

Capacity for (Co)Management of Marine Protected Areas in the Caribbean

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Great strides have been made in identifying and measuring the conditions that favor the success of marine protected areas (MPAs). We can also evaluate the management effectiveness of MPAs. More attention is being paid to sustainable financing, and MPA networks help us to scale-up their benefits. Yet, the capacity to manage or co-manage MPAs often remains limited, especially in small island developing states, even after numerous capacity assessment and development initiatives. Capacity is more than a collection of human technical skills supplemented by physical and financial assets. It is a complex multi-dimensional concept that also includes less easily measurable overarching components such as worldview, organizational culture, and propensity for networking that tend to shape the more mechanistic elements of capacity. We offer a largely qualitative analysis of practical observations on how capacity and management effectiveness (in terms of biophysical, socioeconomic, and governance aspects) have combined to influence success and lack of success in a selection of small Caribbean MPAs. Lessons learned from this analysis contribute to our understanding of the role that human dimensions play in MPA success.

Keywords capacity, Caribbean, marine protected areas

Introduction

Marine protected areas (MPAs) have been identified, and are increasingly promoted on a global scale, as essential tools for mitigating human impacts upon marine ecosystems and the services they provide. MPAs are now typically packaged with ecosystem-based management (EBM), the ecosystem approach to fisheries (EAF), and marine spatial planning (MSP). These are perceived to be at the cutting edge of enlightened approaches to achieving sustainable marine resource use (Fanning, Mahon, and McConney 2011). Well designed and successfully implemented MPAs are, in theory, almost certain to succeed. However, at a global level, the marine ecosystems that are effectively under protection comprise only a small portion of the total area required to make a meaningful difference.

Targets were set through the World Summit on Sustainable Development (WSSD) in 2002 to develop representative networks of MPAs by 2012, and through the Convention on Biological Diversity (CBD) in 2006 to protect 10% of ecological regions in marine areas

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under national jurisdiction by 2010. Initiatives such as the Micronesia Challenge, Coral Triangle Initiative and Caribbean Challenge are attempts to address the conservation targets. Antigua and Barbuda, the Bahamas, Grenada, Jamaica, Dominican Republic, Saint Lucia, St Kitts and Nevis, and St. Vincent and the Grenadines have signed on to the Caribbean Challenge to effectively conserve 10% of marine resources by 2012 and protect 20% of their nearshore area by 2020. In 2010, global coverage by about 6,000 MPAs was, however, not yet 1.5% (Toropova et al. 2010).

MPAs often do not achieve their stated goals and objectives due to issues that may be complex (Pollnac and Seara 2011; Pollnac et al. 2010). Since the majority of MPAs lack the capacity for effective management (Toropova et al. 2010) efforts are underway to measure and improve MPA success (Crawford et al. 2006) and management effectiveness (Pomeroy, Parks, and Watson 2004). Recognizing that MPAs are social–ecological systems, attention to integrating biophysical, socioeconomic, and governance aspects in design, operation, evaluation, and capacity development has increased globally (Ban et al. 2011; Carter, Soemodinoto, and White 2010; Green et al. 2011).

Factors that contribute to, or favor, MPA success have been investigated (Pollnac et al. 2010). Pollnac and others have found that co-management is the governance arrangement best suited to many MPAs, but particularly those that are small to medium sized and near to coasts along which many stakeholder groups need to collaborate. Co-management is the sharing of power and responsibility amongst stakeholder groups in order to collaboratively manage natural resources (McConney, Bunce, and Bustamante 2003).

Within MPA co-management arrangements a factor favoring success is institutional capacity. This includes the levels of formal and informal education, adaptive management skills and leadership ability present in or accessible by the stakeholder groups involved in collaborative management (Pollnac and Seara 2011). Gombos and others (2011) recently profiled and assessed the capacity at twenty-seven MPAs located in The Bahamas, Belize, British Virgin Islands, Saba, St. Eustatius, Honduras, Grenada, Mexico, St. Lucia, St. Vincent and the Grenadines, and Turks and Caicos Islands. They found the region wanting. If Caribbean MPAs are to be successful, then capacity for (co-)management effectiveness requires more attention.

Next we look closer at multi-dimensional concepts of capacity and suggest a practical approach to analysis that takes into account MPA management effectiveness. We examine the capacity for MPA (co-)management effectiveness in the Caribbean using our observations and information drawn from MPA projects and studies. We end by discussing the implications of these findings for MPA initiatives such as the Caribbean Challenge.

Considering Capacity

Although Pollnac and others identify capacity, particularly adaptive and institutional capacities, as important they do not examine these concepts in depth. Practical methods are needed for assessing and addressing capacity gaps (Gupta et al. 2010). There is a rich literature that can be drawn on, much of it related to governance (Jones, Qiu, and De Santo 2011) resilience (Nelson, Adger, and Brown 2007).

Linking capacity to success in the context of community-based natural resource management, Armitage (2005, 703) asks: “Why do some community-based natural resource management regimes perform better than others?” He suggests that the answer lies in their adaptive capacity which he defines simply as the ability of a system (social and/or ecological) to adapt to change and respond to disturbances. Adaptive capacity is largely a function

of social and institutional relationships and the outcomes of interactions among actors in social networks. He identifies four dimensions of adaptive capacity:

- Learn to live with uncertainty and change
- Nurture diversity for reorganization and renewal
- Combine different types of knowledge for learning
- Create opportunities for self-organization

Taking the notion of learning further, Pahl-Wostl (2009) notes that governance failures are the origin of many resource management problems. She develops a framework for addressing the dynamics and adaptive capacity of resource governance regimes taken as multi-level learning processes. The framework highlights the importance of informal networks for double- and triple-loop learning, and the importance of network governance in supporting the innovation and social learning required to build adaptive capacity. We see an image of capacity being concerned with learning and adaptation, involving multi-level governance and being operationalized mainly through social networks. Access to capacity not inherent in the MPA management authority is typically through social and organizational networks.

Examining capacity at the first (management) order of governance (Bavinck et al. 2005) with which we are mainly concerned, Armitage (2005) sets out a series of “strategic” (power, scale, knowledge, community, and culture) and “operational” (technical, financial, social, institutional, and political) issues that attend capacity development. He suggests that performance is a result of combining the three qualities of focus, will, and capabilities. Adaptive capacity improves the fit of these three factors, allowing all to be directed toward performance goals and hence success.

Writing from Caribbean experience, but not specifically on MPAs, Krishnarayan, Geoghegan, and Renard (2002) suggest a multi-dimensional perspective on capacity in which adaptation and other aspects highlighted by Armitage and Pahl-Wostl are embedded. This scheme has seven components:

- *Worldview*: vision and mission guiding capacity requirements
- *Culture*: an organization’s distinctive climate and way of operating
- *Structure*: roles, functions, positions, supervision, reporting, and so on
- *Adaptive strategies*: ways of responding to changing environments
- *Skills*: knowledge, abilities, and competencies for effective action
- *Material resources*: technology, finance, and equipment required
- *Linkages*: relationships and networks for action and resource flows

Pomeroy, Parks, and Watson (2004) set out biophysical, socioeconomic, and governance indicators that can be used to measure management effectiveness defined as “the degree to which management actions are achieving the goals and objectives of a protected area” (p. 3). They emphasize that indicators can be modified or expanded in order to fit site-specific circumstances. Other indicator suites have been developed. For example, the MPA Management Effectiveness Assessment Tool (MPA MEAT) is used in the Philippines as part of the Coral Triangle Initiative. Management effectiveness and success are not synonymous but are closely related. The former is a necessary but not sufficient condition to achieve the latter. In practical terms, however, MPA site managers and stakeholders are likely to assess management effectiveness in order to determine whether they are on the path toward success.

Turning specifically to MPA capacity assessment in the Caribbean, Gombos et al. (2011) do not explicitly refer to any specific conceptual framework for their investigation,

but they found that the concept of management capacity used in MPA assessments varied so widely that they could not be easily compared. They began their assessment by modifying the NOAA Coral Reef Conservation Program MPA Management Assessment Checklist, a specific measurement tool. Gombos et al. (2011, 11) state that their modified self-assessment survey tool:

... captured information for each site on the current level of capacity and needs to improve capacity in the following 24 thematic assessment areas: site designation and design, socioeconomic monitoring, fisheries management, management planning, MPA effectiveness evaluation and adaptive management, integrated coastal management, ecological network development, stakeholder engagement, partnerships/coordination, governance, financing, organizational management, on-site management, outreach and education, sustainable tourism, enforcement, conflict resolution mechanisms, economic valuation, boundaries, resilience to climate change, emergency response process or team, biophysical monitoring, alternative livelihoods, and the use of ecosystem based management principles.

Within this comprehensive coverage we see elements common to most of the previously mentioned schemes for evaluating both capacity and management effectiveness. Based on the findings of Pollnac and others (2001) concerning the importance of capacity to success, and the role of management effectiveness in success (Pomeroy, Parks, and Watson 2004), we propose a simple and practical suite of indicators for combining capacity and management effectiveness evaluation at the operational level (McConney, Bunce, and Bustamante 2003) without losing sight of higher level adaptive and governance concepts (McConney, Deane, and Pena 2010). We proceed on the basis of co-management being the prevalent or desired governance arrangement in the region. Consultative co-management (in which the state merely asks stakeholders for advice) is the most likely scenario, with a desire to mature into collaborative co-management (joint decision-making) but not necessarily delegated co-management (devolved responsibility and authority) (McConney, Mahon, and Pomeroy 2007). Government fisheries or coastal management agencies are usually the state partners, with small nongovernmental organizations (NGOs) or multi-stakeholder advisory boards being the typical civil society partners.

Our indicator suite is set out as a matrix that combines the categories of Krishnarayan, Geoghegan, and Renard (2002) and Pomeroy, Parks, and Watson (2004). This is only a rough “first cut” to be developed further. In Table 1 are examples of indicators in each cell. The indicators suggest what to look for in each dimension of capacity related to each of the factors of management effectiveness. For simplicity we provide only one indicator per cell, but there should be three to five for the measurement to be more valid, robust, and reliable. Appropriate indicators should be developed at site level in a participatory process involving the stakeholders and grounded in the MPA’s goals and objectives (Jentoft, Chuenpagdee, and Pascual-Fernandez 2011). Information exchange that occurs in this process not only results in better indicators with shared interpretation, but is itself an exercise in building capacity. The methods of data collection suggested in Pomeroy, Parks, and Watson (2004) remain appropriate for these indicators. Also see the MPA MEAT assessment tool and Carter, Soemodinoto, and White (2010) for additional suggestions.

The indicators may be purely qualitative or be combined with a numerical score or quantitative data. For example, zero for the complete absence of a characteristic, one for some or middling presence and two for it being fully present. Gombos et al. (2011) use

Table 1
Indicator suite for evaluating the capacity for MPA (co-)management effectiveness

Management Effectiveness Dimensions of capacity	Biophysical factors (e.g., species, habitat, ecology, biodiversity, spill over, resilience)	Socioeconomic factors (e.g., food security, real benefits, livelihoods, values, equity, tradition)	Governance factors (e.g., participation, legal matters, empowerment, enforcement, conflicts)
Worldview: vision and mission guiding capacity requirements	Ecosystem based management (EBM) is actively pursued	Oriented to sustainable livelihoods, well-being, and good quality of life	Participatory approach to management with emphasis on partnership
Culture: organization's distinctive climate and way of operating	Conservation to sustain ecosystem services	Understands importance of human dimensions	People-centered methods are preferred if feasible
Structure: roles, functions, positions, supervision, reporting	Senior staff get in the field to do monitoring	Set up to interact easily with the private sector	Regular reports include stakeholder perspectives
Adaptive strategies: ways of responding to changing environments	Able to test models of MPA ecology and refine	Foster entrepreneurship and income innovation	Addresses three orders of governance, learning
Skills: knowledge, abilities, competencies for effective action	Use scientific and local ecological knowledge	Business planning and financial management	Participatory processes, facilitation techniques
Material resources: technology, finance, and equipment required	Access to boat, gear, lab, computers, manuals	Demonstration of other livelihoods, marketing	Communication items, access to meeting places
Linkages: relationships and networks for action and resource flows	Has natural scientists on staff or within network	Maintains contact with resource user groups	Reaches out to regional and international levels

three “tiers.” Stoplight colors or face symbols can also convey rating. Trend arrows or other intuitive graphics to show decreasing, stable, or increasing tendencies can be added if there is time series information or forecasting. Measurement should be consistent with quality of information. Comparative analysis should not be performed quantitatively simply because numbers can be assigned. Such analysis can introduce unnecessary diversions, haggling, and conflict into the process. Bar and radar charts are other means of visualization, especially if the intention is to compare capacity among the categories of management effectiveness indicators. Effectively communicating results and decisions is important for learning and adaptation (Pomeroy, Parks, and Watson 2004; McConney and Haynes 2011). Innovative measurement and communication can be devised without interpreting more into the data than is justified.

In the next section we briefly explore the utility of these indicators using our own observations and evidence from studies and projects (Gombos et al. 2011; McConney, Deane, and Pena 2010; Pena et al. 2010).

Caribbean Challenges

Gombos et al. (2011) used self-assessment, which has drawbacks that are different from those of an expert assessment. One gets the impression that the investigators did not always agree with the MPA site managers but were not, methodologically, in a position to discuss differences and produce a modified result. They refer to “current perceived capacity of sites,” which is said to be

... greatest in relation to zoning/boundaries, governance, management planning, stakeholder engagement, conflict resolution mechanisms, and outreach and education. Current perceived capacity of sites is lowest in relation to alternative livelihoods, socioeconomic monitoring, and fisheries management. Priority MPA management capacity needs as identified by managers are: 1) enforcement (10 sites) 2) financing (9 sites) 3) management planning, bio-physical monitoring, socio-economic monitoring (7 sites), and 4) MPA effectiveness evaluation, and outreach and education (6 sites). Preferred approaches to capacity building at a regional scale are: 1) technical support, 2) training, 3) more staff, 4) learning exchanges, and 5) higher education course. (Gombos et al. 2011, 11)

Although the indicators in Table 1 are rough and developed by the authors alone purely for illustration they are sufficient to demonstrate application to practical Caribbean MPA cases. The indicators are likely to be more useful at the level of a single site or closely connected ones since they should be relevant to specific MPA goals and objectives. However, the indicators can also be used to provide a more general assessment of a region or collection of MPAs. Using our own observations and data from the studies and projects previously referred to we offer some examples of the rationale behind some of our ratings of MPAs in the English-speaking Caribbean that we assigned in Table 2. Our assessment is simply a qualitative “expert opinion.”

Worldview

The worldviews, or broad perspectives, are rapidly being “modernized” at Caribbean MPAs via linkages with global and regional programmes implemented by big international

Table 2
Preliminary evaluation of capacity for management effectiveness in the Caribbean

	Biophysical factors	Socioeconomic factors	Governance factors
Management effectiveness	Rating: Good = 😊; Fair = 😐; Poor = ☹️		
Dimensions of capacity	Trend: Improving = 📈; Stable = 📊; Worsening = 📉		
Worldview	😊📈	😊📈	😊📈
Culture	😊📊	😊📈	😊📈
Structure	😊📊	😊📈	😊📈
Adaptive strategies	😊📈	😊📈	😊📊
Skills	😊📈	😊📊	😊📈
Material resources	😊📊	😊📈	😊📊
Linkages	😊📈	😊📈	😊📈

governmental or NGOs and universities (Bustamante and Vanzella-Khoury 2011). Their outlooks are becoming more progressive to incorporate social–ecological systems, complex adaptive systems, resilience thinking, and interactive governance (McConney, Deane, and Pena 2010; Gombos et al. 2011).

Culture

Although the organizational cultures of MPA management agencies, whether governmental or NGO, may include a conservation ethic, the grim reality is that this is often effectively countered by unsustainable or damaging development within MPAs and in adjacent coastal areas (Pena et al. 2010). Goals of biodiversity conservation, rebuilding fish stocks and habitat rehabilitation abound. But tourism abuse, illegal fishing by less well off stakeholders and an overriding culture of development in developing countries being equated with investment in physical infrastructure are serious constraints against building capacity in this dimension of organizational culture. Governance and socioeconomics fare better in that people-centered thinking and methods are in more common use mainly due to appropriate training, while understanding the importance of human dimensions is an inescapable aspect of operating small MPAs in small countries with intense coastal use by diverse and often conflicting stakeholders (Gombos et al. 2011).

Structure

There are generally fair but positive signs attending this dimension. Experience suggests that field-oriented senior staff and executive boards are assets in being champions of biophysical factors. They are more informed in their decisions and convincing in their communication if they have field experience, which many do. Interactions with the private sector are fair but improving as some MPAs seek additional partnerships in their quest for sustainable financing (McConney, Deane, and Pena 2010; Gombos et al. 2011). Regular reports from MPAs that genuinely give voice to their stakeholders are relatively uncommon unless linked to a project, and MPA structures are only now gearing towards empowerment.

Adaptive Strategies

Capacity for adaptive strategies is in poor shape, but with some small signs of improvement (Pena and McConney 2010). The main constraints are inadequacies of measurement, assessment, and learning, all of which are essential ingredients for adaptation. Few MPAs have “SMART” (Specific, Measurable, Achievable, Realistic and Time-bound) objectives and even less make them “SMARTER” (add Evaluated and Reviewed) (McConney, Mahon, and Pomeroy 2007). Institutional memories are often very short and fragmented due to issues with record-keeping and turnover of staff. Visiting scientists and even some developmental consultancies are notorious for not sharing their findings at all or in a way that MPA agencies can easily make use of them in their decision-making processes. There is also an unwillingness to experiment given the often high stakes of failure and scarcity of “no harm” opportunities. However, with more exposure to resilience thinking there is some evidence that capacity for adaptive management is improving (McConney, Deane, and Pena 2010).

Skills

Skills are a mixed bag with some signs of improvement. Patchy (in time and space) scientific studies combined with a lack of tradition of use or trust of them in decision-making has resulted in a high level of dependence on local ecological knowledge. However, business planning and financial management skills that can be applied both to the MPA and to facilitate initiatives with stakeholders are scarce (Gombos et al. 2011). This is partly due to many MPAs relying heavily on state-financing, even if they are intended to be revenue-generating, with few economic or accounting studies available to guide their operation. The recent interest and initiatives in sustainable financing is improving the situation especially as governments acknowledge their financial limitations. Regarding governance, training in more people-centered processes is beginning to pay off with increased capacity and less dependence on external assistance. A weakness common to coastal fisheries management authorities, however, is lack of social science skills on staff (Mahon and McConney 2004).

Material Resources

The increase in MPA projects in the region has brought more funding for equipment and services for biophysical activities although seldom salaries for core financing of human resources (Gombos et al. 2011). The situation is deemed stable rather than improving because many times we see this imbalance resulting in underutilized equipment and no real improvement in meeting MPA goals. There is also more attention to livelihoods and socioeconomic factors, but this often falls short of the level of support required to establish viable alternative or supplementary livelihoods (Pena and McConney 2010). Such may be possible only through networking with development agencies set up specifically for this purpose to provide micro-finance, venture capital, or demonstration enterprises. Demand for material resources for governance is less and it is stable with such resources being reasonably available.

Linkages

The Caribbean has not been left out in the global trend toward increased networking. For example, in 1997 UNEP CEP created the Caribbean Marine Protected Area Management Network and Forum (CaMPAM) to enhance marine and coastal area management in the

Wider Caribbean Region (Bustamante and Vanzella-Khoury 2011). CaMPAM has been fairly effective in building capacity through training, information sharing, small-grant funding and field site exchanges. Most MPAs have reasonable access to marine science although much of this is still from external sources. Linkages in relation to socioeconomic factors are good since, from long ago, most MPAs had contact with resource user groups plying their business within and around the areas. Both regional and international linkages for governance are improving, again mediated mainly through major projects (Gombos et al. 2011).

Discussion

Capacity is one of the major factors of MPA success (Pollnac, Crawford, and Gorospe 2001; Pollnac et al. 2010; Pollnac and Seara 2011). This includes individual capacity in areas such as leadership, but is mainly concerned with institutional capacity (Christie et al. 2009; Gupta et al. 2010). MPA management effectiveness is also closely linked to success (Pomeroy, Parks, and Watson 2004). We have shown how capacity for management or co-management can be assessed in a simple and practical way using the Caribbean as an example. The results can be communicated in a manner that is easy for decision-makers to digest. The process of developing the indicators and the assessment process can both be participatory and capacity-building in their implementation. A similar quest to measure management effectiveness and build adaptive capacity is underway in the Asia-Pacific region and elsewhere (Carter, Soemodinoto, and White 2011; Green et al. 2010) as part of a global trend in marine conservation initiatives (Ban et al. 2011).

In the Caribbean it is evident from recent site studies (e.g., Gombos et al. 2011), and from our own analysis, that capacity development needs to remain a high priority. The Caribbean situation reflects many of the symptoms of capacity issues in small island developing states (SIDS) elsewhere (Green et al. 2011) but there are also cultural, social, economic, and governance-related differences among regions that cannot be ignored. Lessons learned should be regularly exchanged not only within, but also among, regions in order to facilitate adaptation.

In the Caribbean, as elsewhere, attention must be paid to the evenness of capacity development across the three main categories of indicators for MPA management effectiveness. All are important (Gaines et al. 2010). There is currently more capacity for addressing biophysical and governance matters than socioeconomic, although none are in particularly good shape. MPA initiatives such as the Caribbean Challenge and Coral Triangle Initiative need to be guided by MPA capacity assessments in order to improve performance and enhance the factors that favor success. The simple suite of indicators that we suggest, and the several others in use elsewhere, are steps in the direction of addressing these issues in order to meet global conservation targets.

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