

Sustainable Financing of Marine Managed Areas: Experiences from around the World

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Colophon

This study is part of a larger report with the title “Assessment of Economic Benefits and Costs of Marine Managed Areas in Hawaii” by Herman Cesar, Pieter van Beukering and Alan Friedlander. This publication is a result of research carried out by Cesar Environmental Economics Consulting (CEEC) and funded by the National Oceanic and Atmospheric Administration, Coastal Ocean Program, under awards NA 160A2412 to the University of Hawaii for the Hawaii Coral Reef Initiative Research Program. Co-funding was obtained from the Division of Aquatic Resources (DAR) and the Department of Business, Economic Development & Tourism (DBEDT).

1. Introduction

Increasing pressure on marine and coastal ecosystems has led to the realization that there is a growing urgency to protect and manage the resources that they provide in a responsible and sustainable manner. This requires managing the human activities that directly impact on them, notably those associated with fisheries and tourism, as well as off-site activities resulting in pollution and sedimentation. In recent decades, Marine Managed Areas (MMAs)¹ have been established in various countries as a means of managing and protecting the marine environment. Such areas have been defined (Kelleher, 1999) as:

“Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.”

In the case of Hawaii, MMAs can include Marine Life Conservation Districts (MLCD), Fisheries Management Areas (FMA), Fisheries Replenishment Areas (FRA), Bottomfish Protected Areas (BFPA) and County Parks among others. Globally, MMAs exist on many different scales, ranging from tiny community-managed fisheries reserves of a few hectares in the Philippines, to the Great Barrier Reef Marine Park with a size of 340 thousand square kilometers, nearly the size of California.

MMAs can provide a number of benefits, the most important ones being (Kelleher, 1999):

- Conservation of biodiversity;
- Protection of habitats attractive to tourism;
- Increased productivity of fisheries, insuring against stock collapse, buffer against recruitment failure, increase in density, size, reproductive output;
- Increased knowledge of marine science through information;
- Refuge for intensely exploited species;
- Protection of genetic diversity of heavily exploited populations; and
- Protection of cultural diversity e.g., sacred places, wrecks and lighthouses.

Some of these benefits can be directly translated into economic terms, while others are indirect benefits that cannot be easily quantified. For instance, the gross recreational value of the Great Barrier Reef in Australia has been estimated at over US\$ 0.5 billion annually (Driml, 1999). In this case there are considerable potential fisheries benefits in addition to the benefits from ecosystem services, such as coastal protection. A recent study by White et al. (2000) estimated the economic value of the Olango Island Wildlife Sanctuary (40 km²) (keep consistent, either always km, or always kilometers - see above - '340 thousand square kilometers') in the Philippines and surrounding area. Sustainable annual net revenue for this area of reefs and mangroves was calculated at \$1.5-2.5 million per year. Another recent study estimated the costs and benefits of park management of the Portland Bight Protected Area in

¹ Marine Managed Areas (MMAs) have also been referred to as, among other things, marine reserves and marine protected areas. Here, the term MMA is used to highlight that the aim of management (or - 'does not simply prioritize') protection and is often related to rational use of scarce and threatened natural resources.

Jamaica (Cesar et al. 2000). The results are presented in Figure 1-1. Here the benefits of park management were estimated at a total of \$41-53 million over a 25 year period. This was compared to the overall costs of management of the area over the same period, estimated at \$19million.

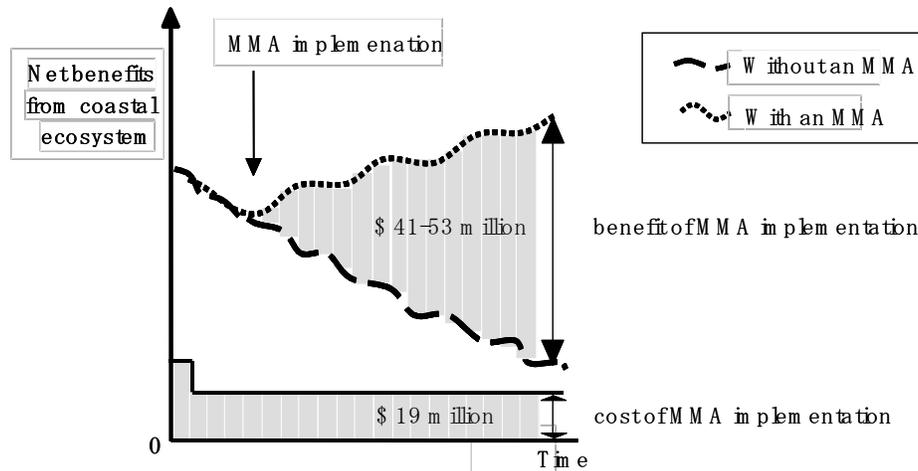


Figure 1-1: Stylized comparison of the cost and benefits of MMA implementation with estimated numbers from the Portland Bight Protected Area, Jamaica

Effective management is needed in order to realize the potential benefits of an MMA in both economic and ecological terms.. Once this management issue is adequately addressed, the main question is how to 'capture' the estimated benefits in order to finance the cost of effective management. This sustainable finance question is the focus of this paper. For the Jamaican example above, this question can be rephrased as: how can we capture the overall management costs (\$19 million in 25 years) out of the estimated benefits of the park (\$41-53 million in 25 years). In order to address this question, this paper describes the experience of sustainable financing projects / programs from around the world. This report provides the background for recommendations on financing marine managed areas in Hawaii presented as part of the study "Creating a better understanding of benefits and costs of Marine Managed Areas in Hawaii".

It is important to emphasize from the outset that there is continuing, open debate as to whether sustainable financing through user fees and other visitor payments is the correct way forward. Some scholars claim that local / national government should be responsible for financing the management of public areas, both on land and in the coastal area, in order to guarantee that the poor are not effectively excluded from the use of such public areas (More, 1999). This is a valid point with regard to the relatively high visitor fees of some of the public lands and national parks both in the US and in developing countries (More and Stevens, 2000). However, in the context of Hawaii, where only minimal charges are discussed, this is likely to be a minor issue, especially as the fee schemes considered exclude Hawaiian residents from paying the fee.

2. Overview of Revenue Earning Mechanisms for MMAs

The examples from the Philippines and Jamaica presented above clearly show that MMAs can have significant economic benefits. These MMAs can also potentially generate considerable revenues for the local population, the MMA itself, and for both the local and national government. The challenge is to effectively institutionalize the appropriate economic, financial and fiscal instruments to raise revenues and capture the benefits in order to sustainably finance the MMA management.

Identifying and implementing appropriate financial mechanisms is especially important in situations where MMA management is hampered by lack of funds for monitoring, management and enforcement and sometimes only exist as ‘paper parks’. Revenue generation can help the park become a conservation success without being a financial burden to the government.

Table 2.1 Financial Revenue Earning Mechanisms for Marine Managed Areas

Source or Mechanisms	Definition/ example
Government appropriations	Funds appropriated in national or state budgets for protected area
Taxes, Levies, surcharges	Fees and levies imposed on certain activities, sales or purchases (e.g. tourism/bed/airport tax, fishing license, diver operator license, etc.)
User fees	Charge for non-consumptive use or visitation (usually ‘per person’ or ‘per vehicle’); may be daily, seasonal or annual, may be charged to tour firms bringing escorted groups
Leases and concessions for products and services	Legally binding agreements between the entity with authority over the protected area and private organizations or entrepreneurs who market goods and services related to the protected area and return some share of the profits, or a flat fee
Sale of goods and services	Gift and souvenir shops, sale of items such as maps and guides, fee-for service tours, anchorage, mooring, equipment rental, camp or picnic space rental, exhibit entry, etc.
Case-related marketing	Sale of mostly intangible items (membership, voluntary add-ons to hotel and restaurant bills, etc.) - primary value is purchaser’s knowledge of helping conservation
Biodiversity prospecting	Contracts in which a pharmaceutical company or other entrepreneur secures right to genetic resources (bio. materials collected and processed for analysis) in return for cash payments and/or royalties on any medicines or products developed
Philanthropic foundations	Grant-giving organizations
Corporations	Sponsorship or other types of voluntary payments by companies
Individual donations	Gifts by individuals through a variety of mechanisms – direct gifts, memberships, wills, bequests, etc.
Trust funds	Capitalized through different donor agencies or funding sources and managed and controlled by an independent board of directors

Source: adapted from Morris (2002) and from Nature Conservancy and UNEP (2001)

Revenues can broadly be categorized into: (i) those from direct users and (ii) those from non-users. Revenues from users include royalties, sales, user fees, taxation and licensing. The

basic economic rationale for this set of funding sources is to capture some of the rent and willingness-to-pay associated with the use of the marine environment. Revenues from non-users include donations, bequests and business sponsorship. Table 2.1 shows an extensive list of sources or mechanisms for revenue earning adapted from Morris (2002), originally based on Nature Conservancy and UNEP (2001). It should however be noted that not all methods of revenue generation are equally sustainable or appropriate in every situation. We focus here on those instruments that are feasible in a 'developed country' setting, leaving out typical 'developing country' instruments like debt-for-nature swaps and the Global Environment Facility among others.

In the remainder of this section, some of these revenue earning instruments will be discussed and examples will be given of their use. Appendix I discusses these different instruments in greater depth.

Government Appropriations

Government Appropriations are funds appropriated in national or state budgets for protected area management. The advantage of these funds are that they constitute a regular, recurrent flow of income and are compatible with national environmental priorities. Another advantage is that government appropriations ensure that low-income people are not excluded from resource-based tourism (More and Stevens, 2000).

However, as government priorities change, these appropriations can become less reliable than foreseen. Most developed countries manage their marine parks at least partly through government appropriations, often supplemented with user fees, royalties and sales of goods and services. It is also possible that user fees are generated, but that these revenues are remitted to the central or local government and do not stay in the park to be used for its management or related local activities. As such, there is no problem with separating the revenues generated from the park from the actual government contribution to park management. In fact, this is what economic theory would advocate in a so-called 'first best' economy without distortions. However, in a setting where parks are under-funded and where the motivation to collect revenues is low because the revenues go back to the central government, a direct link between revenues and park funding is advisable. Government appropriations will not be discussed here in detail, as the main reason for exploring revenue earning mechanisms is precisely that these government appropriations are not sufficient to manage the MMA adequately.

Taxes, Levies and Surcharges

Taxes, levies and surcharges are additional means of raising revenues whereby taxes are placed on the goods and services provided and supported by the existence of an MPA, or where licenses need to be obtained for certain activities. In most countries, Governments already raise revenues from tourism through a bed tax and an airport departure tax. It could be argued that the MPA helps increase the number of tourists and should therefore be supported by the increased revenues from bed and airport taxes. In most countries these taxes go to Central Government coffers. However, a portion of them could be used to fund MPAs. Licensing can also be used e.g. moorings in an MPA can be hired out, or a limited number of

fishing or tour guide licenses could be sold to people wanting to use the MPA, thus raising revenue. In fisheries, use of licensing is also widespread, though the licensing fee is often not collected. Efforts are underway in many developing countries to improve collection of fisheries license fees, or to increase them to provide more revenues. An interesting example, where a whole area is licensed to one fishing company, is given in *Box 1*. (You use MPA in this section, not MMA)

Box 1: Fishery License to preserve healthy fish stocks – the St. Brandon case

Almost 400 km north of Mauritius lies St. Brandon, also known as the Cargados Carajos Shoals. It consists of a shallow area some 60km long and 25km wide with 55 sand cays and vegetated islands, lagoons and coral reefs. Only two islands are inhabited, both by fishermen working for one company. The area has been identified as an area of regional importance for marine biodiversity conservation (Kelleher et al. 1995). St. Brandon has an intact marine fauna due to prudent exploitation by the licensed fishing company that sets conservative quotas and only fishes part of the reef, thereby indirectly establishing MPAs that act as ‘sources’ for adjacent areas. As the company holds a permanent fishing license and lease on 13 islands, and a renewable lease on 15 more, it has a longterm interest in exploiting the resources sustainably.

The key to its successful maintenance of healthy fish stocks lies in the area-based management system adopted, and the company's long term interest in maintaining the resources. This is possible because of the absence of competition. A management plan prepared recently for the area by the World Bank recommends the fishing company as the guardian of the archipelago, to protect not only the marine, but also the terrestrial resources (mainly birds and sea turtle beaches). The remoteness of St. Brandon would render it impossible for the Mauritian government to protect it. Periodic monitoring would be carried out and extension of the renewable lease by the government would be dependent upon the effectiveness of protection. To expand the basis for revenue generation, boat-based (live-aboard) ecotourism is recommended.

Source: (Cesar and Westmacott, 2001).

User Fees

User fees include entrance fees, diver fees and yacht mooring fees among others. They could be defined as any charge for non-consumptive use or visitation of an MMA (usually ‘per person’ or ‘per vehicle’). User fees vary dramatically; The Galápagos National Park in Ecuador charges \$100 per visit and the marine park at Tubataha in the Philippines charges \$50, while the Palolo Deep Marine Reserve only charges visitors \$0.70. However, fees usually range from \$1 to \$5 per day or \$10 to \$30 per year (Lindberg and Halpenny, 2001).

Appendix II gives an overview of user fees around the world, based on Lindberg and Halpenny (2001). Their paper gives both the size of the fee and the collection mechanism and discusses whether the fees are earmarked for conservation or are used for general government revenue generation. The overview also discusses any opposition to the fee scheme and whether the introduction of a user fee has reduced the numbers of visitors.

Lindberg (2001) states five objectives for user fees:

- Cost recovery, which involves generation of sufficient revenue to cover part or all of tourism's financial costs (e.g., construction and maintenance of a visitor center) and possibly tourism's other costs (e.g., ecological damage);
- Generation of "profit," with the excess of revenue over cost being used to finance traditional conservation activities (at the destination or at other sites) or to achieve other objectives;
- Generation of local business opportunities, which may involve low fees in an effort to maximize the number of visitors and/or the earmarking of fees to enhance site or experience quality;
- Provision of maximum opportunities for learning and appreciation of the natural resource, which may also involve low fees;
- Visitor management to reduce congestion and/or ecological damage, which would involve fees high enough to influence visitor behavior.

To illustrate some of the different objectives, the Bonaire Marine Park in the Caribbean has a 'cost recovery' system whereby day-to-day management and monitoring of the Park is entirely funded through diver user fees (See *Box 2*).

Box 2: Bonaire Marine Park – self-financed through user fees

Bonaire is a small island (288 km²) situated in the Southern Caribbean. It is surrounded by fringing reefs that are easily accessible and have provided the island with a valuable resource for the tourism industry. The accessibility of the reefs also makes them vulnerable. Being so close to shore, the reefs are affected by run-off from land, poor wastewater disposal, and seepage from septic tanks and overflow systems. The Bonaire Marine Park (BMP) covers the marine environment from the high water mark down to 60 meters and includes all 2700 hectares of coral reefs, mangroves and seagrass beds. It is a multiple use park with fishing and diving restricted to certain zones. It was established in 1979 with initial start-up funding for 4 years, which enabled a mooring system to be installed. The park functioned until funds ran out and, although supported by dive operators, it became little more than a 'paper park'.

BMP was revitalized in 1991 under the condition that the park had to be self-financing within a new 3-year term of funding. Self-financing was achieved by the end of 1992 when a \$10 diver fee was introduced. The park has almost managed to eliminate destructive practices such as anchoring, spearfishing and coral collecting.

The income generated from the \$10 diver fees through the sale of the diver badges (tags) covers the salaries and operational costs of the park. The BMP staff includes a manager, 4 full time rangers and three administrative staff who are shared with the Washington-Slagbaai terrestrial park. Operational costs include boat and vehicle maintenance and running costs, the maintenance of the 70 public dive moorings, research and monitoring programs and educational activities for the local children and teachers. For specific projects, the Park has to look to grant funding agencies for support. Income from divers has gradually increased as the number of divers has been increasing, while the \$10 fee has remained in place. Earlier studies in 1991 showed that the fee could be increased, and that tourists would still be willing to pay (see Figure 4).

Source: Dixon et al. (1993).

As the number of tourists has gradually increased from 17,000 in 1991 when the park was re-established, to 28,000 in 1998, revenues in Bonaire have also increased (see *Box 2*). Non-divers do not pay. Obviously, a combination of objectives may exist. In many Parks, locals are not charged or are charged less than foreigners (Thailand, Indonesia, etc.) or out of State visitors (Hanauma Bay, Hawaii) in order to combine 'cost recovery' with provision of 'maximum opportunities for learning and appreciation' by locals. Different uses can also be charged differently. As an example, the Soufriere Marine Management Authority in St. Lucia charges divers \$4 per day or \$12 per year, and snorkelers \$1 per day. Bonaire only has an annual fee, while the fee in Palau is on a 2-weekly basis.

One of the main impediments of user fees in a marine setting is fee collection. Depending on the ease of access, a user fee system can be regulated through a booth at the point of entry (Hanauma Bay) as is the case for most terrestrial parks. Alternatively, it can be managed through the dive industry, where operators are responsible for fee collection (Ras Mohamed in Egypt, Bonaire, Palau and others). At Hol Chan (Belize), there is one main dive/snorkel location and rangers collect fees there, while in Kenya, rangers of the Kenya Wildlife Service collect the fee by boat at the snorkel and dive sites in the MMAs.

In the US, most MMAs do not have user fees. Hanauma Bay on Oahu is an exception with a \$5 fee for anyone who does not have local residency. In Saipan, divers pay a \$1 fee per dive trip in the marine park. American Samoa and Guam do not have a user fee system in their marine parks. The John Pennekamp Coral Reef State in Florida has an entrance fee of \$5. The National Park service in the US has expanded its fee collection under the authority of the Recreational Fee Demonstration Project. Yet, there is no entrance fee at the Channel Islands National (Marine) Park in California and the Dry Tortugas National Park in Florida.

Leases and Concessions for Products and Services

Leases and concessions for products and services are legally binding agreements between the entity with authority over the protected area and private organizations or entrepreneurs. These organizations then market goods and services related to the protected area and return some share of the profits, or a flat fee. The returns include concession fees that are charged to individuals or groups, who are licensed to provide services to visitors within the MMA e.g. food, lodging, transportation, guide services, and retail stores. An example is the snorkel rental concession at Hanauma Bay which used to be worth over US\$500,000 per year (Mak and Moncur, 1998).

Concessions also include very elaborate schemes where an eco-tourism facility benefit from special entry rights to the MMA in return for funding and support in management and enforcement. A very novel recent example is the Komodo National Park Collaborative Management Initiative (KCMI) in Indonesia, set up with the support of The Nature Conservancy (TNC). See *Box 3*.

Box 3: Komodo National Park Collaborative Management Initiative (KCMI)

Komodo National Park (KNP) is embarking on a collaborative management approach, involving all key stakeholder groups in the management of the protected area. These include the park authority (PHKA), local government, a Joint Venture between an international NGO (The Nature Conservancy - TNC) and a local tourism company (JPU), as well as local communities, government agencies, and private sector organizations. A tri-partite collaborative management agreement between the Joint Venture, PHKA and the local government is being developed to set out of the three bodies' responsibility for conservation management, monitoring and enforcement and sustainable livelihood activities. PHKA will maintain a role in park management, but only through separate collaborative management agreements. The involvement of local communities will be assured through their representation in the Community Coordination Forum.

The Joint Venture (JV) has been established as a for-profit company whose charter directs that any profits earned will be invested back into conservation. This will give the JV due respect among other commercial bodies involved in the area, while maintaining its credibility as an institution with conservation as its bottom line. A business plan for the JV has been completed. It has applied for a 30-year tourism concession from the Ministry of Forestry, which authorizes the JV to collect gate fees, establish and implement carrying capacity limits, and develop a tourism licensing system. The JV has applied for long-term funding from GEF/IFC to set up this tourism concession. This represents a groundbreaking policy experiment for the government of Indonesia and for management of protected areas in general. The rationale behind the agreement was based on a proven track record of each partner investing in KNP, as well as the complementary agendas of the conservation NGO and the tourism-oriented private sector company. Over time, as the concession becomes more established, the JV plans to move toward co-management arrangements with local communities and local government.

In the long-term, the KCMI plans to bolster the limited capacity of PHKA to protect the resources of KNP and to make it a self-financing park, with tourism revenue covering management costs. The government, TNC and other partners have developed a 25-year management plan for KNP. In addition, an analysis of economic issues, a community enterprise assessment and a comprehensive tourism study have taken place, all contributing to the establishment of the concession. Positive and negative incentive mechanisms will be used to ensure the sustainable use and protection of the resources. These include: a micro-enterprise fund for local family-based businesses, research and development of sustainable methods of marine resource use, and a community development grant to finance urgent welfare needs. Regulation and fines systems will also be put in place and/or strengthened.

Source: Morris (2002) based on project documents and Randy Kramer, pers. comm.

Sales of Goods and Services

Sales of goods and services is a form of revenue generation whereby a percentage of earnings from activities or products connected to the MPA is collected by the MPAAe.g. sales from books, photographs, postcards, films or products of the MPA. However, this revenue is often small (*Box 4*). In addition to the traditional forms of royalties, bioprospecting companies can also pay royalties to the country, as well as paying for the collection of samples for their research and development activities (see discussion below).

Box 4: Revenue generation from sales of goods and services in the Seychelles MPAs

The sale of tickets to tourists for entry into the Marine National Parks, boat mooring fees, filming fees, sale of coco-de-mer and tortoises, and hiring of picnic facilities form the basic revenue of the Seychelles Marine Parks. In 1997, the total revenue of the parks was Rp.1,990,058. Of this, 70% was derived from the user fees and less than 1% from the other forms of revenue generation mentioned above. 68% of this revenue was derived from 2 of the 5 parks which thus subsidized the running of the remaining 3 parks. The central management of the parks by the Seychelles Marine Parks Authority has resulted in cost cutting due to the sharing of administration expenses. Note that the wildlife products for sale have to be sustainably harvested and managed.

Source: Mathieu (1998).

Biodiversity Prospecting

Biodiversity prospecting is an interesting new revenue generation mechanism for the conservation of biodiversity. Large global markets exist for products derived from genetic resources. The sea, and in particular the coastal shelf, contains remarkably high species diversity, and MPAs are often coastal areas with a relative abundance of such diversity. Examples of products derived from marine genetic resources are anticancer compounds, antivirals, antibiotics, antifungals and anti-inflammatory agents (Putterman, 2000). The value of bioprospecting is based on trade of information rather than the product itself and an initial sample can be as small as 100g of material. Consequently, genetic resources research can be divided into a series of value-adding processes. Compensation can be realised in a number of ways, e.g. rental fees, rural employment, profit share, licensing fees, international technology transfer, tropical disease research, royalties and joint venture agreements (Putterman, 2000). When the bioprospecting takes place in an MPA, part of this compensation can be used for MPA management. See *Box 5*.

Box 5: Capturing the commercial value of coral reefs through biodiversity prospecting

International commercial interest can also be translated into funding, as evidenced by the use of payments for coral reef prospecting rights as a means of generating income for marine conservation. A number of useful medical and pharmaceutical applications of coral reef species have been discovered, and many more are under development, e.g. compounds against cancer, treatments for heart disease, sunscreens and bone graft substitutes. There is a high level of international commercial and industrial interest in this potential. In line with this interest, Imperial Chemical Industries has acquired the rights to develop a number of reef pigments for use as sunscreens for humans, and in 1992 the Coral Reef Foundation entered into a five year contract worth US\$2.9 million for the supply of reef samples to the US National Cancer Institute for use in cancer and AIDS screening programs.

Source: Morris (2002) based on Spurgeon and Aylward (1992).

Philanthropic Foundations, Corporations and Individual Donations

Philanthropic foundations, corporations and individual donations are other possibilities of obtaining funding from non-users. There is a strong tradition of sponsorship from business in many countries. The Galapagos National Trust receives considerable donations to help manage the Park. The national wildlife NGOs of East and Central Africa have sponsors from

local business. Bequests from individuals can be a powerful supplement to other types of funding. This funding could be a regular part of the MPA budget or be managed through a trust fund (see below).

Trust Funds

It is possible to establish Trust Funds that provide a yearly income to the MPA (see *Box 6*). A organization of ‘Friends of the MPA’ could capitalize on the goodwill of local residents and business people who want to help the MPA, as well as overseas visitors who want to maintain links with a place they have enjoyed visiting (Kelleher, 1999). Donations can be solicited from tourists for special projects or routine maintenance in MPAs. Examples include restoration of historic buildings, archaeological excavation, improved species protection or habitat purchase, or community development activities such as schools or clinics. In some situations, environment funds are being created as part of the conditions of international debt relief (Kelleher, 1999). However, these are usually created on a national scale where the funding may not reach the individual MPA budget.

Box 6: MesoAmerican Reef Regional Trust Fund (MRFM)

A regional financing mechanism is being established for the MesoAmerican Barrier Reef System, a unique marine ecosystem bordered by Mexico, Belize, Honduras and Guatemala. The MRFM has a long-term endowment goal of \$25 million and will finance projects for the conservation and sustainable use of the reef. There are four country funds participating in the MRFM, including the Mexican Fund for Nature, the Protected Areas Conservation Trust of Belize (PACT), the Biosphere Fund (Honduras) and the Guatemalan Conservation Fund. The MRFM is being designed to fundraise, receive, manage and disperse funds to priority areas and projects for conservation of the reef. The mechanism will select, fund and evaluate environmental projects for the reef under established guidelines and procedures. The fund is being capitalized with funding from the Summit Foundation, the IDB, and a WWF Donor. It will be set up as a private fund and decision on spending will be made by a board consisting of government, NGOs and other representatives. The fund’s priorities will be based on the main threats to the area. It will provide funding to projects that address these threats in key biodiversity regions, including setting up and financing of MPAs.

Morris (2002) and references therein.

3. Other Options for Sustainable Financing of MMAs

Besides revenue earning mechanisms, MMAs can also ensure sustainable financing of its monitoring, enforcement and other management activities. Here, entrepreneurial MMAs and tradable concession permits will be discussed. Due to the fact that individual MMAs have different capacity for revenue generation, there will be a section on the financing of networks of MMAs. Finally, cost-effective management options will be discussed as a way of helping to finance MMAs.

Entrepreneurial Marine Parks

Governments can decide to contract out management and / or financial control to a private entity, such as an ecotourism establishment. This is sometimes referred to as an entrepreneurial MPA (Colwell, 1999). Responsibility for part of the total management, such as day-to-day enforcement, can be transferred or there can be a complete hand-over of responsibilities. Private entities, whether businesses or NGOs, can lease certain areas of high biodiversity with the aim of protecting biodiversity of these areas (Riedmiller, 2000). For instance, in the Netherlands, the Stichting Natuurmonumenten, the largest Dutch environmental NGO, owns considerable areas of land, wetland and cultural heritage sites which it keeps under protected management.

MPAs can also be run as business ventures. An example discussed above is the Komodo National Park Collaborative Management Initiative (KCMI). An older example is Chumbe Island Coral Park Ltd. in Tanzania (*Box 7*). This is an MMA that has been created through agreements between the local government and a private entity to balance conservation management and commercial feasibility. Operations follow commercial principles, but profit from tourism operations is re-invested in conservation activities, including education excursions to the island for local schoolchildren. The aim is to create a model of sustainable conservation area management where ecotourism supports conservation and education.

Box 7: Chumbe Island: An example of privatesector management of MPAs:

Chumbe Island is a small coral island of approximately 22 hectares off the coast of Zanzibar, Tanzania. It differs from most of Zanzibar because it was not plagued by heavy overfishing or blast-fishing, thus providing a rare chance for coral reef conservation. The island was uninhabited and faced little immediate threat from human activities. Chumbe Island Coral Park (CHICOP) was established in 1991. Revenue for running the park is generated from diving, snorkeling, glass-bottomed boat trips, nature trails, accommodation and restaurant services.

An economic analysis carried out in 1998 estimated the overall investment by then to be almost US\$1.2 million, of which US\$220,000 were grants from a variety of donors for several non-commercial project components. Roughly US\$600,000 was spent on conservation, US\$100,000 on education and US\$500,000 on tourism infrastructure. In 2000, the third year of commercial operations, the Chumbe project still receives less than the amount per guest that is needed to break-even and has a lower occupancy rate than required. The project is, therefore, maintained with very cost-conscious operations and has required continued volunteer support. This data shows the challenges of entrepreneurial MPAs in the initial years of operation. Still, as a sign of its success, CHICOP has won various awards, including the prestigious 2000 UNEP Global 500 Award.

Source: Riedmiller (2000).

Entrepreneurial MMAs are one potential alternative to those managed by central government agencies. The latter agencies tend to have major difficulties with sustainable resource management in many countries. This is because supportive institutions are often weak and revenues generated by tourism are not normally re-invested in the management of the area. In addition, nature reserves managed by governments often suffer from conflicting interests among different user groups, particularly between traditional users and tourism interests. Successful attempts are being made in many countries to overcome these problems by devolving authority for wildlife conservation to local communities.

Tradable Permits

It is common that user fees are established to generate cash for the MMA rather than to regulate the number of visitors. However, in many areas, overuse of limited resources by divers can actually degrade the resource instead of contributing to its sustainability. In such cases, very high fees may be needed to sufficiently regulate the number of divers to keep below carrying capacity levels. An alternative to regulating the number of divers through a user fee is a system of tradable permits. Such a system was studied by Cheryl Ann Cumberbatch as part of her MSc. dissertation at the University of York (UK) and discussed in Morris (2002). Her thesis challenges the increasingly popular approach of charging minimal fixed daily and/or annual dive fees, establishing that this model is ecologically and economically unsustainable (in terms of maintaining resource use options and financing capability). A tradable permit system should: (a) issue different types of well-defined permits for different sites, (b) limit these permits to ecologically sustainable levels, thus giving them a value that can be accurately estimated, (c) make the permits freely tradable with limited restrictions on the scope of trading, (d) minimize the transaction costs involved in the trading, (e) enforce penalties for violating a permit (that penalty being greater than the permit price), and (f) enable producers to retain any profits they earn from trading (Cumberbatch, 2001). Such a permit system should provide incentives for sustainable diving within an MMA, giving the users (dive operators) a sense of ownership over the resource. It could be managed by the dive industry itself or alternatively by an NGO or a government agency. This system has not been trialled for MMAs, but works in many other situations where scarce resources need to be allocated.

Networks of MMAs

In several instances, ecologically integrated networks of MMAs are established. Some of these MMAs may have excellent revenue generating potential while others do not. This is possibly due to remote location or inversely, the ease of access. In such cases, sustainable financing options can be considered for the network as a whole. For instance, MMAs can cross-subsidize each other e.g. where one MMA is the 'cash cow' for management of the entire network of MMAs. This can ensure that even those MPAs with limited options for a diverse portfolio of financing mechanisms are able to cover their basic costs. Besides this form of cross-subsidizing, costs can be shared through sharing of staff, technical expertise and monitoring responsibilities (Morris, 2002). An example is the Kisite-Mpunguti MPA complex in Kenya (see *Box 8*).

Box 8: Unequal distribution of benefits in the Kisite-Mpunguti MPA complex, Kenya

The high economic benefits associated with the Kisite-Mpunguti MPA complex (KMMPA) provide strong justification for its status as an MPA, and demonstrate that, in theory, the park is an economically appropriate use of natural, financial and human resources (See Box 3). Yet, support for marine conservation is low around KMMPA, and park management is difficult in practice. The major issue in KMMPA is the unequal distribution of benefits between the different stakeholders. The groups who bear the major direct costs and opportunity costs (i.e. foregone benefits) associated with the MPA (KWS and local communities) receive a disproportionately small share of the benefits generated, while major beneficiaries (private sector tour operators) bear few of the costs associated with management.

More than 3,000 people live on Wasini Island, alongside KMMPA. Almost all primarily rely on fishing for their livelihood. The majority of these people lose out in economic terms from KMMPA, because they have been excluded from their traditional, highly productive fishing grounds in Kisite. These losses far outweigh the local gains from the park in terms of tourist-related income and improved fish productivity. Despite a requirement for visitors to Wasini Island to pay a small fee to the village authorities, only one private tour operator attempts to abide by this arrangement. Even when operational, the improved gains from the benefit-sharing arrangements did not balance the local losses incurred. Most community members will continue, in the absence of tangible economic benefits, to regard KMMPA as an economic liability rather than an asset, and to feel a high level of antipathy towards both KWS and private sector tour operators.

Source: Emerton & Tessema (2000).

Cost Effective Management

Although not the focus of this background report, cost effective management options can greatly reduce the need for revenue generation for park management. In particular, they can lower the costs of managing MPAs by sharing the costs and benefits of management with local stakeholders. Examples of cost effective management include maintenance of mooring buoys by dive operators, decentralization of fishing regulations to local communities, volunteers and/or other interest groups, fee collection and even monitoring. These can all be part of larger co-management arrangements with the stakeholders.

For example, the collaborative management agreement in St. Lucia between the government and a community institution with the capability of managing a marine protected area and administering a fee system. Fees raised will be placed in a separate government fund, which will make quarterly payments to the community institution for the management of the protected area (Salm et al. 2000). An example of co-management in Fiji is given in Box 9.

Box 9: The Ucunivanua Project: benefits from involving communities in co-management

In the early 1990s, residents of Ucunivanua Village in Fiji recognized that the marine resources they depended on were becoming scarce. In the past, village elders recalled collecting several bags of large kaikoso (a clam found in the shallow mudflats and seagrass beds) in a few hours. However, by early 1990s, a woman could collect only half a bag of small clams after a full day on the mudflats. One solution identified by the community was to return to their traditional management practice of setting up tabu areas – regions that were temporarily closed to fishing to replenish stocks. They experimented by setting up a 24-hectare tabu area on the mudflat and seagrass bed in front of the village. A management team was assigned to stake out the area and, with assistance from a team from the University of the South Pacific and the Biodiversity Conservation Network, developed and implemented simple monitoring methods. The management team monitored the site twice in the first year and annually thereafter. The results showed an increase in numbers and size of clams, in some cases, the biggest clams found in three generations. Due to the work involved and the encouraging results, the entire Ucunivanua community became interested in the tabu area and, once they saw the effects of the tabu area, they decided to set up other tabu areas in mangroves and coral reefs to protect one species of mud lobster, several species of sea cucumber and several coral reef fishes and invertebrates, all of which were of some economic or cultural value to the village members. The Ucunivanua community is considering converting some of these temporary tabu areas into permanent no-take sites. Other communities across Fiji soon expressed interest in setting up their own tabu areas, and customary marine reserves are now being set up at four other sites across Fiji. The Ucunivanua project also influenced government policy. The government policymakers are now planning to adopt traditional Fijian customs to manage marine resources and have a full-time program focusing on locally managed marine reserves within Fiji's coastal waters.

Source: Morris (2002) - originally from Tawake et al. (2001).

4. Recommendations

This background report has examined various aspects of revenue generation of MMAs in coral reef areas with examples from around the globe. Bearing in mind that feasibility of the recommendations for a specific location is crucially dependent on the local situation, there are several points that can be drawn from this overview.

- MMAs can be financially attractive because of their potentially positive effect on tourism and fisheries. However, only well-managed MPAs are likely to generate adequate financial resources. Financial sustainability is vitally important for long-term MPA funding.
- Effective MPA management depends on its successful implementation. This can be achieved through several factors: participation of local communities and politicians; personnel capacity – managers, rangers, educators and scientists; financial capacity – ability to raise funds and to keep revenues internal to MPA; and an effective system of monitoring and research to evaluate the progress of the MPA and to allow adaptive management.
- Revenue generation for MPAs can be achieved from a variety of sources depending on the local situation, including government appropriations, taxes, levies, surcharges, user fees, leases and concessions for products and services, sale of goods and services, case-related marketing, biodiversity prospecting, philanthropic foundations, corporations, individual donations and trust funds.
- In areas of clearly identifiable user groups, such as divers and fishermen, these individuals can be a potential source of funding through user fees, e.g. fishing licenses. Reasons for introducing fees and licenses include: cost recovery, generation of "profit", generation of local business opportunities, provision of maximum opportunities for learning and appreciation of the natural resource, as well as visitor management to reduce congestion and/or ecological damage. In areas where the numbers of fishers and/or tourists would be insufficient to generate adequate funds, alternative forms of income generation need to be considered.
- Alternatives such as tradable permits and entrepreneurial MMAs are worth considering;
- Cost reduction through deputization, volunteer groups, co-operation with stakeholders and sharing with other MMAs in the surrounding area may be as important as revenue generation. Networking between MMAs can lead to resource sharing and subsequent cost cutting.

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Appendix I: Financial Revenue Earning Mechanisms for Marine Protected Areas

Source or Mechanisms	Definition / Example	Who can use it	Advantages	Constraints
Government appropriations	Funds appropriated in national budgets for protected area management	National protected areas agencies	-Regular, recurrent income -Compatible with national environmental priorities	-Usually insufficient to meet management needs -Additional funds not usually available -Complex budgeting and accounting rules -Government priorities and budgets can change with political and other changes
Taxes, levies and surcharges	Fees and levies imposed on certain activities, sales or purchases (e.g. tourism tax, bed tax, airport tax, fishing license, diver operator license, etc.)	Government imposes and collects; proceeds may be earmarked (e.g. for protected area budgets, trust funds, etc.)	-Regular, recurrent income -Use generally unrestricted -Can capture economic benefits from resource uses (e.g. tourism, fishing, boating, etc.)	-May require special authorizing legislation -May generate controversy, especially among constituencies to be taxed (requires public education on advantages and purpose of levy) -Can result in negative activities if sole purpose is to raise funds -Goes through central government coffers
User fees	Charge for non-consumptive use or visitation (usually 'per person' or 'per vehicle'); may be daily, seasonal or annual, may be charged to tour firms bringing escorted groups	The entity with jurisdiction over a protected area may collect fees itself or designate another party to do so on its behalf, depending on applicable law	-Regular, recurrent income -Use generally unrestricted -Embodies 'user pays' principle -Can be used to regulate access, control over-use, and manage visitation flow among protected areas -Easy to implement in areas with a limited number of access points	-Not appropriate for little-visited areas (projected revenue should exceed cost of collection) -Potential equity issues (can be addressed by lowering fees for national/local residents, etc.) -Introducing fees for areas that previously were free can generate controversy; -Costs involved with collection of fees -Challenges of setting the correct price -After fees are set there is little flexibility to change
Leases and concessions for products and services	Legally binding agreements between the entity with authority over the protected area and private organizations or entrepreneurs who market goods and services related to the protected area and return some share of the profits, or a flat fee	Protected areas agencies, private reserves, NGOs, businesses	-An effective mechanism to provide services with little up-front investment by the protected area -Concessionaire incurs the risks associated with potential non-profitability -Concessionaires bring marketing and business skills to the table -Enables the management agency to focus on resource protection -Provides opportunities for local entrepreneurs	-Concessionaires operate to generate profit, may not share values of protected area and need to be carefully monitored -Estimation of fees is complex and difficult; need to ensure healthy and safe service at reasonable price to visitor; fair return to both protected area and entrepreneur -Not appropriate for little-visited areas
Sale of goods and services	Gift and souvenir shops, sale of items such as maps and guides, fee-for-service tours, anchorage, mooring, equipment rental, camp or picnic space rental, exhibit entry, etc.	Park agencies, NGOs, concessionaires	-Goods and services can do double duty as sources of income and visitor education, promotion -Generally does not require additional legal authorization; easy to keep proceeds within area	-Initial investment required for production of inventory of goods, recruitment of providers of services -Goods and services should be limited to those related to protected area purposes -potential for competition with other local providers of goods and services

Case-related marketing	Sale of mostly intangible items (membership, voluntary add-ons to hotel and restaurant bills, etc.) - primary value is purchaser's knowledge of helping conservation	Most often used by NGOs	-Combines promotion, education and fundraising -In some cases contributions may be tax-deductible -Markets can be easily identified (park visitors, NGO members, etc.) -Involves local business community in protection	-Many areas have no built-in market, must develop visitor logs, etc. -Requires fairly sophisticated understanding of marketing and what will sell, or an experimental approach -Potential for market saturation
Biodiversity prospecting	Contracts in which a pharmaceutical company or other entrepreneur secures right to genetic resources (bio. materials collected and processed for analysis) in return for cash payments and/or royalties on any medicines or products developed	Generally government or international agencies, sometimes private research institutions with consent of appropriate government agencies	-up-front cost is minimal -opportunity to train and employ local researchers in collection and initial processing	-speculative enterprise, impossible to know potential financial return up front -requires skilled legal representation for contracts -royalty payments may not be received for decades if at all, depending on the actual value of the resources on the global market
Philanthropic foundations	Grant-giving organizations	Generally available only to nonprofit organizations	-can be a significant source of revenue for specific project activities or start-up of new programs	-not a source of recurrent funding -intense competition for limited funding often leads to significant investment of effort in proposals with low-to-medium funding chance
Corporations	Sponsorship or other types of voluntary payments by companies	Park agencies, NGOs	-Generally a means of raising both national and international support for facilities or management -Corporate donors' expectations often can be met with simple acknowledgement placards -means to link companies that benefit from protected areas to supporting them (tourism, hospitality industries)	-Often corporations desiring to be sponsors are those with whom the protected area may not wish to be associated (resource exploitation sector) -What corporate sponsors get in return needs to be carefully limited before donations are solicited and accepted.
Individual donations	Gifts by individuals through a variety of mechanisms – direct gifts, memberships, wills, bequests, etc.	Generally NGOs, but sometimes include protected areas agencies	-Potential donors come to you and only need to be asked -No cumbersome application process -Can build donor loyalty over time -Usually unrestricted gifts	-Requires insight into potential givers and what motivates them -Some gifts, especially bequests, may take years to cultivate and eventually realize -Can be a significant source of funds for an MPA
Trust funds	Capitalized through different donor agencies or funding sources and managed and controlled by an independent board of directors	Park agencies, NGOs	-Sustained, long-term funding for MPAs -Can extend the lifespan of a grant -Channel large-scale grants to many small-scale users -Can be set up for different purposes: a single protected-area, an entire protected-area system, a transboundary protected area or ecoregion, small grants to community -Is kept separate from other sources of money (such as government budgets)	-Potentially have high admin costs -May generate low or unpredictable investment returns, esp. in the short term, if investment strategy is not well conceived, or if particularly sharp changes in the markets occur.

Source: adapted from Morris (2002) and from Nature Conservancy and UNEP (2001)

Appendix II: Experiences with user fees in Marine Managed Areas with coral reefs around the world

Country	Site(s)	Fee and mechanism	Earmarked to park/agency?	Opposition? (by tourism industry unless noted.)	Reduced visitation?
Australia	12 MPAs - managed by national govt	None			
	Great Barrier Reef MP	\$2 per day (max. \$6)	Yes, but through national treasury	Yes, due in part to lack of advance notice. Led to reduction in fee increase and phased introduction.	
	MPAs and other parks managed by States	Varies. No fee at many sites. \$7.50 at Ningaloo MP.	Yes (Tasmania)	Yes, due to lack of advanced notification in past, especially in case of Ningaloo MP (Western Australia).	Yes at some sites with predominantly local use (Tasmania).
Bahamas	Exuma Land and Sea Park	Private vessels: \$5/day; Charter vessels: for private charter, dive charter, kayak charter: \$1/foot/day. No charge for Bahamian vessels.			
Belize	Hol Chan MP; Half Moon Caye	Hol Chan \$2.50; Half Moon Caye \$5; Belizeans free	Yes		No
Brazil	Abrolhos Marine NP; Fernando de Noronha MP	\$4.25 per day	Yes (to IBAMA, with 50% staying in parks)	Some due to concerns about local access	No
British Virgin Islands		\$1 per day + mooring fees Collected primarily by operators, with non-commercial visitors buying directly from the National Parks Trust.			
Costa Rica	Cocos Island	\$105 per trip			
	General	\$6 for foreigners			
Ecuador	Galapagos NP	\$100 for foreigners, \$6 for citizens	Yes, 90%		
Egypt	Ras Mohammed	\$5 for foreigners; \$1.20 for Egyptians	Yes, env'tal fund under Ministry of Env't.	Not usually	No
	Red Sea Marine Park	\$2 per day for divers and snorkelers; Sold via operators	Yes, Egyptian Environmental Trust Fund.	Some opposition; Fee initially set at \$5 to match Ras Mohammad , but industry lobbied to reduce to \$2.	Yes, even at \$2 caused shift to non-fee areas nearby.
Guam		None			
Honduras	Sandy Bay - West End MR	\$1 per dive			
Indonesia	Bali Barat MP	Proposed \$0.20		None	
	Bunaken MP	\$0.20 locals or day visit; \$6.60 per year	80% to park; 10% local govt;	Yes, from local government (distribution of	No

		divers. Tag system, modeled after Bonaire.	10% national govt	revenue). Industry supportive	
	Komodo NP	\$2.50; increase proposed			
Jamaica	Montego Bay MP	None (fees have been proposed)			
Kenya		\$5 for foreigners. \$1 for Kenyans	Yes		
Malaysia		\$1.30 adults \$0.65 children, etc.			
Mexico		Proposed nationally. Currently collected voluntarily at Cozumel MP (\$2 per diver, \$1 per snorkeler per day).	Yes, for current collection at Cozumel.	Operators set up voluntary system at Cozumel. Opposed to national fees because of effect on visitor numbers and lack of earmarking to parks. Opposition apparently has prevented implementation.	
Micronesia	Truk (Chuuk)	\$30 dive tax, \$31.50 per week cruising tax for live-aboards (both per person)			
Mozambique	Bazaruto Archipelago	\$5	To community projects		
Netherlands Antilles	Bonaire	\$10 per year (same for locals and foreigners), tag purchased on resort check-in.	Yes, covers 80% to 90% of park budget.		No – has increased visitation as divers seek well managed reefs.
	Saba	\$3 per dive, \$3 per week for snorkelers. Residents free. Operators collect and transfer to agency.			No
	St. Eustatius	\$12 per year for dive tag; \$10 per night for yachts			
Palau	Koror State	\$15 per two weeks for divers; collected by operators	Yes, raises \$1 million per year, enough to cover all MPA costs.		
Papua New Guinea	Milne Bay	\$1 per diver per site for local boats, \$3.30 for non-local boats	Paid to communities/resource owners	Opposed to increases due to lack of advance notification.	No
Philippines	Tubbataha	\$50 for foreigners; \$25 for Filipinos	Yes, raises \$87,500 per year for management		
	Gilutungan Marine Sanctuary	\$1 per day for foreigners; \$0.50 for Filipinos. Paid by operators.			
Saipan	Marine parks	\$1 per day for visitors			
St. Lucia	Soufriere Marine Management Authority	Divers: \$4 per day or \$12 per year. Snorkelers: \$1 per day (commercial operators only). Operators collect these fees, rangers collect yacht fees.		Support has increased due to positive customer feedback	No – numbers have increased.
Suriname	Galibi Nature Reserve	Day visitors: \$1 per day. Overnight visitors: included in lodging.		Some initial opposition, but not due to lack of advance notification.	No

Tanzania	Mafia Island	Foreigners: \$10 entry, \$5 diving per day	Yes		
Thailand	General	Foreigners: \$4.40; Thais: \$0.40		Yes, due to lack of notification	Yes, amongst foreigners at smaller parks; not amongst organized tours.
Trinidad and Tobago	Tobago Cayes MP	Proposed: \$5 for yachts (tickets purchased locally). \$2.50 for charters (paid by operators).	Yes	Some, for various reasons, including advance notification.	
Turks and Caicos Islands		None, but parks financed by 1% VAT charge on restaurants and lodging			
United States	Hanauma Bay (HI)	None for Hawaii residents. \$3 for non-residents	Yes		
	John Pennekamp Coral Reef State Park (FL)	\$5 per visitor per day			
	Channel Islands National (Marine) Park (CA)	None			
	Dry Tortugas National Park (FL)	None			
Vietnam	Hon Mun MP	Fee system proposed			
Western Samoa	Palolo Deep Marine Reserve	\$0.70			

Notes: (adapted from Lindberg and Halpenny, 2001-a); Blank cells indicate lack of information. All information relates to marine areas unless otherwise noted. Monetary figures are in US\$ equivalents and are rounded to the nearest 0.10. All fees are per person unless otherwise noted. At sites with multiple fees, some fee details are excluded.