



iabin

Inter-American Biodiversity Information Network



Eco-Economics and Management Effectiveness of the Coastal Zone in the Caribbean¹

BACKGROUND: A joint workshop was held March 10-12, 2008 in Ocho Rios, Jamaica with two GEF supported projects, IABIN (Inter-American Biodiversity Information Network) and IWCAM (Integrating Watershed and Coastal Area Management Project). The IWCAM workshop focused on the importance of indicators in determining success in the integration of watershed and coastal area management and the resulting improvement to the environment and livelihoods. See <http://www.iwcam.org>. Concurrently, IABIN held a Caribbean marine experts meeting to establish a Caribbean management effectiveness database using the existing MPA Global database and review geospatial technologies with respect to development of monitoring and evaluation tools for protected areas management. Webpage: <http://www.oas.org/dsd/Events/english/08.03.10.htm>. Both workshops teamed up in the final afternoon to exchange ideas and experiences.

IABIN CARIBBEAN MARINE PROTECTED AREAS DATABASE ON MANAGEMENT EFFECTIVENESS.

Caribbean Countries have requested technical assistance to achieve the commitments laid out in the WSSD Plan of Implementation and the CBD targets. A critical component of meeting these goals is the availability of appropriate and adequate data with which to establish robust baselines and monitor progress towards the goals. This IABIN activity will further improve and expand the MPA data available for the region. This will ensure that the extent and status of marine protection in the Caribbean is accurately represented within regional and global databases that are a) highly visible online and b) used for global and regional monitoring purposes. The contributions and successes of Caribbean MPAs to the global MPA network and marine protection targets will thus be more accurate and transparent. The data will also be available to all Caribbean countries for use at regional and national levels, to facilitate integrated coastal zone planning. This greater visibility and understanding will facilitate:

- the planning, economic valuation, and ecotourism potential of protected areas and their integration into all sectors by providing strategic advice to policy makers;
- the strengthening of capacity and effectiveness of protected area managers through the provision of guidance, tools and information, and as a vehicle for networking;
- the procurement of increased investment in marine protected areas by demonstrating their value to the public and corporate donors, as well as governments;
- the coordination of national, regional and global efforts to meet various marine biodiversity and protection targets;
- preparations for the CBD Biodiversity 2010 and WSSD 2012 reporting requirements.

At the meeting, the IABIN marine experts presented advancements in Country marine biodiversity programs. NGOs also presented their decision support tools. The pertinent countries filled in the manage-

BOX 1.

DATA FIELDS THAT ALREADY EXIST IN MPA GLOBAL AND WOULD BE VERIFIED & UPDATED

1. MPA name
2. Designation type
- 3) MPA location (country or territory)
- 4) Central latitude & longitude
- 5) MPA boundary data (preferably as a zipped ESRI shapefile or interchange file)
- 6) Date MPA was designated (yyyy-mm-dd)
- 7) Name & year of legislation/agreement used to designate the MPA
- 8) Total area of MPA (including land)
- 9) Marine portion of MPA (from mean high water mark)
- 10) Qualitative indication (all/part/none) of MPA that is no-take (i.e. extraction of all resources is prohibited)
- 11) Area that is no-take
- 12) Ownership details (i.e. owner, tenure rights etc)
- 13) Administration
- 14) Management Authority
- 15) IUCN category
- 16) World Heritage designation
- 17) Ramsar designation
- 18) Presence/absence of various habitats in MPA
- 19) Type & area of dominant habitat within MPA

NEW DATA FIELDS UNDER THE IABIN INITIATIVE TO GAUGE MANAGEMENT EFFECTIVENESS

- 20) Reason(s) for designation of MPA
- 21) Is the MPA part of a larger spatial marine resource management plan?
- 22) List up to 2 primary MPA objectives
- 23) Management plan exists for MPA
- 24) Start & end dates of management plan
- 25) List top two critical management activities
- 26) Budget needed for MPA (USD)
- 27) Budget available for MPA (USD)
- 28) Source(s) of budget & values (USD)
- 29) Number of staff (Permanent/Temporary)
- 30) Contact information of MPA manager
- 31) MPA website URL
- 32) Key species occurring within MPA
- 33) Top two threats to the MPA
- 34) Invasive Species present
- 35) Invasive species 1
- 36) Invasive species 2

ment effectiveness database to establish a 2008 baseline and analyzed management effectiveness trends. Key **biological** findings included in the presentations are:

1. Richard M Huber of the Organization of American States and Dionne Newell, member of the IABIN Executive Committee, and Senior Research Officer – Entomology, Natural History Division, of the Institute of Jamaica.



Eco-Economics and Management Effectiveness of the Coastal Zone in the Caribbean

- 1 Marine reserves, particularly those with no-take zones, can increase fish diversity and abundance and recovery of habitats from fishing disturbance.
- 2 Networks of marine reserves can help fishery populations recover, protect reserve habitats from damage by fishing gear, and increase the probability that rare and vulnerable habitats, species, and communities are able to persist.
- 3 Over-fished populations in protected areas will recover following a decrease of fishing and increase in spawning stock biomass.
- 4 Marine reserves support fished species outside reserves.
- 5 Larger carnivorous fish increase within marine protected areas as do fish density, biomass, individual size, and diversity.

Key **management effectiveness** findings included in the presentations are:

- 1 Subsidizing the fishery industry through, for example, below market-priced gasoline can increase overfishing and add to the decline of fish populations.
- 2 Unmanaged fishing around coral reefs results in resource degradation in coastal commons.
- 3 Enforceable governance systems are required – e.g. regulating access (e.g. fishing effort) – that do not undermine local cultural values and practices.
- 4 MPAs are complicated governance structures. Ongoing stakeholder participation in co-management arrangements with authorities and adequate resources to enforce limited entry and use are required.
- 5 MPAs require substantial resources beyond the initial investment in order to operate, retain integrity, and achieve community acceptance. As a result, sustainable budgets are essential. In response to financial sustainability, the following objectives were discussed:
 - By capturing a portion of the economic value of the benefits derived from the local marine environment, ecotourism will be better able to finance management activities to protect natural and cultural resources and fulfill broader social objectives of providing for scientific research and education.
 - Given the current inadequate investment in sustainable ecotourism, reflected by overcrowding, poor infrastructure, and resource deterioration, benefit capture can be effective in aligning social costs with private costs to improve economic decision-making and provide sustained revenues for management authorities.

Key **ecologic-economic synergies** that facilitate sustainability are:

- 1 Benefit capture and market based instruments (MBIs) are effective tools as they apply to the socio-economic and institutional context. Montego Bay Marine Park Trust, Jamaica, was presented as a case study. The recommended instrument for the Montego Bay Marine Park is an earmarked hotel room fee of US\$1 per bed-night, leading to an annual revenue of approximately US\$1.5 million. Key in the recommendations is the provision of information to hotel guests regarding management activities and the benefits of forests, rivers, and coral reefs. An independent administration of the program by the Montego Bay Marine Park Trust in cooperation with the hotel sector, is necessary to ensure accessible and sustained funding.

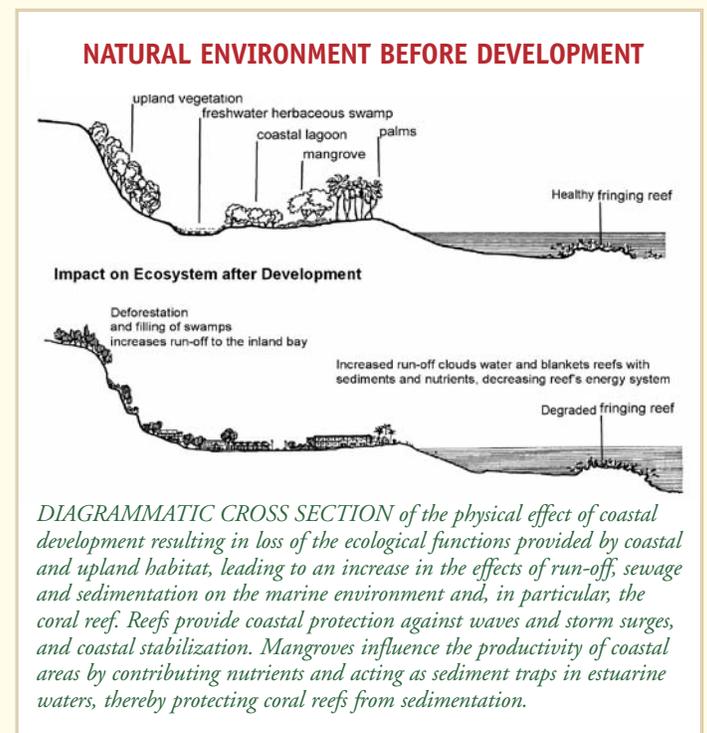
- 2 Total benefits from the Montego Bay reefs are US\$401 million Net Present Value. Up to a 20% increase in coral abundance may be achievable through the use of appropriate policy measures with a present value cost of US\$153 million over 25 years.² Cost effective expenditures to improve reef health include installation of a sediment trap, waste aeration, installation of a sewage outfall, implementation of improved household solid waste collection, and implementation of economic incentives to improve waste management by the hotel industry.

There is a wealth of biological **information and management experience** in marine parks in the Caribbean that involve:

- Frameworks primarily for biodiversity conservation and habitat protection;
- Multi-use marine management characterized by balanced conservation and sustainable use;
- Management for extractive purposes within a sustainable use framework;
- Socio-cultural-ecological protection reserves set up primarily to protect cultural heritage or land/seascapes and the use rights of local peoples.

Recommendations made by the marine park experts include:

- Encourage a unified collaborative on-line Caribbean-wide database like the IABIN management effectiveness database that will help in reporting to CBD, the Millennium Development Goals, and the World Parks Congress.
- Promote the use of science and traditional knowledge to network adjacent or close proximity Marine Parks to achieve greater effectiveness on a larger scale.
- Explore partnerships to help finance the policy reform, institutional arrangements, and sustainable financing agenda required to implement ICZM and create governance through co-management.





- Invest in creating sustainable alternative livelihoods and social protection for those affected by reallocation of use rights.
- Expand biological corridors and biodiversity conservation-oriented MPAs to meet “representative system” targets.
- Scale up community-based resource reserves to mainstream biodiversity protection in the production landscape.
- Explore community-driven development as a platform for mainstreaming local coastal zone initiatives.

CARIBBEAN INITIATIVE WORKING GROUP ACTIVITY:

Dionne Newell, IABIN Focal Point for Jamaica and member of the IABIN Executive Committee, coordinated the Caribbean initiative. The methodology was as follows:

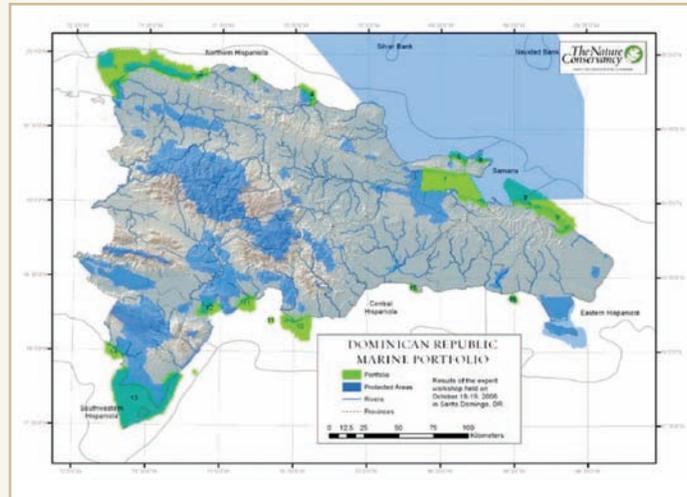
1 Throughout 2007, the data in MPA Global for the Caribbean region was updated by Louisa Woods and Colette Wabnitz. <http://www.mpaglobal.org/home.html>. These updated data were provided to the Government officials for further verification.

2 16 new data fields to gauge management effectiveness were added to the existing 19 fields for a total of 36 fields. By establishing a Caribbean wide database with information on Protected Area Categories and Management Effectiveness, countries can evaluate how well protected areas are being managed, especially the extent to which they are protecting values and achieving goals and objectives. Management effectiveness analyzed:

- design issues relating to both individual sites and protected area systems;
- adequacy and appropriateness of management systems and processes; and
- delivery of protected area objectives including conservation of values. (See Box 1 for complete list of fields.)

CARIBBEAN MARINE PARK DATABASE PROJECT

JUSTIFICATION: The Caribbean Sea has a complex interaction of open ocean waters, coastal and ocean processes, and riverine flows that contribute to the rich and valuable marine ecological and biological diversity. High productivity is also found in near shore habitats such as coral reefs, mangrove forests, and seagrass beds, which naturally dominate the coastal margins in all the islands. Coral reefs, mangroves, and seagrass beds function as spawning and nursery grounds for fish and invertebrates. The coral reef fauna in the Caribbean Islands are the most diverse in the world, in terms of higher taxonomic variety. The Caribbean Sea hosts about 60 species of corals and about 1,500 species of fish, nearly a quarter of which are endemic. With high degree of endemism within the coral reefs, the Caribbean Sea is a biogeographically distinct area of coral reef development particularly important in terms of global biodiversity. Marine turtles, which nest on the beaches in several of the islands, include the hawksbill, green and leatherback.



MARINE RESERVES, such as these illustrated for the Dominican Republic are important for preserving biodiversity and are particularly effective when biological corridors are established and co-management governance is implemented. Scientific research from around the world supports the concept that marine reserves are one of the best ways of protecting marine biodiversity. Marine reserves have been implemented worldwide in response to international concern for the conservation of marine biodiversity.

In the Caribbean region, hard coral cover has declined by 80%. 35% of mangroves have been lost in just 20 years. This has led to the adoption of various targets to increase the level of marine protection globally. The Millennium Ecosystem Assessment, the first global scorecard on the health of Earth’s ecosystems, reported that marine and coastal systems are among the most threatened on the planet. Marine capture fisheries peaked in the mid-1980s and have been declining ever since, with the highest valued species (including large marine predators) disappearing first. Marine biodiversity is also degrading rapidly in response to fishing down the food web, triggering serial depletion of key elements in the food chain. Conversion of highly productive and diverse habitats like mangroves and coral reefs (which are thought to harbor between 1 million and 10 million species) is proceeding at a rapid pace to make way for urban expansion, tourist resorts, aquaculture, and other coastal development. Global trade in marine products accounts for over \$35 billion in goods annually from developing countries, while marine tourism (much of it based on coral reefs) is a multibillion-dollar industry.

Currently, less than 1 percent of the world’s oceans (about 6 percent of territorial seas) are under some form of protected area status, compared with nearly 13 percent of the terrestrial environment. The hope is that 20-30 percent coverage of the world’s major coastal and marine habitats will be categorized as no-take reserves by 2012. These targets, endorsed at the Fifth World Parks Congress in 2003, complement the Johannesburg Plan of Implementation from the World Summit on Sustainable Development (WSSD), that commits to establishing effective, representative networks of marine protected areas by 2012. However, at the current rate of increase of the **global MPA network**, the earliest any of these targets might be met is 2045. A major challenge to achieving these targets and monitoring progress towards them is a lack of sufficient or reliable data on MPAs. Although the work done to update **MPA Global and the WDPA** has



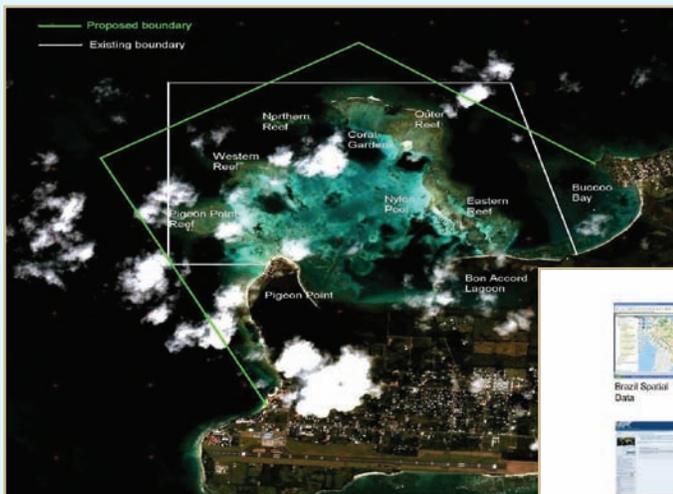
SEDIMENT AND NUTRIENT plume from Montego Bay River affects coral health – but Montego Bay Marine Park Trust is implementing improved sediment and sewage treatment and watershed management to improve reef health.

BOX 2. PROTECTION AND RESTORATION OF CORAL REEFS ARE PRIMARY OBJECTIVES OF INTEGRATED COASTAL ZONE MANAGEMENT (ICZM)

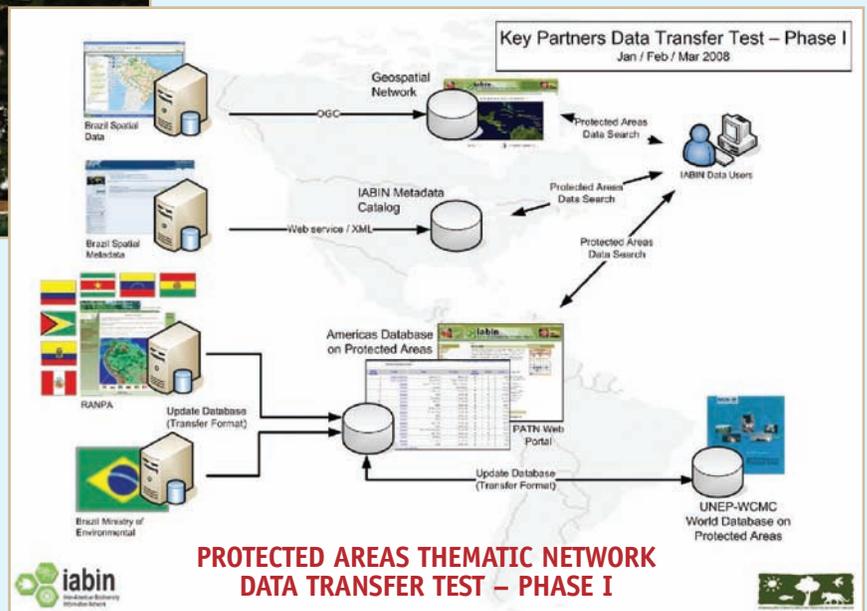
Work is underway on i) cost-effective interventions to protect the “supply” of biodiversity as an economic asset, ii) marine system valuation and the “demand” for biodiversity, and iii) establishing marine park management effectiveness databases. Ecologic-economic analysis of the Montego Bay Marine Park and environment in Jamaica indicates that total benefit funds from the Montego Bay reefs are US\$401 million NPV. Up to a 20% increase in coral abundance may be achievable through the use of appropriate policy measures with a present value cost of US\$153 million over 25 years.⁵ Cost effective expenditures to improve reef health include installation of a sediment trap, waste aeration, installation of a sewage outfall, implementation of improved household solid waste collection, and implementation of economic incentives to improve waste management by the hotel industry. Concurrently under IABIN (Inter-American Biodiversity Information Network)⁶, the Caribbean Marine Experts Working Group⁷ is encouraging OAS Caribbean Countries to present advancements in their marine biodiversity programs and also encouraging the NGOs to present their decision support tools. Select CARICOM countries and the Dominican Republic established a management effectiveness database baseline (2008) and analyzed management effectiveness trends. Key biological findings indicate that marine reserves with no-take zones can increase fish diversity and abundance and also recover habitats lost to fishing disturbance. Key management effectiveness lessons are that unmanaged fishing around coral reefs results in degradation of environmental services in coastal commons. The Working Group encourages more Caribbean-wide databases like the IABIN management effectiveness database that will help in reporting to the Millennium Development Goals (CBD), and the World Parks Congress.

improved the level and reliability of information available for MPAs globally and in the Caribbean, there are still gaps.³

It is important that mechanisms are in place that will assist the region in strengthening technical capacities and infrastructural development in order to achieve the biodiversity conservation goals. The focus for the region is the identification of strategies that can be employed that will facilitate the strengthening of individual countries and the Caribbean region as a whole in technical and structural capacities especially as it relates to bioinformatics. In the context of IABIN, the Protected Areas Thematic Network⁴ would encompass the development of tools for the monitoring and management of watersheds and coastal area and has designed the architecture for data transfer between organizations that house protected areas data. <http://protectedareas.iabin.net/>.



BUCCOO REEF MARINE PARK in Tobago was designated protected by the Marine Protection Act (1973), the Environmental Sensitive Areas Act (2005), and the RAMSAR Convention (2006). In 1995, it had 66% overall mean bleaching with 70% mean at deep sites and 64% mean at shallow sites. Although it currently suffers from Land-based Pollution, Fishing Activities, Physical Damage, and Effects of Climate Change, it can be successfully managed with Installation of Moorings and Buoys, Education, Water Quality Monitoring, Reef Checks and Monitoring, Sustainable Seafood, and the Formation of the Buccoo Reef Marine Park Management Committee which is also looking into implementing User Fees.



3. Wood, L. J., Laughren, J., Fish, L., Pauly, D. 2007. Assessing progress towards global marine protection targets: shortfalls in information and action. Fisheries Centre Working Paper #2007-03. The University of British Columbia, Vancouver, B.C., Canada. Available at <http://www.fisheries.ubc.ca/publications/working/index.php>
4. The IABIN Protected Areas Thematic Network is headed by The Coordinating Institution for the Protected Areas Thematic Network, a Consortium led by “Fundação O Boticário de Proteção à Natureza” (Brazil). The members of the consortium are Fundação O Boticário de Proteção à Natureza (Brazil), Ecociencia (Ecuador), The Nature Conservancy - TNC (USA), Instituto de Investigaciones de recursos Biológicos Alexander von Humbolt (Colombia), Natureserve (USA), World Wildlife Fund (International), The World Conservation Union (International), World Institute for Conservation and Environment (USA/Holland), UNEP World Conservation Monitoring Centre (UNEP-WCMC) (World Conservation Monitoring Center) (International)
5. Gustavson, K., Huber, R.M. and J. Ruitenbeek (eds.) (2000) Integrated Coastal Zone Management of Coral Reefs: Decision Support Modeling, *Work in Progress for Public Discussion*. World Bank, Washington, D.C.
6. The Inter-American Biodiversity Information Network (IABIN) was established in 1996 at the Presidential Summit on Sustainable Development to promote technical cooperation and collaboration among countries of the Americas. IABIN functions as an information sharing network on biological diversity. It is involved in decision-making on natural resources management and conservation and education for the promotion of sustainable development in the region.
7. Caribbean Marine Experts Working Group is made up of (i) representative(s) of CARICOM and the Dominican Republic national protected area agencies, or an organization acting on its behalf; (ii) A representative(s) of the Protected Area Thematic Network of the Inter-American Biodiversity Information Network; (iii) A representative(s) of the United Nations Environment Program World Conservation Monitoring Centre; and (iv) A representative(s) of the Organization of the American States (OAS).