



---

# Coral Reef Protection in Quintana Roo, Mexico. Intercoast #34

---

**Bezaury, Juan and  
Jennifer McCann**

**1999**

**Citation:**

*Narragansett, Rhode Island USA: Coastal Resources Center. InterCoast Network Newsletter, Spring 1999*

For more information contact: Pamela Rubinoff, Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 220 South Ferry Road, Narragansett, RI 02882  
Telephone: 401.874.6224 Fax: 401.789.4670 Email: rubi@gso.uri.edu

This five year project aims to conserve critical coastal resources in Mexico by building capacity of NGOs, Universities, communities and other key public and private stakeholders to promote an integrated approach to participatory coastal management and enhanced decision-making. This publication was made possible through support provided by the U.S. Agency for International Development's Office of Environment and Natural Resources Bureau for Economic Growth, Agriculture and Trade under the terms of Cooperative Agreement No. PCE-A-00-95-0030-05.



# Intercoast Network

Narragansett, Rhode Island, U.S.A. • #31 • Spring, 1998

## Protecting the Maya Reef Through Multi-National Cooperation

By Juan Bezaury and Jennifer McCann

**O**n Earth Day, June 5, 1997, heads of state from Belize, Honduras, Guatemala and Mexico, united in Tulum, Mexico to show their commitment towards the protection

manage their coastal resources regionally. The overall goal is to take advantage of growing opportunities for sustainable development, through the rational use and conservation of reef resources. Involvement and support by coastal communities, private companies, national and international non-profit organizations and government



Fisher in Quintana Roo, Mexico.

and wise use of their shared coastal habitats, especially the coral reef, by signing onto the Mesoamerican Caribbean Coral Reef Systems Initiative. All four countries understand that this rich and diverse ecosystem, second in size only to the Great Barrier Reef in Australia, is the bases for many of their industries including tourism and fisheries. Currently, land-based activities, including coastal development, have placed increased pressures causing, in many cases, destruction or irreversible damage.

The Mesoamerican Caribbean Coral Reef Systems Initiative provides a forum for all four nations to act and

officials is crucial to the success of this regional and integrated initiative. Some of the objectives include the establishment of protected areas; strengthening regulations; ecotourism planning; securing international

funding; and encouraging coastal management to address the need for the sustainable use and conservation of this area. Providing opportunities for training, scientific research and monitoring are also encouraged.

Other agreements have been signed by these four nations, including the Tuxtla I and II Agreements; Agreements of the Central American Commission on Environmental and Development that encourage conservation actions on the Mesoamerican Biological Corridor; and the Cartagena Agreement on the protection and use of marine life in the Greater

## Intercoast Survey Results Show Diverse Readership

**M**ore than 200 people worldwide responded to *Intercoast's* recent readership survey, and the results reveal a truly global audience with diverse areas of interests in coastal resource management.

Readers from more than 50 countries, representing an array of cultures, knowledge and interests, provided personal and professional profile information, fields of interests, and suggestions to improve the look and usefulness of *Intercoast*.

Although the majority of those who responded hold a Ph. D., *Intercoast* appealed to many who did not. Readers are employed as environmental consultants, university professors and lecturers, government employees, research scientists and employees of non-governmental organizations.

Those surveyed indicated that *Intercoast* is a valuable tool that can be used by some to develop national policies, create research projects, compare coastal management strategies and international trends, network, and prepare seminars and workshops; while for others *Intercoast* serves as a source for general insight.

The more than 200 readers

(continued page 2)

### Highlights

3  
Managing  
Tourism in  
East Africa

4  
South Africa  
Launches  
Coastal  
Program

8  
Resource  
Conservation  
in Malaysia

16  
Urbanization  
in Denmark

22  
Reports From  
The Field

(continued page 24)

## Intercoast to Begin Subscription Fee in 1999

In the past two years, *Intercoast* has expanded both its size and its global readership. Due to the costs associated with printing and mailing, the expense of getting *Intercoast* to our increasing readership has risen. One purpose of the recent *Intercoast* survey was to determine the willingness of our readers to pay a nominal annual subscription fee to offset these growing costs.

The response we received was that, on average, *Intercoast* readers would be willing to pay a subscription price of US\$ 10 for three annual issues with a featured topic of interest; and periodically a special edition which would be devoted to a single topic, such as last year's very popular *Intercoast* Special Edition #1 on mangroves. Based upon the survey response, beginning with the January 1999 issue, subscribers to *Intercoast* will be asked to pay an annual fee of \$10.

Some respondents raised concerns about charging a subscription price. These included the issue of costly international exchange rates, the desire to use credit cards rather than money orders and, most significantly, the inability of some individuals and organizations to pay a \$10 annual fee. In regard to the first two concerns, we will develop systems for payment which minimize extraneous costs and complications. As for the last concern, we will provide the opportunity for individuals and organizations from developing countries who wish to continue to receive *Intercoast* for free if the subscription rate is a financial hardship.

Instructions for submitting payment or requesting a waiver will be published in the Fall edition of *Intercoast*. We greatly value our audience and would not like to lose even one reader. We will try to accommodate you and make the transition easy and equitable. Thank you for your continuing interest in and support of *Intercoast*.

—The Editors

### Survey

(continued from page 1)

that replied indicated that, on average, four other people read each issue.

*Intercoast*'s audience is even wider as a result of readers contributing their copies to libraries, after making the rounds among coastal managers. This is in addition to those sent directly to libraries.

*Intercoast* readers suggested many topics for future issues, including marine environment restoration; environmental techniques and methodologies; geographic information systems

(GIS) and remote sensing; effects of climate change; aquaculture and fisheries; water pollution; environmental law and policy; integrated coastal management case studies; among others.

Whether the readers of *Intercoast* are from Algeria, Germany, or Tokyo, they all shared the common desire to learn about and understand coastal issues.

Survey respondents rated the feature articles the most valued element of the newsletter, with "Reports from the Field," "Intercoast Insider Information" and the editorials following close behind. *Intercoast*'s editors will use the survey results to tailor the

newsletter to what readers want to see and what is most relevant and beneficial to their work. *Intercoast* strives to keep the articles and networking information topical and up-to-date.

Readers' suggestions on how to improve *Intercoast* are useful and appreciated, and the editors urge you to continue giving feedback, even in addition to the survey. Those who responded to the survey have already taken the first step to help shape the publication. We welcome your future involvement with *Intercoast* through the contribution of articles and by offering your valued opinions. 🌐

# Small-Scale Tourism in Eastern Africa: Helpful or Harmful to Local Communities?

By Friederike Ziegler

Managed tourism can often contribute to the survival of local communities. This was discussed during the workshop "Experiences in Local and Community Integrated Coastal Management (ICM) Projects – Lessons to Date" held in Zanzibar, Tanzania, March 4-6, 1998. The workshop was organized by the Secretariat for Eastern African Coastal Area Management (SEACAM, see *Intercoast Network* #30) and the Western Indian Ocean Marine Science Association (WIOMSA). Fifteen local, community-based ICM projects from the East African region presented their results achieved and lessons learned. Some 70 participants agreed that tourism, if contributing to community development and respectful of local traditions, is a reasonable means of supporting long-term development and increasing community awareness of the coastal area. Two experiences, one good and one bad, are described here.

## Bazaruto Archipelago – Learning From Mistakes

Bazaruto is located 20 km off the south coast of Mozambique, about 800 km north of Maputo. The archipelago has 2,700 inhabitants of which most are dependent on fisheries. Three of the islands constitute Mozambique's only marine national park established in 1971.

The Bazaruto Project was established in 1989 to implement ICM. One initiative is to establish sustainable tourism that also benefits the local community. From the start, a major problem has been the lack of a legal mechanism to ensure that tourism revenues were returned to the local community. However, last year an informal agreement was reached between island tour operators, the national park and the Bazaruto project; now US\$ 5 is col-

lected from each tourist entering the park. To date, about US\$ 10,000 has been collected, representing some 2,000 visitors. The money has been used to build schools, a health clinic and provide other community services. Also, this money funds two full-time educators who patrol the beaches, answer tourists' questions, burn litter, and monitor for illegal fishing and destructive fishing methods.

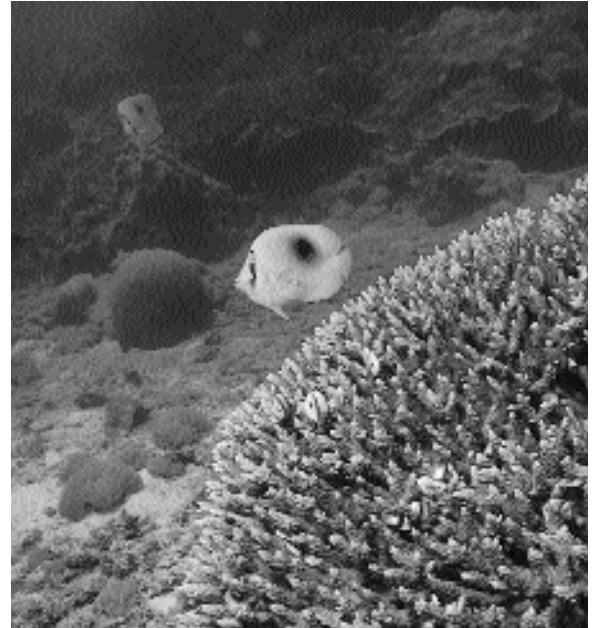
Tourism still cannot be called sustainable. A big problem is that cruise ships carrying 200-400 passengers visit the island, disembark for shopping, snorkeling and diving (often creating environmental problems) without contributing to the tourist fund. The number of ships has increased dramatically over the last year. Another problem is that neither the tour operators or the project employs many local people, mainly because locals lack higher education.

To benefit the local community it is necessary for the tourism industry to contribute to the island community; to consult with the community before granting tourism concessions (to avoid conflicts of interests); and to market the marine park and its ecological diversity.

## Misali Island in the Zanzibar Archipelago, Tanzania – A Successful Venture

A tourism project started on Misali Island, Zanzibar, as part of the already existing Misali Island Conservation Project, begun in 1996. Misali is a small island with an area of 0.9 sq km. It is covered with forest and surrounded by relatively undisturbed mangroves and coral reefs. The World Tourism Organization recommended that Misali become a nature conservation area, and the introduction of low-impact tourism be evaluated. A small-scale pilot project was started in December 1997. The project emphasizes that the local community should participate in and

benefit from the project. So far, four Misali fishers have been trained as tour guides. A tour operator in Zanzibar Stone Town takes tourists by high-speed



Coral reef in Zanzibar.

ferry to Pemba Island, where they stay and make day trips to Misali. Tourists give a voluntary US\$ 10 donation that is spent on the local fishers and their families.

Conflicts between the fishers and conservation interests have not arisen on Misali, since the guides are also fishers and the conservation efforts have led to increased fish catches. Rather, the fishers are very enthusiastic about the project and want to establish a nongovernmental conservation organization.

Misali, because of its small size, represents a manageable and realistic model for development of an ICM strategy which includes conservation, community development and tourism. However, larger efforts are required to conserve marine resources on a regional level.

For further information contact: SEACAM, 874 Av. Amlcar Cabral, Maputo, Mozambique. Tel: 258-1-300641/2. FAX: 258-1-300638. E-mail: seacam@zebra.uem.mz. 🌐



# South Africa Launches Coastal Management Program

The South African coast stretches for some 3,200 km between Namibia and Mozambique. It is the meeting place of the Atlantic, Southern and Indian oceans. People are attracted to this coast because of the many different opportunities it offers through its rich natural resources, beauty and



Langebaan Lagoon, part of the West Coast National Park

economic potential. The history of racially exclusive political and economic development has meant that indigenous populations have had limited access to the coast and its resources.

The growing demands of more and more people concentrated in coastal towns and cities have resulted in overuse, damage and destruction of some coastal resources. The Ministry of Environmental Affairs and Tourism has initiated a Coastal Management Policy Programme to prepare a policy that will guide the management of the coast for the benefit of current and future generations of all South Africans.

## South Africa's Coast

The South African coast is diverse. The biophysical features range from desert conditions in the northwest to tropical conditions in the northeast. Compared with many other coastal countries, South Africa has few large rivers, due to relatively low seasonal rainfall, and few sheltered bays. For much of the year, strong winds and stormy seas are experienced along this high-energy coastline, moving large amounts of sediment northward along the west and east coasts.

Socioeconomic conditions also vary greatly, from isolated and poor subsistence farming to the urbane and sophisticated activities associated with modern cities, notably in Cape Town, Port Elizabeth, East London and Durban. This diversity is reflected in the range of activities that take place at the coast, including commercial farming activities; residential, recreational and resort developments; port activities; marina developments; mining; fishing; nature reserves; and transport infrastructure, among others. There are a variety of cultures and languages, with four of the country's eleven official languages being spoken along the coast, namely Afrikaans, English, Xhosa and Zulu.

Institutional characteristics and capacity also vary along the coast. While a single national constitution applies along the coast, there is a marked variation in local and regional government structures, with the incorporation of traditional leadership structures being a significant feature of administration in some regions.

## History and Structure

The election of South Africa's first democratic government in April 1994 has provided a fundamentally different context for public policy making. Now all South Africans can engage in a meaningful dialogue to address issues of common concern. It is in this context that the Coastal Management Policy Programme has been developed

and implemented.

The program was born out of the need to redress the imbalances of past apartheid policies, and to address the problems inherent in an uncoordinated approach to coastal management. Extensive negotiations with a broad spectrum of national interest groups led to agreement on a process for formulating the coastal management policy and the structures that should guide it.

**Policy Committee:** The Minister of Environmental Affairs and Tourism appointed a policy committee to make recommendations about a draft policy for managing the coast. The policy committee is a partnership between government and civil society, and represents the interests of national government, provincial government, business, labor, community-based organizations, environmental non-governmental organizations, and the sport and recreational sector. Each policy committee member has equal status, and decisions are made by consensus. The policy committee has been constituted as a not-for-profit company to administer the program.

**Project Management Team:** A project management team has been appointed by the policy committee to implement and manage the program. It is made up of individuals from the consulting firms of Common Ground Consulting and Watermeyer, Prestedge, Retief. It also includes individuals with skills and expertise in coastal management, general project and process management, facilitation and public participation, and communications.

**Regional Managers:** A group of five regional managers has been appointed to facilitate the involvement of interested and affected parties around the coast, and to consolidate information relevant to their regions.

**Funding:** The British Department for International Development has generously provided the financial support for this program.

## Program Aims

The coastal management program aims to achieve the following:

**Meaningful public participation:** The program wants to ensure that all interested and affected parties will have the opportunity to participate in all stages of the policy formulation process. Participation is necessary to make sure that the policy addresses real issues of concern, is based on a common vision for the future of the coast, leads to broad ownership of and commitment to the policy, and results in its effective implementation. Government support and active participation is therefore vital, as is broad public participation.

**Scientific integrity:** The policy must build on the knowledge and understanding of coastal systems and resources. Scientific research also needs to be integrated with sources of traditional and common knowledge, and with the information generated through the public participation process of the program. Once the policy has been formulated, there will be a need for ongoing, integrated scientific research.

**Integrated coastal management:** Coastal management is a process that ultimately requires creative partnerships to be established between government, civil society and the private sector. Such partnerships should aim to promote a scientifically rigorous, but inclusive management approach that will improve the quality of life of coastal communities, and those who depend on, use and enjoy the coast. The approach should also maintain the biological diversity, productivity and ecological integrity of coastal ecosystems.

**Practical policy:** This policy will only be effective if it results in better management of the coast. The policy must therefore be practical and address priority and strategic coastal issues. Coastal management is best thought of as a process – it is not a one-time activity. This process involves policy formulation, implementation, monitoring and evaluating the results, and, where appropriate, making revisions to both the policy and implementation

measures to ensure that the desired outcome is achieved. The process of policy formulation must therefore include opportunities to learn from and adapt to direct experience and to that gained by others. The policy formulation process must also strive to promote partnerships that will help the policy to be implemented. Only in this way will an effective policy be developed.

## Program Components

**Integration and analysis of information:** The project management team is integrating and analyzing information from a range of sources including information generated in the course of the public participation process, related initiatives currently underway in South Africa and past research, among others.

**Capacity building:** This aspect of the program seeks to address the unequal access to resources, education, knowledge and power experienced by different groups within South Africa. The focus of this activity is to enhance the capacity of people to participate in the policy formulation process. Approximately 30 percent of the project budget is devoted to this end. It should be noted that it is not only disadvantaged groups who need capacity building. A recurrent theme in processes with a strong emphasis on public participation is the relative distance between specialist professionals and lay people.

**Communications:** The communications program includes activities at the national and regional level to provide information about the program and encourage the involvement of interested and affected parties. It includes media coverage, the preparation of pamphlets, posters and booklets written in plain language, as well as the production of a website dedicated to the program and an introductory video.

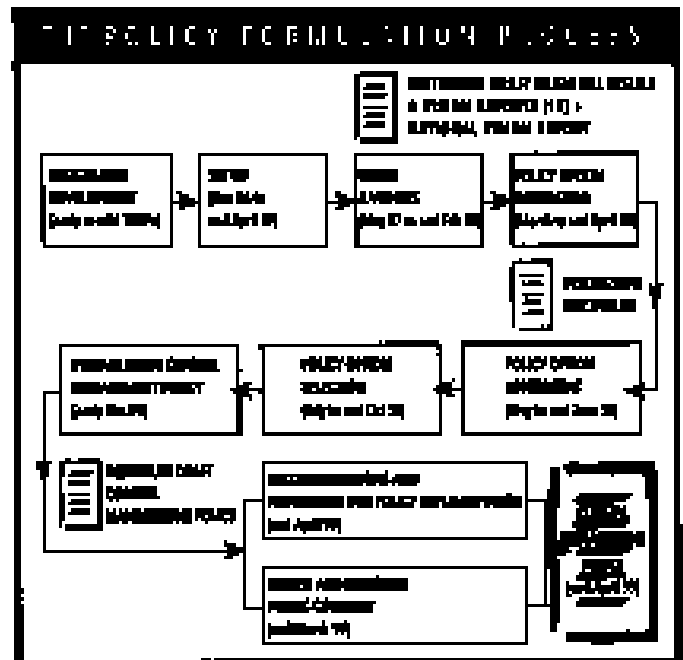
**Governmental relations:** A par-

allel program of interaction with governmental actors has been implemented to ensure that national and provincial levels of government are fully informed and involved in the process.

**Specialist studies:** Four specialized investigations to inform the policy formulation process have been initiated.

They include:

- Related initiatives currently underway
- Characterization and assessment of coastal regions and resources
- Lessons learned from past experience
- Legal and institutional context and capacity



## Conclusion

The Coastal Management Policy Programme marks a fundamentally new approach to coastal management in South Africa. Central to this approach is building new partnerships within and between government, civil society and the private sector. Through these partnerships the program hopes to develop an integrated approach to coastal management based on a practical policy that addresses key coastal issues and realizes a common vision for the South African coast.

For further information on this program, please refer to the following website: <http://www.cmpp.co.za>

# Using ICM and Economics to Conserve Coastal Tourism Resources in Sri Lanka

By Alan T. White,  
Virginia Barker and  
Gunatilake Tantrigama

**H**ikkaduwa and its marine sanctuary are representative of the issues facing many coastal areas in tropical Asia where tourism and coastal development have nearly ruined valuable coastal resources. For Sri Lanka, the Hikkaduwa Marine Sanctuary is the

here, if carried out for more than five years with any level of tourism growth equal to or exceeding 3 percent, is financially beneficial.

## Coastal Management in Sri Lanka

Sri Lanka's national coastal zone management program, established in 1990, allows development within a

coastal strip 300 meters wide on land and 2 km out to sea, while preventing unnecessary environmental degradation, pollution and erosion.

In 1992 Hikkaduwa was selected as one of two Special Area Management (SAM) sites

under the Coast Conservation Department and the Coastal Resources Management Project of the University of Rhode Island's (USA) Coastal Resources Center and the United

States Agency for International Development. A cost-benefit analysis of the tourist industry and key coastal resources was done to justify managing the coastal resources which support tourism. Economic scenarios that assume different levels of tourism were used to portray the potential future economic benefits from improved environmental management.

## Management Issues and SAM Plan Objectives

Tourism in Hikkaduwa has declined in recent years. The reason is unplanned and uncoordinated development causing degradation of the coral reef, declining water quality, sedimentation, inadequate solid waste disposal and coastal erosion, among others. In addition, coral mining, a socioeconomic and environmental problem, continues near the Hikkaduwa Marine Sanctuary.

The overall goal of the SAM plan is to protect and manage coastal resources so the community can benefit from a healthy environment, and the local tourism and fishing economy can remain sustainable. Benefits from resource management include protection of the coral reef and regulation of activities within the marine sanctuary; maintenance of water quality and control of waste disposal;

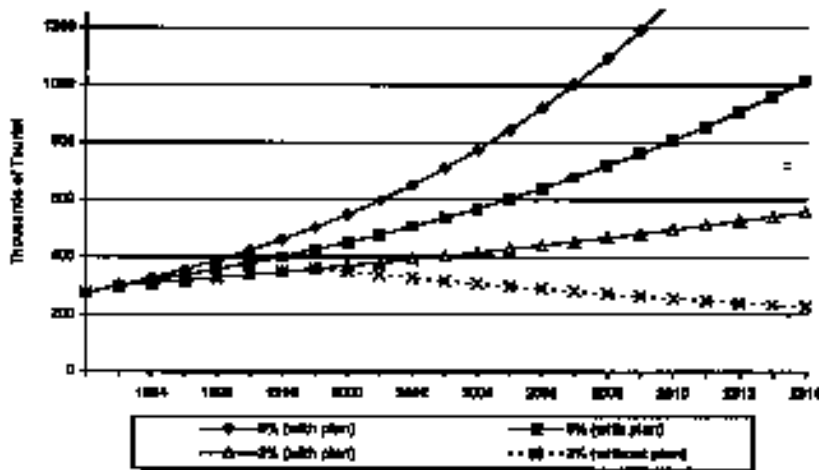


Figure 1: Number of tourist guest nights for high, medium and low growth in Hikkaduwa with and without plan implementation.

only accessible coral reef on the south coast. The 4-km coastal strip (about 100 hectares) is known for its coral reef, clean water and beaches. Tourists continue to come despite increasing environmental degradation, primarily because the damage is not obvious to new visitors. However, tourists are beginning to recognize the problems and threaten to go elsewhere.

Integrated coastal management (ICM) and the investment in environmental management to prevent degradation and loss of biodiversity are the key issue in Hikkaduwa. The question is whether or not the tourism industry, the town and the national government can economically justify the rehabilitation and conservation of the coastal environment of Hikkaduwa. The conclusion is that the program proposed

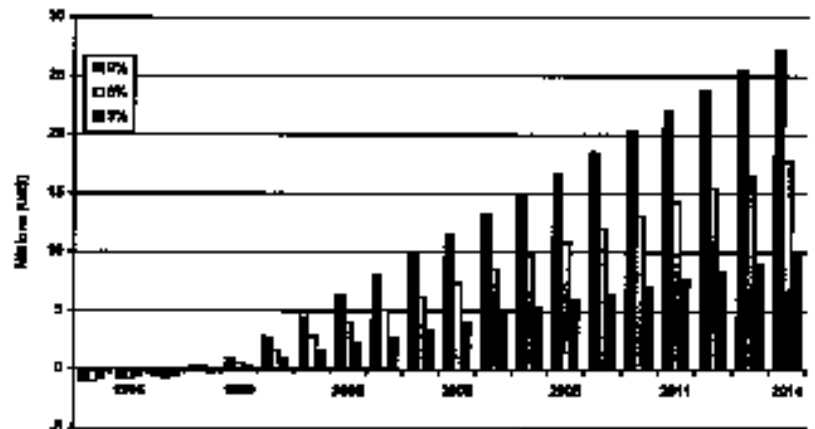


Figure 2: Cumulative socio economic NPV for 9, 6 and 3 percent tourism growth.

control of shoreline development; and more nature-based tourism development.

### Economic Evaluation of Hikkaduwa's SAM Plan

For the SAM plan to merit implementation, it must be competitive with other development and conservation projects and contribute to the economic benefits of Hikkaduwa's tourism economy. Management costs reflect past poor planning, infrastructure and enforcement. These threaten the marine habitats crucial to the tourism industry. The SAM plan resolves competing demands on area resources by planning for optimal and sustainable resource use. It addresses resource degradation as well as the social and economic impacts of tourism.

To determine the project lifetime, an appraisal should consider all years for which the project produces benefits or costs. For Hikkaduwa, since the project has been designed to prevent irreversible environmental degradation, project benefits are expected to accrue into perpetuity. In the interest of predictable analysis results, benefits and costs of the project are only estimated over the first 20 years.

The economic analysis is based on four field surveys: 1) a survey of 168 Hikkaduwa business establishments and their revenues, costs and employment; 2) a survey of 122 randomly selected foreign visitors to Hikkaduwa in 1993; 3) a survey of 96 foreign tourists' willingness to pay for protection of the beach and coral reef resources 1995; and 4) a survey to count reef users in 1995.

### Financial Analysis and SAM Plan Costs

The simplest form of economic evaluation for the SAM plan is the cash flow impacts of management options to direct project beneficiaries and contributors. If the management plan is fully implemented by the direct beneficiaries of Hikkaduwa tourism, then this analysis evaluates the financial profitability of

the plan for the local tourism industry. Unlike the fixed nature of the management plan implementation costs, tourism industry profits are dependent on visitation levels.

To account for the uncertainty of growth projections, three different rates of annual growth are used: an optimistic 9 percent increase, a moderate 6 percent, and a conservative 3 percent increase. Hikkaduwa guest night projections for 1995 to 2014, considering with and without plan implementation, are shown in Figure 1. Without plan implementation, the resources of interest to Hikkaduwa tourists are assumed to continue to degrade.

Financial net present value (FNPV) is the sum of the present values of annual net cash flow balances plus any discounted "scrap values." A positive FNPV indicates that the project is at least as profitable to the owners or stakeholders as the next best investment alternative. FNPV calculated over the 20-year life of the project reveals that the plan is financially viable.

### Social and Environmental Analyses of SAM Plan Implementation

Social benefits to area residents due to SAM plan implementation include

**Table 1. NPV of Benefits (US\$ millions) From SAM Plan Implementation Derived From Various Economic Analyses**

Growth Scenario	Financial	Socioeconomic	Environmental Economic (net profit less SAM cost)	Environmental Economics (with consumer surplus)
High (9%)	13.2	27.8	24.5	27.1
Medium (6%)	8.1	17.2	15.2	10.0
Low (3%)	4.6	9.8	8.7	2.2

solid waste management, sewage collection and treatment, improved roads and other public infrastructure, environmental education programs, vocational training and heightened law enforcement. The net present value (NPV) of quantifiable socioeconomic costs and benefits of implementing the SAM plan are estimated for the three visitation rates (Table 1). Calculation of cumulative net benefits indicates that for any project lifetime exceeding

**Table 2. Absolute and Percentage Share of SAM Project Beneficiaries/Cost Burdens**

Project Beneficiary/ Burden Holder	NPV of Benefits (US\$ millions)	Percentage Share
Local tourism industry	8.86	72.5
International community	5.64	21.7
Local community	0.52	2.0
National economic welfare	0.98	3.8
SAM plan costs	3.47	72.6
Coral miners	1.31	27.4

four years, with any level of tourism growth equal to or exceeding 3 percent, the cumulative benefits exceed cumulative costs and the project pays for itself (Figure 2).

The financial analyses considered only the costs and benefits to the tourism industry within the Hikkaduwa SAM site, whereas the socioeconomic analysis included impacts on the entire economy of the management area and some aspects of the national economy.

*(continued page 28)*



# Balancing Tourism and Resource Conservation in Malaysia's Pulau Payar Marine Park

By Donna J. Nickerson,  
George Chong and  
Kevin Hiew

In Malaysia, the Department of Fisheries (DOFM) established a system of marine parks to protect important marine resources including coral reefs, which contribute to biodiversity and fisheries production. Tourism has been a natural development of the marine parks and also one of the reasons for expanding the scope of marine park management.

DOFM is establishing a Special Area Management Plan (SAMP) for Pulau Payar Marine Park and the surrounding area. The SAMP project is being implemented by DOFM in collaboration with the Bay of Bengal Programme of the Food and Agriculture Organization (FAO). The goal of the SAMP is to promote the conservation and sustained production and use of the area's reef resources. Building on existing marine park management, the SAMP will be used as a model for other marine park islands in Peninsular Malaysia and to develop a national integrated coastal management (ICM) framework.

Pulau Payar Marine Park, established originally as a Fisheries Protected Area in 1987, was the first marine park in Malaysia. Since then, marine waters surrounding 34 additional islands were gazetted as marine parks by DOFM. Prior to the SAMP, park management focused mainly on the environment within two nautical miles and on activities directly associated with tourism. The SAMP expands on the progress made under the park management to now begin to address a wider scope of issues (and stakeholders) that affect the sustainability of the park.

The SAMP approach is incremental. The first phase was to form a working group to complete the groundwork needed to take the SAMP process to a

wider audience. The second phase was to characterize the geographic area under the SAMP to help identify and understand the issues and problems, their probable causes and the possible solutions. The third phase is developing solutions with input from a wider audience of local decisionmakers.

## The Alor Star Workshop

The project held a workshop in Alor Star, Malaysia, in October 1997, that marked the transition between the second and third phase. The results of the scientific characterization activities under the second phase were presented to the SAMP participants. The workshop enabled interactions between the state agencies, universities and non-governmental organizations that will participate in the SAMP.

Participants were invited from 17 agencies and organizations. Topics included: 1) progress in the SAMP activities at the national level to prepare for the interagency state level SAMP development and implementation work; 2) early results of the scientific characterization findings; and 3) participants' recommendations on issues for management, probable causes of the issues and possible solutions.

## Scientific Characterization Results

The study indicated that reef fish catch increased between 1986 to 1996 in the vicinity of the Pulau Payar Marine Park. This included landings of 10 coastal districts of Kedah State and 18 coastal districts of Langkawi Island. Fish catch of non-reef fish had declined during this same period. Further, the status and trends analysis compared catch of fishers that fished outside the vicinity of the marine park (i.e., greater than 25 nautical miles) to catch taken in the vicinity of the park (i.e., less than 25 nautical miles). Results indicated

that while catch near the park had been consistently higher during 1986-1994 than catch outside the park, catch taken near the park decreased during 1995-1996 relative to catch outside the park.

Findings of the coral reef habitat analysis indicated a similar decline in 1996. Live coral coverage between 1982 and 1994 at five sites were analyzed; the same sites were again monitored in 1996. While coverage increased after the establishment of the marine park, coverage at the sites most heavily used by tourists (i.e., Jetty and Float) declined after 1994; declines were less at those sites less used by tourists and only visited by divers (i.e., Kaca).

A study of tourism trends and impacts revealed that divers caused little damage to the reef. However, snorkelers and swimmers caused significant damage by trampling of corals. Park visitor numbers have increased from 1,373 in 1988 to over 91,000 in 1997. The number of visitors is monitored daily by the DOFM park rangers.

Demographic trends analysis of Kedah State indicated that the coastal population in the study area has experienced a 38 percent growth from 1970-1991. However, Kedah's coastal districts have experienced a negative growth rate in the three sub-districts. This may reflect the high out-migration rate of young family members from fishing as an occupation.

Thirty-one percent of fishers interviewed reported improvements in fish stocks, while 20 percent felt that fish stocks are worse off than 10 years ago. However, the majority agreed that government has taken adequate steps to conserve the fishery resources, but that stricter enforcement was needed, particularly on the number of boats in the fishery. The majority also were not satisfied with the current environmental conditions along the coastal areas of Kedah.

At the workshop, smaller working groups discussed SAMP issues: decline in the fishery resources (overfishing); impacts from tourism development; impacts from changes in land and sea-based development; and protection of marine biodiversity and ecosystem health.

A second workshop is being planned that will ensure greater participation from stakeholders who are direct users of the resources, such as fishers and tour/dive operators. The workshop will be geared towards exchanging views with the wider public on the SAMP objectives and potential actions, and identifying and committing to the roles and responsibilities of all stakeholders.

### Tourism in Pulau Payar Marine Park

Economic revenue for the local area and for Malaysia as a whole is generated from the use of both land and marine resources. However, sustainable use and sustainable economic revenue requires a healthy ecosystem. For example, much of the land development in the coastal districts of Kedah and in Langkawi, including the Port of Langkawi and along the mainland, has been for tourism. Tourism, like fisheries, while a large revenue generator for the state, is dependent over the long term on a biologically diverse marine and coastal ecosystem.

Demographic trends indicated that the population in the Langkawi Islands is more stable than in the Kedah coastal districts. The stability of Langkawi's population was explicitly linked to the development of Langkawi as a tourist area. The population has not needed to migrate outside the districts for employment because of the economic opportunities offered by the tourism-associated industries. However, results also showed that maintaining the tourism industry also means maintaining the health of the marine park ecosystem. Pulau Payar is a main item in the tour itinerary to Langkawi. A survey indicated that tourists want a marine park with clean beaches, an abundance

of reef fish, diverse coral life, peace and quiet, friendly and helpful park staff, adequate facilities and adequate information on the marine environment. More than half indicated that the opportunity to dive and snorkel was an important factor. The survey revealed dissatisfaction with the high number of visitors and lack of both guided activities and information on the marine environment. A large percentage indicated that an increase in visitor numbers would affect their enjoyment of the park.

Results presented at the workshop

as indicative of probable effects of the identified problems. Results strengthened the fact that the local economy was dependent on the health of the marine park's ecosystem.

Discussions at the workshop clearly concluded that both federal and state level participation would be equally important in achieving a balance between development and conservation. The next step in the SAMP is to work out a formal mechanism for the long term where the federal and state levels of multiple agencies can continue to understand the interlinkages of



Tourism is expanding the scope of marine parks in Malaysia.

also indicated that unbalanced use of the area's resources may also have an impact on fisheries resources and coral reef habitats. As stated earlier, while live coral coverage increased after the establishment of the marine park, live coverage at the sites most used by tourists declined after 1994 during years of heavy tourism. However, declines were less at sites more infrequently used by tourists and only visited by divers.

Results of the studies are not conclusive, given the limited number of sampling periods and gaps in information. Rather, the results were viewed

their activities and coordinate solutions to ensure sustainability of the park's resources.

*For further information contact:*  
*George Chong, Head, Marine Resources Branch, Department of Fisheries Malaysia, Wisma Tani, Kuala Lumpur 50628, Malaysia. Tel: 603-298-2011. FAX: 603-291-0305. E-mail: gecho01@dof.moa.my; or Donna J. Nickerson, Coastal Management Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Bangkok 10200, Thailand. FAX: 662-280-0445. E-mail: Donna.Nickerson@fao.org. 🌐*

# Mapping Tourism in the Coastal Zone with Digital Aerial Photography

By Paul Geerders, Christiane Klöditz and Orhan Uslu

**A**ccurate and up-to-date knowledge of land use and land cover in the coastal area is a basic and essential element for planning and management activities. The term "land use" in this context relates to human activities or the economic function associated with an area (e.g., urban, industrial, agricultural, or recreational), while "land cover" specifies the type of feature present on the earth's surface (e.g., forest, lake, or highway).

Rapid urbanization and industrialization of the world's coasts, and resulting conflicts and problems, underline the global importance and vulnerability of coastal areas. There are many requests for the application of integrated coastal zone management (ICM) for improved planning and management of these areas. ICM implies managing coastal zones as complete systems, including the complex relations and interactions between different constituents and local communities. Sustainable development can only be achieved in this way.

The successful application of conventional aerial photographs to map land use and land cover has been recognized for decades. But recently digital cameras have become a new and rapidly developing technology for aerial photography with several advantages over conventional photography. First, the images are immediately available in a computer-compatible format for quick inspection during the flight as well as for further digital processing immediately afterwards. Digital images can be directly displayed, manipulated and processed using digital image processing techniques, including image enhancement, geographic information systems (GIS) and classification techniques. Furthermore, the output quality of digital photocopiers is more reliable since there is no "developing" process

which introduces uncertainties.

Applications include updating maps quickly, surveying remote areas, and doing frequent surveys, for instance, to identify illegal building and dumping activities.

During 1997, the Institute of Marine Sciences and Technology (IMST) of Dokuz Eylül University in Izmir, Turkey, in cooperation with its Dutch partners first started to use digital images in coastal zone management. A survey was done in January 1997 in Turkey, using similar means as used in 1996 on a Dutch test site. The first application was during the planning of a marina in southwestern Turkey. Encouraged by the good results, IMST carried out many more flights using digital photography over several areas along the Aegean coast. Parallel to this work, IMST further developed the technology and started to use digital video cameras to obtain continuous images from coastal areas. The use of video necessitated the development of software to snap individual frames out of the series of images; this complicated the processing as compared to digital photography. On the other hand, shooting images from the airplane became fully automated.

## Marine Construction in Fethiye

Digital aerial photographs were taken from a locally hired plane along the southwestern coast of Turkey near Fethiye. This survey was conducted in conjunction with planned coastal construction related to the development of a marina. The images were taken from about 3-km altitude at predetermined positions. A small hand-held global positioning system (GPS) was used to check the position and course of the plane. Each position was marked in the GPS memory for later reference during processing.

Immediately after the flight, the digital pictures were downloaded to a

computer and processed in two ways: 1) they were merged into mosaics using Photostyler and 2) they were converted to a GIS format using IDRISI (IDRISI is computer software with professional-level GIS, image processing and spatial statistics analytical capability). Piecing together the individual digital photographs into one image (mosaic) resulted in an overview of the area. The GIS format allowed comparison to the 1978 map of the area and showed the up-to-date planned construction.

The advantages of using digital photograph images were numerous:

- The existing maps of the area did not show land use changes that resulted from rapid development of the area during the last 20 years. Changes relevant to planning the marina could be detected without new mapping efforts, with minimal cost and time expenditures.

- The images that contained both land and sea areas were an ideal basis for the computer-aided design (CAD) of the marina and for visualization of the entire project for demonstration and presentation purposes.

- The digital images contained a wealth of information able to be used as baseline data for the first steps of the environmental impact assessment for the marina.

- For coastal engineering studies (e.g., design of wave breakers) the images were more reliable than existing maps.

- The coast delineation was accurately depicted in the images which, combined with the bathymetric information, made it possible to determine dredge and fill quantities for the marina construction to the utmost satisfaction of the client. These quantities constituted one of the most important items in the overall cost estimates of the planned construction.

## The Çesme Region

Çesme Peninsula is a rapidly developing tourist resort area on the west coast of Turkey. Besides tourist develop-



ment, many second (summer) houses are being built. The local administrators have been overwhelmed by this development and are finding management difficult. To promote and demonstrate the potential of digital aerial photography/video, IMST proposed to the municipality of Çesme to prepare a GIS, based on Landsat images and aerial photography. Landsat images and existing regional maps constituted the baseline of the planned system. Aerial digital images have been indexed to this baseline at subregions where additional detail was desired. Work started in late 1997 and numerous applications of the GIS have already been substantiated:

- Areas that need a sewage system and water supply could be delineated with great accuracy. Population densities (variable between summer and winter) could easily be assigned to these regions. The total wastewater collection and disposal system could be divided into self-sustained subregions that optimise the construction and operation of the whole system. The priorities and construction sequence of system components could be developed based on information extracted from the GIS.

- In the semi-arid Mediterranean region, treated wastewater can be used for irrigation purposes. In Çesme, digital imagery could define possible irrigation areas.

- Aquaculture areas that cause environmental problems could be delineated by digital imagery. Illegal operations could be detected. For legally operating fish farms, remediation measures can be undertaken.

- A new drinking water reservoir has been completed to supply the region. The digital images were invaluable to plan and manage the land use and to define protection measures in the catchment area of the reservoir.

- The mayor of Çesme was very happy to show the new facilities to his colleagues from neighbouring municipalities. He could boast that his town was the most up-to-date among the municipalities on the western coast of Turkey.

## Detection of Coastal Erosion in the Altnova Region

The Altnova region is famous for its sandy beaches south of Ayvalik on the northern Aegean coastline of Turkey. Construction of an irrigation dam upstream of the Madra Creek resulted in sediment input to the beach region being cut off. Consequently the sediment balance at the coast has been disturbed resulting in heavy erosion. Over seven years, 50,000 sq meters of beach has been lost, and the coastline has receded by 200-250 m. The region's harbour authority asked IMST whether the extent of beach erosion could accurately be determined by digital imagery and whether beach protection measures could be proposed. IMST concluded that this could be achieved with high resolution digital images together with existing maps and Landsat images.

## Digital Images in Environmental Impact Assessment Studies

Environmental impact assessments (EIA) require detailed information on the present environmental conditions of the development area. Digital images/videos have proven to be a very quick and inexpensive way to provide the geographic information at a scale that is appropriate for an EIA. Moreover, the images provide more information on recent land cover and land use than conventional maps. Specifically, it is possible to detect the extent and variation of flora from the images that previously required extensive reconnaissance surveys. Also, recent development of housing, roads, among others, can easily be determined. The digital imagery/video has become an integral part of almost every impact assessment undertaken at the IMST.

## Cost Effective and Flexible

The use of digital aerial photography for monitoring and surveying is very cost effective. Digital cameras are relatively cheap and the *ad hoc* hire of a


small plane is generally not too expensive. Digital images require no special hardware to process, and good, inexpensive photo-processing software packages exist. In addition, packages such as IDRISI present additional options for processing, including precise rectification and classification.

Digital aerial photography as described, forms a cost effective and flexible alternative to the traditional methods of monitoring and mapping coastal areas. The method is simple and straightforward, and can be implemented successfully with minimal investment. Digital aerial photography is a valuable tool in the development and implementation of ICM models, especially



Coastal construction west of Izmir, Turkey

since digital land use maps can be manipulated by computer to allow the presentation of numerous alternative management options.

*For further information contact:*  
 Paul Geerders, P. Geerders Consultancy, Kobaltpad 16, 3402 JL IJsselstein The Netherlands. Tel/FAX: 31 30 6884942. E-mail: [pgcons@wxs.nl](mailto:pgcons@wxs.nl) 



# Development on Majuro Atoll, Marshall Islands

By Riyad Mistry

The Republic of Marshall Islands consists of 29 atolls and five large islands in the central Pacific Ocean. There are 1,225 small islands and islets with a total area of 181 sq km. Bikini and Enewetak atolls were used for atomic weapons testing by the United States during the 1940-50s. Copra production, licensing agreements for fisheries, aid through the Compact of Free Association with the United States and external assistance are the primary sources of revenue to the economy. Tourist attractions include underwater remains of World War II ships, Japanese war relics, coral reefs and sportfishing.



Coastal developments, Marshall Islands.

Aquaculture of black pearl oysters and giant clams, and recovery of sand from offshore areas hold promise for economic development.

In 1988 the total population was 43,380, with an annual growth rate of 3.8 percent. Almost half the population lives on Majuro Atoll, the capital (five sq km), and 19 percent live on Ebeye Island in Kwajalein Atoll. Although the population may be low compared to other developing countries, the litany of symptoms associated with rapid urbanization are evident on Majuro Atoll.

The greatest coastal impacts occur in the urban center of Majuro, while Ebeye is less affected. Impacts are due to shoreline changes related to construction over the past 50 years, increasing population pressure, the growing economy, and inadequate plan-

ning and regulations.

In Majuro, erosion problems are a result of the construction of causeways and coastal structures and dredging activities. The causeway along the southeastern coast has also restricted water circulation in Majuro Lagoon, lowering the water quality. A 1988 report declared seven areas of the lagoon unsafe for swimming or fishing, primarily due to high coliform.

Dredging activities are minimally regulated. Land reclamation and beachfront stabilization are often done using poorly designed concrete seawalls or coral rubble enclosed in wire mesh. Armor rock blasted from reef flats is used for revetments to protect the airport runway and several stretches of coastline in Majuro.

A recent influx of Asian-based live reef fish export operations and the rapid increase in commercial fishing are causing concerns about the sustainability of the coastal fisheries.

A strong legislative framework exists to support coastal management efforts. The Coast Conservation Act of 1988, the Marshall Islands Marine Resources Act, the National Environment Protection Act of 1984 and subsequent regulations modeled on U.S. law provide a solid framework for coastal management. Yet the existence of a traditional land-tenure system and negligible enforcement are obstacles to coastal programs.

Recently, the Majuro Atoll Local Government (MALGOV) has taken an active role in coastal management. Erosion control efforts and fisheries management are the areas of focus. MALGOV's activities and effectiveness have increased as a result of a two-year pilot project titled "Formulation of a Coastal Management Plan for Majuro Atoll," and the creation of an interagency Coastal Management Project Working Group. This project, supported by the United Nations Development Programme with technical assistance from the South Pacific Applied

Geosciences Commission (SOPAC), was based on recommendations of the South Pacific Regional Environment Programme and SOPAC, and proposes to integrate public education, scientific studies, government policies and procedures and local participation to form a coastal management program.

During the design phase in 1996, the Environment Protection Authority, the Marine Resources Authority, MALGOV, the Division of Lands and Surveys, and a few private organizations formulated goals and activities. Since project resources were limited, only four components were targeted. The first is to look at sand mining and dredging activities. Sand is needed for construction; however its supply is limited. Sand transport is affected by coastal morphology and circulation, and nearshore dredging aggravates erosion problems and reduces reef habitat. Sand mining is governed by law, but regulations are not enforced. The importance of sand usage deemed it the starting point for the management program. Technical activities include coastal mapping (using a geographic information system) and the development of shoreline erosion control strategies.

Two other components being addressed are governance and public awareness. A fourth activity is to integrate the first three to formulate a coastal management plan. To ensure the information from this program is available, report summaries and publications describing coastal problems and solutions were translated to Marshallese.

In a country with relatively meager natural resources and dwindling revenues, it was important to highlight the economic importance of its natural resources. Working group members participated in resource economics workshops. An economic valuation study of Majuro Atoll's coastal resources indicated that its resources were valued at \$6.4 million per year and approximately \$115 million total present value (only the direct and indirect resource

values were considered).

Legislation is being introduced to regulate coastal fisheries. This occurred only after local council members were convinced that planning and management were essential to prevent stock depletion. Rather than restricting fishing itself, the ordinance provides for regulation and enforcement at the

point of sale. It also designates protected areas in the lagoon and encourages wiser anchoring practices by installing five mooring buoys.

Rapid, unmanaged urbanization of Majuro is occurring. In order to ensure the sustainability of Majuro's coastal resources, a management program must be implemented. The progress of

the Majuro Atoll project demonstrates that the Marshall Islands is ready to participate in a strong coastal management program.

*For further information contact: Coastal Management Project, MAL-GOV, P.O. Box 796, Majuro, Marshall Islands MH 96960. FAX: 692-625-3757. E-mail: coastal@ntamar.com.* 🌐

## The Economic Benefits of Tourism in the Marine Reserve of Apo Island, Philippines

By H.P. Vogt

**A**po Island is located in Negros Oriental in the central Philippines. It is a volcanic island covering 72 hectares (ha), with a population of 460. Fishing is the main source of income.

In 1979 Silliman University, in the provincial capital of Dumaguete, focused its coral reef conservation program on the fishing community of Apo. The underlying principle was that only the primary reef users could provide effective protection for small-sized reserves. Since 1985, when the marine reserve of Apo was formally established, it has developed into a model site, attracting scientists, reef managers and an increasing number of tourists. Tourism in Negros Oriental is still in its infancy; however, it has a real potential to flourish.

### Financial Benefits of the Marine Reserve

Besides the scenic setting of Apo Island, a major attraction for tourists is the marine reserve. Income generated by tourists visiting Apo was estimated based on data obtained during site visits. These data were grouped into categories covering economic advantages and disadvantages for fishers, resort owners, dive-tour operators, scientists and environmental groups. Results were as follows:

**Fishers** - The financial benefits to

fishers of transporting tourists to the island in outrigger boats is substantial. Selling souvenirs is less profitable, though. The net increase in income to fishers is less than other groups.

The core area of the marine reserve of Apo is a no fishing zone. Thus when the reserve was established, the fishers had to stop fishing at a site where fishing may have been profitable before. However, this potential loss may be compensated by fish migrating from the reserve to adjacent areas, thus allowing increased fish catches in these alternate areas.

**Resort Owner** - Accommodations on Apo Island are very limited. The owner of the only resort took a serious risk and made a substantial investment when building the facility. Income generated by the resort is considerable. Its future is strongly dependent on the health of the coral reefs and the reputation of the Apo reserve.

**Dive-Tour Owner** - The Apo coral reefs are regarded as one of the top dive spots in the Visayas, thus divers frequently visit Apo as part of an extended dive tour. Dive-tour operators potentially benefit the most without having to invest in the site. Economic risks are limited because success/income is not dependent on one dive site alone. However, in the long term it benefits the dive operators to support the sustainable use of the reserves because the number of alternative sites is limited.

**Scientists and Environmental Groups** - Neither group directly benefits financially. However, the Apo reserve provides a study site for both groups.

There are no documented negative effects of tourism on the environment of Apo Island.



### Can This Model be Duplicated in Other Reserves in Negros Oriental?

In a province where native and foreign travelers are welcome, ecotourism may be considered an additional economic benefit of marine reserves. As of March 1997, Negros Oriental had 19 active coral reef reserves covering a total area of 177 ha. Thus, almost 7 percent of the reefs are protected by law and managed by the local fishing communities. Designation of these reserves does result in a loss of fishing grounds.

As a means to compensate for the loss  
(continued page 14)

Fishers will benefit from tourism on Apo Islands.

# Beach Marketing Schemes – A Welsh Perspective

By Cliff Nelson

In the United Kingdom (UK) a day at the beach was once perceived a healthy pursuit. However, over the past few years media headlines concerning quality of bathing waters and beach cleanliness has put strain on the British seaside, with potential to damage tourism. In particular South Wales, heavily reliant upon coastal tourism, has come under intense pressure over the past two years due to a large oil spill in February 1996 off the Pembrokeshire Coast, where the *Sea Empress* oil tanker went aground spilling over 70,000 tons of crude oil, affecting 30 miles of coastline.

To preserve and improve coastal tourism in Wales, the Wales Tourist Board, in conjunction with Welsh Water, have set up a relatively new program, the Green Sea Initiative, designed to improve coastal waters and promote sustainable tourism. The intent is to bring bathing-beach waters up to European Bathing Water Directive standards through the use of high technology ultra-violet light disinfection sewerage systems around the coast. The Welsh coast is to be promoted and marketed through its goal of achieving the European Blue Flag beach award by the millennium.


Beach award systems come under a variety of formats, designed for use by local authorities and coastal managers to encourage tourism. In general, the

criteria that guide these schemes are based on safety, management, cleanliness, public information and water quality. The most prominent system operating in Europe is the European Blue Flag, introduced in 1987 by the Foundation for Environmental Education in Europe. In the UK, the Blue Flag is coordinated by the Tidy Britain Group (TBG), the national independent litter abatement agency. The TBG also own their own beach flag, under the title of Seaside Award. In order to display the beach flag, resorts and rural beaches must have bathing waters that meet the European Bathing Water Directive standards. In addition, the Marine Conservation Society publishes an annual Good Beach Guide, grading British beaches.

Although the aims of the beach award schemes are commendable, their profusion has created confusion leading to continued debate over their effectiveness in marketing beaches. As part of a doctoral research program, the author investigated the knowledge and understanding of beach awards at three beaches along the South Wales coast. Beaches of both resort and rural nature with a gradation of water quality were examined. The research was conducted during the summer of 1996. In general, results indicated that beach users were only marginally aware of beach award schemes, with only 53 percent claiming to have heard of them.

Of those that claimed to know something about the awards, most did not have an accurate understanding of the awards' specific criteria. Just over 20 percent could identify which beach flags indicated safety versus danger. A higher percentage were aware of the Blue Flag designation compared to any other award. However, when shown a photograph of the Blue Flag, only 26 percent recognized it. Further, only 15 percent ranked attainment of a beach award to be important when asked to compare with other beach attributes such as views, landscape and distance travelled from home.

The Green Sea Initiative and the future of cleaner bathing waters is very promising and will surely benefit coastal tourism in Wales. The only caveat is the lack of recognition and knowledge regarding beach award schemes, on which the Green Sea Initiative is reliant. Results of this study indicate that the existence of many different beach award schemes is only serving to confuse the beach user. For the Green Sea Initiative to be fully effective, an intensive education program needs to be implemented to create a greater awareness of beach awards. It is suggested that more emphasis be placed on developing and marketing a unified beach award scheme, such as the European Blue Flag.

*For further information contact: Cliff Nelson, University of Wales, Faculty of Business, Leisure and Food, Colchester Avenue, Cardiff, Wales, United Kingdom. Tel: 01446-741976. E-mail: cnelson@enterprise.net. *

## Apo Island

*(continued from page 13)*

in fishing ground, it has been suggested that a fee for entering the reserve be charged. The fee should be made available to the local Bantay Dagat (fishers volunteer watch organization). This is not done regularly because the small number of tourists makes it uneconomical to hire a person to collect dona-

tions. Also, fees must be collected by the municipality and not by the local fishers, thus much of the money is not spent on maintaining the reserve.

Recently, small-scale ecotourism (e.g., huts made of bamboo) has developed rapidly. However, these struggle to survive because the visitor numbers are still small. Most of these places can

accommodate about 10 people and are rarely fully booked. However, more up-market hotels and resorts have opened in the vicinity of Dumaguete and appear to be doing well. This may be due to the its rapid growth and the increasing number of businesspeople.

Given the unspoiled conditions of

*(continued page 28)*

# Urbanization of the North Coast of Zealand, Denmark

By Henrik Suadicani

Denmark has a 7,300 km coastline, a population of five million and an area of 43,000 sq km, entirely within 50 km of the coast. In Denmark there are 170,000 summer cottages in

of the century the first hotels and summer homes were built in the area at Gilleleje (Figure 1 – 1898).

Starting in the late 1800s, Copenhagen's upper classes spent summers in the country, often building villas and cottages on the nearby coast. The railroad, and later the car, made it possible to travel further from Copenhagen and some families built cottages first at Hornbaek (10 km east of Gilleleje) and later in Gilleleje. Often the family stayed there for the summer while the husbands commuted to Copenhagen. By 1940 the heath, dunes and

grazed lands were completely developed. At that time there were only 3,000 cottages in the county.

The late 1950s marked the start of a general building boom in Denmark. In the Graested-Gilleleje municipality, approximately 64 percent of the cottages were built between 1960-79. Only 23 percent were built before 1960; the

remainder are newer than 1979 (Figure 2 – 1962).

The need for building regulations became apparent, and laws were passed to protect the coastal zone in Denmark. The Nature Conservation Act of 1937 provided a coastal protection zone of 100 meters. The Danish Planning Act of 1974 divided the country into three zones that were regulated differently: an urban, a rural and a summer cottage zone. A Summer Cottage and Camping Act was passed, mandating that summer cottages only be used as secondary houses; no one was allowed permanent residence in a cottage. The 1990 modification to the Summer Cottage and Camping Act made it possible for a municipality to permit owners who owned their house for longer than eight years to make it their permanent residence.

The planning act was supplemented in 1994 (Nature Protection Act) by increasing the coastal protection zone to 300 meters and imposed stricter regulations addressing altering of the natural habitat, erecting fences, parking caravans and subdividing properties. The aim was to protect the coastal zone from further development, and at the same time allow the needed development of cities and their infrastructure, and tourism. It prohibited the designation of new summer cottage zones and required existing areas be reserved for holiday and leisure purposes. Existing summer cottage zones must not be used for urban



Figure 1: 1898.

Map coverage: 7 km x 3.5 km

Heath area: 68.5 hectares (ha) with 2 buildings

Forest area: 36 ha with no buildings

Total number of buildings: 172

Remaining area: farmland

Loss of natural habitats, mostly heath, replaced by houses (both cottages and city houses) and forest. Forest area increases as summer cottages owners plant trees and convert farmlands to forest area.

455 sq km. Surrounding Copenhagen there are 36,100 summer cottages. Frederiksborg County alone has 32,000 cottages of which 26 percent are located in Graested-Gilleleje municipality.

## History of the Area

Gilleleje is a fishing village dating back to before the Middle Ages. In early times, villagers transported goods to and from Copenhagen and other cities around Kattegatt. Trade increased and the first harbor was built in 1873. In 1896 the first railroad was constructed, thus beginning the expansion of the small isolated village to a major fishing community.

Tourism in the coastal villages began in the 1890s. Artists came to paint the primitive people living an exotic lifestyle; with the painters came curious tourists. The first tourists rented rooms in the local fishers' houses. By the turn



Figure 2: 1962

Heath area: 6.8 ha with 4 buildings

Forest area: 76.6 ha with 106 buildings

Total number of buildings: 1084





**Figure 3: 1985**  
Heath area: 9.4 ha with 3 houses

Forest area: 108.1 ha with 235 buildings  
Total number of buildings: 6134

development, even if these areas are close to cities and towns.

Nevertheless, in the newest regional plan of 1997, Frederiksborg County allowed the municipalities to convert nine areas from cottage zones to urban zones, a change from vacation to permanent settlements. This violates the coastal planning zone of the planning act. County officials justify their decision by claiming that the areas already have many houses built for permanent residence. These houses were given permanent resident status as a result of the 1990 modification to the Summer Cottage and Camping Act. These owners have rebuilt the small cottages to meet the demands for higher living and building standards, thus many areas have changed from cottage areas to permanent home areas. Also, since regulations do not exist for the construction of summer cottages, cottages will continue to be upgraded to permanent structures. As this occurs, and as demand for urban zones increases, these summer cottage zones will be transformed to urban zones. This sort of development is happening throughout Denmark (Figure 3 – 1985, present stage).

The municipality and the county of the North Zealand coastal area attempted to allow the conversion of areas from cottage to urban zones; in essence from vacation to permanent housing. This effectively violated the countries planning act. However, the Ministry for

Energy and Environment vetoed this effort. This is the result of the political differences between the liberal county and the municipality on the one side, and the new government which is Social Democratic on the other. The more liberal tend to disregard the restrictions in the 3-km coastal protection zone while the Minister for Environment wants to follow the planning act. This attempt, if nothing else,



**Figure 4: Restricted public access to the beach.**

demonstrates that the intention of the national planning act is not very strict and will be interpreted according to political considerations.

Urbanization of the North Zealand coast of Denmark has resulted in loss of coastal habitat, as well as loss of public access to the shore. Although there is to be public access to all beaches, it is often difficult to get there. Several roads do end at the beach; however, most landowners directly on the coast

have built fences to protect their properties (Figure 4). There is a national initiative to secure public access; however, this can only be done by buying sites and establishing public facilities for amenities such as parking areas and toilets. This is expensive and funding would be from the local government.

Another issue is coastal erosion. Since the 1930s, groins have been built to stop coastal erosion and protect the cottages and houses. Not only has this impacted the scenic quality of the area, but it has caused continued loss of the sandy beaches resulting in continued building of new groins and breakwaters. Until recently, coastal protection was done by the individual landowners with no county regulations; now the county must approve new projects. Also, the understanding of coastal dune dynamics has improved, and the management strategy is slowly changing from constructing breakwaters and still bigger groins to letting nature take its course.

There is an urgent need to address problems of continued urbanization

along the Danish coast. Despite the planning act's coastal planning zone of 3 km, and the attempts to move the urbanization inland behind the 3-km zone, urbanization can still take place along the coast and especially in the summer cottage areas.

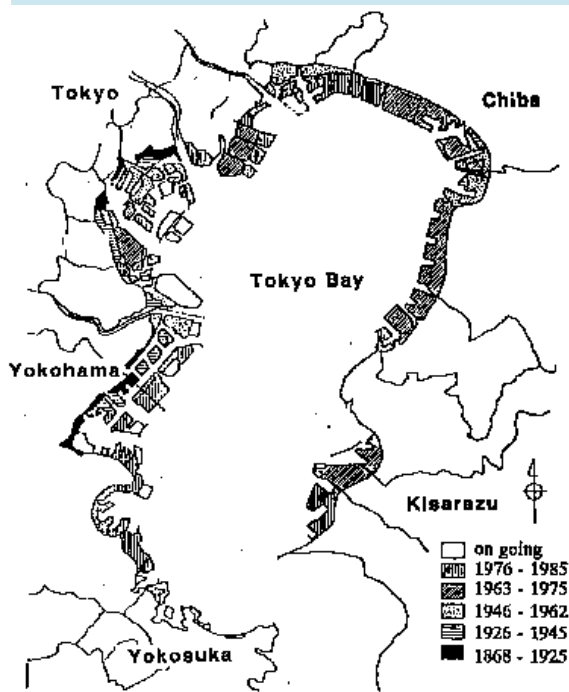
*For further information contact:*  
*Henrik Suadicani, Roskilde University,*  
*Building 10.2, P.O. Box 260, DK-4000*  
*Roskilde, Denmark.*  
*E-mail: SUA@teksam.ruc.dk. 🌐*

# Development of a Coastal Industrial Zone in Tokyo Bay: A Less Successful Project

By Kenji Hotta

After World War II, by making full use of the coastal zone, Japan's economy has achieved tremendous growth. This paper examines the Keiyo coastal industrial zone (located in eastern Tokyo Bay) and its surrounding inland area as an example of coastal development.

## Changes of the reclaimed area. (Tokyo Bay)



The coastal industrial region of Chiba is 12,035 hectares (ha) of reclaimed land with a 76 km shoreline. Industries include iron, steel, aluminum, glass and petrochemical production, oil refineries, electric and gas powerplants, and ship manufacturing. The Keiyo coastal industrial zone has become one of the largest energy suppliers in Japan.

Prior to development, Chiba's primary industries were fishing and agriculture. After development, Chiba became one of the leading industrial regions in Japan. The shipbuilding industry earned US\$ 7.95 million in 1981, ranking sixth in Japan.

Unfortunately, increases in shipping did not increase the area's employment opportunities, nor did it improve the standard of living. On the contrary, the local economy and living standards have been adversely effected.

## Regional Industrial Structure

The fishing industry declined dramatically as the land reclamation project was undertaken and the industrial zone was developed. Agriculture also declined; farming households decreased from 104,094 in 1960 to 21,898 in 1981 due to increased imported agricultural products, conversion of farmlands and the redirection of the agricultural labor force. Furthermore, local industries were considered the low-productivity sector of the economy and given secondary administrative treatment.

In the coastal area, 60 percent of the industries were heavy and material-producing (iron, steel, petroleum and chemical). This is far greater than the national average (26 percent), and has caused an imbalance in the industrial structure. Industries in this area make only a minor contribution to the local economy. This appears to be because the economy is based on the taxes paid by individuals, rather than those paid by large corporations, despite the coastal area having one of the largest industrial zones.

Coastal industries make up 69 percent of the total industrial area, use 74 percent of industrial water and consume 70 percent of the fuel. The same industries produce 90 percent of the sulfuric compounds discharged and are the largest polluter. Nevertheless, the coastal industrial region employs only 24 percent of the entire work force.

Positive impacts of the coastal industries are less than the inland industries. Small- and medium-sized industries are larger contributors to the local economy than the huge coastal industries. The question is, why has the economy of the

coastal industrial zone not flourished?

## Depressed Economy

The primary reason for the industrial zone's depressed economy is that the region is a mere production space for large corporations that have their headquarters outside Chiba (mostly in Tokyo). Trade (sales) and account transactions are not conducted in Chiba, they are carried out at the corporate headquarters.

Second, products manufactured in the coastal industrial zone have nothing to do with the local industries. For example, Chiba is the largest producer of steel and ethylene; however, there are few factories which process and use these materials in Chiba. The Keihin industrial zone, located in western Tokyo Bay, purchases the raw steel and ethylene and produces value-added products with high economic values, thus enhancing Keihin's economy.

Third, the coastal industries in Chiba are not labor-intensive industries; the manufacturing systems are largely automated to save labor costs. Therefore, these factories do not create large employment opportunities.

As a result, neither the people nor economy benefit from the industrial zone because the flow of money and resources is primarily out of the region.

## Environmental Degradation and Increased Financial Burden

The residents have lost valuable coastal recreational area. The industrial zone created a barrier restricting beach access. Residents see this as the loss of cultural, historical and spiritual benefits. In addition, tidal lands have decreased from 7,757 ha in 1945 to about 985 ha at present. Water quality has deteriorated due to increased shipping traffic and oil discharges. Industrial

*(continued page 21)*

# Ecotourism in Virginia, USA: How can we Ensure its Success?

By Virginia G. Witmer

Local ecotour businesses in Virginia, USA, introduce the state's natural resources to thousands of visitors each year. The Virginia Coastal Resources Management Program, a network of Virginia state agencies and local governments that links state laws and policies to protect and enhance coastal resources, is working to ensure that responsible, educated ecotour guides and ecotourists, and an ecotourism code of ethics, play a vital role in the future protection and health of Virginia's unique ecosystems. This includes promoting sustainable development of a successful ecotourism industry.

Experts agree that ecotourism must be a carefully planned industry that is sensitive to and respectful of natural resources, and benefits the local stewards of the resources. "By not compromising unique and fragile resources, ecotour businesses are protecting their own assets," says Sarah Mabey, author of a draft voluntary ecotour guide certification program and curriculum for Virginia's Eastern Shore. The curriculum was contracted by the Virginia Coastal Program. The concept behind the certification program is that natural resources constitute shared capital. To ensure the resources are protected, private businesses, citizens, organizations and public agencies all must recognize their collective responsibility for guarding their assets.

In August 1997 the Virginia Coastal Program initiated meetings with the state's coastal ecotourism business community, local and state natural resource managers, and others interested in ecotourism to discuss the future of ecotourism and outline the elements and steps necessary to develop a successful initiative. The Virginia Coastal Program introduced the voluntary ecotour guide certification concept and the draft curriculum prepared for

Virginia's Eastern Shore.

Participants in the ecotourism meetings agreed that an ecotour guide certification program could help: 1) protect natural resource capital from misuse caused by a simple lack of knowledge; 2) provide a valuable marketing edge to guides who earn an official "seal of approval;" and 3) foster the sustainable growth of Virginia's ecotourism industry. Certified businesses could operate as members of an ecotourism association and agree to certain operating standards. To earn certification, ecotour businesses or guides would be required to participate in regional workshops or training to ensure that they acquire knowledge specific to Virginia's ecological distinct bio-regions. The number of visitors an area can accommodate, without harming the natural resources would also need to be considered for each bio-region. Once training was completed, the business could use an official certification logo in their marketing.

Peter Hangen, Virginia Beach's recreation supervisor, agreed that certification could give local operators a marketing edge and help keep tourist dollars invested in the local economy. "A strong association of local ecotour businesses could be a great marketing tool for local communities and the ecotour businesses, and the minimum standards required for certification would help us ensure quality experiences and a return of visitors to these areas," stated Mr. Hangen.

Many local operators agreed that

there is a business benefit to a certification program. A network of certified Virginia ecotour guides and businesses would present a tremendous opportunity to build a sustainable ecotourism industry in Virginia. In March, these operators joined state and local government representatives and people interested in protection of Virginia's natural resources to form the Virginia EcoTourism Association (VETA). The association will represent those with a vested interest in ecotourism in the state, including scientists, conservationists, resource managers and educators, as well as ecotourism businesses, and will provide a new forum for communication, networking and marketing. Members of the association plan to



Birdwatching on the Eastern Shore, Virginia.

continue development of a voluntary ecotour guide certification program for Virginia's coastal areas. The Virginia Coastal Program and VETA hope that this pilot certification program will serve as a model statewide.

For further information contact:  
Laura McKay, Program Manager,  
Virginia Coastal Program, Virginia  
Department of Environmental  
Quality, 629 East Main Street, 6th  
Floor, Richmond, Virginia 23219,  
USA. Tel: 804-698-4323. FAX: 804-  
698-4319. E-mail:  
lbmackay@deq.state.va.us.  
Website: [http://www.deq.state.va.us/  
envprog/coastal.html](http://www.deq.state.va.us/envprog/coastal.html). 🌐



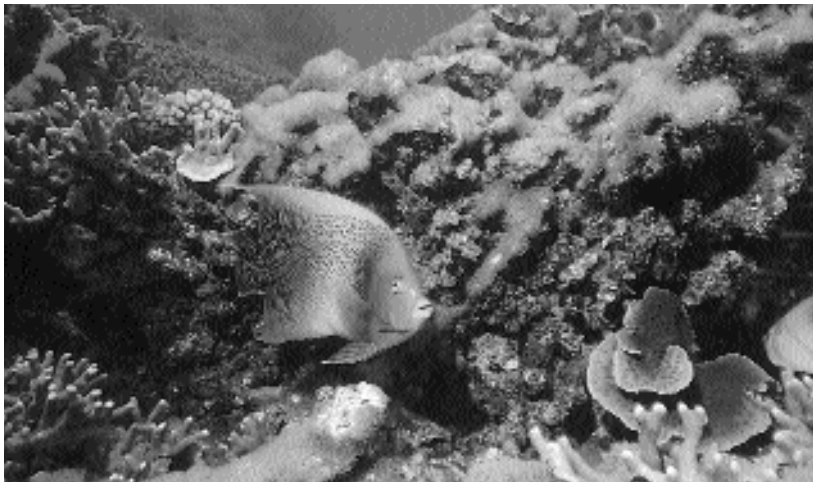
# Coral Reef Ecosystems Suffer as a Result of Global Change

The United States' National Oceanic and Atmospheric Administration (NOAA) has confirmed that during the 1997-98 El Niño, coral bleaching has occurred in the Western Hemisphere at sites in the Florida Keys, Baja California, the Pacific coast of Panama, the Yucatan coast, the Cayman Islands, and the Netherlands Antilles. In the Eastern Hemisphere, reefs in the Red Sea and the Seychelles have experienced some bleaching.

Corals there thrive as long as temperatures remain at or below 27°C – the normal maximum sea surface temperature at this site. An increase of one or two degrees can be deadly to the coral.

This news comes within days of a report by an international working group of scientific experts that met in Boston, Massachusetts, USA, January 3-11, 1998, to discuss growing concerns about the survival of coral reef ecosystems facing global change and

Coral reefs may suffer from global change.



This February, NOAA reported that El Niño-related increases in ocean temperatures in the Pacific Ocean are causing coral reef bleaching around the Great Barrier Reef, Australia. Coral bleaching results when increased water temperatures cause the coral tissue to expel zooxanthellae, a type of algae that lives in the coral structure and is essential to the coral's survival.

Bleaching has been observed on many inshore reefs of central Great Barrier Reef, particularly off Townsville, after temperatures in the water reached 29-30°C (84-86°F). Corals there usually thrive in temperatures no higher than 28°C (82°F). These "hot spots" have been identified by NOAA satellite data and confirmed by field data.

NOAA also reported El Niño-related coral bleaching of the Galapagos Islands off the coast of Ecuador. Surface temperatures there are about 30°C (86°F).

local stresses. The group, sponsored by the Scientific Committee on Oceanic Research (SCOR) and the Land-Ocean Interactions in the Coastal Zone (LOICZ) core project of the International Geosphere-Biosphere Programme (IGBP), and with the support of the NOAA Coastal Ocean Program, produced an interdisciplinary synthesis with important implications for research, assessment and management. The report stated that coral reefs may be threatened by rising concentrations of carbon dioxide in the atmosphere and associated changes in the intensity of storms and rainfall. The ability of reef plants and animals to make the limestone skeletons that build reefs is being reduced by rising atmospheric carbon dioxide concentrations. In 30 to 100 years this may interfere with coral growth, which could threaten the sustainability

of coral reefs worldwide.


Geological, evolutionary and ecological evidence was assembled to show that while corals and reefs can resist or recover from localized stresses such as storms, predation or disease, they do not survive in isolation; the survival of any one reef depends on the nature, health and history of neighboring communities. Current practices of coral reef conservation and resource management in developing countries focus on immediate local threats, but does not consider the climatic forcing at longer, larger scales. Of these, increasing concentrations of atmospheric CO<sub>2</sub>, frequency and intensity of tropical storms, and runoff of terrestrial sediments and nutrients are predicted to be the major contributors to negative changes in some reefs. When compounded by the chronic, local disturbances such as destructive harvesting and pollution, the relatively slow changes in global climate caused by man can markedly decrease coral reef growth.

The effects of global change, be they increasing CO<sub>2</sub> concentrations, El Niño or runoff of terrestrial sediments and nutrients, make it apparent that major revisions are urgently needed to concepts of how corals and reef ecosystems will respond to global change, and that more effective research, conservation and resource management strategies need to be developed.

*For NOAA information contact: Joyce Gross, Tel: 202-482-8360. E-mail: Joyce.W.Gross@noaa.gov.*

Video animation of coral reef hot spots and sea surface temperatures are available on the World Wide Web at: <http://manati.web.noaa.gov/orad-click> "Experimental Products," from there, click "Coral Bleaching Hotspots."

For a still image of the area of coral bleaching off Australia, go to: <http://manati.web.noaa.gov/orad> and click on "What's New."

*For SCOR, contact: Bruce G. Hatcher, Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4J1. Tel: 902 477 8093. FAX: 902 494 3736. E-mail: bhatcher@is.dal.ca. *



# A View on the Developing Tourism Industry

By Timothy Tyrrell

**T**ourism has been the fashionable industry of the 1980s and 1990s; it has been the beneficiary of national and international attention. It is poised to claim the title of the largest industry in the world. As a result, considerable research has been devoted to the study of tourism. The findings are not surprising.

Study results reinforce the idea that resources should not be wasted, whether they are natural or cultural resources. We have also learned that residents, businesses, governments and visitors can be the recipients of different types of impacts from tourism development. These are wide and varied and include all manners of economic, social and environmental impacts.

We are still learning about the links between natural and cultural resources and their importance to residents and visitors. We are also still learning simple lessons about how the actions of one individual or group can influence the well-being of others.

The industry is also learning. The economic downturn of 1990 and early 1991 forced the tourism industry to take a good look at itself. One result was a new focus on sustainability and the potential importance of ecotourism. Both are concepts that put

greater emphasis on social and environmental issues. It is not yet clear how these will change the industry.

One of the major lessons is that regardless of the political system, tourism is a heavily community-based industry. Regardless of the ambitious goals for state and regional tourism development, it is the community that hosts the visiting population. Attractions and services are packaged at the community level and tourists choose destinations where travel time between is at a minimum in order to optimize use of valuable leisure time. As a consequence, local businesses, town councils and chambers of commerce are found to be the greatest promoters of the industry. In addition, town council members, planners, fire and police department chiefs, and social organizations all direct the daily operations of the industry. Together these groups influence zoning restrictions, taxes, fees and other regulations. Control extends to ownership of a large share of attractions and facilities (such as parks and beaches). Although the primary purpose of these public attractions is to serve residential recreational needs, in tourist communities they provide a major component of the product mix offered to the tourist.

Costs and benefits of tourism have the strongest impact at the community level. Some localities may gain from

tourism while others lose, even though there may be positive economic growth at the state level. Specific economic, social and environmental costs and benefits from tourism development, or any other industry, need to be evaluated where impacts are immediate. At regional and state levels, the relationships between costs and benefits and the needs and desires of individual groups and constituencies are easily forgotten.

Tourism development needs to be considered as one among many components of community development. As Philip Kotler says in his book, *Marketing Places* (1996): "The basic idea behind community development is to create a quality environment for people currently living and working in the community. This concept supports good schools, strong neighborhoods, increased public safety, and adequate health facilities and emphasizes the role of strong community-based institutions in affecting the quality of a place. Like any other component of community development, if tourism is found to support these ideals, it should be promoted. If not, it should be resisted."

*For further information contact:*  
Timothy Tyrrell, Resource Economics,  
University of Rhode Island, Lippitt  
Hall, Kingston, Rhode Island, 02881,  
USA. Tel: 401-874-4580. E-mail:  
timt@uriacc.uri.edu. 🌐

## Tokyo Bay

(continued from page 18)

pollution (air, noise and odor) is a serious local health concern.

Another problem is the increased financial burden on local government. Expanded development increased tax revenues and financial resources; however, the local administration needed to spend large sums of public money on projects related to the industrial zone development, such as land reclamation; improvements for plants, and factories, ports and harbors; industrial water-

supply facilities; roads; housing; and educational needs. In addition, the local government has had to pay for pollution controls and disaster prevention required by the industries.

Development of the Keiyo industrial zone did not produce the desired results. Not only were there adverse environmental impacts, but the development resulted in an increased financial burden for the local government. Fortunately, these negative effects were offset by the fact that towns in the Chiba region have become bedroom communities for workers commuting

to Tokyo. As a result, the region's population increased and tertiary industries developed that contributed to sustaining the increasing financial burden, thus fortunately offsetting the negative effects of the development of the coastal industrial zone.

*For further information contact:*  
Kenji Hotta, Nihon University College  
of Science and Technology, Department  
of Oceanic Architecture and Engin-  
eering, 7-24-1 Narashinodai Funabashi-  
Shi Chiba 274, Japan. Tel: 81 0474 69  
5484. FAX: 81 0474 67 9446. E-mail:  
hotta@ocean.cst.nihon-u.ac.jp. 🌐



## CENTRAL AMERICA MEXICO

### Scientific Research in the Tamaulipas Coast

The State of Tamaulipas, Mexico, is a highly diversified region with over 400 km of Gulf of Mexico coastline. Its coastal zone is over 231,000 hectares (ha) and has 14.7 percent of Mexico's estuarine area. Important water bodies are Madre Lagoon (200,000 ha), San Andrés Lagoon (8,500 ha) and Morales Lagoon (6,500 ha), in addition to the Pánuco River delta.

The diverse climatic conditions prevailing in the Tamaulipas Coastal Region (TCR) result in varying vegetation. There are 126 species of birds, 19 species of reptiles, 15 species of mammals, 75 species of fish and 155 species of invertebrates. This biodiversity, in addition to the large natural oil reserves, make this region of significant importance to Mexico's economic development. Management of the area resources poses a significant challenge for the government.

### Urban Growth and the Economy

The population and economic activities are concentrated in three counties in southern Tamaulipas: Altamira, Tampico and Ciudad Madero. These areas are economic magnets for the central Mexican Gulf of Mexico.

The increasing demand for urban

facilities and jobs has placed increasing pressure on the environment, thus requiring planning and management programs that consider both population demands and environmental protection. This region is one of the richest in the Mexican Gulf of Mexico, as it generates large revenues from the petrochemical, port and fishing industries.

Other areas of concern in the TCR are:

- The San Andrés Lagoon, where extensive cattle breeding is combined with agriculture, aquaculture and some local fisheries. These activities lack adequate regulation and have caused serious environmental damage.

- The Soto la Marina River, which has become important for sport fishing. This activity alone is responsible for the accelerated tourism development along its shores. This has occurred without policies to regulate growth and development.

- The Madre Lagoon, the largest coastal lagoon in Mexico, which hosts important fishing and aquaculture activities, but is affected by serious soil problems.

The main problem facing the entire Mexican coastal region is the lack of knowledge at the government level about local resources. The importance of the scientific information has been overlooked, and in most cases the available information is incomplete and/or questionable.

In response to this, the Laboratory of Coastal Ecology (LCE) of the Instituto de Ciencias del Mar y Limnología from the Universidad Nacional Autónoma de México developed a program for a Management Integral Program for the Tamaulipas Coastal Region (MIPTCR). Its main objective is to determine and develop the necessary tools to implement policies to promote economic growth that are compatible with sus-

tainable management and use of the local natural resources.

This project is completing its first stage: to analyze the available scientific information, identify deficiencies, and define research projects needed to generate the information necessary to be used as a solid basis for the preparation of the MIPTCR. The resulting database includes 233 references addressing the natural resources of the TCR.

A significant concern is the quality of the scientific information in the database. The LCE has proposed the creation of an Information System of the Tamaulipas Coastal Region which, in addition to compiling the information about the TCR, could identify the direction educational institutions and research centers should take to ensure proper resource management in the region. The ultimate goal is to establish the best possible sustainable development practices for the TCR.

*For further information contact:*  
*Leonardo Ortiz-Lozano, Laboratorio de Ecología Costera, Instituto de Ciencias del Mar y Limnología, U.N.A.M., Ap. Postal 70-305, México. Tel: 5-622 58 33. FAX: 5-676 19 93. E-mail: leonardo@mar.icmyl.unam.mx.*

## EUROPE GREECE

### Sustainable Growth in the Cyclades

Cyclades represent a unique and diverse group of islands in Greece where the problem of unsustainable growth is particularly evident. Cooperation between the local communities of the islands is essential to ensure sustainable development in the future without irreversibly damaging the environment and the social fabric of the islands.

The Programme for Integrated Coastal Area Management: The Case of Cyclades (P.I.C.A.M.CY) is carried out within the context of the European Commission's (EU) Demonstration Project on integrated coastal zone management (ICM). The program is funded

by the EU, the University of Aegean and the Ministry of Aegean.

It is a three-year project that started in January 1997.

The objective of the project is to develop a pilot model of communities' cooperation for ICM in the island complex of Cyclades, introducing the necessary structures and implementing examples for sustainability.

A network will include representatives from all levels of administration (national, regional and local), non-governmental organizations, socioeconomic actors and other experts. Representatives from selected island communities will form the core of the network. The communities are selected to give a broad picture of the various socioeconomic, cultural and natural environments of the Cycladic Islands. The network will be divided into working subgroups, each based on common characteristics, development restrictions and environmental pressures of the islands, such as geographic characteristics (e.g., small size), socioeconomic characteristics (e.g., development of common economic activities, thus common problems/impacts on the natural and human environment) and administrative/organizational characteristics (e.g., common administrative authority). The five subgroups include:

1) A dominant economic activity developing in accordance, or in conflict with, other economic activities (e.g., extractive and tourism activity in Milos-Kimolos); a case for conflict/problem cooperation.

2) A developed and intense tourism industry (e.g., Thira, Paros and Ios); a case for common pressure/problem cooperation.

3) A group of islands belonging to the same sub-regional administrative

authority (e.g., Sifnos, Milos, Kimolos and Serifos); a case for regional cooperation.

4) Very small islands characterized by rural economies, developing tourism industries and inadequate infrastructures (e.g., Koufonissia, Donoussa and Anafi).

5) A one-island focused analysis (e.g., two local authorities in Sifnos); a case of island-level cooperation.

The project will proceed in the following way:

Phase 1: Organization of the network workshop: Defining the Principles of Integrated Coastal Area Management (held May 27-28, 1997, on the island of Syros).

Phase 2: Assessment of environmental developmental issues workshop: Developing Strategies for ICM (to be held May 29-30, 1998, on the island of Syros).

Phase 3: Assessment of strategies for integrated coastal management workshop: Initiating an Action Plan for Coastal Area Management (proposed date: November 1998).

Phase 4: Specific measures for coastal area management conference: Integrated Coastal Management in Cyclades.

The direct results of the project will be to establish a network of partners, increase overall awareness, assess the national and EU-related policies concerning environmental protection and regional development in the Cyclades, and adopt integrated models for sustainable coastal management.

*For further information contact: Alexandra Mexa, Senior Project Manager, or Harry Coccossis, Project Manager, University of Aegean, Laboratory of Environmental Planning, 30 Voulgaroktonou str., 11472 Athens Greece. Tel: 30-1-680051-3. FAX: 30-1-6800053. E-mail: enpl@ru.aegean.gr.*

## Gulf of Guinea Large Marine Ecosystem Project

Sixty senior scientists and resource managers from Benin, Cameroon, the Ivory Coast, Ghana, Nigeria and Togo met in Abidjan, Ivory Coast in early January to plan the second phase of an initiative to improve the health of the Gulf of Guinea Large Marine Ecosystems.

Actions include increasing the economic benefits from gas, oil, mining, recreational and fisheries resources of the ecosystem, while assuring improved health and long-term sustainability. The Gulf of Guinea ecosystem provides about US\$ 3.8 billion annually to the economies of the adjacent West African countries. With more sustainable resource-use practices, experts estimate the annual contribution to the region's economies could increase to US\$ 9 billion.

The first phase was initiated in 1995 with the financial assistance of the Global Environment Facility, the World Bank, and technical assistance from the United Nations Development Programme, the United Nations Industrial Development Organization (UNIDO), the United States National Oceanic and Atmospheric Administration, the United Nations Environment Programme and several other donor countries. This effort is the largest single project presently underway in Africa aimed at increasing the socioeconomic benefits of a large marine ecosystem.

Accomplishments of the first two years included initiation of community-based mangrove restoration projects, and the agreement by environmental protection agencies of several participating countries to initiate nonhazardous waste exchange programs with industries. These will include gas, oil, mining, steel, agricultural and food production, and will both control pollution and use new technologies for profitable recycling.

## REPORTS CONTINUED

Three hundred and fifty specialists from the six countries have been recruited from all sectors of society. They have access to the latest technologies, including satellite imagery, advanced electronic environmental sensors to measure ecosystem productivity, new techniques to detect changes in coastal pollution, and vessels to conduct fisheries and ecosystem surveys.

All participants agreed to promote large-scale integrated management and sustainable development of coastal resources throughout the ecosystem.

*For further information contact: Chidi Ibe, UNIDO Regional Coordinator, The Regional Coordination Centre, c/o Centre de Recherches Oceanologiques, 29, rue des pecheurs, BP V 18 Abidjan, Ivory Coast, Tel: 225 25 73 69/ 35 50 14/35-58-80. FAX: 225 25 73 69. E-mail: ONUDI@cro.orstom.ci. Website:*

<http://www.africaonline.co.ci/AfricaOnline/societes/goglme/goglme.htm>.

## SOUTH AMERICA BRAZIL

### Inter-American Development Bank Approves Local Coastal Zone Management Initiative in Brazil

The Inter-American Development Bank announced the approval of US \$1.75 million in non-reimbursable financing to help establish a coastal zone management program in Brazil. This program is to manage 120 km of coastline between Tamandaré, in the state of Pernambuco, and Paripueira, in the state of Alagoas.

The funds will help launch Brazil's first locally administered coastal management program, designed to reconcile and integrate land development processes with marine conservation priorities. A local coastal management committee will be established, bringing together municipal governments, re-

sources users and local nongovernmental organizations. The committee will prepare a zoning and management plan for the marine protected area.

The program, to be carried out by the Fundação Mamíferos Marinhos, along with other partners including the Federal University of Pernambuco and Brazil's National Coastal Management Program, will also include community-based demonstration projects in reef restoration, municipal reserve management and maintaining coastal water quality. A management strategy for sustainable artisanal fisheries in both coastal reefs and mangroves will be prepared. Community-based organizations dependent on coastal resources will be strengthened, and conflict resolution techniques will be applied to resolve issues of municipal land development.

*For further information contact: Michele LeMay, Inter-American Development Bank, 1300 New York Avenue N.W., Washington, D.C. USA. 20577. Tel: 202-623-1868. FAX: 202-623-1796. E-mail: michelel@iadb.org. 🌐*

### Maya Reef

*(continued from page 1)*

Caribbean. However, this new initiative will focus the needed attention on this special reef system.

Presently there are coastal management initiatives occurring in all four countries which support this effort. Governments are developing land-use zoning (Mexico) and ecotourism development strategies (Belize) to manage growth. In all four countries, communities, universities, nongovernmental organizations (NGOs) and the private sector are implementing efforts to conserve the areas natural resources by promoting conservation and sustainable development, through the establishment of marine protected areas, fisheries management strategies and incorporating low-impact development techniques. Efforts are underway

to coordinate these activities and promote opportunities to learn different management techniques, as well as securing funding to promote and expand the initiative.

An action plan is being designed jointly to promote scientific research and information exchange, create a constituency, reduce pollution from land-based sources and establish a sustainable financing mechanisms. A meeting was held in Belize City in November 1997 to design this action plan. Over 100 people from government agencies, the private and social sector, research institutions, funding agencies and NGOs contributed. The action plan will constitute the framework for the many actors to unite their individual efforts towards a common goal. Two specific geographic areas have been chosen for this international cooperation. The first is the

Gulf of Honduras where Belize, Guatemala and Honduras are addressing common problems with an emphasis on managing shared fisheries resources. The second is the Bacalar Chico-Xcalak region, located on the border of Belize and Mexico, where managing tourism while protecting valuable natural resources is a shared issue.

The Mesoamerican Caribbean Coral Reef Systems Initiative offers the framework for one of the most viable and unparalleled opportunities to carry out a multi-national conservation effort, over a globally important ecosystem.

*For further information contact: Amigos de Sian Ka'an A.C., Plaza America Loc 48, Apdo Post. 770, Cancun, Quintana Roo, 77500, Mexico. Tel: 98 84 95 83. FAX: 98 87 30 80. E-mail: sian@cancun.com.mx. 🌐*



# INTERCOAST SIDER FORMATION

## Electronic Resources

**Earth Systems Inc.** Includes archives of environmental mailing lists and links to environmental resources and organizations. Address: <http://www.earthsystems.org/2nd.html>.

**Environmental Working Groups.** This site offers a searchable database and publications that focuses on protecting the environment. Address: <http://www.ewg.org>

**European Community for Environmental Travel and Tourism.** This site was designed to promote environmental awareness and good practice in the travel and tourism industry. Address: <http://www.wttc.org>

**Global Seafloor Topography.** National Oceanographic and Atmospheric Administration's National Geophysical Data Center and World Data Center have produced satellite maps of the world's oceans, available in TIFF, GIF, and JPEG formats. Address: <http://www.ngdc.noaa.gov/mgg/image/seafloor.html>.

**Inter-American Strategy for Public Participation in Sustainable Development.** The primary goal is to promote transparent, effective and responsible public participation in decisionmaking and in the formulation, adoption and implementation of policies for sustainable development in Latin America and the Caribbean. Address: <http://www.ispnet.org>.

**International Development Network.** This site provides information resources to those involved in and interested in issues of international economic development. Address: <http://www.idn.org/>.

**Island Resources Foundation.** This site provides information regarding the development and management of small tropical islands. Address: <http://irf.org/>.

### Sources

**Environmental Website.** This is a solutions-based environmental site. Links to ecotourism materials and conferences can be found here. Address: <http://www2.planeta.com/>.

**Sustainable Tourism Research Interest Group.** This site provides links to organizations specializing in sustainable tourism as well as links to articles, conferences and codes of ethics dealing with tourism. Address: <http://www.dkglobal.org/string/rohr>.

**Tourfor.** This is an environmental management system for forest based tourism. Links to topics on tourism and forestry are provided within this website. Address: <http://www.buckscol.ac.uk/leisure/tourfor/tourfor.shtml>.

**U.S. Environmental Protection Agency Office of Water.** This division of EPA focuses on wetlands, oceans and watersheds. Address: <http://www.epa.gov/owow/wetlands/wqual/introweb.html>.

**U.S. National Oceanographic and Atmospheric Administration Geophysical Fluid Dynamics Laboratory.** This site contains information about climate change research. Address: [http://www.gfdl.gov/gfdl\\_research.html](http://www.gfdl.gov/gfdl_research.html).

**U.S. National Oceanographic and Atmospheric Administration International Year of the Ocean.** Information regarding all aspects of the year of the ocean. Address: <http://www.yoto98.noaa.gov/>.

**Virginia Department of Environmental Quality: Coastal Resources Management Program.** This sites discusses state programs for coastal zone management, including goals and areas of concern. Address: <http://www.deq.state.va.us/envprog/coastal.html>.

**Wetlands International.** Information on the conservation of wetlands within Africa, Europe and the Middle East can be found. Address: <http://www.wetlands.agro.nl>.

## Coastnet and NetCoast Merger

As of May, the coastal management listserve, Coastnet, merged with the Dutch Coastal Zone Management Centre's (CZMC) European counterpart of Coastnet, NetCoast. Readers of *Intercoast Network* newsletter will know that CZMC and the Coastal Resources Center (CRC), which was maintaining Coastnet, have had a very good and productive working relationship in the past, and we hope that this transfer will enhance the exchange of information and ideas on coastal management that Coastnet and NetCoast have provided.

CRC believes that NetCoast can provide a valuable forum for those interested in coastal management, from practitioners to members of the general public. We urge new users to subscribe and further improve the exchange of information among the coastal community. To do so, simply choose one of two options:

■ E-mail to:  
[listproc@postkamer.minvenw.nl](mailto:listproc@postkamer.minvenw.nl)  
•Subject: (optional)  
•Message body: Subscribe  
netcoast user-name

OR

■ Access NetCoast WWW site at:  
<http://www.minvenw.nl/projects/netcoast/maillist.htm>  
•You will be able to  
subscribe or unsubscribe  
yourself from the list

CZMC is also interested in finding out more about its new NetCoast subscribers, with hopes of possibly developing more issue-specific discussion platforms within NetCoast in the future. Information such as that included in your signature, as well as your fields of interest and your profession can contribute to future improvements of the network and create new forums for subscribers.

—The Editors

# Publications

**Coastal Zone Management—A Draft Policy for Ireland.** 1997. This is a discussion document concerning the formulation of national policy on coastal zone management. Contact: Government Publications, 4-5 Harcourt Road, Dublin 2, Ireland. Tel: 353 1 6613111. FAX: 353 1 4752760.

**Criteria for the Selection of Marine Protected Areas.** 1998. An analysis of marine protected areas in Sweden. The system of protection used in Sweden is compared to those of international systems. Contact: Cathy Hill, Swedish Environmental Protection Agency, Customer Services, SE-106 48 Stockholm. Tel: 46 8 698 12 00. FAX: 46 8 698 15 15. E-mail: kundtjanst@environ.se. Website: <http://www.environ.se>.

**ECOPRO-Environmentally Friendly Coastal Protection.** A guidebook on how to assess and monitor coastal erosion problems. Contact: Government Publications, 4-5 Harcourt Road, Dublin 2, Ireland. Tel: 353 1 6613111. FAX: 353 1 4752760.

**Green Volunteers, A World Guide to Voluntary Work in Nature Conservation.** 1998. Worldwide volunteer opportunities and research projects can be found within this guide. Website: <http://www.greenvol.com>.

**Live Reef Fish Information.** This bulletin is issued twice a year by the South Pacific Commission. It contains information about the environmental problems associated with the live reef food fish trade. Contact: Aymeric Desurmont. E-mail: AymericD@spc.org.nc.

**Marine Protected Areas and Ocean Conservation.** 1997. This book deals with the role that marine protected areas play in the conservation of the world's coastal environment. Contact: Academic Press. Tel: 800-321-5068. US\$69.95.

**Proceedings from the 13th Australasian Coastal and Ocean Engineering Conference and the 6th Australasian Ports and Harbors Conference.** These conferences were held in Christchurch, New Zealand, September 1997. The proceedings can be purchased for US\$125. Contact: Una

O'Grady, Publications Officer, Centre for Advanced Engineering, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. Tel: 64 3 364 2474. FAX: 64 3 364 2069. E-mail: u.ogrady@cae.canterbury.ac.nz. The proceedings can also be viewed and ordered online at: <http://www.cae.canterbury.ac.nz/coastal/pacific.htm>.

**Strategic Plan for Fisheries Research.** The ongoing research conducted by NOAA's National Marine Fisheries Service is profiled in this five year plan. Contact: Mark Chandler, Office of Science and Technology, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. Tel: 301-713-2363. The plan is also available at: <http://kingfish.ssp.nmfs.gov/sfa>.

**The Built Environment of Coast Areas During the Stone Age.** This focuses on the protection of the cultural environment along the coastal zones. Contact: Magdalena Jezierska, Hel Marine Station, ul. Morska 2, 84-150 hel, Poland. Tel: +48 58 6570-836. FAX: +48 58 6570-420.

**Year of the Ocean Discussion Papers.** 1998. This volume discusses the conservation, exploration, sustainable use and national security interests of the ocean. The present state of the oceans and plans for the future are also discussed. Contact: Office of the Chief Scientist, NOAA, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, D.C. 20230, USA. Tel: 202-484-3385. FAX: 202-482-5231.

## Conferences

June 3-6. **Who Owns America? II: How Land and Natural Resources are Owned and Controlled.** Madison, Wisconsin. Contact: Gene Summers, North American Program, Land Tenure Center, 1357 University Avenue, Madison, WI 53715, USA. FAX: 608-262-2141. E-mail: ltc-nap@facstaff.wisc.edu. Website: <http://ltcweb.ltc.wisc.edu/nap>.

June 8-11. **9th Global Warming International Conference and Expo (GW9).** Hong Kong, China. Contact: Prof. Sinyan Shen, Chair, International Program Committee, Global Warming International Center, PO Box 5275, Woodridge, IL,

60517, USA. Tel: 630-910-1551. FAX: 630-910-1561. Website: <http://www2.msstate.edu/~krreddy/glowar/glowar.html>.

June 8-12. **GCIP Mississippi River Hydrometeorology Conference: Predicting Climate Variability and Its Implications for Water Resource Management.** St. Louis, Missouri. Contact: Adrienne Calhoun, GCP Project Office, NOAA, Office of Global Programs, 1100 Wayne Ave., Suite 1210, Silver Spring, MD 20910, USA. E-mail: calhoun@ogp.noaa.gov. Website: <http://www.ogp.noaa.gov/gcip/miss/misceleb.html>.

June 8-12. **Second Annual International Water Seminar—Water '98: Legal and Regulatory Issues.** Dundee, Scotland. Contact: Moira McKinlay. Tel: 44 1382 344 303. FAX: 44 1382 322 578. E-mail: cpmlp@dundee.ac.uk. Website: <http://www.dundee.ac.uk/petroleum-law/>.

June 8-13. **3rd International Workshop on Participatory Development.** Ottawa, Canada. Contact: Mosaic.net International, Inc., 705 Roosevelt Avenue, Ottawa, Canada K2A 2A8. Tel: 613-728-1439 ext. 1. FAX: 613-728-1154. E-mail: workshop@mosaic-net-intl-ca. Website: <http://www.mosaic-net-intl.ca>.

June 10-14. **Crossing Boundaries: The Seventh Common Property Conference of the International Association for the Study of Common Property.** Vancouver, British Columbia. Contact: Evelyn Pinkerton, School of Resource and Environmental Management, Simon Fraser University, Burnaby, British Columbia, V5A 1S6 Canada. FAX: 604-291-4968. E-mail: iascp98@sfu.ca. Website: <http://www.sfu.ca/iascp98/>.

June 26-July 1. **Disaster Forum '98: Global Partnerships—Creating Solutions.** Edmonton, Alberta, Canada. Contact: Disaster Forum-98, 11215 Jasper Ave., Edmonton, Alberta, Canada T5K 0L5. Tel: 403-496-3804. FAX: 403-422-1549. E-mail: disaster@freenet.edmonton.ab.ca.

July 7-10. **4th International Interdisciplinary Conference on the Environment.** Washington, D.C..

# Training

Contact: Demetri Kantarelis or Kevin Hickey, Assumption College, 500 Salisbury Street, Worcester, MA 01615, USA. Tel: 508-767-7557 (Kantarelis), 508-767-7296 (Hickey). FAX: 508-767-7382. E-mail: dkantar@eve.assumption.edu, khickey@eve.assumption.edu. Website: <http://www.assumption.edu/html/academic/conf/iicecall.html>.

July 12-15. **Minding the Coast: It's Everybody's Business.** Williamsburg, Virginia. Contact: Maurice P. Lynch, Conference Chair. Tel: 804-684-7151. Website: <http://www.vims.edu/TCS16>.

July 13-August 14. **Duke University Integrated Marine Conservation Program.** Contact: Helen Nearing. Tel: 919-504-7502. E-mail: [hnearing@mail.duke.edu](mailto:hnearing@mail.duke.edu). Website: [http://www.env.duke.edu/marinelab/mlt\\_erm2.html](http://www.env.duke.edu/marinelab/mlt_erm2.html).

July 24-30. **Coastal Zone 99 (CZ99).** San Diego, California, USA. The 11th biennial international symposium on coastal and ocean management. Abstracts are due August 1, 1998. E-mail: [cz99@umbosky.cc.umb.edu](mailto:cz99@umbosky.cc.umb.edu). FAX: 617-287-5575. Website: [omega.cc.umb.edu/~cz99](http://omega.cc.umb.edu/~cz99).

July 29-31. **Ecosystem Restoration: National Symposium to Bring Together Ecosystem Restoration Practitioners and Researchers.** Baltimore, Maryland. Contact: Sue Schock or Dan Murray, EPA's Center for Environment Research Information. Tel: 513-569-7551 (Schock), 513-569-7522 (Murray). Website: <http://www.epa.gov/ttnrnr/cei.htm>.

August 7-11. **Order for the Oceans at the Turn of the Century.** Oslo, Norway. Contact: The Fridtjof Nansen Institute, Fridtjof Nansen vei 17, P.O. Box 326, N-1324 Lysaker, Norway. Tel: 47 67 11 19 00. FAX: 47 67 11 19 10. E-mail: [Conference@fni.no](mailto:Conference@fni.no). Website: <http://www.tjener.uninett.no/~fni/los98.htm>.

August 9-12. **4th International Symposium on Environmental Geotechnology and Global Sustainable Development.** Boston, Massachusetts. Contact: Vincent Ogunro, 4th International Geoenvironmental Symposium, Center for Environmental Engineering Science and Technology (CEEST), University of Massachusetts

(North Campus, Rm E-114), One University Ave., Lowell, MA 01854, USA. Tel: 508-934-3185. FAX: 508-934-4014. E-mail: [ogunrov@woods.uml.edu](mailto:ogunrov@woods.uml.edu).

August 10-13. **8th Stockholm Water Symposium.** Stockholm, Sweden. Contact: Symposium Secretariat, Stockholm Water Symposium, SE-106 36 Stockholm, Sweden. Tel: 46 8 736 20 21. FAX: 46 8 736 20 22. E-mail: [sympos@siwi.org](mailto:sympos@siwi.org). Website: <http://www.siwi.org>.

August 27-30. **IGU Study Group on the Geography of Sustainable Tourism as Part of the International Geographical Union Regional Conference 1998.** Estoril, Portugal. Contact: Fred Helleiner, Dept. of Geography, Trent University, Peterborough, Ontario, Canada K9J 7B8. FAX: 705-748-1205. E-mail: [FHELLEINER@trentu.ca](mailto:FHELLEINER@trentu.ca).

September 7-10. **International Conference on Sustainable Tourism in the Next Millennium.** Kathmandu, Nepal. Contact: Head Central Department of Geography, Trighuvan University, Kirtipur Kathmandu, Nepal. Tel: 977 1 330329. FAX: 977 1 331319. E-mail: [cdg@wlink.com.np](mailto:cdg@wlink.com.np). Website: <http://www.icimod.org>.

September 8-12. **International Conference on Coastal Ocean and Semi-Enclosed Seas Circulation and Ecology Modeling and Monitoring.** Moscow, Russia. Contact: Vladimir V. Zhmur, P.P. Shirshov Institute of Oceanology and Institute of Numerical Mathematics of Russian Academy of Sciences. Tel: 095-129-1963. FAX: 095-124-5983. E-mail: [zhmur@tiki.sio.rssi.ru](mailto:zhmur@tiki.sio.rssi.ru).

September 22-26. **Coastal Dunes of the Atlantic Biogeographical Region.** Southport, Northwest England. Contact: John Houston, Sefton Coastlife Project, Formby Council Offices, Freshfield Road, Formby L37 3PG. Tel: 0151 934 2960. FAX: 44 151 934 2955. E-mail: [life@scms.u-net.com](mailto:life@scms.u-net.com). Website: <http://www.merseyworld.com/sclife>.

September 30-October 3. **Ecosystem Considerations in Fisheries Management.** Anchorage, Alaska. Contact: Brenda Baxter, Alaska Sea Grant College Program. Tel: 907-474-6701. E-mail: [FNBRB@uaf.edu](mailto:FNBRB@uaf.edu). Website: <http://www.uaf.alaska.edu/seagrant/Conferences/symposia.html>.

## USDA-NRCS Training Workshop on Water Quality Monitoring.

Four workshops on water quality monitoring are being offered by the United States Department of Agriculture's Natural Resources Conservation Service. The workshops are open to the public and are free of charge. The focus is how to design a monitoring system that will produce cost-effective results.

Workshop dates and locations: May 11-15. Fort Worth, Texas. June 1-5. Fort Collins, Colorado. July 13-17. Corvallis, Oregon. September 14-18. Harrisburg, Pennsylvania. For registration and further information contact: Bruce Newton, National Water and Climate Center, USDA Natural Resources Conservation Service, 101 SW Maine Street, Suite 1600, Portland, OR 97204-3224, USA. Tel: 503-414-3055. FAX: 503-414-3101. E-mail: [bnewton@wcc.nrcs.usda.gov](mailto:bnewton@wcc.nrcs.usda.gov).

## Nature Guide Training Program

RARE Center's approach to Nature Guide Training was developed in 1994 to promote conservation through nature-based tourism. During an intensive, three-month training course, under-educated rural adults learn the conversational English skills and natural history knowledge necessary to become successful nature guides. RARE has conducted courses in Costa Rica and Baja California, and was invited to launch a pilot course in the Yucatán, Mexico. RARE continues to empower local residents to be informed advocates for the protection of the natural resources in their communities.

For more information contact: Brett Jenks, Director, Nature Guide Training Program, RARE Center for Tropical Conservation, 1616 Walnut Street, Suite 1010, Philadelphia, PA 19103 USA. E-mail: [bjenks@ix.netcom.com](mailto:bjenks@ix.netcom.com).



## Sri Lanka

(continued from page 7)

The Hikkaduwa management project will produce environmental benefits and costs for which markets do not exist. These are called "environmental externalities" and are not reflected in either the financial or socioeconomic analyses. The environmental analysis considers the costs and benefits to all areas or people who are likely to be affected by the flow of inputs and outputs associated with the project.

Beneficial environmental externalities generated by implementation of the SAM plan include increased land values and quality of life; protection of the coral reef biodiversity and water quality; protection of beaches and shoreline structures; continued environmental integrity; superior tourist experiences; and heightened local environmental awareness.

### Recovery of SAM Plan Costs

Distribution analysis of the SAM project shows that the local tourism industry would be the primary beneficiary. Table 2 shows the breakdown of the NPV of benefits by beneficiary for the 6 percent tourism growth scenario of the environmental economic analysis above.

Implementation costs and coral mining opportunity costs are the two major SAM plan costs. Thus, if coral mining in the area is stopped, this community sector will bear a significant portion of SAM plan costs unless proactive steps are taken to provide them with alternative employment. The costs of training and developing livelihoods are included in both the socioeconomic and environmental economic analyses.

The question remains as to how will project benefits be captured to pay for plan implementation. Possible options are a growing economy, profit or environmental taxes, consumer surplus collection, a national budget and foreign loans, and utility fees for tourism establishments.

### Conclusions and Policy Implications


The cost-benefit analysis for the Hikkaduwa SAM plan indicates that no matter how it is calculated and using whatever discount rate and with any level of tourism growth equal to or exceeding 3 percent, it is beneficial to invest in the protection and management of the coastal resources – especially the reef and water quality. Without SAM plan implementation, the resources that fuel Hikkaduwa's tourist industry would continue to degrade.

With the many different economic

activities taking place today, solutions to the environmental problems can be addressed only by involving all resource users and abusers. The SAM plan developed for Hikkaduwa is providing a dynamic tool for resource management to maximize benefits while minimizing adverse impacts. The SAM planning approach identifies key issues, formulates strategies, and implements and monitors actions through local participation. Stakeholder participation is essential throughout the process.

The cost-benefit economic analyses conducted for the Hikkaduwa SAM plan and its positive environmental impacts represent a powerful tool in developing policies for effective ICM. For Hikkaduwa, wise planning and action combined with community, national and international support can lead to sustainable win-win outcomes. Lessons learned in Hikkaduwa indicate that the SAM process has potential for wider application for ICM in the country and elsewhere.

(An extended version of this article can be found in *Ambio*, Vol. 26, No. 6, Sept. 1997.)

For further information contact: Alan T. White, Coastal Resource Management Project, Tetra Tech EM Inc., 5th Floor, CIFIC Tower, North Reclamation Area, Cebu, Philippines. Tel: 6332-232-1821. FAX: 6332-232-1825. E-mail: [prccbu@usc.edu.ph](mailto:prccbu@usc.edu.ph) 

## Apo Island

(continued from page 14)


some areas, conflict may arise between the small-scale ecotourism industry and the proposed large two- to five-star hotels. Larger developments will undoubtedly create new jobs that will require specially trained personnel, probably brought in from other areas. The local fishing community may benefit by providing transportation to the reserve, or if they are entitled to charge admission fees. However, this would require a united group dedicated to use the reserve as a source of income. The danger exists that more business-

minded people may take over this role, thus reducing the benefit to the fishers.

Both small-scale ecotourism and hotels seem to be developing without major competition. However, this may change rapidly once the area is targeted by national and international travel organizations. It can be expected that within one to two generations, tourism will have changed the area beyond recognition. The possibility exists that this change will have irreversible effects for the artisanal fishing community that exists now. Whether this change will be for the economic benefit of these people is difficult to predict. Regardless

of whether two- to five-star facilities or small-scale ecotourism prevail, either form of tourism is dependent on a healthy environment, including the existing coral reef reserve. Preservation of the marine life is thus mandatory.

This study was carried out as part of the project Establishment of Marine Reserves in Negros Oriental (EMRI-NO) funded by the European Union.

For further information contact: H.P. Vogt, ZMT, University of Bremen, 24 Doddington Grove, Kennington, London SE17 3TT, England. Tel/FAX: + 44 171 587 3556. E-mail: [HP\\_Vogt@com-puserve.com](mailto:HP_Vogt@com-puserve.com) 



## CRC Books Now Available

A number of books on various aspects of coastal management are now available via the Coastal Resources Center (CRC) at the University of Rhode Island. The only charge for these books is a nominal fee for shipping and handling. CRC will accept checks, money orders and international money orders ONLY for purchases. All orders will be shipped immediately upon check clearance. Any inquiries should be addressed to: Chip Young, Communications Director, Coastal Resources Center, University of Rhode Island, Narragansett Bay Campus, South Ferry Road, Narragansett, RI, USA 02882. Phone: (401) 874-6630; FAX: (401) 789-4670; E-mail: cyoung@gso.uri.edu.

### Available Titles

**A Bibliography for the Anthropological Study of Fishing Industries and Maritime Communities, Supplement 1973-1977**, Landberg, L. C. W., 1979, International Center for Marine Resource Development, University of Rhode Island.

**A National Coral Reef Strategy for Thailand Vol. 2: Policies and Action Plan**, Project, T. C. R. M., 1993, Thailand Coastal Resources Management Project.

**Aspects of Small-Scale Fisheries Development**, Pollnac, R. B. and M. T. Morrissey, 1989, International Center for Marine Resource Development, University of Rhode Island.

**Atacames Special Area Management Plan**, Olsen, S., D. Robadue, Jr. and L. Arriaga, 1994, Technical Report 2077.

**Coastal Aquaculture in Developing Countries: Problems and Perspectives**, Pollnac, R. B. and P. Weeks, 1992, International Center for Marine Resource Development, University of Rhode Island.

**Eight Years in Ecuador: The Road to Integrated Coastal Management**, Robadue, D., Jr., 1995, Coastal Resources Center, University of Rhode Island and U.S. Agency for International Development.

**Emergy Analysis of Shrimp Mariculture in Ecuador**, Odum, H. T. and J. Arding, 1991, Coastal Resources Center, University of Rhode Island.

**Evaluating the Potential of Fishermen's Organizations in Developing Countries**, Pollnac, R. B., 1988, International Center for Marine Resource Development, University of Rhode Island.

**Fish Aggregating Devices in Developing Countries: Problems & Perspectives**, Pollnac, R. B. and J. J. Poggie, 1997, International Center for Marine Resource Development, University of Rhode Island.

**Guia Para La Administracion De La Pesca En Pequena Escala: Informacion del Sector Pesquero**, Stevenson, D., R. B. Pollnac and P. Logan, 1986, International Center for Marine Resource Development, University of Rhode Island.

**Implementing A Coastal Resources Management Policy: The Case of Prohibiting Coral Mining in Sri Lanka**, with Appendices, Hale, L. Z. and E. Kumin, 1992, Coastal Resources Center, University of Rhode Island.

*(continued on next page)*

# Ecuador's Tourism "Eggs" are Mostly Found in One Basket

By Mario Gonzalez

The Galápagos Islands are the undisputed jewel in Ecuador's tourism crown. Some 60 percent of the income the Ecuadorian government derives from tourism comes from the Galápagos. Unfortunately, the sparkle given off by this jewel is attracting more attention than the islands can stand.

Drawn by the tourist revenues, thousands of families have settled in the Galápagos in search of a better standard of living. This situation has caused the islands to have the greatest population growth in the country, confronting the government with the need to find a balance between economic development and the preservation of natural resources. Even though all interested parties agree that the only solution is to find a model for sustainable development, in real life this seems unattainable.

Galápagos is located about 1,000 km away from continental Ecuador. The fact that basic services and products are rather costly does not discourage these new settlers, because salaries on the islands are 75 percent higher than elsewhere in Ecuador.

Tourism is the sole source of income for about 68 percent of the islanders. Nevertheless, most visitors come to the islands in the summer months (July and August), so in slow months the locals fish, grow crops or raise animals. This has caused the introduction of many non-native species. Pigs, goats, cows and rats now threaten the native fauna and flora. Aside from preying on the native species, these immigrants also transmit diseases to which resident birds and mammals have little resistance.

Illegal fishing of endangered species (lobster, shark and sea cucumbers) has increased in the past 10 years, due to the great demand from Asian coun-

tries. Of the 1,900 species exclusive to the islands, 74 are endangered and 19 have already disappeared. According to this study, if the Ecuadorian government does not take immediate steps to mitigate these problems, the islands' ecology will be significantly altered.

In 1959 the Ecuadorian government



Yet unspoiled beach in the Galápagos Islands.

created the Galápagos National Park, that encompasses 97 percent of the surface of the islands, and a special commission was appointed to oversee the park. In 1974 the park's authorities established a yearly limit of 12,000 tourists. But in 1978 that number was increased to 25,000, with the caveat that all activities on the islands should be performed under strict control.

Twenty years after the creation of the park, the United Nations declared the islands part of the Natural Patrimony of Humanity. Since then, the objective has been to find a model of sustainable economic development that includes tourism as the main activity, but whose underlying purpose would be to preserve the unique natural resources of the islands.

Two years ago, the Ecuadorian Parliament passed a special law for the Galápagos aimed at protecting the nat-

ural resources. But the law was vetoed by the then president of Ecuador, Sixto Durán, who gave in to the pressure from the people of the archipelago who thought the limits too strict.

However, on March 6, 1998, Ecuadorian President Fabian Alarcón signed into law the Galápagos Conservation Law. The new law expands the protected waters around the Galápagos Islands from 15 to 40 miles and bans industrial-scale fishing in the

area. The law also established an inspection and quarantine system to combat the introduction of non-native species. Now, half of every tourism dollar will go towards supporting island conservation. Permanent resident status will be restricted to Ecuadorians who have been on the islands for five years or more.

Regardless of all the goodwill, the future of the Galápagos islands seems plagued by trouble, even though experts have identified a good place to start solving its problems. Without addressing these problems, there will be a new reality for the place that Charles Darwin referred to as "the enchanted islands."

*For further information contact: Mario Gonzalez. E-mail: mfway1@ibm.net. Portions of this article appeared in the September 1997 issue of ©The WorldPaper (US), Website: <http://www.worldpaper.com>. 🌐*

**Monitoring and Evaluating the Impacts of Small-Scale Fishery Projects**, Pollnac, R. B., 1989, International Center for Marine Resource Development, University of Rhode Island.

**Postharvest Fishery Losses**, Morrissey, M. T., 1988, Proceedings of an International Workshop Held in April 1987 at The University of Rhode Island, U. S. Agency for International Development, International Center for Marine Resource Development, University of Rhode Island.

**Small-Scale Fishery Development: Sociocultural Perspectives**, Poggie, J. J. and R. B. Pollnac, 1991, International Center for Marine Resource Development, University of Rhode Island.

**Vegetated Buffers in the Coastal Zone: A Summary Review and Bibliography**, Desbonnet, A., P. Pogue, V. Lee and N. Wolff, 1994, Coastal Resources Center, University of Rhode Island.

**SHIPPING AND HANDLING CHARGES (\$US) FOR ALL BOOKS, PER BOOK IS:**

**United States: \$7.50**

**Canada: \$10.00**

**Overseas: \$12.50**

## CRC Books Order Form

All checks should be made payable to: Coastal Resources Center. Please mail to:

Coastal Resources Center - Books  
URI Narragansett Bay Campus  
South Ferry Road  
Narragansett, RI 02882 USA

I would like to order the following books:

S & H Charge

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Total 

---

Please send to:

---

---

---

---



**ECoNETT** - The European Community Network for Environmental Travel & Tourism was developed in December 1995 as a joint project by the World Travel & Tourism Council and DGXXIII of the European Commission, with the goal to increase overall awareness of sustainable travel and tourism.

**ECoNETT** has established valuable relationships with organizations involved in coastal zone management and small islands, such as the European Union for Coastal Conservation and the NetCoast Network, becoming an important point of reference for tourism issues in coastal areas.

**ECoNETT** is continually searching to include new documents in the database and would like to expand its content on coastal zones and small islands in the field of sustainable development.

Contact: **ECoNETT** Project Office, 20 Grosvenor Place, London SW1X 7TT Tel: 44 171 235 2135. FAX: 44 171 235 2445. E-mail: 106316.2226@compuserve.com. Website: <http://www.wttc.org>.

<http://www.wttc.org>

## [Coastal Waters of the World: Trends, Threats, and Strategies](#)

### **Provides Global Overview of the Coast**


“Our coastal areas are suffering from gigantism,” a civil servant from Bombay tells author Don Hinrichsen. “They are becoming like Frankenstein monsters: They are too big and out of control for us to manage.” This fear of the current plight of the planet’s coasts as the global population migrates to where water meets land is the thread running through Hinrichsen’s book, *Coastal Waters of the World: Trends, Threats, and Strategies*, just released by Island Press.

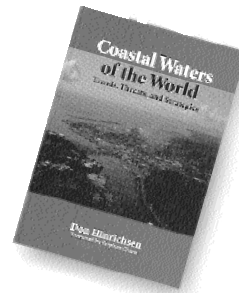
Don Hinrichsen is not a scientist or economist. But he is a first-rate working journalist. In that role he explores the state of our coasts today, how they came to be in that condition, and the future challenges and complexities of managing their resources. Hinrichsen delivers a call for attention to the pressures being inflicted on coastal resources that is clear and compelling to any reader.

The author bolsters his presentation with demographics and statistics that make the case for the need for immediate action to sustain coastal resources. He does this without overwhelming the reader or neglecting the need to substantiate the anecdotal claims of his many sources and interviewees. Case studies are sprinkled informatively throughout *Coastal Waters of the World*, epitomized by his prologue on the island-dwelling Kuna Indians of San Blas, Panama. These effec-

tive de facto coastal managers have long recognized the value of the resources that surround them, and succeeded in working to sustain their use. This stewardship effort has been accomplished in the face of substantial outside pressures, including direct confrontation with the government of Panama itself.

Hinrichsen emphasizes the need for such local ownership of coastal management efforts—hopefully in combination with top-level policy guidance—the necessity of an informed process of governance, and the benchmarking and evaluation of coastal projects as key strategies to effective management. He also calls upon his colleagues in the media to take responsibility to help disseminate knowledge about coastal issues, and facilitate the sharing of lessons learned through firsthand experience.

By breaking down the main body of the book into an evaluation of the coasts along the world’s regional seas, Hinrichsen provides a logical and concise way to compare and contrast past and ongoing efforts in coastal management. Combined with the tightly-focused case studies, this body of information allows the author to lay out the bigger picture—one which drives his summary recommendations. These identify the need for global alliances that weave together current management initiatives worldwide. 





## In the Next Issue of *Intercoast*

While most of the world's economists may be oblivious to the dependence of the global economy on the Earth's coastal ecosystem, resource economists, coastal managers and environmental scientists are not. For them, the mounting stresses are evident on every front as more and more sustainable yield

thresholds are crossed. With the world's economy having expanded sixfold since the 1950s, it has begun to outrun the Earth's capacity to supply goods and services, and the coastal zone is no exception, with approximately 37 percent of the world's population living within 100 km of the coast.

The Fall issue—*Intercoast* #32—will explore the intertwined relationship between the economy and coastal issues.

In addition to articles focused on coastal economic issues, *Intercoast* includes stories on other aspects of coastal management and "Reports from the Field," which give updates on current projects around the world. As always, "Intercoast Insider Information" will update you on new publications, upcoming conferences, new Worldwide Web sites and other resources.

If you would like to contribute to *Intercoast* #32, contact Managing Editor Noëlle F. Lewis, *Intercoast Network*, 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@gsosun1.gso.uri.edu](mailto:noelle@gsosun1.gso.uri.edu). Thank you.



## Intercoast Network

**Editor:** Stephen Olsen  
**Managing Editor:** Noëlle F. Lewis  
**Assistant Editor:** Andrea Ethier

*Intercoast Network*, an international newsletter of coastal management, is published quarterly by the Coastal Resources Management Project of the University of Rhode Island's Coastal Resources Center and the U.S. Agency for International Development (USAID). Funding is provided by USAID's Global Environment Center, and by the Coastal Zone Management Centre, which is located within the National Institute for Coastal and Marine Management (RIKZ), a division of the Netherlands Ministry of Transport, Public Works, and Water Management.

The objective of *Intercoast Network* is to facilitate the exchange of information, experience, and ideas on coastal management. Readers are encouraged to write to the Coastal Resources Center with comments on the newsletter and its effectiveness as a source of information for coastal managers.

*Intercoast Network*  
Coastal Resources Center  
University of Rhode Island  
Narragansett Bay Campus  
Narragansett, RI 02882 USA  
Tel: 401-874-6870  
FAX: 401-789-4670  
E-mail: [noelle@gsosun1.gso.uri.edu](mailto:noelle@gsosun1.gso.uri.edu)  
Website: <http://crc.uri.edu>



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