

Marine protected areas management in the Caribbean and Mediterranean seas: making them more than paper parks

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ABSTRACT

1. The paper comprises recommendations presented and discussed at several workshops of the 3rd International Marine Protected Areas Congress (Marseille, France, 21–27, October, 2013) to achieve effective management of marine protected areas in the Caribbean and Mediterranean Seas.

2. It highlights the similarities but also differences between the two areas as a result of their distinct biogeographic and cultural characteristics.

3. The biophysical setting, socioeconomic scenario and issues related to marine protected areas in the Caribbean and Mediterranean Seas are summarized and case studies from both regions are presented that illustrate the level of success thus far achieved by MPAs.

4. Factors contributing to MPA success are related to ecological conditions, the involvement of stakeholders in decision-making processes, and to better governance, as well as improved communication and training.

5. The SPAW and SPA regional environmental agreements administered by the UNEP Regional Seas Programmes in collaboration with government and non-government partners and the MPA managers' networks have provided technical assistance that has led to improved management.

6. The experience of the last 3 years of contacts between both regional networks of MPA scientists and practitioners (i.e. MedPAN and CaMPAM) highlights the benefits of such an initiative and suggests the need to develop a robust transoceanic Exchange Programme to facilitate knowledge transfer.

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Received 31 March 2014; Revised 26 June 2014; Accepted 17 July 2014

KEY WORDS: marine protected areas; marine reserves; coastal; Caribbean Sea; Mediterranean Sea

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This article forms part of the supplement 'Building Networks of MPAs: new insights from IMPAC3'. Publication of this supplement was supported by IUCN and WCPA with financial contributions from Parks Canada and United Nations Environment Programme (UNEP).

INTRODUCTION

The countries of the Caribbean and the Mediterranean Seas have recognized marine protected areas (MPAs) as valuable tools for the protection and recovery of species and key habitats in decline, together with the associated ecosystem services. Within the Convention on Biological Diversity (CBD) framework, those countries have committed to achieve the Aichi Target 11 of the Strategic Plan for Biological Diversity 2011–2020: ‘10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures’ (CBD, 2010). Despite biophysical and socioeconomic differences, both regions have similar marine conservation issues related to a long history of coastal resource overuse that are being addressed through spatial planning and ecosystem based management approaches. Thus, each region has adopted analogous legally binding conventions under the United Nations Environment Programme (UNEP) umbrella as its legal framework (along with a soft-law action plan) (Kao, 2014).

On the western side of the Atlantic Ocean, the Caribbean Sea and the Gulf of Mexico are surrounded by 38 countries and European overseas territories. The land masses of the south-eastern USA, Mexico, Central America and northern South America and the islands of The Bahamas and the Greater and Lesser Antilles separate the Tropical NW Atlantic Marine Biogeographic Province (Sullivan Sealey and Bustamante, 1999; Spalding *et al.*, 2007) from the Atlantic. In the Caribbean Sea, ocean circulation is dominated by the formation and movement of eddies that flow NW, determined by the bathymetry and coastal topography. This circulation, also influenced by the discharges of large rivers (Orinoco, Magdalena, Amazon and Mississippi) affects the connectivity of biological populations through larval dispersal and adult migrations (see Bustamante and Paris (2008) for specific references).

Caribbean coral reefs provide goods and services such as fisheries, dive tourism, and shore-line

protection, with an estimated annual net economic value in 2000 of \$US3.1–4.6 billion (Burke and Maidens, 2004). In many countries and coastal towns, tourism is the dominant industry, and commercial fishing (mostly artisanal) is common. However, a long history of overfishing, as well as pollution and sedimentation from poor coastal development and agriculture practices have had a negative impact on coral reefs, seagrass beds, mangroves and sandy beaches in many coastal areas throughout the region. In many islands reef fish richness and abundance are low, and in some countries many large species of groupers have become commercially extinct (Sadovy and Eklund, 1999).

On the other side of the Atlantic, the Mediterranean Sea is a semi-enclosed sea whose waters bathe the coasts of 21 countries of a region that was the cradle of great civilizations. The geological and human history of the Mediterranean region has resulted in a rich biological, social, cultural, and political diversity. Yet, the basin is an important ecological area for the unique diversity of life found in its waters, with a high number of endemic species and critical areas for the reproduction of pelagic species (Shi *et al.*, 2005; Coll *et al.*, 2010). However, cumulative impacts, driven by multiple stressors (i.e. intense urbanization, mass tourism, shipping traffic, overfishing, pollution, and climate change), are having a heavy impact on this natural heritage and the ecosystem services essential for human wellbeing and local economies (Micheli *et al.*, 2013).

In both seas there are regional environmental agreements that contribute to the implementation of the CBD for the protection and sustainable management of coastal and marine biodiversity, both administered by UNEP Regional Seas Programmes. In the Mediterranean, the Specially Protected Area and Biological Diversity (SPA/BD) Protocol of the Barcelona Convention (<http://www.unepmap.org>) is the main agreement, while in the Wider Caribbean, it is the Specially Protected Areas and Wildlife (SPAW) Protocol of the Cartagena Convention (<http://www.cep.unep.org/cartagena-convention/spaw-protocol>).

This paper summarizes information on the Wider Caribbean and Mediterranean Seas MPA status and challenges, case studies of good practice, regional training and communication programmes,

and the rationale for the exchange and collaboration between the MPA communities of both regions for expediting the transfer of MPA best management practices necessary to transform paper parks into functional and ecologically effective marine protected areas. The need to strengthen 'transoceanic' collaboration of MPA professional networks and training programmes was discussed and became evident at different workshops of the 3rd International Marine Protected Areas Congress held in Marseille, France in October 2013.

THE MARINE PROTECTED AREAS IN THE MEDITERRANEAN AND THE CARIBBEAN: REGIONAL OVERVIEW AND CASE STUDIES

Regional overview

In the Mediterranean Sea countries are still struggling with establishing a coherent network of effectively managed MPAs (Gabri  *et al.*, 2012). The underlying cause is complex and may include aspects of governance, institutional and legal framework, wealth distribution, social capital, and scientific knowledge (Abdulla *et al.*, 2008a, b). This situation is not unique to the Mediterranean. In many regions of the world, MPAs can be considered as 'paper parks' due to failures in site design, management planning, in the subsequent implementation of management measures; or a combination of these three factors (Christie *et al.*, 2009; Spalding *et al.*, 2013).

A study conducted by MedPAN and RAC/SPA (Gabri  *et al.*, 2012) shows that only 4.6% (677 sites) of the marine area is covered by MPAs (1.08% if the Pelagos Sanctuary is excluded, and 5.2% if the four high-seas Fisheries Restricted Areas are included). This system is still not representative of the habitat and ecosystem diversity in the Mediterranean: most MPAs (96%) are located on the northern coasts of the Mediterranean basin, cover only the littoral zone (leaving many important ecological and socio-economic areas without any protection, especially in the open sea), are geographically isolated and so do not represent the habitat distribution and the connectivity of marine metapopulations. The level of management has been assessed in 80 MPAs: more than 90% of MPAs

of national status have a manager, but more than half of the MPAs and 75% of Natura 2000 sites still don't have a management plan. Nevertheless, there is hope for a significant improvement in these figures, particularly in the southern and eastern countries, as 22% of MPAs surveyed reported they were preparing their management plan. There is also progress on establishing ecological baselines and monitoring of MPAs, with 70% and 80% of managers respectively indicating that they are implementing them (against 39% in 2008). The human resources assigned to MPA management is substantial: 84% have permanent staff, usually supplemented by seasonal and temporary staff. Regarding surveillance and enforcement, only a quarter of MPAs reported having sworn-in staff, but most of them rely on other partners for surveillance (e.g. coastguards, marine police, armed forces). The number of surveillance hours varies widely, with an average of 8.5 h day⁻¹ for MPAs in the north and 1.5 h day⁻¹ for MPAs in the south, furthermore, the MPAs in the north-west are better funded to ensure effective management is in place. Funding comes primarily from governments (89% of MPAs). Self-financing is present in 36% of MPAs only (i.e. through visitors entrance fees and voluntary contributions from users of the MPA). Finally, the study shows that not all Mediterranean MPAs have the same capacity or even management resources for training, equipment and governance. In 2012, a Mediterranean MPA Forum organized by MedPAN and partners¹ was held in Antalya (Turkey). For the first time more than 300 managers, decision-makers, scientists, private stakeholders and donors gathered to discuss what was required in order to establish an ecologically effective network of MPAs in the Mediterranean. They proposed a roadmap aimed at achieving the objectives set out in international commitments by 2020 (Monbrison *et al.*, 2012).

In the wider Caribbean, at a meeting organized by the UNEP-CEP (<http://www.cep.unep.org/>) in 1997, 50 MPA managers agreed to create CaMPAM, a

¹Regional Activity Centre for Specially Protected Areas (RAC/SPA), the General Directorate of Natural Assets Protection (Turkey) and the United Nations Development Programme (UNDP) in Turkey, WWF, IUCN, French MPA Agency, Conservatoire du Littoral, ACCOBAMS, MedPartnership, GFCM, SAD, TUDAV. More information on: www.medmpaforum2012.org

regional network and programme to increase the MPA capacity through training, technical assistance and communication (see <http://campam.gcfi.org/campam.php>). Based on the information provided by the Caribbean MPA managers at the 10 regional courses of the UNEP-CEP/SPAW-CaMPAM Training of Trainers programme on MPA management (<http://campam.gcfi.org/campam.php#ToT>) implemented between 1999 and 2012, it is clear that most MPAs are ineffectively managed. An assessment conducted by Burke and Maidens (2004) showed that only 6% of the Caribbean MPA are well managed. These results can be explained by the fact that most areas do not have management plans, and those that have them, with a few notable exceptions, have very low levels of implementation. MPA plans are written and approved by relevant authorities, but are poorly implemented owing to inadequately qualified personnel, limited financial resources, lack of enforcement of regulations, and little involvement of the stakeholders in planning and management. Most of the Caribbean MPAs are owned and managed by government agencies, and in only a few of them are non-government organizations and local groups involved in management, which is considered to be one of the main factors needed for MPA success (Pollnac *et al.*, 2010). In those MPAs where local communities are not involved and which lack the social or economic incentives to comply with MPA regulations, their effectiveness is compromised.

Despite all challenges highlighted, best practices have been successfully put into practice in the two regions as demonstrated by a number of case studies that exemplify different approaches that have been taken – both at the planning and implementation phase – to develop an effective management framework, according to specific cultural, legislative, and institutional frameworks. These case studies provide important insights to guide future efforts of MPA managers, authorities, and NGOs in other regional contexts to address current shortfalls.

Case studies in the Mediterranean Sea

Two case studies in the Mediterranean Sea (Figure 1) are presented that exemplify different approaches that have been taken to develop regulatory management plans through a fully participatory approach. In the

first case study, the Kaş-Kekova Special Protected Area (SPA) in Turkey, the planning process led by WWF Turkey has evolved from the bottom-up with a progressive engagement of the national government. On the other hand, in Algeria, a new MPA was designed from the outset as an expansion of the terrestrial National Park of Taza to cover the adjacent sea area. Representatives from WWF Turkey and the MPA authority in Algeria have been actively involved in the MedPAN network since 2005 and requested the collaboration of the World Wildlife Fund (WWF) Mediterranean in implementing activities and projects. This collaboration was formalized in 2009 with the launching of the WWF Mediterranean MPA programme to assist Mediterranean countries to meet the Aichi target No. 11 of creating effective MPAs. Considering the recurrent challenges identified in the region, WWF Mediterranean partnered with around 15 organizations (MPA authorities and administrations, NGOs, and universities) to transform selected MPAs from a dormant state into an operational state, with trained and equipped staff, standardized management plans, scientifically sound monitoring, and approved zoning plans (Gomei and Di Carlo, 2012). The countries were selected after an assessment of the status of the MPAs in the region conducted in 2008. At that time, there were no MPA management plans in either Turkey or Algeria as conservation efforts had focused mainly on terrestrial areas (Abdulla *et al.*, 2008a). In addition, an independent feasibility study – conducted by project donors – confirmed the presence of the necessary prerequisites to launch a 4-year management planning process; these included a strong local project ownership by lead organizations, a pre-existing interest in improving the management of the area by local stakeholders, and areas already recognized as ecologically important in national strategies.

Despite the different governance structure of these two case study MPAs, regulatory management plans were developed applying a fully participatory approach, where stakeholder engagement was key to securing buy-in from local communities and resource users, endorsement from national and local governments, and ownership of the MPA.

Kekova was declared in 1990 as a Specially Protected Area (SPA) under the framework of the

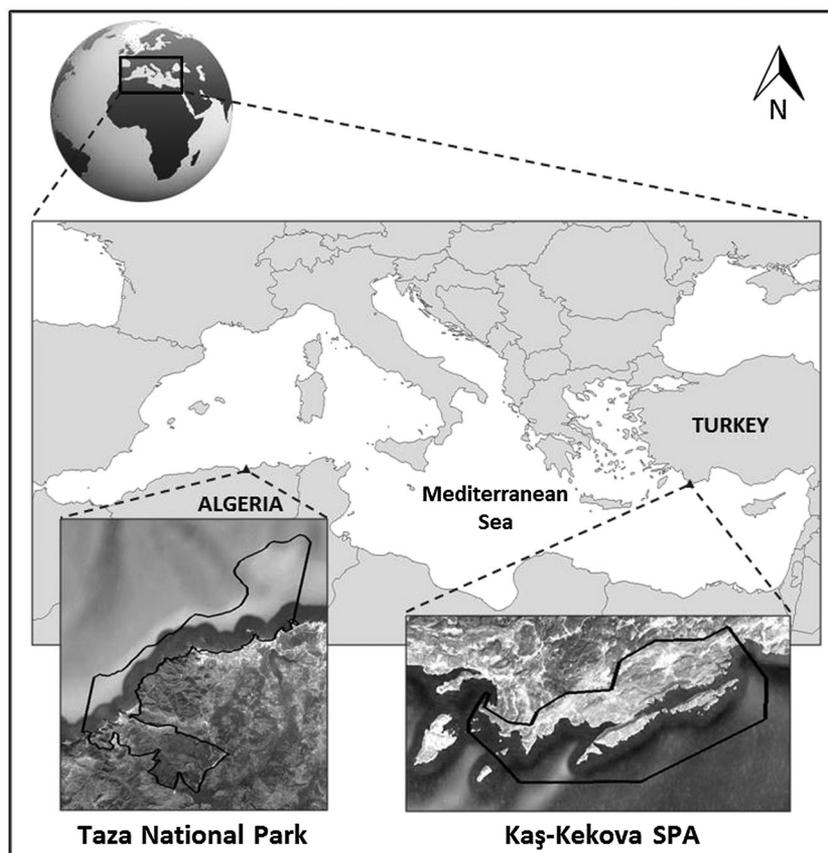


Figure 1. Location of the MPAs selected as case studies for the Mediterranean Sea. Proposed borders of Taza National Park are under revision.

SPA Protocol of the Barcelona Convention. Based on the biodiversity assessment led by WWF Turkey in 2006, the SPA was enlarged to include key marine ecological and biological areas and its name was changed to 'Kaş-Kekova SPA'. The SPA is located on the Lycian Coast (SW Turkey), an area which is still not overexploited, offering varied coastal landscapes and outstanding archaeological ruins along its coastline. Its marine area (16 591 ha) now includes refuge to several keystone and flagship species, such as the Mediterranean monk seal (*Monachus monachus*), the sandbar shark (*Carcharhinus plumbeus*), the dusky grouper (*Epinephelus marginatus*), and the endemic seagrass *Posidonia oceanica* (Tural, 2012). During the tourism high season, the population of Kaş increases from 7000 to about 20 000 people, and hosts 23 local tour operators and 18 dive clubs (Mangos and Claudot, 2013). Although Kaş-Kekova SPA is an important international tourist destination, no strategies were developed to manage

its marine resources and no regulations were issued for control of recreational activities. In 2009, WWF Turkey and WWF Mediterranean partnered with the national authority for MPAs (i.e. the General Directorate of Natural Assets Protection or GDNAP) to facilitate the development of the Management Plan for Kaş-Kekova SPA and the engagement of stakeholders from the onset of the project. WWF and the University of Boğaziçi formed the planning team that led the participatory planning process. The planning team facilitated the work of local and national steering committees, comprising the most important administrations with responsibility to review each step of the process. The process included gathering and analysing existing scientific data and producing a technical report that informed the stakeholder consultation process (Tural, 2012), with representatives of the fishermen and diving operators, among others. Important conservation areas were identified, MPA objectives were established, and a set of management strategies

was recommended. A zoning plan with regulations on fishing, diving and anchoring activities was produced and reviewed by the Steering Committees. As Turkish MPA legislation is still under revision and lacking of a single plan under which all activities at sea are managed, the development of the Management Plan had to take into consideration several laws and regulations (i.e. Zoning Law, Environmental Law, Fishery Regulation, Cultural and Natural Heritage Protection Act). Finally, GDNAP endorsed the Management Plan prepared by WWF and facilitated the process for issuing different regulatory decrees. For example, the fisheries regulations and no-take zones were gazetted by the Ministry of Fishing, whereas diving clubs agreed with the local Governor to implement voluntary diving regulations. The experience of Kaş-Kekova SPA provides a number of lessons learned, that can be adapted and adopted elsewhere. It shows that the lack of appropriate MPA legislation and inadequate implementation of the existing MPA can be overcome by local initiatives. The stakeholders of Kaş-Kekova SPA have taken the first step to respond to existing problems by preparing the management plan, identifying alternative solutions to regulate local activities that in turn influenced and accelerated policy decisions at the national level. As for other planning processes, the case of Kaş-Kekova SPA provides an example of how NGOs can benefit from their independent status to act as effective facilitators between various sectors and stakeholders (Calado *et al.*, 2012).

The second case study is that of the Algerian Taza National Park (3807 ha) which, in 2009, requested an expansion of 9603 ha to protect the adjacent marine area. The proposed additional area has a high species and habitat diversity value and includes the key biodiversity hot spot of the Banc de Kabile, classified as a Specially Protected Area of Mediterranean Importance under the Barcelona Convention (UNEP-MAP-RAC/SPA, 2010). The whole area is a representative example of exceptional geological environment with its underwater columnar basalt and a pristine marine ecosystem that supports healthy communities of slow-growing, long-lived species such as forests of *Cystoseira*, reef-building gastropod *Dendropoma petraeum*, stony coral *Astroides calycularis*, huge colonies of the rare false black coral *Savalia*

savaglia and the Mediterranean red coral *Corallium rubrum*. The area also includes significant spawning sites of commercially important species such as black seabream (*Spondylisoma cantharus*), dentex (*Dentex dentex*), grouper (*Epinephelus costae*), and lobsters (*Palinurus elephas* and *Scyllarides latus*) (Belbacha *et al.*, 2012). To effectively apply best practices developed in other MPAs, the Park authority established collaboration with WWF Mediterranean and its network of experts in the region. As a result, the park staff and key national stakeholders built their capacity on conservation science, management planning, sustainable fishing, and stakeholders' engagement. The improved scientific knowledge of the socio-economic context and natural resources of the area allowed the Park staff to successfully engage representatives from all local stakeholders and authorities to develop the Management Plan for the future MPA. Strong governance during the early planning process was achieved through a Steering Committee, chaired by the local government (*Wali*), which paved the way for long-term commitment for the future implementation of the MPA. As with many coastal MPAs worldwide, the local economy at Taza National Park is mainly based on artisanal fishery. The planning team expected strong opposition to a new MPA from local artisanal fishermen, as their jobs and livelihoods would have been put at risk. Park staff therefore decided to embark on a long consultation process with fishermen, inviting them to actively propose solutions for future fishing regulations. Fishermen received all the necessary information about their rights and also about the real possibility of increased fish catches once the MPA was in place. The consultation process was organized by creating an Advisory and Consultation Committee that included key representatives from three main sectors (i.e. fishermen and fishery authorities, tourism authorities, and local administrators), scientists, and park staff. The Committee worked for 2 years to discuss and negotiate different scenarios of regulations of human activities at sea. At the end of the process, stakeholders agreed on a multiple-use zoning scheme, which included both protection of sensitive habitats and the creation of specific areas for sustainable development. The new management plan has now been submitted to

national authorities and, although the process of revision is still ongoing, Park staff can rely on an increased level of ownership, support and awareness of the local community that will ultimately be to the benefit of the MPA (Walton *et al.*, 2013).

To achieve functional and effective management, MPAs require more than 5 years (FGEF (French Global Environment Facility), 2010). Both Mediterranean case studies are still in the early stages of implementation and thus it is too early to demonstrate that management regulations will meet the MPAs objectives of conserving the marine biodiversity and ensuring ecosystem services to local communities. Nevertheless, in both cases, the practices applied have proved to be critical for achieving the progress so far by considering the socio-economic context and local challenges, and by involving stakeholders and decision-makers at an early stage in the process (Pollnac *et al.*, 2010; White *et al.*, 2014).

Case study in the Caribbean

The implementation of marine reserves or no-take areas in combination with areas of sustainable fisheries has been recognized as a critical approach to achieve biodiversity conservation and sustainable fisheries in the Caribbean. In the GCFI Fisher Forum held in 2009, 25 Caribbean fishermen and more than 150 marine scientists indicated the need to increase the number of no-take areas and granting of exclusive fishing rights to traditional fishermen within MPAs (Toropova *et al.*, 2010).

Among the most notable examples of the application of these and other successful management tools is the Hol Chan Marine Reserve (HCMR) located in N Belize close to the Mexican border. This reserve is part of the Belize National System of Marine Protected Areas administered by the Fisheries and the Forest Departments, in partnership with several non-government agencies, including large and small community-based institutions (<http://www.fisheries.gov.bz/>). The HCMR co-management scheme operates as something in between a government agency and a non-governmental organization, with a certain level of financial and administrative independence. The Reserve is financially self-sustaining, primarily due to the user fees collection system in place, which

allows the management authority to charge visitors. The revenue collected is also managed by the same authority. The Fisheries Department has responsibility for the marine reserves of the country. A user-fee system is one of the main factors affecting the success of most MPAs in the region as governments are not able to provide the necessary resources for the MPAs to operate. Hol Chan MR does not receive any direct government funding other than occasional grants for special projects. Since the environmental quality of the coastal ecosystems (reefs, beaches, mangroves, lagoons, etc.) is essential to the local economy (mainly based on tourism, and to some extent fisheries) and this is clearly understood by stakeholders, there is good collaboration between the Reserve management authority and NGOs and business associations (of fishers and tour operators). As a result, community leaders and Reserve managers have succeeded in stopping some very large developments (e.g. cruise ship ports and large condominiums and hotels) and avoiding overfishing, which would jeopardize their main attraction: healthy coral reefs and associated habitats. The management scheme that makes this Reserve a model in the Caribbean comprises a long list of tools, namely:

- a revenue generation scheme administered by the Reserve based on the collection of entrance/user fees paid through tour guides and dive shops operators;
- a sound financial plan;
- the enforcement of fisheries regulations, no-take areas, fishing and flora and fauna collection/harvesting restrictions with the involvement of stakeholders;
- exclusive fishing rights for local traditional fishers;
- a fundraising programme to support education and monitoring projects;
- institutional arrangements with the Navy, NGOs, etc.;
- operational mooring buoys;
- a contingency plan for natural damage restoration (hurricanes);
- habitat restoration programmes;
- a Board of Trustees with financial and advisory responsibilities;
- a co-management scheme between the Advisory Committee and the Fisheries Dept.;
- an education/outreach programme for school kids, the general public and visitors;
- enforcement capability (rangers, patrols, etc.);

- navigational restrictions;
- a qualified on-site professional staff (manager, biologists, wardens, educators);
- a permitting programme (to license uses such as fishing, snorkelling, diving) that generate income;
- research facilities in collaboration with academic institutions, NGOs;
- signage and boundaries demarcation;
- a zoning scheme based on habitat distribution and uses; tourism regulations;
- a visitor centre; a volunteer programme (with rules to avoid staff overloading); and more recently,
- the implementation of a 'managed access' fisheries tool that is being tested in the entire country.

The HCMR, which is listed under the SPAW Protocol² has benefited from the support of conservation programmes but is also serving as a 'learning centre' for MPA managers and stakeholders (e.g. fishers) from other parts of the region. Among those activities held in Hol Chan MR, are the ones recently coordinated by the UNEP-CEP/SPAW-CaMPAM programme in collaboration with the Reserve staff, the Belize Fisheries Department and NGOs, namely the regional course of the 2011 Training of Trainers Programme on MPA Management³ (the UNEP-CEP flagship training programme for Caribbean MPA managers) and an exchange visit of MPA officers from Cuba (2014). In addition, the IUCN BIOPAMA programme in collaboration with CaMPAM, implemented in February 2014 an Exchange of Junior MPA Officers with Hol Chan MR staff. The participants of all these activities recognized the value of the Hol Chan MR management model and are already incorporating some of their management tools in their own sites in different Caribbean countries.

Despite its record of success due in great part to the government's vision and policy of managing protected areas in collaboration with NGOs, as in most Caribbean MPAs, the Hol Chan MR has challenges derived from the increasing tourism activities and coastal development (construction of piers and marinas, hotels, buildings).

In Belize, the 'managed access' initiative (Foley, 2012) led by the Belize Fisheries Department (BFD)

with a coalition of organizations (the Toledo Institute for Development and Environment (TIDE), the Wildlife Conservation Society (WCS), the Environmental Defense Fund (EDF) and Belizean fishers) is exploring the implementation of a new fisheries management policy that restricts fishing in zones of general use within marine reserves, by using a licensing system to 'traditional fishermen' defined via community consultation with guidelines produced by the BFD. The programme is being tested in pilot sites such as the Port of Honduras, the Hol Chan and the Glover's Reef Marine Reserves. The programme includes the use of market-based incentives to align fishers' economic interests with conservation outcomes. If successful, this will be the first country in the Caribbean to manage the access to fisheries resources in large areas of the country with the participation of local stakeholders.

An important element in the success of Belize MPAs has been the relatively strong coastal-marine policy administered by a Coastal Zone Management Authority and Institute initiated more than 20 years ago through a large GEF project and sustained through the years by other projects and initiatives which the government has promoted. In addition, the decision of the government to allow private conservation organizations to get involved in the management of coastal areas and the generation of local socioeconomic incentives by the parks and reserves have been critical to the development of the protected area system.

SOCIAL NETWORKS AND CAPACITY BUILDING FOR IMPROVING MPA MANAGEMENT

Social science research information shows that the ecological and biological performance of MPAs is related to complex social interactions and stakeholders' participation rather than simply to the level of government enforcement that is imposed (Pollnac *et al.*, 2010). As a management framework is designed to influence, modify, and control human behaviour, stakeholders should be involved from the early consultation phase of the establishment of a new MPA to implementation of the management plan (Kelleher, 1999).

²<http://www.car-spaw-rac.org/?Presentation-of-the-18-PAs-listed,412>

³For details go to <http://campam.gcfi.org/campam.php#ToT>

In both regions, conservation organizations have identified that for building capacity of MPAs, knowledge transfer among MPA managers and stakeholders is essential. In the modern world of fast internet communication and travel, international organizations with this mandate use social networks as well as meetings, exchange visits and field work to enhance communication and information exchange.

MedPAN (<http://www.medpan.org>) in the Mediterranean Sea, and CaMPAM (<http://campam.gcfi.org/campam.php>) in the Wider Caribbean are social networks of MPAs. They have existed for more than a decade, and have been coordinated and funded by intergovernmental, governmental and non-governmental bodies and donors. They both developed training and communication tools that allow marine environmental managers to acquire knowledge and exchange experiences through training courses, internet forum, site visits, grant awarding, technical assistance, and the participation in workshops and conferences. These activities are implemented in partnership with individuals and organizations that provide financial resources and technical support. Among them are the following: WWF-Mediterranean (<http://www.panda.org/mediterranean>), IUCN-Med (<http://www.iucn.org/about/union/secretariat/offices/iucnmed/>), The Small Islands Initiative / Conservatoire du Littoral (<http://www.initiative-pim.org/en/presentation>), the UNEP/MAP- RAC/SPA (<http://rac-spa.org/>), The Nature Conservancy, the Organization of Eastern Caribbean States (<http://www.oecs.org/>), the Caribbean Natural Resources Institute (CANARI, <http://www.canari.org/>), the Gulf and Caribbean Fisheries Institute (<http://www.gcfi.org>), the IUCN Caribbean Initiative (<http://www.iucn.org/about/union/secretariat/offices/meso/caribe/>) and several others.

Although MedPAN and CaMPAM have similar objectives and activities, they have different structures and institutional frameworks. MedPAN membership is composed of more than 50 MPA managers and 31 partners that participate in the management of more than 80 MPAs in 18 Mediterranean countries. The network has existed since the 1990s but only started to be run by MedPAN in 2010. Since then, a permanent institutional structure with dedicated funds has enabled more regular technical exchanges among

MPA managers, providing technical and financial support to MPAs in the field, improved communication and representation to bring the 'voice' of MPA managers in regional and world fora and, finally contributed to building closer links and partnerships with other regional marine conservation organizations, scientists, private stakeholder federations and NGOs. The heart of activities of the network is targeting the improvement of MPA management effectiveness but the network is also contributing to improve the ecological network of MPAs (pushing for creation of new MPAs) with strong political actions as well as enabling more cooperation with scientists and private stakeholders (see the strategic plan for 2013–2017 in Monbrison *et al.*, 2013).

CaMPAM, on the other hand, was created in 1997 by Caribbean MPA managers and UNEP-CEP in order to implement one of the mandates of the SPAW Protocol, strengthening MPAs in the region. The membership is composed of individuals that communicate and can benefit from resources that range from training workshops, technical assistance and communication tools, to grants for projects (Bustamante and Vanzella-Khoury, 2010). The main communication tool is the CaMPAM List (campam-l@listserv.gcfi.org), through which over 850 members can post, request and exchange information such as publications, contacts, project reports, new initiatives, grant opportunities, research results, press releases, lessons learnt, challenges, call for proposals, meeting sponsorships, course announcements, etc. The GCFI Annual Conference (<http://www.gcfi.org>), the main forum for marine scientists and managers of the Caribbean, is used by CaMPAM to hold yearly an MPA Science and Management session which brings together a range of MPA practitioners from managers, to fishers and scientists. The Caribbean 'Training of Trainers on MPA Management'² is the flagship capacity building programme of the network. Since 1999, 10 regional courses have been delivered (alternating Spanish and English, one in French) and held at MPAs in different countries (Saba, Dominican Republic, St. Lucia, Mexico, US Florida, Trinidad and Tobago, Guadeloupe and Belize). Managers/staff from MPAs throughout the region are rigorously selected to attend each course that covers two-week intensive training on all aspects of MPA management,

including communication and training skills. Following their training, each trainee is responsible for organizing at least one local training activity for its MPA, which is also funded through CaMPAM. In this way CaMPAM not only facilitates training but also provides an incentive for the trainees to share their acquired knowledge with colleagues and other local stakeholders. More than 150 MPA managers have been trained directly and over 2000 stakeholders have benefited from the local training. In addition, a Small Grant Programme periodically awards \$US8000 to \$US100 000 to government and non-government institutions to support staff exchanges, consultation meetings, introduction of sustainable fishing methods and ecotourism operations, development of education and communication materials and activities, installation of demarcation and mooring buoys, lionfish control, monitoring programmes, development of management plans, etc. The grants are funded by different organizations and donors via UNEP-CEP/SPAW. For example, in 2010–2013 the Directorate General for Development Cooperation of the Italian Ministry of Foreign Affairs supported the training of trainers, exchanges and technical assistance in MPAs of eight countries of the Insular Caribbean associated to the Caribbean Challenge Initiative (<http://campam.gcfi.org/campam.php#CarChall>). In 2014–2016, the UNEP-CEP/SPAW CaMPAM will coordinate a Small Grant Programme for supporting the creation of new MPAs and improving the management of existing ones in six Caribbean insular countries. The project is part of the Eastern Caribbean Marine Managed Areas Network (ECMMAN) project of The Nature Conservancy funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (see <http://listserv.gcfi.org/scripts/wa-GCFI.exe?A2=ind1402&L=CAMPAM-L&P=R239283>). In addition, in 2012–2014 UNEP-CEP/SPAW awarded small grants for developing projects aiming at improving the management of the MPAs listed under the SPAW Protocol. All these projects have benefited from the collaboration of individual experts, as well as local, national and international organizations that contribute expertise, logistical support and/or financial resources to each activity. More recently, CaMPAM launched a Mentorship Programme under which one senior MPA manager

will assist one junior MPA manager using different means, including site visits and information exchange, all funded by UNEP-CEP/SPAW. An initial group of seven experienced MPA managers will form a cadre of mentors. They will also assist CaMPAM with organization and delivery of exchanges and courses, data gathering for the CaMPAM MPA database, technical review of proposals, etc.

As a result of an assessment conducted recently by WWF Mediterranean, RAC/SPA and MedPAN of the existing capacity building programmes and training activities related to MPA management in the Mediterranean a regional, long-term, capacity-building strategy for MPAs was developed (Di Carlo *et al.*, 2012). The programme provided a variety of training opportunities on different topics, using different approaches. In the review, the capacity building programme promoted by the partnership WWF/NOAA (US National Oceanic and Atmospheric Administration) was seen as a prime example of a good regional programme, covering the full range of issues on MPA management. By combining theoretical training with practical experience at regional and national levels, the programme provides the tools and knowledge needed to address specific management weaknesses. Training events are tailored to local needs, priorities and management context, and based on results of preliminary need assessments. Participants include MPA managers, academics, in-country NGOs, government agencies and administrations. So far, more than 10 countries have participated in the programme, each characterized by a different level of implementation of conservation commitments related to MPAs. In countries like Libya, where the first MPAs were only established in 2010 and the political structure created delays in the implementation of the management phase, basic training activities were developed to build the capacity of Libyan practitioners responsible for future marine conservation efforts. In contrast, in Croatia, where all existing MPAs are part of a coordinated system of young and old MPAs, a 4-year step-by-step capacity building programme was developed to increase the skill levels of practitioners on management planning, stakeholders' involvement, monitoring and business planning. Participatory

training workshops were followed by the implementation of acquired skills in each MPA. This process supported the managers of five MPAs and representatives from national authorities (State Institute for Nature Protection, Ministry of Environmental and Nature Protection, and County authorities) with the facilitation of the national NGO Association Sunce to review the national management framework, develop standardized monitoring protocols, and create a social network of national MPAs (Gomei and Di Carlo, 2012). To complement the learning process delivered by training events, the capacity building programme of WWF also facilitates stakeholder networking among Mediterranean MPAs through exchange visits involving managers, fishermen, and dive operators from various countries. 'Learning centres' MPA (i.e. the Torre Guaceto MPA in Italy, the Cabrera National Park in Spain, and the Bouche de Bonifacio Nature Reserve in France) with well established co-management approaches and management plans hosted representatives from MPAs with internal conflicts (e.g. where no-take zones are being designated with stakeholder opposition) or that were still developing management plans. These visits led to agreements between MPAs, formally stating cooperation on activities including management plan development and monitoring. Such cooperation strengthens the MedPAN network and secures stakeholder support for MPA activities.

TRANSREGIONAL COOPERATION

During recent years there have been several contacts between the leaders of UNEP-CEP/SPAW CaMPAM and the European MPA regional programmes and networks, in particular in the Mediterranean led by WWF-Mediterranean and MedPAN, and the Atlantic Arc (MAIA, <http://www.aires-marines.com/International/Exchange-Networks/MAIA>). These consultations between the respective network and programme coordinators, experts and MPA managers from these different regions enable mutual learning on approaches and practices and reduce the geographic and thematic distance between programmes with similar goals, while addressing gaps and maximizing resources. This increased collaboration between regional networks

has gained significant momentum due to the need for countries to deliver on international conservation commitments and hence has the potential to expand the collaboration at the level of governments, intergovernmental organizations, universities and NGOs dedicated to assist countries to establish effective networks of MPAs.

In particular, MedPAN, WWF-Mediterranean and CaMPAM representatives have met in several fora such as the Global Ocean Forum (Paris, May 2010), the MedPAN Experience-sharing workshop and general assembly organized by MedPAN and partners (Tunisia, December 2010), and more recently at the International Marine Protected Area Congress (IMPAC3) in Marseille on October, 2013. They also plan to organize joint activities for the next IUCN World Park Congress in Australia, 2014.

The need to strengthen 'transoceanic' collaboration of MPA professional networks and training programmes became more evident at IMPAC3. In this congress, MedPAN and WWF-Mediterranean invited CaMPAM to contribute to workshops where the experiences of both regional programmes were highlighted and discussed. One of those workshops was jointly organized by MedPAN and CaMPAM to show the role of regional 'human' MPA networks.

Through these exchanges it has become apparent that a stronger collaboration between the two MPA regional communities will benefit significantly both parties. Several managers of Spanish, French and Croatian MPAs with strong tourism operations have expressed their interest in visiting Caribbean marine reserves to learn about the engagement of tour operators and related stakeholders in the MPA co-management scheme. Other regions of interest for the Mediterranean include West Africa especially related to sustainable financing mechanisms for MPAs. On the other side, Caribbean MPA managers have requested UNEP-CEP to fund exchange visits in Europe where they can be exposed to different approaches to marine protected area management, and to building ecological networks of MPAs, which are still incipient in the Caribbean. Other regions of interest for the Caribbean to explore include the South Pacific, with a very different social network of marine areas and with sustainable fisheries practices which could be useful for the Caribbean.

There is enormous value in exchanging experiences beyond a single region: the identification of commonalities and differences in various biophysical and cultural scenarios is known to stimulate solutions to our own problems.

Furthermore, over the last 10 years, European governments (from Spain, France, Italy and Germany) have funded important capacity building efforts of UNEP-CEP SPAW/CaMPAM. The network has benefited from the generosity of Mediterranean governments that have greatly contributed to advance its work and enhance its impact and delivery on the ground. This improved capacity and maturity could be further expanded and be mutually beneficial if our networks and programmes work jointly in acquiring the resources necessary to support an exchange programme under which marine environmental managers from both sides of the world can visit and learn from each other, as well as establish a longer working relationship useful for both regions. Such a programme will allow MPA managers from one region to visit the most successful and best-managed MPAs (or 'learning centres') in the other region, like the ones described in this paper. In the same way scientists learn by discussing their research findings with their peers at international congresses, MPA managers from different regions may benefit by witnessing first hand effective and creative management practices being implemented in other geographic areas but with similar socioeconomic and conservation issues, i.e. globalization of MPA management learning. Often these 'creative' practices are not always documented, they have been adapted to the particular setting and local conditions and adjusted and fine tuned through implementation (e.g. monitoring protocols, business plans, revenue generation schemes, enforcement tools). This type of experience is invaluable for managers and should be shared to save time and resources and enhance management effectiveness.

ACKNOWLEDGEMENTS

The 2012 Mediterranean Status Report, 2020 roadmap and MedPAN 2013–2017 strategy, are the result of a joint effort from MedPAN members

and Secretariat, MedPAN partners (IUCN-Med, RAC/SPA, WWF, ACCOBAMS, the French MPA Agency, the CBD, UNDP Turkey, the GFCM, the Conservatoire du Littoral, the Ministry of Natural Protection Assets in Turkey, and participants to the 2012 Mediterranean MPA Forum in Antalya.

The case studies from the Mediterranean are a result of the commitment of MPA staff, fishermen, divers, scientists, and communities, and of the strong collaboration between Governments and NGOs. Our special thanks go to Nilay Akca, Nilüfer Araç, Yassine Belhimer, Zrinka Jakl, Alessandra Pomé, Zeljka Rajkovic, Nadia Ramdane, Milena Sijan, Mauro Randone, Umut Tural and Anne Walton.

We are very grateful for the recommendations and changes suggested by the paper reviewers, particularly by its editor, Professor John Baxter, whose suggestions improved significantly a paper written by non-native English speakers.

REFERENCES

- Abdulla A, Gomei M, Maison E, Piante C. 2008a. *Status of Marine Protected Areas in the Mediterranean Sea*. IUCN: Malaga and WWF: France.
- Abdulla A, Gomei M, Hyrenbach D, Notarbartolo di Sciarra, G, Agardy T. 2008b. Challenges facing a network of representative marine protected areas in the Mediterranean: prioritizing the protection of underrepresented habitats International Council for the Exploration of the Sea. *ICES Journal of Marine Science* **66**: 22–28.
- Belbacha S, Ramos Esplás A, Semroud R. 2012. Preliminary data on the distribution, composition and state of the coralligenous in the national park of Taza marine area (East Algeria, SW Mediterranean) In *International Conference MarCoastEcos2012, Tirana, Albania, 25–28 April 2012. Proceedings: 592–595* (<http://www.marcoastecos2012.al/proceedings/MarCoastEcos2012-Proceedings.htm>)
- Burke L, Maidens J. 2004. *Reef at Risk in the Caribbean*. World Resources Institute: Washington DC.
- Bustamante G, Paris C. 2008. Marine population connectivity and its potential use for the nomination of new World Heritage Sites in the Wider Caribbean. *Marine Sanctuaries Conservation Series, NOAA*. ONMS-08-07: 97–112. <http://sanctuaries.noaa.gov/science/conservation/pdfs/carib.pdf>
- Bustamante G, Vanzella-Khoury A. 2010. Building capacity and networking among managers: essential elements for an effective large-scale, transboundary ecosystem-based management through effective MPA networks. In *Towards Marine Ecosystem-based Management in the Wider Caribbean*, Fanning L, Mahon R, McConney P (eds). Amsterdam University Press: 368. (<http://www.worldcat.org/title/towards-marine-ecosystem-based-management-in-the-wider-caribbean/oclc/669124819>)

- Calado H, Bentz J, Ng K, Zivian A, Schaefer N, Pringle C, Johnson D, Phillips M. 2012. NGO involvement in marine spatial planning: a way forward? *Marine Policy* **36**: 382–388.
- CBD (Convention on Biological Diversity). 2010. Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets. Secretariat of the Convention on Biological Diversity, Montreal, Canada. <http://www.cbd.int/sp/targets>
- Christie P, Pollnac RB, Oracion EG, Sabonsolin A, Diaz R, Pietri D. 2009. Back to basics: an empirical study demonstrating the importance of local-level dynamics for the success of tropical marine ecosystem-based management. *Coastal Management* **37**: 349–373.
- Coll M, Piroddi C, Steenbeek J, Kaschner K, Ben Rais Lasram F, Aguzzi J, Ballesteros E, Bianchi CN, Corbera J, Dailianis T, *et al.* 2010. The biodiversity of the Mediterranean Sea: estimates, patterns, and threats. *PLoS ONE* **5**: e11842.
- Di Carlo G, Lopez A, Staub F. 2012. Capacity building strategy to enhance the management of MPAs in the Mediterranean Sea. Commissioned by WWF MedPO / MedPAN / UNEP/MAP/RAC/SPA. (http://mediterranean.panda.org/about/marine/marine_protected_area/the_medpan_south_project/?206184/Report-Capacity-building-strategy-to-enhance-the-management-of-MPAs-in-the-Mediterranean-sea)
- FGEF (French Global Environment Facility). 2010. Marine Protected Areas - Review of FGEF's cofinanced project experiences. (<http://www.ffem.fr/lang/en/accueil/publications/Publications-geographiques-sectorielles-et-thematiques?actuCtnId=51594>)
- Foley JR. 2012. Managed access: moving towards collaborative fisheries sustainability in Belize. *Proceedings of the 12th International Coral Reef Symposium*, Cairns, Australia, 9–13 July 2012, **18A** Evaluating Management Success.
- Gabriel C, Lagabriele E, Bissery C, Crochelet E, Meola B, Webster C, Claudet J, Chassanite A, Marinesque S, Robert P, *et al.* 2012. The Status of Marine Protected Areas in the Mediterranean Sea. *MedPAN and CAR/ASP. MedPAN Collection*.
- Gomei M, Di Carlo G. 2012. Making Marine Protected Areas Work—Lessons Learned in the Mediterranean. WWF Mediterranean. (http://awsassets.panda.org/downloads/making_mpas_work_english_.pdf)
- Kao S. 2014. Regional cooperation in the Mediterranean and the Caribbean Seas: lessons learned and possible alternatives to the South China Sea disputes. *Coastal Management* **42**: 263–279.
- Kelleher G. 1999. *Guidelines for Marine Protected Areas*. IUCN: Gland, Switzerland and Cambridge, UK.
- Mangos A, Claudot MA. 2013. Economic study of the impacts of marine and coastal protected areas in the Mediterranean. Plan Bleu, Valbonne. *Plan Bleu Papers* **13** <http://planbleu.org/en/publications>
- Micheli F, Halpern BS, Walbridge S, Ciriaco S, Ferretti F, Frascchetti S, Lewison R, Nykjaer L, Rosenberg AA. 2013. Cumulative human impacts on Mediterranean and Black Sea marine ecosystems: assessing current pressures and opportunities. *PLoS ONE* **8**: e79889.
- Monbrison D, Rais C, Romani M. 2012. *Mediterranean MPA roadmap*. MedPAN, RAC/SPA, Turkish General Directorate of Natural Assets Protection, UNDP Turkey/GEF project.
- Monbrison D, Romani M, Canals P. 2013. The MedPAN network's 2013–2017 Strategy. MedPAN. MedPAN Collection.
- Pollnac RP, Christie P, Cinner JE, Dalton TM, Daw T, Forrester GE, Graham NAJ, McClanahan TR. 2010. Marine reserves as linked social-ecological systems. *Proceedings of the National Academy of Sciences* **107**: 18262–18265.
- Sadovy Y, Eklund A. 1999. Synopsis of the biological data on the Nassau grouper, *Epinephelus striatus* (Bloch, 1792), and the jewfish *E. itajara* (Lichtenstein, 1822). NOAA Technical Report NMFS 146.
- Shi H, Singh A, Kant S, Zhu ZL, Waller E. 2005. Integrating habitat status, human population pressure, and protection status into biodiversity conservation priority setting. *Conservation Biology* **19**: 1273–1285.
- Spalding MD, Fox HE, Allen GR, Davidson N, Ferda ZA, Finlayson M, Halpern BS, Jorge MA, Lombana A, Lourie SA, *et al.* 2007. Marine ecoregions of the world: a bioregionalization of coast and shelf areas. *BioScience* **57**: 573–583.
- Spalding MD, Meliane I, Milam A, Fitzgerald C, Hale LZ. 2013. Protecting marine spaces: global targets and changing approaches. *Ocean Yearbook* **27**: 213–248.
- Sullivan Sealey K, Bustamante G. 1999. *Setting Geographic Priorities for Marine Conservation in Latin America and the Caribbean*. The Nature Conservancy: Arlington, Virginia. http://conserveonline.org/workspaces/MarCons_LAC
- Toropova C, Kenchington R, Vierros M, Bustamante G, Glazer R, Vanzella-Khoury A, Karibuhoye C, Wenzel L, Hibino K, Kim Tan M, *et al.* 2010. Meeting global goals at regional scales and in the high seas. In *Global Ocean Protection: Present Status and Future Possibilities*, Toropova C, Meliane I, Laffoley D, Matthews E, Spalding M (eds). Agence des Aires Marines Protégées: Brest, France, Gland, Switzerland, Washington, DC and New York, USA: IUCN WCPA, Cambridge, UK: UNEP-WCMC, Arlington, USA: TNC, Tokyo, Japan: UNU, New York, USA: WCS 96. <http://data.iucn.org/dbtw-wpd/edocs/2010-053.pdf>
- Tural U. 2012. *Results of Marine Biodiversity Research*. Commissioned by WWF MedPO. <http://www.panda.org/msp>
- UNEP-MAP-RAC/SPA. 2010. *Specially Protected Areas in the Mediterranean, Assessment and Perspectives*, Ben Haj S, Ben Nakhla L, Ouerghi A, Rais C (eds). CAR/ASP: Tunis.
- Walton A, Gomei M, Di Carlo G. 2013. Stakeholder Engagement. Participatory Approaches for the Planning and Development of Marine Protected Areas. World Wide Fund for Nature and NOAA—National Marine Sanctuary Program. <http://www.panda.org/msp>
- White AT, Aliño PM, Cros A, Fatan NA, Green AL, Teoh SJ, Laroya L, Peterson N, Tan S, Tighe S *et al.* 2014. Marine protected areas in the coral triangle: progress, issues, and options. *Coastal Management* **42**: 87–106.