INTERCOST NEWSLETTER
REFLECTIVE and RETROSPECTIVE
1986 to 2000

INTERCOAST NETWORK
INTERNATIONAL NEWSLETTER OF COASTAL MANAGEMENT

Coastal Resources Center, University of Rhode Island
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Highlights

Theme Advisor:
John R. Clark

Changing Times: Coastal Management 1986 to 2000

By John R. Clark, founder and former editor of *InterCoast* and its predecessor *CAMP* Network

So much has changed in the practice of coastal management over the past 15 years that my task of reviewing progress in the field as reported by my colleagues is intriguing. It is my good fortune that progress has been so well tracked by *InterCoast* newsletter and its predecessor the Bulletin for Coastal Area Management and Planning Network (*CAMP*) Network, and that the authors in this issue have written such excellent retrospectives comparing coastal management practices of earlier years with those of the year 2000.

In a way, *CAMP* was modeled after the American Littoral Society's *Underwater Naturalist*; a newsletter that built each issue mainly on subscriber-written articles. This approach seemed ideal except individuals needed to be identified and prompted by the editor to write these articles. *CAMP* would only be a successful newsletter if those who subscribed to read about others' coastal management issues, dilemmas and solutions were willing to share their own coastal experiences. Fortunately, there was a very interested and active subscriber base, thus making soliciting articles less difficult. A problem was that this approach favored those proficient in English. This was overcome by the excellent work over the years by the editors to solicit and edit articles written by authors who did not have English as their first language.

Publishing a newsletter might seem like a great idea, but the communication, editing, printing and mailing takes considerable time and effort, and most of all, it takes money and dedication. These problems were addressed in 1986 when the National Park Service's International Office encouraged me to create and distribute the *CAMP* newsletter free to all who wished to subscribe. Through these efforts, the *CAMP* newsletter became the international medium of communicating among practicing coastal management practitioners. Fortunately, when I left the National Park Service in 1987, though I remained editor until 1990, Mel Goodwin enabled distribution of

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Tracking the Success of a Coastal Management Newsletter

The Bulletin in Coastal Area Management and Planning newsletter (*CAMP* Network) originated in a cooperative program (the Environmental and Natural Resources Expanded Information Base) between the United States Agency for International Development (USAID) and the National Park Service (NPS). It became clear early in the project that interest was accelerating worldwide in the subject of management and planning systems for coastal resources. Thus, in 1986, the National Park Service's International Office undertook this effort, and under the direction of John R. Clark, founded *CAMP* Network; the medium of communication among coastal management practitioners worldwide (see Changing Times, page 1).

CAMP Network began with the goal, "to bring you news of meetings, training sessions, and publications, as well as occasional communications about progress in integrated coastal development, particularly that which leads to sustainable use of renewable resources." It started as a five-page, unbound newsletter reaching a handful of coastal managers interested in sharing their experiences. Its readership quickly grew, and as a result its articles became more diverse. In 1987, John left the NPS, but continued as *CAMP*'s editor. The Sea

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INTERCOAST NETWORK
INTERNATIONAL NEWSLETTER OF COASTAL MANAGEMENT

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

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

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Changing Times

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the newsletter through the Sea Grant program of the University of South Carolina, USA. In 1990, Stephen Olsen and Jens Sorensen of the Coastal Resources Center (CRC), University of Rhode Island, USA facilitated the adoption of *CAMP* (and its 1,200 subscribers from over 117 nations and territories) by CRC, who have continued to publish it to date. To reflect the changing role of the newsletter, in 1991, its name was changed to *InterCoast* Network newsletter).

The idea of Noëlle F. Lewis, the current editor, to do this retrospective issue was appealing because it provides an opportunity for coastal practitioners to reflect on progress during a major period of coastal management transition-the 80s through to 2000. Below I try to capture the highlights from some of the contributing authors who reported on change during the last two decades.

In their article, Alan White and Evelyn Deguit (page 6) reflect on advances in community-based approaches to coastal management from 1987. They conclude that progress has been made but that in countries like the Philippines, the process needs to be scaled up to 'more integrated management of coastal areas' requiring better multiple-sector involvement and community support. The authors also favor a reverse direction to currently popular approaches; that is, they emphasize the need to expand from independent community projects back to integrated nationwide programs.

Alasdair Edwards (director of the M.Sc. program in coastal management at the University of Newcastle upon Tyne) reports (page 24) a major shift in the university's curriculum, from "fundamental science" to "applied problems and solutions," reflecting the growing need for broadly trained coastal managers during the last 13 years. Alastair also mentions a "dramatic change" in training programs provided by the recent upsurge in electronic communication.

Jens Sorensen (page 20) gives a retrospective assessment of the Coastal Zone (CZ) conference series that takes place in the USA biennially (1978-1999). The format of CZ 2001 (page 21) deviates from the earlier conferences, perhaps to catch the interest of the 'baby-boomers.' It appears that music of the 80s is the major theme of the 2001 conference in Cleveland, Ohio, USA.

Sue Wells (page 8), reporting on global coral reef status over the past eight years, indicates that the resource trend is downwards. In spite of intensive efforts at community management, integrative frameworks, capacity building, and so forth, overall health of coral reef resources has declined. Much of the decline comes from external pressures like global warming, tourism, and international trade. Hope seems to lie with increased global awareness of the coral dilemma and more energetic programs for comprehensive conservation programs at the local level.

Jim Kapetsky (page 10) reports that in 12 years, aquaculture/mariculture production has increased by three to four-fold. Oysters, prawns, and seaweed were the major crops. Kapetsky reported in 1988 that lack of information was a major

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Tracking Success
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Grant program of the University of South Carolina, USA,undertook publishing *CAMP*.

In 1990, after four years and eleven newsletters, *CAMP* was transferred to the Coastal Resources Center (CRC) at the University of Rhode Island, USA, under the direction of Stephen Olsen and Jens Sorensen. At that time, there were over 1,200 subscribers in 117 nations and territories. In April 1991 (issue #14), *CAMP* was renamed *InterCoast* Network to better portray its evolution into a newsletter that reached resource managers, government officials and national and international organizations.

Today *InterCoast* is a 36-page, two-color publication. It continues to be published at CRC and is available electronically (http://crc.uri.edu/comm/htmlpubs/ic/index.html). Its current subscriber list is over 2,000; however, certain issues of *InterCoast* have been received by over 4,000 subscribers.

Over the 14 years of its existence, *CAMP/InterCoast*'s subscriber-written approach has allowed hundreds of practitioners interested in coastal management to contribute articles and learn from others' experiences. Contributors have come from all walks of life and written on a wide range of issues. *CAMP/ InterCoast* was able to provide otherwise unavailable information to those interested in coastal resources management. It is important to acknowledge that the dedication of many coastal management practitioners is what has made *InterCoast* the internationally respected newsletter it is today.

Noëlle F. Lewis has been editor of InterCoast since 1997.

Sustaining ICM Initiatives in the Tropics

By Stephen Olsen

The Bulletin for Coastal Area Management and Planning (*CAMP* Network) and its successor *InterCoast* Network newsletter have traced an explosion of interest worldwide in the accelerating change our species is bringing to coastal regions, and the various forms of coastal management that attempt to respond to the impacts. When *CAMP* Network began in 1986, the investments in coastal management in developing tropical countries, where the processes of change are most rapid, were virtually nonexistent. Today, there are hundreds of initiatives, and the investments by international donors, development banks, national governments, and in a few cases, business interests, are in the hundreds of millions of dollars.

In 1997, *InterCoast* newsletter reported on a survey of how those investing in coastal management were evaluating what they got for their money. We found that most evaluation focuses mainly on internal processes of project performance and accountability. Although there was great interest among those surveyed, relatively little was being done to objectively assess what was being learned or what outcomes might be attributed to coastal management initiatives beyond the narrow scope of the places and people directly benefiting from the investments. The survey contributed to framing a 'common methodology for learning' initiative that has subsequently proposed simple frameworks by which initiatives can be grouped according to their scope and to the progress they have made. We have suggested that progress can be organized by grouping activities into the familiar steps in the process by which all public policy evolves and by a sequence of orders of outcomes. The idea is to use simple and elastic frameworks that can accommodate a broad diversity of coastal management initiatives. The steps in the policy cycle are therefore pared down to the essence—step 1, identify and analyze issues; step 2, formulate a plan of action; step 3, formulate commitment to a set of actions; step 4, implement; and step 5, evaluate. We have developed lists of questions to probe each step.

In the past several years, these simple methods have been applied to a number of evaluations of coastal management projects in developing countries sponsored by bilateral donors, development banks, and the Global Environment Facility (GEF) with varying degrees of involvement by national governments, private businesses and nongovernmental organizations. These have provided a diversity of settings to sort out what the project designs hoped to achieve, and what was achieved in a project cycle that typically

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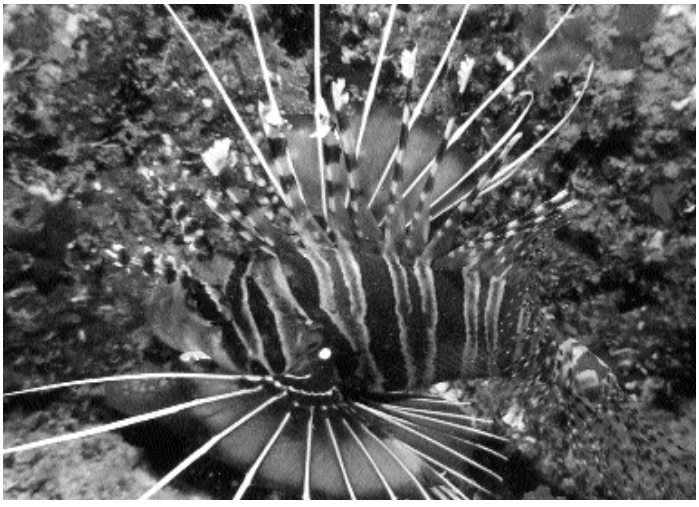
Fisheries Management and Marine Protected Areas–A 2000 Perspective

By Richard Kenchington

The pioneer marine protected areas (MPAs)–Fort Jefferson National Monument in Florida, USA, in 1934 and Green Island and reef in Queensland, Australia, in 1937–reflected a need for specific site protection rather than a reflection of the need to protect an ecological system. Despite a history dating to the 1930s, most of the development on the idea of systematic protection of marine ecosystems has occurred in recent decades. The World Congress on National Parks, in 1962, was one of the first international conservation meetings to address this from the conservation perspective.

Despite its history, the concept of MPAs was still quite novel in 1988 (*CAMP* Network, June 1988, "Fisheries Management and Marine Protected Areas"). Since that time, the concept has developed with two main roles and objectives. The first, most familiar from the terrestrial national park precedents, is that of strict protection of examples of ecosystems and their biological diversity as refuges, reference sites and remnants of a natural heritage otherwise displaced by human activities or vulnerable to such displacement. The second has a broader role as an essential and active component of integrated management for conservation and sustainable use of marine environments and natural resources. This second role can be particularly important in the quest for demonstrably sustainable fisheries management which has more significance as a result of the acknowledged collapse of many fisheries in the past two decades. Fisheries managers are moving beyond a traditional focus on stocks and methods to give consideration of measures to protect the ecosystems which sustain fisheries.



Reef fish

Issues of Scale and Linkage

Development of the marine protection concept must reflect the scale and linkage of ecosystems. A planktonic larva, or anything else, drifting for a month in the water column at 1 knot will travel more than 1,000 kilometers. The biological communities of a defined site on the seabed and in the water column above it have generally originated from far away. Those communities are likely to be routinely affected by biological, chemical and physical factors occurring well outside their boundaries. In turn, they may contribute through larval supply to the recruitment of species at other distant sites.

The scale and linkage of marine ecosystems mean that it is generally difficult to address their conservation within usual frameworks of jurisdictional and sectoral separation of responsibilities that have served reasonably well for terrestrial situations.

The issue here is that the concept of a protected area that can be managed in effective isolation from activities in surrounding areas is not ecologically tenable. The ecosystem processes lead to the concept of a network of protected areas that are part of a broader approach to sustainable management. This requires a more holistic approach to planning and management, a defined framework in which users and sectoral managers work together rather than compete with or ignore each other. This requires deliberate attention to addressing the ecological, social, and economic considerations simultaneously.

Issues of Culture

Culturally, the sea has been about ships, fish, and fishing. Management of the sea has customarily been the management of shipping and fishing with limited interaction between the two and virtually no need to consider other activities and interests.

Almost all human coastal and marine cultures have developed with the concept of the 'boundless' or 'mighty' ocean, capable of providing forever because there are always 'plenty more fish in the sea.' There is also the concept of the sea as receiver of wastes; what we add is 'just a drop in the ocean,' and the

ocean is the great sink for what we would prefer to be 'out of sight and out of mind.'

For much of the maritime world, the resources of the sea are common to all. The right to go fishing in the sea is often a deeply held element of the freedom of the individual. While there are many long traditions of fishing restriction, they relate largely to protecting a local community resource from local over-use or from incursions by outsiders. These restrictions did not displace the concept of an undamageable ocean, but their purpose was a local, social, and economic imperative from times before the capacity to travel long distances and to take and preserve catches.

Tradition flowing from Roman law assigns the sea and its products as common property, available to all. For those with skill, determination, ingenuity, and bravery, the seas were the source of wealth and the foundation of fortunes. However, there is now a general acceptance of the need to manage, but a spectrum of views on how to manage. The need is for a holistic approach within which there are strictly protected areas and also clear rights, guidelines, and performance criteria. This is to ensure uses are sustainable and the privilege of access is matched by the responsibility of demonstrating sustainability. In effect, this reverses the old burden-of-proof from 'no restriction without demonstrated damage' to 'no continuing access without demonstrated sustainability.'

There cannot be effective management without serious involvement of all sectors through a framework of clearly defined roles and mutual understanding and acceptance of roles and responsibilities. This does not sit easily with many of the traditions of business and governance which flow from the concepts that 'good fences make good neighbors', and within your fence or area of responsibility, you look after your own business. The need for an inclusive approach is further complicated by the importance of land/sea effects and the long range of ocean currents. Multisectoral management must have the capacity to reach collaborative arrangements across internal land/sea boundaries, and more generally, with neighboring jurisdictions.

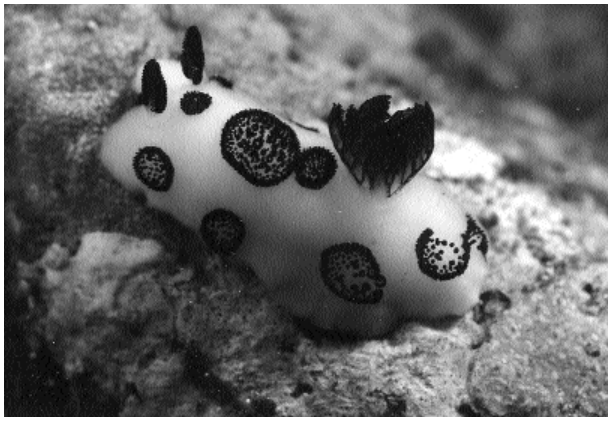
Multi-Use Management

There now seems to be general acceptance that management of uses and the creation of protected areas are the elements necessary for sustainable use of marine environments. Conceptually, the means should be a series of uses managed within plans and performance criteria, and a system for allocating uses to areas which minimizes conflict. This then establishes an assured basis for sustainability and provides a system of representative protected areas. The issue is how to create an effective management system.

Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park (GBRMP) was the first attempt to address the scale and complexity of marine ecosystem and resource use involving multiple use management at the scale of an ecosystem. Its establishment resulted in a protected ecosystem some 350,000 square kilometers. The GBRMP's underlying framework is provided by a system of zoning that was put in place in 1988. This framework identifies the purposes for which each part of the marine park may be used or entered.

Conservation or preservation of sites is addressed by categorized zones that cover some 5 percent of the total park area. There is currently a review program that will ensure there are viable representative examples of all ecosystems in the Great Barrier Reef. These areas will be highly protected.



Sea Slug

Multiple use is addressed by a number of defined zones which cover about 80 percent of the marine park and provide for a broad range of activities including trawl fishing.

The GBRMP plans and regulations provide a strategic framework within which activities must occur on a sustainable basis. The Great Barrier Reef is also a World Heritage Area, giving Australia the international obligations to protect its outstanding natural heritage. Within that framework, management plans are required for fisheries, and environmental impact assessments are required for other activities. Subject to those requirements, and subject to the defined limitations of the marine park zoning plans and regulations, management activi-

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Philippine Community-Based Coastal Management: Evolution and Challenges

By Alan T. White and Evelyn Deguit

More than 10 years ago in an article for *CAMP* Network, August 1987, "Why Public Participation is Important for Marine Protected Areas," I wrote about the virtues of community education and participation as the basis for successful coastal resource management (CRM). I stated: "Education and good examples (pilot projects) can show and remind people what is possible in terms of sustainable use and the value of coastal resources. But education is not participation. Participation comes from wanting to support common values to gain some real or perceived benefit for the individual and community. Without it, marine resources can never be conserved and sustained because 'enforcement' of laws in such a commons is not practicable. When people decide to 'participate,' they as resource users will make the real difference in resource area management… Once resource users decide to participate and receive the associated benefits, the process will perpetuate itself."

This is still true, but our perspective on what constitutes 'community-based' CRM has evolved to include more than the hope that communities, once educated and empowered, will accomplish the task alone. Both our understanding of the situation and the legal and institutional context have changed since the 1980s in the Philippines.

Generally, the Philippine's 18,000 km of coastline are under siege from a variety of activities and impacts which are eroding the natural resource base and the area's potential for future sustainable use. The lack of control of almost all development in the coastal zone is symptomatic and indicative of what is to come if much stronger and more effective institutions and procedures for integrated coastal management (ICM) are not put into place in the near future. The challenges of coastal management are of such magnitude that Philippine institutions are beginning to respond with more concern and integrated approaches than in the past. But, the path ahead is still not well defined.

An important question is whether the current, community-based approaches can be successful in stemming the tide of resource degradation and increasing poverty in coastal areas. The Philippines is often looked to for models in 'community-based coastal management' where many well-designed and successful projects exist or have accomplished their objectives. Yet, given this outwardly positive trend as often voiced in the literature or suggested by the organizations responsible for successful projects, what are the real trends and what will be needed to scale-up community-based efforts to more integrated management of coastal areas in the country?

Evolution of Coastal Management in the Philippines

In recent years, the development of coastal management in the Philippines has been influenced by two major forces. The first is a series of donor-assisted projects that have provided a number of large experiments in CRM, or now referred to as ICM. The second major influence is the devolution of authority to the local governments (municipal and provincial).

The challenge created by the devolution of coastal management responsibility is that few coastal municipal governments in the country have the capacity to manage their natural resources. They generally lack trained personnel, budget, and technical knowledge. In spite of these limitations, the motivation among municipal governments to manage their resources is increasing rapidly as they realize the seriousness of the problem, and what they stand to lose if no action is taken. Thus, the opportunity to improve ICM in the country is tremendous given the 832 coastal municipalities bordering the extensive coastline. Yet, the realized gains in coastal resource management are small.

A key lesson generated by coastal management projects to date is that it is extremely difficult to plan and implement successful ICM programs without a multi-sector approach that has sufficient support from the government and its partners, and a strong level of acceptance among the resource dependent communities. It is still difficult to claim success for ICM in any of the major projects except at a very localized level where the geographic scope is small and the number of stakeholders limited. How can these successes be scaled up?

New Directions for Coastal Management

Past experience in the Philippines shows that an essential element of successful coastal management is active participation by the entire community. This includes day-to-day resource users such as fishers and other local stakeholders. At the same time, while community-based ICM has come a long way since its birth among small, fairly isolated islands, community-based interventions alone have not solved critical ICM problems. With the passage of the Local Government Code in 1991 and the 1998 Fisheries Code, the responsibility for managing municipal waters and the resources therein has largely devolved to the local government level. With these realities in mind, current trends and new paradigms in coastal management in the Philippines include:

- ICM replacing fisheries development and habitat management approaches of the past
- Local government units assuming responsibility and allocating resources to manage municipal waters and resources
- A redefined role of national government agencies to provide technical assistance to local government in ICM and to influence policy formulation, modification and clarification
- Multi-sector collaboration becoming essential to solve complex ICM problems

Key activities presently seen as essential for success at the community and local government level include:

- Participatory coastal resource assessments
- Participatory and ICM planning
- Economic development for resource users through environment friendly enterpries
- Implementation of limited access regimes such as marine sanctuaries
- Formation and strengthening of CRM organizations
- Training in skills relevant for ICM planning and implementation
- Local government units allocating budget for ICM
- Legal instruments required for effective support of ICM
- Policy analysis and formulation
- Participatory monitoring and evaluation

One important difference from the past is these key activities must be fully integrated with local municipal, city and provincial governments. National agencies have an important supportive role to play, but no longer have the full responsibility for environmental management as in the past. This changes their orientation.

Challenges Ahead

Several themes that will most likely permeate coastal management discussions in the Philippines and in other tropical developing countries are suggested below. Future ICM projects need to incorporate more efforts to address these concerns.

Expanding from community level to nationwide projects There will increasingly be questions about how this can be done, particularly in relation to national policy frameworks for support. Scale of effort and geographic extent of projects are concerns that need more analysis in relation to government capacity to govern and their redefined roles.

Building local government capacity in meaningful ways This follows again from national policy and how local governments support localized ICM efforts. A key may be how to build more local leadership with emphasis on technical skills. Obtaining increased environmental budgets needs exploring.

Developing a broader environmental management framework A link between watershed management, waste management and other pollution problems with ICM is becoming critical in many areas.

Developing databases that work and are practical to maintain Measuring success and returns in any form requires keeping track of certain data over time. Databases and how to make all kinds of information systems work in the context of ICM for measuring change over time is essential.

Measuring changes in environmental quality Environmental parameters need to be better understood in the context of community management and monitored both for the measurement of success in the program and as an incentive for local participation to continue and increase.

Designing institutional arrangements with local and national government The reality emerging in the Philippines is that collaborative management is the only means to sustainability of community institutions. Institutional arrangements that include municipalities, national agencies, nongovernment organizations, academia and others are becoming the norm and needs further refinement and more working models.

Linking population programs to natural resources management This is needed to highlight the

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Emerging Trends in Reef Management: Eastern Africa

By Sue Wells

In 1992 I was asked to write an article for *InterCoast* #17 on 'successful' coral reef management programs. I remember grappling with the topic and asking myself: What do we mean by 'successful' coral reef management? Are there any coral reef management programs that have been running long enough, or that have been well enough documented, to judge them successful? Being asked eight years later to contribute an article on this issue, I reread my earlier article and discovered very little has changed. What were perceived as potential ingredients for success then, differ little from those being promoted today. These include:

- Involving local communities in decisionmaking and management
- Ensuring appropriate livelihoods for those immediately dependent on reefs for their income
- Developing integrated coastal management frameworks for coral reef management
- Involving the tourism and dive industries
- Identifying mechanisms for sustainable financing
- Promoting training and capacity building
- Establishing long-term monitoring programs

If the priority ingredients for success remain much the same, other things have changed. Most depressingly, the overall health of reefs at a global scale has declined, largely as a result of the extensive bleaching events that occurred in different parts of the world, particularly in the latter part of the 1990s. Recent reports have shown that in some countries reefs have suffered severe coral mortality, although there are places where good coral recovery and new recruitment is underway. This has shown that reef health depends on factors that go far beyond individual management efforts, and that apply in all parts of the world. It is clear that individuals and activities in developed countries far from these tropical ecosystems have an impact through global warming, consumption, trade, tourism and a host of other issues.

The rapid decline of reef health triggered a major response at international and national levels. In 1995 this included the launch of the International Coral Reef Initiative (ICRI) with its Call to Action. ICRI has become increasingly active over the last few years, developing a Renewed Call to Action at the International Tropical Marine Ecosystem Management Symposium (ITMEMS) in 1998. The International Year of the Reef in 1997, followed by the International Year of the Oceans in 1998, drew much needed public attention to the plight of reefs and resulted in many initiatives at local, national and international levels for their conservation. Numerous monitoring and assessment programs have been set up at national, regional and global levels to increase our knowledge on reef status. The Global Coral Reef Monitoring Network (GCRMN) is now in operation in several regions; Reef Check, the community-based component of GCRMN has increasing participation in its annual global assessment; and ReefBase (the global reef database program), the United Nations Environmental Programme World Conservation Monitoring Centre and other agencies, have continued their programs to gather information. These initiatives have contributed to a better understanding of the global picture.

As a result, coral reefs are now on the agenda of global conventions including the Convention on Biological Diversity and the Ramsar Convention (Convention on Wetlands of International Importance), and have been brought to the attention of other major international fora such as the Commission on Sustainable Development. The spring 1999 issue of *InterCoast* on coral reefs elaborated on many of these initiatives. This issue also provided good examples of the new approaches and innovative mechanisms for reef management now underway. Just as the theme advisor of that issue (#34), Lynne Hale, said in her article *Optimism or Pessimism? The Future of Coral Reefs*, I am also unsure whether to feel optimistic or pessimistic about the future of coral reefs.

Perhaps it would be useful to reflect on some of the new trends in reef management that are emerging, illustrating them with some of the initiatives underway in Eastern Africa and the Western Indian Ocean.

Tackling Root Causes

There is now a better understanding of the importance of

careful identification of the social, political and economic issues that lead to reef degradation and of the changes required that will lead to reef recovery and sustainable use. It is recognized that managing reefs is in reality about managing people and promoting behavioural changes that benefit, rather than negatively impact, reefs. To promote this, a training workshop on socioeconomic assessment is being organized in the Eastern Africa region. At Diani, an area of the Kenya coast south of Mombasa, where management of the reef has been an issue of conflict for many years, a new approach is being developed starting with an in-depth analysis of the social, economic and cultural issues. It is hoped that this study, carried out by the Coast Development Authority and facilitated by The World Conservation Union (IUCN), will lead to a management model that will be fully participatory and more solution oriented.

Increasingly, initiatives that started primarily as 'biodiversity conservation' interventions, such as establishing a marine protected area (MPA), are evolving into collaborative efforts by all the stakeholders to develop mutually beneficial programs. Coral reef management is being seen much more 'as a way of life,' rather than just as a series of short-term projects. At the same time, it is still difficult to make sure that communities dependent on reefs have the quality of life and assured livelihoods they need.

Involving fishers directly in reef management is invaluable. As data continues to accumulate showing the benefit of closing reefs to fishing, fishing villages themselves are taking the initiative to designate such areas. In the Tanga Region of Tanzania, fishing communities are now developing their own fisheries management plans, which include reef closures among other measures. Similarly, in the Comores, a proposed zoning scheme for the collaboratively-managed marine park, each village involved has designated a no-fishing zone. The role of other 'alternative' or 'supplemental' livelihoods, such as seaweed farming, handicrafts and ecotourism (both being promoted extensively in the East African region) in reducing pressure on reefs is less well understood, and further analysis of these activities is needed.

Confiscated dynamite

Sustainable Financing

The economics of coral reef management is being given more attention. Efforts to put monetary values on reefs and their uses (such as fisheries and tourism) are helping to convince decisionmakers, planners and politicians of the role of healthy reefs in the sustainable development of a country. The Coral Reef Degradation in the Indian Ocean (CORDIO) program has been looking at the socioeconomic impact of the bleaching event in countries such as the Seychelles and Maldives.

Equally important is the need to find mechanisms to ensure the financial sustainability of reef management. In Eastern Africa, as in many regions, decreases in donor funding, revenue from tourism, and government subventions are meaning that income for MPAs and other forms of coastal management are declining. For example, in both Kenya and Seychelles, declining numbers of visitors to MPAs have resulted in a decrease in income from entrance fees. Various solutions are being proposed to remedy this, and efforts are now underway to test them. In Kenya, where entrance fees to MPAs provide a large proportion of the management agency–Kenya Wildlife Service–funding for, the centralized approach to management and the lack of resources has had noticeable negative effect on effective management. In the Comores, plans are underway to establish an Environmental Trust Fund to provide support for management of the new marine park. In Tanga, where tourism is not yet sufficiently developed to provide funding for reef management, methods to improve revenue from fishing are being developed. A forthcoming review of sustainable financing activities for coastal management in the Eastern African region, sponsored by the Secretariat for Eastern Africa Coastal Area Management (SEA-

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Aquaculture Planning: Information Management Using GIS–Then and Now

By James M. Kapetsky

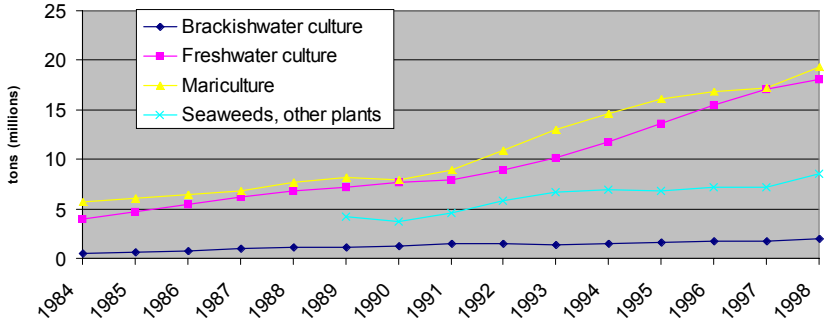
For the June 1988 issue of *CAMP* Network, I wrote a short article entitled "Planning for Aquaculture: Information Management" about using Geographic Information System (GIS) and remote sensing to fill information gaps. The final paragraph stated that "The significance of this approach to coastal area planning and management is clear: better all-around allocation of coastal lands and waters through incorporation of aquaculture to coastal areas where most appropriate, and consequent lessening of competition and friction with other users; improved success in aquaculture by comprehensive matching of aquaculture technologies with the natural environmental, human and financial resources."

This follow-up article has two purposes, one is to show, in brief overview, how aquaculture has changed in quantitative terms, from 1984 to 1998 (the data set available). Coincidentally, that period spans the history of GIS applications in aquaculture and corresponds well with the period since my article was written 12 years ago. Thus, the second purpose of this article is to show how GIS applications in aquaculture have evolved over the same period.

The Evolution of Aquaculture

From 1984-1998 brackish water aquaculture production of animals has increased 3.4 fold, mariculture 3.5 fold and inland culture 4.6 fold. Production of seaweeds and other plants has increased two fold over a lesser period, from 1989-1998. Production of aquacultured animals from inland areas is approximately equal to mariculture, but brackish water aquaculture is much less important (Figure 1). In production, the Pacific cupped oyster was the top maricultured species in 1998, the giant tiger prawn was the top species cultured in brackish water and the top cultured seaweed was the Japanese kelp. Aquaculture animal production and value are greatly skewed among continental areas with Asia, by far, the most important continent (Figure 2).

Figure 1. Evolution of aquaculture of animals by environment, and of seaweeds and other plants



The Evolution of GIS Applications in Aquaculture

My 1988 article was written with a rather narrow focus: overcoming constraints on aquaculture development from a developing country's perspective. My perception was that the lack of information on aquaculture potential was one of the basic constraints on planning for development. My belief was that GIS and remote sensing could go a long way towards filling the information gap. I still hold that belief, but now it is the sustainability of aquaculture that is the fundamental issue. It is an issue that takes in both development and management in the context of other uses of land and water. The sustainability of aquaculture encompasses many other related issues that have spatial elements. It is these that open the door for a broad spectrum of applications of GIS.

A Survey of GIS Applications in Aquaculture

The information used in this article was compiled for a book chapter on GIS applications in aquaculture. The compilation is based on a recent survey, from a global perspective, of Aquatic Sciences and Fisheries Abstracts' searches of websites and my own collection of materials in print and as electronic files. There are 102 examples of GIS applications in aquaculture that I have categorized as shown in Table 1.

Survey Results

The findings include:

- GIS applications in aquaculture date only from 1985
- The great majority of GIS applications were aimed at coastal aquaculture, while nearly all of the remainder were for inland areas. Only one application was offshore.

■Geographical gaps are evident in the patchiness of GIS applications within large countries, and also among countries, regions and continents. Two examples suffice: 1) although the largest number of GIS applications in aquaculture is in the USA, only 14 of 50 states are represented, and 2) although about 83 percent of aquaculture production and 91 percent of aquaculture value come from Asia, only about 20 percent of the GIS applications cover that continental area.

■GIS aimed at aquaculture development is relatively well covered (Table 1), and it is encouraging that there are studies in the important area of anticipating the consequences of aquaculture. In the realm of GIS applications in culture practice and management, apparently little attention has been given to the environmental impacts of aquaculture. This is surprising because of the widespread concern for this matter. There are a relatively small number of GIS applications in the category 'Planning for aquaculture among other uses of land and water.' I set this category apart to emphasize that the future development of aquaculture will follow a much smoother path if the requirements and consequences of its development become more widely known, particularly, if aquaculture is integrated into multi-sector development and management plans. Along contrasting lines, it is encouraging to see that GIS is being employed to gauge uses of land and water other than for aquaculture while planning for aquaculture development.

Table 1. Categories and numbers of GIS applications in aquaculture

GIS Training and Promotion
- ■Training (7)
- ■Promotion of GIS (13)

GIS Aimed at Development
- ■Suitability of the site (16)
- ■Strategic planning for aquaculture development (20)
- ■Anticipating the consequences of aquaculture (8)
- ■Web-based aquaculture information systems (1)
- ■Marketing (1)

GIS in Culture Practice and Management
- ■Inventory and monitoring of aquaculture and the environment (24)
- ■Environmental impacts of aquaculture (2)
- ■Restoration of aquaculture habitats (1)

Multi-Sectoral Planning that Includes Aquaculture
- ■Management of aquaculture together with fisheries (3)
- ■Planning for aquaculture among other uses of land and water (6)

Conclusions

Considering the vital role that GIS might play in providing comprehensive information for planning for the development and management of aquaculture, the potential of GIS is as yet largely unrealized as indicated by the remarkably few applications in evidence.

Use of GIS in aquaculture can expand, if technical personnel take it upon themselves to ensure that mid- and upper-level managers are made aware of the potential benefits of GIS.

There is great potential for GIS to more broadly take into account competing uses of land and water in the context of planning for the development and management of aquaculture. Likewise, the aquaculture sector can be better represented in multi-sectoral planning. But, its needs for land and water, and the consequences of aquaculture (both the positive and the negative: environmental, economic and social) must be better qualified, quantified and communicated more widely. GIS is one of the tools to achieve this end.

[Until last year, Dr. Kapetsky was with the United Nations Food and Agriculture Organization, Inland Water Resources and Aquaculture Service, Rome, Italy.]

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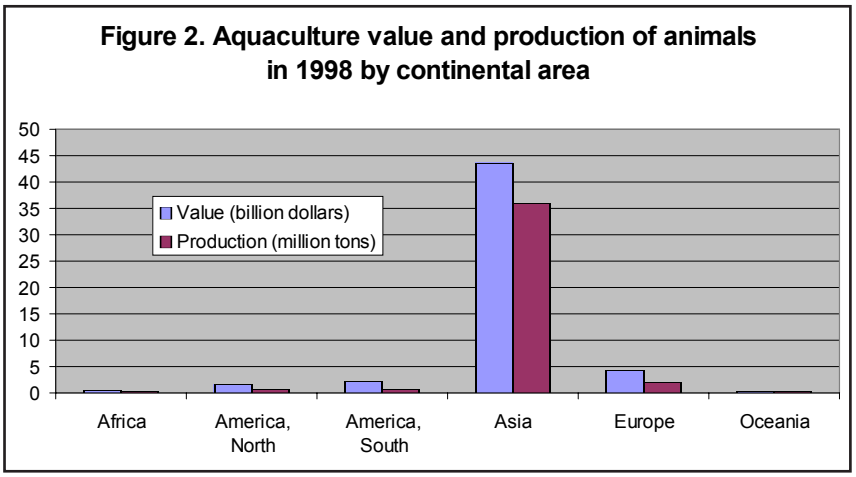
Figure 2. Aquaculture value and production of animals in 1998 by continental area



1988 to 2000

Redefining Tropical Coastal Wetlands

By Peter Bacon

In the article "Fitting Wetlands Conservation into Integrated CAMP Programs" in *CAMP* Network, June 1988, I wrote that coastal wetland conservation in tropical countries was hindered because there was widespread disagreement about what a wetland was, and that this resulted in ill defined managerial responsibility for wetland ecosystems at the land/sea interface.

At that time, at least in the Latin America and Caribbean Region with which I was familiar, most people thought that 'tropical coastal wetland' meant a stand of mangrove plants. Consequently, these tended to be managed by a government forestry or conservation department independently from management of the seacoast, estuary or lagoon beside which they grew; without any obvious need for integration in coastal zone planning.

Furthermore, because of the low diversity and simple zonation/distribution pattern of mangrove species in the tropical Americas, the idea of a general uniformity in coastal wetlands was widespread. To some extent this hindered research because it was thought that once we knew something about a mangrove community in Puerto Rico, for example, the same must apply to one in Colombia or Barbuda. Thus, there was a somewhat generic approach to mangrove management that had highlighted mangrove ecosystem diversity–despite the extensive work of V.J. Chapman, of Bruce Thom in Mexico, and Derek Scott and Montserrat Carbonnel throughout Latin America.

An understanding of mangrove site differences came gradually as national coastal wetland inventories were improved in the early 1990s. The methodological approaches of the US National Wetland Inventory, the International Waterfowl & Wetlands Bureau, the Tropical Forestry Action Plan, and the Ramsar International Wetlands Convention Bureau were all instrumental in this regard. However, it took a long time for both researchers and managers to realize that coastal wetlands (still narrowly defined as mangroves and salt marshes) are components of larger system units; and that site differences related to the environmental context in which the wetland had developed.

Through coastal management and planning programs and a number of national initiatives, wetland conservation has been seen increasingly in the context of larger management units, such as river basins, natural areas or coastal complexes. Recognition of the place of wetlands within geomorphological units has provided a new understanding and new linkages, but has not always led to better or more integrated management.

Considerable problems have been experienced for a long time, and continue to be experienced, when tropical coastal wetland conservation comes into conflict with development plans. Despite all the coastal management and planning programs and integrated coastal zone management, there is still a net loss of mangroves and tropical salt marshes worldwide, including throughout the Americas and in the Insular Caribbean in particular. Coastal wetlands, even when defined as components of larger geographical units, are readily replaced by port, urban, tourism and residential developments because of their perceived low economic value. Government agencies and developers are often not impressed by generic arguments that mangroves are important (say for fish nursery or wildlife habitat) when many mangrove sites obviously are not. If one could demonstrate more clearly that it is the integration of coastal wetlands into broader systems that supports overall resource production, rather than their site values in isolation, the economic equations would be quite different.

In this regard, the Ramsar Wetlands Bureau has greatly advanced tropical wetland conservation by broadening the definition of coastal wetland and giving emphasis to fully utilizing

Coastline of Xcalak, Mexico

wetland resources and values. Perhaps of greatest significance in this regard was the inclusion in the definition 'areas of marine waters the depth of which at low tide does not exceed six meters' (Article 1.1., Ramsar Convention). The significance of this does not appear to have been fully appreciated until the 1996 Meeting of the Conference of Contracting Parties to the Convention in Brisbane, Australia. Here the conference recommended that the Convention Bureau foster "conservation and wise use of coral reefs and associated ecosystems as a component of an integrated strategy of worldwide wetland conservation."

This put the major types of tropical nearshore ecosystems (mangroves, seagrass beds and coral reefs) in a new light, as they could now be managed as functional links in a coastal wetland complex. This was not a new idea, but it had serious and exciting implications for coastal planning.

In the Caribbean Region, the need to research relationships between these wetland components generated the Caribbean Coastal Marine Productivity (CARICOMP) program for which sampling stations were established where coral reefs, seagrass beds and mangroves are in close geographical association. CARICOMP has greatly enhanced our understanding of site differences and of ecosystem processes; and future research will clarify and quantify functional linkages. The program increasingly confirms that these units form part of a mutually supportive coastal wetland complex. This new understanding needs to be incorporated into both coastal wetland valuation and management planning.

An experience in Queensland, Australia, is of interest here. Eric Wolanski and Norman Duke's article in the LOICZ (Land-Ocean Interactions in the Coastal Zone) Newsletter (March 14, 2000) reports that loss of mangroves around Cairns has been linked to increased sedimentation and turbidity on the Great Barrier Reef, one of Australia's most valuable natural features, thus illustrating the former values of those coastal mangroves. That major mangrove-lagoon-barrier reef wetland system is being viewed increasingly as a functional unit for management purposes.

Admittedly, some confusion has occurred among wetland managers with the inclusion of coral reefs as 'wetlands.' However, coral reefs, though well researched, suffered from a lack of protective legislation and management. There was no international convention for their protection. When more fully applied, the Ramsar Convention will correct this deficiency and lead to better management, probably more effectively than the Coral Reef Initiative. The Ramsar Convention is effective because it has been very determined about acknowledging government responsibility for conservation and in developing government agency commitment and capability. The Ramsar conservation and management methodology (involving definition of 'ecological character' and 'change in ecological character'); use of its Montreux Record of sites under stress; and the 'wise use' concept has tremendous potential if properly applied to tropical coastal ecosystem management.

House on stilts

The Ramsar Bureau has also been successful in moving wetland conservation away from descriptive geographical study to maximizing benefits. Their 'wise use' management approach has directed attention to those features that determine a system's usefulness in the functional/resource sense. The inclusion of reefs, seagrass beds and other coastal ecosystems under the wetland umbrella will help to get this across, especially where reefs are associated with mangroves of importance in fish nursery, nutrient exchanges and water quality maintenance.

Although considerable progress has been made since 1988, the nature of the ecological integration within coastal wetland complexes must be better researched and publicized before integrated management can become a reality.

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The MEDCOAST Project: 1993 to 2000

By Erdal Özhan

In 1994, *InterCoast* #20 reported on the First International Conference on the Mediterranean Coastal Environment, MEDCOAST 93, 2-5 November 1993, Antalya, Turkey. The MEDCOAST initiative has grown; however, MEDCOAST's three major initiatives today are the same as those in 1993:

- Development of a scientific meeting series
- Development of human resources (conferences, training programs, networking)
- Collaborated research and demonstration projects at the regional scale

Its goal is to enhance the integrated coastal and marine management and conservation in the Mediterranean and the Black Sea countries.

Over the period of eight years, MEDCOAST organized four conferences in its well-established series: International Conference on the Mediterranean Coastal Environment (Antalya, Turkey, 1993; Tarragona, Spain, 1995; Qawra, Malta, 1997; Antalya, Turkey, 1999). The fourth event, MEDCOAST 99, was a special occasion, as it was organized jointly with the Fourth International Conference on Environmental Management of Enclosed Coastal Seas (EMECS 99). The theme was Land-Ocean Interactions: Managing Coastal Ecosystems. The fifth event is planned to be in Hamammet, Tunisia, in November 2001.

Additionally, MEDCOAST organized an important international workshop on Integrated Coastal Zone Management in the Mediterranean & the Black Sea: Immediate Needs for Research, Education-Training and Implementation in Sarigerme, Turkey, 2-5 November 1996. This was in cooperation with Mediterranean Action Plan/Priority Action Programs Regional Activity Centre of United Nations Environment Programme (UNEP), and the Global Environmental Facility (GEF) Black Sea Environmental Program. Finally, a conference on Wind and Wave Climate of the Mediterranean and the Black Sea, 30 March-2 April 1999, Antalya, Turkey, took place with the support of the TU-WAVES project of the NATO Science for Stability Program (an effort to understand the wind and wave climate affecting the Black Sea basin and other Turkish coasts).

These scientific meetings produced 12 volumes of proceedings (over 8,000 pages), focusing on the coastal and sea environment of the Mediterranean and the Black Sea. Additionally, special MEDCOAST volumes of two leading international journals, *Ocean and Coastal Management* and *Journal of Coastal Conservation*, were published by utilizing selected papers from the MEDCOAST conferences.

MEDCOAST's training programs include five events of the three-week MEDCOAST Institutes ('94, '95, '96, '98 and '99) and a two-day short course prior to the MEDCOAST '95 conference on the topic of Integrated Coastal Management in the Mediterranean and the Black Sea. Additionally, in 1995 MEDCOAST started a one-week training program on Beach Management in the Mediterranean, and organized five successful events in 1995, 1996, 1997, 1999 and 2000. Eleven international training programs (1993 to 2000) produced nearly 250 MEDCOAST alumni from 34 countries, some playing leading roles in their countries in international programs or projects for developing coastal management.

The third dimension of the MEDCOAST initiative is collaborative research at the regional level on the coastal and sea environment of the Mediterranean and the Black Sea and on management issues in this region. This is done by involving the network institutions in cooperation with the third parties. Two research projects are already in progress, one on beach management and one on the wind and wave climate of the Black Sea. The Middle East Technical University has led these comprehensive projects; generously sponsored by the Science for Stability Program of NATO and seven institutions from four Black Sea countries. MEDCOAST's activities are run by several key people from 15 Euro-Mediterranean institutions, forming the MEDCOAST network.

Over the last eight years since its birth, MEDCOAST has made significant, measurable contributions to integrated coastal management in the Mediterranean and the Black Sea by being instrumental in the production and dissemination of scientific and professional information, and by developing human resources over both basins. These have enhanced national and international efforts for

(continued page 28)

The Mangrove Action Project (MAP): 1992 to 2000

By Alfredo Quarto

In 1994, *InterCoast* #21 reported on the Mangrove Action Project (MAP), an international coalition consisting of environmental, human rights, and community-based groups dedicated to protecting mangroves and the communities affected by their distruction. Today, MAP is making great strides in raising awareness and appreciation of the mangrove ecosystem. MAP aims to empower the people who must decide to conserve and sustainably manage their coastal forest areas.

Mangrove forests are one of the most productive and biodiverse wetlands on earth; yet, these are among the most threatened habitats in the world. Mangrove forests may be disappearing more quickly than inland tropical rainforests, and so far, with little public notice. Growing in the intertidal areas and estuary mouths between land and sea, mangroves provide critical marine and terrestrial habitat. In addition, mangrove forests fix more carbon dioxide per unit area than phytoplankton in tropical oceans. Healthy mangrove forests are key to a healthy marine ecology. However, in many areas mangrove deforestation is contributing to fisheries declines, degradation of clean water supplies, salinization of coastal soils, erosion, and land subsidence.

Mangrove forests once covered three-quarters of the coastlines of tropical and sub-tropical countries. Today, less than 50 percent remain. Many factors contribute to mangrove loss, these include the charcoal and timber industries, urbanization, and pollution. However, in the past decade one of the most significant causes of mangrove forest loss has been the consumer demand for luxury shrimp (prawns) and the corresponding expansion of destructive methods of export-oriented shrimp aquaculture. To satisfy demand, vast tracts of mangrove forests have been cleared to develop coastal shrimp farm facilities. The failure of national governments to adequately regulate the shrimp industry, and the headlong rush of multilateral lending agencies to fund aquaculture development without meeting their own stated ecological and social criteria, are also important pieces to this unfortunate puzzle.

The great monetary earnings of shrimp culture are short lived, while the real costs in terms of consequent environmental ruin and social disruption are long term and astronomical! While the immediate profits from shrimp farming may satisfy a few, vast numbers of coastal residents once dependent on healthy coastal ecosystems for fishing and farming are being displaced and impoverished.

MAP is dedicated to reversing the degradation of mangrove forest ecosystems worldwide. Its central tenet is to promote the rights of local coastal peoples, including fishers and farmers, in the sustainable management of coastal environments. MAP provides four essential services to grassroots associations and other proponents of mangrove conservation:

1) It coordinates a unique international nongovernmental organization (NGO) network and information clearinghouse on mangrove forests

2) It promotes public awareness of mangrove forest issues

3) It develops technical and financial support for NGO projects

4) It helps publicize within the developed nations the basic needs and struggles of Third World coastal fishing and farming communities affected by the consumer demands of the wealthy nations. (This is done through a quarterly newsletter, action alerts, and published articles, as well as planned public forums and presentations.)

MAP's international network has grown to include over 400 NGOs and over 250 scientists and academics from 60 nations.

Mangrove cutting in Tanzania

MAP has effectively used the internet to establish international links and action-oriented plans (http://www.earthisland.org/map/map.html). Through its wide network,

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A Platform for Action: Sustainable Management of Mangroves, Gulf of Fonseca, Central America

By Manuel Benítez, Guadalupe Duron, Maritza Erazo, Sarah Gammage and Melany Machado

Few areas illustrate the interaction between population pressure, resource consumption and environmental degradation more acutely than coastal ecosystems. Fragile and rich in resources, mangrove coastal ecosystems are valuable for the raw materials they provide and their biodiversity. This ecosystem supports a wide range of individuals and groups with competing interests.

The tension between resource consumption and conservation is highlighted in conflicts over access rights. The formal access rights lie largely in the hands of the state. Throughout the world, coastal lands and estuaries, and the rights to their resources, are in the hands of sovereign governments that provide concessions for economic activities to a variety of groups and individuals. Despite these formal rights structures, many customary and indigenous access rights systems have evolved. Typically, while the land may belong to the state, much of it has been subject to *de facto* management by coastal populations. Far away from national capitals, local populations exercise ownership rights over the lands their families have inhabited for generations.

Salt production in Honduras

The conflict between converting mangrove to aquaculture activities and the subsistence demands of coastal populations is a clear example of the collision of customary and state access rights. Aquaculture is a growth industry in the developing world. The cultivation of fish and shrimp in tanks or excavated ponds yields high returns and commands much-needed foreign exchange. Consequently, there are state and private enterprise incentives to convert the mangroves to aquaculture. Yet, locating these tanks and ponds in the mangrove wetlands has deforested valuable woodland, concentrating dependence on the few remaining stands.

Concern about conflict over resource management in Central America led a variety of groups to explore how the mangroves in the Gulf of Fonseca may be sustainably managed and the interests of competing stakeholders mediated. The outcome represents the culmination of over eight years of collaborative research and advocacy activities that have brought together governmental, nongovernmental, community and private sector organizations.

Following are summarized the key findings and recommendations, with an emphasis on the role of women and the need to include them in the decision-making process.

Policy recommendations were sent to the Ministry of Environment and Natural Resources in El Salvador in the form of a letter signed by participants in these different meetings and endorsed by the community groups.

Action 1: Harmonize Resource Use Among Different Interest Groups

There are multiple stakeholders with diverse interests in the use and transformation of the mangrove ecosystem in the Gulf of Fonseca. Although these stakeholders may compete for the ecosystem goods and services, there is also potential to harmonize their interests in order to secure the sustainable management of the ecosystem.

Bring Stakeholders Together

A broad coalition of stakeholders should be brought together to form a multi-sectoral commission in each country that includes the primary stakeholders in the mangrove ecosystem and the institutions that assign access rights or enforce compliance. These include ministries of agriculture and environment; the judiciary, navy and police; local and municipal governments; nongovernmental organizations; academic and research institutions; agriculturists and livestock owners; aquaculturists; salt producers; harbor authorities; industrial fishing interests; artisanal fishers; community and grass roots organizations; men and women.

Define Sustainable Management in Each Country

Sustainable management needs to be defined and made operational. The multi-sectoral

commissions should develop a definition of sustainable management of the mangroves that is consensus driven and reflects the interests and concerns of all constituents. Particular effort should be made to ensure the communities have voice in this process, and the needs and concerns of women are adequately reflected.

Action 2: Alleviate Poverty to Reduce Environmental Degradation

Poverty affects the choices that individuals and households make about the use and management of natural resources. Poor households may rely disproportionately on the environment to provide fuelwood and timber for energy and shelter as well as wildlife flora and fauna for food and livelihood security. As the ecosystem degrades and mangroves are converted to other uses, the stocks of fuelwood, timber, fauna and flora are drawn-down and the livelihoods of those that depend on these resources are threatened.

Establish Buffer Zones for Fuelwood Extraction and Promote Agroforestry Actions

Poor households need secure access to legally extract fuelwood resources. Governments can support these initiatives by providing communities with multi-purpose tree seedlings that do not require labor intensive cultivation, are fast-growing and yield short- to medium-term returns.

Extend Micro-credit Services to Women and Poor Households

The poor have limited opportunities to diversify their source of income or increase earnings. Micro-credit has been effective in addressing this gap through the disbursement of small group and individual non-collateral loans. The challenge is to provide access to formal banking services and provide loans where the repayment schedules are tailored to the activity undertaken. These initiatives may be particularly important for women and female-maintained households allowing them to diversify their income-earning activities.

Action 3: Bring Communities into Decisionmaking

Where communities have been unable to participate in decisions about mangrove management, women have been doubly excluded from decisionmaking. Efforts should be made to ensure the full participation of the community in decisions about the design and operation of sustainable management strategies and in particular to include women in this process.

Train and Strengthen Community Organizations and/or Institutions in Ways to Secure and Improve Access to and Management of Forestry Resources

To effectively apply environmental legislation, national governments need to invest in building local capacity for resource management. Women need to be drawn into this process to ensure that their voices and concerns are represented.

Governments need to heighten awareness of national environmental legislation, promote the organization of community resource management groups, and set gender targets and quotas to ensure that women are actively included in the community representation, and their use rights are considered when designing and implementing management plans.

Action 4: Strengthen Institutions and Define Appropriate Rules and Regulations

The existing regulatory and institutional framework is sufficiently weak, fragmented and obsolete. This inhibits the design and implementation of sustainable mangrove management practices that respond to the development needs of coastal populations.

Review Existing Property and Access Rights

The multi-sectoral commissions should review, revise or establish legal access and use rights to mangrove, wetlands and fisheries resources that recognize customary rights and coordinate these with national environmental laws. Procedures for community participation must be established.

Undertake an Institutional Capacity Audit

The existing institutions in each country have been unable to monitor and enforce agreements about mangrove management. The multisectoral commissions should recommend how to reorganize these institutions to ensure effective monitoring and enforcement plans. Institutions must ensure the needs and concerns of women in the communities are represented.

Develop Policies on Biodiversity and Sustainable Use of Coastal Resources

Currently there are no national policies that link biodiversity to habitat.

Action 5: Collect Data

There is an alarming lack of data on biological indicators that describe the health of the ecosystem.

Without this data, governments and regulatory bodies

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Continuing Concerns Related to Shrimp Farming in the Tropics

By Conner Bailey

In 1988, I published an article in *Ocean and Shoreline Management* entitled "Social Consequences of Tropical Shrimp Mariculture." A portion of that article was reprinted in the April 1989 edition of *InterCoast* newsletter. I've been asked to comment on what has changed since that time.

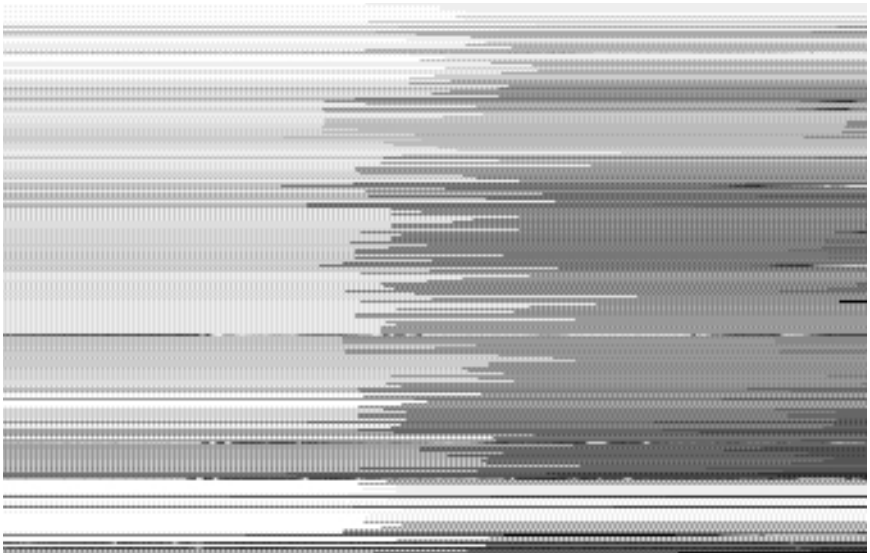
In my original article I highlighted two interrelated problems: 1) the combined social and ecological costs associated with widespread conversion of mangrove resources into shrimp ponds; and 2) the tendency of local and national elites to capture most of the benefits of what was then a new industry, leaving most coastal residents relatively (and in some cases absolutely) worse off than before.

My initial concern regarding conversion of mangrove into shrimp ponds was based on experience living in coastal fishing communities in Malaysia and the Philippines, and extensive fieldwork in Indonesia. I knew how important mangrove resources were to local residents as a source of both subsistence and commercial goods. I argued that wholesale conversion of mangrove into privately owned shrimp farms represented loss of local control over an important resource base, and that this change would have serious social and ecological consequences.

By the late 1990s, however, the issue of mangrove conversion had become less central as a focus of concern. From the vantage point of producers, there always had been serious problems associated with conversion of mangrove into shrimp farms, including acidic soils and the sheer cost of clearing mangrove forest. During the 1990s, shrimp farmers increasingly shifted attention away from mangroves and towards other coastal lands, including marginal agricultural lands and salt flats. In Thailand, producers even took to shipping hypersaline water into the interior and began producing shrimp in rice fields hundreds of kilometers from the coast. The issue of mangrove conversion continues as an important concern, but has come to be understood by industry critics as one among a larger set of issues relating to my second concern, the distribution of benefits.

To predict that the benefits of shrimp farming would be concentrated in few hands involved limited intellectual risk on my part. The same thing could be (and often has been) said of virtually every significant technological change or development project in the last fifty years. But there were (and continue to be) good reasons for concern in the particular case of shrimp farming. In Latin America, the pattern of large land holdings in the agricultural sector was replicated so that a relatively few firms controlled most of the area in production. Moreover, many of these firms were integrated, with feed mills, production ponds and processing facilities under common corporate control. The primary beneficiaries of this industry are easy to spot in Latin America.

Compared to Latin America, shrimp farms in Asia are relatively small, reflecting density of coastal populations and the high value associated with land as a scarce resource. Under these conditions, the approach taken to increase production has been to intensify stocking and feeding rates. The profit potential of shrimp farming attracted outside investors, mostly urban entrepreneurs interested in making quick profits. Few residents of rural coastal communities can afford the cost of adopting high-intensity production systems. In some areas, outsiders have gained control over local resources through conversion of public lands (e.g., man-



Shrimp farms in Ecuador

Cultured shrimp

grove) into private shrimp farms. In other areas, rice fields have been bought or leased by outsiders to cultivate shrimp. The net result in areas suitable for shrimp farming has been loss of local control over resources upon which coastal communities depend.

In Asia, as in Latin America, most of the benefits of shrimp farming are gained by a relative handful of individuals, few of whom are from the rural coastal communities where production takes place. To be sure, employment in shrimp farming, processing, and supporting industries (feed mills, hatcheries, transportation, etc.) has increased. But my original concern, that many coastal dwellers would become increasingly marginalized, appears to have been valid.

A new concern has arisen over the past decade concerning the sustainability of coastal shrimp farming: the threat of disease outbreaks that threaten to wipe out farms in whole regions. Organic wastes from shrimp farms, especially where intensive production practices are used, create water quality problems that are associated with viral disease outbreaks. Beginning with the collapse of Taiwan's shrimp industry in 1988, disease problems have devastated shrimp farming in virtually every area where this industry has been established. Water quality and disease management have emerged as the Achilles Heel of modern shrimp farming.

Coastal farming of shrimp in the tropics has emerged as a lightening rod, where all the positive and negative aspects of aquacultural development are given full expression. Certainly it is true that critics of shrimp farming have become increasingly well organized and vocal. The Mangrove Action Project, founded in 1992 (see Quarto, p. 15), was instrumental in alerting the environmental community to problems of mangrove conversion and, more importantly, helping forge linkages between nongovernment organizations (NGOs) in Asia, Latin America, and Africa. More recently, the Industrial Shrimp Action Network (ISA-Net) was formed in 1997 to coordinate NGO actions. Their efforts led to formation (also in 1997) of the Global Aquaculture Alliance (GAA), an industry organization which defends the interests of shrimp farmers and other aquacultural producers. It is too early to predict the outcome of this dialogue, but if the two sides both listen as well as speak, some common ground may be found.

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A Retrospective Assessment of the United States' Coastal Zone Conference Series: 1978 to 1999

By Jens Sorensen, with assistance from Frank Gable and Nelia Badilla Forest

Coastal Zone 2001 (CZ 01) conference (page 21), to be held in Cleveland, Ohio, USA, July 15-19, 2001, is the twelfth in a series of biennial international conferences held in the USA. The first conferences took place in San Francisco, California, in 1978. These conferences have evolved into an international exchange of information and ideas concerning the identification and resolution of problems associated with coasts and oceans. Today, the CZ series is the primary coastal conference in the USA.

Prior to the CZ conferences, the U.S. National Oceanic and Atmospheric Administration (NOAA) convened three national conferences (Annapolis, Maryland, 1973; Charleston, North Carolina, 1974; and Asilomar, California, 1975). Participation has grown from 500 participants at the Asilomar, California, conference to over 13,000 names on the mailing list for CZ 01.

Organizational Arrangement and Funding

The organizational arrangement for CZ 78 was a tripartite sponsorship by the American Society of Civil Engineers (ASCE), the Conservation Foundation, and NOAA. In addition to the three sponsors, there were 14 affiliated institutions: six federal agencies, four California state agencies (the conference's host state) and four nongovernmental organizations (NGOs). The tripartite arrangement reflected the different areas of coastal zone management: policymaking, planning and management (U.S. Department of Commerce), environmental conservation (Conservation Foundation) and science and technology (ASCE). This arrangement reflects a policy that continues today—the free flow of information and the ability to address controversial issues, as well as to take political positions, requires independence from government institutions, particularly NOAA. This goal was similar to one of the primary goals of the U.S. Coastal Zone Management Act—to achieve interagency cooperation among the many national government agencies having responsibility for planning and/or managing coastal zone uses, resources and environments. To this end, NOAA was willing to broaden the sponsorship and administration of national coastal zone management (CZM) conferences to other governmental organizations as well as nongovernmental organizations to avoid playing the role of both administrators of the national CZM program and political advocate. Were one government agency to assume responsibility for full financial support and administration of national CZM conferences, the action clearly would have a chilling effect on the participation of others involved in CZM, both in their presentation of information and direct financial or in-kind support of the event.

The success of CZ 78 led to a continuation of the same organizational arrangement of government and NGO institutions in sponsorship, organization and administration of successive conferences. The Coastal Zone Foundation, a non-profit organization, was established to serve as the secretariat to conference sponsors and national organizing committees. Since CZ 80, the combined number of sponsors and affiliates varies between 27 (CZ 80) and 49 (CZ 95). Over the 22-year span of CZ conferences, the number of government organizations and NGO has been approximately 50/50.

Conference Goals and Objectives

Achievements based on the conference's goals and objectives are so varied in subject and extent, it is impossible to even speculate. Conference goals according to CZ 78's announcement and call for papers stated:

"Coastal Zone 78 will be a multidisciplinary specialty conference to provide an opportunity for those scientists, engineers, planners, and other involved professionals to convene and exchange information and views. The purpose of the conference is to provide a forum for discussion of coastal zone management, beneficial use, protection and development leading hopefully to a better understanding of the interrelationships between the environmental, socioeconomic, engineering, and regulatory decisions involved. The conference will foster more effective and meaningful jurisdictional arrangements, conservation considerations, regulations enforcement policies, planning activities, and design parameters

(continued page 32)

Coastal Zone 2001 (CZ 01): Hands Across the Water? Linking Land, Lake and Sea

Cleveland, Ohio, USA, November 19-23, 2001

CZ 01 website: www.csc.noaa.gov/cz2001

CZ 01 is the twelfth in a series of biennial international conferences, to be held in Cleveland, Ohio, USA, December 3-7, 2001. The Coastal Zone conference series has evolved into an international exchange of information and ideas concerning the identification and resolution of problems associated with coasts and oceans attracting over 1,000 attendees.

CZ 01 will feature models of successful partnerships, such as that established in the Great Lakes, USA, where two sovereign nations jointly manage water and living resources of this great 'inland sea.'

The four central themes, named after four popular songs, of CZ01 are:

Taking Care of Business: Sustainable Coastal Communities

The growth of metropolitan populations along ocean coasts and our inland seas too often occurs as sprawl, with all of its attendant negative environmental impacts and external costs, rather than in a sustainable well-managed manner. This thematic area will examine creative urban planning strategies, fiscal incentives, innovative policies, and other techniques to achieve 'smart growth' in coastal communities.

Son of a Son of a Sailor: Maritime Transportation and Commerce

Virtually every type of commodity imaginable is transported through a port. M aritime transportation and commerce has tremendous advantages for energy conservation, cost savings, and reduced environmental impacts compared to alternative transportation modes overall. Ocean ships, bulk cargo carriers, tug-propelled barges, and cruise ships operate in a system linked with energy, agriculture, industry, and travel and tourism.

Everyday People: People and the Coast

Coastal management is really about managing people. Values and choices made by people at home, work, and in the community ultimately determine coastal environmental health and community well being. Information management can combine essential data, making the information accessible and useful for decisionmaking by community leaders, businesses, and everyday people.

Here Comes the Sun: Energy and the Environment

The production, transport, and use of energy resources have profound impacts on coastal resources and communities. Energy efficient power plants, localized power sources, alternative energy sources, energy efficiency audits, and the purchase of emission credits are among a host of things that are moving forward in response to climate change and air quality concerns.

For information on CZ 01, contact Jan Kucklick, NOAA Coastal Services Center, 2234 South Hobson Avenue, Charleston, South Carolina 29405 USA. Tel: 843 740-1279. Fax: 843 740-1313. E-mail: Jan.Kucklick@noaa.gov

Building a Global Database of ICM Efforts: Baseline 2000 (B2K)

By Jens Sorensen

A very common citation in the literature about integrated coastal management (ICM) as an international practice is: "In 1991, there were 146 ICM efforts in 44 coastal nations and semi-sovereign states." The citation derives from a survey done for this newsletter, *InterCoast*, and reported in issue #16, February 1991. The 146 efforts included 56 initiatives in the United States (by-in-large ICM programs of the states and territories pursuant to the United States Coastal Zone Management Act and the National Estuary Program). However, this total does not include the 20 international efforts at that time, or the 18 National Estuarine Research Reserves in the USA at that time. Including these increases the total to 184 ICM efforts.

Another survey of ICM efforts around the world was done this year. This survey was one of a number of assessments conducted for "Baseline 2000: the Status of Integrated Coastal Management as an International Practice." The Coastal Zone Canada Association commissioned Baseline 2000 as a discussion paper for the Canada CZ 2000 Conference (Saint John, New Brunswick, September 17 to 22). The survey made a distinction between ICM efforts at the international level and the national or sub-national levels. At the present time the listing of ICM efforts has been organized into four tables and they have been posted on the website www.coastalmanagement.com for review and comment. Table 1 summarizes some of the information derived from the survey.

In the years since 1991, the total number of ICM efforts has more than doubled—from approximately 180 to approximately 380. Also in that period, the number of nations and semi-sovereign states that have ICM efforts at the national and/or sub-national level has grown from 57 to at least 87. Other findings from the survey include:

- Since 1973, almost all the world's 207 coastal nations and semi-sovereign nations have at one time or another participated (at least on paper) in one or more international ICM efforts. To date, there have been 25 efforts for planning and/or management of international open seas, international land-locked seas, international gulfs, and international lakes.
- It is important to make a distinction between ICM efforts at the national and/or sub-national levels and international regional ICM efforts. The former, with few exceptions, are ICM efforts that represent a significant level of commitment by the nation or the sub-national

Table 1. Number of ICM Efforts and Composition

Coastal nations and semi-sovereign states*	207
Coastal nations and semi-sovereign states participating in international ICM efforts	197
Coastal nations and semi-sovereign states having or having had national and/or sub-national ICM efforts	95
Developing nations or semi-sovereign states	70
Nations or semi-sovereign states in the tropics	45
Island nations or semi-sovereign island states with national or sub-national ICM efforts	1
Total international, national, and sub-national efforts	380
International regional ICM efforts	25
National and sub-national ICM efforts	345
Efforts at the sub-national level	284
Efforts in developing nations	156
Efforts on island nations or semi-sovereign states	65
Efforts that focus on estuaries, bays, or lagoons	138

* Includes nations and semi-sovereign states that border on international lakes and international land-locked seas

unit to prepare and implement a program that resolves issues involving conflict and/or degradation of coastal resources or environments and the reduction in the costs of coastal hazards. By contrast, since most of the international ICM efforts are consensual agreements with little or no enforcement powers and inadequate budgets, the implementation commitment, in general, is significantly less than national and sub-national efforts.

- In many coastal nations, particularly the large ones, the focus of ICM is at the sub-national level. Delegation of a national ICM program to one or more sub-national units offers numerous advantages, such as accommodating local variation and facilitating community-based management.
- Approximately 40 percent of the ICM efforts are focused on estuaries, lagoons or bays, usually adjoining major metropolitan areas. Most of these enclosed coastal water bodies adjoin or are surrounded by metropolitan development. The focus on bays, estuaries and lagoons is because conflicting uses and degradation of enclosed coastal water bodies is both very evident and of high concern to the stakeholders who surround them.
- Since 1990, developing nations and states account for most of the increase in ICM efforts at the national and/or sub-national levels. Seventy developing nations (including countries in transition from a communism to a capitalism governance) have now initiated one or more ICM efforts at the national and/or sub-national levels.

Eventually the database of ICM efforts should be taken down to the local government level (e.g., coastal municipalities, counties or cantons). In the USA, at least ten of the state coastal zone management programs require local units of government to prepare a local coastal plan based on state guidelines. Expanding the database to local coastal plans will allow direct communication among local governments that commonly confront the same issues (e.g., management of urban beaches, public access, waterfront development and/or redevelopment). For example, beach recreation planning and management in Tel Aviv, Nice and Sydney have almost the same set of issues, stakeholders, and options for management techniques as does the City of Los Angeles, California, U.S.

The four tables of ICM efforts are only the first stage of database development. The second stage (pending funding) would be to distribute a standardized survey questionnaire to each ICM effort; the third stage to conduct data analysis and formatting; and the fourth stage to develop a website.

For further information, contact Jens Sorensen, Harbor and Coastal Center, University of Massachusetts, Boston, Massachusetts 02125 USA. Tel: 617 287-5578. Fax: 617 287-5599. E-mail: jens.sorensen@umb.edu

Educating Coastal Managers

In 1991, *InterCoast* (#14) focused on 'Educating Coastal Managers.' This issue highlighted several fledgling academic programs: the Songkla University, Thailand; University of Guaymas, Mexico; and the University of Newcastle upon Tyne, UK. Also described were examples of pioneering efforts towards educating coastal managers through workshops in Southeast Asia and regional networking in Africa.

Educating coastal managers has come a long way since 1991, both in knowledge and interdisciplinary educational opportunities. Today, many institutions have developed interdisciplinary environmental and marine affairs programs in response to a growing recognition of the environmental problems facing coastal regions. Recognized over the years has been the need to develop programs based on in-country assessments and needs, and assuring these programs can be implemented within the in-country institutional framework.

The University of Newcastle's program and short-course training is just one example of the growth of these early programs and serves as an aspiration for developing programs.

The Evolution of a Tropical Coastal Management Program: 1987 to 2000

University of Newcastle upon Tyne, United Kingdom

By Alasdair Edwards

The world of coastal management has changed a great deal since my colleague at the Unversity of Newcastle upon Tyne, Barbara Brown, reported on the University's four-year-old international masters of science (M.Sc.) program (*InterCoast* , #14, 1991, "Master of Science Program in Tropical Coastal Management at the University of Newcastle upon Tyne, United Kingdom"). Started in 1987, by 1999 the program had had 52 students, 40 from the tropics and 12 from Europe. The program was started to satisfy a growing demand by the industrialized and developing nations for a broad training in coastal management. This training was for scientists, planners, economists and environment and natural resources ministry officials.

Today, the program has graduated around 160 students from some 40 nations. Only one-third of the course participants have been from Britain, with the remaining two-thirds coming from abroad (about half from Asia and the other half evenly distributed between Africa, the Americas and mainland Europe). The average age of students is 29 years. Most take a one-year leave from employment to complete the M.Sc. program. About 60 percent of the students have been funded by UK overseas aid, international development banks (e.g., World Bank, Asian Development Bank), United Nations' agencies, overseas governments and multinational companies. The remaining 40 percent have funded their own way through the course—a tribute to their dedication and commitment to coastal management as a career.

The Newcastle program has been very fortunate to have high-calibre applicants. As a result, we often find ourselves working alongside our alumni at international conferences and workshops, as consultants or during fieldwork in various countries around the globe. This is perhaps the most rewarding experience for a teacher!

The primary aim of the program from its inception has been to provide a holistic overview of the tropical coastal zone to specialists with knowledge of particular aspects. By stimulating an awareness of the natural and social science, economic, engineering, and legislative issues, the program seeks to promote sustainable and integrated development in the coastal zone, rather than the often piecemeal, economically inefficient, high risk, and thus unsustainable development which has sadly characterized much coastal development worldwide. To provide the broad spread of tropical expertise needed to do this, course lecturers have been selected from several faculties at Universities of Newcastle as well as from the Universities of Edinburgh, Essex and Stirling. In addition, the

program draws on industry and UK government marine research laboratories.

Since our program started, several other UK universities and a number of overseas universities have developed masters programs. These programs either focus entirely on coastal management, or coastal management is their major component, giving students a wide choice of programs with different emphases.

Our program has changed dramatically since 1987, as has the technology available for teaching it. In 1987, the knowledge and technical ability on remote sensing and geographic information system was not really accessible for routine hands-on learning by students. Now, practical tasks can readily be accomplished by students on desktop computers, opening numerous new training possibilities. Similarly, the advent of the worldwide web and vast searchable databases has revolutionized information dissemination and availability. Owing both to these technological changes and the rapid development of the subject area, Newcastle, in 1997-98 and after 10 years of running the program, took a year to review and restructure the entire program. During this process, both alumni working in the field and potential employers of our graduates assisted us. We benefited immensely from these inputs coming from the cutting edge of coastal management.

Resulting from the evaluation, we have shifted the emphasis of the program from the fundamental science underpinning coastal management towards applied problems and solutions for practitioners. Thus, while we still address fundamental issues and stimulate an awareness of the gap that exists in understanding the complex dynamics and interactions in the coastal zone, the emphasis is more on how to solve real problems with the resources typically available to the management community. This redirection has required a considerable change in the way the program is taught. The program now involves far more hands-on problem solving and realistic exercises using first-hand case studies developed by the program's staff. The revised program was launched in 1998 and is now finishing its second year. Feedback from students of those two years indicated the redesign was well worth the investment of time and resources, and that we have a program appropriate for the new century.

In addition to the masters program, we have been involved in short-course training in coastal management for the government of India. Starting in 1995, and in collaboration with Indian colleagues and colleagues from the Universities of Bath, Stirling and Essex, we have run three short courses (two to three months in duration) for senior and middle-ranking professionals in federal and state government departments and research institutions. Currently we are helping to develop the capacity of Anna University in Chennai, and Jadavpur University in Calcutta, to deliver integrated coastal management training catered towards officials developing and implementing state coastal management plans. With our colleagues at Anna and Jadavpur, we are developing innovative case study-based problem-solving training packages that we hope to bridge the gulf between plans and implementation–implementation being where the project cycle so often breaks down!

[Details of the short-course training can be found at website www.ncl.ac.uk/mscmcourses/ Details of the M.Sc. and postgraduate programs can be found at website www.ncl.ac.uk/tcmweb/ctcms/]

For further information, contact Alasdair Edwards, Department of Marine Sciences & Coastal Management, University of Newcastle, Newcastle upon Tyne, NE1 7RU, United Kingdom. Tel: +44 (0)191 222 6663. E-mail: A.J. Edwards@newcastle.ac.uk

The Importance of Government in the Management of Land-Based Marine Pollution

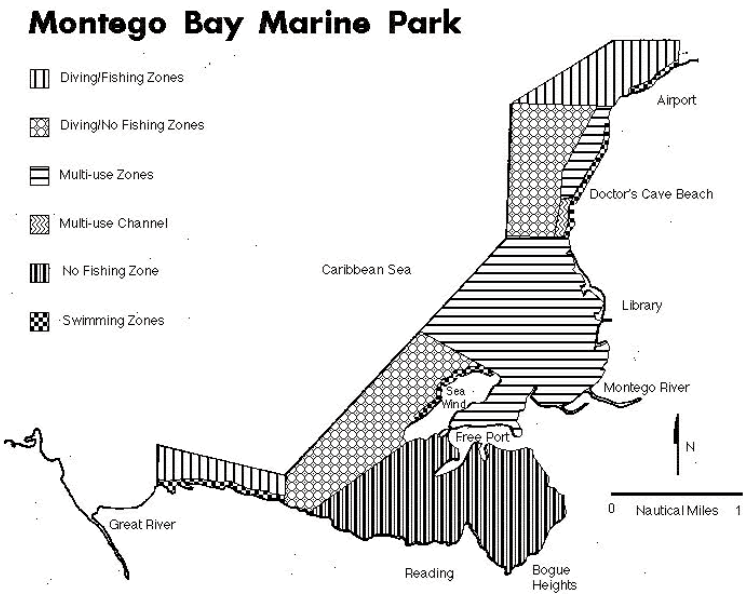
By Stephen C. Jameson, Richard M. Huber and Jill H. Williams

Government can be a positive or negative factor in managing land-based sources of marine pollution. In Montego Bay, over the last 30 years, the Government of Jamaica (GOJ), like many small island states burdened with massive International Monetary Fund debts, made decisions which encouraged the development of tourism and light industry to provide employment and earn foreign exchange. This boom outgrew the infrastructure of the town and its ability to absorb the influx of workers, contributing significantly to land-based sources of pollution. Also, over the past 20 years there has been progressive thought towards not using the ocean and inland bays as receptacles of human waste, as there is an increasing appreciation of the negative environmental impacts-particularly for recreation, tourism and coral reef ecosystem condition. Typical of most governments, Jamaica has centralized, top-down management and the compartmentalization of sectors without coordinated integration. This helped foster a 'tragedy of the commons.'

Fortunately, government now recognizes its past shortcomings and is working to reduce land-based marine pollution in Montego Bay. One of the recent major positive steps is the formation of a strategic partnership with the Montego Bay Marine Park Trust (MBMP), the non-governmental organizations with government delegated authority to manage the national marine park. This partnership is starting to significantly contribute to decreasing land-based sources of marine pollution and is facilitating a better sharing of marine park benefits with the community thereby alleviating poverty.

With ssistance from donor countries, a second positive step was completing work on a new Montego Bay sewage treatment facility.

The GOJ recently signed off on ISO 14000 (voluntary international standards that will lead to the protection of the earth's environment while spurring international trade and commerce) and held seminars on the initiative. The Jamaica Bureau of Standards and the National Resources Conservation Authority (NRCA) are promoting this effort. To develop constituencies on a range of environmental issues, NRCA (and other agencies) are trying hard to get bottom-up concerns and has been holding parish meetings on policy documents. This is slowly having an effect. The Jamaica Tourist Board is preparing a major tourism action plan and has invited MBMP to provide input on ecotourism in the national parks. This indicates a noticeable change in the attitude of GOJ towards improving land-based pollution.



The Montego Bay Marine Park

Montego Bay is one of Jamaica's leading tourist centers and is considered to be one of the most threatened near-shore coral reef ecosystems (seaward coral communities are in better condition as they benefit from flushing offshore currents). This is the result of many years of natural and anthropogenic forces. Water pollution, in the form of nutrient enrichment, from municipal raw sewage discharges, household waste, associated leaching, and sedimentation have been especially devastating to the near-shore reefs. Oil pollution and runoff of agricultural fertilizers and pesticides add to the problems. Once luxuriant near-shore coral reefs are now smothered by algae and struggling for survival. Overfishing and decimated sea urchin populations (herbivores) intensify the situation.

Two watersheds drain into the park, Great River and Montego River (see map). These carry the inland pollutants to the park waters. Coastal mangroves, other wetland areas and seagrass beds are being destroyed.

Impacts from wind blown dust and illegal sand removal contribute. The MBMP, charged with conserving the bay, is now faced with a long-term and expensive restoration project.

Government Impacts

The table below outlines the government interventions (or lack thereof) over the last 30 years that contributed to land-based sources of marine pollution that have degraded Montego Bay Marine Park. This history clearly shows there has been no comprehensive plan accounting for cumulative impacts of pollutants or the environmental carrying capacities of Montego Bay.

Mitigating Impacts and Overcoming the Poverty Cycle

The GOJ, through its NRCA, is now working to protect the natural environment by getting the different sectors to work together at the national level. Locally, government is involving NGOs in management so the community looks after its economically valuable natural resources and is watchdog over private and public sectors. There are 11 public-private partnerships (ongoing or planned) by the MBMP in concert with various government agencies to prevent and manage land-based pollution in the marine park.

Implementing the necessary water quality management measures to ensure a healthy coral reef ecosystem will not be quick or easy. In about five years, 60 percent of the population in Jamaica will reside in urban areas, such as Montego Bay, and a third will be located in squatter communities unsaved by adequate household waste disposal. Only 25 percent of the country's households are connected to sewer systems, and even where such connections exist, wastewater treatment is inadequate. The lack of a comprehensive waste management policy and clear lines of government responsibility delays

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Chronology of Government Interventions (or Lack of) That Have Increased Land-based Sources of Marine Pollution in the Montego Bay Marine Park, Jamaica

Year	Government Intervention (or Lack of)	Environmental Impact
1969	Freeport development	Loss of mangrove, Circulation changes, Reduced oxygen in Bogue Lagoon Reduced fish stocks, Overfishing continues
1969	Airport expansion	Loss of mangroves & wetlands, Increased sedimentation and tourists
1969	Holiday Inn construction	Mass tourism starts, Urban immigration begins
1972	Urban Development Council waterfront development	Coastline changed, Sedimentation increases, Reefs destroyed
1975	No infrastructure to accommodate growing tourism and tourism service sector	Increased waste & lack of sewage treatment, Squatting starts, Urban sprawl increases, Cost of transport high, Loss of public use of beaches & turtle nests
1980s	Population increases without planning/regulation	More sewage, Lack of sewage treatment, Increased waste, squatter settlements , Landslides, Overfishing
	Dump located to Retirement Area	Not sanitary, Groundwater pollution increases
	Housing development increases	More run off & garbage, Lack of drainage, Reef deterioration via sedimentation, Nutrification
	Dump overloaded	Dump site continually burning, Ground water pollution
1990	Sewage system overload	Nutrient-rich effluent discharging into Montego Bay, Underground seepage
1994	National Commercial Bank Citrus Project	Removed thousands of ancient guango trees over 10,000 acres, Pesticides & fertilizers, Soil erosion & sedimentation
1994	Breezes Hotel construction	No sewage hook-up, Built on beach, Too many rooms
1995	Lowered duty on imported cars and allowed second hand cars not meeting emission standards in Japan to be imported	More traffic congestion, Waste oil & air pollution
1997	South Gully widening approved	Increased sediment and garbage flowing into park
1998	Greater Montego Redevelopment Corporation management plan delays so development	No development order yet to implement new coordinated zoning and development plan continues ad hoc
1999	Sewage treatment ponds constructed	Secondary treated effluent discharged into Montego Bay, Sewage hook-up not mandatory in community, Focus of treatment human health not reef health
1999	North Coast Highway construction	Loss of mangroves, Marl into lagoon

Land-based Pollution

(continued from previous page)

implementation of effective waste management.

The local communities are the principal force behind the need for reef conservation, standing to benefit considerably but also being the principal cause of reef loss. Notwithstanding these threats, the natural areas in Montego Bay remain in good enough condition that, if properly managed and rehabilitated, will provide substantial opportunities for economic growth, poverty alleviation, and the maintenance of globally important biodiversity.

However, given the economic trade-offs and local awareness of environmental issues, coral reef ecosystem preservation and associated water quality is presently seen as a luxury. Until public relations and education efforts take root, and informed government policies and programs dealing with pollution and poverty issues are enacted, coral reef managers are caught in a downward spiral of poverty. Nothing will change unless resource managers demonstrate short-term economic benefits from conservation. Long-term payoffs mean nothing in an economy where subsistence is of primordial concern.

For further information, contact Stephen C. Jameson, Coral Seas Inc., 4254 Hungry Run Road, The Plains, Virginia 20198-1715 USA. E-mail: sjameson@coralseas.com; Richard M. Huber, Environmental Specialist, The World Bank. E-mail: rhuber1@worldbank.org or Jill Williams, Executive Director, Montego Bay Marine Park Trust. E-mail: ll@n5.com.jm

MEDCOAST: 1993 to 2000

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protection and rational management of the coastal and sea areas. Most importantly, the initiative has created the MEDCOAST 'family' of scientists, professionals and conservationists who collaborate for a common goal.

All of these achievements were internationally acknowledged in 1997 when MEDCOAST was selected as one of the world's 10 most significant efforts for marine conservation, and by the Pew Award in Marine Conservation being given to the founder and chairman of MEDCOAST. MEDCOAST has collaborated closely with the UNEP's Mediterranean Action Plan from the start. In 1999, the representatives of the Mediterranean countries elected MEDCOAST as a nongovernmental member of the Mediterranean Commission for Sustainable Development.

Many exciting challenges now await MEDCOAST. The Mediterranean Coastal Foundation (the MEDCOAST Foundation) is being set-up. Also, in the planning phase is the building of the International MEDCOAST Centre, a facility located on the southern Aegean coast of Turkey, which will be the center of MEDCOAST's activities.

For further information, contact Erdal Özhan, Chairman and Founder of MEDCOAST, Coastal Engineering & Management, Middle East Technical University, 06531 Ankara, Turkey. Tel: (90 312) 210 54 29 or 30 or 31. Fax: (90 312) 210 14 12. E-mail: medcoast@metu.edu.tr

MAP: 1994 to 2000
(continued from page 15)

MAP exchanges ideas and information for mangrove forest protection and restoration, and promotes effective regulations and enforcement to ensure sustainable shrimp aquaculture practices.

When MAP first started in 1992, it spotlighted the problems affecting both the coastal ecology and local communities. To do so, MAP had to become 'whistle blowers' against the shrimp aquaculture industry, drawing attention to the expansion of an enterprise responsible for the destruction of thousands of hectares of mangrove forests and the loss and ruin of valuable coastal areas.

MAP has recently expanded its work by addressing other serious problems affecting mangrove forests (e.g., the logging, oil, charcoal and tourism industries). MAP's continued networking efforts have brought widespread awareness to the importance of mangrove forests and the seriousness of their loss. Mangrove forests are no longer viewed as smelly, mosquito-infested wastelands. Instead, a growing number of people are calling for effective conservation and restoration measures.

To meet this new challenge, MAP has begun looking for viable, long-term and equitable solutions to mangrove loss and restoration. For instance, in 1996, MAP organized a community-based mangrove-replanting project in Ecuador. MAP has supported mangrove restoration efforts in India, the Philippines, Indonesia and Malaysia. In 1997, MAP organized an eco-study tour in Thailand. MAP's approach is to support a bottom-up method and place the local community at center stage in the restoration and management process.

In 1999, working closely with the Yadfon Association in Thailand and the Small Fishers Federation of Sri Lanka, MAP helped launch its premier program-In the Hands of the Fishers-which is a series of workshops bringing together grassroots NGOs and fisherfolk from two or three developing nations containing mangroves. These workshops offered an innovative format for information and skill sharing among local stakeholders. It also offered a toolkit of working alternatives to help enhance community-based coastal resource management which is truly in the 'hands of the fishers.' Follow-up projects will be undertaken at the participating villages; these will serve as sites or nodes for modeling sustainable, low-intensity development alternatives. In 2000, MAP and the Small Fishers Federation of Sri Lanka established the MAP-South Asian Resource Center based in Chilaw, Sri Lanka. This resource center will be the center for MAP's continued work towards further solutions.

In 2000, MAP is ready to release its Mangrove Educational Curriculum that has been developed in the Cayman Islands for school children from kindergarten to ninth grade. This curriculum will be modified regionally and by language and taken to other parts of the world. Ultimately, this will raise awareness and appreciation of the mangrove ecosystem among local youths who later must decide to conserve and sustainably manage their coastal forest areas.

MAP now publishes two news bulletins: *The Late Friday News*, a bi-weekly electronic news bulletin reaching over a thousand subscribers worldwide; and *The MAP Quarterly News*, a hard copy of related news that is mailed to over fourteen-hundred subscribers in sixty nations.

For further information or membership information, contact Alfredo Quarto, Mangrove Action Project, P.O. Box 1854, Port Angeles, Washington 98362-0279 USA. Fax: 360-452-5866. E-mail: mangroveap@olympus.net. Website: http://www.earthisland.org/map/map.html

Emerging Trends

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CAM) will provide valuable information on measures being developed.

Building Capacity

Training and capacity-building efforts are being looked at much more critically. Many training programs have been held in Eastern Africa, and these have increased the number of individuals with skills and knowledge on marine and coastal management. However, this does not necessarily lead directly to improvements in management on the ground. Often, people find that such programs, though educational, have not equipped them to apply their new skills or knowledge back in the work place. More emphasis is clearly needed on exchange visits between projects, internships and other forms of 'on-the-job' training. The new capacity-building program for Eastern Africa being developed by the Western Indian Ocean Marine Science Association and the Coastal Resources Center, University of Rhode Island, is attempting to find a solution to this problem.

The Regional Approach

The bleaching event has illustrated the importance of taking a broad ecosystem approach to reef management. For example, MPAs may play a critical role in reef recovery through the protection of areas of coral that have survived bleaching or that may be more resilient to such impacts. However, to be fully effective, MPAs need to be established and managed as a linked network throughout a region. Efforts are underway to develop such an approach in the Western Indian Ocean, initially through the establishment of a network of MPA managers and experts. Programs such as Worldlife Fund for Nature's East African Marine Ecoregion initiative also have the potential to contribute much in this respect.

Management of severely degraded reefs, primarily those that have suffered heavy mortality from bleaching, is now a fundamental concern in the Western Indian Ocean, as in many countries. Using experiences from the region, a booklet is being produced, with the support of IUCN, World Wide Fund for Nature, United States Agency for International Development and the Secretariat of the Convention on Biological Diversity, which outlines measures and the precautionary approaches that are needed to optimize conditions for reef regeneration. It will be launched at the Bali International Coral Reef Symposium in October 2000 with the aim of contributing to efforts to aid reef regeneration and to encourage further research on this important issue.

For further information, contact: Sue Wells, E.A. Marine Programme, IUCN Eastern African Regional Office, P.O. Box 68200, Nairobi, Kenya. Tel: +254 2 890605. Fax: +254 2 890615. E-mail: smw@iucn-earo.org

Platform for Action

(continued from page 17)

will not be able to develop monitoring systems or to implement management initiatives.

Collect Data on Ecological Processes

Existing data need to be gathered together and additional data collected on the ecological variables in each ecosystem.

Collect and Combine Existing Socioeconomic Data on Human/Environment Interactions

While there is comparatively more ecological data, there are only a few studies exploring human/environment interactions and forecasting the demand for ecological goods and services.

This Platform for Action is part of an ongoing dialogue between different stakeholders. In El Salvador, the platform constitutes one of the first attempts to bring stakeholders together. In Honduras, this dialogue has been underway for sometime.

Development of this Platform for Action has been a slow and sometimes difficult process because of the entrenched positions and unequal power of some of the stakeholders. Those who have developed it believe, however, that sustainable management can be achieved and concerns of equity as well as of environmental quality can be mediated.

[For a full version of the Platform for Action, contact the International Center for Research on Women at website: http://www.icrw.org]

For further information, contact Sarah Gammage, CEASDES, 2034 17th Street, NW, Washington, DC 20009 USA. Tel: 202 884 0089. Fax: 603 506 2591. E-mail: sgammage@bellatlantic.net

Remote Sensing for Tropical Coastal Managers
UNESCO Series, Coastal Management Sourcebooks 3

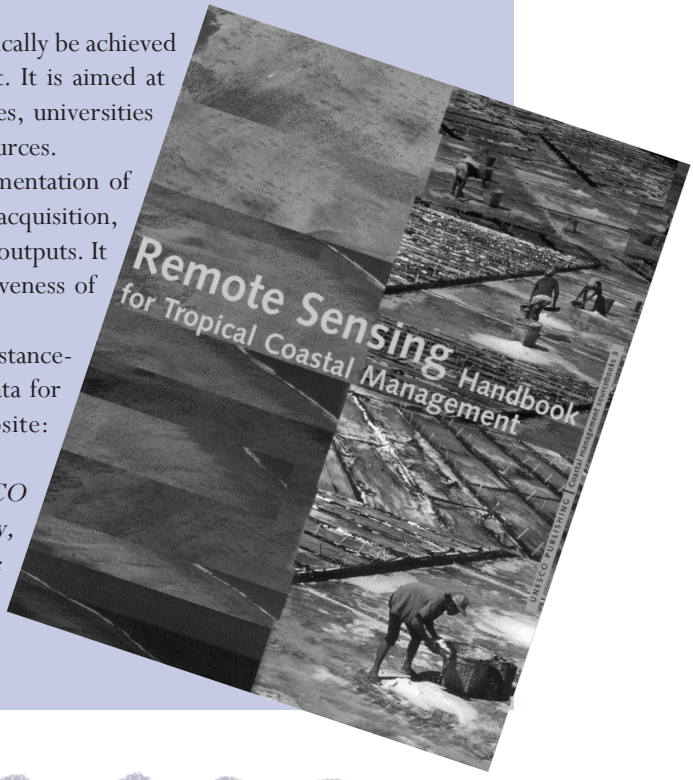
E.P. Green, P.J. Murphy, A.J. Edwards and C.D. Clark

This handbook provides a detained evaluation of what can realistically be achieved by remote sensing in an operational coastal management context. It is aimed at users of the technology in government, NGOs, research institutes, universities and consulting who are involved in managing tropical coastal resources.

The handbook takes the user through the planning and implementation of remote sensing projects from the setting of realistic objectives and acquisition, through to image interpretation and evaluation of the accuracy of outputs. It also provides a clear guidance on the capabilities and cost-effectiveness of the most wildly used sensors.

Linked to the handbook is a computer-based remote sensing distance-learning module: Applications of Satellite and Airborne Image Data for Coastal Management, available free of charge via website: www.unesco.bilko.org

For further information and purchasing, contact UNESCO Publishing, Promotion and Sales Division, 7 place de Fontenoy, 75352 Paris 07 SP, France. Fax: +33-1-45 68 57 37. Website: www.unesco.org/publishing



Philippine Management

(continued from page 7)

connection of population with carrying capacity in coastal areas. This is important considering the conservative stand of the Catholic Church.

Community-based coastal management has many small successes to its credit in the Philippines. But with the scale of problems becoming more apparent, we need to develop new models. 'Community' is often being replaced with 'collaborative,' and experience is showing that multi-sectoral arrangements are basic to success. Another ingredient more commonly being considered is economics and the role of value. The 'values' of resources are important using whatever measures appropriate since it is value and the perception of people about value that motivates people into action. Our models can place more emphasis on environmental value formation, and how to derive economic benefits from healthy coastal environments using non-destructive and non-extractive techniques. This will help communities and government to justify investment in coastal management and build stronger partnerships.

[Adapted from article published in *Out of the Shell Coastal Resources Network Newsletter*, 1999, Vol. 7, No. 2, p. 7-9.]

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Marine Protected Areas

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ties continue to be the responsibility of the agencies, industries, and other users which have traditionally managed fisheries and other activities.

The conclusion of more than 20 years of GBRMP management is that an ecosystem-scale approach to management can address the requirements of conservation and sustainable use, but it involves continuous and substantial social and political energy. A regime was created to achieve the necessary significant cultural shift in sectoral thinking and management. To ensure that this cultural shift responds to experience and new information requires continuing effort. This can be very difficult.

The necessary cultural shift affects all sectors, but it can be particularly acute for fisheries. Fishing industries, their managers and researchers, must make a transition from a culture of growth, new stocks, and new technology for more effective finding and catching of fish, to a culture that reflects the need to demonstrate reasonableness and sustainability. This is a profound, and perhaps generational, cultural shift for a community, managers and industry. In the medium to long term, there is a synergy because a fishery which is not ecologically sustainable will not be economically or socially sustainable. In the meantime, the adjustments to live within the ecological limitations can have substantial economic and social implications and need to be addressed systematically and carefully if they are not to become political minefields.

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Coastal Zone Conferences

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in the development and implementation of coastal plans."

These two goals—providing a forum for multidisciplinary exchange of information and improving the practice of CZM—have generally remained the same over the years. However, the multidisciplinary concept has expanded to include other interest groups actively engaged in CZM. With this came the emphasis towards improving integrated coastal management (ICM). ICM emphasizes finding solutions and assessing the success of implementing them. These changes are reflected in the two stated goals for CZ 97 as expressed in the announcement and call for papers:

1) "To reach out to a broad range of domestic and international, public and private policymakers, NGOs, planners, business and industry interests, managers, and scholars to create an environment that will foster an ecosystem-based, integrated approach to coastal zone management."

2) "To encourage conference participants to address the increasing challenges of the coast by sharing lessons learned and identifying both innovative and effective approaches, as well as weaknesses, gaps, and unresolved issues in coastal zone management."

Conference Scope and Content

The scope of CZM has changed since 1978. One clear change is the evolution from program preparation to program implementation to program evaluation. In 1978, most of the programs were in the program preparation stage. Since then many have advanced to the implementation stage. This trend can be seen in the increase of presentations on monitoring and evaluation. Conference announcements and call for papers from CZ 85 onward have stressed solutions.

The scope of main and sub-topics is very inclusive. It is difficult to identify a subject that is relevant to CZM that can not be connected to one or more general topics or sub-topics. The purpose of the topic listings is to inform those who are not familiar with CZM what the field encompasses. CZ 99's call for papers had several topics not usually included in a CZ conference, such as ecological economics and sustainable development and spirituality, religion and philosophy.

Currently, there are at least 218 topic areas that are under the very wide tent of CZM. The broad scope of the practice, as can be seen by reviewing the diversity of the 218 topics, has and always will be one of the greatest challenges to CZM (from cetaceans to cost analysis, from ecotourism to exclusive economic zones, and from red tide to religious beliefs). There are only two things that all CZM topics have in common: a

connection to policymaking or implementation and some connection to seawater.

The need for the series to focus and to do a few things well is one of the lessons learned in the 37-year history of CZM. For any program, the concept of addressing a priority set of issues is based on the reality that a CZM program at any level of governance will never have the resources and the supportive constituency to effectively address all the issues. Similarly, the reality of both limited resources and a supportive constituency for a CZM program also requires that a program learn from it own experience, as well as the experiences of similarly situated programs. This is a second lesson gleaned from CZM's 37 years.

Presentations and Participation

Presentations made over the course of 22 years have been on work done in 79 countries and 14 international regions. However, many of these presentations (applied science or technology topics) labeled with a country or an international region focus bear little relevance to the location in which the work was done. The work itself is not region specific and could have been done at other locations.

Presentations and registrants have been dominated by the USA. This is understandable because since CZ 93, with two exceptions, no concerted effort has been made to attract overseas participation. One exception is the International Seminar that has been convened for a two-day period prior to the conference since CZ 91. The second exception is the CZM cooperative program established by United States Agency for International Development (USAID) and the University of Rhode Island's Coastal Resource Center, Rhode Island, USA (CRC). Since CZ 85, USAID and CRC have drawn in counterparts from their projects in at least eight nations (i.e., Ecuador, Honduras, Indonesia, Mexico, Philippines, Sri Lanka and Tanzania, among others).

Conference Proceedings

A review of the proceedings from CZ 78 through 97 indicates that approximately a third of the 3,345 presentations are both informative and still relevant to present CZM programs. For those interested in 'how' issues, and the means to resolve them, the entire set of CZ proceedings provides a wealth of information. For example, 'how' has the issue of public access been interpreted and addressed since 1978? How effective have CZM programs been in resolving public access issues? What have we learned from experience?

The set of proceedings also traces the development of techniques (such as a GIS or cumulative impact assessment) or technologies (such as erosion control works or wastewater treatment systems). In addition, the proceedings provide a history of many CZM programs. For some programs (e.g., USA, national program or state programs; Sri Lanka; Ecuador; Australia) these are periodic snapshots of sequential steps from program preparation to adoption to implementation to evaluation to revision.

However, at present, there are two very evident problems with using the complete set of proceedings: their availability and the lack of a search system. A small number of individuals and institutions have the complete set of proceedings; a reasonable guess is probably between 10 and 20. If one does have access to a complete set, the daunting challenge is to locate the presentations that are both informative and still relevant to a particular area of interest. The remedy for both problems would be the development of a searchable CDROM.

Let us hope that interest, nationally and internationally, in the information presented at CZ 01 will both stimulate and revive interest in overcoming these hurdles, thus making the many years of information available to all.

[Excerpted from the draft report *A Retrospective Assessment of the Coastal Zone Conference Series in the United States,* Harbor and Coastal Center, University of Massachusetts, Boston, Massachusetts 02125 USA]

(With the exception of CZ 83, the author has attended all the conferences, giving one or more oral presentations.)

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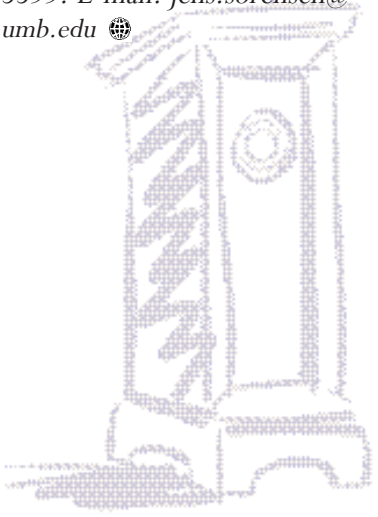

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spanned four to six years. Projects are usually less than clear on the assumptions that underpin the outcomes they propose to achieve in their usual four to six-year life span. When one teases out such assumptions, it usually becomes clear that a number of them are nothing short of heroic in terms of: 1) the time in which desired outcomes will be achieved, and 2) the geographic scales at which such project outcomes will have a positive impact. A typical integrated coastal management (ICM) project design calls for 'initial implementation' of the plan or plans developed at the pilot sites, laying the groundwork for replication of successes elsewhere, and documenting some measure of outcome—all within a project's life span.

Two closely linked conclusions cut across all the initiatives we have surveyed. These conclusions appear to be reinforced by reports on the accomplishments of other coastal management initiatives in this newsletter and elsewhere.

Conclusion #1: It takes longer

In most cases, coastal management projects we have examined are taking place in areas where nothing like it has been attempted before. A common strategy is to focus on a few small selected sites or 'pilot areas' while simultaneously preparing the ground for improved planning and decisionmaking at a larger geographic scale. The typical expectation is that within the life of such projects, the initiative will proceed through an initial phase of implementation. In the great majority of cases, we find that the reality is that five years is a minimum to prepare a technically sound and politically viable (i.e., with adequate participation and subsequent commitments among those affected) plan of action and to put in place the capacity to implement it. The common pattern is for energies to be expended primarily at the pilot project scale. Little time or energy is left over for building support at the next higher scale, be it the province or the nation.

Many of the designs pay scant attention to step 3—formal commitment with the funds and the public support (constituencies) that are preconditions for implementation. There seems to be a real distaste for acknowledging the necessity of step 3. This is understandable given the weakness of formal government in many developing countries. But implementation of a plan of action that addresses important issues involving the interests, if not the livelihoods of many people, needs more than the good intentions of a few individuals. There has to be some formal institutional commitment—be it from a village council, a business association, government agencies or, most often, a combination of them all. In the U.S. Coastal Zone Management Program, states must demonstrate that they have the authorities and the capacities in place to implement their program if they want more generous funding. Furthermore, the longer historical record of management efforts in USA, Australia, and Europe, demonstrates that it is a commitment to a plan that will address the challenges raised by how coastal areas and resources are to be used and changed that lies at the heart of making the all important step from intention to fruitful action.

Conclusion #2: Success requires sustained political support and funding

Experience in the wealthier, more politically stable nations demonstrates that achievement of measurable outcomes in coastal settings usually requires significant changes in societal behavior. Yet the great majority of the coastal management initiatives now underway are funded, at least in part, by institutions that operate across national boundaries—be they governmental, nongovernmental or business driven. Yet in most cases the grant funds available to developing nations are for planning only. With the notable exception of the GEF, nation states are expected to pay their way for implementation. This creates a climate of great uncertainty for those involved, and raises questions about the commitment of the international community to making progress on the issues that ICM is designed to address. Creative and well-connected individuals skilled in the art of project preparation can sometimes sustain promising efforts, but far too many solid beginnings are falling by the wayside.

If ICM is to fulfill its promise as a means of progressing towards sustainable forms of development at a time when the trends demonstrate that we are usually moving in the opposite direction, we must become realistic on how long it takes to make progress. Project designs must recognize that measurable outcomes at significant geographic scales will take many years of sustained effort to achieve. It is folly to expect otherwise. It is equally unrealistic

to expect that poor nations can piece together funds to sustain promising ICM initiatives. There needs to be an international equivalent of the implementation grants that catalyzed state-level coastal management in the USA.

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Oceans and Coasts at Rio +10: Assessing Progress Addressing Continuing and New Challenges

UNESCO headquarters, Paris, France, December 3-7, 2001

Close to 10 years after the 1992 United Nations Conference on Environment and Development (UNCED), informal discussions among nongovernmental organizations and scientists have resulted in the planning of a global conference to consider the status of oceans and coasts. As is well known, a broad oceans and coasts agenda has been adopted.

Years 2000-2002 will bring numerous meetings and conferences related to the post-UNCED ocean agenda. However, no plans exist for a conference that would bring together all aspects of the post-UNCED oceans and coasts agenda and provide an overall perspective in order to chart new directions on cross-sectoral issues. This is the intent of the Oceans and Coasts at Rio +10 conference.

The conference aims to:

- Assess post-UNCED progress
- Identify and renew commitment to persistent challenges
- Provide options to address outstanding cross-sectoral issues

Panels will feature a combination of speakers from governments and intergovernmental, international and nongovernmental organizations.

Conference topics include conferences and conventions Implementation (e.g., Law of the Sea, Rio Principles), sustainable development; land and sea-based pollution; resource use and conservation; climate change; capacity building among others. In addition, renewing commitments, identifying new challenges and defining issues for the global agenda in the next decade.

On all of these topics, implementation has occurred at the international, national, and sub-national levels. Hence, the conference will encourage papers that provide an overview of implementation activities and initiatives.

Post-conference material will include a conference summary and conference recommendations. These will be distributed to government delegations prior to the Rio +10 meeting. In addition, longer analytical papers will be published in a series of special issues in the international journal *Ocean & Coastal Management*, and in related journals such as *Marine Policy*, *Coastal Management*, and *International Journal of Marine and Coastal Law*.

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Changing Times

(continued from page 2)

deterrent, but 12 years later it seems that sustainability of production is the key. There is a growing need for more rational siting of culture facilities (including minimization of negative environmental impact). Allocation of space for culture can be aided greatly by use of GIS technology.

Since reporting in 1988, Conner Bailey (page 18) is concerned about a shift in shrimp (prawn) culture in Asia. Specifically, decimating mangroves to build shrimp ponds is now not so prevalent as it was 12 years ago. However, growers are shifting to salt flats and poor agricultural lands because of the expense of clearing mangroves and the effects of acidic soil conditions. In addition, the lack of benefits from farming provided to local people seems to be worsening.

Richard Kenchington (page 4) notes that since 1988 marine protected area initiatives have expanded from biodiversity and unique natural asset protection sites into multiple-use management areas where sustainability of seafood resources is a priority. Multiple-use areas require much wider participation and a more comprehensive, management-type approach.

Peter Bacon (page 12) argues that opportunities for mangrove management have changed since 1988 when individual mangrove stands were designated as wetlands and were protected by a forestry or conservation department totally apart from management of the coast or estuary where they were located. Bacon believes that in the past 12 years, knowledge of the linkages of mangrove, seagrass, coral reefs, etc. in coastal ecosystems along with international concern has improved the outlook for more comprehensive management.

Unfortunately, I have not been able to mention all the excellent articles in this issue. Still, those not mentioned combined with those mentioned cover only a portion of the activity in our field. A thread common to all is the confirmation that we are in a transitional phase of coastal management practices. Moreover, the articles suggest that further advances are likely in the new millennium if we remain dedicated.

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