Tropical Coasts

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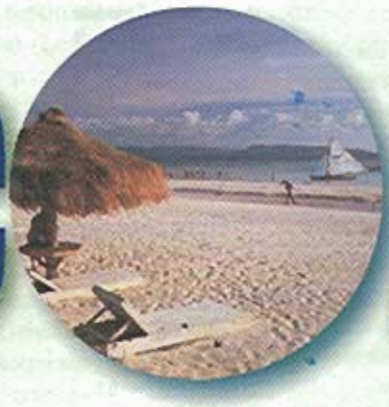
COASTAL TOURISM



EDITORIAL

Tourism is a rapidly growing industry contributing significantly to the gross domestic product of many countries around the world, with coastal tourism generating a substantial share of this invisible export. In the East Asian region, coastal tourism, which is largely "sand, sun and sea", is a significant foreign exchange earner, in countries like Indonesia, Malaysia and Thailand. During the past three decades, coastal tourism has had a phenomenal growth in most littoral countries in the region, fostering economic development and job creation in many tropical resort areas like Phuket, Pattaya, Bali, Penang, Batam and Boracay. Even with the regional currency crisis, coastal tourism is still a major source of revenue. However, the economic impacts may be more localized while the overall situation at the national level remains relatively unchanged (e.g., shift to non-coastal tourism).

Some of the internationally well-known coastal resorts cited above have become overdeveloped and show signs of environmental degradation like erosion and pollution in addition to sociocultural problems. Yet these places continue to thrive, probably because of the presence of other attractions (e.g., entertainment, cultural sites and theme parks). In recent years, "environmentally friendly" tourism or eco-tourism such as SCUBA diving in coralline areas, wildlife observation and nature sightseeing or trekking have become popular. If proper tourism plans and effective enforcement are not in place, the likelihood of these types of tourism to be sustainable will diminish. To be sustainable, tourism should contribute to the economic and social development of the locality enriching local culture and lifestyles in a positive direction. A component of such a plan should be public awareness on the environment, not only dealing with cleanliness (e.g., solid waste) but also on the conservation of living resources, preservation and protection of landscapes and maintaining or improving environmental quality (air, water, ecosystems).

The impacts of coastal tourism on the environment and the marine ecosystems in particular are due to infrastructure development, recreational activities and sociocultural interactions compounded by inadequate and ineffective legal and institutional arrangements including enforcement. Unlike other economic sectors, coastal tourism is highly dependent on the environment (i.e., coastal waters, beaches, coral reefs, etc.) and the degradation of that environment will result in the degradation of the industry itself as well as creating secondary impacts on other industries (e.g., service-oriented industries, local commercial enterprises). For example, Boracay, Philippines, recently was the center of a controversy between two government agencies—the Department of Tourism and the Department of Environment and Natural Resources—over the level of coliform in coastal waters, suggesting contamination by domestic waste from commercial establishments. Apparently, many of the commercial establishments (hotels) did not have environmental compliance certificates to operate so that most of their domestic wastes were not properly disposed of. From the point of view of the tourism department, such pronouncement generated negative publicity on the resort and scared away tourists resulting in economic losses. Although the controversy has dissipated, it illustrates a very typical situation in tourist centers in the region. In many ways, coastal tourism programs and activities often fail to appreciate the benefit of the resources that are the very basis of their industry, centering largely on the profits potential rather than on their true value.

This eighth issue of the *Tropical Coasts* presents work on how coastal tourism can be sustainable through the assessment of the resources and associated economic activities including carrying capacity. By analyzing or evaluating these factors and parameters, decision makers and stakeholders will be able to appreciate the intrinsic, sometimes manifestly intangible values of coastal resources and ecosystems in quantitative economic and physical terms. While refinement is still needed, these values can serve as benchmark in planning and management to develop, improve or expand the tourism industry, resolve conflicts, safeguard environmental quality and zoning of tourist sites, among others. Ample classic cases of coastal resorts having resource use conflicts and environmental problems can be found worldwide. By examining these cases, assessing the resources in physical and economic terms and developing coastal codes and policies and in partnership with the private sector, concerned government agencies in the East Asian region can go a long way towards ensuring sustainable coastal tourism and at the same time, conserving and protecting the environment.

James N. Paw, *Issue Editor*

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MANAGEMENT OPTIONS FOR COASTAL AND MARINE RESOURCE PROTECTION

Conceptual Framework

Tourism is an invisible export with the unique characteristic that the purchasers of its 'products' have to travel to a destination (e.g., other countries) in person to 'consume' them (Lea, 1988). Tourists may be prepared to travel long distances if the destination is worth the time, trip and expense including suitable accommodation. It makes use of or 'consumes' both onshore and offshore coastal resources such as swimming, windsurfing, water skiing, boating and fishing. These activities are made possible by a detailed tourism infrastructure, and the continuous growth of the tourism industry which consequently results in critical changes in the natural and human systems in the coastal zone. Specific tourist activities also take place on coral reefs, which with their unique marine life require special care to ensure their longer-term viability (OECD, 1993). The private and public sector economics of tourism needs to be recognized, planned, monitored and regulated to achieve sustainable development. Otherwise, it leads to haphazard expansion of the tourism industry, further intensifying multiple-use conflicts within the coastal and marine ecosystem.

> *"... tourism development involves choices made between national and regional economic programs, and between the welfare of diverse interests whose uses of coastal resources compete..."*

Most studies that analyzed tourism emphasized the revenues and employment generated by this industry as well as the possible detrimental changes in the natural environment. Two of the many important tradeoffs that are part of tourism development involve choices made between national and regional economic programs, and between the welfare of diverse interests that compete in the use of coastal resources (Miller and Ditton, 1986). The issue of *economic efficiency* usually arises as a result of the use of coastal resources for alternative activities, i.e., the 'opportunity cost'. Since resources are limited, they should be used in activities where the *net economic returns* are the greatest. Net economic returns or net benefits are considered here as net of all costs, including environmental and other social costs.

The economic analyses described below have been applied to coastal tourism in the Malacca Straits. This paper is part of the study on risk assessment and risk management of the Malacca Straits Demonstration Project under the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas.

Concept of benefit-cost analysis

The *benefit-cost analysis* is the popular technique for evaluating public expenditures and policies for a non-marketed commodity, such as water and marine resources. Where market failure exists, the benefit-cost analysis, using shadow prices for the non-marketed impacts, will aid in preventing wasteful usage of resources.

Net present value (NPV)

The most commonly used formula in project analysis is the net present value (NPV). It determines the present value of net benefits (that is, benefits less costs) by discounting the streams of benefits and costs back to the beginning of the base year (year 0) across an economic time horizon. The appropriate time horizon for a project depends on the following factors: (1) the expected useful life of the project in terms of yielding the outputs and the associated economic benefits for which the project is designed, and (2) the level of the discount rate used in the economic analysis (Dixon and Hufschmidt, 1986). The discount rate is used to compare and weigh benefits and costs that occur at different points in time, and to get the present value of the benefits and costs yielded by the project. The discount rate factor, which is chosen exogenously, acts progressively to reduce the present value of outputs or benefits obtained in future years. Hence, the lower the discount rate, the longer the economic

time horizon. Moreover, all prices used in the analysis are real or constant (dollar) prices; thus, the discount rate should not reflect inflation. Benefits and costs are defined as the difference between what would occur *with* and *without* the project. A positive value for NPV indicates that benefits from the project are greater than costs over time.

Benefit-cost ratio (BCR)

The *benefit-cost ratio* is a simple derivative of the net present value criterion. This ratio compares the discounted value of benefits with the discounted value of costs. A BCR of less than 1 means that the project generates losses from an economic point of view.

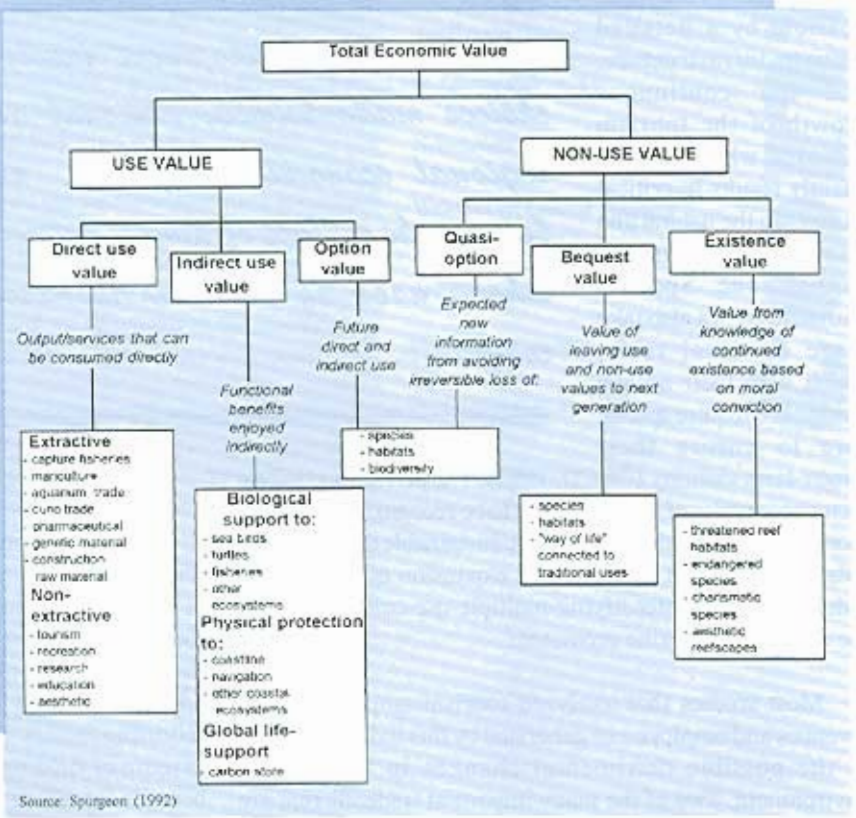
Traditionally, only the direct project benefits and project costs are accounted for in project evaluation. The expanded approach results in combining both economic and environmental analyses. This approach includes the external and environmental improvement benefits (plus the benefits from environmental protection), as well as the costs of external and/or environmental damages and of environmental control measures, being careful not to double count the latter (Dixon and Hufschmidt, 1986). Thus, the economic analysis is done from the standpoint of society's welfare, wherein social opportunity costs and benefits from various policies or projects are reflected.

To get the values for the external benefits and costs, the environmental effects of the project must first be identified. Secondly, these effects have to be quantified (in physical terms), and then the quantified changes have to be valued or given monetary values. The actual economic analysis or comparison of benefits and costs is conducted after the monetary valuation of important environmental effects has been accomplished.

Total economic value

Conceptually, the *total economic value* (TEV) of a natural resource or environmental service is the amount of resources, expressed in common units of money that society would be worse off if the natural resource or environmental amenity were lost. It consists of (i) use value (UV) and (ii) non-use value (NUV). *Use values* may be broken down further into the direct use, indirect use and the option value (potential use value). The direct use values that can be derived from coastal and marine resources include the *net* benefits from fishery, recreation and tourism, while indirect use values include benefits of carbon sequestration, erosion and flood control, etc. The *option value* is the willingness to pay to maintain the natural resource weighted by the probability that the resource will be used at some future date. One major category of *non-use value* is *existence value*. It arises from the satisfaction of merely knowing that the asset exists, although there may be no intention of using it. The value derived from non-uses, however, depends on the number of the people, their awareness of the natural resource (e.g., coral reef), their level of information, and their preferences for the resource and its characteristics (Universitetet I Bergen Senter for Miljo-og Ressursstudier, 1994). ***Figure 1*** illustrates the economic values attributed to the environment, using coral reef as an example.

Figure 1: Total Economic Value.



The entire east coast of Sumatra has natural beaches, and the developments (ports, residential and industrial estates, tourist resorts) represent only a small portion of the beach area. In Singapore, natural beaches are narrow, while artificial beaches, found along the east coast of the main island, are created from coastal land reclamation. In Malaysia, the known beach resorts are found in Pangkor Laut Island, Langkawi and its southern islands, Port Dickson, Pulau Land Tengah (Blue Coral Island) and Tioman Island. The coral reefs along the Malacca Straits are in fair condition, but are facing degradation due to sedimentation, fishing intensity, etc., although tourist activities have so far not contributed much to the stress (Chua et al., 1997).

Among the direct impacts of tourism in these countries are the revenues derived from this sector. From 1982 to 1995, the number of annual arrivals in Indonesia increased by a record level of almost 630%—from 592,000 in 1982 to 4.3 million in 1995. For Malaysia, the number of annual arrivals increased from 2.5 million in 1981 to 7.3 million in 1995, or an increase of 189%. The number of annual arrivals to Singapore more than doubled—from 3 million in 1985 to 7 million in 1995 (*Table 1*).

The tourism receipts in Indonesia increased by 127%, from $2.1 billion in 1990 to $5.2 billion in 1995. Tourism in Malaysia is the third major foreign exchange earner. Revenues (from tourism) increased from $1.7 billion in 1990 to $3.9 billion in 1995 in Malaysia. For Singapore, tourism revenues account for about 7% of GDP and about 6% of total exports of goods and services. There was an increase from $8.3 billion in 1990 to $11.7 billion in 1995 in Singapore.

Management options

Two management options are considered in this paper: coral reef protection, and setback zoning for the beach areas, and a 20-year time horizon is adopted for the benefit-cost analysis. Discount rates of 5%, 10% and 15% are used for sensitivity analysis. Lower discount rates are preferred for environmental projects while higher discount rates are preferred by financial analysts to reflect market rates for investment and working capital.

Table 1: Visitor Profile, Indonesia, Malaysia and Singapore, 1990-1995.

	1990	1991	1992	1993	1994	1995
INDONESIA						
Purpose of visit ('000)						
Vacation	1,767	2,128	2,520	2,534	2,894	2,864
Business	284	326	400	753	1,006	1,367
Others	127	116	143	116	106	93
Length of stay (days)	11.82	11.84	11.08	10.66	10.33	11.15
Ave. per capita daily expenditure ($)	81.79	82.89	96.56	109.92	115.63	108.44
MALAYSIA						
Purpose of visit ('000)						
Vacation	3,648.8	3,917.5	4,024.7	4,377.2	4,732.9	4,905.7
Business	361.0	361.0	385.0	396.7	423.8	439.3
Others	1,624.3	1,624.3	1,606.3	1,730.1	1,907.3	1,976.9
Length of stay (days)	—	4.6	4.8	—	—	—
Ave. per capita daily expenditure ($)	47.06	57.78	62.97	64.38	36.60	45.37
SINGAPORE						
Purpose of visit ('000)						
Vacation	3,312	3,133	3,519	3,752	4,024	3,965
Business	1,023	1,020	1,064	1,145	1,240	1,321
Others	988	1,262	1,407	1,529	1,635	1,851
Length of stay (days)	3.3	3.26	3.14	3.0	2.95	2.89

Sources: Department of Tourism, Posts and Telecommunications. *Statistical Report on Visitor Arrival to Indonesia.*
Malaysian Tourism Promotion Board. *Annual Tourism Statistical Report.*
Singapore Tourism Promotion Board. *Singapore Annual Report on Tourism Statistics.*

The direct benefits (revenues and consumer surplus) considered in this paper are for tourism only. *Table 2* shows how tourism revenues from beach use in the Malacca Straits are derived. It is assumed that the tourists spent at least 30% of their stay in the beach or marine parks (Cesar, 1997). For the direct benefits of coral reef protection, revenues from divers in the coral reef sites in the Malacca Straits are derived, assuming that the number of divers is limited to 80,000 per year to maintain carrying capacity, and that average daily expenditures amount to $266 per day (Vogt, 1996).

(*Table 1*) are used. For beach use and coastal amenities, these benefits ranged from $182 million to $437.2 million in 1995. For recreational amenities provided by coral reefs and marine parks, the benefits (especially for divers) ranged from $1.6 million to $390 million.

The total beach area in the three countries is about 272,289.1 ha (GEF/UNDP/IMO, in press). Adopting the value of $49.73 as the value of the consumer surplus (adjusted consumer surplus derived by Bell and Leeworthy, 1990), the total consumer surplus in the three countries

Table 2: Tourism Revenues from Beach Use

	Code	Value
Indonesia		
Visitor arrivals (to Batam and Medan/Sumatra)	a	1,167,480
% of tourists going for vacation	b	66%
Average length of stay (days)	c	10
% of time spent at beach	d	30%
Average expenditure per day	e	US$108.44
Subtotal	f1=a•b•c•d•e	US$250,671,031.78
Malaysia		
Visitor arrivals (to West Coast towns and islands)	a	2,928,800
% of tourists going for vacation	b	67%
Average length of stay (days)	c	4.8
% of time spent at beach	d	30%
Average expenditure per day	e	US$45.37
Subtotal	f2=a•b•c•d•e	US$128,202,292.11
Singapore		
Visitor arrivals	a	7,137,255
% of tourists going for vacation	b	56%
Average length of stay (days)	c	1
% of time spent at beach	d	30%
Average expenditure per day	e	US$386.54
Subtotal	f3=a•b•c•d•e	US$463,484,204.01
TOTAL	f1+f2 +f3	US$842,357,527.90

Valuing tourism benefits signifies measuring not just the direct monetary benefits, such as tourism receipts, but also the surplus that these natural resources would generate to the local economy if the environment and natural resources were efficiently priced for the tourist population. The various estimates of consumer surplus (per person per day) derived from studies on recreational demand by tourists are adopted in this study as measures of non-market benefits provided by coastal and marine resources. The consumer price index (CPI) is used to adjust these consumer surplus figures to real or constant prices for the years considered. To get the aggregate values, the number of tourists going to Indonesia, Malaysia and Singapore for vacation, particularly in places along the Malacca Straits, and the average length of stay

amounts to $326.6 million per year or $1,199.47 per ha per year. The total area of coral reefs in the Straits is 6,532.12 ha (GEF/UNDP/IMO, in press). Adopting the value of $277.93 as the consumer surplus of divers (adjusted consumer surplus derived by Pendleton, 1993), and 80,000 divers per year, the total consumer surplus is estimated to be around $22.2 million per year or $3,403.85 per ha per year. These values (benefits) will be dissipated over time if the resources are not maintained or protected.

The main indirect benefit to be derived from setback zones for beach is shoreline protection, and letting natural vegetation to occur. For coral reefs, the indirect benefits are maintenance of biodiversity, contribution to research, and

prevention of erosion. These indirect benefits are included in the economic analysis because of their impacts on tourism (*Table 3*). Except for the value of the direct benefits (i.e., tourism revenues and consumer surplus), the value of the indirect benefits and costs used in the economic analysis are from GEF/UNDP/IMO (in press). The economic analysis shows positive NPVs for the different discount rates used. Moreover, large NPVs indicate the acceptability of these policies (*Table 4*).

Table 3: Estimated Benefits and Costs (in US$ per ha per year) of Coastal Resource Management.

Coral reef protection		
Direct benefits:	Eco-tourism	24,636.72
	Consumer surplus (diving)	3,403.85
Indirect benefits:	Biodiversity (option and existence value)	15.00
	Research	91.08
	Erosion prevention	34,871.75
Costs:	Eco-tourism	
	Investment cost	115,189.98 (in year 1)
	Annual cost	4,224.67
	Maintenance cost	4,115.77
	Mitigation cost	5.75
Beach: setback zone		
Direct benefits:	Tourism	3,175.77
	Consumer surplus	1,199.47
Indirect benefits:	Shoreline protection	103.01
Costs:	Investment cost	3,627.47
	Annual cost	133.04
	Maintenance cost	130.87

When incorporating quality attributes, the aggregate values are estimated by multiplying the adjusted *consumer surplus per person*[1] (resulting from such pollution reduction and beach nourishment programs) by the same variables used in deriving the aggregate value of consumer surplus from beach use by tourists. The pollution and erosion reduction schemes provide large benefits, particularly to tourists (and to local users as well), and can be used to justify such schemes. Existence values for beach nourishment are positive for several reasons: bequest motives, benevolence toward relatives and friends who use the beach, sympathy for people and animals affected by beach erosion, feelings of responsibility to preserve environmental resources such as a beach, and altruism (Silberman et al., 1992). *Table 5* indicates the potential gains to be made from maintaining natural areas.

Any program involving either conservation or management of these resources should consider the tourism benefits that its present status provides to the local/regional economy. Tourists/consumers appreciate the quality and availability of particular characteristics, such as beaches, landscapes, clean air and sewage treatment. For

Table 4: Summary of Results of the Benefit-Cost Analysis (US$ per ha).

Management Program	Discount Rate 5%	10%	15%
Coral reef protection			
NPV	565,648.09	349,924.81	226,771.12
BCR	3.57	2.88	2.35
Setback zone for beach			
NPV	48,892.52	32,251.58	22,751.48
BCR	8.07	6.49	5.31

[1]The studies considered are: (a) Bockstael et al. (1987) for the 10% reduction in oil, coliform bacteria and color; (b) Bockstael et al. (1989) for the 20% reduction in nitrates and phosphates; (c) McConnell (1986) for reduction of polychlorinated biphenyl; and (d) Silberman and Klock (1988) for beach nourishment programs.

Table 5. Potential Gains from Maintaining Natural Areas.

1. 10% reduction in oil, coliform bacteria and color	$ 64.9 million
2. 20% reduction in nitrates and phosphates	$ 906 million
3. reduction of polychlorinated biphenyls (PCBs)	$ 44.4 - 51 million
4. beach nourishment (to mitigate erosion effects)	$ 61.6 - 256.9 million

example, any loss of coral reef and water quality and reduction in the fish population would result in divers shifting their demand to other islands competing for the same market, and the loss of this market would be very difficult to replace with other visitors (Dixon et al., 1994).

Conclusion

Environmental quality and state of natural resources, together with price, service quality and accessibility influence consumer choice. On the other hand, production decisions, such as provision of tourism infrastructure (hotels, resorts), have effects on the conditions of the environment and natural resources. Thus, tourism has both positive and negative impacts. Regulated tourism development, however, can reduce or mitigate the negative impacts. The benefit-cost analysis of policies toward beach zoning and coral reef protection shows that the costs involved in implementing these policies are less than the tourism and recreational benefits that will be gained from maintaining biodiversity and the state and quality of coastal and marine water and resources. The large NPVs derived in this study indicate the 'profitability' of undertaking management programs for the protection of these resources. Moreover, there are large potential benefits, as shown by changes in consumer surplus as a result of pollution reduction and beach nourishment programs.

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TOURIST COASTS: UNDERSTANDING COASTAL TOURISM

Coastal tourism is an activity familiar to most people. For coastal zone management (CZM) planners, this activity has to be assessed carefully as it makes demands on resources, competes with other uses, and has significant impacts, sometimes negatively.

Tourist Coasts

Most coastal researchers would generally agree that natural coasts can be classified into simple categories of cliffs, stony coast, sandy coast, mangrove coast and coral reef coast. For coasts changed by human activities, the term "artificial coasts" is used but this has a strong connotation to coastal structures. The term "developed coasts" can also be used. This constitutes a larger category in which several types of human-impacted coasts can be included. Tourists coasts are those developed for recreation and tourism.

A case can be argued for using the term "tourist coast" instead of coastal tourism. Presently, "coastal tourism" tends to refer more to general tourism which includes non-coastal activities. The studies on coastal tourism largely deal with resort morphology, processes of coastal tourism development, resort evolution and resort typology in which the coast is often reduced to a straight line. There is not enough evaluation of the physical system and its implications for a fuller understanding of coastal tourism.

A patch of mangroves at the end of a bay beach prevents fine materials of a nearby stream from reaching the sandy beach, Lombok, Indonesia.

Conceptually, the interaction of a physical system (coast) with the human system (tourism) should result in coastal tourism or a tourist coast, and ideally all components should be treated holistically. By focusing on tourist coasts, the physical system can be better related to tourism and thus, reduce the imbalance. This is sometimes easier said than done. For example, a tourist coast has zones above and below water level, but there are different ways of defining these zones based on biosciences or geosciences.

This paper attempts to look at tourist coasts from the perspective of coastal geomorphology, which is the study of the forms and processes of the coast and is strongly based on field work.

Basic Field Studies

A coastal geomorphological study was conducted along 100 km of the north coast of Bintan, an Indonesian island located about 40 km south from Singapore, for the development of a large integrated resort. The work produced an inventory of maps on a scale of 1:20,000 showing various coastal types (sandy shore, rock shore, coral reefs, mangroves, artificial shore, island). This was supplemented by information on stream outlets, coastal erosion, and beach profiles and grain size changes of twenty-four stations for three monsoon periods.

The field study serves several purposes: it identifies potential tourism sites which include beaches, headlands and other unique features, identifies ecologically sensitive or fragile areas, such as small islands, certain headlands, fringing reefs and mangroves, where resort development is not recommended; indicates the setback lines, based on the seasonal beach changes and other information; and provides preliminary information for EIS (environmental impact statement).

Such field studies are basic and should be carried out for any proposal to develop the coast for tourism. To meet the needs for information (especially for EIS requirements) and with the current economic crisis, there is a need to develop suitable methodologies for rapid and reliable field studies of tourist coasts.

Coastal Sites

Site is one of several factors influencing coastal tourism. It is strongly associated with the physical environment of the coast. Specific advantages and disadvantages of the site can influence the layout and evolution of resorts. For example, sites on wide sandy beaches and in large bays with a hinterland are different from sites on rocky headlands, small islands or coral cays.

A study on the resorts and coastal geomorphology of the east coast of Peninsular Malaysia identifies several characteristic sites for resorts (***Figure 1***): zetaform bays (also called crenulate, crenellated, half-heart, J-shape) with a protected upcoast curve in the lee of the headland; non-zetaform bays which are usually small and have strong seasonal beach changes at either ends; coastal barriers; low linear coasts and estuaries. This schema provides a useful basis for planning resort sites on similar types of coast. It can be expanded or modified for use elsewhere. Similar or related schema can be developed to identify and analyze the tourism-coast interactions.

Figure 1: Beach Resort Sites in (A) Zetaform Bay, (B) Non-zetaform Bay, (C) Coastal Barrier, (D) Low Linear Coast and (E) Estuary.

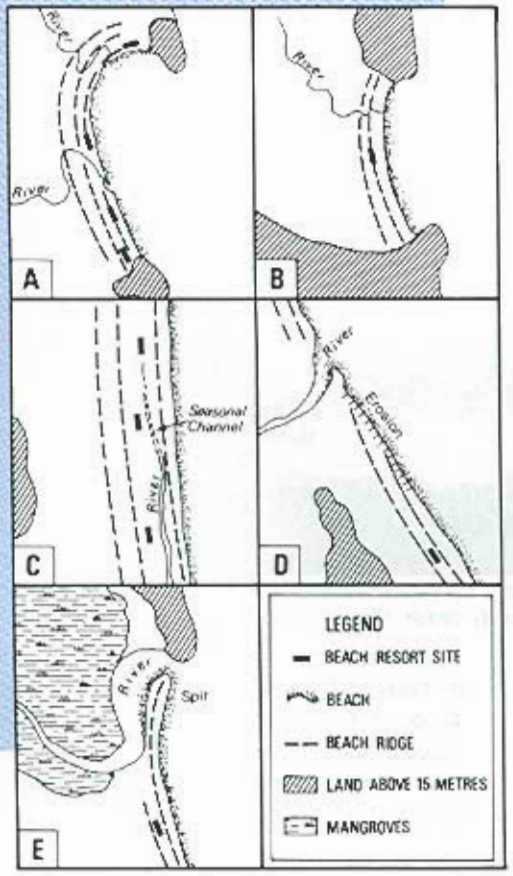
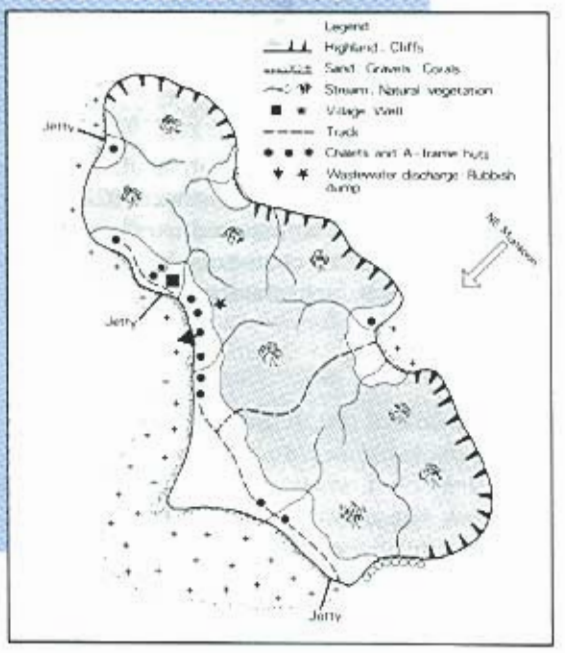


Figure 2: Schematic Representation of Small Island Tourism.



Small Island Tourism

Islands with their unique combination of landforms and water are particularly favored for tourism development. Tropical islands have an added asset of year-round sunshine and the presence of coral reefs which create distinctive coralline beaches. Island size is one of the critical factors influencing island tourism. A study on tourism development on small islands off the east coast of Peninsular Malaysia shows the significance of the island's geomorphology and its relationships to tourism development. ***Figure 2*** attempts to summarize these relationships.

The island's coastal geomorphology is strongly affected by the monsoons, with an exposed east coast marked mainly by cliffs and a sheltered west coast with beaches. Accessibility is an important factor in tourism development and again, coastal geomorphology dictates the construction of long jetties across the reef flats on the west coast. Tourism development is confined mainly to the sheltered coast, and connected by a series of paths and tracks. More isolated beaches are reached only by boats. The island resources are limited. The water supply is from wells but this has become increasingly saline due to a lowering of the water table and the islands have been relying on potable water in jerry cans brought in by boats. All food supplies have to be imported except for limited amounts of coconut, fish and poultry from the local fishing village. Tourism

development is typically spontaneous and operates on a small scale based on chalets or A-frame huts. The negative impacts of such development are evident in the inadequate setback from the beach, the discharge of wastewater into the sea and rubbish dumps hidden in a vegetated area out of sight from tourists.

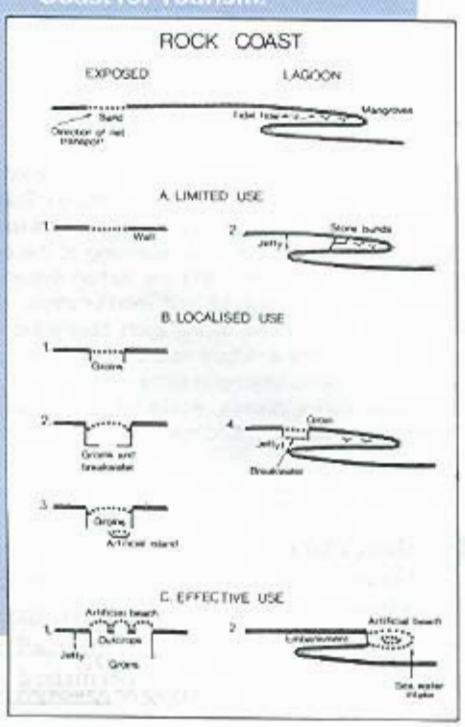
An artificial beach in a bay excavated on a low limestone coast, Mactan Island, Philippines.

Rock Coast Tourism

Coastal tourism in Southeast Asia is strongly based on sandy beaches and not many resorts have established on rock coast sites. The southeast coast of Mactan, a small island east of Cebu, Philippines, provides a useful example on the adaptive use of tourism on a low rock coast. Tourism development in Mactan started in the 1970s. A field study of the Mactan resorts suggests three major changes to the rock coast (*Figure 3*). The initial stage involved a minimum change to the rock coast and the beaches. The second stage witnessed a variety of coastal structures established to retain the beaches and beach nourishment. Groins are the main structures and together with breakwaters, a variety of resort layout was created. The final stage was the excavation of the rock coast or the lagoon and the creation of artificial beaches.

Mactan's experience shows the potential and extent to which a low rock coast can be used for resort development. Much depends on the deployment of appropriate coastal protection measures, beach nourishment and the success of artificial beaches (grain size and density are critical factors). Spatially, such tourism development gives rise to compact enclave instead of the ribbon development characteristic along sandy coasts.

Figure 3: Adaptive Use of Low Rock Coast for Tourism.



Coastal Erosion

Coastal erosion appears to be an issue on several tourist coasts of Southeast Asia. On some tourist coasts, the evidence for coastal erosion is less although sea walls have been built to protect the resort property. Several questions need to be addressed: how and to what extent are coastal erosion and coastal protection measures related to tourism development? Is coastal tourism a significant factor in coastal erosion?

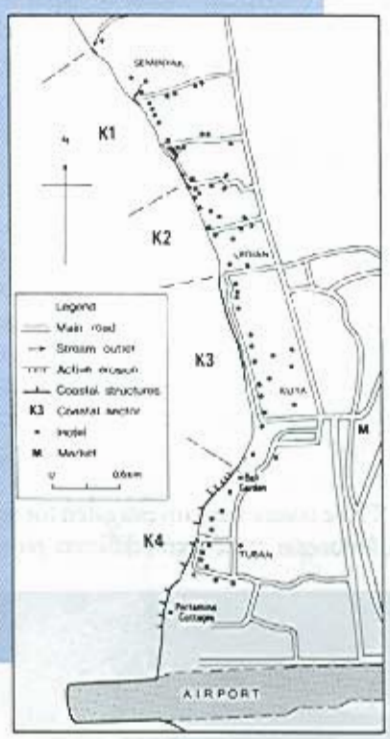
These issues were investigated for six tourist beaches in Bali, Indonesia, which have different physical characteristics,

Sea walls encourage beach erosion, Koh Samui, Thailand.

various levels of tourism development and a variety of coastal protection measures. Field mapping and analysis were carried out on three variables: the physical nature of the coast, the nature and extent of tourism development and shore protection measures. Where necessary, the tourist coast was subdivided into appropriate sectors based on one or more of the variables and the information summarized in maps and in a table for comparison. An example is given for Kuta coast, the most popular tourist coast in Bali (***Figure 4***).

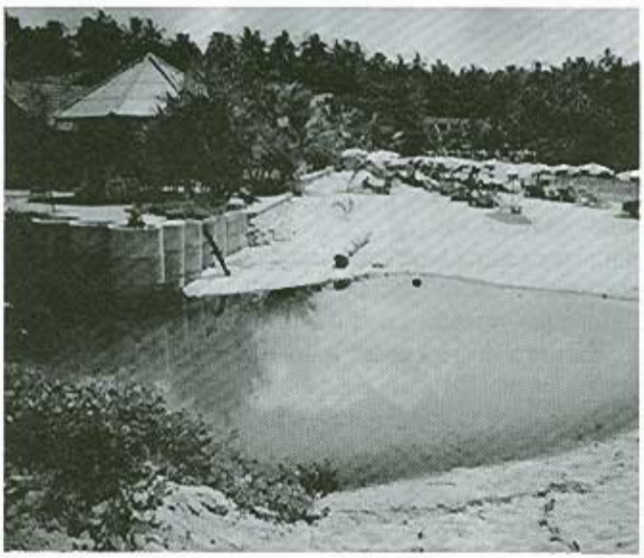
The results show that a tourist coast is likely to develop as a single-sector coast based primarily on its physical character. Multiple sectors subsequently result with the deployment of coastal structures. The physical factor is likely to remain constant or even decrease in significance in the evolution of the tourist coast. For Bali, the coastal protection measures are deployed in three situations: (a) measures to protect resort properties from erosion due to natural and human causes; (b) specific measures to provide the coastal environment for tourism, e.g., breakwaters to provide protected waters, groins to protect artificial beaches, beach nourishment; and (c) "last-resort" measures to salvage the coastal environment for tourism, e.g., at Candi Dasa where large T-groins are used to protect a coast that has lost its beaches due to the destruction of the coral reef and the construction of sea walls.

Figure 4: Tourist Coast of Kuta, Bali.



Sustainable Coastal Tourism

Sustainable coastal tourism is still a debatable topic but will benefit from an increased research input from the environmental (coastal) perspective. As yet, there is no model for sustainable coastal tourism applicable to Southeast Asia. Current major issues center on the scale of tourism development, inputs to local population and implementation. Information provided by the technical and field research in environmental science, engineering and management to identify the "best" practices can provide directions for sustainable coastal tourism.



Polluted water, unnecessary sea walls, inadequate setback and destruction of coastal vegetation can be prevented by the enforcement of proper environmental guidelines for coastal tourism development.

Notes

The International Geographical Union Commission on Coastal Systems (IGU CCS) currently runs a project on Tourist Coasts convened by the author. Its objective is to examine tourist coasts holistically, based on a sound understanding of the components of the physical system (coast) and the human system (tourism). The environment/tourism links and relationships, issues and challenges and opportunities facing such coasts include coastal resort space and models; future scenarios of change of tourist coasts; specific aspects relating to setback lines and buffer zones, coastal erosion, public access, sustainability, carrying capacity, etc; planning tourist coasts; and management of tourist coasts.

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TUBBATAHA REEF NATIONAL MARINE PARK

Introduction

Tubbataha Reef National Park is the Philippines' only national marine park. It is included in the UNESCO World Heritage list (considered as a significant national habitat for *in situ* conservation of biological diversity). There are a number of marine protected areas in the country, but none approaches Tubbataha in area, diversity of marine fauna and marine habitats, and abundance of marine organisms. The purpose of the park is "to protect and preserve the coral reef atoll with its abundant and diverse reef assemblage, including the marine turtles and water birds found roosting in the area."

> *"...to protect and preserve the coral reef atoll with its abundant and diverse reef assemblage, including the marine turtles and water birds found roosting in the area."*

Proclaimed by Philippine President Corazon C. Aquino a national marine park under Proclamation no. 306 on 11 August 1988, Tubbataha occupies an area of 33,200 ha of coral reefs, islets and marine waters in the center of Sulu Sea (119°50'-120°04' latitude and 8°43'-8°54' longitude), about 156 km east of Puerto Princesa, Palawan, to which province the marine park politically belongs. Proclamation no. 306 states that the administration of the park is the responsibility of the Department of Environment and Natural Resources (DENR). But in the early 1990s, a nongovernment organization was authorized by DENR to manage the park. This authority was later withdrawn probably because of many reports on violations of park regulations. The Navy was then given the responsibility to protect the park. At this time, the DENR may have tasked the Palawan Council for Sustainable Development to manage the park.

Hard coral assemblages are very common along the reef margins of Tubbataha. Branching corals such as the staghorns (*Acropora* sp.) are extremely vulnerable to destructive fishing practices and they constitute the majority of the rubbles found in dynamite-blasted reefs.

Prior to the proclamation, Tubbataha was a center of controversy between farmers of the seaweed *Eucheuma* who had set up their farms in one of the lagoons and the environmentalists who objected to the use of the reef area on ecological grounds. The controversy was resolved when the DENR issued eviction orders forcing the farmers to leave the area.

Nature of the Tubbataha Environment

Tubbataha is part of the reef system in the middle of the Sulu Sea. The reef system includes Cagayan Islands, Cavili Island, Arena Island, Basterra Reef and several others. Because of the resemblance to the atolls in the South Pacific region in having a central lagoon surrounded by a rocky rim, the term "atoll" or "semi-atoll" has been given to the North and South Reefs of Tubbataha.

Biological Importance of Tubbataha

Tubbataha is possibly the source of fish larval recruits for coral reefs in the west and southwest part of Sulu Sea, including those associated with or near the Palawan mainland. Such recruits could be carried by prevailing ocean currents to these reefs, which serve as fishing areas. This hypothesis makes sense. First, water from the Pacific Ocean upon entrance to the Sulu Sea, has been reported to move

westward and southwestward (Soegiarto, 1986). Second, the currents generated would bring larvae of marine organisms from Tubbataha to the Palawan group of islands through a distance of some 150 km, well within the distance traversed by fish larvae before settlement. If these assumptions hold, the larval recruits from Tubbataha would be a major factor to ensure the sustainability of the fisheries of the Palawan area, which supplies a considerable portion of the fish needs of Metro Manila.

Schools of reef fishes are often encountered in close association with the corals. Small-sized species of damselfishes for instance, seek refuge from predators by swimming very close to the branches of tabulate corals.

Marine Environment and Resources of Tubbataha

The marine resources of the Tubbataha Reef Natural Park have been studied by scientists from the Marine Laboratory of Silliman University including the problem of poaching. The major findings and conclusions of these assessments, which were carried out in three seasons from 1991 to 1992, are:

1. The observed numbers of bird species were much reduced compared to observations made before 1991.
2. Four or five large marine mammals have been sighted in Tubbataha waters.
3. Data for numbers and biomasses of target fish species (Serranidae, Lutjanidae, Lethrinidae) are much higher compared to other fishing areas in the Visayas.
4. The densities of ichthyoplankton (fish and crustacean larvae) were also higher than in other areas of the Visayas.
5. Poaching occurred in the site as shown by the presence of dried shark fins, fish and live fledgling boobies in a fishing boat apprehended by a survey party in May 1991. Several carcasses of marine turtles littered the beach at North Islet, apparently killed by the poachers for food.
6. Live coral cover in both North and South Reefs showed a clear decreasing trend from 1984 to 1992, a definite indication of human disturbance, possibly through fishing with dynamite.
7. Concentrations of nitrates and phosphates were low as expected in unpolluted marine waters.
8. Research is needed to assess the role of Tubbataha as the source of fish larval recruits for the fisheries stocks along Palawan and nearby fishing grounds.

"...any economic development that will have bearing on Tubbataha should be designed and implemented with conservation and protection as the overriding concern."

Eco-tourism

Tourism in Tubbataha is mainly the eco-tourism type such as SCUBA diving, snorkeling and underwater photography. Tourists, mostly foreigners and domestic corporate executives, are the frequent visitors. As there is no tourism infrastructure in the area, organized tours are made, generally originating from Puerto Prinsesa (capital of Palawan) consisting of 2 to 3 large vessels carrying about 30 to 40 people. Each tour generally lasts for a week with 5

days of diving and each diver is charged about US$200 per day. These tours are organized by private tourism groups largely based in Manila or Cebu. Thus, in terms of tourism

Surgeonfishes are also common in shallow waters where they feed mainly on algae found in association with the corals. A tabulate coral (*Acropora* sp.) is shown here with the fishes.

very little revenue or income is accrued to Palawan, particularly the residents (boat operators and local diving guides). The diving season lasts about 4 months from March (end of the northeast monsoon) to June (start of the southwest monsoon).

Protection of Tubbataha is tasked to the Philippine Navy. However, the area is large so that illegal fishing (although not rampant) is difficult to control. Being a World Heritage Site, any economic development that will have bearing on Tubbataha should be designed and implemented with conservation and protection as the overriding concern. Fishing, for instance, should only be allowed at designated areas outside the site. To help the government in the protection and conservation of the World Heritage Site, a public-private partnership with tourist operators having strong environmental concern should be forged as a long-term goal. With this partnership, the government can collect diving permit fees or overhead cost (e.g., equivalent to about US$100 or more per tourist per tour) and in turn, should provide facilities for waste management, servicing of diving equipment and vessels, emergency assistance and improve security (i.e., for environmental protection and conservation) of the site. The private tour operators will benefit from such infrastructure through reduction of maintenance and operating expenses, increased tourist volume and access to facilities and services. For their part, the private tour operators can help in the conservation of the site through environmental public awareness (not just concentrating on the corals or the fishes), especially of the fishermen in nearby areas and of the general population about the ecological significance of Tubbataha.

An exquisite array of tabulate corals (*Acropora* sp.) found in the shallow portions of the reef system of Tubbataha. Protection of these fragile organisms and their habitat would ensure the sustainability of the fisheries in the Palawan area.

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CARRYING CAPACITY AND SUSTAINABILITY OF COASTAL TOURISM IN HIKKADUWA, SRI LANKA AND CALANGUTE, GOA, INDIA

Introduction

The development of coastal tourism in developing countries poses special problems compared with non-coastal sites. Several factors contribute to this phenomenon:

i. The high demand for tropical beach holidays has led to mass tourism and *ad hoc* development of coastal tourism infrastructure accompanied by adverse ecological, environmental and sociocultural impacts.

ii. The coastal areas are characterized by multiple resources and users leading to conflicts among different user groups.

iii. Tourist business sectors in coastal areas are owned by hotel groups and individuals from outside the area with inputs also obtained from outside resulting in lesser benefits to the locals and to their neglect.

iv. Management policies in the coastal areas are implemented by a variety of local, national and regional organizations depicting uncoordinated efforts.

To ensure the continued viability of tourism (also called "sustainable tourism") requires the maintenance of "environmental, social and economic integrity and well being of natural, built and cultural resources in perpetuity" (Federation of Nature and National Parks, 1993). One way to measure sustainability is to identify the carrying capacity of a tourism site. It provides a useful technique to understand the threshold limits beyond which the activities seem to be unjustifiable.

The World Tourism Organization (WTO) reports that "*Carrying capacity is the level of visitor use an area can accommodate with high levels of satisfaction for visitors and few impacts on resources*" (WTO, 1992). Boullion (1985) provides a general formula to estimate the tourism carrying capacity which consists of dividing the area to be used by tourists by the average individual standard required:

$$\text{Carrying capacity} = \frac{\text{Area used by tourists}}{\text{Average individual standard}}$$

The average individual standard is set by taking into consideration the important aspects that need attention. For example, minimum beach area per tourist bed may be used as a standard to measure carrying capacity of beach space.

Three types of carrying capacity are commonly used for analytical purposes. These are:

i. Ecological carrying capacity – the maximum number of tourists that an area can absorb before ecological decline takes place.

ii. Physical carrying capacity – the absolute limit on tourist numbers that a resource can cope with. Physical carrying capacity includes water and electricity facilities, solid waste and sewage disposal, telecommunication and road transport.

iii. Environmental carrying capacity – the maximum number of tourists that an area can accommodate without initiating a decline in the general perceived attraction of the area.

This paper uses the carrying capacity concept to investigate the tourism activities and its impact on two coastal tourism sites in Hikkaduwa, Sri Lanka and Calangute, Goa, India. These two sites exemplify the adverse impacts resulting from unplanned and uncoordinated coastal tourism development.

Tourism in Hikkaduwa

Hikkaduwa is the most popular coastal tourism site in Sri Lanka and is one of the finest beach resorts in South Asia. The total length of the beach is approximately 4 km. It is situated in the southwest coast of Sri Lanka about 100 km from Colombo and about 150 km from the Katunayaka International Airport. The marine sanctuary is the focal point of tourist attractions in Hikkaduwa.

Hikkaduwa marine sanctuary

Key issues of tourism in Hikkaduwa

The present problems of Hikkaduwa tourism area are: declining water quality, depleted coral fish population, sedimentation of the coral reefs, inadequate solid waste disposal system, coastal erosion, inadequate anchorage facilities for fishing boats, increasing traffic congestion, and conflicts between different user groups.

White and Tantrigama (1995) in a study of tourism-associated benefits and costs found that tourist business activities in Hikkaduwa generate substantial economic benefits in terms of profit, wages, purchases, foreign exchange earnings, employment, etc. If the present problems are not properly addressed, they will lead to a downturn in tourist arrivals. Thus, the long-term net positive benefits will not be sustainable.

Tourism in Calangute

Calangute is located approximately 16 km to north of Panaji, the capital city of Goa. The total length of the beach area is approximately 4 km. It is one of the top 10 bathing beaches in the world.

Calangute has always been the most popular beach for the Goans and is visited by domestic and foreign tourists. The ratio of foreign tourists to domestic tourists in the state of Goa is about 20:80.

Key issues of tourism in Calangute

Calangute has been adversely affected by mass tourism and unplanned development that resulted in a rash of haphazard constructions, giving Calangute an urbanized look (ECOFORUM, 1993). According to D'Souza (1997) "...in the good old days Calangute was considered as the Queen of the beaches. ... Calangute is now terminally ill with cancer..."

Wilson (1997a, 1997b) summarizes the adverse implications of coastal tourism in Goa in general, most of which are applicable to Calangute. These are: overdevelopment of the coastal strip, flaunting of planning regulations (especially those forbidding any construction within 200 m of the high tide line), danger of exhausting the underground aquifers through overuse, threat of salination from wells located too close to the sea, preferential access to scarce water supply by the hotels which limit the water supply to local residents, environmental degradation including destruction of sand dunes, pollution by hotel sewage, dumping of garbage, removal of beach sand for construction

Access road to Calangute beach

Hikkaduwa beach

purposes, restricted access for local inhabitants to beaches, intimidation of villagers out of their homes as property developers attempt to buy up the remaining coastal strip, erosion of local cultural values through nudism, prostitution and pedophile activities and drugs and moonlight parties held by hippies (back-packers).

Calangute beach

Tourism carrying capacity of Hikkaduwa

i. Ecological carrying capacity

The most important ecological asset in Hikkaduwa is the marine sanctuary. The two main components of this sanctuary are: (i) coral reefs and (ii) coral fish population. The extent of land area of the marine sanctuary is approximately 45 ha. The main tourism activities taking place within the marine sanctuary are: viewing of coral reefs and coral fish through glass bottom boats (GBB), snorkeling and sea bathing.

Glass bottom boat ride in Hikkaduwa

The maximum number of tourists to engage in different kinds of activities at any particular moment is estimated as follows:

(a) Total number of tourists allowed in GBBs: (4 boats at a time x 9 adults or 12 children)	36 adults (or 48 children)
(b) Total number of tourists to engage in snorkeling: Total space/ Space required per tourist (4,290 m^2/50 m^2/person)	86 persons
(c) Total number of tourists to engage in sea bathing: Total space/Space required per tourist (2,600 m^2/25 m^2/person)	104 persons

ii. Physical carrying capacity

The important considerations in measuring physical carrying capacity are: the land area usable for construction, water supply, electricity supply and solid waste disposal system. There are about 400 permanent structures such as hotels, restaurants, guest houses, shops and housing units constructed within the Hikkaduwa coastal area. When taking into consideration the setback limitation allowed by the Coast Conservation Department, the space required for wastewater disposal and minimum space of beach frontage required, the Hikkaduwa tourism area is considered congested with permanent structures. Any expansion may result in the aggravation of problems in water and electricity supply, solid waste disposal and sewerage disposal. It can be concluded that the physical carrying capacity of Hikkaduwa has been exceeded.

iii. Environmental carrying capacity

The basis used for estimating environmental carrying capacity is the beach space required per tourist. This is considered to be a substitute for assessing the capacity limit to preserve environmental quality along the beach area and desirable ambience expected by tourists. Estimation of environmental carrying capacity has been carried out as follows:

- WTO has set a guideline of 40 m^2 of beach space per tourist bed. Taking into consideration the infrastructure and other facilities required to supplement the beach space, present analysis assumes 50 m^2 of beach space per tourist is required to maintain proper environmental quality.

- The total length of the beach area in Hikkaduwa is approximately 4 km of which only three-fourths (3 km) of beach surface is usable by tourists. Letting the average width of about 25 m of beach, the total usable beach space is estimated to be approximately (3,000 m x 25 m=) 75,000 m^2.

- Therefore, the maximum number of tourists allowable at any particular moment is (75,000 m^2/50 m^2/person=) 1,500 persons.

> *"...no attempt has been made to evaluate the carrying capacity of Calangute in relation to ecological resources..."*

Tourism carrying capacity of Calangute

i. Ecological carrying capacity

Calangute is famous for its wide sandy beach rather than any specific ecological resources like coral reefs. Therefore, no attempt has been made here to evaluate the carrying capacity of Calangute in relation to ecological resources.

ii. Physical carrying capacity

Goa tourism authorities have been subject to severe criticism for adopting a lenient policy in granting permission for new hotel constructions in Calangute area. Also, local residents occasionally object to hotel operators using public water and electricity supply in large amounts which diminishes their use of such facilities (ECOFORUM, 1993). With this prevailing situation, it appears that the physical carrying capacity of Calangute has been reached.

iii. Environmental carrying capacity

Similar to Hikkaduwa, the environmental carrying capacity of Calangute has been assessed based on the availability of beach space per tourist. An estimation of environmental carrying capacity has been carried out as follows:

- The total beach length is about 4 km of which three-fourths is assumed to be usable for tourism. Therefore, the total length of usable beach is 3 km.

- The average width of the beach is 40 m. Therefore, the total beach area available for the use of tourists is (3,000 m x 40 m=) 120,000 m^2.

- On the basis of 50 m^2 of beach space per tourist, the maximum allowable number of tourists at any point of time is 2,400.

Results of the Carrying Capacity Analysis

Results of the carrying capacity estimates in relation to Hikkaduwa and Calangute are summarized in ***Table 1.***

Compared with existing tourist arrivals in Hikkaduwa, there is a potential for accommodating more tourists on the beaches within carrying capacity limitations. However, in Calangute the carrying capacity of the beach is clearly exceeded. It was found that in both locations physical carrying capacities were exceeded. On the other hand, it should be noted that tourist arrivals are not evenly

Table 1: Carrying Capacity Analysis of Hikkaduwa and Calangute.

Carrying Capacity	Hikkaduwa	Calangute
i. Ecological carrying capacity	Not exceeded	Not relevant
ii. Physical carrying capacity	Exceeded	Exceeded
iii. Environmental carrying capacity	Not exceeded; overcrowding during certain times	Not exceeded

distributed during the peak season or during any day. There are certain hours during which both beaches are overcrowded. For example, between 9 a.m. and 12 noon during Saturdays and Sundays the beach alone in the Hikkaduwa marine sanctuary is overcrowded with domestic tourists.

> *"...require recognition of the needs of different user groups as well as the involvement of authorities at local, regional and national levels in the formulation and implementation of management strategies..."*

Enhancement of Carrying Capacities in Hikkaduwa and Calangute

The carrying capacity analysis of Hikkaduwa and Calangute reveals that apart from beach capacity of Calangute, the most critical factor in both sites is the physical carrying capacity. It was found that in both sites, physical carrying capacities have been exceeded. This has an impact on the use of facilities by residents that could lead to conflict.

Carrying capacity could be enhanced through proper management of resources. It will require recognition of the needs of different user groups as well as the involvement of authorities at local, regional and national levels in the formulation and implementation of management strategies. The present study clearly identifies the need for immediate actions in order to maintain biodiversity, optimal use and long-term sustainability of tourism resources in Hikkaduwa and Calangute.

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Newsbriefs

The Global Environment Facility (GEF)/ United Nations Development Programme (UNDP)/ International Maritime Organization (IMO) Regional Programme for Marine Pollution Prevention and Management in the East Asian Seas (MPP-EAS) is now on its fifth year of implementation. The Programme is participated in by Brunei Darussalam, Cambodia, China, DPR Korea, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Thailand and Vietnam. This section highlights recent activities of the Programme from January to July 1998.

STAP Expert Group Workshop on Emerging Technologies in International Waters and their Application to GEF Projects. The Scientific and Technical Advisory Panel (STAP) convened scientists and experts from developed and developing countries in a workshop to discuss the emerging technologies deemed important and relevant to GEF projects in international waters. The meeting was held on 24-26 February 1998 at the Marine Science Institute of the University of the Philippines, Diliman.

The expert group workshop established a dialogue among scientists at the forefront of the development of new methods, scientists from developing countries who could effectively use these methods in their own projects and GEF International Waters project staff. Aside from this, the meeting also laid the ground for the establishment of cooperative networks of scientists for the efficient transfer of new technologies.

The STAP meeting evaluated present GEF International Waters projects to determine how future projects could be improved by incorporating new developments in science and technology. It also addressed the existing barriers and barrier removal options on utilizing new technologies.

The output of the workshop included the recommendations to GEF on how to incorporate new methods and tools to improve the quality of GEF projects as well as the modalities for technology transfer, taking into account the capacity and existing infrastructure in third world countries.

The meeting was structured in five phases. These included: an official session addressed by an official of the Philippine Government and the Vice-Chairperson of STAP; a thematic segment where presentations on generic methods in gathering and processing information in support of the management of water bodies and examples of applications of emerging technologies in international water bodies were made; presentations and discussions of case studies based on current GEF projects' experience stressing the need for science and technology to effectively implement projects and realize its objectives; Working Group Sessions where working groups discussed the potential of utilizing new technologies, the existing barriers and the means to overcome those barriers, examined how and which new technologies and methods could be transferred to developing countries and adopted in GEF projects to achieve GEF goals and formulated recommendations and drafted concepts for projects that incorporate new methods and tools; and a Plenary discussion of the Working Groups' outputs.

A total of 33 participants, composed of 10 international experts, 5 local experts, 8 GEF project personnel, 3 STAP members, 2 from implementing agencies and GEF Secretariat, 3 UNEP personnel and 2 STAP Secretariat, attended the workshop.

BATANGAS BAY DEMONSTRATION PROJECT

First Steering Committee Meeting on Hazardous Waste Management. This meeting was held on 14 July 1998 at the Provincial Government-Environment and Natural Resources Office (PG-ENRO), Batangas City, Philippines. The meeting informed stakeholders about the implementation of the project on "Identification and Evaluation of Hazardous Waste Processing and Disposal Facilities and Services in the Batangas Bay Region" and solicited their cooperation, participation and input in the project.

The Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB), DENR-Region IV, DENR-Provincial Environment and Natural Resources Office (PENRO-Batangas), Sustainable Project Management (SPM), Batangas Coastal Resources Management Foundation (BCRMF), Batangas Chamber of Commerce and Industry (BCCI), Tetra-Tech, Inc., PG-ENRO and the Regional Programme were represented in the meeting.

Dr. Luis of Tetra Tech, Inc. reviewed the various stages of the proposed project covering five distinct components, namely: hazardous waste generation and management practices and facilities in Batangas Bay Region—current and future; regulatory requirements and controls covering hazardous waste generation and management; alternative approaches to developing hazardous waste facilities and services; financial and economic analysis; and implementation strategies, including possible funding arrangements.

The project will gather secondary data on hazardous waste in Batangas Bay from relevant agencies and organizations including information on current and future waste generation and management requirements. The study will list large, medium and small companies in the Batangas Bay Region, their production, number of employees, waste generated and current waste management practices and estimate/forecast the quantities of waste that will be generated by the year 2020.

The hazardous waste management project is an activity under the Batangas Bay Integrated Waste Management Action Plan. It will be coordinated by a Steering Committee composed of representatives from the DENR-EMB, DENR-Region IV, DENR-PENRO (Batangas), DOH-Region IV, SPM, BCRMF, BCCI, Tetra Tech, Inc., PG-ENRO and IMO Manila. The BCMRF will chair the Project Steering Committee as lead agency.

MALACCA STRAITS DEMONSTRATION PROJECT

Second International Conference on Marine Pollution and Ecotoxicology. The City University of Hong Kong organized the said conference. It was co-sponsored by the Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, United Nations Environment Programme and the Intergovernmental Oceanographic Commission. The primary objective of the conference was to provide a forum for regional and international experts to meet and discuss research findings and the latest advancements in marine pollution and ecotoxicology. It also aimed to advance the participants' understanding of global and regional marine pollution issues and research programs. The conference primarily focused on the following subjects: ecotoxicology, particularly biometers, sublethal effects and toxic mechanisms; risk assessment and risk management including ecosystem stress, ecological studies and environmental management; pollution monitoring; QA/QC in environmental assessment; eutrophication and nutrient enrichment; waterborne pathogens; and trace organics.

Twenty-seven participants from the Malacca Straits research team and members of the Marine Pollution Monitoring and Information Management Network attended the workshop. Dr. Chua-Thia Eng, Regional Programme Manager, delivered opening remarks and a keynote address on marine pollution prevention and management in the East Asian Seas. In addition, he chaired two sessions on paper presentations.

Mr. Adrian Ross of the Regional Programme presented a paper entitled "Risk Assessment/Risk Management of the Subregional Sea Areas" during a special session of the workshop.

INTERNATIONAL CONVENTIONS

MARPOL Workshop in Jakarta, Indonesia. The National Workshop on the Implementation of MARPOL 73/78: Cost-Effective Shore Reception Facilities was conducted on 14-15 January 1998 in Jakarta, Indonesia. It was funded by the Government of Norway and implemented by the International Maritime Organization (IMO) through the Regional Programme. The workshop was co-chaired by Captain Henky Lumentah of the Directorate General Sea Communication (DGSC) and Mr. Adrian Ross of the Regional Programme. A total of 70 participants from both the private and public sectors in Indonesia

attended the workshop, held at the Millennium Sirih Hotel in Jakarta.

Mr. Zafrul Alam, 2nd Assistant Director of the Policy Division of the Maritime and Port Authority of Singapore, presented a paper on the Singapore experience in developing and managing shore reception facilities and focused on the application of environmental legislation in the world's busiest port.

Mr. Neil Challis, Director of Strategic Planning and Development (Asia) of the International Response Corporation (IRC), presented a paper on the establishment of a MARPOL waste oil reception facility in Thailand. The presentation tackled mainly Thailand's policy decision to ratify MARPOL 73/78 following a number of pollution incidents in the vicinity of Bangkok Port and the Eastern Seaboard of Thailand.

Mr. Seah Khen Hee, Director-General Manager of the Singaport Cleanseas Pte. Ltd, discussed the private sector investment in shore reception facilities in Singapore particularly the nature of oil residues, and collection/treatment/disposal of wastes, as well as the commercial approach to reception facilities.

An action plan on cost-effective shore reception facilities was formulated. Components of the action plan include: Strengthening Legal and Regulatory Instruments; Enhancing Enforcement Capacity and Effectiveness; Identification of Public-Private Partnership Opportunities; and Developing and Strengthening Opportunities for Private Sector Investment in Shore Reception Facilities and Related Land-Based Waste Management Services. DGSC is the lead agency for implementing the action plan.

Websites on Coastal Tourism and Related Issues

The following Websites contain information on types of coastal tourism, sources of reference materials, and guidelines which may be useful for researchers, planners, decision makers, policy makers, implementors, local and national authorities, coastal users, and others interested in promoting sustainable development in coastal areas.

http://www.wttc.or.../1c18d5c88e0c37df002565b7005494fa?OpenDocument&ExpandSection=1

The concept of a European Coastal Code was first proposed by the European Union for Coastal Conservation (EUCC) in 1993, as a means to provide practical guidance to Local Authorities, coastal users, and others with regard to ecologically sustainable development in the coastal zone. The development of the European Coastal Code was formally adopted by the European Environment Ministers in October 1995 as part of the Pan-European Biological and Landscape Diversity Strategy. The Strategy is part of the European implementation of the Convention on Biological Diversity, agreed at the UNCED Earth Summit in Rio in 1992. The Strategy is being promoted and coordinated by a variety of institutions including the Council of Europe, the United Nations Environment Programme, IUCN and the European Centre for Nature Conservation. Over the next 20 years the Strategy will promote the integration of biological and landscape diversity considerations into social and economic sectors.

http://www.wttc.org/EcoData.nsf/6dc81.../3f1a7c51304feb7d002565cb004335ca?OpenDocumen

The Rügen Recommendations are the result of the international conference "Rügen Talks", which took place in November 1997 in Binz/Island of Rügen. They are published under the motto "Management for a sustainable coastal tourism as a contribution to sustainable development in the Baltic Sea Area" to an international public.

http://www.wttc.org/WTTCGATE.NS.../1b9074e20b203386802563a400533e6e?OpenDocumen

In 1996, three international organizations—the World Travel & Tourism Council, the World Tourism Organization and the Earth

Council, joined together to launch an action plan entitled *Agenda 21 for the Travel & Tourism Industry. Towards Environmentally Sustainable Development*—a sectoral sustainable programme based on the Earth Summit results.

http://www.wttc.org/EcoData.nsf/d34fd.../015277a5f26cf8a4002565b7005494dc?OpenDocumen

The World Tourism & Travel Council recommends environmental guidelines to travel and tourism companies and to governments and asks that they be taken into account in policy formulation, e.g., (1) Travel and Tourism companies should state their commitment to environmentally compatible development; (2) Targets for improvement should be established and monitored; (3) Environmental commitment should be company-wide; (4) Education and research into improved environmental programs should be encouraged; and (5) Travel and Tourism companies should seek to implement sound environmental principles through self-regulation, recognizing that national and international regulation may be inevitable that preparation is vital.

http://www.wttc.org/EcoData.nsf/d34fd9.../abfe77f6a1b9ff53002565b7005494db?OpenDocumen

Charter for Sustainable Tourism Development—Published by Tourism Concern and sponsored by the World Wide Fund for Nature. This Charter was initially launched at the Rio Earth Summit. Based on the International Chamber of Commerce's *Business Charter for Sustainable Development* the document aims to influence the policies and programs adopted by the travel and tourism industry worldwide.

http://www.wttc.org/EcoData.nsf/6dc8.../6c7ea999ba377ab6002565b70054ade1?OpenDocumen

The International Forum of Coastal Cities, Tourism and Environment (IFOCC) is an international non-profit association pursuing scientific aims, including: (1) to increase the effectiveness of coastal cities in developing tourism while conserving or enhancing the natural and social environment; (2) to raise the awareness of coastal tourism and environment as public policy issues of important concern to all levels of government; and (3) to assist local authorities with training and development related objectives.

http://www.world-tourism.org/off.htm

The World Tourism Organization—the leading international organization in the field of travel and tourism—serves as a global forum for tourism policy issues and a practical source of tourism know-how. It is an inter-governmental body entrusted by the United Nations with the promotion and development of tourism.

http://www.world-tourism.org/books.htm

World Tourism Organization Publications on Tourism Policy, Directories, Education and Training, Tourism Development, Quality, Financing, Marketing, General Publications on Statistics, Guidelines on Statistics, Tourism Market Trends, Global Tourism Forecasts to the Year 2000 and Beyond, Tourism 2020 Vision, Conferences and Seminars.

http://www.ambio.kva.se/1997/Nr2_97/mar97_2.html

Bali: Sustainable Development, Tourism and Coastal Management. Article by D. Knight, B. Mitchell and G. Wall in Ambio. Vol. 26, No. 2, March 1997. "Bali is encountering significant challenges in the promotion of policies to encourage vigorous economic development, while simultaneously enhancing traditional culture and protecting the integrity of the natural environment. ... An integrated approach is recommended to protect and rehabilitate linked coastal ecosystems within the context of coastal tourism policies."

http://library.waikato.ac.nz:8000/MARION/ABM-6281

Guidelines on environmentally sound development of coastal tourism. 1995. By the United Nations Economic and Social Commission for Asia and the Pacific. United Nations, New York. Subjects: Tourist trade—Environmental aspects—East Asia, Pacific Area, Planning. Ecotourism—East Asia, Pacific Area. Coastal ecology—East Asia, Pacific Area

http://www.irf.org/irtourdq.html

Coastal Tourism and Degradation in the Wider Caribbean. This report includes an "assessment of the extent of coastal resource degradation due to tourism and recommends approaches to address this degradation in the Wider Caribbean."

http://www.amazon.com/exec/obidos/ASIN/0819199958/qid=9033424.../002-5245891-120985

Environmental Issues of Tourism and Recreation. By Zbigniew Mieczkowski. August 1995. "Topics include the environmental impacts on tourism and tourists, the positive and negative effects of tourism on the natural environment and ecosystems, the issue of carrying capacity, environmentally sustainable tourism, environmental planning and management of tourism, and ecotourism."

http://www.amazon.com/exec/obidos/ASIN/0792324048/qid=9033412.../002-5245891-120985

Tourism vs. Environment. The Case for Coastal Areas (The Geojournal Library, Vol. 26). November 1993. Edited by P.P. Wong.

http://www.amazon.com/exec/obidos/ts/book-customer-reviews/08519.../002-5245891-120985

Ecotourism in the Less Developed World. By David B. Weaver. June 1998.

Announcements

Fifth Asian Fisheries Forum

The Fifth Asian Fisheries Forum will be held on 11 to 14 November 1998 at Lotus Hotel Pang Suan Kaew, Chiangmai, Thailand. This will be sponsored by the Asian Fisheries Society and the Aquatic Resource Research Institute of Chulalongkorn University. There will be presentation of technical papers and posters. For more details, please contact:

Dr. Padermsak Jarayabhand
Aquatic Resources Research Institute
9th Floor, Institute Bldg. No. 3
Chulalongkorn University
Bangkok 10330, Thailand
Telephone: (662) 2188160-3
Fax: (662) 2544259
Email: ardic@chulkn.car.chula.ac.th

Investors Round Table on Public-Private Partnerships

The Investors Round Table on Public-Private Partnerships will be held on 10 to 11 November 1998 at the Diamond Manila Hotel, Philippines. This will be supported by the Global Environment Facility (GEF), United Nations Development Programme (UNDP), International Maritime Organization (IMO) and Sustainable Project Management (SPM). The activity will focus on Public-Private Partnerships' Investment Opportunities in Coastal and Marine Sectors. International Financial Institutions, multilateral and bilateral donor agencies, development banks, commercial lending institutions, local and national government agencies, private sector financiers and private sector developers are invited to attend the said event. For more details, please contact:

GEF/UNDP/IMO Regional
Programme for the Prevention
and Management of Marine Pollution
in the East Asian Seas
P.O. Box 2502 Quezon City 1165,
Philippines
Telefax: (632) 926 9712
Email: info@imo.org.ph

Challenges and Opportunities in Managing Pollution in the East Asian Seas

The international conference on Challenges and Opportunities in Managing Pollution in the East Asian Seas will be held on 22 to 24 March 1999 in Manila, Philippines. The conference is organized by the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) together with the Coastal Management Center and the Department of Environment and Natural Resources. It is also co-sponsored by the Swedish International Development Cooperation Agency-Marine Science Programme, ASEAN-Canada Centre, the Urban Waste Expertise Programme-Waste and UNEP/COBSEA. The organizers of the conference invite authors to submit abstracts of their papers for presentation. For more details, please contact:

GEF/UNDP/IMO Regional
Programme for the Prevention
and Management of Marine Pollution
in the East Asian Seas
P.O. Box 2502 Quezon City 1165,
Philippines
Telefax: (632) 926 9712
Email: info@imo.org.ph

International Conference on the Straits of Malacca

The conference will be held on 19 to 22 April 1999 in Malacca, Malaysia. It will be organized by the Regional Programme on the Prevention and Management of Marine Pollution in the East Asian Seas, the Malaysian Fisheries Society and the Faculty of Science and Environmental Studies-Universiti Putra Malaysia. The theme of the said conference will be "Towards Sustainable Management of the Straits of Malacca." There will be oral and poster presentations during the conference. Among the topics that will be covered include: Oceanography and Hydrography, Marine Ecology, Fisheries and Aquaculture; Pollution; Integrated Coastal Zone Management; Shipping and Transportation; Marine Archaeology; Tourism; Marine Policy; Security; and Economics and Management. For further information, please contact:

The Secretariat
International Conference
on the Straits of Malacca
Department of Biology
Faculty of Science
and Environmental Studies
Universiti Putra Malaysia
43400 Serdang, Selangor
Malaysia
Telephone: 603 9486101 ext. 3724, 3630, 4201
Fax: 603 9432508
Email: shapor@fsas.upm.edu.my
URL: http://www.fsas.upm.edu my/~icsm/index.html

Upcoming Activities of the Regional Programme

1998

August

11-14	Final Evaluation of the Xiamen Demonstration Project (PR China)
17-22	Training Course on Marine Water Sampling and Field Measurements (DPR Korea)
25-27	Workshop for Subregional Cooperation in Oil Spill Modelling in the Malacca Straits (Jakarta, Indonesia)
28-31	Integrated Coastal Management (ICM) Site Evaluation (Denpasar, Surabaya, Jakarta, Indonesia)

September

7-26	Fourth Regional Training Course on the Application of Integrated Coastal Management (ICM) System for Marine Pollution Prevention and Management (Philippines, PR China and Singapore)
21-23	Legal Training Programme on Strategies, Tools and Techniques for Implementing International Conventions on Marine Pollution (Bangkok, Thailand)

October

22-24	Study Tour. ICM Demonstration Site in Batangas (Philippines)
21-28	Training Programme on Environmental Risk Assessment and Natural Resources Damage Appraisal for Tropical Ecosystems (Singapore)
29-30	Regional Workshop on Marine Electronic Highway (Singapore)

November

10-11	Investors Round Table on Public-Private Partnerships (Manila, Philippines)
16-21	Training Workshop on Integrated Environmental Impact Assessment for Coastal and Marine Areas (Singapore)

December

2-5	The Fifth Programme Steering Committee Meeting and Tripartite Review (Indonesia)

1999

March

22-24	Challenges and Opportunities in Managing Pollution in the East Asian Seas (Manila, Philippines)

April

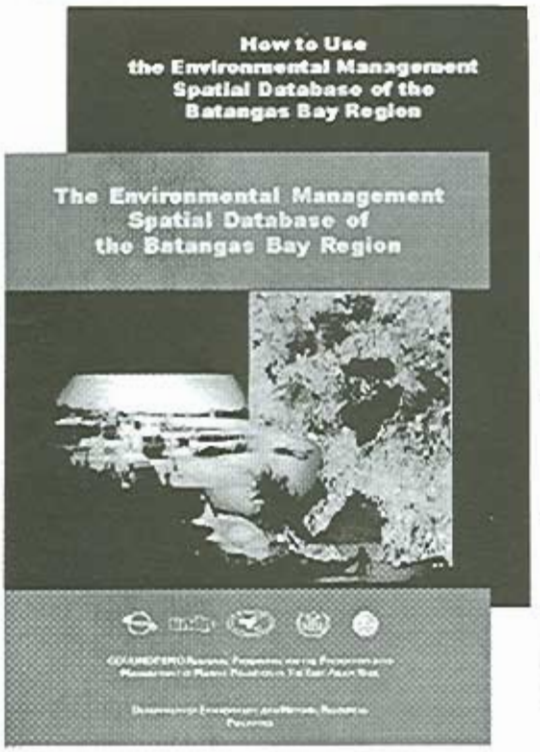
19-22	International Conference on the Straits of Malacca (Malaysia)

For further information, please contact the:

GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
P.O. Box 2502, Quezon City 1165
Metro Manila, Philippines
Telefax: (632) 926 9712
Email: info@imo.org.ph
URL: http://www.imo.org.ph

Introducing The Batangas Bay Multimedia CD-ROM

We are pleased to announce our new ***Environmental Management Spatial Database of the Batangas Bay Region.*** This multimedia is primarily focused on Batangas Province and the Bay Region in particular. It is one of the outputs of the application of geographic information systems (GIS) sub-project of the Batangas Bay Demonstration Project of the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas in support of the integrated coastal management (ICM) system being applied in the Bay Region with emphasis on marine pollution abatement and management.



This multimedia CD-ROM has several unique features:

- maps in the CD-ROM are of three types - basic maps which were digitized from the 1:50,000 scale map sources; digital maps generated from interpolation of point data, such as bathymetry; and generated from modelling activities, such as pollutant dispersal;
- each map has a corresponding text which describes the contents of the theme map, its relevance, source and quality, technical information about the contents obtained from reports, map analysis and modelling in the GIS;
- maps can be saved to a PCX format to the local drives of the computer where it is running, it can be edited and printed to any popular imaging software; and
- it comes with the operating manual and tutorial to assist every user.

Although this CD-ROM was prepared for the Batangas Bay Region, it can be used as a model or training tool in the preparation of a similar multimedia CD-ROM for a selected planning area.

Fill in the form below and mail it back to us. Pay only US$10 for the air mail cost.

Name: _____

Organization: _____

Address: _____

City: _____ State/Country: _____ Zip Code: _____

Tel. No.: _____ Fax No. _____ E-mail: _____

Note: Please make checks payable to: IMO/UNDP Marine Pollution Project (RAS/92/G34)

Send your order/request to:

The Regional Programme Manager

GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
P.O. Box 2502, Quezon City 1165, Philippines
Telefax (632) 926-9712; Telephone: (632) 920-2211 local 4 or 6;
E-mail: info@imo.org.ph; URL: www.imo.org.ph

A publications brochure is also available

FACTS AND FIGURES

Marine Protected Areas Potentially Threatened by Nearby Coastal Development Activity, 1995

Region	Percent of Areas at Risk			Number of Marine Protected Areas	
	Low	Moderate	High	Assessed[a]	Unassessed[b]
Africa	24	8	68	96	17
Asia	14	11	75	286	12
North and Central America	40	12	49	319	69
South America	49	11	40	35	6
Europe	13	12	75	109	13
Former Soviet Union	39	6	56	18	1
Oceania	27	25	48	245	47
World	26	14	59	1,108	182[b]

Source: Dirk Bryant et al. Coastlines at Risk: An Index of Potential Development-Related Threats to Coastal Ecosystems, World Resources Institute (WRI) Indicator Brief (WRI, Washinngton, D.C., 1995), p.7.

Notes: a. Includes only marine protected areas with known geographic coordinates located within 100 kilometers of continental and large island coastlines.
b. The world total includes 17 unassessed sites within the Antarctic region.

Tropical Coasts is published to stimulate exchange of information and sharing of experiences and ideas with respect to environmental protection and the management of coastal and marine areas. This newsletter is published twice a year and distributed free of charge to individuals and relevant organizations in the developing countries. Readers are strongly encouraged to send their contributed articles to:

The Executive Editor

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Quezon City 1165
Metro Manila, Philippines

Accuse not Nature; she has done her part; you but do yours.

John Milton, Paradise Lost

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