

# INTERCOAST

N E T W O R K

INTERNATIONAL NEWSLETTER OF COASTAL MANAGEMENT

Coastal Resources Center, University of Rhode Island  
 Narragansett, Rhode Island USA • #34 • Spring 1999

## Renewed Call to Action

Excerpted from "Renewed Call to Action: International Coral Reef Initiative"

In November 1998, scientists, managers, resource users, donors and decisionmakers from around the globe convened for a week in Townsville, Australia, to review global progress in addressing the decline of the world's coral reefs. As a result of their deliberations, the participants at the International Tropical Marine Ecosystems Management Symposium (ITMEMS) reaffirmed the International Coral Reef Initiative (ICRI) Call to Action and Framework for Action, and issued a Renewed Call to Action. This reconfirmed the importance of reefs to their cultures, communities and economies, and the strong relationship between healthy reefs and the sustainable livelihoods of many sectors of society.

### The Global Problem

The deterioration of coral reefs around the world continues to be of grave concern. Improved monitoring data and detailed predictive studies presented at ITMEMS indicate that in the four years since the first ICRI Call to Action the state of reefs has significantly worsened.

Human activities threaten the majority of coral reefs in all regions of the world. In addition, the recent impacts of "natural" events, such as widespread coral bleaching

and catastrophic storms, on coral reef ecosystems provide an alarming overlay to the increasing human impacts.

### ICRI Achievements 1995-1998

Since the first ICRI workshop in 1995, significant progress has been made in implementing the ICRI Call to Action and Framework for Action. This resulted from the actions of many stakeholders, and through many large and small efforts from the local to the global level.

ICRI partner governments and nongovernmental organizations (NGOs) raised the profile of coral reefs in major international forums. ICRI was endorsed by the Parties to the Convention on Biological Diversity, the Commission on Sustainable Development, the United Nations Environmental Programme, the Intergovernmental Oceanographic Commission, and the scientific community at the International Coral Reef Symposium in Panama. Agreement was reached on The Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities, which bears directly on reducing a major threat to reefs.

Regional action plans have been developed in all areas of the world. Regional and national and local coral reef initiatives were created based on the elements of the Framework for Action and ICRI regional strategies. However, the

*(continued page 2)*

## Optimism or Pessimism? The Future of Coral Reefs

By Lynne Zeitlin Hale

Coastal managers have long recognized the value of coral reefs. They are among the world's most biologically diverse and productive ecosystems. Reefs provide food for many poor coastal villages and are a source of jobs and revenue from both the fishing and tourism sectors. Reefs also protect tropical coasts from erosion, provide a source of recreation and enjoyment, support the social fabric of many communities, serve as habitat for numerous species, and offer unique materials for education and scientific research.

But beyond these and other intrinsic values, coral reefs are a powerful symbol of both the economic and ecological significance of coastal ecosystems, as well as the rapid loss of biodiversity and the resources upon which millions of coastal residents depend. Coral reefs are early indicators of global climate change; as well as signalling the need for and value of monitoring and reporting on resource condition and use. Importantly, coral reefs can also serve as a rallying point for building constituencies for addressing a broader array of coastal issues.

While coastal managers and

*(continued page 2)*

### Highlights

4 Entrepreneurial MPAs

6 Private Coral Reef Park

10 Fight Against Dynamite Fishing

16 Community Law Enforcement

19 ReefBase 3.0 and Reef Check

Theme Advisor:

Lynne Zeitlin Hale



**Editor:** Stephen B. Olsen  
**Managing Editor:** Noëlle F. Lewis  
**Designer:** Matt Castigliero

*InterCoast* is an international newsletter of coastal management, published three times each year by the Coastal Resources Management Project of the University of Rhode Island's Coastal Resources Center (CRC) and the U.S. Agency for International Development (USAID). Funding to publish *InterCoast* is provided by USAID's Global Environment Center, and the National Institute for Coastal and Marine Management, The Netherlands.

*InterCoast's* objective is to facilitate information exchange on coastal management. Readers are invited to contact Noëlle F. Lewis, managing editor, with contributions, questions and comments on *InterCoast*.

*InterCoast* Network  
 Noëlle F. Lewis  
 Coastal Resources Center  
 University of Rhode Island  
 Narragansett, RI 02882  
 USA  
 Tel: 401-874-6870  
 FAX: 401-789-4670  
 E-mail: noelle@gso.uri.edu

We invite others to reprint articles found in *InterCoast*. We would appreciate if you would notify Noëlle F. Lewis, at the above address.



COASTAL RESOURCES CENTER  
 University of Rhode Island

## Renewed Call to Action

(continued from page 1)

lack of national level commitment in some countries hindered implementation of global and regional achievements.

Growing partnerships with the scientific and NGO communities were particularly effective in advancing ICRI goals. Borne by their strong commitment, the 1997 International Year of the Reef, followed by the 1998 Year of the Ocean, broadened awareness and commitment around the world and created a new sense of urgency for conservation and sustainable use of coral reef ecosystems. The Pacific Year of the Reef and the launch of the Reef Check voluntary monitoring network are just two of the many innovative activities.


Since 1995, bilateral and international development resources have continued to be directed to projects related to coastal management. Though not systematically enumerated, it is clear that ICRI goals have shaped some funding priorities.

It is also clear that many communities continued or initiated

efforts to find sustainable means to utilize the marine resources upon which they depend. Many more require the education, capacity building, training and finances necessary to begin to realize this possibility.

## Building the Foundation of New ICRI Action

ITMEMS participants analyzed a series of issues—coastal development; pollution control; fisheries; the private sector and tourism and protected areas; destructive fishing practices and collecting methods; and coral reef assessment and monitoring—using case studies to identify lessons learned, gaps in understanding and priorities for action on each. In an effort to expand the scope of the Framework, participants focused on four cross-cutting themes which underlie all management efforts:

- Coordination and linkages to other programs
- Stakeholder partnerships and community participation
- Public awareness and education
- Reliable and accessible data and information 

## Optimism or Pessimism?

(continued from page 1)

scientists have been worrying about reefs and the communities who depend upon them for decades, over the last five years there has been a sharp increase in both public and political interest. This interest was first expressed in the 1995 International Coral Reef Initiative's (ICRI) Call to Action, and reconfirmed in the November 1998 International Tropical Marine Ecosystem Management Symposium's (ITMEMS) Renewed Call to Action (page 1). Articles in this issue excerpted from ITMEMS can be identified by the "Coral

Reef: ITMEMS" sidebar.

Despite increased attention, the world's coral reefs continue to decline. While the massive coral bleaching of 1998 stands out, it should not overshadow the continuing threats to reefs that coastal managers can more directly address: over-fishing and destructive fishing, nutrients and silt from shorefront and upland activities degrading water quality, and tourists and divers continuing to often "love reefs to death."

This issue of *InterCoast* gives an update on what the world is both saying and doing about coral reefs. There is growing global consensus

## CURRENT PRIORITIES FOR ACTION

While reaffirming the Call to Action and Framework for Action, ITMEMS participants identified the following priorities (bold) for action which are listed below them:

**Ignorance is destroying reef ecosystems**

Launch multi-faceted, global-to-local-level campaigns to change peoples' behavior

**Pollutants, sediments and nutrients from land-based activities severely threaten reef ecosystems**

Incorporate watershed-level management into coastal management implementation

**Destructive fishing practices are destroying reef ecosystems**

Eliminate unsustainable fishing practices

**Private-sector activities can protect or destroy reef ecosystems**

Encourage the private sector to adopt better environmental practices

**An ecosystem approach to management conserves and restores the value of reefs and related ecosystems**

Implement marine protected areas as components of managing large biogeographic areas

**Traditional knowledge and management systems must be recognized**

Affirm sustainable management and resource conservation through capacity building and validation of traditional practices

**Projects have failed because socioeconomic and cultural factors were not addressed**

Social science is essential in developing community-based management programs and educating policymakers

**Managers and communities are not getting information and management tools needed for good decisionmaking**

Create networks of knowledge-based management system through networks of people, ideas and information

**Reef Check and other monitoring programs demonstrate the value of reef assessments**

Strengthen monitoring efforts at all scales

**Lack of funding hampers efforts to define threats to reefs, monitor their health and assess management practices**

Develop financing at local, regional and international levels

*Excerpted from "Renewed Call to Action: International Coral Reef Initiative." For copies contact: Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville, 4810 Australia. FAX: 617 4772 6093. E-mail: registry@gbrmpa.gov.au. Website: <http://www.gbrmpa.gov.au>.*

### Optimism or Pessimism?

on the importance of reefs, the threat they are under, the need to stop the degradation, and promising approaches for sustainable reef use and management. One sees political commitment expressed at regional and national levels to conserve reefs as shown by the East Asian Seas Coral Reef Action Plan (page 25), the Mesoamerican Coral Reef Initiative (page 22), the U.S. Coral Reef Task Force (page 9) and the Jamaica Coral Reef Action Plan (page 14). Even with this unprecedented level of support, the challenge remains one of turning rhetoric into action; of turning from "knowing" to "doing."

Several articles in this issue give a snapshot of how some practitioners are working hard to turn principles into practice. For example,

participation by resource users in reef management is widely accepted as necessary. Teams in Quintana Roo, Mexico (page 24), and North Sulawesi, Indonesia (page 11), report on their promising efforts to do this in societies which are only now experimenting with meaningful citizen participation. An exciting new development is the emergence of the private sector—the dive and tourism industries—as a major player in reef conservation. The emergence of "entrepreneurial" marine protected areas, supported by dive and tourism operators, holds great promise for improved conservation of reefs, and adds a major new strategy for extending protection to more reefs. As pointed out by both Stephen Colwell (page 4) and Sibylle Riedmiller (page 6), such

strategies are most likely to succeed in locations that have excellent quality reefs, are relatively isolated and have few pre-existing use conflicts. With these pre-conditions in place, and with support from government and resource users, these can make a real contribution. Lastly, coastal colleagues from the Philippines (page 16) remind us of the challenges of on-the-ground implementation and enforcement of management regimes. The national "experiment" of using local resource users to help enforce fisheries laws in municipal waters is providing lessons that have wide applicability throughout the developing world.

It is also encouraging that the information base about reef conditions and use is expanding. Through

*(continued page 35)*

# Entrepreneurial MPAs: Dive Resorts as Managers of Coral Reef Marine Protected Areas (MPAs)

By Stephen Colwell

Although improperly managed tourism can be a threat to coral reef ecosystems, some dive-tourism resorts have emerged as local champions for the reefs, acting as responsible managers of small-scale coral reef marine protected areas (MPAs).

There are a myriad of potential negative environmental, and ultimately economic, impacts of tourism on coral reefs. However, certain dive resorts have concluded that it is in their best interest to protect local reefs, and have shown that they can provide local economic benefits, as well as environmental benefits. In the most dramatic cases, the resorts have taken over primary responsibility for local reef conservation, essentially creating “entrepreneurial MPAs,”



Boats from the El Nido Resort in the Philippines are used to patrol nearby areas, protecting local coral reefs

where the resort provides most of the funding, staffing and logistical support for the protected area.

Global studies of established MPAs have shown that few achieve their conservation management objectives. This is particularly true in isolated, underfunded coral reef

areas where the MPA is often officially designated but has no staff or other resources for management. These “paper parks” provide virtually no protection to the local marine ecosystem.

An entrepreneurial MPA may be thought of as the antithesis of a paper park—it has the resources needed for management, but not the legal authority. Most dive resorts have boats, personnel and other equipment needed to help manage a local protected area. They also have a substantial economic incentive to ensure that there will be healthy reefs for their visitors and a sustainable source of funding for the MPA in the form of fees from divers.

The Coral Reef Alliance (CORAL), a conservation organization that works to promote coral reef conservation among divers and the dive industry, has undertaken a preliminary study of entrepreneurial MPAs. The following are two examples taken from the study.

## Examples of Entrepreneurial MPAs

Although blast fishing, cyanide fishing and other types of destructive fishing practices are banned, they are still practiced with devastating results in the once fertile coral reef habitat in the northwest corner of Palawan Island, Philippines. The only parts of this area that have regularly been patrolled over the past decade are those within a boat ride of the El Nido Resort, a luxury dive resort in Bacuit Bay. The resort has allowed government patrols to use its boats, facilities and equipment to protect the area, and additional patrols have been carried out by resort employees, some of whom have been deputized as sanctuary

wardens. The steady stream of dive boats and marine taxis from the resort also make it difficult for blast fishers or others to operate unobserved. As a result, the reefs within the patrolled areas are in relatively good condition, while those outside are severely damaged. In October 1998, the president of the Philippines proclaimed the El Nido as a Managed Resource Protected Area, and presumably additional government resources will be devoted to its management. What is clear is that without the resort’s support to this point, the El Nido Sanctuary would have been nothing but a paper park.

On the island of Roatan, Honduras, the Sandy Bay Marine Reserve was established in 1989 to protect two miles of fringing coral reef. The primary force behind the establishment of the reserve was Anthony’s Key Resort, a dive resort in Sandy Bay. The reserve was designed to protect the reefs from spearfishing, lobster diving, coral and sand mining, anchor damage and other impacts that were rapidly depleting the local marine life. The resort supplied patrol boats, gas and mooring buoys for the reserve. Within two years of establishing the reserve, there were dramatic increases in lobster, grouper and other marine life, and the protected reefs near the resort soon became known as some of the healthiest on the island. By 1993, hotel and dive shop operators in the neighboring West End area, noticing the popularity of the protected reefs in the Sandy Bay Reserve, formed their own committee to extend the reserve an additional three miles to form the Sandy Bay/West End Reserve. Control over the reserve

was then turned over to a local conservation nongovernmental organization (NGO). While the long-term effectiveness of the reserve is now in question because no provision was made for controlling land-based sources that caused reef destruction (such as sewage), the reserve was one of the earliest demonstrations of how a small-scale, entrepreneurial MPA could revitalize a local marine ecosystem.

## Lessons Learned

Many of the same difficulties that plague traditional MPAs, such as lack of local support or resource management expertise, also reduce the effectiveness of entrepreneurial MPAs. It seems evident that dive resorts interested in protecting their marine resource could benefit from the lessons learned by the practitioners of integrated coastal management and other formal marine conservation programs. By the same token, academics, conservationists and coastal resource managers interested in involving the private sector in conservation, could benefit from studying the lessons learned from entrepreneurial MPAs:

1) Entrepreneurial MPAs cannot provide the comprehensive protection ultimately required for large marine ecosystems, but they may perform several valuable functions including:

- Protecting discrete areas that serve as refuges for threatened marine life
- Building local capacity in MPA awareness, support and management
- Acting as test cases for MPA management techniques
- Providing core areas around which larger MPAs could be developed

2) Entrepreneurial MPAs have the advantage of using existing commercial infrastructure (such as

boats and communications equipment), management structures and sources of income, making it possible to create these small-scale MPAs more quickly and to institute management regimes more easily than with more traditional government-formed MPAs. Thus, entrepreneurial MPAs may have a better chance of providing the quick “success stories” that planners and managers need in order to convince a broader audience of the value of MPAs.

3) Entrepreneurial MPAs are most likely to be successful in only a limited number of areas because of two conflicting criteria for success:

- They seem to work best in relatively isolated areas where there are fewer potential conflicting uses of the marine resources by other stakeholders

- They must be relatively accessible in order to attract a steady, paying clientele of SCUBA divers, snorkelers and other visitors to help offset the management costs

4) Entrepreneurial MPAs are only appropriate where the government or local community is unable or voluntarily chooses not to exercise its right to manage local marine resources.

5) Entrepreneurial MPAs must have the ability to enforce restrictions on resource use (e.g., destructive fishing), otherwise they are just another form of paper park. This requires delegation of enforcement power by some entity acknowledged to have the right to manage local marine resources. This is not a surrender of sovereignty, only a delegation of specified rights to control certain resource uses.

6) Many of the lessons from projects using community-based, integrated coastal management apply equally well to commercially-sup-

ported MPAs. One of the most important lessons is that without substantial input of all key stakeholders in defining issues, selecting management strategies and implementing management measures, the best laid plans for MPA management will fail.

7) Baseline studies and extended follow-up monitoring by outside researchers are needed to verify the effectiveness of any entrepreneurial MPA. There is great potential for abuse of power by a resort or other commercial entity which has profit as its primary motive and does not answer to a public constituency. The resort's activities, including disposal of sewage and solid waste, coastal clearing and construction, and recreational use of the marine resources, must be subject to scrutiny by a government agency, NGO or other unbiased observer.

## Conclusion

Flexible and creative approaches to coastal resource management are needed in order to reverse the global degradation of coral reefs and related ecosystems. In certain circumstances, dive resorts may be able to provide the financial resources and management capacity to create and operate small-scale MPAs, particularly in isolated coral reef areas.

Private management of coral reef areas carries some risks, but given the current rate of coral reef degradation around the globe, the potential benefits of entrepreneurial MPAs should not be ignored simply because entrepreneurial MPAs do not fit conveniently into the current model for MPAs. Eventually, many MPAs may evolve into some form of hybrid MPA with increased partnership among private stewards, NGOs and governments. For the immediate future, private management of

*(continued page 8)*

# The Chumbe Island Coral Park: A Private Marine Conservation Project

By Sibylle Riedmiller

Chumbe Island Coral Park (CHICOP) in Zanzibar, United Federation of Tanzania, is an example of a small but increasing number of privately created and managed protected areas operating in an often difficult institutional and legal environment. For the past seven years, the project has invested in the conservation of Chumbe Island, and has established it as an efficiently managed protected area.

## The Legal and Institutional Environment

At the start of the CHICOP project in the early 1990s, liberalization of the Zanzibar economy had been initiated. However, the nation is still predominantly socialist, and the legal and institutional environment did not encourage private

ment or awareness about the limitations of the resource. The national language, Kiswahili, has no word for corals (referred to as *mawe na miamba*, "stones and rocks"). Also there is no formal education on coral reefs; they are not covered in the syllabi of primary and secondary education.

Chumbe Island, a small coral island off the coast, approximately 22 hectares, presented a rare chance for coral reef conservation. The island was uninhabited and seemed to face little immediate threat. Fishing was traditionally not allowed on its western side, bordering the shipping channel between Zanzibar and Dar es Salaam, as small boats would obstruct large vessels. For many decades the area surrounding the island was also a military area where the army routinely conduct-

ed shooting range exercises from the adjacent coast. In addition, few boatmen could afford an outboard engine, which was necessary to easily reach the island.

Conservation management was built through capacity building and raising the awareness of local fishers (by training rangers and having them interact with fishers) and government officials (through an advisory committee).

Though privately funded (with some minor donor input), the project is non-commercial. Profits from ecotourism are to be reinvested in area management and used to fund excursions for local school children.

The Zanzibar government approved the project as a tourism investment based on the provisions of the Zanzibar Investment Protection Act 1986, and gave CHICOP the lease of the project site on Chumbe Island in 1993. After commissioning ecological baseline surveys on the flora and fauna, and thus establishing its conservation value, CHICOP was designated a protected area in 1994, covering an area of about 300 hectares along the western shore of the island. Simultaneously, CHICOP was given management contracts for the whole island and the reef sanctuary.

Initially, there were some political challenges to the conservation status of the area. Today, there are no major problems with infringements from fishers or other users, and the project is well accepted by the local communities. CHICOP is registered with the World Conservation Monitoring Center and has been chosen for presentation at the World Exhibition in Hannover, Germany for its achievements in private conservation area management and the innovative eco-architecture of all buildings.



Chumbe Island  
Coral Park

investment or nongovernmental initiatives. These were not legally possible before 1995.

While coastal communities in Zanzibar depend on fishing for their survival, there is little evidence of traditional reef manage-

ed shooting range exercises from the adjacent coast. In addition, few boatmen could afford an outboard engine, which was necessary to easily reach the island.

## The Project

CHICOP is a privately funded and managed reef and forest con-

The coral communities in the sanctuary appear to have survived the 1998 bleaching event much better than most other reefs in the region. In Tanzania/Zanzibar, the 1998 event was monitored by the Institute of Marine Sciences of the University of Dar es Salaam. Their findings, reported in a recent International Coral Reef Initiative report, indicate that corals bleached in mid-May 1998 along the whole coastline of Tanzania. Survival after bleaching was about 50 percent in Mnazi Bay, and 60-80 percent in Chumbe and Bawe. Survival was very low (less than 40 percent) in Changuu and Chapwani. The latter two reefs, Changuu and Chapwani, are only a few kilometers north of Chumbe. The difference is that these reefs are not protected and are more accessible to local fishers and, therefore, heavily fished. In addition, they are closer to and downstream of the Zanzibar town sewerage system which releases untreated sewage. All these factors are believed to contribute to coral stress.

In summary, project activities from 1992-1998 were:

- Four former fishers from adjacent villages were trained and employed as park rangers by expatriate volunteers. Their training included skills for interacting with fishers, monitoring and tourist guide techniques.

- With the help of volunteers and some limited donor funds, baseline surveys and species lists of the island's flora and fauna were conducted.

- An advisory committee was established in 1993 with representatives of the departments of fisheries, forestry and environment, the Institute of Marine Sciences of the University of Dar es Salaam and leaders of neighboring fishing

villages.

- A Management Plan for 1995-2005 was produced in 1995 which guides project operations.

- Forest and marine nature trails were established from 1993 with informational material.

- A sanctuary for the endangered Ader's duiker was established in 1997.

- The ruined lighthouse keeper's house was rehabilitated as a park headquarters/visitors' centre.

- Free excursions to the island are offered to local school children during the off-season.

- Seven visitors' bungalows (eco-bungalows) and the visitors' centre were constructed according to state-of-the-art eco-architecture (e.g., rainwater catchment, grey-water recycling, compost toilets, photovoltaic power generation).

- Tourism operations (day excursions and overnight stays) started in 1997, but have not reached economical levels yet.

As a result of successful management, the coral reef remains one of the most pristine in the region, with 370 species of fish and over 200 species of scleractinian coral.

## **Lessons Learned**

### **On the positive side: Coral reef conservation can work on the ground**

The Chumbe experience suggests that private management of marine protected areas is technically feasible and efficient even when the enforcement machinery of the state is not available or is ineffective. This is probably true only for reefs that are not yet over-exploited by communities depending on them for survival.

A protected area such as Chumbe can provide important community benefits, particularly in capacity building, biodiversity conservation and restocking of fisheries resources. The hands-on

approach in capacity building and monitoring through inexpensive on-the-job-training of local fishers by volunteers has produced very competent and committed park rangers. They are stationed on the island and manage the reef sanctuary with no other means of enforcement than persuasion of their fellow fishers. Lacking government support and policing power, the rangers interact with fishers by stressing the role of the protected area as a breeding ground for fish. This has been very successful. Village fishers now generally respect the park boundaries and report that catches outside the boundaries have increased since the establishment of the sanctuary. This is because the sanctuary provides a safe haven for endangered species and breeding grounds for reef fish and other organisms. With the predominantly northerly currents in the Zanzibar channel, and the sanctuary being located south of all major fishing grounds off Zanzibar town, depleted areas downstream are naturally restocked.

The project has also helped to raise conservation awareness and understanding of the legal and institutional requirements among government officials. Seven government departments were involved in negotiating the project in the initial phase, followed (among other issues) by intense discussions on the Management Plan 1995-2005. This has improved political support and prepared the ground for improvements in the legal framework.

With an overall investment of approximately US\$ 1 million over seven years, the cost of private management is probably considerably lower than would have been the case with a donor-funded project through the government. Most importantly, there are better

*(continued page 8)*

## Chumbe Island

(continued from page 7)

prospects for sustainability, as the incentives to struggle for commercial survival are much stronger for private operations than for donor-funded projects.

### **On the negative side: Reef conservation is commercially risky in Tanzania**

The regulatory environment is characterized by cumbersome bureaucratic requirements with wide discretionary powers for government officials. This encourages corruption and delays operations, thus increasing investment insecurity and costs in general. This is particularly so for innovative and environmentally friendly project designs that are generally not encouraged by existing regulations, e.g., building permits.

CHICOP is regarded as just another tourism venture by the Zanzibar government and given no tax exemptions or other benefits for the conservation work. The up to US\$ 10,000 annually to be paid for land rent, government fees and licenses represent a considerable burden on operational costs, compounded by the high and complex tax regime.

Building on an island, and particularly the innovative technology for water and energy provision, as well as the commitment to not cause any degradation of the island environment, have added to the development costs. A compost toilet, for example, which operates without any sewerage, costs about five times the price of a normal flush toilet. Water, sand and timber for the building operations, and even the firewood for cooking meals for the building workers and staff, had to be purchased and transported to the island at a high cost.

The drastically increased investment costs and continuing burden of government taxes and fees has

forced CHICOP to revise the price structure for tourist operations. A financial analysis conducted in 1998 established that overnight prices would have to be around US\$ 300 per person per night for commercial viability. Access to this market requires further investment in marketing rather than in conservation.

As a consequence, Chumbe Island now has to be marketed as an exclusive private island. While it is a challenge to train park rangers and local staff for the service expectations of that particular market, there is also a potential conflict with the non-commercial project component of providing free education to local school children.

In addition, realistic price levels that reflect conservation costs are difficult to realize as long as unmanaged and donor-managed wilderness areas can be accessed at very low cost (though still expensive). It can be said that Chumbe Island may face unfair competition from "cheap" destinations subsidized with donor funds.

As donor support in conservation is typically given as grants to government institutions that sometimes lack commitment, competence and accountability, there are few incentives to check waste, misuse and mismanagement. This not only depletes precious resources but also crowds out private initiatives which have to operate commercially, and so must be more cost-conscious and clearly show profits.

## Conclusions

It is suggested that particularly in a country like Zanzibar, it is primarily commercial viability and long-term economical resource use that makes conservation area management sustainable. Investment in conservation is necessarily long-term and requires high security and

a supportive legal and political administrative environment. Therefore, the overall conclusion is that before anything else, a favorable investment climate is required for private investment in marine conservation.

In some cases, this may require a revision of donor policies concerning the creation of conservation areas and the establishment of management structures. Instead of building up costly institutions that need long-term or permanent external funding, donor money would over time play a more positive role when supporting improvements in the legal, institutional and regulatory environment for investment. Donor organizations should also consider sharing risks of private investment in conservation, supporting non-commercial project components or providing seed capital.


*For further information contact:*  
Chumbe Island Coral Park, Ltd. P.O. Box 3203, Zanzibar, Tanzania. Tel: & FAX: 00255-54-31040. E-mail: [chumbe.island@raha.com](mailto:chumbe.island@raha.com). Website: [www.xtramicro.com/work.chumbe](http://www.xtramicro.com/work.chumbe). 



## Entrepreneurial MPA

(continued from page 5)

small-scale MPAs may well be the key to successful conservation in a number of coral reef areas that otherwise would have little or no hope of meaningful protection.

*For further information contact:*  
Stephen Colwell, CORAL-The Coral Reef Alliance, 64 Shattuck Square, Suite 220, Berkeley, CA 94704, USA. E-mail: [CoralReefA@aol.com](mailto:CoralReefA@aol.com). Website: <http://www.coral.org/>. 



# United States Coral Reef Task Force

By **Barbara A. Best**

In recognition of the serious threats to domestic and international coral reefs, United States President Bill Clinton established the U.S. Coral Reef Task Force by Presidential Order at the National Ocean Conference in June 1998. The mission of the task force is to help implement research, monitoring, mapping, conservation, restoration and international measures to reduce human impacts on coral reefs. The Secretary of the Interior and the Secretary of Commerce co-chair the task force, which is comprised of representatives of eleven federal agencies and seven states and territories. The task force is divided into six working groups—five that focus on domestic reef issues and the International Working Group, co-chaired by the Department of State and the U.S. Agency for International Development.

On March 5-6, 1999, the U.S. Coral Reef Task Force held its second meeting in Maui, Hawaii. Reporting on their progress to date, the working groups identified a number of key action steps that need to be taken, including: the establishment of a representative network of coral reef protected areas within U.S. waters; implementation of a coordinated coral reef monitoring program; strengthening of local and regional efforts to protect coral reefs; and mapping of U.S. reefs in the Pacific.

The task force also passed several resolutions on critical issues facing coral reefs, including global climate change, international trade of coral reef species and destructive fishing practices. The task force voted to support the Department of State's report on "Coral Bleaching, Coral Mortality and

Global Climate Change" which was presented by Rafe Pomerance, deputy assistant secretary at the Department of State. The report announced that in 1998 coral reefs around the world suffered the most extensive bleaching and subsequent mortality in modern record. The report, one of the most strongly worded U.S. government documents on the effects of global climate change, states that it is likely that anthropogenic global warming has contributed to increasing sea surface temperatures, and subsequently extensive coral bleaching and coral mortality.


A resolution passed by the task force notes that "the global threat of climate change to corals is overlain on the impacts of more localized anthropogenic factors which already place reefs at risk. These conclusions lead us to call for greater urgency in our efforts to manage the entire range of human-induced threats to reefs including climate change. These efforts must be supported by concerted monitoring and research to improve our understanding of the relationship between climate factors and coral reef bleaching, and to assess the impact of such events on ecological, social and economic systems."

The International Working Group presented a report to the task force that addresses the U.S. role in the international trade in coral reef organisms. The report notes that the U.S. is the world's largest importer of corals, currently importing 80 percent of all coral and 50 percent of aquarium fish traded worldwide. The task force passed a resolution calling for the U.S. to evaluate options to address imports of coral reef species and promote sustainable harvesting of traded coral reef resources.

A third issue brought forth by the International Working Group was on destructive fishing practices. A resolution was passed to support the Asia Pacific Economic Cooperation forum's recommendations to address destructive fishing practices, including cyanide fishing and blast fishing. In addition, the State Department and the U.S. Agency for International Development jointly announced new funds to be used to address destructive fishing practices in East Asia and the Pacific, and to promote alternative livelihoods including coral mariculture.

The International Working Group also presented draft action plans for three regions: the wider Caribbean, Southeast Asia and the South Pacific. These action plans propose and outline key actions that need to be taken to protect, conserve and ensure sustainable use of coral reef resources in each region.

All of the draft action plans from the six working groups were presented to the task force, as well as to the general public, for comments and feedback. Copies of all the draft documents can found on the U.S. Coral Reef Task Force website at <http://coralreef.gov/draftrec.html>. Comments are welcome and can be directed to the contact person indicated for each report.

*For further information contact:*  
Barbara A. Best, U.S. Agency for International Development, Global Environment Center, G/ENV/ENR, 1300 Pennsylvania Ave., NW, Washington, DC. 20523-3800. Tel: 202-712-0553. FAX: 202-216-3174. E-mail: [bbest@usaid.gov](mailto:bbest@usaid.gov). 

# Community Participatory Approach Pays Dividends in Fight Against Dynamite Fishing

By Gratian Luhikula

Dynamite fishing, even though illegal, is a problem that seemed to evade all practical solutions in Tanzania. However, in mid-1998, the Tanzanian government decided to use not only a sizable budget, but also the Tanzania People's Defense Forces (TPDF) to fight the problem.

Though the TPDF crackdown is over, TPDF officers still monitor the situation in some areas. In the district of Mtwara, however, the local community is strongly committed to stopping dynamite fishing and has taken charge and relieved the TPDF.

"Here in Mtwara, we no longer require the TPDF officers—not even the marine police—to check out dynamite fishing. The people are taking full ownership of the sea and the coast to make sure that the critical resources that form the main part of their livelihood are

area that was once a hub of dynamite fishing. Speaking to a team of coastal management experts currently working with the Tanzania Coastal Management Partnership (TCMP) on the ongoing process of formulating a coastal management policy, Mikidadi noted that the Mtwara coastal community has vowed to protect the sea to make sure that dynamite fishing is not practiced again in the waters of Mtwara.

TCMP is a joint initiative between the government's National Environment Management Council (NEMC), the United States Agency for International Development (USAID) and the University of Rhode Island's Coastal Resources Center (URI/CRC). It is part of the USAID Tanzania Strategic Objective Two that aims to establish the foundation for adoption of an environmentally sustainable natural resources management policy.

"Fishing by explosives had become a dilemma," Mikidadi told the visiting TCMP team. "The local community had literally abandoned all their traditional fishing methods in favor of the easy and high-yielding dynamite blasting. To the poor local community, dynamite fishing was an immediate answer to their overriding needs." The TCMP team was on a field tour in Mtwara and Lindi to collect inputs for the policy from local government leaders and other stakeholders.

Dynamite fishing in Mtwara and Lindi districts was carried out in two different forms. The most action was from organized groups from Dar es Salaam, Tanga and

Zanzibar. The other was by local fishers who dynamite-fished in waters close to shore. The organized groups based outside of Mtwara traveled to Mtwara and Lindi with power boats. They stayed in the area for about two weeks, collected their catch, stored it on ice, then returned to their home port, unloaded, refueled and returned to continue dynamite fishing. They not only used dynamite, but also distributed dynamite at exceptionally low prices to the local fishers in return for the sale of their catch.

Motivated by the lucrative business, every local fisher got involved in dynamite fishing. According to Mikidadi, there was no single hour that passed without hearing a series of blasts from the sea, and this continued until the intervention of the TPDF.

Though the situation cooled down after the TPDF intervention, dynamite fishing did not stop completely. It simply went underground, with local fishers taking advantage of the weak law enforcement capability. It is then that the Mtwara district leaders, in collaboration with the Rural Integrated Project Support (RIPS) and *Shirikisho la Kuhifadhi Mazingira ya Bahari Kanda ya Kusini* (SHIRIKISHO), launched a community education and awareness campaign on the harmful effects of dynamite fishing to the environment and associated resources.

SHIRIKISHO is an association that was initiated and formed by the Mtwara and Lindi coastal communities to enhance community participation in coastal and marine environmental safeguarding. It formed primarily due to the increasing amount of dynamite



Isssa Salum, who lost an eye and both arms to dynamite fishing

sustainably utilized," said the Mtwara District Commissioner, Fatuma Mikidadi. She added with pride that it is a unique and inspiring development happening in an

fishing which went on unpunished. Its motto is *Bahari Yetu Hatutaki*,— meaning that they don't want anybody tampering with their sea.

The additional campaign was necessary as most fishers continued dynamite fishing solely for the income, without knowing the damage they caused to the environment and, to some extent, human health. The anti-dynamiting campaign was to be a long-lasting solution to the problem since the TPDF intervention was only a temporary measure.

The campaign was strategically carried out using a participatory approach, involving all members of the community including district officers, village governments, women, men and children. It was also exhaustive, covering all coastal villages and providing wide and deep knowledge on the adverse impact of fishing by explosives.

A total of 230 fishers in Mtwara district surrendered, along with 112 kg of TNT, 202 kg ammonium nitrate, 100 detonators and 26 fuses. Other dynamiting material was found abandoned at various places including the back yard of

the district commissioner's office.

"It was a unique exercise that I'll long treasure in my memory," explained Mikidadi "Imagine a mother standing up in a public seminar and who accuses her own son for involving himself in dynamite fishing. Or a wife, which is not common in coastal traditions and norms, raising an accusing finger to her bewildered husband."

For some people, especially women, the seminars organized to educate the communities were platforms for them to demonstrate their resentment of dynamite fishing, not necessarily for environmental degradation reasons but for the human health danger to which explosives exposed their husbands.

"Mothers and wives who had witnessed men in agony after being maimed by explosives, or those who see their neighbors reduced to beggars after ugly dynamite accidents, found the seminars as opportunities to voice their 'silent fears' when their beloved ones went out in the sea," the district commissioner elaborated.

Several people who are now rendered disabled after ugly dynamite

fishing accidents are now leaders of village-based anti-dynamite groups. These include Mzee Juma Mussa, whose foot and finger were maimed by mishandled dynamite, and Issa Salum who lost an eye and both arms (see photo).

The seminars were essentially reconciliatory, aimed at forgiving and forgetting the past and paving the way for a new life. They were carried out without physical force and police-like conditions, as during the TPDF crackdown, which caused men to flee their homes for many days. It was a learning process targeted towards empowering the people to create their own solutions and desired actions. The district commissioner added that the remarkable result of the seminars is that they empowered the local community with an enormous sense of ownership.

*For further information contact:*  
Gratian Luhikula, TCMP, Haile Selassie Road, Plot No. 87, P.O. Box 71686, Dar es Salaam, Tanzania. Tel: 255-51-667589. FAX: 225-51-668611. E-mail: gluhikula@epiq.or.tz. 🌐

## Community-Based Coastal Resources Management in North Sulawesi, Indonesia

By **Brian R. Crawford, I. M. Dutton, C. Rotinsulu and L.Z. Hale**

*Proyek Pesisir* (Coastal Resources Management Project – Indonesia), a cooperative initiative of the government of Indonesia and the United States Agency for International Development, has been working for 18 months in the province of North Sulawesi to

establish effective models of participatory and community-based coastal resources management. After an initial startup period (October 96-March 97), actual site work began in July 1997, and three field sites were selected in North Sulawesi after consultation with local government authorities and local communities. This was followed by an initial socialization

process with those communities to clarify expectations and identify appropriate approaches in each village. From October 1997, extension officers were stationed permanently in each community to facilitate project implementation.

**Community-Based Extension Officers.** One of the most successful ways to reach desired outcomes of community-based activities is to encourage a high level of participation in the planning and implementation process.

Experience in similar programs (e.g., Sri Lanka) has shown that an extension officer can be critical to

*(continued page 12)*

## North Sulawesi

(continued from page 11)

facilitating this process. The extension officer acts as the principal catalyst and coordinator for community-based activities by the project with technical support provided by *Proyek Pesisir* (Manado office), local consultants, nongovernment organizations and local government agencies.

*Proyek Pesisir* extension officers live and work full-time in the communities, and are trained in a range of disciplines, from marine ecology to community development. Despite the fact that all extension workers had college degrees, significant investments were required to build the capacity of these officers to enable them to effectively interact with communities across the spectrum of local coastal management issues. To ensure adequate coordination and reporting of progress, field extension officers come into the Manado office on a monthly basis.

The current field extension officers will not, however, remain assigned in the communities forever. Once plans and/or ordinances are developed, approved and implementation initiated, and the community has developed sufficient capacity, the extension officer will be withdrawn from full-time assignment in the community. They will then start outreach and planning activities in neighboring coastal villages, as well as documenting lessons and approaches based on the results at the initial field sites.

### A Marine Sanctuary at the Blongko Village Field Site

The successful Apo Island marine sanctuary in the Philippines is an example of one model which *Proyek Pesisir* is attempting to adapt and test in North Sulawesi. The purpose of a community-based marine

sanctuary is twofold. First, it can provide a biological function of biodiversity protection, and a protected spawning and nursery ground. Second, and particularly important to the local community, it can have an economic function of sustaining or increasing reef-related fish production, and in some cases, be a marine tourism destination for divers and snorkelers.

The specific steps in the process of establishment and management of the first Indonesian community-based marine sanctuary in the village of Blongko are as follows: **Community Socialization.** This process started with the extension officer establishing a project office within the village, and conducting a series of formal meetings and informal discussions with various social and religious groups to inform them about the project goals and process. The extension officer also prepared an ecological and human history of the community by interviewing elderly residents and other key informants about changes in population and settlement patterns, and changes in long-term conditions and use of coastal resources.

**Public Education and Capacity Building.** The extension officer held numerous public education events on marine and coral reef ecology, and the marine sanctuary concept. Training was also conducted on coral reef mapping and monitoring. This information was then incorporated into the marine sanctuary planning process. Realizing the potential benefits of increased fish production from a sanctuary, and the value of the local fishery to their community in supporting the livelihoods of future generations, the community engaged in efforts with *Proyek Pesisir* staff to identify a proper site, and to develop a local ordinance to regulate the proposed protected area. Within a few months, the commu-

nity fully supported the marine sanctuary concept. This was a major milestone in the process of establishing the sanctuary.

**Site Selection.** Site selection for the actual marine sanctuary location was another area of important discussion and decisionmaking. After much discussion, a site was selected by the community with moderately good coral cover and within sight of the village.

### Community Consultation and Village Ordinance

**Formulation.** Additional meetings were held to discuss the draft ordinance and modify the contents. The technical team made certain recommendations on regulations and management techniques, and ways of keeping management and the language in the ordinance simple. However, the community decided on a stricter set of regulations than was recommended by the technical team; this is one of several cases where this occurred.

**Village Ordinance Approval.** Final community approval of the ordinance took place at an all-village meeting called specifically for this purpose in September 1998. Copies of the final ordinance were distributed to every household in the village prior to the meeting.

Provincial, regency and district officials were kept informed concerning the sanctuary development throughout the process. High-level delegations from provincial and national agencies also visited Blongko and expressed their support and encouragement in promoting the sanctuary concept and continuing this initial experiment in Blongko. The entire process, from the initial assignment of the extension officer at the field site to ordinance approval, took one year.

**Implementation.** Even before the village ordinance was completed, initial implementation activities were started. Already an information/meeting center is under con-

struction; placement of boundary markers is underway; information signs are being created; a management committee has been formed; and a community group has been trained to monitor coral condition. A management group is in the early stages of formulating a management plan for the sanctuary.

On April 16, 1999, the community of Blongko and the Management Community of Blongko Marine Sanctuary inaugurated the Blongko Marine Sanctuary (see box).

### Reflections and Lessons Learned

Some of the initial practices and policies that assisted this process

were to:

- Map and understand the niche of the project
- Use the right human resources to build an extended team
- Use experienced community members as extension agents and trainers to other communities
- Build the skills of staff and supply appropriate technical assistance in stages
- Work incrementally and adaptively
- Develop and implement a public education strategy early on in the planning process
- Engage local government institutions early on in the planning process
- Assess carefully the capacity of

local partners and communities at the onset of a project

These are suggested not as a comprehensive set of guidelines, but rather as a basis for consideration in the design of complementary initiatives in the future. An unfortunate hallmark of most past coastal management initiatives has been a tendency to not learn from past experience.

*For further information contact:*  
*Brian Crawford, Coastal Resources Center, University of Rhode Island, Narragansett, RI 02882 USA. Tel: 401-874-6225. FAX: 401-789-4670. E-mail: [crawford@gso.uri.edu](mailto:crawford@gso.uri.edu). Website: <http://www.crc.uri.edu>.*

## INAUGURATION—Blongko Marine Sanctuary

The Blongko Marine Sanctuary, the first community-based marine sanctuary in Indonesia, was inaugurated by the government of the North Sulawesi Province in Blongko on April 16, 1999. The regional secretary of North Sulawesi, Mr. M. Arsyad Daud, representing the governor of North Sulawesi; U.S. Agency for International Development (USAID) mission director Terry Myers; and members of the staff of Indonesia's coastal management project, *Proyek Pesisir*, jointly stressed the government support of the marine sanctuary, and hopes it can be a model of community-based coastal resource management for other villages in North Sulawesi and throughout Indonesia. The North Sulawesi government also thanked USAID and *Proyek Pesisir* for its direct involvement in helping the government and coastal villagers in North Sulawesi to better manage the province's natural resources.

"The area of the marine sanctuary is small (only 6 hectares), but the community has made a big step in managing their coastal environment not only for Blongko and Minahasa regency but also for Indonesia," said USAID's Myers in praising the effort of the local community and government. "If this model can be replicated widely, it can have a great positive impact, and the benefits will be more visible to all, and will be enjoyed by more people. The Blongko Marine Sanctuary is one of many different approaches in coastal resource management. The important aspect of any approach is community ownership, and local residents taking responsibility to actively maintain and manage their natural resources."

### A Living Bank

For the community, the marine sanctuary is viewed as a valuable investment for their future. *Proyek Pesisir's* North Sulawesi project manager, Johnnes Tulungen, described the marine sanctuary as a "living bank," where the community puts their savings for their future and for the next generation of Blongko. The main depositor in this "living bank" is the local community, in the form of its commitments and responsibilities. The interest earned and credit, Tulungen explained, are in the form of increased production of fish around the sanctuary. The community must pay back the "used credit" in the form of maintenance, conservation and monitoring of the sanctuary. Therefore, the Blongko Marine Sanctuary can be seen as a new, environmentally-friendly technology to increase and sustain fish production. Tulungen expressed his dream that this model be used by the regency and provincial governments as a key program for coastal village development, and as the main policy approach to enhancing fish production and economic development in coastal villages.

At the Blongko inauguration ceremony, Mr. S. Kindangen, head of the Regional Environmental Impact Protection Agency of North Sulawesi, praised the community and the village government for their commitment to protecting their coastal resources for future generations. The inauguration was attended by more than 300 people from the surrounding villages, local and provincial government institutions and officials, the media, the North Sulawesi Pacific Asia Tour Association, Sam Ralulangi University of North Sulawesi, and USAID, as well as the members of the Blongko community.

*For further information contact: J. Johnnes Tulungen, Proyek Pesisir North Sulawesi, Jl. Wolter Monginsidi No. 5 Kleak Lingk. 1 / 19, Manado, North Sulawesi, Indonesia. Tel: 0431 841 671. FAX: 0431 841 673. E-mail: [crmp@manado.wasantara.net.id](mailto:crmp@manado.wasantara.net.id).*

# The Jamaica Coral Reef Action Plan and the Portland Bight Sustainable Development Area

By Peter Espeut

The first International Coral Reef Initiative (ICRI) Regional Workshop (for the Tropical Americas) was hosted by Jamaica from July 5-8, 1995. At the meeting the ICRI Framework for Action was adapted to the specific needs of the Caribbean, and individual countries were asked to hold national meetings to adopt national action plans. Jamaica held its national meeting on June 5-6, 1997, and adopted the Jamaica Coral Reef Action Plan (JCRAP). A steering committee was formed to coordinate implementation of the JCRAP; its first meeting was held in September 1998.

For all coral reef-related work, the steering committee terms of reference were to:

- Oversee the implementation of the JCRAP
- Collect data and make recommendations on research
- Oversee consultants
- Review and direct related national policies
- Disseminate information
- Advise the Natural Resources Conservation Authority (NRCA) on international treaties and conventions
- Advise the NRCA on any and all matters relating to the management of coral reefs

The steering committee's twenty-four members are drawn from the public and private sectors, environmental nongovernmental organizations (NGO), and the tourism and fisheries sectors.

The JCRAP is divided into six sections:

1. Legal and institutional
2. Environmental education

3. Co-management of coastal resources (coral reef fisheries and marine protected areas (MPA))
4. Land-based pollution sources
5. Research and monitoring
6. JCRAP financing

The main strategy is to establish under a co-management regime, a chain of MPAs around the island and on the inshore and offshore cays and banks. The Jamaican government has stated its intention to declare 14 national parks, marine parks and MPAs in this planning period (by the end of the decade). The Montego Bay Marine Park and the Negril Marine Park have already been officially designated. The Jamaican government intends to delegate the management of these parks and MPAs to suitable NGOs.

## The Portland Bight Sustainable Development Area

One area to be declared is the Portland Bight area on Jamaica's south coast just west of Kingston Harbor. The area is large by Jamaican standards—520 km<sup>2</sup> of land and 1,350 km<sup>2</sup> of marine space, about 1,870 km<sup>2</sup> in all. Management of this area is scheduled to be delegated to the Caribbean Coastal Area Management (CCAM) Foundation.

The land area comprises coastal forest (40.5 percent) and wetlands (15.8 percent), the largest continuous stands of mangroves left in Jamaica. The protected area will be divided into zones having different types and levels of protection. Within the protected area are sugar estates, a bauxite-alumina plant, a coffee factory, a paper factory, a feed mill, two power plants, two

shrimp hatcheries and two major ports importing oil and grain and exporting alumina. The human population of the area numbers about 20,000, including fishers and related occupations, coal-burners, agricultural laborers, industrial workers, farmers, clerks, teachers, tradesmen and the like. The residents are mostly below the poverty line with poor literacy skills, but have strong views on the need for environmental conservation. CCAM proposes the term "Socio-Biosphere Reserve" be coined to emphasize the human presence in the Portland Bight.

The CCAM management team consists of social and natural scientists. The approach taken is that 'fisheries management is not the management of fish.' This is the first conservation effort led by a social scientist taking the position of participation through co-management, not self-managing, of the protected area. The intent is to manage through a series of stakeholder councils including government, private sector and resource user representatives. Six councils were proposed—fisheries, watersheds, communities, tourism, enforcement and pollution—with a lead management council. With sustainable development as CCAM's objective, the area was named the Portland Bight Sustainable Development Area (PBSDA).

Baseline surveys of Portland Bight's natural and human resources were done. Management efforts began with the fisheries sector, working with the two existing fishers' co-operatives (supply) and to assist fishers (and other persons of fish-related occupations) on other beaches to form associations. Five fisheries associations were formed. Although the fishers who have joined the effort are highly motivated, they are usually in the

minority; a problem ahead is how to motivate more fishers to join. There are no associations on two beaches because of lack of interest.

The first stakeholder management council, the Portland Bight Fisheries Management Council (PBFMC), was launched on International Fisherman's Day, June 29, 1995. The PBFMC has 30 members: 16 artisanal fishers (two from each beach), two from the federation of fishers co-ops, two from recreational fishing clubs, eight from government departments and two from CCAM. It has met monthly since then—some 30 times—with fair attendance, missing only one meeting.

The PBFMC's first task was to prepare draft fisheries regulations to send to the environment minister for promulgation. It took two years of monthly meetings for the fisheries management regulations to be drafted with recommended penalties for violators. The proposed regulations banned dynamiting, dragnetting and use of SCUBA for fishing; defined minimum mesh sizes for fish traps and nets; recommended establishing eight fish sanctuaries (no fishing areas); and proposed a system of limited entry of fishers into the PBSDA resulting in a slow reduction in fishing effort and number of fishers over time. Annual fees were proposed for fishing within the PBSDA to contribute to the cost of fisheries management. One of the issues which prompted the longest debate was the matter of penalties to violators. The fishers on the PBSDA were ruthless in recommending draconian penalties, e.g., the death penalty for dynamiting, and six years hard labor for fishing in a sanctuary. It took time to negotiate more reasonable penalties with the fishers.

The proposed regulations were then sent to each fishers' co-op and



Reef fish

association for ratification. This process was fully participatory, and resulted in a situation where both the Portland Bight fishers and the government own the regulations which they helped draft, and which the Portland Bight fishers are prepared to enforce.

The PBFMC has recommended about 50 fishers who have been appointed honorary (unpaid) game wardens and fisheries inspectors by the government. This confers powers of arrest and empowers them to enforce current fisheries and wildlife legislation. In the last two years there have been several seizures of illegal catch from their peers, and one arrest which resulted in a conviction and a fine of J\$ 2,000 (approximately US\$ 56). The PBFMC process has tremendous local credibility, and should lead to an increase in fish stocks and income once the new regulations become law.

This effort is still in its infancy. It is premature to claim success, yet the process underway in the PBFMC has been applauded by many as achieving real community participation in planning and decisionmaking, and seems to be a successful mechanism for the empow-

erment of grass-roots community organizations and other organizations of civil society. The process has also been praised for the cooperation it has extracted from state institutions, which normally are unwilling to share their authority with the public.

On November 14, 1998, the Portland Bight Citizens' Council (PBCC) was launched. A federation of citizens' associations within the PBSDA, the PBCC will have the mandate to provide wider citizen participation in the management of the PBSDA. It is planned that in 1999, the Portland Bight Industrial Council (PBIC) will be formed, which will deal with land-based pollution issues.

If this experiment in natural resource co-management works, there will be a firmer foundation on which to base a realistic hope for Jamaican coral reefs and the coral reefs of the world.

*For further information contact: Peter Espeut, Caribbean Coastal Area Management (CCAM) Foundation, 7 Lloyds Close, Kingston 8, Jamaica, W.I. Tel: 876 978-4050 (51). FAX: 876 978-7641. E-mail: [pespeut@daffodil.infochan.com](mailto:pespeut@daffodil.infochan.com). *

# Local Participation in Fishery Law Enforcement

By Ruperto F. Sievert and Dolores Ariadne D. Diamante-Fabunan

*A*no naman ang magagawa namin laban sa mga high powered guns ng mga iyan? Eh di siyempre, bababa na lang kami ng mga barko ng hindi nai-inspeksiyon ng ayos iyon. May mga pamilya rin kami! "What can we do against their high powered guns? Of course, we would simply get off these suspected illegal fishing boats before we can inspect them properly. We have families, too!"

It seems not so long ago but, indeed, it was an expression of fear, as well as disgust, by an employee of the Bureau of Fisheries and Aquatic Resources whose duty it was to board and inspect suspected illegal fishing boats some 15 years ago. Today things seem better, but are they, really?

In the Philippines, natural resources are owned and regulated by the state. Laws on fisheries, waste disposal, forestry, mining and other human activities have been enacted and revised. There are numerous reports on violations and petitions for action. Unfortunately, enforcement efforts lack greatly.

Government enforcement agencies complain of the lack of personnel, equipment and financial resources, allegedly preventing them from protecting the country's 18,000 km of shoreline. To address this weakness and to respond to the clamor of civilians for authority to apprehend fishery law violators, in 1978 the national government passed a number of measures that would enable local governments and communities to share this responsibility. Then President Ferdinand E. Marcos ordered the training and deputization of *barangay* ("village"; also, "smallest political unit") officials and fishers

association officers as deputy wardens and forest guards. Patrol boats and radios were supplied by the national government in response to requests from municipal governments. Two more recent laws, the Local Government Code of 1991 and the Fisheries Code of 1998, explicitly obligate municipal and city governments to enforce fishery laws in their respective territories. However, this devolution of power is not yet fully recognized. One still hears the Bureau of Fisheries and Aquatic Resources alone being blamed for incidences of illegal fishing in municipal waters (these include inland waters and coastal waters out to 15 km).

Thus far, not all local governments have organized fishery law enforcement teams, more popularly known as *Bantay Dagat* ("guardian of the sea," or literally, "to watch over the sea"). Organization of the enforcement team depends primarily on the determination of the political leadership. There are some political leaders who are convinced of the adverse impact of destructive fishing, and there are those who act only upon extreme pressure from their constituents. Here, it is a trusted municipal agriculturist, an appointed official whose office is to provide basic services to the fishery sector, who can convince an unsure mayor to take a stand. In the absence of financially influential relations or relatives who are illegal fishers, this may not be difficult. Otherwise, it takes a respected nongovernment organization to make up for the indifference of the municipal government. Whatever the case, adherence to the policy against illegal fishing practices changes periodically coinciding with municipal elections held every three years. Fishery law enforce-

ment may or may not be high on the agenda of the new mayor.

The *Bantay Dagat* enforces laws on closed areas and seasons, license requirements, prohibited gears, banned fishery products and for protected species. Depending on the nature of the violation and whether a national law or municipal ordinance is invoked, violators are fined outright or charged in court. The gear, boat or catch may also be confiscated and the license (if one exists) revoked. Fines for violating national laws go to the national treasury. In some municipalities, the fine paid by the violator is shared between the municipal government and the members of the patrol.

The *Bantay Dagat* team may be comprised of the deputized fish wardens, members of the local police force who may be assigned by the mayor, and occasionally, a representative from the Philippine National Police Maritime Command (the civilian police force), Coast Guard or Navy. The mayor, some town councilors, the municipal agriculturist and the fishery technologist occasionally join the patrol. This provides a very good opportunity for the community to really work together, supporting each other in an effort to achieve a common goal. This concerted effort becomes even more meaningful during instances when neighboring municipalities undertake joint patrols.

While the national government periodically gives out patrol boats and radios, this does not fully address the day-to-day enforcement-related needs of hundreds of municipalities in the country. More often, the patrol craft is a wooden outrigger powered by a 16-horsepower gasoline engine or a converted diesel truck engine.



Municipalities without their own patrol crafts usually borrow the fishers' boats.

Patrol frequency varies depending on the monthly budget allotment. Some municipalities are able to obtain monthly fuel subsidies under certain national programs. Other expenses include food, coffee and cigarettes. Patrol members bring their own flashlights, raincoats and notebooks. Sometimes, private individuals donate a bullhorn or a searchlight.

The deputized wardens may work strictly voluntarily or receive some form of compensation at the discretion of the municipal government. In a few municipalities, they are covered by accident and/or life insurance. In others, an honorarium in recognition of their service is given.

The term-of-office for the *Bantay Dagat* is designed to coincide with the mayor's term. However, this jeopardizes efforts to appoint and educate wardens. In addition, since this position may not be formalized in any document, job assurance is limited. Learning fishery law can be a formidable task and tends to be complicated and vague. Likewise, documenting the evidence can be daunting, particularly for team members who have minimal education.

Apprehending commercial fishing boats can be very dangerous, especially at night. Civilian volunteers are not provided firearms which may help them capture violators and/or provide self defense. Only the Philippine National Police or military, if present, are allowed to carry arms. Patrol boats have been rammed, and wardens threatened with firearms that belong to the commercial boat's armed escorts, who may also be members of the police, military or paramilitary. In a number of cases, lone fish wardens have been beaten by the

crew of commercial fishing boats. But the more usual way in which violators take revenge is by filing counter-charges against the fish warden, alleging damages to the gear or boat. When countercharges are made, there is no mechanism to provide legal or financial support to the warden unless they are a *barangay* ("town") official. This is truly tragic considering that deputy team members are mostly simple fishers who have undertaken voluntarily, yet serious, enforcement jobs for minimal financial compensation.

Despite these problems, there are instances of improved law enforcement particularly in well-organized, cohesive communities. A success case is in the reef management by the Calaogao Marginal Fishers and Farmers Association of Caliling, Cauayan, Negros Occidental. After approximately four years of consistent apprehensions, the number of violators decreased.

The number of *Bantay Dagat* has risen from four to 20. The *Bantay Dagat* are equipped with radios, binoculars, searchlights, uniforms and the like, largely by donations from local stakeholders. However, it is still risky to empower civilians to enforce the law. Local participation in law enforcement seems ideal, but as it is today, fishers tend to be exploited and exposed to undue risks. Continued use of the *Bantay Dagat* indicates the contin-

ued inadequacy of the government to provide armed enforcers to do the job. Perhaps, for the time being



Reef fish

at least, the teams should concentrate on information gathering, and the military members make the arrests.

Members of the military or Philippine National Police Maritime Command should be trained to enforce fishery laws. This is more reasonable than soliciting local participation for active law enforcement. It appears that the government forgot to create a body to enforce the laws they adopted. Only when the proper mechanisms are in place can the government and the communities form a partnership to protect the environment and manage the country's natural resources.

For further information contact:  
Ruperto F. Sievert or Dolores Ariadne D. Diamante-Fabunan, CRMP, 5th floor, CIFIC Towers, North Reclamation Area, Cebu City, Cebu, Philippines. Tel: 6332 232 1821. FAX: 6332 232 1825. E-mail: prcebu@usc.edu.ph. Website: oneocean.org. 🌐

# A Regional Approach to Evaluating Reef Condition in the Atlantic and Gulf of Mexico

By Robert Ginsburg and Philip Kramer

A new approach to evaluating the condition of coral reefs in the western Atlantic and Gulf of Mexico is well underway. The Atlantic-Gulf Rapid Reef Assessment (AGRRA) is an international program designed specifically to assess the current condition of numerous reefs leading to significant scientific and/or managerial results. Health screening of reefs will identify areas that have suffered significant declines and need the intensive care of monitoring and analysis of the causes of decline. In addition, AGRRA can also identify reefs that should be candidates for marine protected areas or parks. By assessing large numbers of reefs, it will be possible to compare the general condition of similar reefs in widely separated areas and to contrast the condition of reefs impacted by the activities of large populations with comparable reefs remote from these people-produced impacts. The goal is to complete a regional assessment of reef conditions by 2001.

The need for health screening of reefs grew from the results of the Conference on Global Aspects of Coral Reefs (1993), in which some 120 reef scientists met for a week to consider the state of the world's reefs. For reefs of the Atlantic and Gulf of Mexico, two principal conclusions emerged from the conference: 1) fringing and nearshore reefs adjacent to land areas with large populations show significant declines, and 2) the conditions of most of the region's reefs are largely unknown.

The most reliable assessment of

reef condition is through periodic monitoring. Unfortunately, the absence of baseline data from most of the regions reefs make it impossible to make meaningful comparisons. To evaluate reef condition when there is no previous data requires both different standards and a different approach.

## The Approach

The vitality of a reef depends on complex relationships between corals, fish and algae. When changes occur in the community dynamics of one of these components, the other two components are affected as well and the whole relationship can be disrupted. Therefore, to evaluate the condition of a reef from a one-time assessment, it is critical that multiple indicators of the corals-algae-fish relationships are examined. In developing an assessment protocol, AGRRA relied on this principal and the need to have a simple standardized protocol that could be applied rapidly to a large number of reefs.

Following these guidelines, a rapid assessment protocol was developed and tested by the AGRRA Organizing Committee over the past four years. To include the opinions of scientists from the region, a workshop was convened in Miami in June 1998 in which some 85 participants from 21 countries attended. The discussions led to several additions and revisions of the AGRRA protocol, which is now posted on the AGRRA website (<http://coral.aoml.noaa.gov/agra/>). The indicators of the AGRRA protocol are: 1) the partial or total mortality of major reef-building corals by species and size; 2) the relative

abundance of major algal types—turf, macro-algae and crustose corallines; and 3) the diversity of fish, and the abundance and sizes of key species. The results of an AGRRA survey are a quantitative indication of reef condition. From the examination of a large number of reefs, it will be possible to develop a scale of reef condition and allow regional comparisons. Although the approach does not attempt to distinguish between cause and effect of reef condition, the data gathered can be used to develop hypotheses on trends of reef decline, particularly across large spatial scales.

## Case Example: Andros Reef Complex, Bahamas

The first comprehensive study using AGRRA was conducted along Andros Island, Bahamas. The Andros Reef Complex is one of the longest reef systems in the western Atlantic with few anthropogenic impacts because of its remoteness and low population. The purpose was to determine the condition of this reef complex with a one-time assessment. A team of six scientists surveyed 70 reef sites along the 150-km reef tract during four weeks of field work during 1997 and 1998. Over 7,000 individual reef-building corals and 2,500 algal quadrants were examined and 400 fish belt transects were conducted. The surveys revealed low to moderate partial coral mortality, with patchy occurrences of recent mortality caused by coral disease outbreaks and bleaching during 1998. Of particular interest are the extensive thickets of the elkhorn coral found to be in good condition and localized areas of luxuriant forereef carpets with high coral cover. Macroalgal cover was low to moderate, and the abundance of herbivorous fish and commercially significant fish (e.g., grouper) was high. Overall, this assessment

*(continued page 20)*

# ReefBase 3.0

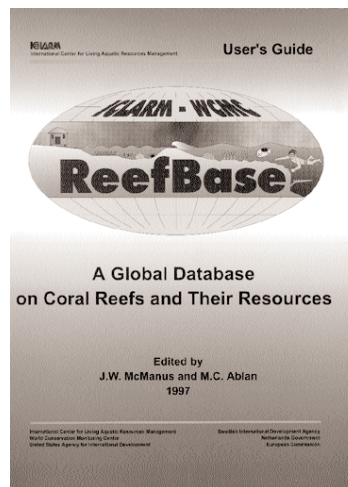
By J.W. McManus, S.G. Vergara and K.P.K. Reyes

ReefBase is a database that documents coral reefs around the world, identifies related resources, describes marine protected areas (MPAs) and their features, and provides information on reef stresses, threats, management initiatives, reef-related socioeconomic variables and tourism. It features several types of maps, photographs, satellite pictures, related databases, information on the ReefBase Aquanaut monitoring method and a comprehensive query system.

ReefBase 3.0 was released in November 1998 at the International Tropical Marine Ecosystems Management Symposium in Townsville, Australia. The ReefBase package consists of a CD-ROM and a user's manual.

New features in ReefBase 3.0 include:

- National Aeronautic and Space Administration satellite photos
- Reefs at Risk, a map-based indicator of threats to the world's coral reefs undertaken by the World Resources Institute, International Center for Living Aquatic Resources Management (ICLARM) and the World Conservation Monitoring Centre
- Charles Darwin's book *The Structure and Distribution of Coral Reefs*



- The Australian Institute of Marine Science Reef Monitoring Data Entry System (ARMDRES) database

- A wide range of summary graphs
- An improved query system
- Data from the 1997 Reef Check Program, based at the University of Science and Technology, Hong Kong, during which divers gathered data on over 300 reefs around the world.

- ReefBase 3.0 also contains:
- Selected information on over 8,000 reefs
  - Ecological information on corals and fish communities for 3,000 reefs
  - Stress data for over 2,000 reefs
  - Coral reef fisheries and mariculture production information
  - Dive sites, dive operators and tourist lodging information for 1,000 reefs
  - Management practices and legislation information for 500

(continued page 20)

# Reef Check: Volunteer Monitoring of Coral Reefs

By Gregor Hodgson

Prior to 1997, there were many media reports about coral reef decline, however, it was not possible to answer the question: What is the health of the world's coral reefs? Too few scientists spend too little time studying reefs. In 1997, the Hong Kong University of Science and Technology's (HKUST) Institute for Environment and Sustainable Development organized the first global survey of coral reefs. The survey was the largest ever and one method was used at all sites for comparisons purpose. The results confirmed that reefs in different parts of the world share similar problems. Overfishing was shown to be far worse than expect-

ed, particularly at remote locations.

Reef Check works well as a rapid assessment tool, and indicates where additional scientific studies are needed.

## Goals of Reef Check

The scientific goal is to assess human impacts on coral reefs. The coastal management goal is to raise public awareness about coral reefs, threats to their health and solutions to these problems, and to establish a global network of teams dedicated to coral reef conservation and management.

## Approach

Reef Check is a volunteer program based at HKUST and is run by Internet. National and regional

coordinators organize teams of experienced recreational divers who are trained in the survey methods, and led on surveys by a professional marine biologist. The survey methods were specially designed for recreational divers, so that training is rapid and organism identification is accurate. Key "indicator" organisms, such as grouper, are used as a measure of cyanide fishing impacts, while butterfly fish indicate the impacts of the aquarium-fish trade. There are worldwide indicators, e.g., lobster, and regional indicators, e.g., humphead wrasse (Indo-Pacific).

## Global Bleaching and Mortality

Coral bleaching occurs when  
(continued page 21)

## Regional Approach

(continued from page 18)

revealed the Andros Reef Complex is in good condition and has few signs of degradation or significant over fishing.

## Improving Capacity and Collaboration

AGRRA has a special opportunity to contribute the much-needed capacity building for managing coral reefs throughout the western Atlantic by conducting training workshops. The first AGRRA workshop, held February 1999 at the Bonaire Marine Park, trained 15 participants in how to assess reef condition using the protocol, how to analyze the results and how to apply them for the management of coral reefs. The best measure of success of the workshop is that several participants were encouraged to lead assessments of coral reefs in the Flower Gardens in the Cayman Islands, and in Tobago and St. Vincent. This positive result inspired a second training workshop held in May 1999 in Akumal, Mexico, with scientists and managers from countries bordering the Mesoamerican Reef System.

To develop the essential collaboration between scientists and managers throughout the region,

AGRRA has established a multinational advisory board and organized a regional network of in-country specialists. The advisory board, with members from Cuba, Mexico, Guadeloupe, Costa Rica, Belize and Brazil, assists in selecting priority areas and coordinates assessments. The regional network consists of in-country scientists who form the nucleus of each AGRRA team.

## Applications to Management

AGRRA results have direct application to reef management. They provide immediate answers about the current status of coral communities, the extent and patterns of decline in corals or fish, where to locate monitoring sites, and the extent of damage from hurricanes, bleaching and disease. For example, increased water temperatures in the summer of 1998 led to significant bleaching throughout the region. Managers can use AGRRA surveys to determine if bleaching will be transient or lethal, and how large an area was affected. AGRRA surveys also provide information for establishing baseline data on reef condition, groundtruthing benthic habitat maps, identifying reefs for marine protected areas, and developing management zoning and plans.

## 1999 and Beyond

Initial AGRRA assessments have been conducted in parts of Bonaire, Bahamas, Mexico, the Florida Keys, Brazil and U.S. Virgin Islands. In 1999, additional assessments are planned for Cuba, Venezuela, Honduras, Mexico and Puerto Rico. Challenges for the next two years include developing an AGRRA regional database accessible to all, expanding assessments to additional areas in the region, and synthesizing data to make preliminary regional comparisons of reef condition. The target date for completing the assessment of the western Atlantic and Gulf of Mexico region is the end of the year 2001. AGRRA welcomes collaboration and partnerships with individuals and organizations interested in this regional effort.

For further information on AGRRA, visit the website (<http://coral.aoml.noaa.gov/agra/>), or contact Robert Ginsburg, Tel: 305-361-4875, E-mail: [rginsburg@rsmas.miami.edu](mailto:rginsburg@rsmas.miami.edu); or Philip Kramer, Tel: 305-361-4968, E-mail: [pkramer@rsmas.miami.edu](mailto:pkramer@rsmas.miami.edu) - both at the Rosenstiel School of Marine and Atmospheric Science/MGG, University of Miami, Miami, Florida 33149 USA. 🌐

## ReefBase

(continued from page 19)

### MPAs

- The ReefMap system of 196 maps of coral reefs in 118 countries and island states
- The Dot Map low-level geographic access system for displaying information in ReefBase
- The REEFHAB diagnostic model for predicting coral reef distribution
- 883 aerial, underwater and ter-

restrial pictures of coral reefs, their use and misuse

- 188 low-orbit earth photographs
- Index of experts, monitoring programs and institutions involved in coral reef research
- Dictionary of common coral reef terms
- Over 7,000 references of published material
- The Ecopath 3.0 ecosystem modeling software
- The Rapid Assessment of

Management Parameters sub-database on reef-related human activities

In addition, following the International Coral Reef Initiative in 1995, a Global Coral Reef Monitoring Network has developed, with ReefBase as its repository.

Ease of use remains a major feature of ReefBase 3.0. Strategic links facilitate accessing information through different entry points and permit the user to access sum-

## ReefBase

mary information and generate reports for specific data and management requirements.

The data entered in ReefBase come from published and unpublished reports, from surveys conducted by governmental and non-governmental organizations and individuals, as well as from a wide array of other data sources.

Citation information on all data sources is included in the database, allowing ReefBase users to directly cite the source of any piece of information.

ReefBase's clients include environmental and coastal managers, scientists, students, tourists, divers

and other interest groups. The database has been designed to facilitate a wide range of activities including managing coastal areas, setting up systems of protected areas, planning diving trips, generating research strategies and conducting comparative analyses of reef ecology and management approaches.

The new ReefBase Aqanaut Survey Manual describes a sampling approach in which nonspecialists, such as sport divers, marine park rangers and others, can set up ecological monitoring programs. An international certification program is underway in which SCUBA instructors are

trained to teach courses to certify divers as data-gathering "aquanauts." At a more technical level, ReefBase data has been used in recent predictions of the effects of climate change on coral reefs, including the determination that a warmer sea surface might lead to reductions in reef-building activity.

The ReefBase 3.0 CD-ROM and User's Guide is available for US\$ 30 plus mailing costs.

*For further information contact: The ReefBase Team, ICLARM, MCPO Box 2631, 0718 Makati City, Metro Manila. Tel: 63-2817-5255. Fax: 63-2816-3183. E-mail: reefbase@cgiar.org. Website: <http://www.reefbase.org>.*

## Reef Check

*(continued from page 19)*

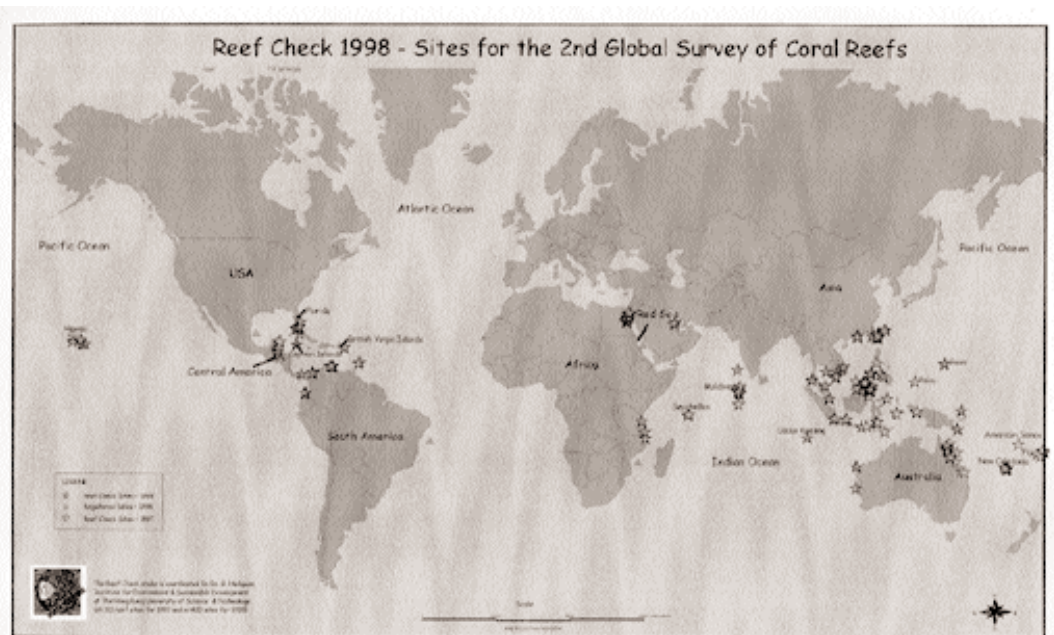
corals are stressed by high temperature, ultraviolet light or other environmental changes. As a result they lose their symbiotic algal cells and appear white. The corals may recover or die. The 1998 El Niño was the hottest since 1860 when records were first kept. Bleaching began in the Indian Ocean and the South Pacific, and then followed the sun. During the northern hemisphere summer, bleaching affected Southeast Asia, the Arabian Gulf and the northern Caribbean. Thirty percent of sites surveyed reported some bleaching. The Great Barrier Reef Marine Park Authority reports that the Great Barrier Reef experienced widespread inshore bleaching with up to 88 percent of nearshore corals affected. An indication of the severity of the event is that corals up to 1,000 years old were killed in several parts of the world.

## 1998 Results

Almost 40 countries and territories participated in 1998, an

increase over 1997, Reef Check's first year. Surveys were carried out between April 1, and September

Results from 1998 confirmed those of 1997, that most reefs are severely over-fished, with most



Reef Check Sites: 1998

30, 1998. Several hundred divers and over 100 marine biologists volunteered. Support for the program has been growing among scientists, governments, dive clubs, environmental groups and the tourism industry.

high-value organisms missing. Of the worldwide indicators, lobster, formerly abundant, were missing from 85 percent of reefs surveyed, a four percent increase in "vacant" reefs. There were no grouper at 63

*(continued page 22)*

## Reef Check

(continued from page 21)

percent of reefs, a 16 percent increase over 1997. Other worldwide indicators showed similar trends. Of the Indo-Pacific indicators, there were no humphead wrasse at 90 percent of reefs, and no edible sea cucumbers at 62 percent of reefs, the latter is a 23 percent increase.

The reef corals themselves showed a 10 percent decrease in living coral cover. A major cause of this change was an unprecedented bleaching event which killed many reef corals and other organisms.

## Conclusions

### Over-fishing:

- Over-fishing of high value seafood items, often using illegal methods such as poison and blast fishing, has worsened
- Reefs remote from cities are similarly affected due to long-distance fishers
- The demand for reef fish and shellfish has exceeded their natural supply
- There are too many fishers, and not enough fish

### Over-fishing Solutions:

- More and larger marine parks with no fishing allowed are needed

to serve as a source of reseeded

- The government should establish a testing program for fish using the latest detection systems for cyanide residues, and should penalize importers who bring in cyanide-caught fish

- All countries should ban the export and import of juvenile fish and shellfish

### Global Bleaching and Mortality:

- The global bleaching and die-off is unprecedented both in geographic extent, in depth where effects were reported and in the severity of the effects
- The economic impacts of this event will be felt by the tourism and seafood industries and in other unexpected areas for many years
- The Intergovernmental Panel on Climate Change (2,500 scientists) has concluded that global change (warming) is already measurable. There is a clear increasing trend over the past seven years, however, natural variability in year to year temperature and El Niño may have pushed temperatures beyond the threshold for corals in 1998.

### Bleaching Solutions:

- The US, China and other big

producers of greenhouse gases should aim to reduce their production by far more than the 5-7 percent agreed at Kyoto

- Existing power plants need to have pollution controls, and newer more efficient ones need to replace older ones

- Gas mileage on cars should be increased by law to 50 miles per gallon

- Logging of old growth forests should be banned, and new forests planted

- The European Union, developing nations and the United States should not use flexibility mechanisms such as emissions trading to try to avoid implementing the Kyoto agreement

Those concerned about reefs believe that there is a hole in the boat and it is sinking. The European Union, the United States and the G77(developing countries) are arguing about who should take off their shirt first to plug the hole.

For further information contact:

Website: [www.ust.hk/~webrc](http://www.ust.hk/~webrc)

/ReefCheck/reef.html. E-mail:

[reefchck@ust.hk](mailto:reefchck@ust.hk). Tel: 852 2358-8568 or -6939. FAX: 852 2358-1582. 🌐

# The Mesoamerican Caribbean Reef—A Proving Ground for Large-Scale Marine Conservation

By Miguel A. Jorge

The largest and most intact area of coral reef habitat in the Atlantic Ocean is the Mesoamerican Caribbean Reef (MACR). This system of fringing, patch, barrier, bank (or atoll) reefs stretches nearly 450 miles from the northern tip of the Yucatan Peninsula to the Bay Islands off the coast of Honduras. World Wildlife Fund (WWF) has recognized it as

one of the 200 most important “ecoregions” in the world in which to focus biodiversity conservation efforts.

The ecological richness forms the basis for the fisheries sector and the rapidly expanding tourism sector in Belize, Guatemala, Honduras and Mexico. Implicit in the discussion of the MACR is the recognition that species, habitats and the ecological processes transcend political boundaries.

Recognizing this, in 1997, the four governments agreed on a common Mesoamerican Reef Initiative (MRI) for the protection and development of the MACR. The purpose is to integrate the actions and efforts of the four countries thus forming a special management regime. The MRI has moved forward, with technical assistance from The World Conservation Union and WWF, government resource managers and

nongovernmental organizations (NGOs), to develop an Action Plan that is divided into regional and national priority actions including:

- Research and monitoring
- Legislation and regulations
- Protected areas development
- Sustainable tourism development
- Land-use planning
- Water quality and pollution prevention
- Capacity building
- Regional coordination
- Compliance with international commitments

The four governments, through the World Bank, have begun the project preparation phase that will include a series of strategic assessments on which a larger Global Environmental Facility (GEF) proposal will be developed. This GEF project will support the implementation of the transboundary issues that require intergovernmental coordination. It is worth noting that there have and continue to be other parallel initiatives at the national and regional level.

The Inter-American Development Bank is carrying out an Environmental Management Project in the Bay Islands of Honduras focused on improving water supply and sanitation, strengthening local institutions, and establishing mechanisms for investments in the environmental sector.

Funded by the United States Agency for International Development, the Central America Regional Environment Project (PROARCA/Costas) is a joint initiative by The Nature Conservancy, the University of Rhode Island's Coastal Resources Center and WWF. One project site is the Gulf of Honduras, where a tri-national alliance of NGOs has formed to address resource management issues that transcend three national boundaries (see *InterCoast*, Winter 1999).

The Belize Barrier Reef Complex Project builds on the achievements of the GEF-funded pilot-phase project and seeks to operationalize the country's recently passed Coastal Zone Management Act which provides for integrated coastal management in Belize.

WWF is initiating an ecoregion-based conservation planning process for the MACR. WWF will be looking at the entire area—treating it as a functional unit. The first step is to do a biological assessment to assess the threats and their cause. In addition, social, economic, cultural and political factors will be analyzed. WWF held a meeting of local and regional experts to allow for more strategic and effective assessments, and for tailoring the process to local circumstances and generating intellectual buy-in.

Once the assessments are completed, WWF will hold an ecoregional workshop where scientists and resource managers will develop conservation priorities. The workshop will produce a shared vision for the MACR—an articulation of what needs to be protected, conserved or restored, well into the future.

Once consensus is reached, then the real work begins. Major threats need to be identified, and a conservation strategy developed. Partnerships and buy-in of government agencies, NGOs, local communities and the private sector is a critical element for the success of

any resource management effort. This is more likely to be successful if a dialogue with stakeholders occurs in the earliest stages of project design and is maintained throughout.


Given the number of co-existing projects and agendas, an equally important issue for the MACR is avoiding duplication, and wasted effort and limited resources. Maximizing the combined positive impact of all initiatives will require a conscious effort to exchange information. Hopefully, the fact that representatives of all the above-mentioned initiatives partici-



Tropical Coral Reef

pated in the recent WWF meeting will facilitate communication.

In order to assure that these and the many other efforts in the MACR lead to long-term improvements, collaboration and coordination among many organizations at a multitude of levels will be essential.

*For further information contact:*  
Miguel A. Jorge, Latin America and Caribbean Program, World Wildlife Fund, 1250 Twenty-Forth St. NW, Washington, DC 20037 USA. Tel: 202-778-9624. E-mail: [miguel.jorge@wwfus.org](mailto:miguel.jorge@wwfus.org) 

# Coral Reef Protection in Quintana Roo, Mexico

By Juan Bezaury Creel,  
Carlos López Santos,  
Jennifer McCann,  
Concepción Molina Islas,  
Pamela Rubinoff, Don  
Robadue and Lynne Hale

Quintana Roo's rich coastal habitats are being threatened by tremendous development pressures. Cancun, located at the northern end of this coast, houses over 22,000 hotel rooms in only 20 kilometers of coastline. In just 25 years, Cancun, driven by the tourist industry, has grown to a population of over 350,000. As a result of the rich natural resources in the area, tourism is slowly developing along the southern coastline of Quintana Roo, on the Costa Maya which borders Belize.

The residents of Quintana Roo understand that for tourism to survive, there must be healthy and productive natural resources. To ensure this, the establishment of a

have successfully encouraged social participation in resource management.

## Ecological Zoning Programs

An Ecological Zoning Program (OET) for an area establishes regulations for land and water use-related issues and governs regulations at the federal, state and municipal levels. The OET process is meant to consider environmental, social and economic issues. Once approved, all other plans (e.g., zoning) must be consistent with the OET regulations.

OETs have the potential to become the main tool to unify coastal resource management. The OET assembles the different actors that need to be involved in an integrated coastal management (ICM) strategy. Intergovernmental and nongovernmental bodies must actively participate and buy into all stages of the OET process to safeguard their effectiveness, including design, implementation, compliance and review.

## Protected Areas

Protected areas are important in Mexico's strategy to protect biodiversity. Protected areas in Mexico are, to a certain extent, multiple use zones, where

activities are limited to ensure sustainable use of the resources. In this respect, protected areas are not isolated from the national economy. Rather, these areas enhance Mexico's economy within the limits needed to conserve environmental conditions.

In order to incorporate interagency and public participation into the protected area management strategy, the Mexican government formed participatory consultative bodies to assist the management through consensus-building processes. The number of coastal and marine protected areas in the State of Quintana Roo has grown tremendously in the last four years; all of them have experimented with participatory resource management. An example of effective intervention is at the Sian Ka'an Biosphere Reserve where the consultative body prohibited the use of SCUBA to catch lobster on the reef, and put severe restrictions on the use of nets in Ascension Bay. Although some advances have been made towards local stakeholder participation, it is important to recognize that this concept is in its infancy. There are still important forces that support an authoritarian decisionmaking process. More stakeholder training and capacity building must occur to achieve positive and long-lasting results from the public participation process.

## A Case Study of Xcalak

The small fishing village of Xcalak, at the southern end of Quintana Roo, has been the site of a three-year collaborative project of Amigos de Sian Ka'an, A.C. (ASK), the University of Rhode Island's Coastal Resources Center (CRC) and residence of Xcalak to initiate a community-based ICM program. The utility of protected areas and OET as policy tools for promoting intergovernmental and public participation is clearly demonstrated at this site. The Xcalakeños have employed these two tools to protect their resources by associating their community with many stakeholders, including the government sector, and estab-



Xcalak, on Mexico's  
Yucatan Peninsula

robust management program that involves all stakeholders is essential. Recently the Mexican government acknowledged the effectiveness and need for public participation. By using two environmental policy tools, Ecological Zoning Programs and protected areas, they



ishing resource management strategies.

Quintana Roo contains some of the least developed coastal areas in Mexico. The village of Xcalak is the only significant settlement in this area, with 285 inhabitants. Xcalak was founded in 1900; coconut farming was the primary industry until 1955 when Hurricane Janet devastated the area. Since then they have relied on fishing, and to a growing extent, tourism. The economic success of both industries is closely tied to the health of the area's natural resources.

During the mid-1990s, two developments led the Xcalakeños to take action to protect their natural resources; fishers became concerned about declining fish catch, and the state government informed the village that the Costa Maya had been targeted for tourism development. The community actively became involved in the planning, and requested assistance to improve fisheries management and promote low-impact tourism strategies.

### The Participatory Process

The Xcalak Community

Committee (XCC) was formed to establish a marine protected area (MPA), and with help from ASK and CRC, established the 17,000-hectare Xcalak National Reef Park. Formation of the MPA would protect coastal resources while allowing low-impact tourism development. The community participated at every level of the park's development. In addition, a no-take zone adjacent to the town was established through an agreement among the fishers. The XCC has continually held public meetings to gain the community's input on MPA strategies. Members of the XCC have also participated in the Costa Maya OET meetings and consultative process to ensure that the national park will be incorporated into this larger zoning effort.

The Xcalak model offers some valuable lessons for promoting public and intragovernmental participation. First, in mobilizing for a protected area, the Xcalak community clarified and articulated its goals and objectives, fostered an unprecedented participatory process and became engaged in the larger state planning initiatives. The

formation of the XCC and its ensuing work in these areas created vertical linkages between the local community; the local, state and national governments; and a wide array of other stakeholders. These linkages are essential for any ICM effort.

Plans are underway to replicate the Xcalak model in other coastal communities in Quintana Roo, which will give momentum to a statewide ICM initiative. This will increase the amount of coastline under some form of resource management program. Finally, connections were made between Xcalak and Bacalar Chico in Belize. The Xcalak Reefs National Park, when officially designated, will complement the Bacalar Chico Marine Reserve to form a large area of the Mesoamerican Caribbean Coral Reef, which falls under the Mesoamerican Reef Initiative.

*For further information contact:*  
*Carlos López Santos, Amigos de Sian Ka'an A. C., Plaza America Loc 48, Apdo Post. 770, Cancun, Quintana Roo 77500 Mexico. Tel: 98 84 9583. FAX: 98 87 3080. E-mail: sian@cancun.com.mx. 🌐*

## Coral Reefs in the East Asian Seas

By Hugh Kirkman and Shutao Cao

The East Asian Seas region is the center of the world biodiversity for reef-forming corals, including more than 30 percent of the world's coral reef area. Indonesia and the Philippines account for a major portion of coral reefs. Reefs in both countries have an extraordinarily high level of fish diversity. The marine resources of the region supply food products and raw materials for the industries of the adjacent countries.

Most reefs in the region are

degraded already or are in danger. It is estimated that about 10 percent of the Association of Southeast Asian Nations (ASEAN) countries' reefs have been severely damaged. Less than 20 percent of the reefs in the five participating ASEAN countries are in excellent condition (>75 percent live coral cover).

Studies show that most of the coral reefs of the Philippines, Sabah, eastern Sumatra, Java and Sulawesi were assessed as having a high potential of being threatened. More than 70 percent of the Philippines' 33,600 km<sup>2</sup> of reef are in varying stages of deterioration,

and in Indonesia only 29 percent of the area's coral reefs are considered in good condition. Coral bleaching has occurred in most countries in the region.

The major anthropogenic causes of coral and related ecosystems degradation are coastal development, inland and sea-based pollution, over-exploitation, use of destructive fishing methods, coral mining and tourism. These are attributed to increasing population and rapid economic growth, combined with neglecting marine environmental protection.

Since 1995, the East Asian Seas Regional Coordinating Unit

*(continued page 26)*

## East Asian Seas

(continued from page 25)

(EAS/RCU) considered reefs as a high priority and directly addressed coral reef issues or incorporated coral reefs into project activities. All member-country governments translate regional plans and actions into activities in their own national plans and policy priorities.

The International Coral Reef Initiative (ICRI) Regional Workshop for the East Asian Seas held in March 1996, proposed major strategic activities: integrated management; capacity building;

research and monitoring; and mechanisms for coordination, implementation and review of ICRI-related activities. These proposed strategies are taken into account in the EAS regional activities, among other regional projects.

Based on an assessment of regional marine issues, the following areas need to be addressed through integrated management, capacity building and research and monitoring activities:

- Land-based marine pollution control
- Destructive fishing practices
- Ecologically friendly coastal

and marine tourism

- Degraded coastal and marine ecosystems
- Sustainable fisheries management
- Marine protected areas (MPAs)

For further information contact:

Hugh Kirkman, East Asian Seas Regional Coordinating Unit, 10th Floor, UN ESCAP Building, Rajdamnern Avenue, Bangkok 10200, Thailand. Tel: 662 2881860. FAX: 662 2678008. E-mail: [kirkman.unescap@un.org](mailto:kirkman.unescap@un.org) 

## Urbanization and Water Resources in the Pacific Islands

By Philomene A. Verlaan

The steadily increasing migration to urban areas of the Pacific islands is not yet generally appreciated. The urban growth rate is 50 to 100 percent higher than the already large overall population growth rates of 2.3 percent per year. In the early 1990s, seven of the 13 independent Pacific island countries (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) were more than 50 percent urban; the others were more than 25 percent urban. Thus sustainable development of Pacific islands mandates substantial attention to managing issues of urbanization; water resources are among the most pressing.

In 1997, these 13 countries participated with the Global Environment Facility (GEF) to create a Strategic Action Programme (SAP) for their international waters. The SAP was endorsed by

the governments at the 28<sup>th</sup> South Pacific Forum, Rarotonga, Cook Islands, September 17-19, 1997. This is the first effort to address the needs of islands in a SAP.

The GEF's definition of international waters banishes conventional political and jurisdictional boundaries by extending farther inland and out to sea. Acknowledging the physical unity imposed by the global hydrological cycle, international waters include oceans, large marine ecosystems, enclosed or semi-enclosed seas and estuaries, as well as rivers, lakes, groundwater catchments and wetlands with transboundary drainage basins or common borders. The associated ecosystems and critical habitats are integral parts of the GEF's international waters designation.

The purpose of SAPs is to provide a framework to integrate and coordinate national and regional sustainable development priorities with environmental concerns. The Pacific island countries added an ambitious, innovative methodology to define nationally and regionally

consistent policies to manage marine and terrestrial resources, whose fundamental interdependence was explicitly recognized as the governing management principle of the SAP.

Substantive contributions and procedural aspects of the SAP are useful to mayors and other municipal leaders concerned with managing water resources in urban areas. The insights from this SAP are likely to be applicable to other resources and urban areas.

### Substantive Contributions

**Fresh and marine water resources are similarly threatened.** Adoption of the GEF's definition for international waters obliged the Pacific island countries to analyze their water resources from a new perspective. They concluded that their fresh and marine waters were subject to:

- Pollution from land-based activities
- Physical, ecological and hydrological modification of their associated critical habitats
- Unsustainable use of their living and non-living resources

**Prioritizing threats is unsuitable for effective management.** Because water resources are so intertwined, threats to them must be managed simultaneously. Hence, effective water resource management requires whole island management. The SAP is explicitly based on the physical continuity of international waters.

**Management deficiencies are a cause of threats to water.** This can be addressed through improvement of governance and understanding. Improving governance requires developing institutional mechanisms to integrate environmental concerns, development planning and decisionmaking. Improving understanding requires creating a whole-island ecosystem awareness throughout all levels of the population. The Pacific islands SAP may well be the first of its kind to focus on good management as a politically endorsed, principal objective for achieving sustainable development.

**Key information gaps are not in basic data.** The most important information gap is not inadequate data on basic science or economics. Instead, the gap is a lack of appropriately presented, strategically oriented information to assist decisionmakers, resource users, managers and communities in deriving optimum benefit from their water resources, whose numerous alternative uses might otherwise be unproductively employed or erroneously perceived as conflicting or mutually exclusive.

**The precautionary principle applies.** It is recognized that insufficient information need not create inaction, but in such cases the precautionary principle should apply in developing activities and choosing between alternatives. Where potentially detrimental environmental consequences are

surmised, decisionmakers should remember that prevention is generally far cheaper than cure—and cure is often not even possible.

**Water resource management is ecosystem based.** The SAP allows a focused transition from sectoral to integrated management of water resources. It provides the local, national and regional framework within which activities toward that end are identified, developed and implemented. This framework establishes a complementary pair of organizing principles: integrated coastal and watershed management (ICWM) and oceanic fisheries management (OFM). The two management units proposed are ecosystem based: upstream watersheds and adjacent coastal areas for ICWM, and the western Pacific Warm Pool for OFM.

The ICWM/OFM framework also enables inclusion of four development issues which are highly relevant to water resource management, but previously addressed separately: tourism, biodiversity, vulnerability to climate change and land degradation.

### Procedural Aspects

The SAP was developed through country-driven, sectoral, national, regional and international consultations. These were organized around 13 national task forces. Each country set up its own task force, comprised of public and private stakeholders.

Each national task force was led by its own native full-time coordinator. The coordinator established working links with their counterparts from the other countries, thereby forming the nucleus of a longer-term planning and implementation network.


A regional task force was formed to ensure regional policy consistency. It included senior government representatives, regional

and international intergovernmental and nongovernmental organizations, development banks and the private sector.

The national task forces met in their respective countries to set the parameters for the SAP. This required analysis and identification of the major environmental concerns, principal imminent threats, root causes of the threats, information gaps, proposed solutions and priorities for action. The task forces were encouraged to obtain maximum public participation locally. The South Pacific Regional Environment Programme (SPREP) served as the secretariat for the coordinators and regional task forces, who met jointly at SPREP's headquarters during the preparation period of the SAP. Those involved concluded that the process was cumbersome, complex, difficult, time-consuming, expensive and exhausting, but nevertheless absolutely essential to engendering a SAP that is owned by the countries themselves.

### Conclusion

Protection and management of fresh and marine water resources is probably the most complex of the requirements for sustainable urbanization. Meeting these requirements offers a daunting challenge to even the most financially and technically well-endowed countries of the world. Fully cognizant of the implementation difficulties associated with their choice of management principles, the Pacific island countries, nevertheless, consider their approach to be indispensable to ensuring long-term availability of their water resources.

*For further information contact:*  
Philomene A. Verlaan, 2 Tredegar Mews,  
London E3 5AF, England. E-mail:  
paverlaan@gn.apc.org;  
p.verlaan@ic.ac.uk. 



**AFRICA**  
**NIGERIA**

**Mangroves of the Cross River Estuary, Nigeria: An Endangered Natural Wealth**

In Nigeria, mangrove forests form a clear vegetation zone along the entire 960 kilometer coastline. The 11,134 km<sup>2</sup> of mangroves represents about 10 percent of the total forest and wooded area.

Mangroves in the Cross River Estuary, in southern Nigeria, provide a breeding and nursery ground for commercially important finfish and shellfish. Other organisms live permanently in the mangroves. Mangrove areas are also a source of fuelwood and construction materials for the local communities.



Mangrove roots

**Where is the Danger?**

Any natural resource whose exploitation is unregulated is unlikely to be sustainable in the long term. The danger lies in the

subtle decline of the mangrove forests and, most importantly, the poor attention paid to this problem. Of the total coverage of mangroves along the Nigerian coast, it is estimated that 619 km<sup>2</sup> have been destroyed. However, a survey of the mangroves of the Cross River Estuary implies that this estimate is conservative.

A study revealed that over the past few decades, the number of fishing settlements in the area has increased significantly. This is directly related to the high unemployment in Nigeria, which forces people to use an open-access resource, fisheries, for employment. Sixty-eight settlements (sizes ranging from 20 m<sup>2</sup> for small temporary huts to 150-200 m<sup>2</sup> for permanent settlements) have been recorded, and each represents an equivalent loss of mangrove forest. Additional losses result from exploitation for fuelwood, construction of embankments for the settlements, and house and gear construction.

Another concern is the abundance and rapid spread of nypa palm along the coastline. The nypa palm was introduced from its native Pacific habitat into the region in the early 1900s. It displaces the native mangroves and is spreading deeper inland. This invasion is a direct result of human action; once mangroves are cut, there is rapid invasion by nypa palm. Re-invasion by the mangroves is almost impossible. The nypa palm does not contribute to coastline stability nor to ecosystem fertility. Unfortunately, the situation is similar for the Niger Delta region, and perhaps the entire Nigerian coastline.

**Management and**

**Conservation**

The Cross River mangrove region is relatively untouched in comparison to other mangroves in the West African subregion. To ensure that this area remains healthy, it is being suggested that international attention be focused on its management and conservation. Rehabilitation is needed for the mangroves in the outer estuary, where loss of mangroves is resulting in severe wave erosion which threatens coastal dwellers.

The following actions need to be undertaken to preserve the mangroves:

- Establish a Cross River mangrove park which regulates area use
- Provide an alternative source of fuel to the coastal communities. Using the nypa palm in place of mangrove would serve a dual purpose, decreasing the nypa population and sparing the mangroves.
- Replant mangroves where nypa palms are removed
- Educate the local people on the importance and sustainable use of mangroves
- Undertake a comprehensive survey of the Nigerian mangrove forest reserve to establish a baseline against which to assess ongoing exploitation

The mangroves of the Cross River Estuary are still of great ecological and economic importance. A strategy is needed to save the Cross River mangroves. This should focus on educating the local people and replanting of mangroves.

*For further information contact: Francis M. Nwosu or Sieghard Holzlöhner, Institute of Oceanography, University of Calabar, PMB 1115 Calabar, Nigeria. E-mail: francis@uni-bremen.de.*

## Second International Oceanic Conference—Mie Prefecture

Mie Prefecture, one of 47 local government areas in Japan, under the leadership of Governor Masayasu Kitagawa, recently began a program to revitalize its coastal areas and, in so doing, better protect the natural and cultural values of those areas. The process began with a series of community visioning workshops, resulting in the 1997 Mie Manifesto: a comprehensive plan for sustainable development of prefectural resources based on community aspirations.

To facilitate further development of the plan, the Mie Prefecture government, in association with the Japan International Marine Science and Technology Federation and various national and local governments, and industry organizations, sponsored the Second International Ise-Shima Oceanic Conference in the city of Ise in October 1998. Under the chairmanship of Kenji Hotta (Nihon University), keynote speakers Ian Dutton, Coastal Resources Center, University of Rhode Island; Michael Fisher, William and Flora Hewlett Foundation; Judith Swan, Foundation for World Oceans; Katutoshi Yabuki, University of Osaka; and Francois Simard, Monaco Oceanographic Museum, presented a range of perspectives on sustainable coastal resources management. The audience of 1,200 engineers, planners, bureaucrats, researchers and community organizations were then invited to participate in breakout workshops on topics of special interest. The conference concluded with a review of options for development and implementation of the Mie Manifesto; the review invited presentations from participants and

featured lessons from the programs of the Rhode Island, USA-based Save The Bay organization.

A post-conference study tour of offshore wave generation, water destratification and fish feeding plants was undertaken—Mie Prefecture is also home to the Mikimoto pearl farm and has a long history of innovative exploitation of marine and coastal resources.

Overall, the conference was an outstanding example of how global experience with coastal management can be successfully blended with local initiatives. Mie Prefecture is leading the way in Japan with local governance of coastal resources, and is a potentially valuable study tour destination for coastal management professionals—a local organization (International Center for Environmental Technology Transfer; website: <http://www.icett.or.jp>) specializes in facilitating tours and training.

*A report of the conference is available from Ian Dutton, Coastal Resources Center, University of Rhode Island, Jakarta Office, Jl. 1 Madiun No. 3, Menteng, Jakarta 10320, Indonesia. Tel: 62 21-392-6424. E-mail: [crmp@cbn.net.id](mailto:crmp@cbn.net.id).*

## ASIA

## PHILIPPINES

## Local Implementation of ICM in the Philippines

In an effort to protect the Philippine's 18,000 km of coastline, the Coastal Resource Management Project (CRMP), supported by the United States Agency for International Development (USAID) and implemented through the Philippine Department of Environment and Natural Resources, is drawing on past experiences to introduce innovations for coastal management.

Currently, most local govern-

ment units in the Philippines neither have the capacity nor resources to manage their municipal waters. CRMP activities are striving to achieve expansion of the project activities to 2,000 kilometers of Philippine coastline by the year 2000. Six "learning areas" serve as nodes for expansion. These six field areas include 29 municipal government units and cover about 670 kilometers of coastline.

## The CRMP Experience

In the first two years of CRMP, the activities and results which are leading to improved coastal management within the targeted coastal areas include:

### National policy related activities

- Legal and jurisdictional guidebook published and distributed
- Mangrove management policies reviewed and revised
- National fisheries code analyzed and publicized, for implementation by local governments and communities
- National integrated coastal management (ICM) awards given to local governments
- Major workshops conducted for national policymakers, judges and prosecutors
- National coastal master plan initiated
- Booklets on procedures for ICM produced
- Publications and videos disseminated

• Major exhibit on marine life and important coastal and ocean habitats created, and shown to more than one million people

### Field-level activities in six learning areas

- Memorandums of agreement signed with all 29 municipal governments
- Participatory coastal resource assessments completed in all 29 areas
- Six coastal environmental pro-



files written in final draft form

- One hundred and fifty graduates from an 11-day ICM course active in learning areas
- One hundred and fifty-two *barangay* ("community") and municipal level management groups formed and active

- Various municipal ordinances on coastal fishery and ecosystem management drafted and passed
- One or more marine sanctuaries initiated or established in each learning area

- Two thousand hectares of mangrove habitat in Bohol Province initiated for community-based forest management agreements in 1999

- Community-level seaweed farming projects started in five learning areas; ecotourism projects launched in two learning areas

#### Expansion area activities

- Ten other municipal governments have started their own ICM program influenced by the CRMP

- Two areas are progressing with marine park and area management plans

- Linkages have been formed with three major donor and government projects to collaborate in up to 50 municipalities using the CRMP products listed above

#### Lessons Learned

The lessons learned by the CRMP include:

- Focus both on national and local-level work simultaneously
- Use multiple education and communication strategies to build support

- Encourage collaboration among agencies and donor projects

- Promote expansion by supporting demand from committed local governments and other institutions

- Support leadership in ICM through training, education and learning-by-doing

The most important finding is that for ICM to be adopted by local

governments throughout the country, it must be acceptable, understandable and practical for local governments, communities, national government and private sector partners to implement. ICM has to offer tangible solutions which produce results in terms of improved quality of coastal ecosystems and their production, improved livelihood opportunities, and improved ability on the part of local and national participants to do the job themselves. Objectives of field projects must be achievable while providing real benefits.

*For further information contact Alan T. White, Coastal Resource Management Project, Tetra Tech EM Inc., 5th Floor, CIFIC Towers, North Reclamation Area, Cebu City, Philippines. E-Mail: prcebu@usc.edu.ph.*

## NORTH AMERICA UNITED STATES

### NOAA's Clean Water Initiative, US\$ 22 Million in Fiscal Year 2000

The National Oceanic and Atmospheric Administration's (NOAA) Clean Water Initiative requested US\$ 22 million in fiscal year (FY) 2000, an increase of US\$ 5.8 million. The initiative will help restore and protect the United States' valuable coastal waters that support billions of dollars of economic activity every year through tourism, recreation and commercial fishing.

Polluted runoff is now a major source of coastal water pollution. Communities, businesses and human health are being increasingly threatened by polluted runoff and the damaging consequences of polluted coastal waters. Every year, degraded water quality causes warnings or closures to thousands of beaches, and nearly 30 percent of U.S. shellfish growing areas continue to be restricted or closed,

resulting in significant losses to the tourism, recreation and seafood industries. Harmful algal blooms like *Pfiesteria* (red tide) and brown tides, which are frequently associated with polluted waters, have impacted nearly every coastal state. The blooms produced an estimated US\$ 1 billion in economic losses in coastal communities over the past 20 years.

**Control of Harmful Algal Blooms—US\$ 9 million.** Polluted runoff often carries large amounts of nutrients that can contaminate coastal waters. Harmful algal blooms, such as *Pfiesteria*, are often associated with high levels of nutrients. The funding increase will allow NOAA and its academic partners to undertake research and monitoring essential to finding the sources and solutions to the spread of harmful algal blooms, and to better predict and prevent these events.

**State Partnerships to Reduce Polluted Runoff—US\$ 12 million.** A FY 2000 budget to fight polluted runoff of US\$ 12 million, an increase of US\$ 4 million, will provide coastal states with funding to fully develop and implement their Coastal Nonpoint Pollution Control Programs. This will significantly improve their ability to manage polluted runoff and reduce coastal water pollution.

**Protect and Restore our Coastal Resources—US\$ 1 million.** US\$ 1 million in FY 2000 will reduce the flow of pollutants from hazardous waste sites into coastal water. NOAA's Coastal Resource Coordination program works at hazardous waste sites to protect and restore coastal resources and their habitats, including the water and sediments necessary to support a healthy ecosystem.

The increasing frequency and magnitude of these problems

demand that significant action be taken now to restore and protect the health of U.S. coastal waters. NOAA has the authorities, capabilities and partnerships critical to successfully reduce polluted runoff and meet the challenges of the interagency Clean Water Action Plan.

Further information on the Clean Water Action Plan is available on the web site: <http://www.cleanwater.gov/>.

## NORTH AMERICA UNITED STATES

### Rebounding in Florida Keys' Marine Sanctuary

In July 1997, the National Oceanographic and Atmospheric Administration's Florida Keys National Marine Sanctuary created several no-take zones, which are an innovative way of allowing nature to replenish itself in a small section of the sanctuary. Within the parameters of these zones, nothing may be removed (neither plant nor animals) although visitors are still free to enjoy the coral colonies and colorful inhabitants of the marine ecosystem.

One year later, the hands-off approach appears to be paying off as divers say that fish are getting bigger, and the ocean floor, once littered with discarded monofilament, is now an uncluttered thoroughfare for scuttling lobsters growing to breeding age.

While most of the reports of a resurgence in marine life come from divers and fishing captains, sanctuary superintendent Billy Causey says the scientific data being collected parallels these early anecdotal reports. The sanctuary has begun research and monitoring to see how effective zones are in protecting marine biodiversity. But, it looks as if anecdotal evidence will mirror hard data.

"It's extremely exciting to see

these changes taking place in our coral reef environment," says Causey, "More lobster, more fish, more biodiversity."

For further information contact: Justin Kenney, Florida, USA. Tel: 301-713-3140.

## NORTH AMERICA UNITED STATES

### Vessel Grounding Results in Restoration and New Navigation System to Protect Florida Keys' Coral Reefs

The federal government has installed state-of-the-art navigational aids in the Florida Keys National Marine Sanctuary to help ships avoid grounding on fragile, threatened coral reefs.

Officials with the U.S. Coast Guard and National Oceanographic and Atmospheric Administration (NOAA) installed the northernmost of eight Racon radar transponder beacons at Fowey Rocks, approximately 20 miles southeast of Miami. The beacons are mounted on navigational structures along the Florida reef tract, stretching from Miami to the Dry Tortugas. The devices emit unique signals that appear on ship radar, allowing mariners to precisely identify the location of navigational aids and warn ships that they are nearing a reef. Each signal has a range of 15-20 nautical miles.

The owners of the Contship Houston, a 613-foot container ship that went aground on a coral reef in 1997, purchased the beacons as part of a damage assessment and restoration agreement. The installation of this navigation system represents a creative solution to compensating the public for the injury that was done to the reef by reducing the likelihood of future navigational errors. The hull of the

Contship Houston cut a swath through the reef, crushing and breaking corals for approximately 400 meters. Under federal and state statutes, the parties that injure resources in national marine sanctuaries are responsible for restoring the injured resources and the services they provide. The reef restoration is the result of unprecedented cooperation between the vessel owner, insurer, NOAA and the state of Florida. As a result, restoration activities were completed within 10 months of the vessel grounding.

Shortly after the grounding, more than 3,000 injured pieces of coral were reattached to the reef substrate, and pieces of reef debris were removed or stabilized with epoxy to prevent ongoing damage to the reef and marine life. The vessel owners paid for and deployed flexible concrete mats to stabilize more than 7,650 square feet of reef substrate, and also placed large boulders to provide three dimensional habitat for organisms.

"This effort brought together a great team of federal, state and private partners that was able to do more with less, and provide a new era of protection for our coral reefs," said NOAA sanctuary superintendent Billy Causey.

NOAA's Marine Sanctuaries Division Damage Assessment and Restoration Program, the U.S. Coast Guard and the state of Florida all made significant contributions to the successful resolution of this incident.

A map detailing the Racon beacon placement is available on the Internet at: <http://www.sanctuaries.noaa.gov>.

For further information contact: Cheva Heck, Florida, USA. Tel: 305-292-0311.



## EUROPE

### GERMANY

#### **Cost Estimate of Climate Change on Sylt Island, German Wadden Sea**

Sylt Island is a well-known barrier island in the German Wadden Sea, in the federal state of Schleswig-Holstein. In 1985, the region was designated a national park in recognition of the high ecological significance of the Wadden Sea, which is a feeding and resting place for migratory birds and an important nursery ground for many aquatic species.

Sylt Island also provides many recreational opportunities. The sandy beaches along its west coast attract many tourists and have considerable economic importance for the island and the state. This area is threatened by sea-level rise due to climate change.

An economic analysis, to be carried out at the Technical University Berlin, proposes to evaluate, in monetary terms, the potential impacts of climate change on the socioeconomic and natural systems of the island. A benefit-cost analysis is used to assess these impacts.

The project will investigate the potential economic damage by formulating scenarios describing the erosion of the coastline due to sea-level rise and an increase in storm frequency over the next 50 to 100 years. The first stage of the analysis will be to identify the different impacts in a "with" and "without"-project context. This will be done by assessing the investment in coastal construction aimed at alleviating land erosion and flooding, including the use of beach nourishment. The magnitude of these impacts will then be measured, thus determining the amount of physical damage. The main physical impacts identified are property loss, recreational loss and environ-

mental loss. Monetary values will be placed on the measured physical impacts using basic economic methods.

Using the concept of total economic value, the benefits lost (property, recreational and environmental) include both use and non-use values. The use category is generated by the market, thus the value of traded goods and services at given prices is used. Market and shadow price valuation techniques will be applied. To determine the price of the non-use values (existence and option values) provided by the island and the surrounding Wadden Sea, a contingent valuation study will be carried out to assess the willingness-to-pay of Germany's inhabitants. Results of project research are expected in April 2000.

This analysis is an integral part of an interdisciplinary research project involving several German universities. The case study is one of the projects within the program "Climate Change and Coasts" funded by the Federal Ministry of Education, Science, Research and Technology (case study website: <http://soel.geographie.uni-kiel.de/sylt/>).

*For further information contact: Ina Meyer, Technical University of Berlin, Institute for Management in Environmental Planning, FR 2-7, Franklinstr. 28/29, 10587 Berlin, Germany. Tel: +49-30-314-73492. FAX: +49-30-314-73517. E-mail: [ina.meyer@imup.tu-berlin.de](mailto:ina.meyer@imup.tu-berlin.de).*

## INTERNATIONAL

### GLOBAL

#### **The Marine Aquarium Council: Certifying Quality and Sustainability**

The Marine Aquarium Council (MAC) is a non-profit organization composed of representatives of the aquarium industry, hobbyists, con-

servation organizations, government agencies, and public aquariums—all with a shared interest in the future of the marine aquarium industry, the marine organisms it is based on and the habitat that supports them.

MAC emerged from these stakeholders' concerns for:

- The effects of destructive fishing and poor handling practices on coral reef fish and habitat
- The need to develop a market for marine aquarium organisms supplied through certified sustainable practices
- The need to maintain the livelihoods of rural aquarium fishers through a sustainable marine aquarium industry
- The increasing marine conservation awareness within the industry and among aquarium hobbyists and the public

Market forces are the most useful means to encourage and support quality products and sustainable practices in the marine ornamentals industry. The demand from informed consumers for such products and practices creates an incentive for industry to adopt and adhere to standards for quality and for the management of the organisms, habitat, and industry practices, thus providing quality-assured, higher value-added marine organisms.

The goal of MAC is to ensure a sustainable future for the marine aquarium industry, organisms and habitat through market incentives that encourage and support quality and sustainable practices. MAC will accomplish this by establishing standards for "best practices," developing an independent system to certify compliance with these standards, and creating consumer demand and confidence for MAC-certified organisms, practices and industry participants.

The importance of what MAC is working to achieve, its innovative



basis in market mechanisms and the broad base of participation has led to the active interest and initial support of several funding organizations for the development of the certification system in pilot areas. In Hawaii, an initial prototype set of collecting and handling guidelines has been developed through a series of multi-stakeholder workshops; similar efforts are underway in the Philippines and soon will begin in a South Pacific pilot area. MAC will continue a phased process of multi-stakeholder consultations to finalize the initial standards, test them in collection-to-retailer operations in pilot areas, and begin pilot certification and labeling in 1999. The MAC organization and process, when fully established and mature, will evolve

into a largely self-financed system based on the improved economic return from certified marine aquarium organisms and fees for participation in the certification. In the meantime, external funds continue to be sought for the initial stages of establishing MAC.

MAC offers those with a stake in the future of marine aquarium organisms, habitat and the industry, the opportunity to:

- Participate in developing standards for quality, and a certification and labeling system
- Exercise greater management over the organisms and habitat
- Provide a quality-controlled, value-added product to the consumer
- Benefit from consumer demand for organisms supplied

through MAC-certified practices

Organizations, companies, government agencies and other groups, or individuals who are ready to collaborate and contribute constructively to achieving the goals of MAC are invited to join the MAC network by completing and submitting the form on the MAC website at <http://www.aquariumcouncil.org>.

*For further information contact: Paul Holthus, Executive Director, Marine Aquarium Council, 3035 Hibiscus Dr., Honolulu, Hawaii USA 96815. Tel: 1 808 923-3254. FAX: 1 808 923-6023. E-mail: [paul.holthus@aquariumcouncil.org](mailto:paul.holthus@aquariumcouncil.org). Website: <http://www.aquariumcouncil.org>.*

## Status of Coral Reefs of the World: 1998

Clive Wilkinson (ed.)

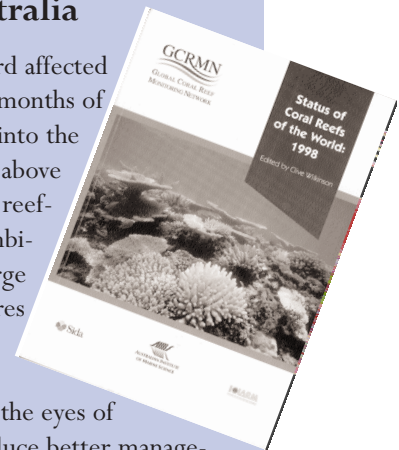
Australian Institute of Marine Science, Townsville, Australia

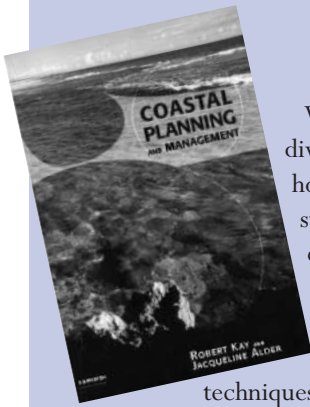
Beginning in 1997 and continuing into 1998, one of the largest El Niño events on record affected the global climate with coral bleaching and death on numerous reefs. During the first six months of 1998, the trade winds in the Indian Ocean decreased and virtually the whole ocean went into the doldrums. This meant that sea-surface temperatures increased several degrees Centigrade above the normal summer maximum (sometimes up to 5 degrees). These warm waters stressed reef-forming corals, as well as soft corals and many other animals, such that they lost their symbiotic algae and bleached pure white. These stresses were so extreme and prolonged that large populations of corals died, in places over 90 percent. This stress was in addition to pressures from excessive human activities such as pollution, excess sedimentation and over-exploitation.

This book presents a baseline summary of the status of reefs of the world seen through the eyes of local scientific experts. The baseline it provides can be used to measure attempts to introduce better management of reef resources in the future. In 2000, another updated version of this book will be produced to provide a status reports on the health of reefs from about 80 countries who sign on to the Global Coral Reef Monitoring Network and Reef Check (forming the International Coral Reef Initiative Monitoring Project).

*Copies of this book can be purchased from the Coastal Resources Center. To cover the cost of shipping and handling, there is a per book fee: United States: US\$ 7.50, Canada: US\$ 10.00 and Overseas: US\$ 12.50. Payment can be by MasterCard or Visa, or by check or money order payable to Coastal Resources Center. Please mail or E-mail Suzanne Wood, Coastal Resources Center, University of Rhode Island, Box 53, Narragansett, RI 02882 USA. Tel: 401-874-6109. FAX: 401-789-4670. E-mail: [suzwood@gso.uri.edu](mailto:suzwood@gso.uri.edu).*

*For book information contact: Clive Wilkinson, Australian Institute of Marine Science, PMB No. 3, Townsville MC, Queensland, 4810 Australia. Tel: 6107 4753 444. FAX: 6107 4772 5852. Website: <http://www.aims.gov.au>. E-mail: [c.wilkinson@aims.gov.au](mailto:c.wilkinson@aims.gov.au).*





## *Coastal Planning and Management*

**Robert Kay and Jackie Alder**

Writing a coastal zone management book is both an enlightening and sobering experience. The sheer diversity and magnitude of the problems in coastal zones globally sometimes leaves one with a sense of hopelessness that coastal management initiatives, however well thought out, will never really make a substantial impact. Then just when the problems of the coast seemed to be too much, we would write about coastal management successes from the literature, contributors or personal experiences in academia, research, consulting and government service.

The book, *Coastal Planning and Management*, is infused with this sense of realism about the current condition of coastal zones and how these conditions can be improved through planning and management techniques. The approach was to mix theoretical analysis with current best-practice coastal management and planning examples from around the world. The aim was to provide clear and practical guidelines for people who make daily decisions about the world's coastlines. We also wanted to produce a textbook that could be used at advanced undergraduate and graduate levels.

A common feature of most coastal plans around the world is the absence of quantitative evidence of their effectiveness—this despite the often considerable resources used in their formulation and implementation. Politicians, government departments and the public are increasingly expecting coastal programs to provide a clear demonstration of success. Coastal program managers are increasingly required to include monitoring and evaluation measures into program design—a difficult task without a set of commonly accepted coastal management performance measures.

The book will evoke either pessimism, at its rather depressing list of often chronic problems, painting a not too bright future for the coast; or excitement and optimism about the challenges that these problems present. A realistic coastal planner/manager will absorb a little of both, striving to be creative and flexible in dealing with the limitations of government and private sector bureaucracies. Only through the efforts of those coastal managers does the sustainable management of the world's coastal zones have a chance of success.

For further information see the Internet at <http://www.coastalmanagement.com> or contact Robert Kay, Western Australian State Government, 1 Essex Street, Fremantle WA 6160, Australia. Tel: 618 9239 2399. FAX: 618 9239 2281. E-mail: [rkay@transport.wa.gov.au](mailto:rkay@transport.wa.gov.au) or Jackie Alder, E-mail: [j.alder@cowan.edu.au](mailto:j.alder@cowan.edu.au).

## *The Coastal Environment Towards Integrated Coastal and Marine Sanctuary Management*

**Gary A. Klee**

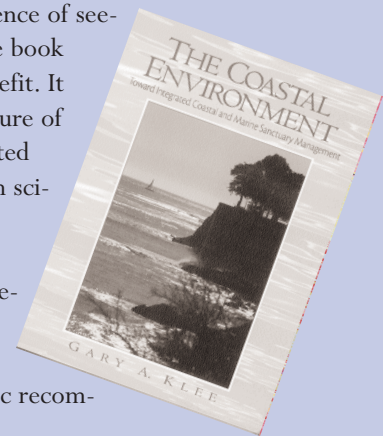
This book offers an introduction to coastal and marine sanctuary management—the art and science of seeing the interrelationship between coastal-land issues and adjacent marine sanctuary concerns. The book focuses on understanding, monitoring and managing these two related areas for their mutual benefit. It uses the United States National Marine Sanctuary program as a vehicle to discuss the physical nature of America's coasts, their environmental problems and various other conservation strategies associated with the field of coastal resource management. Each major chapter is equally distributed between science, policy and management.

The book adopts an issue-driven, pragmatic approach to looking at coastal hazards, pollution, ocean dumping, offshore oil development and transport, and open space preservation and management. The approach is environmentally based, embracing the social, cultural, legal, political, economic and ethical aspects of management. Included is a General Recommendations section for each of the major coastal issues that discusses the pros and cons of various issues and gives specific recommendations for moving “from the problem” to a possible solution.

This book offers the first comprehensive analysis of the U.S. National Marine Sanctuary Program and how it relates to coastal resource management. Also highlighted is The Monterey Bay National Marine Sanctuary, the second largest sanctuary in the world.

There is a wealth of information including numerous illustrations, case studies of each of the problem issues, a list of further reading and a list of key coastal management resources.

To purchase a copy contact: Patrick Lynch, Prentice Hall Publishers, Textbook Department, One Lake St., Upper Saddle River, NJ 07458 USA. Tel: 201-236-745 or 800-526-0485. E-mail: [patrick\\_lynch@prenhall.com](mailto:patrick_lynch@prenhall.com).




## Optimism or Pessimism?

(continued from page 3)

programs like Reef Check (page 19), ReefBase (page 19), the Global Coral Reef Monitoring Network and the Atlantic-Gulf Rapid Reef Assessment (AGRRA) (page 18), more is known and being communicated about the status of reefs. While the news about reef condition is not good, the expanded information base is providing the ammunition needed to talk to decisionmakers, and is helping assess the effectiveness of management actions.

Given all the above, I am unsure whether to feel optimistic or pessimistic about the future of coral reefs, and indeed about the future of our global coastal ecosystem. The articles in this issue give reasons for hope and reasons for grave concern. I hope that the disturbing information on the condition of coral reefs motivates all of us to more action; and the articles on promising approaches inspire management and offer us fresh ideas on how to address the enormous challenges of managing reefs and related coastal ecosystems.

Lynne Zeitlin Hale is the associate director of the Coastal Resources Center at the University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882 USA. Tel: 401 874 6112. FAX: 401 789-4670. E-mail: lzahale@gso.uri.edu. Website: <http://crc.uri.edu>. 

## CRC PUBLICATIONS NOW AVAILABLE

The Coastal Resources Center (CRC), University of Rhode Island, is recognized worldwide as a source of information on coastal management. Through its technical report series and other publications CRC promotes essential elements of sustainable development: to protect the world's environment, foster balanced economic growth, promote democratic participation in governance, and improve the health and well-being of coastal peoples. CRC is now making these and other publications available. Certain publications are available free of charge, other are available for a nominal fee to cover shipping and handling costs. (Per book fee in the United States: US\$ 7.50, Canada: US\$ 10.00, Overseas: US\$ 12.50.) CRC will accept MasterCard, Visa, checks, and money orders. All orders will be shipped upon payment clearance.

The titles below are only a few of the numerous publications available. For a complete list contact Suzanne Wood, Coastal Resources Center, University of Rhode Island, Narragansett Bay Campus, South Ferry Road, Narragansett, RI, USA 02882. Tel: 401 874-6109; FAX: 401 789-4670; E-mail: [suzwood@gso.uri.edu](mailto:suzwood@gso.uri.edu).

- Manual for Assessing Progress in Coastal Management
- Learning From Experience: Progress In Integrated Coastal Management
- Status of Coral Reefs of the World: 1998
- Coastal Aquaculture in Developing Countries: Problems and Perspectives
- Eight Years In Ecuador: The Road to Integrated Coastal Management
- Monitoring and Evaluating the Impacts of Small-Scale Fishery Projects
- Normas Practicas Para el Desarrollo Turistico de la Zona
- Rapid Assessment of Management Parameters for Coral
- Maintaining A Balance: The Economic, Environmental and Social Impacts of Shrimp Farming In Latin America
- Manteniendo un Balance: Impactos Económicos, Ambientales y Sociales del Camarón en Latinoamérica

Addendum to book review in *InterCoast* Winter 1999

### *Coastal Seas. The Conservation Challenge* John R. Clark

Price: US\$ 20.00. Available from Blackwell Science. Contact Anna Rivers, Blackwell Science, Osney Mead, Oxford OX2 0EL, England. Tel: 44 1865 206206. FAX: 44 1865 206096. E-mail: [anna.rivers@blacksci.co.uk](mailto:anna.rivers@blacksci.co.uk).

## *InterCoast* on the Worldwide Web

Back issues of *InterCoast* can be found on the WWW at  
[http://crc.uri.edu/comm/htmlpubs/ic/IC\\_main\\_page.html](http://crc.uri.edu/comm/htmlpubs/ic/IC_main_page.html)

# Fall 1999 Issue of INTERCOAST

## Natural Disasters and Hazard Mitigation

Nineteen ninety-eight and 1999 have been very hard years for coastal nations as a



result of the numerous natural disasters that have severely affected the coastal communities. One of the largest El Niño events on record affected the global climate, and hurricanes devastated communities in Latin America and the Caribbean, and elsewhere in the world. The uncontrollable

occurrence of natural disasters strongly demonstrates the need for hazard mitigation efforts. A prime time for hazard mitigation efforts is post-disaster, in the rebuilding stages. It is imperative that strategies are incorporated into rebuilding efforts to assure that subsequent natural disasters do not result in the same degree of devastation. This issue of *InterCoast* will focus on recent natural disasters, and the hazard mitigation techniques available to protect against future disasters.

In addition to articles on **Natural Disasters and Hazard Mitigation**, *InterCoast* includes articles on general coastal issues and 'Reports from the Field,' summarizing projects and achievements or initiatives.

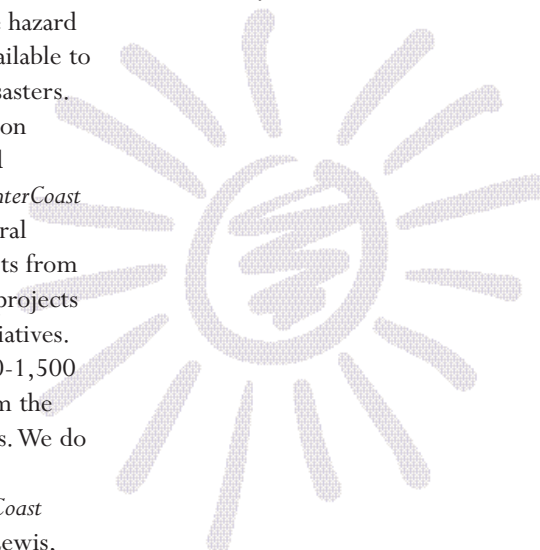
Articles should be 750-1,500 words, and 'Reports from the Field' are 250-500 words. We do edit articles.

To contribute to *InterCoast* #35, contact Noëlle F. Lewis,

Coastal Resources Center,  
Graduate School of  
Oceanography, University of  
Rhode Island, Narragansett, RI,  
02882 USA. Tel: 401-874-6870.  
FAX: 401-789-4670. E-mail:  
noelle@gso.uri.edu. Website:  
<http://crc.uri.edu>.

Deadline is August 13, 1999

Thank you.



Coastal Resources Center  
University of Rhode Island  
Narragansett Bay Campus  
Narragansett, RI 02882 USA

*Address service requested*

Nonprofit  
Organization  
U.S. Postage  
PAID  
Wakefield, RI  
Permit No. 19