FOCUS ON: IMPLEMENTATION & COMPLIANCE

INTERCOAST NETWORK

INTERNATIONAL NEWSLETTER OF COASTAL MANAGEMENT

Narragansett, Rhode Island USA • #33 • Winter 1999

Charting a Course Through the Stormy World of Coastal Program Implementation

By Donald Robadue

Implementation has a simple dictionary definition. It is a straightforward matter of selecting the right tools, then carrying a program or policy into effect to fulfill an objective and accomplish a goal. Yet coastal management practitioners can only dream that it could be so easy, that plans and policies attract all the funds, staff, and political and administrative support required to put those plans and policies into motion.

Consider the following scenario: You, as a coastal manager, have worked for months to build a consensus among stakeholders to create a plan or policy that will successfully solve a difficult issue. The stakeholder committee is finally unanimous, the press coverage is extensive and supportive, and the planning team is exhausted but satisfied. Yet it is with some fear and doubt that you watch the carefully crafted plan passed along and adopted by authorities with power and responsibility. Your dream slowly becomes a nightmare when you realize that decisionmakers live in a different world and operate by different rules and concerns. You watch helplessly as they pick and choose among the parts of the action program the planning team has so skillfully woven together as the first integrated proposal for coastal management. As if this was not demoralizing enough, you learn in the newspaper that the largest natural resource user group complains to the minister that it has grave reservations about complying with what it considers a misguided proposal. This influential user group announces it will only agree to investigate the issue. The bright promise and hopeful spirit of the consensus-driven planning stage is replaced by the nightmare world of scarce budgetary resources, distracted and perhaps disinterested leaders, broken promises, weak political support and institutional frailty.

We know that 'implementers' are often only able to take on a tiny portion of a work plan that they might support with vigor. A proposed lead agency might decline to conduct joint exercises or share resources with other ministries or departments that are essential for the success of a proposal. A capable staff who worked long, hard weeks to prepare a coastal plan, can be quickly dispersed to other posts and assignments, leaving a 'skeleton crew' to carry out an ambitious program. A key donor who expressed early enthusiasm might unexpectedly present a long list of preconditions, modifications and restrictions for the program, which would never be acceptable to the stakeholders who agreed to the plan or the government that adopted it. As a result, one can be faced with the likelihood of receiving only a fraction of the funds needed to launch the program.

Advice from the Field: Ways to Avoid Implementation Nightmares

This issue of *InterCoast* highlights projects, policies and strategies from around the globe which illustrate how to bridge the gap between the worlds of planning and implementation. No grand schemes and one-size-fits-all solutions are presented here. Instead, the articles and cases cover a wide range of issues, settings and scales, yet reveal some common-sense ingredients for success.

Provide Implementers What They Need to Know in Order to Act. Governments face information limitations that can impede their coastal management duties. Officials need to tap available sources of expertise and find collaborative forums to apply knowledge to case decisions. Skilled professionals, both within and outside public agencies, are needed who willingly work together and take personal responsibility for expanding their skills can do much to reduce the knowledge gap. In

(continued page 11)

Highlights

Theme Advisor:

Donald D. Robadue, Jr.

A Mooring Buoy Training Program Creates New Partners in Reef Protection in Kenya

By Mark Amaral

At the conclusion of the workshop, the Kenya Wildlife Service expressed a strong desire and commitment to implement the mooring management plans.

Kenya has taken several small, but significant steps towards initiating an integrated coastal management (ICM) process by preparing an action strategy for the Nyali-Bamburi-Shanzu beach area. One of the immediate implementation projects recommended was installing mooring buoys in the Mombasa Marine Park. This action will reduce the direct physical damage caused by human activities such as anchor damage, boat groundings and trampling of corals by tourists. The Kenya Wildlife Service (KWS) was assigned the responsibility of implementing this activity.

Installation of the mooring buoys could have been done by the KWS alone, however, the KWS and the Coastal Management Steering Committee (CMSC) recognized the virtue of using this activity to build support for marine park management and ICM among their local stakeholders (boat operators, hoteliers, dive shops among others). To this end, the KWS teamed with the CMSC to implement a mooring buoy training program and stakeholder meeting. The major objectives were:

•To provide technical training to the KWS so they could design and install more efficient moorings, building on their own experience and incorporating lessons learned from other marine protected areas

•To inform the KWS about the purpose and use of the moorings

•To explore how 'positive' enforcement (versus the more traditional law enforcement) could be an effective tool in park management

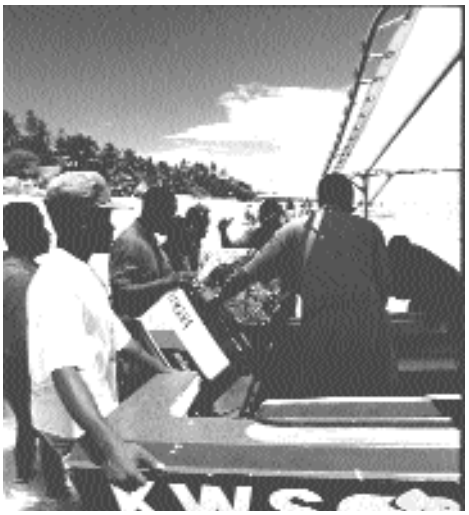
•To work with the local constituency to begin creating a mooring management program

The meeting facilitated consensus-building among opposing stakeholder groups about where mooring should be placed, how they should be used and what the general operating rules should be for boaters in the area.

The discussion went well beyond how to install mooring buoys, on to areas of enforcement, education and community involvement. During part of the workshop, the KWS was joined by local boat operators and hoteliers. In this non-threatening 'training' environment, boat operators and KWS rangers shared openly their opinions and ideas. Boat operators helped construct the moorings, select the new mooring sites and install the moorings. By working together, everyone's interests were considered and incorporated into the decisions.

Stakeholders also worked with the KWS to draft a code of conduct for the use of the newly installed moorings, and for an educational brochure about the park and the moorings. Both these products were presented at a formal stakeholders' meeting held on the last day of the training. At the meeting, participants reviewed the draft code of conduct and brochure and suggested changes. Several of the suggestions supported rules stricter than the KWS would have proposed for fear of themselves being seen as heavy-handed. By the end of the meeting the stakeholders approved revisions to both products. This cooperative process created the necessary stakeholder support for the rules and, as a result, will reduce the level of formal enforcement necessary to implement them.

At the conclusion of the workshop, the KWS expressed a strong desire and commitment to implement the mooring management plans designed at the workshop. Stakeholders publicly supported the new mooring management plans, putting positive pressure on the KWS to follow through with implementation. The facilitators from the KWS's training center will work with staff from each marine park and reserve to conduct workshops and training programs on moorings, using much of the same material used during this workshop. The purpose of each workshop is to develop a brochure and a mooring map for each area, and to bring local stakeholders into the process.



Kenya Wildlife Service at work.

For further information contact: Nyawira Muthiga, Kenya Wildlife Service, P.O. Box 82144, Mombasa, Kenya. Tel: (254) 11 227774. FAX: + (254) 11 312744. E-mail: NMuthiga@africaonline.co.ke.

The Changing Face of Implementation and Compliance: Public/Private Partnerships Build Good Will for Action

By Noëlle F. Lewis

In November 1998, the Rhode Island, USA, Chapter of the American Society for Public Administration, held a three-day workshop, "Towards Virtual Government: A Report Card on the Changing Face of Public Administration." One session focused on "The Governance of Coastal Ecosystems: New Approaches and Partnerships." The panel examined the changing theory and practice associated with the administration of the environment. Private and public partnerships, self-regulation, and other emerging forms of governing and managing the environment were discussed.

Big Business Can Join with Interest Groups to Prevent Environmental Damage

Peg Brady, executive director of the Massachusetts Coastal Zone Management Agency, spoke on Massachusetts' efforts to achieve an environmental and cost effective solution to the dredging problems associated with the development of Boston Harbor.

The Port of Boston has enormous shipping traffic. Overall, the port handles over 1.3 million tons of general cargo, 1.5 million tons of non-fuels bulk cargo and 12.8 million tons of bulk fuel cargo yearly, which is over 90 percent of Massachusetts' petroleum consumption. Fuel vessels have become larger and wider. This, combined with the fact that Boston Harbor has not been dredged for over 50 years, made it necessary for the harbor to be dredged. This led to a somewhat unusual partnership between the United States Army Corps of Engineers (Corps), a public entity, and the Massachusetts Port Authority (MassPort), a private enterprise.

The volume of the dredge spoils from this project was estimated to be 3.7 million cubic yards. Because of its magnitude, the project received immense publicity. Numerous interest groups and stakeholders became involved. The key issue was disposal of the dredge spoils; and as a result of pressure from the interest groups, offshore disposal was used for only a portion of the spoils. Due to soil contamination, approximately one-third of the spoils, 1.2 million cubic yards, was not suitable for offshore disposal. These would be disposed of in the harbor in permanent storage 'cells.' These cells are 200 ft by 500 ft in size and would be buried 30 ft deep.

There was great concern about the environmental monitoring. The resulting framework for the monitoring was the creation of an 'independent observer' to ensure that the monitoring was as bulletproof as possible. The observer, financed by MassPort, is a consultant who works with a group of interested organizations. The observer has the ability to stop and start the project if there are environmental concerns. Another key feature to this framework is the assurance that the monitoring program will scale down as the project reaches completion. Because of the level of trust between the players that the monitoring will be undertaken properly, the interested parties agreed to have confidence in the opinion of the independent observer as to the amount and duration of the monitoring, and in its results.

This form of project overseeing has been very successful primarily because the amount of planning and involvement by all groups led to a high degree of trust between the interested parties, MassPort and the Corps. This was not driven by management (top down) or by the interest groups (bottom up); it was a trust agreement among all.

An Ecosystem Management Approach to Implementation Fosters Collaboration Among Diverse Groups

Virginia Lee of the Coastal Resources Center, University of Rhode Island, spoke of the use of the ecosystem management approach, that has recently been gaining acceptance in Rhode Island. Three projects were described: the Pawcatuck Watershed approach, the Aquidneck Island Partnership (AIP) and a hazard mitigation project. These projects have a common thread: each has several public and private entities that need to find common ground to implement needed change.

The Pawcatuck Watershed contains 14 cities and towns and a sovereign American Indian nation, and is located in two states (Connecticut and Rhode Island). It is the first watershed to have a bi-state agreement to develop management strategies for the resource. Facilitating communication among these agencies and local stakeholders has produced a broad-based agreement on the nature of threats to the region, a needed first step towards serious debate.

The AIP has taken the ecosystem management approach in looking at management issues on Aquidneck Island. The AIP represents interests from public and private

(continued page 4)

(continued from page 3)

organizations in the three island communities of Middletown, Newport and Portsmouth, and is working to achieve coordinated resource management that maintains a balance between economic development and environmental well-being, while maintaining the island's unique character.

The hazard mitigation project is one of the strongest of the public/private partnerships. It links two national programs, the Federal Emergency Management Agency (FEMA) and the Institute for Business and Home Safety (IBHS) an initiative of the insurance industry. FEMA, after years of pouring money into rebuilding after natural disasters have damaged or destroyed personal property, has joined with the IBHS to promote the use of creative techniques to reduce disaster losses. This is done through education programs and mandates that focus on building, rebuilding or relocating to avoid future loss.

Business Regulation: Be Environmentally Friendly and Be Rewarded

Curt Spalding, executive director of Save The Bay, a Rhode Island citizens environmental group, wore a different hat for this discussion. Though currently working as an environmental advocate, he spoke of his experience while working at the United States' Environmental Protection Agency (EPA). His perspective was that of a private industry needing to work with regulatory agencies on pollution issues. Citing numerous examples of environmental programs undertaken by the EPA, Spalding said that in many cases regulatory agencies have found that addressing the special needs of individual companies which are subject to an industry-wide regulation, by treating individual companies within an industry differently if a company is voluntarily addressing environmental concerns, has been an effective method of achieving compliance with environmental regulations. In these cases, the companies are less regulated than those showing no regard for the environment. The regulatory agencies are finding that there is a need to differentiate companies' actions and reward good behavior. However, Spalding stressed, "The agencies need to make changes incrementally, not start a new program and/or make big changes to existing ones. The stakeholder process takes time and cannot be done overnight."

Voluntary Compliance: A Success Story

Grover Fugate, executive director of the Rhode Island Coastal Resources Management Council (CRMC), used CRMC's experience with the Rhode Island Marine Trade Association as an example of a public/private partnership success story. The key element in this success was similar to that described by Spalding, providing incentives for marina businesses when they comply with the regulations voluntarily as opposed to by legal action. He also echoed the need to make small, incremental changes in regulations based upon learnings from practical experience.

Fugate described the process the CRMC used to bring Rhode Island's marinas into compliance with the marina perimeter permit. A number of the marinas in the state, in operation pre-CRMC in 1977, were not in conformity with state regulations or they had outdated permits, or had been established and operated without any permit. In order to bring all marinas within the legal requirements of the coastal program, the CRMC process began by developing a relationship of trust with the Marine Trade Association and developing a process that would be accepted by the marina owners, as well as be as maintenance-free as possible. This was accomplished after much negotiation, and took the form of a 'grandfather permit' process. This special permit would require that the marinas define their area of operation and specify the maximum number of boats. When a marina did this voluntarily, CRMC would issue a permit for work on the marina property without any sanctions, as though it had applied through the standard process. Once this was done, the marina was given the freedom to adjust the internal layout of the floats as the market demanded, requiring only a maintenance permit from CRMC, which could be quickly approved. This satisfied the business owners' need for equitable and quick decisions.

For marinas that chose not to voluntarily apply for a permit, the CRMC threatened to hold the marina to the 30-year-old permits, thus requiring massive change to marina configuration, and inevitably resulting in loss of boat slips. Approximately 96 percent of the marinas have now completed the permitting process. Fugate stressed that implementation of the 'grandfather permit' did not occur without problems and did not happen overnight. A willingness and ability to make gradual chages in the process allowed the CRMC and marinas to move in the same direction at a reasonable pace. This allowed the CRMC and the marinas to move in the same direction at a reasonable pace.

Facing a Brighter Future.

These four examples demonstrate the importance of developing a strong public/private partnership. The driving force for the partnerships included environmental protection driven by interest

(continued page 6)

Financial Resources for Coastal Management in Latin America and the Caribbean: A Funding Institution's Perspective

By Michele Lemay

The Inter-American Development Bank's (Bank) 'Strategy for Coastal and Marine Resources Management in Latin America and the Caribbean' provides new directions for Bank activities which significantly affect the coastal zone. Calling for a renewed, more integrated approach, the strategy is intended to bring the Bank's interventions in sectors such as fisheries, tourism, maritime transport and pollution control in line with the Eighth Capital Replenishment strategy. The principles, elements of innovation and actions which are at the core of the strategy, are designed to fill a void in the Bank's current policies in natural resources management. The strategy and its accompanying policy research paper were approved by the board of directors of the Bank on June 17, 1998, following two years of discussion about the region.

One of the strategy's objectives is to assist the region in establishing programs for the integrated management of coastal and marine areas tailored to the social and economic priorities of coastal states. In doing so, the intent is to promote leadership in coastal management, create opportunities for innovative solutions, link coastal management to other aspects of sustainable development such as water resources management, and foster a genuine commitment towards understanding and managing coastal and marine areas.

Design Programs to Achieve Steady Improvement, Not Leaps Forward

When the Bank considers making an investment in coastal management, it is important that it accurately assess the appropriate scale of effort. This requires evaluating whether during the period being contemplated, a country's program is best categorized as being at the level of demonstration, consolidation or extension, and accurately assessing the capacity of the institutions and stakeholder groups involved. The best approach is for countries to progress through a sequence that begins with strong local support for action, gradually encompasses larger geographic areas, moves towards further decentralization and involvement of local governments, and addresses more issues. Programs that ignore this sequence usually run into trouble.

Progress towards integrated coastal management in Latin America and the Caribbean calls for innovative institutional arrangements designed to overcome conflicts in coastal resource use, reinforce decentralized decisionmaking and build partnerships with the private sector. The largest impediment to this progress in the region is the inadequate supply of skilled professionals and weak institutional capacity.

Programs Must Show How Institutional and Human Capacity Will Be Strengthened

There are two main types of actions that the Bank can take to address human capacity needs. The first is to build into projects short-term training and team reviews of experience to enhance the skills and abilities of those involved in coastal management programs. Learning-by-doing, bolstered by documentation and dissemination of experience, should be a cornerstone of all coastal management programs in the region.

The second is to invest in short-term training in emerging university-based education programs. Formal educational programs are urgently needed to build an indigenous regional capacity in integrated coastal management and related disciplines such as natural resource economics.

The Bank, along with other financing institutions, must support capacity building for coastal management not only within government at national, provincial and local levels, but also within non-governmental organizations, universities and key private sector groups. The objective should be to build the full range of coastal management services from data collection and analysis, land use planning, community-based management, monitoring and enforcement, and education. In addition to strengthening individual institutions, there should be an emphasis on strengthening regional and national networks of resource managers stationed in the field, as well as universities, research institutions and laboratories conducting marine sciences.

The Bank will match its coastal management projects to the capacity of institutions, both public and private, responsible for their execution. Providing funds and responsibilities to institutions that exceed their capacity is counterproductive since it usually results in failure, loss of credibility and even the dismantling of what had been a promising but young and inexperienced institution. This

(continued page 6)

Financial Resources

(continued from page 5)

means that when considering an investment of Bank resources, the maturity of the existing coastal management program in terms of demonstrated capacity needs to be assessed. Countries will need to demonstrate that certain 'threshold' requirements are in place before investments are made. One such requirement should be a basic capacity and commitment to generate revenues, establish fees or enter into cost-sharing agreements to ensure the financial sustainability of coastal management.

Sustained Funding Requires Partnerships and Leveraging for Additional Resources

The Bank intends to continue coordinating with bilateral donors and international organizations supporting coastal management with the specific objectives of: (a) identifying opportunities where funds can be leveraged as additional incentives for integrated coastal management; (b) ensuring consistency towards resolving the region's priority coastal issues; and (c) making most efficient use of resources. In this regard, the Bank will also work with its borrowing member countries to identify project opportunities (or project components) eligible for financing through the 'international waters' focal area of the Global Environmental Facility (GEF).

Financing Instruments. The Bank has at its disposal a variety of instruments to finance operations for the management and development of coastal and marine resources. For example, the Bank can continue to support coastal management initiatives through public sector investment loans for tourism and port rehabilitation. Investments for the expansion of coastal transportation corridors, sanitation or for integrated rural development can also include coastal management components that can help mitigate the indirect impacts of infrastructure development in coastal rural areas. The Bank will also continue to finance public sector loans for integrated coastal management upon request, with care given to factors such as institutional leadership, capacity and ownership.

There are opportunities for promoting strategic partnerships for coastal management by using various technical funds administered by the Bank. Here, the Bank will explore the possibility of supporting involvement of marine science institutes, specialized organizations and centers of excellence in Europe, Japan, Canada and the US as a means of strengthening professional networks for coastal and marine management. Other Bank available funds offer complementary opportunities for financing initiatives aimed at strengthening industry associations and promoting micro-enterprises in sectors such as ecotourism, fisheries and mariculture, port administration and maritime navigation.

Analysis of Coastal Development Project Design

Changes are needed in the way public sector loans for tourism, maritime transport, fisheries management, marine pollution control and other investments are analyzed to take into account competing resources uses, the need to internalize environmental costs (including those associated with cumulative impacts) and the role of government. The Bank will support improvements in project analysis methods to address these changing circumstances. More thorough documentation of economic benefits and costs of existing coastal management loans will also play a critical role in improving project analysis methodologies.

Several other elements of the strategy represent a significant departure in financing natural resources management. These include, for example, a reorientation of assistance in fisheries to support the move from open to closed access regimes and the integration of environmental concerns in fisheries management. Emphasis is also placed on the need to build capacity to manage conflicts among competing economic sectors in the coastal zone.

(The full version of the document, "Strategy for Coastal and Marine Resources Management in Latin America and the Caribbean" (GN-1906-2) can be found on the web site:http://www.iadb.org/sds/content.cfm?parent=60&id=425.)

For further information contact: Michele H. Lemay, Senior Coastal Specialist, Environment Division, Inter-American Development Bank, 1300 New York Avenue, NW, Washington, DC 20577 USA. Tel: 202-623-1000. E-mail: MICHELEL@iadb.org.

Partnerships

(continued from page 4)

groups or regulatory agencies, resource conservation and user permitting. Each of these cases show that implementation is more successful through a partnership, and compliance follows from increased trust between partners. The report card results truly imply that there is a changing face in public/private administration.

For further information contact: Noëlle F. Lewis, Coastal Resources Center, University of Rhode Island, Narragansett, RI 02882 USA. E-mail: noelle@gso.uri.edu. Web site: http://crc.uri.edu.

An Innovative, Non-Structural Solution to Beach Erosion: Costs Less and Delivers More Benefits

By Pierluigi Aminti, Luigi E. Cipriani and Enzo Pranzini

More than 50 percent of the 3,250 km of Italian coastline experiences severe erosion (1991 estimate). In an effort to counter this, coastal engineers have favored the use of hard structured barriers due to the low cost of rocks and the fact that sand dredging is rarely needed, due to the absence of river and estuary navigation. As a consequence, hard structures such as breakwaters, seawalls and groins protect over 330 km of shoreline.

These structures are believed to cause longshore beach erosion, resulting in loss of a valuable coastal environment. As a result, in recent years beach renourishment has been used as a technique for coastal restoration; some researchers have found methods that have restored beach areas where breakwaters and seawalls had been constructed. If benefit-cost analysis had been done before the construction of hard structures such as breakwaters, many of the problems may not have occurred. At present, cost-effectiveness analyses are being used to assess possible solutions.

Marina di Pisa is a seaside resort located on the southern side of the Arno River delta (Figure 1). The severe erosion characterizing the area is a consequence of the reduction in the Arno River sediment load from approximately 5,150,000 cubic meters per year between the 16th and the 19th centuries, to the estimated 1,910,000 cubic meters per year in the last 50 years. Beach erosion began during the mid-19th century at the delta apex and gradually spread laterally. Beach erosion has proceeded uninterrupted along the uninhabited northern side of the delta. Since 1850, the shoreline has retreated approximately 1.3 km, reaching local peak values of approximately 20 meters per year in recent years.

Along the southern side of the delta, the first coastal defenses (groins) were constructed near the end of last century, when a shoreline retreat of approximately 100 meters endangered the newly inhabited village. Different types of rock rubble/boulder breakwaters were built during this century. Today at Marina di Pisa, offshore breakwaters run for 2.5 km from the river mouth southward, and a continuous seawall protects the

Figure 2. Seawall and breakwaters.

coastal highway (Figure 2). In addition, groins divide the protected coast into five cells of different size (Figure 3-top). More than 5 km of hard structures defend 2.5 km of coastline.

Although shoreline retreat was stopped directly in front of the town, erosion rates nevertheless increased southward and offshore of the breakwaters. A 1997 bathymetric survey indicates that a 7-m isobath runs at the foot of the breakwaters. Wave reflection over the breakwater induces undertow erosion and scouring, together with the offshore dispersion of sediments that no longer reach the southern beaches where new groins are built every year.

In 1996 an innovative project of coastal restoration was initiated by the local authority (Comune di Pisa). The project aims to prevent offshore dispersion of the southward longshore sediment transport, to stop the construction of any new hard structures, and to gradually return to a more natural coastal landscape in areas where hard structures were built. This is to be achieved by removing the breakwaters to mean low water (MLW) and by covering the existing seawall with an artificial gravel beach in order to dissipate wave energy and to prevent overwash (Figure 3-bottom). Wave channel experiments were performed at the University of Florence laboratory; these proved that even under extreme wave conditions, a well-designed gravel fill is able to prevent overwash on the coastal high-

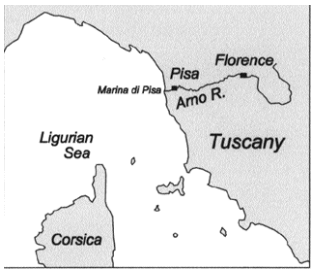


Figure 1. Location map of the study area.

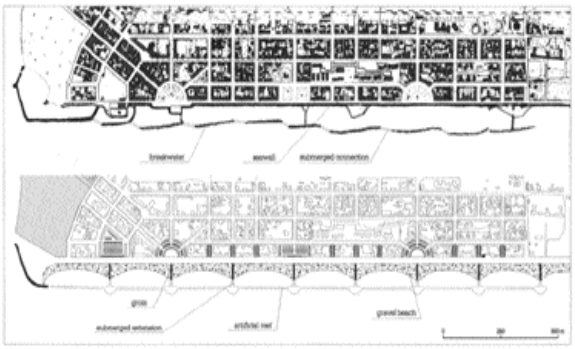


Figure 3. Present coastal configuration (top) and proposed restoration project (bottom).

way and to restore a good-sized beach (one able to support a tourist industry).

In the meantime the Public Works Ministry, responsible for the seaside resort shoreline protection, had to maintain two breakwaters – raising their berm from 2 m to 3.5 m above MLW – at a cost of approximately US$ 1.8 million. Each breakwater must undergo this type of maintenance every 10-15 years.

Breakwater maintenance is not

(continued page 34)

The Community Quilt Concept of Environmental Financing

By Jeremy Haas, Elizabeth Hickey and Jack Greer

Typically, a community's environmental resources – and its environmental problems – comprise a patchwork of ecosystems, public and private land ownership, and mixed jurisdictions. While community leaders often search for a 'silver bullet' to finance environmental protection and restoration efforts, what they really need is a 'community quilt' that pieces together funds to pay for environmental and public health projects. The restoration of stream or riparian buffers in the 64,000 square mile watershed of the Chesapeake Bay (Maryland and Virginia, USA) is an example of this approach.

During the last 30 years, counties within the Chesapeake region have experienced heavy development as agricultural and forested lands have been converted into housing subdivisions. As a result, the habitats along the 100,000 miles of streams are divided into a mosaic of public, private and nonprofit organization land ownership, supporting numerous activities. At the same time, riparian zone issues affect the health of the entire watershed, so management efforts are most effective when addressing and including all activities relative to the diverse networks of streams.

Piecing together funding programs, technical assistance programs and innovative financing techniques creates broad-based solutions to environmental challenges.

More Targets = More Funding Options

The diverse nature of stream corridors (and other environmental regions such as watersheds, coastlines and forests) allows a broad collection of terms to be used to describe management efforts. Using a variety of terms, in turn, can expand sources of funding and lead to broad-based support for restoration and conservation. For example, terms such as wetland restoration, community education, urban and agricultural best management practices (BMPs), source water protection and reforestation, all describe aspects of stream corridor management, and all have public and private funding sources.

Traditional funding is no solution. Traditional sources of infrastructure financing (government grant programs, tax-exempt bonds and private capital) are limited in their ability to address today's environmental financing demands for clean water, air and land. New, innovative approaches are needed to fill the gap between traditional financing methods and the costs of environmental restoration and conservation. Some innovative financing techniques to supplement federal and state grants include sale-leaseback arrangements, special assessment districts and revolving loan programs (see box).

The process of choosing alternative financing techniques is similar to sorting through government-sponsored programs. Factors to consider when analyzing techniques include political attractiveness, opportunities to leverage funds for capital and operating costs, applicability to the situation, and legal and administrative requirements. In addition, some options, especially ones that require landowner participation such as management agreements or conservation easements, may have better success when a local citizen organization is involved as a partner with the local government. Moreover, communities may consider integrating management efforts in areas such as stormwater, wastewater, recreation and habitat that are united by their ties to the stream corridor.

The Community Quilt Concept of Financing

A whole-system perspective to environmental financing helps place each activity (whether for restoration or development) within the context of the entire system, such as a watershed or stream corridor. Further, taking a broad watershed view allows targeting of innovative local approaches to where federal and state subsidy programs (e.g., grants and below-market loans) leave gaps. Piecing together funding programs, technical assistance programs and innovative financing techniques creates broad-based solutions to environmental challenges. The resulting 'quilt' of financing techniques can cover the watershed activities that are threaded together by the stream.

Federal and state programs. Federal and state governments have realized that a variety of land uses affect stream corridors, and many programs offer funds and technical assistance to property owners, public agencies and watershed associations to protect property and improve fish and wildlife habitat. Examples include grants for wetland and riparian habitat restoration, agricultural BMPs, coastal zone management and low-interest loans to improve drinking and surface water quality. However, these funds cannot be relied upon to solve all problems, and there are many ways to finance water clean-ups besides traditional federal support programs.

Community-based efforts. Even communities without substantial revenues can encourage water quality protection. In fact,

prevention of pollution can be thought of as a financing method because cleaning up waterways after they have been polluted is extremely costly. Therefore, pollution prevention measures taken by communities, which may include providing incentives or dis-incentives for agricultural and suburban BMPs, low-impact development, management agreements and landowner recognition programs, can contribute significantly to the financing quilt of techniques for water quality management. Communities can select from a range of such techniques (see box), including revenue-generating programs, but the choice of financing options to protect sensitive lands adjoining streams, rivers and coastlines depends on the willingness of the community and its elected officials.

For instance, taxes and fees targeted at users or polluters, such as a stormwater utility, appeal to the wallet and provide dedicated revenue, but may face initial citizen skepticism and may require substantial effort to develop and administer. Conversely, voluntary measures, such as landowner recognition programs, appeal to one's sense of pride for the land and may need only minimal effort to establish, but do not ensure participation in the community's effort to reduce nonpoint source pollution. Rather than relying on a single activity, some communities use a variety of approaches to establish a stream restoration or watershed management program.

Four Stages of Funding

There are four stages of stream corridor and watershed management that require funding efforts, and each can be supported by various federal and state assistance programs and innovative financing techniques:

Planning. Assessing potential impacts using maps and other information is an important first step in correcting a problem. Also, by developing a plan, a property owner (public or private) can be assured of a thorough analysis and complete identification of the problem.

Capital. Both structural BMPs, such as stream rip rap, retention ponds or animal fencing; and non-structural BMPs, such as riparian forest buffers and marsh plantings, require capital funds. Capital may also be provided in the form of technical assistance.

Maintenance. Often maintenance of stormwater and erosion control projects is the most important part in retaining the project's effectiveness. Poorly maintained facilities provide little or no flood protection, lead to water quality degradation and threaten public safety, and can ultimately cost more to repair. An effective routine maintenance program can reduce overall costs and should be considered part of a financing option.

Education and outreach. Every aspect of managing is enhanced by education and outreach. Effective public education can encourage prevention, which in the long run is cheaper than correction efforts. There are several sources of funding for environmental education for local governments: partnerships with local organizations (e.g., wildlife groups) have proven very effective.

The Quilt Covers the Costs

Because there are many activities affecting natural resources, a variety of approaches to financing are needed to best address shared environmental problems. This type of holistic approach to financing environmental projects can also increase the types of support available through the leveraging of funds and by involving many segments of the community. As a result, when various federal and state funding sources are supported by local initiatives to prevent pollution and encourage wise stewardship, a comfortable financing quilt is created to provide support for desired and mandated environmental goals.

For further information contact: Elizabeth Hickey, Environmental Finance Center, University System of Maryland, 112 Skinner Hall, College Park, MD 20742 USA. Tel: 301-405-6384. FAX: 301-314-9581. E-mail: hickey@umbi.umd.edu. Web site: http://www.mdsg.umd.edu/MDSG/EFC/.

Local Government Initiatives to Supplement Funding Programs (in order of increasing community effort)

- Programs for landowners who conserve sensitive areas
- Management agreements
- Leases
- Loan agreements, including low-interest loans
- Mini-bonds
- Fees, including stormwater districts and other impact fees
- Conservation easements, including transfer and purchase of development rights
- Land acquisition, including land banks, rights of first refusal and options to purchase

Urbanization and Tourism on the South Coast of Brazil

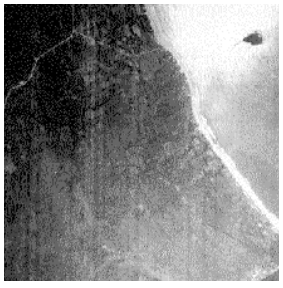
By Marcus Polette

In recent years, increased tourism along the Brazilian coast has resulted in degradation of the natural resources and a decline in tourism. Evidence of this includes a decline in the local economy, environmental degradation, and the loss of cultural integrity and identity by the local population, among others.

The city of Balneário Camboriú is a good example of the current problems. It is one of the largest tourist cities on Brazil's southern Atlantic coast, receiving large numbers of tourists from Argentina, Uruguay and Paraguay. During the summer, the population of a 6-km stretch of coast increases 10 times its permanent population, receiving approximately 60,000 tourists and reaching a density of 9,000 inhabitants per square km. This has caused almost irreversible damage and it is clear that short-, medium- and long-term coastal management programs are needed, and that these must include local participation.

The Historic Process

The region was initially a fishing and agricultural area. In the 1920s, the first summer houses appeared. In 1938, Camboriú resort had few tourists. The coastal plain was covered with forests, with few structures for visitors. The local social structure, especially artisanal fishers, was strong and the environment was unaffected by tourist activities. The 1940s began the start of rapid development with the construction of hotels and residences along the beach. Further from the beach, residences were built along narrow streets in strips parallel to the beach (the rural district).



Aerial view in 1938.

In the 1950s and '60s, the numbers and regularity of visitors increased significantly during October to February, the summer season, and there was an increase by local interests to develop the area. In 1964, independent political structures were established for the coastal area and the rural district. The rural district was designated the municipal district.

In the 1970s, a highway was built in Brazil to facilitate north/south access, passing through the heart of the municipal district. This contributed greatly to the area's development. At this time, residences located on the beach front were transformed into hotels and commercial buildings. A residential expansion also began.

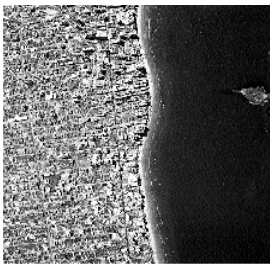
Real estate speculation was a decisive factor in the loss of environmental quality in the municipal district. With a significant increase in population, and with the entrepreneurs in charge of development – with support both financially and politically from the public municipal powers – problems increased. The local community, being dependent on jobs from resort development, did not interfere.

In the 1980s and '90s, the area became firmly established as a resort city, with the tourist population larger than the permanent population and tourism dominating the economy. Hotels were built quickly, and were now being built inland because of the lack of available coastal land. Today, areas once used by artisanal fishers are slowly being converted to marinas and piers, and other facilities associated with tourism.

During March to November when tourism is low, the city settles down and is occupied mostly by the permanent population. However, when the summer season begins, the city goes from a quiet mode to a full-swing tourist resort. The result is a decline in the quality of life for the local population, as increased demand is put on the water supply and sewage treatment system, as well as the town's overall infrastructure.

Aerial view in 1956.

Current conditions indicate that there is a great need for an integrated coastal management program for Balneário Camboriú today, but which also addresses the demands for future growth, as well as an increasing permanent coastal population. Several programs are already in place to mobilize the local population to become involved, not just with problems in the city, but in the watershed of the Camboriú River. These programs are aimed to educate and empower a small portion of the population, who in turn will educate the remaining population in an effort to improve their environment and quality of life.



Aerial view in 1995.

Very recently, a locally-organized committee, the Management

Committee of Rio Camboriú Watershed Basin, began a process for the planning, adoption and implementation of a coastal management program in an integrated and participatory manner. This committee is working towards wide social visibility and credibility; only when this is achieved will the committee be able to participate in the decisionmaking process.

An expected implementation problem will be the ability to achieve a consensus between the governmental and nongovernmental stakeholders. The main problems identified so far are lack of sewage treatment, agrotoxicity from the rural areas, lack of a strong monitoring programs for land use activities, lack of an effective master plan, deforestation of Atlantic rainforest and lack of environmental education programs in the urban and rural areas.

For further information contact: Marcus Polette, University of Vale do Itajaí, Faculty of Sea Sciences/Oceanography, Rua Uruguai 458 - Itajaí - SC, 88302-202 Brazil. E-mail: ecologia@univali.rct-sc.br.

Charting a Course

(continued from page 1)

Latin America, the Inter-American Development Bank is focusing on building institutional capacity through professional training and fostering integrated projects which link economic development and natural resource management.

Implementers are concerned more with the feasibility of solutions than refining the diagnosis of the problems. Economic studies that reveal the full range of benefits action might be more useful in attracting administrative and political support..

Save money by using sound coastal management policies. Coastal policies aimed at sustaining the coastal resources can foster economic development, and pay for themselves. Pollution prevention strategies (see Letson article, page 14) and non-structural alternatives to coastal erosion (see Polette article, page 10) can be backed by strong economic arguments showing that conservation or balanced use of resources is advantageous.

Prove that a good idea can really work: Seeing is believing. Pilot projects and easily managed demonstrations such as mooring buoys or small marine park projects can test specific key doubts and concerns about implementation. A successful small exercise can have a motivating and confidence-building effect far beyond its size and cost.

Attend to basic human needs. Owusu-Mensah's article (page 18) raises the crucial question of whether an integrated coastal management program offers much for poor people living subsistence lifestyles. In some countries, community-based coastal management programs are among the few mechanisms for protecting the natural resource base upon which coastal communities depend. Coastal programs can also give a voice to the need for access rights to common-property resources that are frequently not considered when large-scale development decisions are made.

Cultivate partnerships and implementation networks. An important recent trend in coastal and marine conservation is the private-public partnership and the expanding role of civic organizations in taking on implementation responsibilities. (See Lewis article, page 3; Heyman article, page 19) The purpose of these collaborations is not to circumvent legal requirements or weaken enforcement, rather to find and respond to the motivating factor or need which resource users require in order to change behavior. This often means flexibility in the method by which a business meets pollution standards or resource harvesting limits. It also can mean empowering local conservation groups who are already motivated to carry out conservation measures but may lack official recognition, organizational capacity or legal authority to enforce management policies.

Craft a practioner's network. Promoting a coastal management community, both locally and worldwide, is crucial. Associations of organizations with a common purpose are succeeding in engaging both government and civic associations to solve specific problems.

Success stories in implementation are as diverse as the places they come from and the dedicated people who pursue them, sometimes with great courage against formidable odds. Although the specific tactic or strategy may not be transferable to another cultural or legal setting, the spirit to continually try to find what works most definitely can be transplanted.

Don Robadue has guided US and international coastal management project teams for 22 years and presently coordinates CRC's Latin America technical assistance program. He can be contacted at: Coastal Resources Center, University of Rhode Island, Narragansett, Rhode Island 02882 USA. Tel: 401-8746128. FAX: 401-789-4670. E-mail: robadue@gso.uri.edu. Web site: http://crc.uri.edu.

Implementing Coastal Management – A Conversation with Leonard Nurse, Director of the Coastal Management Unit, Barbados

Interviewed by Pamela Rubinoff, Coastal Resources Center

Question: Describe the origin and the principles of the coastal management program in Barbados.

Answer: Our program began officially in 1983, when the government of Barbados embarked on a pre-feasibility and diagnostics study for coastal conservation. It focused initially on the issue of coastal erosion. However, the issues have changed over time. The primary reason for the change in the issues stems from the recognition that one cannot tackle issues in isolation. We recognize, for example, that coastal erosion is clearly linked to the increased vulnerability of coastal beaches through reef degradation, water quality issues, the removal of coastal vegetation, among other things. This led to fundamental changes in the program, broadening its scope and look.

We have a number of competing user groups – the tourism sector; hoteliers; fisheries; passive recreationists such as divers, snorkelers or swimmers; and water-sport operators such as jet-ski and glass-bottom boats operators. Conflict resolution became a new and emerging issue. We recognized that it was important to pay considerable attention to the question of systems' thresholds and recognition of carrying capacity if we were to maintain the integrity of coastal resource space. So, while we did initially focus on problems related to coastal erosion, we succeeded only by broadening that outlook to other issues and integrating them more.

Q: Over the last 15 years, what would you say have been your major accomplishments within the program?

A: I would like to highlight five of them. I think first of all we have managed to embed the notion of coastal zone management in the thinking and the psyche of our leaders. People have come to recognize that the coast is a critical national asset. It has a dollar value. It is an economic good, and therefore, it has to be treated as a resource, which needs to be properly managed if it is to become sustainable.

Secondly, I think we've also succeeded to some degree in arresting the coastal erosion at critical sites, particularly at those favorite beach locations which are important for both residents and visitors alike. We have brought the prime beach locations under control by using a variety of litigation measures, soft and hard erosion options, and regulatory techniques.

Thirdly, we now have at our disposal better mechanisms for conflict resolution among the coastal stakeholders. We have initiated a system where we can bring conflicting interests together in the coastal zone and try to work through those difficulties and find some common ground among stakeholders.

A fourth area of success is the considerable building of national capacity within Barbados, specifically in terms of training. We have a good pool of highly trained professionals working in the Coastal Zone Management Unit. Coastal management programs can only be sustainable if there is a good cadre of local, trained professionals that can develop along with the program.

There is one final area that I'd like to mention, that is the extent to which we've been able to get government's successive changes in political administration to buy into the coastal management program. Indeed, it would be true to say that our resources, both in terms of staff and budgets, have increased with every successive change in political administration. Political support is important for ensuring survivability of the program in terms of budgets, resources and sense of ownership.

Q: Who else is involved in the work of coastal management in Barbados?

A: There are specialties and skills which we don't have within the office. Thus we have set up functional linkages (management linkages) with other agencies, for example, with the Ministry of Economic Affairs. We don't have the skills of economists within our office. We have no attorneys attached to our office either, so we draw those resources from elsewhere in the government sector or from cooperating agencies.

Q: Failures often give us some of the lessons learned and some of the strength to move forward. Can you offer some examples?

A: Yes. No one likes to stand up in front of a group and say, "I've been a spectacular failure." But I think we can learn as much from failures in coastal zone management as we can from successes. We have generally tended not to document our failures in the past. And maybe this is something which coastal management and scientists around the world need to begin

doing because there are very good lessons to be learned. We have made, on occasion, erroneous assumptions about solutions to problems, and end up sometimes with the wrong definition for what we perceived to have been the problem. The lesson is that solutions essentially are location specific. I am a firm believer in this. Even though problems may look similar to those in another country, the solution required may be vastly different.

Another lesson learned I would like to mention is our tardiness in recognizing the critical role that all stakeholders have to play. In the early days we made certain assumptions about which groups of stakeholders were critical and which were not. That is the most dangerous thing to do in coastal management and planning. We've learned that even those stakeholders who initially you may have assumed to be marginal to the process, are often crucial in ensuring that the program survives. At the same time, we must recognize that stakeholders are good reservoirs of knowledge, and I think that knowledge can be harnessed and put to good use in the management process.

A third example has been our tardiness in recognizing the value of quantifying, in dollar terms, the importance of our coastal resources. I think people tend to take coastal resources such as beaches for granted, believing that they will always be there. It is essential to quantify in dollar terms the importance of those resources so that people can understand the economic value of coastal resources. For example, calculating what the loss by erosion of a kilometer of beach means in dollar value.

Q: You mean in lost revenues and opportunity costs?

A: Precisely. Revenue is lost from the point of view of enjoyment and beach use by tourists or locals. It also is 'lost' in the sense that we now have to find money to stabilize that beach or to design mitigation measures and quantify those mitigation measures to restore that beach. So I think the resources have to be measured in those terms. Only then do politicians and administrators recognize that they're sitting on a very valuable resource. This is also one area that we need to look at in the future in terms of institutional strengthening and as the Coastal Zone Management Unit develops and broadens.

Q: How has the institutional framework within Barbados been able to promote coastal management?

A: The Town and Country Planning Office was initially responsible for all physical development on the island, including coastal development. It is staffed by urban and physical planners. They did not have all the specific skills required to manage coastal resources and to deal with coastal problems. What they do is to enter into consultation and seek advice on specific aspects of coastal problems from other agencies with that experience.

In 1983 the Coastal Conservation Unit was set up. The government recognized that it was critical to ensure the permanence of the agency. It has grown from a staff of four to close to 30 scientists and other professionals. It is now called the Coastal Zone Management Unit and is a permanent entity in the government of Barbados. One critical thing is the importance of ensuring that you have trained, qualified staff with appropriate areas of expertise to manage a coastal program.

Q: What do you see as the challenges for the future of coastal management in Barbados?

A: One of the challenges we face is that as our program expands and as new responsibilities are taken on by our office, we have to spend more time looking at the issue of enforcement. It is pointless if after doing good science, designing a program and putting a management plan in place, if we are not going to pay attention to enforcement. It is expensive, and I think what we will try to focus on is finding the best mix and attempt to design an enforcement system that is not cumbersome, administratively burdensome or overly expensive. There are ways that one can do enforcement by drawing on the resources and the expertise of other agencies that are perhaps better placed and better trained to do enforcement.

A second challenge is focusing on the consistent and genuine involvement of all stakeholders in the process. We plan to ensure that there are resources and access to personnel by nongovernmental organizations and other stakeholders, as well as to ensure that there is stakeholder training.

A third important area is the need to prioritize all the issues that are still outstanding and need to be tackled. In other words, we have to order our focus a bit more. As the program matures, there are more challenges that come up. We as a group have to do some soul-searching in terms of prioritizing our needs and the way in which we look at issues.

Finally, and perhaps one of the greatest challenges we will face in the future or have begun to face, is coping with the increasing pressures being brought to bear on the coast. The competition among user groups is becoming fiercer. We need to ensure that the northeast and southeast coasts of the island are not developed in the same way and at the same pace that the west

(continued page 35)

Pollution Prevention in the U. S. Coastal Zone

By David Letson, Daniel Suman and Manoj Shivlani

In the past decade, national and international pollution policies have increasingly opted for prevention over remediation. Installing pollution control infrastructure and retrofitting industrial and commercial operations after the fact, in order to restore contaminated rivers, lakes and coastal waters, has resulted in significant progress over the past three decades in water quality restoration and protection. However it has come at enormous expense, requiring complex implementation and compliance systems that countries find increasingly difficult to undertake. The United States' Pollution Prevention Act of 1990 defines pollution prevention (P2) as source reduction, and offers a four-tier hierarchy of waste management options, in descending order of preference:

While not a panacea, the United States' pollution prevention program adds analytical and managerial options that may yield better long-run environmental results and increase chances for implementation.

1. Prevention and reduction
2. Recycling and reuse
3. Treatment
4. Disposal

P2 warrants careful consideration as an anticipatory, comprehensive approach that might save money and avoid end-of-pipe regulations, which are key problems in coastal pollution control implementation.

Over the past 25 years, U.S. legislation has increasingly embraced P2 principles in the management of coastal environments. Four case studies illustrate P2's prospects for improved success in actions to address a variety of pollution problems within the coastal zone: marinas in Broward County, Florida (toxic substances); the cruise line industry (solid waste); Chesapeake Bay, east coast U.S. (nutrients); and Boston Harbor, Massachusetts (wastewater).

The coastal zone is unique in the nature of P2 activities. Water transports pollutants released on lands and waters far from the source, affecting sensitive habitats and economically valuable resources. The coastal zone is a good site for adoption of P2 strategies. Because coastal resources are multi-media and are exposed to a broad suite of pollutants, damage is often readily visible and there is the possibility of creating a strong constituency in support of action.

The P2 case studies reported here all faced significant political, legal or economic obstacles to successful implementation. Political factors include the absence of grassroots acceptance, weak political will and poor cooperation and communication between the regulators and the regulated community. On the legal level, problems arise when regulations do not permit the affected sources to select approaches that they consider to be cost effective or socially acceptable. Enforcement in pollution control is often complicated by large numbers of geographically-dispersed small sources that together generate significant amounts of pollution. However, the voluntary nature of many P2 campaigns may reduce the command and control-based enforcement burden somewhat. Economic limitations include weak incentives to adopt clean technologies and the lack of accounting of the positive effects of a cleaner environment.

Toxics in Broward County Marinas. The Broward County, Florida, marina program regulations contain an exemption for small marinas (<10 boat slips) and, therefore, many marinas remain outside the formal P2 program. Despite the cooperation between county regulators and the marina industry, many marina owners oppose the program and are suspicious of the county's motives. To address this difficulty in program execution, public education and cooperative ventures with the regulated industry were undertaken to encourage adoption of P2 strategies. Recognizing that clean technologies may be costly, state and local governments could provide stronger economic incentives to encourage marinas to adopt P2 strategies.

Disposal by the Cruise Line Industry. Compliance with international and national restrictions on ocean disposal of garbage has stimulated adoption of some P2 strategies by the cruise line industry, as has industry sensitivity to public image. However, despite these restrictions, full compliance remains problematic. A successful implementation program in this case must address several unique factors. The vast size of the ocean presents logistical problems for monitoring vessels. Many cruise ships are not registered in the U.S., and sail in waters beyond the jurisdiction of U.S. authorities. Some foreign ports that receive garbage from U.S. vessels may not have recycling or garbage-handling facilities. Availability of cheap disposal outside the U.S. may inadvertently subvert P2 initiatives. The consumptive nature of this industry implies that source reduction may have only limited success. Additionally, older vessels would require extensive retrofitting to install new garbage treatment systems.

Nutrients in Chesapeake Bay. Nutrient reduction in the

Chesapeake Bay watershed provides numerous land-based examples of successful P2 by setting out the overall results but allowing flexibility in how to achieve them. Obstacles to P2 strategies in the Chesapeake watershed include administrative coordination on a multi-state level. To enhance the chances for success, the effort is watershed based, considers ecosystem function and is multi-jurisdictional. With the overall nutrient reduction goals established by interstate agreement, each jurisdiction possesses the flexibility to select its own mix of strategies based on political and economic factors. Strategies may embrace land management techniques, agricultural best management practices, phosphate detergent bans, and/or nutrient reduction from sewage treatment plants. Lack of political will at the highest levels of some states may still derail the original agreement. Even where political will exists, funding limitations may restrict the programs' full effectiveness.

Wastewater in Boston Harbor. The revitalization of urban wastewater treatment facilities may introduce technologies with a higher P2 rank. The P2 principles may prompt identification of feasible solutions with superior environmental results. For some of the nation's older northeast cities, a national ban on ocean dumping of sewage sludge appeared to pose an insurmountable obstacle by mandating alternative disposal methods. Boston's selected option, pelletization (formation of small pellets), is 'external waste recycling and use' in P2 language and may prove a superior outcome in the long run. Pellet sales only recoup about 10 percent of production costs. However, the accounting would change if one were to quantify the avoided environmental harm, as well as the comparative costs of alternative disposal. National and state standards for limits to metal loadings in land-applied sludge have encouraged industrial pretreatment and source reduction, which are also yielding environmentally superior results.

Integrating P2 and Coastal Management

In addressing the effectiveness of P2 in the coastal zone, a recurring concern has been integration of stakeholder-wide participation (comprehensiveness). For example, five types of integration in coastal management have been identified that also seem desirable for P2:

- Horizontal integration of separate economic sectors and associated governmental units
- Vertical integration of all levels of governmental and nongovernmental units
- Integration of planning and management perspectives that address land-use and sea-use processes
- Integration across scientific disciplines of analyses and assessments
- Program integration consisting of planning, management, education and applied research

Comprehensiveness in addressing pollution control and prevention is not always desirable, particularly if it brings in more numerous stakeholders with more heterogeneous economic interests and divergent agendas that dilute the focus of implementing P2. Perhaps the goal should be maximum participation that does not induce paralysis. The Chesapeake Bay watershed has its 'free riders' (the states of Delaware, New York and Virginia) and still faces coordination problems. Broward County's jurisdictional concerns range from prohibitive enforcement costs for all the small facilities, to the need to elicit the cooperation of its political neighbors. Similarly, the cruise line industry is international and prohibitively expensive to monitor. Boston's long road to clean-up is partly attributable to diffusion of responsibility among its many communities. (The Massachusetts Water Resources Authority serves 61 cities and towns.)

P2 is fundamentally anticipatory in its focus. However, anticipating effluents before they occur implies an indirect and likely distorted approach that might lead to unanticipated mistakes. Such 'upstream' strategies, those that limit inputs to or intended outputs from polluting activities, may be easier when effluents are unobservable or expensive to remediate (e.g., toxic substances or nonpoint source pollution). Unfortunately, producers or consumers facing limits on the inputs they use or the outputs they desire may respond in ways, unforeseen by policymakers, that actually increase pollution. For example, farmers have sometimes responded to acreage limits by increasing their use of agricultural chemicals. Thus the input restriction induced the substitution of a polluting input (chemicals) for an abating one (land), possibly increasing pollution. The efficiency of an anticipatory approach depends on whether the administrative ease of addressing inputs or outputs is worth the consequent distortions.

P2 Effectiveness

The effectiveness of P2 relates to its evolution. Through no historic accident, P2 has several basic underlying principles. First, in recognition of technological limits to end-of-pipe strategies and of rising remediation costs, P2 anticipates rather than reacts to pollution. This precautionary principle has become an accepted approach for developing coastal resource use policies. Second, environmental

(continued page 21)

Coastal GOOS: What is it and Why do it?

By Thomas C. Malone

As human populations and activities increase in coastal watersheds, the combined effects of global climate change and human alterations of the environment are expected to be especially pronounced in coastal aquatic ecosystems where inputs of materials and energy from land, sea, air and people converge.

Episodic meteorological events and longer-term climate change will compound the effects of local and regional human alterations of the environment through sea level rise and an increase in storm-surge hazards, and possible changes in the frequency and intensity of storms. Over the next 100 years, rising sea level may inundate large areas of coastal wetlands and a significant portion of dry land less than 50 cm above sea level. Assuming current development trends continue, flood damages incurred by properties subject to sea level rise are projected to increase by as much as 50 percent for a 30-cm rise, and by over 100 percent for a 90-cm rise. In addition, saltwater is likely to intrude further inland and upstream, threatening drinking water supplies. Projected increases in water temperature and changes in freshwater flows are likely to have profound local and regional affects on the biodiversity and productivity of coastal ecosystems.

A recent analysis of 'ecosystem services' concluded that their global value, in terms of the cost of reproducing them in an artificial biosphere, is on the order of US $30 trillion – or nearly twice the cumulative global gross national product. Services provided by coastal aquatic ecosystems (Table 1) were valued at US$ 11.4 trillion, with terrestrial (US$ 11.1 trillion) and oceanic (US$ 7.5 trillion) ecosystems accounting for the rest. Such analyses of ecosystem services and current predictions of climate change and its effects are controversial. However, they underscore the importance and urgency of achieving a more holistic, predictive understanding of the responses of coastal ecosystems to inputs from terrestrial, atmospheric, oceanic and human sources.

Coastal-Scale Global Ocean Observing Systems

Achieving a predictive understanding of coastal ecosystems depends, among other things, on the development of regional-to-global networks that link observation, analysis and applications in an effective and timely manner. To achieve this, the Global Ocean Observing System (GOOS) was created in 1991 in response to the desire of many nations to improve climate forecasts, mitigate natural hazards and improve the management of living resources. GOOS would establish integrated, multidisciplinary observations systems required to achieve these goals on a coastal-to-global scale. Conceptually, GOOS consists of two components, a basin-scale component concerned primarily with the role of the oceans in global climate change, and a coastal-scale component concerned primarily with the combined effects of climate change and human activities at local-to-regional scales.

Although many governments have expressed strong support for Coastal GOOS (C-GOOS), agreement on goals and the development of a strategic plan for implementation has been slow, largely because implementing C-GOOS requires two fundamental changes in how things are done:

1. The coastal research community has been internally fragmented (oceanographers, meteorologists, estuarine ecologists, terrestrial and landscape ecologists, etc.) and isolated from the public and the pub-

Table 1. Ecosystem Services Provided by Coastal Aquatic Ecosystems in Order of Estimated Value.

Rank	Ecosystem Service	Ecosystem Functions	Examples
1	Nutrient Cycling	Nutrient storage & processing	Nitrogen fixation, nutrient cycles
2	Waste Treatment	Removal, breakdown of excess nutrients & contaminants	Pollution control, detoxification
3	Disturbance Regulation	Buffer impact of climatic disturbances	Storm protection, flood control & drought recovery
4	Recreation	None	Boating, sport fishing, swimming, etc.
5	Food Production	Portion of primary production extractable as food	Fish harvest
6	Refuges	Habitat & biodiversity	Nurseries, resting stages & migratory species
7	Cultural	None	Aesthetic, artistic, spiritual & research
8	Biological Control	Trophic dynamics & biodiversity	Keystone predator & pest control
9	Raw materials	Portion of primary production extractable as raw materials	Lumber & fuel
10	Gas Regulation	Chemical composition of the atmosphere	Carbon dioxide, ozone & sulfur oxides

lic interest. C-GOOS must promote more effective linkages between these groups.

2. With few exceptions, research to document patterns in coastal ecosystems has emphasized observations and experiments on small (local) scales. Thus, experiments and observations are generally too limited in time and space to provide summary information on the scale that characterizes biological and physical variability in coastal ecosystems and their adjacent watersheds and oceans. C-GOOS must promote the collection of observations on coastal ecosystems of sufficient duration, spatial extent and resolution, and of real-time data telemetry, assimilation and visualization.

In an attempt to address these challenges, two efforts have been initiated in 1998 to make C-GOOS a reality:

• The Intergovernmental Oceanographic Commission (IOC) established a C-GOOS panel that had its first meeting in April of 1998, during which the panel established a program to design international C-GOOS

• Federal agencies, led by the office of the National Oceanographic and Atmospheric Administration, concerned with the coastal zone have established a C-GOOS Support Office at Horn Point Laboratory, Maryland.

Two activities will be a workshop in Spring 1999 to highlight the importance and challenges of *in situ* sensing, real-time telemetry and assimilation modeling; and LABNET, an attempt to network U.S. coastal laboratories for the purposes of detecting and predicting change in the coastal zone.

Recurring Environmental Issues

There are many environmental problems and issues that occur on a global scale. These can be organized into operational categories that reflect user needs (Table 2). The role of C-GOOS is to encourage and support the development and application of methods of defining current and predicting future environmental conditions. These predictive capabilities would be used as a means of preserving healthy coastal environments, promoting sustainable uses of coastal resources, mitigating coastal hazards, and ensuring safe and efficient marine operations. To these ends, with support from the IOC, World Meteorological Society, United Nations Environment Programme and International Council of Scientific Unions, a C-GOOS panel has been formed to develop a strategy that will promote:

• The use of remote and *in situ* sensing technologies and real-time data acquisition and analysis

• More timely exchange of information and knowledge among terrestrial and estuarine ecologists, oceanographers and meteorologists working in the coastal zone

• The development of models to improve the understanding of coastal ecosystem structure and function, and to predict changes in their capacity to support ecosystem services

• More effective linkages between science and society; and increased public awareness of the issues, especially as related to the interactive effects of climate change and human activities in the coastal zone

• The design and implementation of regional-to-global coordinated strategies for monitoring, data acquisition, integration, synthesis, modeling and dissemination of products

Table 2. Globally Issues Organized by Operational Categories.

Operational Category	Issues
Preserve Healthy Coastal Environments	Habitat loss and modification Nutrient over-enrichment Toxic contamination Increases in marine organisms Harmful algal blooms Non-indigenous species Biodiversity
Promote Sustainable Use of Coastal Resources	Exploitation of living resources Mariculture Saltwater intrusion
Mitigate Coastal Hazards	Water (flooding, storm surges) Wind (tropical storms) Erosion Sea-level rise
Safe and Efficient Marine Operations	Safe navigation Efficient maritime commerce Exploitation of non-living resources Spills of hazardous materials Ballast water (non-indigenous species introduction)

For further information contact: Thomas C. Malone, Horn Point Laboratory, University of Maryland Center for Environmental Science, P.O. Box 775, Cambridge, Maryland 21613 USA. Tel: 410-221-8406. FAX: 410-221-8473. E-mail: malone@hpl.umces.edu. Web site: http://www.hpl.umces.edu.

Link Between Poverty and Environmental Degradation Must Be Addressed for ICM to Succeed in Developing Countries

By Ben Owusu-Mensah

From the first day of the University of Rhode Island Coastal Resources Center's 1998 Summer Institute in Coastal Management program, the more I learned about integrated coastal management (ICM) and sustainable development, the more I became alarmed that many developing countries are only paying lip service to ICM, and that ICM initiatives in developing countries are in jeopardy.

If we define sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs,' then how can one implement programs that call for the use of coastal resources in a 'sustainable' manner? Must most coastal communities in developing countries use coastal resources as their main source of livelihood, which in most cases out of necessity leads to overexploitation and degradation. There are often no alternative livelihoods, and considering these people have to live, how can they be bothered about environmental degradation and sustainable development? 'Let's live today and let tomorrow take care of itself,' as the saying goes. The question therefore is whether there is a correlation between poverty and environmental degradation? It seems that there is. The following questions support this.

When implementing ICM plans in developing countries, literacy programs and other programs geared towards improving the communities economic well being must be implemented either in tandem with the main ICM plan, or before, through early actions.

- Why are governments in developed countries more concerned about environmental issues than governments in developing countries?
- Why are communities in developed countries more concerned with their environment to the extent that they are even prepared to make trade-offs (like paying more taxes) to preserve their environment?
- Why are more affluent communities in a developing country more concerned about their environment than people living in poorer communities in the same country?

The question I pose is whether the framework being put forth by developed countries to achieve sustainable development in the communities of poor developing countries will succeed, or does each developing country have to evolve its own approach to address ICM problems?

Within the ICM policy cycle (issue identification, program preparation, adoption and funding, implementation and evaluation), to guarantee success, would it not be more prudent if after the program preparation and funding stages, and before the implementation stage, emphasis be placed on 'early actions' that would directly improve the economic and social livelihood of the people? This should be accomplished by awareness programs. Otherwise ICM programs will have less chance of success when economic and social conditions are bad. Environmental issues are of low priority when there is no food on the table.

The National Scale

On June 11, 1998, U. S. President Clinton signed an executive order on coral reef protection committing US$ 2 million a year for coral reef protection, and a further US$ 224 million for ocean areas. On the national level, the U.S. has an ICM plan, while every coastal state also has its own ICM plan. In Europe, the European Union has its Coastal Management Code. On the other hand, in the Sub-Saharan Africa region, most governments either have no coastal management plan or are in the process of evolving one. In most cases these program have been started through the initiative of an international body and not through the governments' own initiative. Not many countries in Sub-Saharan Africa have US$ 2 million, or feel they can afford to sacrifice other social needs for environmental protection. Some would rather sacrifice their environment for money.

Many countries in Sub-Saharan Africa sit down helplessly and watch as their coastlines are devastated by erosion, their fisheries collapse and their waters become polluted. These governments have to make difficult trade-offs with their scarce resources. Should they be pumping in huge sums of money to control environmental degradation, or invest in vital services such as health and education? It might be that the US$ 224 million provision for ocean areas protection in the U.S. is perhaps 0.001 percent of the federal budget, while this amount might be a three-year budget for a whole country in Sub-Saharan Africa.

Communities and the Correlation between Poverty and Environmental Degradation

The importance communities place on their environment might

(continued page 20)

'The Alliance' – Shared Responsibility to Assure Results

By William D. Heyman

The Gulf of Honduras encompasses a tri-national body of coastal and marine waters including portions of the exclusive economic zones of Belize, Guatemala and Honduras. The gulf contains a critical network of existing and proposed marine reserves, but also provides a home to nearly a half million inhabitants, two industrial shipping ports and all the associated commerce. If the health of the coastal ecosystem is maintained, fisheries and marine and coastal tourism will contribute greatly to the sustainable economic development of the region.

Because the Gulf is a shared ecosystem, whereby marine currents link the waters of three countries, implementation and enforcement becomes complex and difficult. For example, effluents from the Ulua and Motagua rivers of Honduras and Guatemala affect water quality around the Sapodilla Cayes along the Belize Barrier Reef. Belize continues to allow turtle harvesting, while it is banned in Guatemala and Honduras. Guatemala allows lobster capture during the time when Honduras and Belize have seasonal closures. In order to address conservation and management issues across this gulf, a group of eight concerned nongovernmental organizations (NGOs) have come together as the Alliance of Nongovernmental Organizations for the Conservation of the Gulf of Honduras – "The Alliance."

The Alliance members recognize the authority and national sovereignty of their respective governments, but also recognize their unique role as NGOs in guiding development and conservation. The Alliance has had six formal meetings since its formation in 1996. Its major objectives are:

- Tri-national fisheries management
- Tri-national system of coastal and marine protected areas
- Sustainable economic alternatives for local residents, especially ecotourism
- Protection and management of certain species, especially manatees
- Port contingency planning

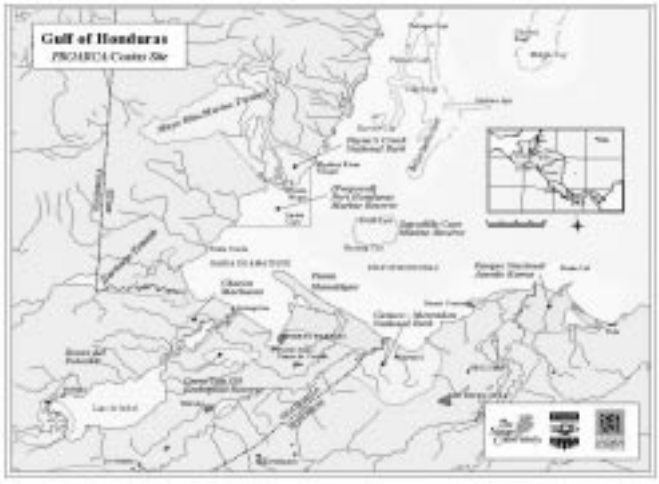
The Gulf of Honduras contains all major Caribbean coastal and marine habitats in close proximity: estuaries, mangroves, seagrasses, coral reefs and open ocean waters. These waters support healthy and diverse fishery resources including spiny lobster, conch, shrimp, and finfish including snappers, groupers, jacks, mackerel and snook. According to both regional technical assessments and anecdotal reports from local fishers, these resources are under heavy extraction pressure and in a drastic state of decline. Since these resources are shared, open-access resources, there is little incentive for management.

The fisheries management strategy of The Alliance, therefore, is to work at both the national government level, as well as with local fishers in all aspects of research, issue identification and solution implementation. The Alliance has completed the first stage by conducting a survey of coastal fishermen which details their opinions about the state of the resources, and their suggestions for better management. They have also helped sponsor a regional fisheries management policy meeting, held in Puerto Barrios, Guatemala, and attended by local fishers from all three countries, and government representatives from Guatemala, Honduras and Mexico. Government officials from Belize, Guatemala and Honduras also attended the most recent meeting of The Alliance which was held in Punta Gorda in Belize. Finally, NGOs are supporting the enforcement efforts of their national government partners, in some cases by providing boats and fuel to enforcement agencies whose operational budgets are severely restricted.

NGOs are supporting the enforcement efforts of their national government partners, in some cases by providing boats and fuel to enforcement agencies whose operational budgets are severely restricted.

Marine Protected Areas

A linked system of coastal and marine protected areas is critical for the support of marine fisheries, and coastal and marine tourism development. These protected areas are severely limited, financially, yet the ecological and economic services that they provide are highly significant. Alliance members in each country are assisting their national government partners with the planning and management of coastal and marine protected areas. For example, the Fundación para la Protección de Lancetilla, Punta Sal y Texiguat, is managing the Parque Nacionál Janette Kawas at Punta Sal, on behalf of the Honduran



(continued page 20)

Poverty

(continued from page 18)

also lend to understanding the correlation between poverty and environmental degradation. In big cities like New York, Washington or London – communities where there is poverty – the urban environments are very much degraded as compared to affluent communities. In these poor communities, where environmental awareness is very low, garbage littering is very pronounced, while the same is not true in the richer communities where awareness and concern are very high.

In comparing rural and urban coastal communities of developing countries, you see that rural communities pay much less attention to their environment. Environmental awareness is low, and, in most cases for those living in the coastal zone, there are few or no alt ernate livelihoods, thus they necessarily exploit, and usually over-exploit, their coastal resources to survive. In some communities, in the absence of vital social amenities like toilets and garbage dumps, the beaches are used for these purposes.

Constituency Building

Experience in coastal management worldwide demonstrates that the success of sustained management efforts are significantly increased by the meaningful participation of the communities. But when one asks the opinions of coastal managers who work in a developing country, they will agree on how difficult it is to build constituency for a coastal management initiative. Even to convince communities that their own environment is under threat seems to be a losing battle. Villagers have lived this way since the times of their forefathers, and as such see nothing wrong with traditional practices for using resources, nor the need for change. Modernization theorists claim that developing countries remain poor because they do not want to change from the ways their forefathers lived.

On the other hand, constituency-building in developed countries seems to be much easier. In some cases the initiative for area management plans emanates from the communities themselves.

Early Actions Necessary for ICM in Developing Countries

For ICM to be successful in developing countries, finding the proper argument to motivate action will first need to be addressed, which will in turn assist in improving the community awareness. When implementing ICM plans in developing countries, literacy programs and other programs geared towards improving the communities' economic well-being must be implemented either in tandem with the main ICM plan, or before, through early actions. Today many ICM plans in developing countries have yet to reach their implementation stage, and thus their success or failure is not known. Even when the implementation stage is reached, it will be yet another huge undertaking to achieve compliance with the regulating components of an ICM program. Only when implementation and compliance are addressed together can there be hope for true success.

Ben Owusu-Mensah, (Benom Consult/Coastwatch Ghana), 2nd Soula Street, North Labone, P.O. Box 4932, Accra, Ghana. Tel: 233-21 776356; Fax: 233-21 775482. E-mail: benom@africaonline.com.gh.

The Alliance

(continued from page 19)

government. The Fundación para Ecodesarollo y Conservación (FUNDAECO) is managing Cerro San Gil, while Fundación Mario Dary is developing management arrangements for the Punta Manabique Reserve in Guatemala. Finally, the Toledo Institute for Development and Environment (TIDE) has developed management plans for the Port Honduras Marine Reserve and the Payne's Creek National Park in Belize.

Tourism

The Gulf of Honduras contains all the necessary elements for tri-national, community-based coastal and marine tourism. An Alliance member organization, the Belize Tourism Industry Association, is drafting regional ecotourism development policies in all aspects of tourism development, which include community members living near existing and proposed reserves. Providing locals with the economic alternative of ecotourism will help bring about long-term sustainable development by increasing the stakeholder base in environmental protection. For example, TIDE, in southern Belize, has trained local gill-net fishermen

to be catch-and-release fly fishing guides. As guides, these fishers will make more money than they would with gill nets, and do little damage to the environment. Belizean community fishers are now becoming important stewards for their coastal resources as a result.

Pollution

The Gulf is vulnerable to catastrophic chemical and oil spills, since large volumes of these substances are transported in and out of the major seaports of Puerto Barrios, Guatemala, and Puerto Cortés in Honduras. Recognizing this threat to the gulf, FUNDAECO facilitated a port contingency planning process for Puerto Barrios. The committee that developed this is made up of major transporters including Shell, Basic, Texaco, the naval base and others. To prove their willingness and ability to respond to disasters, the committee sponsored an oil spill simulation on July 4, 1998, which served as a regional awareness building event.

Tri-national Alliance of NGOs collaborate on a regional survey of fishers.

For further information contact: William D. Heyman, PROARCA/Costas, The Nature Conservancy, 62 Front Street, Punta Gorda, Belize. Tel/FAX 501-7-22503. E-mail: will@btl.net.

Pollution Prevention

(continued from page 15)

authorities increasingly have difficulty legally defending mandates, and P2 favors voluntarism, although often backed up with the threat of adverse public opinion or possible government mandates. Land-based sources of marine pollution sometimes lack obvious offenders or easy targets for mandates. P2 recognizes the site-specific character of many pollution problems and delegates decisions to those having the knowledge, if not the incentives, for effective, least-cost reductions. This contrasts with a nationwide standards approach that seeks to achieve uniform discharge levels from categories of industries and discharges, regardless of local impact.

Third, responding to criticisms of single-medium approaches as piecemeal, and acknowledging other exposure routes besides environmental release, P2 follows material use across media. More than a slogan, P2 is an application of the adaptive management principle, permitting a more fluid response to changing issues and stakeholder preferences. P2 can play an important role in the coastal zone, where these principles also have shaped management.

If environmental policy continues its long-term trend toward an anticipatory, voluntary and cross-media emphasis, P2 will increasingly influence coastal management. However, anticipation and comprehensiveness as strategies are not always better, and sources do not always volunteer to reduce. While not a panacea, P2 adds analytical and managerial options that may yield better long-run environmental results and increase chances for implementation. The coastal zone activities considered are all increasing with coastal populations. Thus, even if coastal economic sectors adopt P2 strategies, no guarantee exists that pollutants released to coastal waters will decrease. Nevertheless, P2 presents worthy options for coastal pollution management that, taken across economic sectors, can minimize releases of pollutants to coastal waters and enhance the amenities of these unique resources.

(For a more detailed project report, see Letson D., D. Suman and M. Shivlani (1998) "Pollution prevention in the coastal zone: An exploratory essay with case studies." *Coastal Management* 26(3): 157-175.) Web site: www.epa.gov/docs/opptintr/p2home/aboutp2.htm.)

For further information contact: Manoj Shivlani, Division of Marine Affairs and Policy, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Causeway, Miami, FL USA 33149-1098. Tel: 305-361-4685. FAX: 305-361-4675. E-mail: mshivlani@rsmas.miami.edu.

AFRICA

TANZANIA

Capacity-Building Program for Tanzania and the Western Indian Ocean Region

One of the main recommendations of the "Workshop on Integrated Coastal Area Management for Eastern Africa and the Island States," held in Tanga, Tanzania in August, 1996 was that there was a need for training program for experts and practitioners that focused on the practical aspects of planning and implementation of integrated coastal management (ICM) programs in the region. To guide this, a new framework for building capacity for ICM is now in place with the signing of a Memorandum of Understanding (MOU) for the Western Indian Ocean Regional Capacity Building Program, signed by the vice-chancellor of the University of Dar es Salaam, the president of the Western Indian Ocean Marine Science Association (WIOMSA) and the University of Rhode Island's Coastal Resources Center (CRC).

According to the MOU, there will be a national training program in ICM for Tanzania that will be designed through a process facilitated by the Tanzania Coastal Management Partnership in cooperation with the Institute of Marine Sciences of the University of Dar es Salaam. It will target technical experts at both the national and district level and across multiple sectors. The focus will be to facilitate the sharing of ideas, approaches and information, as well as creating a Tanzania network of coastal management practitioners. There will also be a similar regional training program for the Western Indian Ocean regional states.

Preparations for the first national training program are already underway with a needs assessment exercise in progress. The needs assessment has been designed to assess the existing human and institutional capacity. The findings will identify existing sources of training and education, as well as provide guidance on formalizing a broader training and education agenda for ICM. This will be used to design training courses; the first will be a two-week short course held March 1-12, 1999, in Mombasa, Kenya. The course will be designed for practitioners from the states of Comoros, Kenya, Madagascar, Mauritius, Mozambique, Reunion, Seychelles, South Africa and Tanzania. It will be implemented through WIOMSA in cooperation with CRC.

The MOU also establishes a framework that will allow the regional training and the national training to come together over time to establish a regional center for ICM course work and training. It is hoped that a certificate course will be offered for regional practitioners and, eventually, a certified undergraduate and graduate curriculum will be available.

Through the regional training partnership that was built during the Tanga Workshop, capacity building will continue to be improved and strengthened for the benefit of the Western Indian Ocean region.

For further information contact: Gratian Luhikula, Tanzania Coastal Management Partnership, P.O. Box 71686, Dar es Salaam, Tanzania. Tel: 255 51 667589/666190. FAX: 255 51 668611. E-mail: gluhikula@epiq.or.tz.

AFRICA

TANZANIA

Towards an ICM Policy Process for Tanzania

On November 29, 1998, a meeting was held on integrated coastal management (ICM) in Tanzania hosted by the vice president's office. Directors, commissioners and heads of key government institutions, whose departments and institutions are key stakeholders in coastal and marine management, endorsed the process of formulating a national ICM policy for Tanzania.

During the one-day meeting, government executives, led by the principal secretary in the vice president's office, Peter Ngumbullu, reviewed and scrutinized pertinent critical coastal issues identified by the Tanzania Coastal Management Partnership (TCMP) Working Groups. They made valuable comments and inputs that provide for a clearer description, emphasis, and clarity on complexities of the issues and their cross-sectoral nature.

Endorsement of the process was made after group discussions which focused on the following issue areas, among others:

•Maintaining and improving coastal village well-being and livelihood

•Shorefront planning and management of Tanzania's emerging coast-related economic opportunities, including tourism, mariculture, industry, and oil and gas

exploration

•Shorefront erosion resulting from extraction of coastal resources

•Supporting local initiatives and decisionmaking for inter-sectoral development

•Lack of human and institutional capacity

The meeting emphasized the need for a more detailed issue description on gender issues, agriculture, small-scale and informal sector needs, public awareness and capacity building. It further suggested the inclusion of issue themes on coastal emergency preparedness and hazard reduction, as well as on cross-boundary problems such as pollution and pelagic fisheries.

The government executives outlined key actions to guide the process to move from issue identification to adoption of an ICM policy. They directed that while the overall ICM policy is being formulated and adopted, action should be taken in the short term on critical issues such as resource depletion.

The TCMP is expected to prepare policy elements to be reviewed by the sectoral heads who will guide the drafting of the coastal policy. "We have been leading the eastern African region on ICM issues and now, with our new focus at the national level through the TCMP, we are considered leader in the field of coastal management probably for the entire continent," said the Minister of State in the vice president's office, Edward Lowassa, "We should not be complacent but move quickly and boldly towards effective policy."

For further information contact: Gratian Luhikula, TCMP, P.O. Box 71686, Dar es Salaam, Tanzania. Tel: 255 51 667589/666190. FAX: 255 51 668611. E-mail: gluhikula@epiq.or.tz.

AFRICA

SOUTH AFRICA

South Africa's Coastal Policy

The need to harness and optimize the economic opportunities presented by South Africa's coast is a key thread that runs through South Africa's "Coastal Policy Green Paper." This message is balanced with a strong warning that South Africa can realize these opportunities only if it manages its coastal ecosystems wisely.

The Green Paper proposes neither a 'green' nor a 'development at any cost' policy. Rather, it suggests a policy aimed at promoting economic and social development. It effectively addresses the need for the coast to provide benefits to all South Africans on a sustained basis.

According to Jeff McCarthy, chairperson of the Coastal Management Policy Programme Policy Committee, the Green Paper estimates the value of coastal goods and services in South Africa to be approximately US$ 3.036 billion annually, approximately 37 percent of the country's annual gross domestic product. It also acknowledges benefits which can not be attributed a monetary value, such as the coast's cultural, aesthetic, educational, scientific and spiritual value. It is clear that the coast provides an important basis for future economic development, poverty reduction and sustainable job creation in South Africa.

The Green Paper is based on specialist studies and an extensive, unprecedented process of public participation. Over 65 regional public events and numerous one-on-one meetings have resulted in more than 1,000 individuals from over 200 organizations being directly involved in the program. The successful development of a final coastal policy is dependent on maintaining this high level of public input.

One of the first significant products of the public participation process was a draft vision for the coast. This national vision has guided and informed the formulation of the Green Paper.

Principles, Goals and Objectives

A set of principles, goals and objectives for coastal management have been developed in order to realize the national vision. The principles relate to the overarching issues of national heritage, economic development, social equity, ecological integrity, holism, risk aversion and precaution, duty of care, coordination and integration.

The goals and objectives will be achieved through appropriate institutional and legal arrangements. The Green Paper puts forward three possible institutional models, as well as a number of legal arrangements, which require further evaluation and discussion.

Regional and provincial workshops, culminating in a national event in early 1999, are planned to debate and reach consensus on the various policy options and institutional and legal arrangements presented in the Green Paper. This will result in a final coastal policy (White Paper) by April 1999.

The Coastal Policy Green Paper is a product of the Coastal Management Policy Programme, funded by the British Government's Department for International Development.

To receive a copy of the Green Paper, or be involved in the program, please contact Nicola Acutt, Tel: 021 424 5054. FAX: 021 424 2495. E-mail: cmpp@iafrica.com.

For further information contact: Glynis Ponton, P.O. Box 1828, Cape Town, South Africa 8000. Tel: 021 424 5054. FAX: 021 424 2495. E-mail: cmpp@iafrica.com.

ASIA

SRI LANKA

Halting Coral Mining in Sri Lanka: A Hard-Won Success Story

Halting coral mining – which has occurred in parts of Sri Lanka for over 400 years – has been a major problem for the Sri Lanka Coast Conservation Department (CCD) since its inception in 1981; a problem where significant progress is now being made.

Coral is the principle source of lime for Sri Lanka's construction industry, supplying approximately 90 percent of the lime used. Traditionally, only inland relic reefs behind beaches were mined, however, the growth of the construction industry in the late 1960s stimulated the coral mining industry, which then expanded to include collection of coral rubble from the beach and reef breaking. Such activities not only destroy reef habitat, but also reduce erosion protection offered by the reef.

The coral mining problem in Sri Lanka was significant. In 1984, over 18,000 tons of coral lime was mined, 58 percent of it illegally from the coastal zone. The socioeconomics of the industry compounded the problem. About 1,200 individuals were directly engaged in this seasonal activity. In just four months, 'miners' working in the coastal zone were able to earn over US $300, approximately the average annual income in Sri Lanka at the time. In addition, this ongoing problem was undermining the credibility of CCD – which on other fronts was making outstanding progress on improved coastal management.

Since its formation, CCD had attempted to halt illegal coral mining in the coastal zone. At first, the department relied on policy and regulation. In 1988, CCD obtained a specific legislative amendment to their act which made the mining, collecting, processing, storing, burning and transporting of coral in the coastal zone illegal. CCD also recognized the need to deal not only with the legal aspects of the problem, but with the socioeconomic aspects. Multiple strategies to end illegal coral mining in Sri Lanka were clearly needed, and as they were implemented, it was clear that some worked better than others.

CCD identified and found funding for alternative livelihood schemes for coral miners. Sometimes there were unanticipated consequences – such as attracting people to become miners so they could become eligible for a particular alternative livelihood scheme. CCD engaged in research to identify alternative sources of lime, but to date these sources have not been developed. CCD also carried out education programs, not only with miners, but with enforcement officers and affected communities. As education efforts began to take effect, and create more awareness of the problem and its consequences, CCD was able to step up its enforcement actions and demolish illegal kilns in the coastal zone.

The results of these efforts began paying off. By the early 1990s, coral mining was no longer spreading to new areas. By 1993, the amount of illegal coral being mined was reduced significantly, down to about 4,000 tons per year – a 48 percent decrease from 1984. In CCD's two special area management sites along the southern coast – Hikkaduwa and Rekawa Lagoon – CCD was able to achieve even greater compliance with the coral mining prohibition. In both locations, coral mining has been reduced by about 95 percent. At Rekawa, over 75 illegal coral lime kilns have been voluntarily demolished. The remaining coral lime production is now utilizing coral debris from demolished buildings and inland fossil coral.

While Sri Lanka has not yet totally solved the coral mining problem, solutions are in sight. What has it taken? It has taken multiple strategies: sufficient legal authority, political support at both high and local levels, a partnership between resource users and resource managers, identification of alternative sources of lime, and perhaps most important of all, CCD's creativity, patience and perseverance.

For further information contact: Chip Young, Communications Director, Coastal Resources Center, University of Rhode Island, Narragansett, RI 02882 USA. Tel: 401-874-6630. FAX: 401-789-4670. E-mail: cyoung@gso.uri.edu. Web site: http://crc.uri.edu.

ASIA

INDONESIA

Indonesia Targets Marine Degradation and Pollution

The Indonesian Environmental Impact Management Agency (BAPEDAL) has initiated programs that target marine degradation and sources of marine and coastal pollution. In line with BAPEDAL's mandate, these programs involve working closely with, and building consensus among, the central government, local communities and governments, nongovernmental organizations and the private sector. Key programs in marine and coastal management focus on clean harbors, clean tourist beaches, coral reefs and mangroves. These programs come under the umbrella program *Pantai Lestari* – the action plan for the control of coastal pollution and degradation.

Clean Harbors: BAPEDAL is cooperating with port authorities and the Ministry of Sea

Communications in assessing alternative strategies, procedures and technologies for reducing waste entering the marine environment of ports. Implementation of this program, with technical assistance from the Canadian International Development Agency (CIDA), began in March 1998 with seminars and field inspections at the port of Tanjung Priok, Jakarta.

Clean Tourist Beaches: Indonesia has become increasing popular as a tourist destination, with clean beaches being the major attraction. The program will concentrate on efforts to control wastes and to promote the aesthetic management of tourist beach areas. The program will be implemented along the popular beach area extending from Nusa Dua to Sanur on the southeast coast of the island of Bali, Indonesia's main tourism destination.

Coral Reefs: Indonesia has one of the most extensive and diverse coral reef systems in the world. BAPEDAL has partnered with the Indonesian office of The Nature Conservancy (TNC) in planning and implementing a mooring buoy program in popular marine parks and areas. Significant damage in coral reef parks originates from bottom and reef anchoring of tourist and fishing boats. Since July 1996, BAPEDAL, TNC and the Ministry of Forestry have installed and promoted the use of nine mooring buoys in Kepulauan Seribu National Park (north of Jakarta) and 46 mooring buoys in the Komodo National Park (Central Indonesia). The program has scheduled the installation of 25 buoys in Bunaken National Marine Park (north of Manado, North Sulawesi), 20 buoys at Pulau Musala (North Sumatra) and 89 buoys around Bali.

Mangroves: Local communities, private aquaculture companies and the Ministry of Forests, in cooperation with BAPEDAL, are investigating, testing and implementing rehabilitation methods. A Green Belt program was introduced in 1998 supported by regulations promulgated by the Ministry of Forests. Under this program, no housing or other buildings may be located within a set distance from the high tide line in mangrove areas. Structures presently in place will be removed and set back according to a weighted formula.

The future of each of these programs is now uncertain given Indonesia's current political and economic crisis. BAPEDAL's 1998/1999 budget was cut 50 percent from the previous year's level and the reallocation of scarce resources within the institution is underway. Cooperation with other agencies and organizations in activities of joint interest, and promotion within government of the coastal environment as a resource of national strategic importance, will enable BAPEDAL to continue to play an important role in marine and coastal management.

For further information contact: Brian Yates or Jacques Whitford, Environment Limited, Vancouver, Canada. E-mail: byates@ibm.net; or Noel Boston, Marine Pollution Control Advisor to BAPEDAL, EVS Consultants, North Vancouver, Canada. E-mail: nboston@ibm.net.

ASIA

INDONESIA

Villagers Take Lead in Creation of the Blongko Marine Sanctuary

Blongko is a small village with a population of 1,250. It is located on the northwest shore of Minahasa, North Sulawesi, approximately one degree, eight minutes north of the equator. Its approximately 6.5 km of coastline is healthy and productive, bordered by relatively thick and vigorous mangrove. Most of the population lives along the water, and the majority of the population are fishers, although many residents both fish and farm. The fishery, both offshore and on the coral reef, plays a significant role in the livelihood of the community. Most fish captured are used for home consumption or sold by the fishers' wives to the local community.

The idea of making six hectares of mangrove swamp and part of the coral reef a marine sanctuary came about after a field visit by Blongko villagers to a marine sanctuary at Apo Island in the Philippines. A return visit by the Apo Island village chief and members of the women's cooperative took place to observe Blongko and exchange ideas. The *kepala desa*, village government head official, of Blongko and the community quickly understood the Apo Island group's description of how their community-driven marine sanctuary effort was developed and implemented. Realizing the value of the local fishery, and seeing a way to protect it as a valuable nursery for fish that could help feed future generations, *kepala desa* worked with Proyek Pesisir's (the Indonesian coastal resources management project) staff and community members to collect data, identify a proper site and develop a local ordinance to regulate the proposed protected area. Within a year, the community fully supported the concept, completed technical research and selected a site. The village government also received support from the regional and national governments for the ordinance that the villagers had crafted. In October 1998, the area was officially designated a marine sanctuary. Already an information/meeting center is under construction, placement of boundary markers is underway and

information signs are being created. By promoting the community-based marine sanctuary, Blongko's residents now have a more active role and responsibility for protecting and sustaining marine resources which directly affect their day-to-day lives. The resource users in Blongko are now becoming resource managers.

While one small sanctuary may not seem like much, if it is used as a model which is replicated widely, it can greatly add to the amount of coral reef area protected within a nation. It also has positive financial implications over time. With budgets being cut due to the national economic crisis, community-based marine sanctuaries become an attractive and less-costly means of marine ecosystem and biodiversity protection as the majority of costs – like the benefits – can be internalized within the community rather than be rolled into national budgets.

The Blongko Marine Sanctuary is minuscule in a global context, but it is extremely important as an example of success in a country such as Indonesia, which contains 20 percent of the world's coral reefs and the highest marine biodiversity in the world – "the underwater rain forest."

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

ASIA

INDONESIA

Indonesian Coastal Resources Management Program

Proyek Pesisir (Indonesian Coastal Resources Management Project) is part of the USAID/Indonesia Natural Resources Management program. Its objective is to decentralize and strengthen coastal resources planning and management.

Bunaken Declaration

On September 26, 1998, President J. Habibie signed the Bunaken Declaration to safeguard Indonesia's seas. He signed the declaration in Manado, North Sulawesi on the International Year of the Ocean Day. The declaration will help *Proyek Pesisir* advance its projects in N. Sulawesi and throughout the archipelago.

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

Kalimantan Field Program

Proyek Pesisir's East Kalimantan (Borneo) field office officially opened in September 1998. A study will be done of the pressure industry places on the coastal areas surrounding Balikpapan. The office will seek to establish innovative coastal resources management partnerships between government, the community and private sector interests. The immediate plan is to develop coastal resources management capacity at the sub-provincial level in both government and nongovernmental institutions.

For further information contact: Ramli Malik, Proyek Pesisir Kaltim, Jl. Pierre Tendean no. 37, Balikpapan, Kalimantan Timur, Indonesia. Tel: 0542 31580. FAX: 0542 31580. E-mail: p-pesisr@balikpapan.wasantara.net.id.

Lampung Field Program

One of the first activities undertaken by the Lampung field office of *Proyek Pesisir* in southern Indonesia was a study of how socioeconomic gaps undermine integrated coastal management.

As with many other coastal zones of Indonesia, the coasts of Lampung face serious problems. One issue is illegal and destructive fishing in Lampung Bay, including the illicit use of trawls. This illegal fishing has reduced the catch of artisanal and traditional fishers who are unable to compete with the better-equipped fishing fleets. The equipment gap has led to a socioeconomic gap; a rift that has worsened with the financial turmoil of the past year. Lampung also faces land use and tenure conflicts. In its enthusiasm to attract investors, the local government eased land use and tenure regulations in coastal areas. As the economic crisis began, the large companies that owned the seaside plots could not continue operations. Many of these lots were abandoned before any economic output was realized.

Similarly, the conversion of mangroves and paddy fields into shrimp aquaculture ponds has exceeded the environmental carrying capacity. This negative impact is exemplified by the erosion, salt-water intrusion and marine pollution found along Lampung's eastern coast.

The environmental damage and non-sustainable development in the coastal and marine zones of Lampung deserves serious attention. The poverty that many residents shoulder is the direct result of this environmental degradation, and, ironically, the same poverty has led to further environmental damage.

Proyek Pesisir set up an office in the province to address these problems. The project is preparing an integrated coastal management strategy for the province. The dynamic management plan will accommodate socioeconomic and cultural aspects. The plan, through participatory democratic means, will incorporate community interests and aspirations in an effort to

improve coastal conditions and living standards.

For further information contact: Budy Wiryawan, Proyek Pesisir Lampung, Jl. Sutan Syahrir no. 4, Pahoman, Bandar Lampung 35231, Indonesia. Tel: 0721 250984, 252851. Fax: 0721 253013. E-mail: crmp-lpg@indo.net.id.

EUROPE

UNITED KINGDOM

Environmental Governance: Responding to the Challenge of Deliberative Democracy

At a one-day session on December 17, 1998, over 140 people gathered for the first in a series of conferences on the topic of 'Deliberative and Inclusionary Processes in Environmental Decisionmaking,' or 'DIPs.' Sponsored by the United Kingdom (UK) Economic and Social Research Council, with additional financial support from the UK Environment Agency and English Nature, the conference series will explore and assess innovative forms of decisionmaking. The Environment & Society Research Unit (ESRU), University College London, is leading the series in partnership with researchers from the University of Lancaster and the University of East Anglia.

The idea for the conference series emerges from a growing debate in environmental policy circles which suggests a need to move from statistical methods of assessment towards more deliberative ways of making decisions and developing policy. The new agenda, in turn, demands the inclusion of many different social groups; in particular those who were previously ignored or 'spoken for.' However, many questions need answering: not least, who should be involved, and do deliberative processes lead to better decisions?

The first conference brought together academics and practitioners in the environmental field to discuss invited papers on the subject of DIPs. Papers were presented on the contribution of DIPS to environmental governance, the implications of social intelligence and contemporary politics for DIPs, and the relationship between formal and informal systems of governance.

While it was agreed that DIPs, in principle at least, provide a vehicle for expression of other forms of knowledge and values traditionally excluded from decisionmaking, the conference papers and contributions from the audience posed a series of key questions for discussion in later seminars.

First, the temporal and spatial scales of DIPs present real problems for practitioners. Over what spatial scales are DIPs relevant? Should local instances of DIPs take priority over regional or even national strategies? When might DIPs be inappropriate? The increased complexity of environmental issues which transcend administrative and regulatory boundaries pose particular challenges for the role of DIPs in environmental governance. Similarly, environmental problems extend over time. How might DIPs work under conditions of uncertainty, yet still capture and represent the 'silent voices' of either unborn generations or, indeed, non-human forms of life?

Second, the legitimacy and accountability of the DIPs process and outcome were subjected to close examination. Key issues centred on who should be involved, when and how? Equally important for the outcome of DIPs is the agenda which participants are permitted to discuss. What is the role of the state in facilitating a legitimate process? Should DIPs be compulsory for environmental regulators and agencies?

The third main theme, how we might evaluate DIPs, generated considerable discussion. Do deliberative and inclusionary processes actually lead to better decisions? How could this be measured? Should strategic decisions by environmental regulators be subject to scrutiny by a more deliberative and inclusionary audit panel?

These themes and questions will be considered in the next three seminars which will be held in 1999-2000.

For further information contact Kevin Collins, Environment & Society Research Unit, Department of Geography, University College London, 26 Bedford Way, London, WC1H, 0AP, United Kingdom. Tel: +44(0)171 504 5548. FAX: +44(0)171 380 7565. E-mail: kcollins@geog.ucl.ac.uk. Web site: http://www.geog.ucl.ac.uk/esruwww/dip/index.htm.

LATIN AMERICA

JAMAICA

Study of Marine Protected Areas Builds Support for Conservation

In Jamaica, and throughout the Caribbean, there is concern for the health of the coral reefs and the coastal environment. Many reefs are deteriorating and fish populations are declining. Reasons for this range from increased construction on shore and pressure from fishers, to natural events such as cyclones.

In response to this concern, the United Kingdom's Department for International Development authorized a program to investigate the development of areas of the sea where activities are restricted, commonly called marine protected areas (MPAs). This program looks at the marine biology and the

social-anthropological aspects of MPAs. The marine biological side of the project is investigating the effects on reef populations of various forms of restrictions on fishing and other marine activities. The social-anthropological side is investigating the factors that are likely to affect the ways people who fish will respond to the restrictions on their activities.

The marine biological research began in April 1997. The information gathering was completed in April 1998, and analysis of that information is in progress. The social-anthropological side began in April 1998, and will end in mid-1999. The main field site is Whitehouse, Jamaica, a part of Montego Bay where many people live and fish. A study of fishers in River Bay is also being carried out. This is different from Whitehouse because it is primarily a landing beach, not a place where fishers live. In addition to the two sites in Montego Bay, three months will be spent in Negril, and a shorter period in Discovery Bay. These sites were selected because each has some form of MPA.

This research will be important for those in the Caribbean who have advocated MPAs as a solution to some of the problems faced in the region. Advocates tend to think in terms of the sorts of activities that should be restricted, and often assume that fishers and others will accept and even support the restrictions imposed on their activities that come with MPAs. However, the history of MPAs within the region shows that often this acceptance and support is not forthcoming, that fishers and others are reluctant to change fishing methods and locations.

This research will seek to see generally what sorts of activities fishing involves, how those activities affect the lives of fishers and others, and how fishers think about their fishing activities and the waters they fish. The intended result is a set of issues and questions that need to be evaluated by those in government and voluntary organizations that are considering establishing MPAs.

(Results of the entire project will be presented in a meeting to be held in Jamaica in July 1999, together with speakers describing other regional MPA projects.)

For further information on the social-anthropological study, contact: James G. Carrier, Durham, UK,. FAX: +44 191 374-2870. E-mail: James.Carrier@durham.ac.uk or Lucy Robertson, Jamaica. E-mail: Lucy@n5.com.jm.

For further information on the marine biological study, contact: Nicholas Polunin or Ivor Williams, Newcastle, UK. FAX: +44 191 222-7891. E-mail: I.D.Williams@ncl.ac.uk or N.Polunin@newcastle.ac.uk.

LATIN AMERICA

MEXICO

Partnerships Promote Low-Impact Tourism in Quintana Roo

With the attraction of large-scale tourism destinations such as Cancun and the Mayan Riviera in northern Quintana Roo, the government, local communities and investors are hoping to create a contrasting type of tourism in southern Quintana Roo – specifically, one which diversifies the tourism market and also maintains high ecological diversity. While the existing regulatory regime includes many valuable tools, integrated strategies that support sustainable tourism development are limited. To address this, the United States Agency for International Development/Mexico (USAID) is working to develop a strong private sector initiative to develop strategies to protect the natural resources that are the industry's principal attraction, and the driving force for regional economic development.

In July 1998, the "Normas Prácticas para el Desarollo Turístico" (Practical Guidelines for Low-Impact Tourism Infrastructure) was published by the Amigos de Sian Ka'an, a local nongovernmental organization, and the University of Rhode Island's Coastal Resources Center (USA). The manual is a collection of over 100 practical measures for the design and placement of coastal infrastructure. Topics addressed are beaches and dunes, wetlands and lagoons, vegetation and landscape, potable water and wastewater, solid waste and alternative energy options. Many of the techniques described have been successfully applied in the U.S. and other coastal programs throughout the world. These techniques are aimed to address the challenges facing Quintana Roo. The goal of the Normas Prácticas is to provide workable voluntary alternatives to assist the private sector in protecting tourism investments and preserving the environment, since the environment is the core attraction.

Implementation of the Normas Prácticas is critical to the success of ecotourism in southern Quintana Roo. Working with government tourism promoters, the Normas Prácticas' development team identified a developer who would apply the guidelines in the field and evaluate the results. As an outcome, design changes were recommendations that reduced environmental impacts. These included a 30-m setback from wetlands and ocean-front, constructing wetlands for wastewater treatment, and implementing a landscape plan consisting of dunes with a narrow, interspersed pathways vegetated with native species. In the coming year,

the goal is to facilitate more public/private partnerships to enhance use of the guidelines and to fine-tune them for application within the region. The government has also found the manual useful in the implementation of various regulatory tools and in formulating zoning plans currently being drafted by the Quintana Roo government.

Complementary efforts to promote and market the concepts of sustainable tourism development have been initiated through the use of a planning and incentive/certification program known as the Green Globe Alliance. Colleagues from the World Travel and Tourism Council and George Washington University (USA) have signed a memorandum of understanding with Mexico's Tourism Secretary to promote sustainable tourism practices. Additionally, project members joined with USAID partners from Jamaica to participate in a two-day workshop in September 1998; 40 hoteliers and investors in the Cancun area were informed about the concepts and benefits of Green Globe's environmental management systems and the Normas Prácticas' low-impact development techniques. The program was well received, and demonstrated ways to save money, protect the environment and receive certification of their environmental achievements.

The Spanish language version can be purchased from the Coastal Resources Center for US$ 10 to cover postage and handling (contact Pam Rubinoff at address below). The full manual in Spanish will be available on the World Wide Web in early 1999, and be translated into English in early 1999.

For further information contact: Pam Rubinoff, Coastal Resources Center, University of Rhode Island, Narragansett, Rhode Island 02882 USA. Tel: 401-874-6135. FAX: 401-789-4679. E-mail: rubi@gso.uri.edu.

LATIN AMERICA

MEXICO

Civic Associations Develop Agenda for Sustainable Resource Use

The first-ever meeting of Mexican civil associations from Sonora, Sinaloa, Baja California and Baja California Sur on the conservation of natural resources in the Gulf of California area was held in Guaymas, Sonora, November 12-14, 1998. The Spanish title "Conocer Para Conservar," has a dual meaning that captures the spirit of the event, which was to emphasis the need to better understand and appreciate this vast, unique biogeographic region, and bring together the area's leading groups to increase communication and mutual support.

Representatives of nearly 30 organizations described their activities and worked to develop a common agenda and build new working relationships. In addition, workshop participants shared concerns and strategies for creating successful alliances and networks of local conservation organizations – an increasingly important trend in Latin America.

The Gulf of California is located between the Baja California peninsula and the western mainland of Mexico. It is 1,600 km long and 100 to 200 km wide; it runs from the Colorado River Delta in the north to the Pacific Ocean in the south. It has a coastline of 3,000 km and is bordered by six states. It has been identified as one of the 20 most important marine regions in the world.

The region's environmental leaders agreed to prepare a detailed common agenda highlighting four key areas:

1. Defining a vision for the biogeographic region. This is a major challenge because of the importance of protecting migratory species of fish, marine mammals and birds, as well as the coastal and upland ecosystems. It is important to document the ecological value of resources, the economic impact of resource use and the cultural dimensions of the region that influence successful management.

2. Compiling and sharing information about management experiences in the region for identifying common themes, avoiding duplication of effort and learning from successes and failures.

3. Strengthening civil associations' knowledge of issues including sources of financing; legal requirements and administration; training of staff (including leadership, networks and alliances); and program development.

4. Developing a common framework, beginning with a historical review of key conservation and management ideas including sustainability, quality of life and the participatory process. In addition, examining the political and social efforts to achieve sustainability.

Meeting participants will convene as smaller committees during early 1999 to develop specifics on how to address these areas. Also planned for 1999 is a second meeting to review progress and involve more groups, especially from the state of Nayarit.

The meeting was supported by the David and Lucille Packard Foundation, the United States Agency for International Development and the World Wildlife Fund.

For further information contact: María de los Angeles Carvajal, Conservation International México, A.C., Miramar 59 A., Colonia Miramar, C.P. 85450, Guaymas, Sonora, México. Tel/FAX: 52-6-22 1-0194. E-mail: cimxpgc@tetakawi.net.mx.

NORTH AMERICA

UNITED STATES

Citizen Stewards Stand Watch for Environmental Change: Project COAST, Florida, USA

Project COAST, a coastal water quality monitoring program, recently celebrated its one-year anniversary. The initial goals of recruiting volunteers, establishing sampling stations, working out the logistics of monitoring more than 100 miles of Florida's coast, and setting up the water chemistry laboratory have been achieved.

One hundred sites have been designated adjacent to five coastal counties (Taylor, Dixie, Levy, Citrus and Hernando). These sites have been sampled monthly for total phosphorus, total nitrogen and chlorophyll. Temperature, salinity and water clarity were also recorded.

Over 1,000 samples have been collected and the data are currently being processed in the water chemistry laboratory at University of Florida's Department of Fisheries and Aquatic Sciences. Additional samples were also collected in cooperation with the Department of Environmental Protection's (DEP) Fisheries Monitoring program in the Cedar Key area.

Why sample? Florida's Big Bend section of coast is home to some of the most pristine and extensive areas of salt marsh and seagrass habitats in the world, and encompasses coastal drainage and associated estuaries from Apalachicola to Tampa. Seagrasses and salt-marshes provide essential habitat for many recreational fisheries (e.g., spotted sea trout and red drum) and commercial fisheries (e.g., blue and stone crabs, grouper, oyster, shrimp and clams). Changes in coastal water quality could alter the ecology of these systems.

Citizen involvement. Project COAST's challenge was to define a time frame and identify individuals to collect water samples. Citizen volunteers were the answer. Modeled, in large part, after University of Florida's LAKEWATCH program (now one of the largest volunteer monitoring programs in the U.S.), Project COAST involves citizen volunteers with three main goals in mind:

- To provide the public with educational information concerning environmental issues
- To encourage and support a new approach to water management, including a sense of shared responsibility with the public
- To develop a cost-effective, long-term data set that can be used to establish baseline water quality conditions in coastal waters of Florida, and warn of significant environmental changes that could affect valuable marine resources

Sampling is coordinated by the Department of Fisheries and Aquatic Sciences in cooperation with the Florida DEP and citizen volunteers. Financial support for this first year of monitoring was provided by the Suwannee River Water Management District and the Southwest Florida Water Management District. Project COAST is now being recommended for expansion to a statewide comprehensive water monitoring program.

For more information contact: Tom Frazer, University of Florida, Department of Fisheries and Aquatic Sciences, 7922 NW 71st Street, Gainesville, FL 32653 USA. Tel: 352-392-9617 ext. 243. E-mail: frazer@nervm.nerdc.ufl.edu.

Rapid Assessment of Management Parameters for Coral Reefs
By Richard B. Pollnac

Coral reefs are a powerful symbol of both the economic and ecological significance of coastal ecosystems, as well as the rapid loss of marine biodiversity, and the resources upon which millions of coastal residents around the world depend.

In 1995, the International Coral Reef Initiative (ICRI) was launched to call attention to the alarming decline of the world's coral reefs and to catalyze a response to reverse current trends. It was recognized early on that there was little work concerning the role of humans in this complex ecosystem. To address this gap, project *RAMP* (Rapid Assessment of Management Parameters) was conceived. *RAMP* was designed to expand upon the International Center for Living Aquatic Resources Management's (ICLARM), ongoing work on ReefBase, a global database of coral reef condition, by defining a set of indicators of human factors potentially impacting coral reefs. Project *RAMP* is truly a pioneering effort.

Rapid Assessment of Management Parameters for Coral Reefs. 1998. Richard B. Pollnac. Coastal Resources Center, University of Rhode Island. Narragansett, Rhode Island USA. 199 pages.

Shipping and handling per book in the United States: US $7.50, Canada: US$ 10.00 and Overseas: US $12.50. Master Card, Visa, check and money order accepted payable to Coastal Resources Center. Please mail to Suzanne Wood, Coastal Resources Center, URI Narragansett Bay Campus, South Ferry Road, Narragansett, RI 02882 USA. Tel: 401-874-6109. FAX: 401-789-4670. E-mail: suzwood@gso.uri.edu.

INTERCOAST SIDER FORMATION

Electronic Resources

American Fisheries Society. Publications, current events, upcoming meetings and related events dealing with fisheries are located at this site. Address: http://www.fisheries.org.

Associated British Ports. This site focuses on port management and the environmental benefits from shipping. Links related to port research and business can be found here. Address: http://www.abports.co.uk.

Coastal Education and Research Foundation. This non-profit corporation is dedicated to coastal research, management and maintenance. Address: http://www.cerf-jcr.com.

CoastNet (The Coastal Network). CoastNet is a membership body linking together individuals and organizations involved in practical coastal management in the United Kingdom. It represents the largest pool of practical experience in coast management in the UK. Address: http://csweb.bournemouth.ac.uk/consci/coastnet/. To subscribe, E-mail: coastnet@bmth.ac.uk.

Cosmo-Bio Demo Site. This was developed to show the possibilities and benefits of a decision support system for integrated coastal zone management. Address: http://www.minvenw.nl/projects/netcoast/bioweb/index.htm.

Discovery of Rhode Island Coastal Environments. This site offers virtual field trips to the coastal ecosystems of Rhode Island. Address: http://omp.gso.uri.edu/doce.htm

Environment Australia. This site was developed to promote ecologically sustainable management of Australia's coastal and marine resources. Address: http://www.environment.gov.au/marine/.

HazNet. This organization is dedicated to helping people meet the challenges presented by natural hazards. Information on coastal hazards and mitigation policy and planning is presented in this site. Address: http://www.haznet.org.

International Union for Conservation of Nature and Natural Resources. The goal of this organization is to conserve and manage natural resources on a global scale. Address: http://www.iucnus.org.

Jug Bay Wetlands Sanctuary. This site provides information on the education and research that occurs at a wetland sanctuary. Address: http://web.aacpl.lib.md.us/rp/parks/Jugbay/.

NetCoast. Information regarding all aspects of integrated coastal zone management can be found here. Address: http://www.minvenw.nl/projects/netcoast/index.htm.

Oregon Coastal Index. Information about this state's program for managing coastal resources and the administrative rules regarding the protection of water dependant shorelands are presented in this site. Address: http://www.lcd.state.or.us/coast/index.htm.

Resource Analysis. Policy adviser to various groups involved in sustainable management and the use of natural resources. Address: http://www.resource.nl/index.html.

Sustainable Development Institute. The SDI is a non-profit organization designed to link economic and environmental goals through policy and practice. Address: http://www.susdev.org.

Tidal Wetlands Impacts Data Home Page. This site presents detailed summaries of cumulative impacts to tidal wetlands in Virginia, USA. Address: http://www.vims.edu/rmap/wetlands/cgi-bin/index.htm.

Publications

Aquaculture Economics and Management. This journal focuses on the use of economic analysis to manage aquaculture. Other topics include aquaculture inputs and production, farm management, government policy, international trade and cooperation and environmental impacts. Contact: Blackwell Science Ltd., Journal Subscriptions, P.O. Box 88, Oxford OX2 0NE, UK. Tel: 44 1865 206126. FAX: 44 1865 206219. E-mail: journals.sc@blacksci.co.uk.

Development of Biological Criteria for Coral Reef Ecosystem Assessment. This publication can be viewed at the EPA Coral Reef Homepage: http://www.epa.gov/owow/oceans/coral. Paper copies are available

by contacting Kennard Potts, E-mail: potts.kennard@epa.gov.

Habitat Lost: Taking the Pulse of Estuaries in the Canadian Gulf of Maine. Published by the Conservation Council of New Brunswick. 1998. 81 pages. Price: US$ 8.00. Contact: CCNB, 180 St. John Street, Fredericton, N.B., Canada E3B 4A9. Tel: 506-458-8747. FAX: 506-458-1047. Web site: http://www.web.net/~ccnb/orderF%7E1.htm.

Handbook for Wetlands Conservation and Sustainability. Released by the Save our Streams (SOS). Department of the Izaak Walton League of America. Topics include basic wetland ecology, wetland function and values, stewardship and monitoring methods. 2nd edition, 288 pages. Price: US$ 35 plus shipping and handling. To order contact: SOS Staff, IWLA, 707 Conservation Lane, Gaithersburg, MD 20878. Tel: 800-BUG-IWLA. E-mail: sos@iwla.org. Web: http://www.iwla.org.

Journal of International Wildlife Law and Policy. This is a journal of Kluwer Law International that focuses on legal and political issues concerning the interrelationship between the human race and the wildlife species, including international and regional wildlife treaty regimes and national legislation and regulations, and the impact that judicial decisions have on a national and international level. To subscribe contact: The Managing Editors at JIWLP@earthling.net.

Navigating the Uncertain Waters of the 21st Century: The Role of New Technologies in Building a Competitive and Secure Maritime Infrastructure. The Institute of Navigation, the National Oceanic and Atmospheric Administration, and the U.S. Coast Guard Academy Center for Advanced Studies sponsored a workshop on May 22, 1998 in Washington, D.C., USA. Models of foreign ports, in particular the Port of Rotterdam and foreign operations, in this case Canada Steamship Lines and British Airways, are showcased in this paper as examples of how public-private partnerships can lead to improvements in maritime transportation. A summary paper of the conference can be obtained from Lori Costantino, U.S. Coast Guard Academy, 15 Mohegan Ave., New London, CT 06371 USA, Tel: 860-444-8298. E-mail: lcostantino@exmail.uscga.edu. Select portions of the conference are available as a video broadcast at http://www.theshippingnetwork.com.

Sustainable Strategies for Oceans: A Co-Management Guide. 1998. 85 pages. Price: US$15.95. Contact: Renouf Publishing Ltd., 5369 Canotek Road, Unit #1, Ottowa, Ontario K1J 9J3. Tel: 613-745-2665. FAX: 613-745-7660. Web site: http://www.nrtee.ca/english/index.htm.

WaterNews is a weekly on-line publication that focuses on water-related issues. Policies, activities and publications are available through this newsletter. To subscribe, E-mail: listserver@unix-mail.rtpnc.epa.gov. Leave the subject line blank and in the body of the message write: Subscribe waternews firstname lastname.

Conferences

1999 American Wetlands Month Conferences. Terrene Institute's 3rd Annual American Wetlands Month Conferences: Communities Working for Wetlands. Four conferences are scheduled beginning in New Orleans Feb. 18-20, followed by San Francisco March 18-20, Indianapolis April 8-10, and concluding in Andover, MA May 6-8. Contact: Tel: 703-548-5473. FAX: 800-813-1925 document 204. Web site: http://www.terrene.org.

March 2-4, 1999. **International Symposium on Geographic Information Systems in Fishery Science.** Seattle, WA USA. Contact: Tom Nishida, National Research Institute of Far Seas Fisheries, Shizuoka, Japan. E-mail: tnishida@enyo.affrc.go.jp.

March 20, 1999. **Forth Annual International Wildlife Law Conference.** Washington, DC. Contact: Wil Burns, Managing Editor. Journal of International Wildlife Law and Policy, 46 Shattuck Square, Suite 18, Berkeley, CA 94704. Tel: 510-540-0980. FAX: 510-452-9266. E-mail: JIWLP@earthling.net.

March 23-27, 1999. **Legacy of an Oil Spill: 10 Years After Exxon Valdez.** Anchorage, Alaska. Contact: Brenda Baxter, Alaska Sea Grant. Tel: 907- 474-6701. E-mail: FNBRB@uaf.edu.

March 30-April 2, 1999. **The International MEDCOAST Conference** on: Wind and Wave Climate of the Mediterranean and the Black Sea. Antalya, Turkey. Contact: Dr. Saleh Abdalla, Ocean Eng. Research Center, Civil Engineering Dept., Middle East Technical University, 06531 Ankara, Turkey. Tel: +90-312-210 54 37. FAX: +90-312-210 14 12. E-mail: abdalla@metu.edu.tr. Web site: http://tu-waves.klare.metu.edu.tr/conference/.

April 9-11, 1999. 1999 **Conference of Coastal Communities.** Steveston, Canada. Contact: Coastal Community Network, P.O. Box 218, Ucluelet, B.C. Canada VOR 3AO. Tel: 250-726-4683. FAX: 250-726-2268. E-mail: coast-com@island.net. Web site: http://www.coastalcommunity.bc.ca.

April 14-16, 1999. **International Conference on Scientific Aspects of Coral Reef Assessment, Monitoring and Restoration**. Ft. Lauderdale, Florida. Contact: National Coral Reef Institute, Nova Southeastern University Oceanographic Center, 800 N. Ocean Drive, Dania, FL USA 33004. Tel: 954-920-1909. FAX: 954-921-7764. E-mail: ncriconfinfo@mako.ocean.nova.edu. Web site: http://www.nova.edu/ocean/ncri/confinfo_1.html.

May 10-14, 1999. **Research for the Development of Fisheries and Aquaculture in the Coastal Zone of Central America.** Costa Rica. Contact: Anne van Dam, Programa UNA-LUW, Escuela de Ciencias Biologicas, Universidad Nacional, Apdo. 86-3000 Heredia, Costa Rica. FAX: 506-237-6427. E-mail: unaluw@una.ac.cr.

May 19-22, 1999. **The Canadian Coastal Conference 1999: Coastal Science and Engineering Into the Next Millennium.** Royal Roads University, Victoria, B.C. Canada. Contact: Mr. Christian J. Stewart. CCC`99 Conference Chair. VGI Vision Group International Inc. 5325 Cordova Bay Road, Suite 211, Victoria, British Columbia, Canada, V8Y 2L3. Tel: 250-658-4844. FAX: 250-658-0084. E-mail: cstewart@vgivision.com. Web site: http://www.vgivision.com/ccc99.

July 18-20, 1999. **Workshop on Market-Based Instruments for the Environmental Protection**. Cambridge, Massachusetts. Contact: Robert N. Stavins, John F. Kennedy School of Government, Harvard University, 79 John F. Kennedy Street, Cambridge, MA UAS 02138. Tel: 617-495-1820. FAX: 617-496-3783. E-mail: robert_stavins@harvard.edu. Web site: http://www.ecu.edu/econ/aere.

July 24-30, 1999. **Coastal Zone `99 Conference**. San Diego, California. Contact: Urban Harbors Institute, University of Massachusetts Boston, 100 Morrissey Boulevard, Boston, MA USA 02125-3393. Tel: 617-287-5570. FAX: 617-287-5575. E-mail: cz99@umbsky.cc.umb.edu. Web site: http://omega.cc.umb.edu/~cz99/main.html.

Education and Training

Integrated Coastal Management for Practitioners in the Western Indian Ocean Region. March 1-12, 1999. Whitesands Hotel, Mombasa, Kenya. The Western Indian Ocean Marine Science Association (WIOMSA), in cooperation with the Coastal Resource Center, University of Rhode Island (CRC/URI) and a number of other regional partners, will offer a two-week regional training course for coastal management practitioners from East and South Africa and the Island States. For further detailscontact Margareth Kyewalyanga, WIOMSA, The Secretariat, P.O. Box 3298, Zanzibar, Tanzania. Tel: (++255)(54)/32128/30741. FAX: (++255)(54)33050. E-mail: maggie@zims.udsm.ac.tz.

Marine Biology Station, Costa Rica. The station is part of the School of Biological Sciences of the Universidad Nacional, where an undergraduate course program in Marine Biology and a 'Licenciatura' program in Marine and Freshwater Resources are offered. Its mission is to train professionals, generate information and to solve problems faced by users of the coastal zone. The station has two main focuses: coastal management and marine aquaculture. There are extension projects on various issues and research projects on marine resources. On request from both the private and public sector, the staff of the station also provide consultant services on coastal problems. Recently, a new curriculum for a Masters degree in Marine and Coastal Science was developed. This course is scheduled to open in 2000. For more information, contact Angel Herrera, Estación de Biología Marina, Apdo. 126-5400 Puntarenas, Costa Rica, Fax (506) 6613635, E-mail: ebm@una.ac.cr. Web site: http://www.una.ac.cr/biol/ebm/.

Nonpoint Education of Municipal Officers (NEMO) is a University of Connecticut Cooperative Extension project using innovative techniques to teach local officials about the sources and impacts of nonpoint source pollution, how different land uses affect water quality, and what towns can do to protect water quality. Web site: http://www.lib.uconn.edu/CANR/ces/nemo/.

Integrated Coastal and Ocean Management

By Biliana Cicin-Sain and Robert W. Knecht

and

Coastal Seas: The Conservation Challenge

By John R. Clark

This past year has provided us with two new books designed as guides to the concepts and practices of coastal management. *Integrated Coastal and Ocean Management* by Biliana Cicin-Sain and Robert W. Knecht (Island Press) is a hefty 500 page-plus volume designed to address "the difficult problems of managing among overlapping jurisdictions, competing coastal and ocean uses, and sensitive environments." The second is by John R. Clark, the author of the encyclopedic 1996 Coastal Zone Management Handbook. Clark's second effort, *Coastal Seas: The Conservation Challenge* (Blackwell Science) is in essence a synopsis of his earlier work containing a sequence of short sections grouped into chapters with headings such as Impacts, Program Design, Methods and Tools and the Coastal Professional. As with his earlier volume, Clark's new book contains many pithy statements on complex topics. It serves as a good orientation for the uninitiated and will remind the practitioner of the fundamentals of their profession.

Integrated Coastal and Ocean Management is the product of an ambitious undertaking supported by United Nations Educational, Scientific and Cultural Organization's Intergovernmental Oceanographic Commission. This volume is divided into two approximately equal parts. The first half leads the reader through the why and the what of integrated coastal management (ICM), the evolution of ICM and on to a 'practical guide to ICM.' Many of the sub-sections have similar or identical headings to those in Clark's volumes. The approach, however, is more scholarly. It places a greater emphasis on the prescriptions of international bodies and contains numerous text boxes and tables that document and illustrate points made in the text. Chapters on the evolution of coastal and ocean management are a well-documented and useful synthesis of international responses to the challenges posed by the transformation of coastlines and the intensifying use of ocean resources. The 'practical guide' is somewhat uneven in its style and content but contains many useful sections with considerable detail and pointers to additional sources. For example, the chapter on science and information for management contains a lengthy table that poses scientific questions and the kinds of information that are likely to be most relevant to understanding common coastal management issues. On the other hand, the section on financing a coastal management program provides little in the way of practical guidance on this crucially important topic.

The second half of the Cicin-Sain and Knecht's volume is devoted to case studies and lessons learned. Much of the information presented is in the form of short profiles of national programs. The style and the content complements the cases in Clark's 1996 volume with its focus on how individual coastal management initiatives illustrate specific issues and approaches to their resolution. Cicin-Sain and Knecht's concluding chapter is a thoughtful summing up on a rapidly evolving field.

These two new guides to the theory and practice of coastal management do much to introduce a profession that is attempting the difficult task of integrating across traditional sectors and academic disciplines. Both the student and the practitioner can now have on their bookshelves volumes that successfully distill out the salient features of a new field and a new profession.

Beach Erosion

(continued from page 7)

consistent with the new project, and an alternate solution to defend Marina di Pisa was presented to the ministry by the local authority. For this project, a special wave channel experiment was performed that tested gradual lowering of a breakwater concurrent with filling with gravel. This solution, razing the breakwaters to MLW and dumping the surplus rock boulders at the offshore toe of the structure, decreased the external slope and reflectance and increased the stability. In addition, testing was done to determine the optimum volume of gravel to use (100 cubic meters per meter of coastline). The total cost for this solution was estimated to be approximately US$1.3 million, and was found to be cost effective. Data on the stability of using gravel for beach renourishment are not readily available in the literature; however, the above-mentioned laboratory experiments suggest this method is quite durable. Detailed monitoring of the beach renourishment project will provide data to perform an accurate cost-effectiveness analysis.

In addition to the lower cost of the cost-effective option, a 30-m

wide gravel beach will be formed. The economic value as a result of increased tourist use of the new coastal environment is expected to increase as a consequence of the increased beach area, the improved water quality due to an increase in water circulation and the restoration of a more natural landscape. This will allow tourists to enjoy watching the sun set on the Ligurian Sea, rather than on a 3.5-m high rock mound.

For further information contact: Enzo Pranzini, Dipartimento di Scienze della Terra, Università degli Studi di Firenze, Via Iacopo Nardi, 2-50132 Firenze, Italy. Tel: +39 55 243486. FAX: +39 55 241595. E-mail: epranzini@cesit1.unifi.it.

Nurse

(continued from page 13)

and south coasts have developed.

Q: Do you have any final thoughts about implementing coastal management?

A: I think that coastal programs can be donor-funded, but need to be internally driven. It is important that the programs be designed and implemented by locals, with help from external expertise if that capacity isn't resident in their countries. I don't think we should ever begin by trying to bite off more than we can chew. We should proceed slowly, do things incrementally, set very clear objectives, accomplish them and then move on.

If we believe that we can accomplish something called integrated coastal management overnight, I think we're making a sad mistake. In the case of the Barbados program, we have been trying to grapple with it for over 15 years. I think we have learned a lot of things. But I would be the first to admit that we still have yet a long way to go.

Leonard Nurse is a leading expert on coastal management in the Caribbean. He has nearly two decades of experience guiding its growth in the island nation of Barbados. He can be contacted at: Oistins Government Complex, Oistins, Christ Church, Barbados. Tel: 246-428-5945. E-mail: lnurse@caribsurf.com.

InterCoast Subscription Order Form

For an annual subscription fee of US$ 10, three issues and a periodic special issue of *InterCoast* are available. For students, and readers from developing countries who cannot afford the subscription fee, *InterCoast* will be provided free of charge if a waiver is requested.

☐ **Enclosed one-year (US $10) (check or money order, payable to CRC)**

☐ **Waiver requested**

Please bill my ☐ **Visa** ☐ **MasterCard** **Card#**_____

Cardholder name_____

Expiration date_____ **Signature**_____

Salutation ☐ Mr. ☐ Mrs. ☐ Miss ☐ Ms.

Last Name First Name

Organization Title/Position

Address

Telephone FAX E-mail

Mail to: ***InterCoast* Subscription**
Coastal Resources Center
URI Narragansett Bay Campus
South Ferry Road
Narragansett, RI 02882 USA

Next *InterCoast* on Coral Reefs

The issue on Coral Reefs will draw strongly, but not exclusively, from the International Coral Reef Initiative and the Great Barrier Reef Marine Park

Authority's inaugural International Tropical Marine Ecosystems Management Symposium (ITMEMS) held in Townsville, Australia, on November 23-26, 1998. ITMEMS served as a major forum for discussion of coral reef-related topics including: tourism, climate, fisheries, public outreach, education and training, research, data analysis, among many others.

In addition to articles on coral reefs, *InterCoast* also includes articles on general coastal issues and 'Reports from the Field,' summarizing projects and achievements or initiatives. *InterCoast* also includes '*InterCoast* Insider Information;' listing upcoming conferences, new publications, web sites, training and other useful items.

Articles should be 750-1,500 words, and 'Reports from the Field' are 250-500 words. Photos, maps and other graphics are strongly encouraged. We do edit articles as necessary to fit the available space.

To contribute to *InterCoast* #34, contact Managing Editor, Noëlle F. Lewis, Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI, 02882 USA. Tel: 401-874-6870. FAX: 401-789-4670. CRC Web site: http://crc.uri.edu. E-mail: noelle@gso.uri.edu.

Deadline is March 21, 1999. Articles can be submitted electronically.

Thank you.

INTERCOAST NETWORK

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

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

The objective of *InterCoast* is to facilitate information exchange on coastal management. Readers are invited to contact Noëlle F. Lewis, Managing Editor, with questions and comments on *InterCoast* and its effectiveness as a source of information on coastal management.

InterCoast Network
Noëlle F. Lewis
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@gso.uri.edu

InterCoast invites others to reprint articles found in *InterCoast*. We would appreciate if you would contact Noëlle F. Lewis, at the above address, for permission.

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