastal communities to understand conditions prior to MMA establishment compared with current conditions. The analysis will assess the MMA effects on food security of coastal residents, livelihoods, human threats to the marine resources, and environmental awareness and knowledge as well as assess the governance effects, including impacts on management structures and strategies, stakeholder participation and representation, property rights and access to resources, management plan compliance by resource users. In addition, enabling factors for MMA effectiveness will be determined. The factors being examined include leadership and long term support of local government, participation by community and all those affected, shared benefits among participants, and alternative livelihoods that may be appropriate in decreasing resource use pressures within MMAs. This project within the Conservation International Marine Management Area Science Program, is a work in progress and demonstrates the application of monitoring and research to support improved understanding and adaptive management of coral reefs and related ecosystems.

Key words: governance, marine protected area, monitoring, socioeconomics.

Introduction

Marine managed areas[1] (MMAs) are used throughout the world to cope with human impacts on marine ecosystems by limiting unsustainable economic activities, reducing user conflicts, and promoting non-extractive uses such as recreation activities. Marine conservation efforts are recognized as working with over 75% of respondents in Caribbean and Southeast Asia acknowledging marine area conservation benefits (Loper et al. 2008). An understanding of socioeconomic and governance conditions is vital for effective implementation of MMAs.

Socioeconomic and governance monitoring is a critical tool with which coastal and ocean resource managers can determine the impact and effectiveness of their management programs. It does little good to understand the health of coral reef and other coastal resources without understanding how people are interacting with those resources or what those resources are worth to local communities. Lloret and Riera (2008) examined the evolution of human uses ini the marine environment of Cape Creus and emphasized the increasing socioeconomic importance of recreational activities in detriment to artisanal

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[1] Marine managed area (MMA) and marine protected area (MPA) each have the same base definition, MPAs are primarily intended to protect or conserve marine life and habitat, and are therefore a subset of marine managed areas (MMAs), which are broader groups of named, discrete geographic areas along the coast that protect, conserve, or otherwise manage a variety of resources and uses, including living marine resources, cultural and historical resources, and recreational opportunities. Marine managed area classifications include state water quality protection area, state marine cultural preservation area, and state marine recreational management area (as defined in Fish and Game Code Section 2852. Source: http://www.dfg.ca.gov/mlpa/defs.asp)

fisheries. Apparent threshold levels of dependence on marine resources, material wealth, distance to markets and population, exist when considering customary forms of resource management (Cinner et al. 2007). On the sustainability of social-ecological systems, certain attributes of governance function in society to enhance the capacity to manage resilience in marine (Lobel et al. 2006). Given the paucity of socioeconomic and governance data available, there is an increasing demand globally from MMA managers, decision-makers, resource users, scientists and other stakeholders to understand the socioeconomic and governance conditions of MMAs.

Both government and non-government agencies, as well as other stakeholder groups, recognize that the dearth of existing data regarding the socio-economic and governance aspects of coastal and marine ecosystem management creates challenges for effective planning and implementation. This study will demonstrate the effects of MMAs on socioeconomic and governance conditions in the surrounding communities. In addition, this study will provide socioeconomic and governance information useful for determining how marine area management is contributing to community development, including poverty alleviation and equitable sharing of benefits. The synthesis analysis will contribute to marine conservation efforts at the site, regional and global levels, especially when integrated with the ecological monitoring results.

Methods
Figure 1 presents the coastal communities in the four countries where socioeconomic and governance monitoring is being conducted. These communities were selected for this study based on stakeholder consultation on access to MMAs and use patterns or dependence on marine ecosystems. These communities and corresponding MMAs are presented in Table 1.

Data collection is currently being undertaken. This involves literature review and primary data gathering. This was done as a collaborative endeavor among the participating local institutions and stakeholder groups. Surveyed respondents (n = 2736) were from a random sample (90 to 95% confidence) of MMA user groups within coastal communities.

The selection of the socioeconomic and governance variables was based on the MMAs' management objectives contained in their respective plans. The management objectives cover relevant socioeconomic and governance aspects. In addition, a series of community level multi-stakeholder consultations were undertaken to develop a consensus on identifying and selecting appropriate socioeconomic and governance indicators to measure these effects.
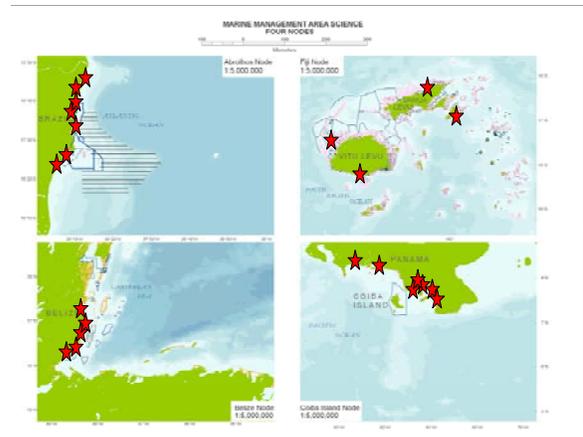

Figure 1: Location of coastal communities in the four nodes covered in this study. (counter clockwise, from top left map: (1) Abrolhos. Brazil; (2) Fiji; (3) Belize; and (4) Coiba, Panama.

Table 1: Socioeconomic effects of marine managed areas.

Country	Marine Managed Areas	Coastal communities
Belize	Lighthouse Reef, Laughing Bird Caye, South Water Marine Reserve, Sapodilla Cayes, Port Honduras Marine Reserve	Sarteneja , Chunox , Copper Bank, Dangriga, Hopkins, Sittee River, Seine Bight, Independence, Placencia, Monkey River, Punta Negra, Punta Gorda
Brazil	Albrolhos National Park, Corumbau Extractive Reserve, Cassaruba	Portu Seguro, Caraiva, Corumbau, Prado, Alcobaca, Caravelas, Nova Viscosa
Fiji	Navakavu, Waitabu, Navatu, Malolo	Waiqanake, Muaivusu, Namakala, Nabaka, Waitabu, Boumai, Lavena, Navatu, Solevu, Yaro
Panama	Coiba National Park	Pedregal, Remedios, Pixvae, Bahia Honda, Santa Catalina, Hicaco, Puerto Mutis, Leones Arriba, Gobernadora, Malena

In order to evaluate the socioeconomic impact of MMAs on individuals of specific user groups, baseline conditions prior to the establishment of MMAs were determined. Comparing the current conditions and trends against this baseline provided a basis for measuring the effect of MMAs. In the absence of existing baseline data, other benchmarks were identified.

Survey instruments were developed to measure effects on:

- Livelihood outcomes: Have the family improved economically? Have economic activities

diversified? Do households have more services available? Have the dependency on marine resource changed? Are there infrastructures changes?

- Perceptions on environmental problems: have community environmental concerns changed?
- Perceptions about and use of the MMA: are the restrictions imposed on access to resources perceived as harmful? Do communities perceive that they can take benefit from the MMA? Has knowledge about the MMA increased?
- Use of marine resources and economic activity: monthly family income, main source of income, membership in commercial organizations (coops, etc.), use of coastal resources, frequency of marine related activities, use of MMA, types of tourism activities done in the area
- Community organization and participation: are more people participating in community-based groups? Are more people participating in the MMA activities? Has the awareness of environmental/community projects increased?

In all four countries, the socioeconomic and governance monitoring sites are the same sites where ecological monitoring is being conducted. This is to ensure integration of the data for cross-disciplinary analysis of: (1) which ecological factors (e.g. productivity of extractive resources, habitat quality, ability to absorb waste, frequency of natural disturbances) affect socioeconomic outcomes (e.g. livelihoods); and (2) which socioeconomic (e.g. resource use patterns) or governance factors (e.g. stakeholder participation) affect ecological outcomes.

Preliminary Observations
Data gathering and analysis is underway in Belize, Brazil, Fiji and Panama with stakeholder consultation meetings conducted since March 2007 with local non-government organizations, MMA management bodies, and civil society groups including fishers' organizations, tour operators and tour guide associations. In addition, secondary data analysis (e.g., reports from government agencies, profiles of communities, etc.) is complete.

In Belize, fishing is not only an economic activity but a way of life, enhancing social and cultural values. More recently, the managers of protected areas have formed themselves into an association called the Association of Protected Areas Managers Organizations (APAMO). APAMO was organized to strengthen the Protected Areas Network in Belize. Through APAMO it is expected that protected areas management will evolve to focus more on a systems approach to conservation and sustainable management. Belize is a good example of co-

management agreements that can be strengthened to cover key emerging issues such as stakeholder participation, conflict resolution, and recovery of investments. Creation and direct involvement of APAMO over activities in the MMA sites affect the immediate environment and ultimately, the environmental quality of the adjacent MMAs.

In Panama, the buffer zone of the Coiba National Park (CNP) has been experiencing several socio-economic and demographic changes over the past two decades. For example, fishermen in the area of Bahía Honda, Puerto Mutis, and Puerto Remedios mention having experienced a decrease in fishing productivity over the last few years which is attributed both to overfishing and to tighter regulations restricting fishing in areas of the CNP. This has implications on how some groups within communities are better positioned to take advantage of conservation benefits compared with others. There is a general positive sense about the park because it can strengthen the community (e.g.., diversifying the economy), however, there is some concern about the unequal distribution (e.g., permits to non-artisanal fishers) of benefits that may accrue only to the tourism sector.

Homogeneity of user groups across countries may have implications on the causality of effects of MMAs. Initial statistical runs for Belize and Panama show that there are significant differences in terms of four demographic parameters: household size, years of residence, age, education. In terms of perceptions of non-monetary benefits from MMAs, local communities in Belize consider marine ecosystems important, not only for extractive uses, but also for their non-use values (Figure 2).
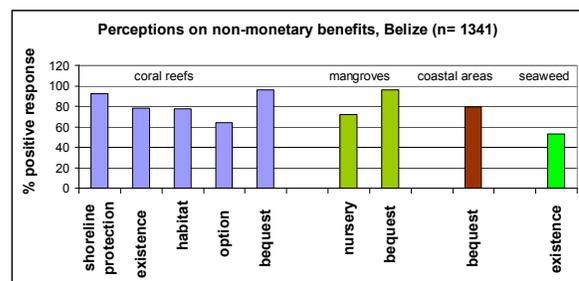

Figure 2: Perceptions on non-monetary benefits of marine managed areas in Belize.

Conclusion and Next Steps
Socio-economic and governance conditions provide the context within which coastal marine resources are managed. The values, perceptions and behaviors of local communities, key stakeholder groups and the policies developed and enforced by local and national authorities determine which areas are managed, the

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extent to which they are managed and the level of compliance with management objectives. Changes in resource use and conservation patterns are therefore intricately linked to the overall political and socio-economic seascape.

Increasing poverty among coastal communities, literacy rates, historical or traditional resource use patterns, the increased cost of living, the rising cost of fuel and the annual threat of natural disasters, are just some of the variables that impact on how people interact with coastal marine ecosystems. In turn, people's interactions with coastal marine ecosystems determine the development of management strategies and the resources needed to conserve these ecosystems.

The level of conflict or compliance among user groups and with MMA management is often positively correlated with the lack of viable alternative livelihoods, resulting in communities engaging in illegal and destructive extraction activities. Hence, governance dimensions such as the type of MMA designation (e.g. ,national park, wildlife sanctuary etc.), the type of management structure (eg: government, non-government or community-based), the implementation of environmental education programs, the development of mechanisms to maintain stakeholder participation and involvement, and the effectiveness of the national legislation framework and the legal monitoring and enforcement system determine the relationship of people and marine ecosystems.

Managers of at last three of Belize's marine managed areas have begun to scientifically collect this type of data and use it in planning for more effective resource management. Because the integration of social science methodologies and approaches is groundbreaking for the conservation community, much learning regarding effective methods of study is taking place.

Data gathering in all four countries is expected to be completed in March 2009. Analysis will be completed by June 2009. The results from the synthesis of the socioeconomic and governance information from each of the countries, will provide information to: (1) establish a program of scientific monitoring of socioeconomic and governance processes for adaptive management; (2) measure the effectiveness of the MMAs in achieving its conservation goals; and (3) characterize and measure the effects of the MMA on ecological, socioeconomic and governance processes.

To ensure that the results from the socioeconomic and governance monitoring will feed into policy and decision-making, several products are being planned with relevant government and policy making bodies in each of the countries. For example, in Belize, the socio-economic and governance monitoring protocol is being developed for adoption by the Association of Protected Areas Management Organizations (APAMO).

References
Cinner JE, Sutton SG, Bonds TG (2007) Socioeconomic Thresholds That Affect Use of Customary Fisheries Management Tools. Conserv Biol 21:1603-1611.

Lloret J, Riera V (2008) Evolution of a Mediterranean Coastal Zone: Human Impacts on the Marine Environment of Cape Creus. Environ Manag, 42:977-988.

Loper, C., Pomeroy R, Hoops V, McConney P, Pena M, Sanders A, Sriskanthan G, Vergara S, Pido M, Vave R, Vieux C, Wanyonyi I (2008) Socioeconomic Conditions Along the World's Tropical Coasts: 2008. National Oceanic and Atmospheric Administration and Conservation International. 52 pp.