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**Coherence of Conservation and Development Policies of Coastal and Marine
Protected Areas in West Africa**

**Cohérence des politiques de conservation et de développement des aires
protégées marines et côtières en Afrique de l'Ouest**

**Coerência das políticas de conservação e de desenvolvimento das áreas
protegidas marinhas e costeiras na Africa Ocidental**

BIBLIOGRAPHY ON MARINE PROTECTED AREAS

General and West African references

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14. FOREST

Woodbury, R. O., & Little, E. L. Jr. (1976). Flora of Buck Island Reef National Monument (U.S. Virgin Islands). Vol. 4 pl.; 17 ref. (p. 27 pp.). Puerto Rico: Institute of Tropical Forestry.
Abstract: An annotated systematic list of 228 species, including 62 trees, found on this small uninhabited island (only 1 mile long) off St. Croix, with a history of the island. The vegetation is tropical dry deciduous forest considerably modified by former settlement and logging. [The island is primarily a marine reserve.]

France Comite Scientifique du Parc national de Port Cros. (1978). Travaux scientifiques du parc national de Port-Cros. [s. l.]: [s. n.].

Abstract: The Port-Cros national park was established in 1963, and comprises the islands of Port-Cros, Bagaud, La Gabiniere and Rascas in the Hyeres archipelago along with a marine park 600 m wide around each island. The report studies the evolution of the vegetation on these mountainous wooded islands. There are 5 main vegetation zones: the halophilic littoral zone; the littoral brushwood, which rings the islands and includes *Olea europaea* var. *oleaster*, *Myrtus* and *Pistacia lentiscus*; the original *Quercus ilex* forest which survives in the wet valleys; the high maquis, with *Arbutus unedo* and *Erica arborea*; and *Pinus halepensis* forming a secondary forest in degraded or fire-damaged *Quercus ilex* stands.

Lucas, P. H. C. (1979). Experience with national parks and related reserves in the South-West Pacific. In: The Canadian national parks: today and tomorrow. Conference II. Ten years later. Banff October 8-13th 1978. Volume I *Studies in Land Use History and Landscape Change*: Vol. 7.

Abstract: In New Zealand the need for co-ordination of reservations under the three major Acts has led to formation of a co-ordinating committee. It hopes to develop guidelines for reservations under the relevant legislation; to co-ordinate policies for wilderness areas permissible under all three Acts; and to establish an overall scientific committee to inventory ecosystems already adequately protected, those inadequately represented, and those not represented at all. Concepts for seacoasts, lake shores and river banks, scenic and allied reserves, private land, state forest land, marine reserves, and walkways are set out. There remain many problems in South Pacific countries. It is difficult to introduce nature conservation to a society which, until the coming of Western civilization, depended on conservation of resources for survival. The Niuean approach of building conservation into the fabric of society may well give a lead to other areas, and to the Western World.

Jones, R. S., & Cotterell, C. C. (1980). Recreation, wildlife and nature conservation. (p. 18pp.; 2 maps.). [s. l.]: [s. n.].

Abstract: Prepared for the Eleventh Commonwealth Forestry Conference, the pamphlet outlines the most important facilities available in the country for recreation, wildlife and conservation enthusiasts and describes the proposed national parks including the mountain ranges and lowland areas of unique, dry scrub and limestone forests. It further deals with beaches, marine parks, scenic roads and trails, botanical gardens, caves, spas, rivers, coral reefs, and nature preserves. The existing problems of management of the resources are discussed and some solutions outlined. The latter include the training of personnel, planning and implementing development strategies by both government and private individuals, advertising, rationalizing of a single development agency and a more authoritative government land use policy.

Thornton, S. et al. (1980). Holocene evolution of a coastal lagoon, Lake of Tunis, Tunisia. *In: Sedimentology*, 27(1), 79-91.

Abstract: Historical records demonstrate that the Lake of Tunis, Tunisia, was an open bay that became separated from the Mediterranean by an accreting barrier spit, forming a lagoon. Closure of the lagoon was caused by increased sedimentation as a consequence of Roman deforestation of the Medjerda River drainage basin to the north and subsequent accelerated longshore transport. The separation of the lagoon from the Mediterranean was completed in the early 1500s. At present, the 48 km² lagoon averages <1 m in depth and reaches eutrophic conditions in the late summer. Consistent with the historical records, the lagoon sedimentary column shows three distinct successive environments of deposition: (1) an arid continental environment; (2) an open marine bay; and (3) the present brackish to hypersaline lagoon. These depositional environments are represented by the lower grey layer, <0.5 m thick, the middle olive-grey layer, 1 to 5 m, and the upper black layer, 1 m thick. All of the strata are predominantly silt plus clay, but usually contain at least 10% sand. The lower grey layer consists of pitted quartz sand, with very few abraded broken molluscan fragments and benthic foraminifera with thick tests. An arid, subaerial depositional environment of latest Pleistocene time best explains these sediments and fossil assemblages. Heavy metal analyses of total samples in five cores demonstrate that Mn and Fe vary randomly, and are apparently derived from natural sources only. Cd, Cr, Pb, Cu and Zn are typically highest in the uppermost unit, which reflects levels of human contamination since closure of the lagoon

Hehanussa, P. E. (1981). Coastal Zone Management in Indonesia. Proceedings Of The Workshop On Coastal Area Development And Management In Asia And The Pacific, Manila, Philippines, 3 To 12 December 1979 (pp. 65-66). Honolulu, Hi Usa: East West Environment And Policy Institute

Abstract : The Indonesian Constitution, which is the basis for the management and utilization of Indonesia's natural resources, provides that the "land and water, and the natural resources contained therein, shall be controlled by the state and utilized for the greatest feasible prosperity of the people." The most challenging problem for Indonesia is the need to support its rapidly growing population. This is a strong incentive to manage its limited natural resources efficiently. A five year program for coastal area resource use management should have among its objectives the establishment of: environmental quality standards; national laws implementing international conventions for the protection of the environment; marine parks; a national contingency plan for oil spill cleanup; a research program on maximum sustainable yield of mangrove forests; a monitoring program for environmental quality; and more employment possibilities in the coastal zone

Busch, W. S. (1982). Marine science laboratories move into the sea. Proceedings Of The Sixth Meeting Of The United States Japan Cooperative Program In Natural Resources Ujnr. Panel On Diving Physiology And Technology, Menlo Park And Catalina Island, California, October 20-26, 1981 (pp. 241-251).

Abstract: Research opportunities in tropical island waters, on a mid-Pacific archipelago, amidst temperate water kelp forests, and on the Atlantic continental shelf have been opened up with the aid of the National Oceanic and Atmospheric Administration's Undersea Research Program. The facilities are as diverse as the marine ecosystems they serve - a submersible which will allow two scientists to explore the depths to 1200 feet....a habitat sitting on the seafloor within a giant kelp forest and functioning as a home and laboratory for six aquanauts....a habitat in tropical waters allowing four scientists to monitor the life of a coral reef....a research ship supporting scientific divers tethered to a depth of 120 feet along the U.S. continental shelf. Research areas include studying the effects of pollution and ocean dumping, devising methods of extracting energy from the oceans, protecting marine mammals, answering

questions about marine geology and the composition of the continental shelf, and using bioactive substances in drug development. One habitat, the HYDROLAB, located in St. Croix, U.S. Virgin Islands has supported over 152 scientists from 35 universities and institutions

Ong, J. E. (1982). Mangroves and aquaculture in Malaysia. *In: Ambio*, 11(5), 252-257.

Abstract: Malaysia's 650,000 hectares of mangroves are under the jurisdiction of the various State Forest Departments. Some 20 percent of the total has been lost through cutting for the wood-chip industry in the last 20 years. Another 20 percent has been earmarked for possible aquaculture development in Peninsular Malaysia. A comparison between sustained yield management for forestry and conversion to aquaculture shows that aquaculture development is economically precarious. A conservation plan involving sustained yield management and the establishment of mangrove national parks is suggested. Seed materials from the national parks will ensure genetic vigor for sustained yield management

White, A., & Wells, S. (1982). Coral reefs in the Philippines. *In: Oryx*, 16(5), 445-451.

Abstract: With 44,000 sq km of coral reef surrounding its many islands and an ever-increasing population that depends heavily on fish for protein food, the damage being done to the Philippine reefs is of serious concern. Silting of the water (the results of erosion following forest clearing), modern fishing methods and the collecting mania all contribute to this. A long list of suitable areas for marine reserves has been compiled, and thanks to education programmes some communities are taking conservation measures for themselves

Johnson, S. W., & Heifetz, J. (1985). Methods for assessing effects of timber harvest on small streams. *In: NOAA Tech. Memo.*, 39.

Abstract: The methods used by the Northwest and Alaska Fisheries Center's Auke Bay Laboratory in assessing the effects of clear-cut logging on salmonid habitat and the effectiveness of buffer strips in protecting fish habitat during and after logging are described in detail. The methods have been used by the laboratory since 1982 to study fish populations and habitat in three different categories of streams in southeastern Alaska. The methods described include measurements of fish, periphyton, benthos, preferred fish habitats, and stream physical characteristics, such as discharge gradient, substrate, and water quality

Moyer, J. T. et al. (1985). Threat to unique terrestrial and marine environments and biota in a Japanese national park. *In: Environmental Conservation*, 12(4), 293-301.

Abstract: Miyake-jima, one of the Izu Islands of southern Japan and a part of the Fuji-Hakone-Izu National Park, has been designated by the governments of Japan and the United States of America as the site for a proposed military airport. Construction of the proposed facility would destroy lands especially designated, by the Environmental Agency of Japan and the Japan Ministry of Agriculture, Forestry, and Fisheries, for special protection. Relocation of farmland and housing from the proposed site would result in destruction of valuable National Park land on other parts of the island

Niang, A. L. (1985). Etude des reboisements sur les terres salées du Sine-Saloum (Sénégal). Ministère de l'Agriculture, Montpellier.

Cortes, J. (1987). Los parques marinos de Costa Rica. *In: Parks*, 12(1, Supplement), 3-4.

Abstract: Around 8% of the national territory of Costa Rica is devoted to reserves which protect a variety of marine environments and resources. Marine areas face environmental problems caused by man and nature, amongst which are the uncontrolled collection of organisms and sedimentation on the reefs. Recovery of reefs is always slow, and is exacerbated by human intervention. The collection of organisms could be regulated through legislation, but

sedimentation of the reefs is very difficult to control as the sediment may come from outside the protected area. It is recommended that, when declaring a marine zone as a reserve, adjacent areas, river basins and nearby forests are also considered. However, the success of this type of project will only be achieved through environmental education and conscience of the people.

Craik, W., & Dutton, I. M. (1987). Assessing the effects of sediment discharge on the Cape Tribulation fringing coral reefs. *In: Coastal Management*, 15(3), 213-228.

Abstract: In 1984, a new road was constructed through the coastal rain forest north of Cape Tribulation in North Queensland. Strong concerns were expressed at the time about the potential effects of runoff from the road on the adjacent fringing reefs. The Great Barrier Reef Marine Park Authority responded by developing a comprehensive research and monitoring program to determine what effect (if any) runoff from a new unsealed road through the coastal rain forest between Cape Tribulation and Bloomfield in North Queensland, Australia, has had, or is having on the adjacent fringing coral reefs. This paper describes the complex biophysical and management settings in which the program has been introduced, the program objectives and content, and its importance to management of the Great Barrier Reef Marine Park

McCormick, M., & Choat, J. H. (1987). Estimating total abundance of a large temperate-reef fish using visual strip-transects. *In: Marine Biology*, 96(4), 469-478.

Abstract: Total abundance estimates for the large, common, reef fish *Cheilodactylus spectabilis* (Hutton) were obtained for a marine reserve and adjacent section of coast in north-eastern New Zealand during 1985. Preliminary sampling indicated that *C. spectabilis* was distributed heterogeneously, and that density was habitat-related. An optimal stratified-random design was employed in both locations, to obtain total abundance and size-structure estimates. This reduced the between-habitat source of variability in density.

Simberloff, D., & Cox, J. (1987). Consequences and costs of conservation corridors. *In: Conservation Biology*, (1), 6-71.

Abstract: There are few controlled data with which to assess the conservation role of corridors connecting refuges. If corridors are used sufficiently, they could alleviate threats from inbreeding depression and demographic stochasticity. For species that require more resources than are available in single refuges, a network of refuges connected by corridors may allow persistence. Finally, a corridor, such as a riparian forest, may constitute an important habitat in its own right. A dearth of information on the degree to which different species use corridors makes it difficult to tell which of these potential advantages will be realized in any particular case. Corridors may have costs as well as potential benefits; they may transmit contagious diseases, fires, and other catastrophes, and they may increase exposure of animals to predators, domestic animals, and poachers. Corridors also bear economic costs. It may be cheaper to manage some species by moving individuals between refuges rather than by buying and maintaining corridors. Each case must be judged on its own merits because species - environment interactions differ.

Tegner, M. J., & Dayton, P. K. (1987). El Nino effects on Southern California kelp forest communities. *In: Advances in Ecological Research*, (17), 243-279.

Bojos, R. M. Jr., & Vande Vusse, F. J. (1988). Artificial reefs in Philippine artisanal fishery rehabilitation. Report Of The Workshop On Artificial Reefs Development And Management. Penang, Malaysia, 13 18 September 1988 Manila (Philippines): ASEAN/UNDP/FAO Reg. Small Scale Coastal Fisheries Development Proj.

Abstract: Philippine coastal fishery harvests have been declining because of overfishing by 900,000 artisanal and commercial fishermen and coastal fish habitat destruction. The Central

Visayas Regional Project I(CVRP I) seeks to address this problem with community organization and a series of resource management activities carried out by the fishermen. These activities included: artificial reefs constructed and placed by fishermen; mangrove reforestation and management; coral reef management with establishment of marine sanctuaries; small scale sea ranching and farming of valuable native species; and deep water fish attracting devices harvested only with handlines. The fishermen who have been blamed for much of the coastal resource degradation can become effective managers of that resource. Key elements needed for the transition are: community development workers willing to live and work in fishing villages; simple, low cost technologies that are profitable, equitable to the majority of fishermen and sound from a resource management standpoint; and a flexible regulatory framework within which communities may make equitable resource allocation decisions.

Davis, G. E., & Halvorson, W. L. (1988). Inventory and monitoring of natural resources in Channel Islands National Park California. (p. 648). Ventura, CA (USA): Channel Islands Natl. Park.

Abstract: The Channel Islands, an island chain lying just off California's southern coast, USA, provide habitat for marine life ranging from microscopic plankton to the largest creature on earth - the blue whale (*Balaenoptera musculus*). These same islands shelter unique plant and animal life found nowhere else on earth. In 1980, Congress designated five of these islands Channel Islands National Park and mandated the inventory and protection of the islands and surrounding waters. A long-term monitoring system was therefore developed to achieve the objectives of resource inventory and increased ecological understanding upon which to base future resource management decisions. A series of ten handbooks has been prepared as the result of an ongoing effort to standardize the monitoring methods used and share these methods with others who may benefit from them. The handbooks included in the report are pinnipeds, sea birds, rocky intertidal communities, kelp forest, terrestrial vertebrates, land birds, terrestrial vegetation, fishery harvest, weather, and visitors

Mcmanus, J. (1988). Coral reefs of the ASEAN region: Status and management. *In: Ambio*, 17(3), 189-193 .

Notes: Special issue: East Asian Seas.

Abstract: Coral reef provide a substantial part of the protein intake in Southeast Asia. Reefs and nonreef coral communities within 15 km of shore are generally overfished, while offshore subsurface atolls and pinnacle reefs are often beyond the reach of small-scale fishermen. Major destructive forces include excessive sedimentation, related to deforestation, and various forms of destructive fishing, especially blast fishing. Current attempts to manage these areas through coastal-zone plans, fishery restrictions, and the development of marine parks have been effective in only a few isolated cases.

Simmons, D. (1988). Coastal conservation and marine parks. Report Of The First Oecs Workshop On Fisheries Management And Development. St. Vincent And The Grenadines, 24 27 August, 1987

Abstract: The development of the agricultural, tourism and manufacturing sectors in the OECS has led to the depletion and mismanagement of a number of the critical natural resources of the region (forests, soil and coral reefs). This paper provides an introduction to the concept of marine parks as an element of a coastal conservation strategy and notes the role which they may play in safeguarding coastal resources

Sadio, S. (1989). Pédogenèse et potentialités forestières des sols sulfatés acides salés des tannes du Sine Saloum, Sénégal. Université Agr. Wageningen, Paris (FRA).

Notes: Document édité : Paris; ORSTOM, 1991. - ISBN 2-7099-1039-X

Cousteau, J. M. (1990). Deep Ocean Wilderness Protection Needed. *In: Underwater USA*, 7(5), 30-31.

Abstract: Sylvia Earle, renowned for her pioneering role in deep-water diving and the first person to walk untethered on the deep ocean floor, is suggesting a new approach to protecting the oceans. Recognizing that earthly life depends on the health of these waters, Earle recently launched in Washington D.C., the notion of deep ocean wilderness areas--vast protected areas of open sea in which human activities would be prohibited or strictly limited. She has written that: ""Starting early in the century, broad areas of the U.S. were designated as national forests, national parks wilderness and resource management areas. They were, if you will, put in the bank and treated as the nation's natural resource reserve. These broad areas can be regarded as environmental capital. The same philosophy should be applied to the sea..National and international strategies are needed to figure how to best go about protection of ocean ecosystems, how to protect places, processes and resources that nobody owns, but everybody uses."" Of course, many nations have already created protected areas within their national waters--such as the Great Barrier Reef National Park in Australia, Buck Island in St. Croix in the Carribean, and various Marine Sanctuaries in the coastal U.S. But deep ocean wilderness would be more international in scope, thus requiring levels of international cooperation and bold thinking that, thus far, have been difficult to obtain. Further meetings will take place this fall to begin work on ways to reconcile the concept of ocean wilderness with the significant international hurdles--such as territorial claims, exclusive economic zones, bilateral treaties, national sovereignties, and military access to the open sea. It may be possible for nations to declare together huge swaths of ocean wild forevermore--no fishing, no dumping, no shipping. In just the last half century humanity has gone from marveling at the wonders of the ocean to threatening its survival. It is ironic that the same generation that first explored the ocean wilderness areas now needs official declarations to protect it. 1990

Murdoch, L. (1990). Bali's first marine park: Pulau Menjangan. *In: Reflections*, (25), 12-13.

Abstract: The article briefly describes various aspects of Bali's national park. The wildlife reserve consists of coral reef, marine waters and forest, thus activities such as fishing and reef mining have made their impact on the local economy and way of life. A brief overview is given of management guidelines and methods of monitoring tourist arrivals.

Diouf, P. S. et al. (1991). Contribution à l'élaboration d'un Plan d'Action Forestier. Pêche et aquaculture continentales. Vol. 1 Diagnostic. (p. 325). [s. l.]: CRODT/FAO/MDR.

Diouf, P. S. et al. (1991). Contribution à l'élaboration d'un Plan d'Action Forestier. Pêche et aquaculture continentales. Vol. 2. Proposition d'Action. (p. 32). [s. l.]: CRODT/FAO/MDR.

Diouf, P. S. et al. (1991). Plan d'action forestier: Pêche et Aquaculture continentales.[s. l.]: CRODT/MDRH/FAO.

Sadio, S. (1991). Pédogenèse et potentialités forestières des sols sulfatés acides salés des tannes du Sine, Sénégal. [s. l.]: [s. n.].

[Anon.] (1992). Management recommendations [for Johnstone Strait killer whale conservation]. (p. 44). Victoria, BC (Canada): Johnstone Strait Killer Whale Comm.

Abstract: Western Johnstone Strait has one of the world's highest concentrations of killer whales in an accessible location. In May 1990, the joint provincial and federal government Johnstone Strait Killer Whale Committee was appointed to examine the impacts of all human activities on killer whales in the Robson Bight (Michael Bigg) Ecological Reserve, and to assess the impacts of whale watching in other areas of the Johnstone Strait. In May 1991, a

background report was released for public comment and open houses public meetings were held in Campbell River, Port McNeill, Victoria, and Vancouver. This report presents the general recommendations of the Committee, as well as specific recommendations on education, enforcement and regulations, research photography, commercial fishing, whale watching, land access, and forest management. For each topic, a brief rationale is given, the nature of the public input received is summarized, and recommendations are made

Bousquet, B. (1992). Guide des parcs nationaux d'Afrique: Afrique du Nord, Afrique de l'Ouest. (pp. 368 ; fig., maps, pl., tab.; ref.). Lausanne; Switzerland : Delachaux et Niestle.
Abstract: Designed for nature tourists and ecologists, this book offers an illustrated guide to 43 national parks in North and West Africa. Following a general introductory section which looks at the history and development of conservation in Africa and of the national park system, the following two chapters examine their major objectives, those of maintaining the natural equilibrium and biodiversity and developing and preserving natural renewable resources, through tourism, fishing, fauna and forests. The next chapter then considers in turn the principal types of natural environment in Africa, looking at coastal and mountain areas, forests, scrubland, deserts and savanna. Aspects of management of national parks and their flora and fauna are also discussed. The main part of the book then presents a classification of the national parks in Africa by country, giving for each a description, a map, a list of animals, practical advice and details on the type of institutional organization and impact of human activity. The countries covered are Algeria, Benin, Burkina Faso, Cote d'Ivoire, Guinea, Mali, Morocco, Mauritania, Niger, Senegal, Togo and Tunisia

Fairbairn, T. I. J., & Tisdell, C. (1992). Marine property rights in relation to giant clam mariculture in the Kingdom of Tonga. Giant clams in the sustainable development of the South Pacific: socioeconomic issues in mariculture and conservation (pp. 119-133, 6 ref., 2 maps). [s. l.]: ACIAR.

Abstract: Marine property rights in the coastal waters of the Kingdom of Tonga are fairly uncomplicated. Ownership of Tonga's reefs and lagoons, as well as its territorial waters as a whole, is vested in the Crown and has been so since the late 19th century. While such an arrangement effectively took away the traditional and customary rights of local groups over these waters, it allows open access to all Tongans for purposes of fishing, both subsistence and commercial. The main exceptions are certain restricted areas set aside as marine parks. Leases over reef sites for giant clam and other forms of mariculture can be negotiated with the government. The Fisheries Act of 1987 and the Fisheries Regulations of 1989 provide the basic legislative framework for such leases. Specific terms and conditions relating to leases are negotiated under the auspices of the Ministry of Agriculture, Forestry and Fisheries. Under existing legislation, the Minister of Agriculture, Forestry and Fisheries has fairly wide regulatory powers to ensure, among other things, that mariculture, and fisheries in general, proceed along sound lines. Tonga appears to possess many favourable features for giant clam mariculture. The country's many constituent and widely scattered islands support extensive reef and lagoon areas; the necessary legislative and tenurial framework is in place; while public awareness on the potential of clams as a major industry seems to be growing (Tonga's 'giant clam circle' project has contributed in this respect). The Ha'apai Group, with its large reef areas and generally favourable social environment, appears to be particularly well-placed to support a major clam project. For purposes of establishing a commercial clam project, including one with foreign participation, the collaboration of local groups seems to be a vital prerequisite. The involvement of local villagers can be particularly valuable for the policing of project sites to prevent poaching. Collaboration with other local groups also seems necessary, for example, the Fishermen's Association and local government officials.

Sweeney, L. (1992). Central America Nations Guard Biodiversity. *In: Underwater*, 8(10), 23.
Abstract: Endangered green sea turtles and other Caribbean wildlife will be better protected, since an important conservation decree was signed in Central America in the fall of 1991, defining Nicaragua's Miskito Cays Marine Reserve. Another important decree, to expand Costa Rica's Tortuguero National Park, is expected to be signed in early 1992. The Miskito reserve will encompass over 5,000 sq. mi. of reefs, sea grass beds, and coral islands in an area off the northeast coast of Nicaragua. The area is home to endangered sea turtles, manatees, and other rare species, along with productive shrimp and lobster fisheries. A multiagency commission will oversee an emergency plan to curb resource piracy by foreign fishing fleets, and provide a permanent resource conservation plan for the area. Representatives of the Miskito communities, which depend on the natural resources for their livelihoods, are included in the commission. The fisheries will be managed in order to support the native Miskito lifestyle, but the area will still be preserved in its natural state. While the grassbeds and reefs of the Miskito Cays are one of the world's most important foraging grounds for endangered green sea turtles (*Chelonia mydas*), many of these same turtles migrate 300 mi. south to a single nesting beach along the northeast coast of Costa Rica. Tortuguero National Park shelters one of the most significant green turtle nesting beaches in the world. Expansion of the park, which is in a region that is increasingly affected by tourism and deforestation, is being supported by the non-profit Caribbean Conservation Corporation with funding from the U. S. Agency for International Development. When legal technicalities are completed, the first phase of the expansion will be to double the size of the park to nearly 40,000 hectares, encompassing a 9,000 hectare corridor connecting it with the Barra del Colorado National Wildlife Refuge to the north. The remainder of the sea turtle nesting beach, Tortuguero Mountain, and a strip of land along the San Juan River on the border of Nicaragua will be included. The second phase will include additional land bordering the park, and eventually a buffer zone will also be added to protect the park. The resulting preserve will shelter 80,000 hectares of intact lowland rain forests, mountains, estuaries, and beaches from timbering and development

Brown, J., & Baugh, T. (1993). The National Coastal Wetlands Conservation Grants Program. ASLO AND SWS 1993 ANNUAL MEETING. vp

Notes: Summary only.

Abstract: Section 305 of the Coastal Wetlands Planning, Protection, and Restoration Act of 1991 established the National Coastal Wetlands Conservation Grants Program. This program, administered by the U.S. Fish and Wildlife Service, provides for matching grants to coastal States to carry out coastal wetlands conservation projects, including acquisition, enhancement, restoration, and management. Eligible applicants are State agencies of coastal States. Funds are made available from monies deposited in the Sport Fish Restoration Account of the Aquatic Resources Trust Fund. Project proposals are solicited and evaluated annually by criteria that address project benefits to endangered species biological diversity, anadromous fishes, and contaminated wetlands. Priority consideration is given to conservation projects involving maritime forests on barrier islands. In 1992, 13 projects received \$5.7 million in federal funding. A similar level of funding is available for 1993

Burgess, J. C. (1993). Timber production, timber trade and tropical deforestation. *In: Ambio*, 12(2-3), 136-143; 40 ref.

Diop, E. S. (1993). Les mangroves du Sénégal et de la Gambie. Conservation et utilisation rationnelle des forêts de mangroves de l'Amérique latine et de l'Afrique (pp. 22-38). [s. l.]: [s. n.].

Dugan, J. E., & Davis, G. E. (1993). Applications of marine refugia to coastal fisheries

management. *In: Canadian Journal of Fisheries and Aquatic Sciences*, 50(9), 2029-2042.

Abstract: Marine fisheries refugia, unaltered areas that serve as sources of replenishment, can potentially compensate for recruitment and ecosystem overfishing and enhance fishery yields for some coastal stocks. The efficacy of refugia in fisheries management is virtually untested, despite the existence of many marine parks and reserves. Evidence from existing marine reserves indicates that increased abundance, individual size, reproductive output, and species diversity occurred in a variety of marine species in refuges of various sizes, shapes, and histories in communities ranging from coral reefs to temperate kelp forests. Fishery yield enhancement in areas surrounding refuges occurred in the few studies where yields were examined. Fishery refugia design should consider species life histories, oceanographic regimes, habitat quality, and socioeconomic factors

Gadgil, M. (1993). Biodiversity and India's degraded lands. *In: Ambio*, 12(2-3), 167-172; 27 ref.

Gadgil, M., & al. (1993). Special issue. Biodiversity: ecology, economics, policy. *In: Ambio*, 12(2-3), 61-172.

Abstract: Publication of this special issue was partly supported by SAREC (Swedish Agency for Research Cooperation with Developing Countries) and SIDA (Swedish International Development Authority). Seventeen papers are included on various aspects of biodiversity in relation to sustainability and conservation worldwide. Solutions are briefly explored in 4 categories of degraded land, reserved forests, shifting cultivation, village common land and cultivated land.

Grose, K. (1993). IUCN publications, 1948-1992 : a catalogue of publications produced by IUCN or in collaboration with other organizations. (pp. 325 ; 28 cm., Includes indexes). Gland, Switzerland: IUCN.

Lugo, A. E., Parrotta, J. A., & Brown, S. (1993). Loss of species caused by tropical deforestation and their recovery through management. *In: Ambio*, 12(2-3), 106-109; 30 ref.

Salazar-Vallejo, S. I. et al. (1993). Areas costeras protegidas de Quintana Roo. *In: S. I. Salazar-Vallejo, & N. E. Gonzalez. Coastal And Marine Biodiversity Of Mexico* (pp. 687-708).

Abstract: Quintana Roo is the only Mexican state in the Caribbean Sea; it has 12 areas legally protected and 9 include or were established because of its coastal attractions. Most coastal areas are in northern Quintana Roo; they have been affected by tourism, organic pollution, deforestation and landfilling of wetlands, physical stress by divers and boats and were impacted by hurricane Gilbert in 1988. We suggest modifications in the limits of Punta Cancun, P. izuc, in the marine reserve of Cozumel island mainly to cover coral reefs, and buffer zones between urban areas and natural sites in Cozumel island. Tulum National Park has serious troubles on limits and land property. Several well-preserved sites deserve protection such as northern wetlands or Yalahau Lagoon, border zone of Chetumal Bay and some of its adjacent lagoons, and Chinchorro Bank. There are federal and state laws related to conservation but specific actions are still few or absent; Mexico signed the Kingston protocol on specially protected areas and wildlife. A state (or international) coastal management plan must be made soon.

Smith, A., & Berkes, F. (1993). Community-based use of mangrove resources in St. Lucia. *In: International Journal of Environmental Studies*, 43(2-3), 123-131.

Abstract: The sustainable use of mangrove forests can effectively contribute to their conservation. The experience with an integrated conservation-development project in St. Lucia

showed that charcoal producers using mangrove fuelwood resources in a Marine Reserve Area have successfully changed their harvesting practices, reversing a trend of mangrove destruction. The conditions under which this change occurred included strengthening the organization of local users and their resource-use rights, and building a community-based management system, leading to the avoidance of open-access conditions. Surveys of the mangrove, undertaken before and after management intervention, showed that while the mean stand diameter of the fuelwood trees did not change significantly, there was an increase in the density of stems and in total basal area of timber

Tamoykin, I. Y., Petrov, A. N., & Kruglov, M. (1993). About creation of the initiated near shore reservation covering area Pheolent aja sarych capes of the Crimea (the Black Sea). Sixth Interdisciplinary Conference On Natural Resource Modeling And Analysis.#Sesta Conferenza Interdisciplinare Di Analise E Modellistica Delle Risorse Naturali. (Rome (Italy)), (1993) Rome Italy: Ministero Agricoltura e Foreste. Lab. Cent. de Idrobiologia
Notes: Summary only.

Abstract: The following reasons were given to allocate territory for reservation: the present reservation area is insufficient to maintain normal functioning to coastal communities and to restore essential genetic and ecological diversity; the presence of bottom biocenosis with the considerable environmental wide effect; the coasts there are unsuitable for any social and economic development. The concerned coastal area covers the precipitous slopes part developing into rocky formations of mountain range difficult to get to. Diversity of the seascapes and terrestrial landscapes, rare and extincting plants and animals, nearly natural state of the communities ask for immediate actions in natural protection for preservation of the self purifical potential and biological productivity of this coastal region. Around the reservation it is necessary to create the protective zones about 2 3 km wide. Otherwise, intensive recreational and industrial activity in the region will destroy the last of extant wild landscapes and endemic communities, that in turn will cause a drop in natural potential of the Crimea coast.

Visser, N. M. (1993). Wetlands and tourism. Wetlands of Kenya. The KWWG Seminar on Wetlands of Kenya, Nairobi (Kenya), 3-5 Jul 1991 Gland (Switzerland): IUCN

Abstract: Five wetland oriented actions are recommended to develop and safeguard the financial resources derived from tourism in Kenya. These are to: improve the quality of the sewage water discharged into Lake Nakuru; stop the inflow of agrochemicals into lake Naivasha and let an Environmental Impact Assessment form the basis of the decision whether or not to remove water from Lake Naivasha to supply drinking water to Nakuru town; accelerate anti erosion activities around Lake Baringo; Include mangroves, that now falls under Forestry Department, in the KWS management of marine protected areas; make the Tana River Delta a protected area, including a large area of freshwater wetland north of the river and develop tourism infrastructure

Akegbejo Samsons, Y. (1994). Establishing national coastal protected areas in Nigeria: Problems and prospects. Coastal Zone Canada '94, Cooperation In The Coastal Zone. Conference Proceedings, Halifax, NS Canada, 20-23 Sep. 1994 Dartmouth, NS Canada : Coastal Zone Canada Assoc.

Abstract: In Nigeria, while there exist strict natural forest reserves, game reserves and parks, there is yet to be a directed effort towards the establishment of a coastal or marine protected area. The 970 kilometre square Nigeria's coastline and the entire area is viewed for its rich biological diversity and its fundamental usefulness as a resource base. This includes the fish, wildlife, forestry, agriculture, a esthetic, social and fossil oil components. The need for the establishment of marine protected areas is discussed while the socio cultural aspects of their establishment and maintenance are highlighted. It is suggested that closer links should be

forged between the local resource users and government agencies if the cultural, social and educational objectives of their preservation are to fully realized

Davis, G. E., Faulkner, K. R., & Halvorson, W. L. (1994). Ecological monitoring in Channel Islands National Park, California. The Fourth California Islands Symposium: Update on the Status of Resources. Santa Barbara, CA (USA), 1994 Santa Barbara: Museum of Natural History

Abstract: Natural resource managers need to understand the natural functioning of and threats to ecosystems under their management. They need a long term monitoring program to gather information on ecosystem health, establish empirical limits of variation, diagnose abnormal conditions, and identify potential agents of change. The approach used to design such a program at Channel Islands National Park, California, may be applied to other ecosystems worldwide. The design of the monitoring program began with a conceptual model of the park ecosystem. Indicator species from each ecosystem component were selected using a Delphi approach. Scientists identified parameters of population dynamics to measure, such as abundance, distribution, age structure, reproductive effort, and growth rate. Short term design studies were conducted to develop monitoring protocols for pinnipeds, seabirds, rocky intertidal communities, kelp forest communities, terrestrial vertebrates, land birds, terrestrial vegetation, fishery harvest, visitors, weather, sand beach and coastal lagoon, and terrestrial invertebrates (indicated in priority order set by park staff). Monitoring information provides park and natural resource managers with useful products for planning, program evaluation, and critical issue identification. It also provides the scientific community with an ecosystem wide framework of population information

Dixon, J. A. et al. (1994). Economic analysis of environmental impacts. (pp. 2, xii + 210 pp., 40 tab., 25 fig.; many ref.). [s. l.]: [s. n.].

Abstract: This book focuses on the imposition of monetary value on the environmental impacts of economic development. Although much of the emphasis is on project level impacts, it also recognizes the importance of macro level government policies on the patterns of resource use. It contains sixteen chapters divided into two parts. The use of environmental assessment procedures, valuable at the early stages of project identification and priority setting, are discussed in chapter 2. The basic theoretical assumptions that underlie the proposed approach to valuation are then outlined in chapter 3. The techniques themselves are presented in chapters 4, 5 and 6; Chapter 4 focuses on techniques that are generally applicable to project analysis, while chapters 5 and 6 concentrate on techniques which are more difficult to apply and whose use in project analysis has therefore been limited. Chapter 5 covers selectively applicable techniques that rely on the existence of surrogate markets or the use of survey based approaches, and chapter 6 discusses the use of mathematical models, natural resource accounting, and analysis of economy-wide impacts within the broader context of economic development and environmental management. The limitations of the economic measurement of environmental impacts are discussed in chapter 7. Case studies, which illustrate complete economic analyses as well as the use of individual techniques, are presented in the nine chapters in part two. The first of these case studies examines the use of changes in the values of milk, fertilizer and firewood production to assess a watershed management and forest development project in Nepal; the second evaluates selected mangrove management schemes in Bintuni Bay, Indonesia, on the basis of changes in productivity in mangrove-based activities including fishing, forestry and hunting; the use of the cost-of-illness approach to estimate the health costs of air pollution in Jakarta, Indonesia, is illustrated in the third case; the fourth estimates the benefits of a soil conservation project in the Loess Plateau, China; the fifth compares the cost-effectiveness of several waste-water disposal methods in the Togonan Geothermal power plant, Leyte, Philippines; the sixth the benefits for tourists and local residents of the establishment of

a new National Park in Madagascar; the trade-offs between ecology and economic functions in the Bonaire Marine Park, Dutch Antilles is the seventh case; while the eighth estimates willingness to pay for improved water supply in Onitsha, Nigeria; and the final case study focuses on the priorities for setting priorities for pollution control measures in Central and Eastern Europe. The book represents an updated form of the Economic analysis of environmental impacts of development projects, published in 1988.

Forestell, P. H., & Kaufman, G. D. (1994). Resource managers and field researchers - allies or adversaries? Townsville, Qld Australia: Great Barrier Reef Marine Park Authority

Notes: 16 ref.

Abstract: As the public demand for access to marine creatures in their natural habitat increases, so will the challenge for resource managers to balance public appetite on the thin edge of ecosystem integrity. In co-ordinating frequently mis-matched agenda of the public, commercial interests, conservationists, endangered species and threatened habitats, resource managers need input from many sources. Ways in which marine mammal field researchers can facilitate the task of resource managers in permitting public participation while limiting the degree of negative impact are discussed.

Harding, L. E., & McCullum, E. (1994). Biodiversity in British Columbia : our changing environment. (pp. xxii, 426 : ill., maps (some col.) ; 28 cm). [Ottawa]: Canadian Wildlife Service.

Abstract: Introducing biodiversity : The importance of conserving systems / J. Stan Rowe -- Terms of endangerment / Andrew Harcombe... [et al.] -- A rose by any other name / Edward H. Miller and Geoffrey G.E. Scudder -- Species diversity : Endangered terrestrial and freshwater invertebrates in British Columbia / Sydney Cannings -- British Columbia's butterflies and moths / Crispin Guppy and Jon Shepard -- Biodiversity of marine invertebrates in British Columbia / Philip Lambert -- Rare and endangered bryophytes in British Columbia / W. B. Schofield -- Rare and endangered lichens in British Columbia / Trevar Goward Macrofungi of British Columbia / Scott A. Redhead Rare and endangered vascular plants in British Columbia / Hans Roemer, Gerald B. Straley and George W. Douglas -- Benthic marine algal flora (seaweeds) of British Columbia: diversity & conservation status / Michael W. Hawkes -- Reptiles in British Columbia / Stan A. Orchard -- Amphibians in British Columbia: forestalling endangerment / Stan A. Orchard -- Threats to fish diversity in the fresh waters of British Columbia / Alex Peden.

Contents: Endangered mammals in British Columbia / David Nagorsen -- Threatened and endangered birds in British Columbia / Richard Cannings -- Exotic species in British Columbia / Lee E. Harding... [et al.] Ecosystem diversity : Overview of ecosystem diversity / Lee E. Harding and Emily McCullum -- Threats to diversity of forest ecosystems in British Columbia / Lee E. Harding -- Threats to biodiversity of grasslands in British Columbia / Michael Pitt and Tracey D. Hooper -- Threats to biodiversity in the Strait of Georgia / Lee E. Harding -- Urban biodiversity / Valentin Schaefer -- Songbirds in decline / Lee E. Harding -- Atmospheric change in British Columbia / Lee E. Harding and Eric Taylor Future of British Columbia's flora / Richard Hebda Prospects for the future : Protected areas in British Columbia: maintaining natural diversity / Kenneth E. Morrison and Anthony M. Turner -- The British Ecological Reserves Program / B.C. Parks Conserving marine ecosystems: are British Columbia's marine protected areas adequate? / Michael W. Hawkes.

Contents: Thoughts on an earth ethic / Robert F. Harrington -Conclusions and recommendations / Lee E. Harding.

Kim, L. C. (1994). Coastal zone management plan development in Malaysia with particular reference to the management of fisheries resources. Socio Economic Issues In Coastal Fisheries

Management. Proceedings Of The Ipcf Symposium In Conjunction With The Twenty Fourth Session Of IPFC, Bangkok, Thailand, 23-26 November 1993 Bangkok Thailand: FAO Indo Pacific Fisheries Comm.

Abstract: Planning, management and development in Malaysia is presently undertaken on a sectoral basis. Numerous ministries, agencies and regional authorities are all variously involved in the development and management of land and natural resources. The situation is further complicated by overlapping jurisdictions concerning land use and marine waters by state and federal governments. Within the framework of an ASEAN US Cooperative Programme, a pilot plan for coastal resources management has been elaborated for South Johore with the objective of creating a truly integrated plan designed and operated by a group of local scientists, resource managers, administrators and policy makers on a consensus basis. The Coastal Resources Management Plan (CRMP) seeks to establish zones for compatible uses of the resources, prohibition of zones for incompatible activities, zones for the protection of unique resources and ecologically threatened areas. Resource specific management plans for coastal forests, fisheries, island and marine parks and issue specific plans for coastal erosion, sand mining and water quality have also been developed. The CRMP further provides for area specific plans for sensitive areas and recommends a legislative and institutional framework for plan implementation. The fisheries issues identified by the project are summarised and an overview given of the CRMP strategies set out for the coastal resources in relation to the management needs of the marine fisheries resources

Sarr, A. (1994). L'évaluation des potentialités agroforestières des terres salées du bassin du Sine. [s. l.]: [s. n.].

Andersson, J. (1995). Marine resource use in the proposed Mafia Island Marine Park. (p. 34). [s. l.]: Unit for Environmental Economics, Department of Economics, Gothenburg University.

Abstract: The marine resource users in the proposed Mafia Island Marine Park include the local men, women, and children and an increasing number of outsiders, mainly from Dar es Salaam, Mtwara, Lindi, and Zanzibar. Finfish were the main marine resource, but the individual income earnings were larger for the collection of corals. Octopus fishing was the activity that involved the largest number of people; this is mainly because it can be performed by women and children. Octopus is the product that had the largest difference in buying price on Mafia and selling price in Dar es Salaam. Other identified marine resource activities of significance to the locals were shell and sea cucumber collection. These had very small or no relevance for local consumption and were sold to external markets. Identified environmentally harmful activities were coral collection, dynamite fishing, the use of destructive fishing gears, and the illegal cutting of coastal and mangrove forests. The economic incentives to burn corals for the production of lime were large. Dynamite fishing was generally considered as 'bad', but there was a discrepancy in the perception of the activity between the smaller islands included in the proposed park area. The perception among the locals towards the implementation of the park was very positive. The largest expectations among the local resource users were for the park to secure and eventually improve the productivity of their fishing grounds

Causey, B. (1995). An ecosystem approach to managing marine protected areas for sustainable use. Sustainable Financing Mechanisms For Coral Reef Conservation: Proceedings Of A Workshop, Washington, DC (USA), 23 Jun 1995 Washington, Dc Usa : World Bank

Abstract: The Florida Keys extend approximately 220 miles southwest from the southern tip of the Florida peninsula in the United States. Located adjacent to the Keys' land mass are spectacular, unique, and nationally significant marine environments, including seagrass meadows, mangrove islands, and extensive living coral reefs. These communities are the marine equivalent of tropical rain forests in that they support high levels of biological diversity,

are fragile and easily susceptible to damage from human activities. Warning signs that the Keys' environment and natural resources were fragile, and not infinite, came early. In 1957, a group of conservationists and scientists held a conference at the Everglades National Park and discussed the demise of the coral reef resources in the Keys at the hands of those who were attracted there because of their beauty and uniqueness. The conference resulted in action that created the world's first underwater park, the John Pennekamp Coral Reef State Park, in 1960. Other management efforts were undertaken to protect the coral reefs of the Florida Keys. The Key Largo National Marine Sanctuary was established in 1975 to protect 103 square nautical miles of coral reef habitat stretching along the reef tract from just north of Carysfort Lighthouse to south of Molasses Reef, offshore of the Upper Keys. In 1981, the 5.32 square nautical mile Looe Key National Marine Sanctuary was established to protect the popular Looe Key Reef, located off Big Pine Key in the Lower Keys.

Diouck, D. (1995). Contribution à l'étude de l'écologie d'une bande de colobes bairds ('Colobus badius temminckii') de la forêt Fathala, parc national du delta du Saloum, Sénégal : adaptation aux modifications du milieu et conditions de survie. Université Cheikh Anta Diop, Dakar.

Echeverria, J., Hanrahan, M., & Solorzano, R. (1995). Valuation of non-priced amenities provided by the biological resources within the Monteverde Cloud Forest Preserve, Costa Rica. *In: Ecological Economics*, 13(1), 43-52.

Abstract: To quantify the economic benefits of the Monteverde Cloud Forest Preserve and to test the contingent valuation method in a third world setting, a contingent valuation survey was designed with five experimental treatments. These determined an overall expected value per visitor; determined and compared two ways of eliciting value, single versus annual lump-sum payments; and compared average values of Costa Rican versus non-Costa Rican visitors. Visitors were willing to pay to prevent the Preserve's conversion to agricultural uses. Monteverde's value as a cloud forest preserve appears much higher than any value it might have in agricultural use. Despite lower incomes, Costa Rican visitors valued the Preserve more highly than non-Costa Rican visitors. Visitors may have differentiated only weakly between greatly differing bid amounts. Expected values derived from econometric analysis of the differing experimental treatments suggest that further methodological adaptation of the contingent valuation method may be required (1) when it is applied in third world settings, and (2) when precision is critical in estimating WTPs.

Enright, J. (1995). Aquaculture degrades Khao Sam Roi Yot National Park. *In: Coast. Manage. Trop. Asia*, (4), 24-25.

Abstract: Khao Sam Roi Yot National Park, located approximately 300 km southwest of Bangkok, on the Gulf of Thailand, has 10 distinct habitat zones including mixed deciduous and secondary forests, tidal mudflats, mangroves, sand beaches, scrub, saltflats and cultivation, brackishwaters and prawn ponds, paddy fields, 5 offshore islets, and open sea. The status of 'National Park' has not been enough to protect the area from the onslaught of the black tiger prawn (*Penaeus monodon*) farming boom. Large scale encroachment by prawn farms has occurred, mainly allowed by the fact that park boundaries have never been clearly demarcated in certain regions. The park has lost substantial amounts of habitat including mangrove, reedbed marsh and tidal mudflats, including also the wildlife and birds. The impact of the prawn farm extends beyond the pond itself, as the saline water seeps into the surrounding soil and ground water; the waste water is sometimes released onto adjacent land where it can kill the freshwater reedbeds and grass. It is concluded that although the park has suffered greatly from the direct impact of encroachment and from secondary impact by unrestricted aquaculture growth, it is still a valuable resource worth preserving. The prawn farming industry needs to be brought under control, and transformed into a sustainable form of aquaculture. Some conservation

measures are proposed

Freezallah, B. C. Y. (1995). Forestry and Protected Areas: A Natural Partnership. *In:* J. McNeely (ed.), Expanding Partnerships in Conservation . Washington, D.C.; Covelo, California: Island Press.

Norton-Griffiths, M., & Southey, C. (1995). The opportunity costs of biodiversity conservation in Kenya. *In:* Ecological Economics, 12(2), 125-139.

Abstract: This paper estimates the opportunity costs of biodiversity conservation in Kenya from the potential net returns of agricultural and livestock production, and compares them with the net returns from tourism, forestry and other conservation activities. At the national level, agricultural and livestock production in the parks, reserves and forests of Kenya could support 4.2 million Kenyans and generate gross annual revenues of \$565m and net returns of \$203m. These forgone net returns of \$203m, some 2.8% of GDP, represent the opportunity cost to Kenya of biodiversity conservation. The current combined net revenues of \$42m from wildlife tourism and forestry are quite inadequate to cover these opportunity costs to land. The government of Kenya is clearly subsidising conservation activities whose chief values are all indirect and external to Kenya, and their ability to continue doing so will be a function of growth and modernisation in the Kenyan economy. Dependency on land will increase if the economy stagnates and rural populations continue to grow, and while the government of today may not consider degazetting parks and reserves, the situation could be quite different in 25 years when rural populations have doubled yet again. In contrast, dependency on land will fall only once the economy grows and modernises and rural populations are drawn off the land and into industrial and service sectors. Given the global nature of the benefits from Kenya's conservation efforts, it is quite inappropriate that so much of the cost is born by Kenya. The present scale of subsidies should instead form the basis for international negotiations to transfer funds to meet all or part of them. At present the global environment facility (GEF) is the only operational programme through which such contributions can be channelled to meet the incremental costs of biodiversity conservation, but situations such as the one described here for Kenya were never envisaged when the GEF was designed. If the developed world expects a country like Kenya to maintain conservation estate on its behalf, then it must be prepared to contribute substantially towards these costs until such time as Kenya can afford to carry the burden itself.

Olenin, S. (1995). A marine protected area in the Lithuanian coastal zone: Ecological values and anthropogenic impact. *In:* R. S. Volskis (ed.), Species And The Environment (pp. 160-163). Venice: ROSTE.

Abstract: Recently, the joint World Wide Fund for Nature (WWF) and the Baltic Marine Biologists (BMB) Working Group have identified several coastal and offshore marine areas in the Baltic Sea in need of protection. The areas were selected in accordance with certain criteria like ecological value, scientific and educational importance, state of still existing naturalness, etc. One of the areas nominated by the WWFBMB Working Group, the "Pajurio" regional park, is situated in the northern part of the Lithuanian coast in between the maritime health resort Palanga and a suburb of Klaipeda, the main city of the Lithuanian Coastal Region. The park includes 5.000 ha of land and about 2.000 ha of the inshore waters. Its terrestrial and marine parts comprise a variety of coastal and marine biotopes: a) coastal forests; b) coastal "grey" and "brown" dunes; c) a moraine cliff; d) sandy beaches sometimes with mixture of pebbles and gravel; e) bottoms of sand, gravel and stones, including different variations among them

Uy, W. H., & Openiano, P. L. Jr. (1995). Survey of coral reefs in the proposed Initao Marine Park: Coral communities. Third National Symposium In Marine Science Of The Philippine

Association Of Marine Science Pams

Notes: Supplement.

Abstract: Coral reefs of the proposed marine park in Initao, Misamis Oriental were surveyed last November 1993 to January 1994 to assess their ecological status. Rapid resource assessment was done using the manta tow reconnaissance technique. The coral benthos and associates were assessed using the lifeform line intercept technique in five sites. Five 20-meter transect tapes were laid in two depths at 3m and 10m in each site. A total of 68 species of hard corals were recorded. Results of the manta tow showed relatively healthy coral communities fronting the Initao forest park and along the northeastern portion. The southwestern portion fronting the different beach resorts showed relatively low coral cover. Results of the lifeform transect showed live coral cover, raging from 11.37-49.77% in the upper reef slope and 13.42-50.49% in the lower reef slope. Dead coral cover gave an average of 26.96% and 12.06% for the upper and lower reef slope, respectively. Massive type *Porites* and *Euphyllia* dominated both the upper and lower reef slopes. Among the associates, soft corals recorded relatively high cover, ranging from 0.99-28.67%, with highest cover in the upper reef slope fronting the Initao forest park. Live coral cover in the proposed marine park is generally fair. Proper management measures are recommended to prevent further habitat degradation and to increase coral abundance in the area.

Cortes, J. (1996). A reef under siltation stress: a decade of degradation. *In: Biological Conservation*, 76(2), 215.

Abstract: The coral reef at Cahuita National Park, Caribbean coast of Costa Rica, has been stressed by sediments from watersheds of rivers that flow to the sea near the Park. High sediment loads in these rivers are due to deforestation on the highlands and to inappropriate agricultural practices on the coastal plains. During the last decade natural disturbances (coral bleaching in 1983, sea urchin *Diadema antillarum* die-off in 1983 and 1992, at 7.4 earthquake in 1991) and other anthropogenic stresses (pollution, tourism) have contributed to the degradation of the coral reef.

Das, I. (1996). Evaluating biodiversity: the Batu Apoi experience. *In: Biological Conservation*, 76(2), 217.

Abstract: Batu Apoi, a dipterocarp forest in Brunei Darussalam being developed into the country's first National Park, is richer in species than might be expected from its size. New species of virtually every group of plants and animals have been identified.

Kulbicki, M. et al. (1996). Les peuplements de poissons de la réserve marine du récif Abore (Nouvelle-Calédonie): composition scientifique, structures trophique et démographique avant l'ouverture à la pêche. *In: Doc. Sci. Tech. Cent. ORSTOM Noumea*, 1(1), 210.

Abstract: An inventory of the fish assemblages was undertaken in a marine reserve of New Caledonia. Part of this reserve will be soon open to fishing. This study has two parts, on one hand the study of the fish assemblages and on the other hand the study of commercially or recreationnaly important species. The reserve covers 80 km², with three major biotopes, the reef flat, the dropoff and a submerged reef of branching *Acropora*, called locally the "forest". A total of 32 stations were sampled by 32 transects for fish assemblages and 157 transects for commercial fish species. These stations are distributed equally among 6 zones, each zone being divided into the three biotopes (reef flat, dropoff, forest). A total of 340 species were observed, of which 147 were of commercial interest. The dropoff had the most species (254), the reef flat and the forest having a similar number of species (204 and 206). The average density was 3.6 fishm super(2) (*Clupeidae* excluded), the highest densities being on the dropoff (3.65 fishm super(2)) and the lowest in the forest (1.9 fishm super(2)). The density of commercial species (0.91 fishm super(2)) followed the same trends. The major families in density were the

Pomacentridae, Labridae, Scaridae, Acanthuridae, Mullidae and Chaetodontidae. The species composition in density changed from one biotope to the next, the major families remaining the same. The most abundant commercial species were the Scaridae and Acanthuridae. The average biomass was 338 gm super(2), however if the very large and rare species (sharks and rays) were excluded, then the biomass was of 262 gm super(2). Nearly 70% of the biomass was made of commercial species. The dropoff had the highest biomass (326 gm super(2)) and the reef flat the lowest (195 gm super(2)). The benthic macrocarnivores had the most species (96), followed by the herbivores (62 species), the microcarnivores, zooplanktivores and piscivores having a similar number of species (from 38 to 43). There was no difference between biotopes in the trophic structure in species number. Zooplanktivores were the most abundant with the herbivores, these two categories totaling more than 70% of the total density. The variability between biotope of the abundance of the various trophic groups was small. Biomass was dominated by macrocarnivores and herbivores, whereas zooplanktivores represented only a low proportion of the biomass. There were more piscivores in the forest than in the other biotopes. The biomass of herbivores increased with the amount of hard substrate. The analysis of the size structure suggests migrations with age between biotopes and different growth rates depending on the biotope for a large number of species. The distribution of the life history strategies suggested that the most stable assemblages were found in the least disturbed biotopes (forest and bays in the reef), and the least stable being found on the reef flat. Most of the stock was in the forest, this biotope having a large area. The families contributing the most to the commercial stock were the Scaridae and Acanthuridae, however, *Plectropomus leopardus* was the major commercial single species. The MSY was grossly estimated. The fishing effort needed to reach this MSY is well beyond the local fishing potential. However, the fishing effort should not be distributed evenly, the reef flat and the dropoff being much easier to fish, whereas these biotopes support only 20% of the commercial stock

Leao, Z. M. A. N. et al. (1996). Impact of tourism development on the coral reefs of the Abrolhos area, Brazil. *In: Biological Conservation*, 76(2), 215-216.

Abstract: The reefs of the Abrolhos area (the southernmost coral reefs in the Atlantic) have an undoubted importance for scientific studies, as they are ecologically unique and rich in endemic species. They are also economically valuable for fisheries. A five year survey on the effects of marine tourism in the offshore reefs of the Abrolhos Marine Park revealed that the regional tourism is the most active one, and although severely controlled, visitor activity has been hazardous to the reefs. In the nearshore zones, the reefs are not under any kind of environmental control. They have been impacted by high sedimentation influx, caused by deforestation of the Atlantic rainforest. This is now reinforced with the fast growth of urban centers in the coastal zones.

Lugo, A. E. (1996). Preservation of primary forests in the Luquillo Mountains, Puerto Rico. *In: Biological Conservation*, 76(2), 215.

Abstract: The Caribbean National Forest, a National Forest under the jurisdiction of the US Forest Service and a UNESCO Biosphere Reserve, contains the only primary tropical forests in Puerto Rico. The planning for future uses of the Caribbean National Forest has been controversial and serves as a case study of the application of federal regulations designed for continental temperate zones to insular tropical conditions. Given the history of custodial management of the forest by the US Forest Service, it appears unlikely that the agency will advocate conversion of the only primary tropical forests under US Government jurisdiction in order to satisfy requirements of the National Wilderness Act and/or the National Forest Planning Act. The planning, management, and conservation of the Caribbean National Forest can be a model for such activities elsewhere in the Caribbean and the American tropics but only if it demonstrates a balance between intensive use of suitable stands and absolute protection of

primary forests.

MacKinnon, K., Irving, A., & Bachruddin, M. A. (1996). A last chance for Kutai National Park - local industry support for conservation. *In: Biological Conservation*, 76(2), 217.

Abstract: Kutai National Park in East Kalimantan was originally established as a game reserve in 1936 and became a national park in 1982. The parks' lowland forests have suffered from logging, agricultural encroachment and extensive fires during the prolonged dry season in 1982 and 1983. During the 1980s a new coal mine opened at Sangatta. Industrial development has provided a new opportunity to strengthen park protection and management.

Mehrotra, B. N. (1996). Collection of biological materials in biodiversity prospecting in India: problems and solutions. *In: Journal of Ethnopharmacology*, 51(1-3), 161-165.

Abstract: Forests are the chief resource for the collection and exploration of biological materials. The past few decades have witnessed a large scale deforestation in India due to substantial pressures generated by population growth, leading to demand for more land for agriculture, urbanization and industrial activities, in addition to increased demand for fuel wood and timber. This has resulted in the loss of soil cover, habitat destruction, environmental degradation and ecological imbalance. This scenario has created a progressive awareness for the conservation and restoration of habitats and, thus, the declaration of many forest areas into protected zones, such as national parks, biosphere reserves, etc., including the protection of some marine areas, by both the National and State Governments. Normally, permission for biological collecting is not granted in these protected areas. In India, forests are a State subject and grant for collection permission is vested with the State Forest Departments. In the absence of any rules, regulations and guidelines, either from National or State Governments, forest authorities impose their terms and conditions, which are arbitrary and even contradictory at times, in the process of granting collecting permits. A set of new rules to be applied throughout the country is needed

Ngoile, M., & Kiwia, M. A. (1996). Community participation in the development of Mafia Island marine park. *In: O. Linden, & C. G. Lundin National Workshop on Integrated Coastal Zone Management in Tanzania, Zanzibar, (Tanzania), 8-12 May 1995* (pp. 124-132).

Washington,-D.C.-USA : World Bank, Environmental Department, Land, Water and Natural Habitants Division.

Abstract: The southern part of Mafia Island hosts a great variety of natural resources and habitat types with considerable physical and biological diversity. Larvae produced within the reef system of southern Mafia is likely to contribute to the maintenance of reef related marine life, including commercial fish stocks in Tanzania and the northern Eastern Africa coastal waters. Thus southern Mafia may serve as a seed bank for an area much more extensive than Mafia itself. Threats undermining the sustainable resource use at Mafia include the recent rise in dynamite fishing, clear felling mangroves, use of illegal fishing gears, coral mining for building and lime production, anchorage damage, pollution from oil discharge and siltation and imbalances caused by changes in terrestrial run-off after deforestation in the Rufiji Delta. Marine turtles are threatened by encroachment at breeding sites and increasing numbers are caught in shark nets.

Ogden, J. C., & Ogden, N. B. (1996). The coral reefs of the San Blas Islands: revisited after 20 years. *In: Biological Conservation*, 76(2), 215.

Abstract: Coral reef sites studied and photographed in a Gulf of San Blas on the Caribbean coast of Panama in 1970-71 were revisited In 1991. There was a dramatic decline in the most common foliose and branching corals and an increase in algal cover. *Agaricia* spp. which formed most of the patch reefs and lines the slopes of channels and deep bays were mostly dead

or being outcompeted by the brown alga *Lobophora*. Extensive, shallow *Porites porites* mounds had been harvested. Deeper mounds were overgrown 50-100% by algae. Only debris fields and scattered small colonies remained of once extensive thickets of *Acropora cervicornis* and, in higher wave energy areas, *A. palmata* was mostly dead. Massive corals appear generally healthy. These changes have taken place in a context of natural and human impact including the sea urchin *Diadema* mass mortality, coral bleaching and diseases, fishing, coral mining, deforestation, and increased nutrients.

Oleksyn, J., & Reich, P. B. (1996). Pollution, habitat destruction, and biodiversity in Poland. *In: Biological Conservation*, 76(2), 216.

Abstract: In the past 50 yr Poland has experienced unprecedented deterioration of the environment and loss of biodiversity. Emissions of toxic gases, such as SO₂, have reached 3-4 million tons annually. Almost all surface waters are heavily polluted. Over 75% of the water in the Vistula, Poland's largest river, is unsuitable even for industrial use. Environmental pollution, habitat loss and fragmentation, and industrialization of agricultural lands and forests have contributed to the loss of biodiversity. As many as 2500 plant species may be endangered (c25% of all species) and 228 (2%) have been extirpated from Poland. Largest losses of flora and fauna have occurred in wetland ecosystems. Among vertebrate species 15 (2%) have been lost and > 210 (another 30%) are endangered.

Parnwell, M. J. G., & Bryant, R. L. (1996). Environmental change in South-East Asia: people, politics and sustainable development. *In: Global Environmental Change Series*, , xv + 383 pp.; bibl., .

Abstract: This collection of 16 chapters explores the interaction of people, politics, and ecology. South East Asia, with its explosive mix of rapid economic growth and pervasive environmental degradation, epitomises the dilemma facing policy makers as they seek to promote sustainable development. The centrality of politics to environmental change and the human response to that change is examined and ostensibly green activities, namely plantation forestry, ecotourism, hydro-electricity, are revealed as guises used by elites to promote their own political and economic interests. Fatal flaws in the present economic and ecological approaches are highlighted, and it is suggested that neither the quest for sustainable development nor the process of environmental change itself can be understood without reference to political processes. Specifically, following an introductory chapter, Part I contains three chapters on: Indonesia and Thailand in the global pulp and paper industry; environmental NGOs and different political contexts in Malaysia, Indonesia and Vietnam; and Japan and South East Asia's environment. Part II consists of three chapters on: sustainable livelihoods in Indonesian transmigrant settlements; political power in Lao; and forest management in Lao. Part III contains three chapters on: environmental change in Malaysian Borneo; mapping the environment in South East Asia; and a critique of Vietnam's tropical forestry action plan. Part IV contains six chapters covering: the sustainability of ecotourism in Indonesia; marine park management in Indonesia; environmental degradation, non-timber forest products and Iban communities in Sarawak; environmental characteristics of Brunei's rain forests; Philippine community-based forest management; and a concluding chapter.

Smith, S. (1996). Status and recent history of coral reefs at the CARICOMP network of Caribbean marine laboratories. *In: Biological Conservation*, 76(2), 215.

Abstract: Fourteen of 19 Caribbean marine laboratory members of the CARICOMP (Caribbean Coastal Marine Productivity) network responded to a questionnaire requesting qualitative information on the historical and present status of the coral reefs selected for long-term research in the program. Eight of the 14 sites indicated that coral cover had recently declined. While much of the loss was attributed to natural events, nutrient-loading,

sedimentation, and over-fishing were also implicated. Six sites reported algal cover as medium to high (10- > 30%), the suspected result of reduced herbivory by over-fishing, *Diadema antillarum* mortality, and nutrient-loading. Nine of the sites reporting are located in marine parks, preserves, or areas of restricted access. Generally, coral cover has remained stable at these sites, except where threatened or damaged by direct tourist impact or distant forest clearing causing coastal sedimentation

Andrews, G. (1997). Development of Mafia Island Marine Park. *In:* O. Linden, & C. G. Lundin The journey from Arusha to Seychelles: Successes and failures of integrated coastal zone management in Eastern Africa and Island States (pp. 241-254). Washington, DC USA : The World Bank, Environmental Department.

Notes: Paper also presented at: Experts and Practitioners Workshop on Integrated Coastal Area Management for Eastern Africa and Island States, 12-16 Aug 1996. Also published in: *Sharing Coastal Management Experience in the Western Indian Ocean*. Edited by Humphrey, S. and J. Francis, 1997

Abstract: The Mafia Island region (Tanzania) contains estuarine, mangrove, coral reef and marine ecosystems. Habitats in the area of the Mafia Marine Park (MIMP, 400 km super(2)) include hard coral dominated reefs, soft coral and algal dominated reefs, sheltered back reef systems, intertidal flats with hard and soft substrate, mangrove and coastal forests, seagrass beds, algal, sponge and soft coral subtidal beds. The fisheries around Mafia provide much of the area's subsistence protein as well as a substantial income for the community. The productivity of Mafia's marine and coastal habitats are threatened by activities that include: destructive fishing techniques, particularly dynamite fishing; over-exploitation of fisheries resources and the access to that resource; excessive coral mining for aggregate and lime production; excessive harvesting of mangroves for building and fire wood; clearing of coastal forests for agriculture and unsustainable resource use; and unmanaged tourism development. Throughout Eastern Africa, integrated conservation management and policy development has generally concentrated on terrestrial ecosystem. However, the recognised economic and ecological importance of marine and coastal environments prompted the government of Tanzania to prepare a legislative base for marine protected area by passing the Marine Parks and Reserves Act in 1994. A management plan for the Mafia Island Marine Park (MIMP) was developed in 1993 and the park was officially gazetted in April 1995. The management systems and institutional capacity for Mafia Island Marine Park are addressed

Bolido, L., & White, A. (1997). Reclaiming the island reefs. *In:* People and the Planet, 6(2), 22-23.

Abstract: The paper reports on the exploitation of coral reefs around the Philippines, and more recent efforts to protect these areas. The destruction of reef areas had left local coastal communities with very poor fish catches. The case of Apo Island is described, noting its community-based coastal management programme that has seen the establishment of marine reserves and sanctuaries, livelihood projects, environmental education activities, community development training, agroforestry and water development schemes. Such projects operated by local stakeholders has reversed the decline of the coral reef and the fish stocks, and also increased tourist revenue. The island is now seen as a model of successful community-based management.

Diop, E. S. et al. (1997). Suivi de la station expérimentale de reboisement par la mangrove dans la lagune de la Somone (janvier 1996 mars 1997). *In:* Rapport Final De L'EPEEC. [s. l.]: [s. n.].

King, A., & Malleret-King, D. (1997). Small fisheries research in Kwale District. *In:* J.

Hoorweg (ed.), Environmental management, research and training in coast province, Kenya , Chap. 1, (pp. 31-34). Nairobi Kenya : Acts Press.

Abstract: Two studies were conducted, one focusing on fishingfarming production systems and the other on governance and resource management among the Digo community at Kinondo location, Kwale district, Kenya. The community is on the fringe of heavy tourism development, depending on the common pool resources of marine and terrestrial environment for their existence. The area has suffered significant environmental degradation over the last ten years as illustrated by reduced fish catches and lost forest which has lead to threatened livelihood and greater pressure on remaining resources. Historically, the community had a traditional form of fisheries management. However, the transition through colonial administration and conversion of the Digo community to Islam, a new structure of authority was created thus slowly by slowly the traditional regimes have been undermined over time and responsibility shifted away from the community both physically and socially. Over time therefore, the management regime has changed from communal governance to state governance, which in general has been ineffective due to among other things lack of funds, leading to a laissez-faire regime. The consequence of this has been a collapse of the fish resources. More time and effort is now being used to catch far fewer fish, which detracts people from the time used previously for cultivating subsistence crops. Subsequently, marine reserve and fishermen committee strategies have been introduced to alleviate the management situation. However, the former strategy which was being implemented by KWS was forced to withdraw due to fears by the community that implementation of a marine reserve was a first step to a marine park which would eliminate their only source of livelihood. From the above it is abundantly clear that interaction between community and government is a key factor to influencing both the natural and human components of ecosystem and the impact on natural environment

Martens, E. E. (1997). KWS Coastal Wetlands Conservation Project. *In:* J. Hoorweg (ed.), Environmental management, research and training in coast province, Kenya , Chap. 1, (pp. 27-29). Nairobi Kenya : Acts Press.

Abstract: The three main coastal wetland biotopes constitute mangrove forests, intertidal seagrass beds and coral reefs. The coastal wetlands support abundant marine life, area refuge for rare or threatened species and are crucial resting and feeding grounds for resident and migratory birds. They have important interrelationships, which are the basis for biodiversity. In addition to being a centre for social, subsistence and recreational activity, wetlands also add to the economy through tourism, fisheries and fisheries products. Because of the inextricable linkage of wetlands to their surrounding systems, their conservation management must be persued in the context of an integrated approach to environmental conservation and ecologically sustainable development. The main objective of the programme is to promote and facilitate conservation and integrated management of marine protected areas and coast wetlands to safeguard the biodiversity and integrity of ecosystems and their productivity. The overall objective follows the three main goals of KWS which are biodiversity conservation, partnership and nature tourism. The coastal wetland projects, which are funded by the Netherlands government supports conservation and management activities in the marine parks and reserves along the coast. The projects give special attention to endangered species such as turtles, dugongs and also mangroves within and outside protected areas. Other wetland conservation and training programmes funded by the Netherlands are the inland wetlands project based at KWS Nairobi headquarters and training project at Naivasha Training Institute

Ong'-anda, H. O., & Mwandotto, B. A. J. (1997). Kenya Integrated Coastal Area Management (ICAM) pilot project: Bamburi-Nyali-Shanzu area, Mombasa. *In:* B. G. Rawlins, & T. M. Williams (edS), ODA/LOCS Workshop on Environmental Monitoring in the Coastal Zone, Mombasa (Kenya), 23-25 Apr 1997 (p. 1). Nottingham-UK : British-Geological-Survey.

Notes: Summary only.

Abstract: The Kenyan Coast is endowed with a number of natural resources. There are coral reefs, mangrove forests, lowland and Kaya forests, and sandy beaches. These resources support a number of thriving industries ranging from the multi-million dollar tourism industry, reef fisheries and mangrove harvesting. The port town at Mombasa is also a centre of import/export and other commercial activities supporting a population close to 1.4 million people. The dynamics of the socio-economic, cultural and ecological situations has necessitated the need for sustainable exploitation of these coastal resources. This gave rise to the first pilot study of ICAM in Kenya. Seven (7) Kenyan Coastal institutions drawn from the governmental and non-governmental agencies constituted a working team led by Coast Development Authority for implementing the ICAM pilot study. The study site, an area approximately 100 km super(2) has an interesting profile consisting of hotels, mangroves, human settlements, roads, marine park and reserve, urban market, research centre, industry and it has a sea front. The process of fact finding included verbal interviews, personal observations and verification of archive data. The resulting profile was discussed and crystallized at local and national stakeholders workshops. Seven issues were finally identified namely: The need for improved land use management; Provisions for adequate infrastructure and public services; Fresh and coastal water quality degradation; Declines in the reef fishery and the viability of artisanal fishing as livelihood; Degradation of coastal and marine habitats-mangroves, coral reefs, beaches and seagrasses; Coastal erosion; and Increasing on-water and land use conflicts. For all these issues, short and long-term management strategies that are practical in addressing them using local resources were proposed. Some demonstration activities have been employed to amplify the benefits of ICAM to the local communities. Various stakeholders participate in the demonstration activities. To continue the evolution of ICAM process in Kenya to cover the whole of the coastline, a coastal management steering committee has been put in place to oversee the many activities which have been planned in the strategy document that will be carried out by the respective technical (working) groups according to the issues. This study is part of the wider effort to develop ICAM for the whole of Western Indian Ocean Coastal countries including the Island states

Tacconi, L. (1997). An Ecological Economic Approach to Forest and Biodiversity Conservation: The Case of Vanuatu. *In: World Development*, 25(12), 1995-2008.

Upreti, A., & Shanmugaraj, T. (1997). Gulf of Mannar Marine Biosphere Reserve. (p. 47). Tamil Nadu, India: Tamil Nadu Forest Dep.

Abstract: Biosphere reserves are protected areas of representative environment. The Gulf of Mannar is one of the marine biosphere reserves (GOMMBRE) situated along the coastline of east coast of India and Sri Lanka. It is covering an area of 10,500 sq. km. and included 21 islands. The Gulf of Mannar is one of the biologically richest and important habitat for sea algae, seagrass, coral reef pearl banks, sacred chank bed, fin and shell fish resources, mangrove endemic and endangered species. Nearly 3,600 species of flora and fauna are represented here. The 21 islands and Gulf of Mannar are declared as marine national park in 1986 for the purpose of protecting marine wild life and its environment by Government of India and state of Tamil Nadu. Objectives of GOMMBRE, bio-physical environmental features, important fauna and flora, management strategy and infrastructural facilities are discussed

Barbosa, C., Broderick, A., & Catry, P. (1998). Marine Turtles in the Orango National Park (Bijagos Archipelago, Guinea-Bissau). *In: Marine Turtle Newsletter*, (81), 6-7.

Abstract: The Orango National Park is part of the Biosphere Reserve of the Bijagos Archipelago of Guinea-Bissau, West Africa. The Park includes 5 main islands and associated islets, covering 268 km super(2), which constitute almost one third of the total land surface of

the Bijagos Archipelago. The main islands are low-lying, covered with forest and savannah, and surrounded by large areas of inter-tidal sand, mudflats, and extensive areas of mangrove. The human population is approximately 2500. Four species of turtle were recorded nesting during the surveys: green *Chelonia mydas*, olive ridley *Lepidochelys olivacea*, hawksbill *Eretmochelys imbricata* and leatherback *Dermochelys coriacea* turtles. We estimate that each of the first two species lay at least 200-300 nests per year on the beaches of the Park. Hawksbill and leatherback turtles seem to be very rare and only a few individuals nests were recorded during two years of surveying. However, the difficulty of distinguishing between the tracks of hawksbill and ridley turtles might have resulted in this species being under-recorded. Although this nesting population of green turtles is probably less significant than that of the neighbouring Poilao and associated islands, Orango National Park is likely to be the most important nesting ground in the Archipelago for the remaining species which are rare or absent in Poilao

Diop, E. S. et al. (1998). Raising mangrove nurseries for reforestation of coastal areas in Senegal Somone lagoon and Saloum Islands. *In: Technicals Reports*. Dakar: [s. n.].

Edwards, M. S. (1998). Effects of long-term kelp canopy exclusion on the abundance of the annual alga *Desmarestia ligulata* (Light F) . *In: Journal of Experimental Marine Biology and Ecology*, 228(2), 309-326.

Abstract: Experiments in a central California *Macrocystis pyrifera* (L.) C.A. Agardh forest examined the effects of long-term (six year) kelp canopy exclusion on the abundance of the annual brown alga *Desmarestia ligulata* (Light F). Exclusion of both surface and subsurface kelp canopies from replicate clearings within Stillwater Cove, CA, USA showed that *D. ligulata* sporophyte recruitment is opportunistic, with more sporophytes occurring in areas where canopies were excluded than under control canopies. Kelp canopy exclusion also increased spring and summer bottom irradiances, and resulted in a steady increase of perennial turf algae over the six-year study. This, in turn, led to a decrease in the availability of nongeniculate coralline algae (the primary substratum on which *D. ligulata* recruits). Subsequently, the annual maximum abundance of *D. ligulata* sporophytes decreased in the canopy clearings, but did not change under control canopies. Removal of turf algae from experimental plots further increased bottom irradiances and significantly enhanced *D. ligulata* recruitment. When released from apparent competition for light and space, *D. ligulata* sporophytes exhibited an annual life history, with recruitment occurring during a two-week period (April 4th - April 17) in the spring, and maximum bottom cover occurring in the summer (July). The onset of *Desmarestia* sporophyte recruitment was closely associated with seasonal increases in daylength and rapid decreases in ocean temperature. These results indicate that the *Desmarestia* sporophyte life history is both annual and opportunistic, with the onset of recruitment stimulated by predictable, seasonal changes in environmental conditions, and the magnitude of recruitment modified by stochastic processes that affect the availability of light and space. Comparison of these results with those from similar studies indicate that they are robust and suggest that they may be generalized over broad temporal and spatial scales.

Grasso, M. (1998). Ecological-economic model for optimal mangrove trade off between forestry and fishery production: comparing a dynamic optimization and a simulation model. *In: Ecological Modelling*, 112(2-3), 131-150.

Abstract: Mangrove ecosystems provide valuable ecological services for the maintenance of the adjacent habitats and wildlife preservation. They also provide a highly caloric timber, used frequently for burning purposes as, e.g. charcoal. The forestry activity usually ignores the capacity of the mangroves to support the local fisheries. Therefore, it is necessary to study the relationship between these activities and how they could be managed in order to maximize their benefits, and at the same time to preserve ecosystem services. This problem was approached by

two different modelling procedures, widely used in natural resources management studies: a dynamic optimization and a simulation model. The dynamic optimization model gave us some hints about the best allocation of workers between forestry and fishery sectors. Using the simulation model it was possible to take the data generated and employ it in our first order conditions equations from the optimization model to find the shadow prices for the resources stocks. The most important variable in the simulation is the forest growth rate, since the fishery production is directly dependent on the area of mangrove forest.

Jaffe, R. et al. (1998). Baseline study on the levels of organic pollutants and heavy metals in bivalves from the Morrocoy National Park, Venezuela. *In: Marine Pollution Bulletin*, 36(11), 925-929.

Abstract: Bivalves have been extensively used as bioindicators of pollution in aquatic environments, particularly in coastal areas worldwide. The rationale behind the use of bivalves in monitoring programmes has been discussed in several scientific reports since the introduction of the 'Mussel Watch' concept. The present study reports the concentrations of selected organic and inorganic contaminants in the flat tree-oyster (*Isognomon alatus*) from one of the largest marine parks in Venezuela, the Morrocoy National Park, as an initial step to determine the present levels of contaminants and establish a baseline reference for future monitoring efforts. The Morrocoy National Park (Fig. 1) covers an area of about 32000 acres, most of which comprises aquatic habitats such as mangrove forests, seagrass beds and coral reefs. The Park is composed of a series of small islands that provide a natural habitat for many endangered species of birds and constitute excellent nursery environments for numerous fish species. Its beauty has made this Park one of the primary tourist attractions in Venezuela

Lykke, M. A., & Sambou, B. (1998). Structure, floristic composition, and vegetation forming factors of three vegetation types in Senegal. *In: Nordic-Journal-of-Botany*, 18(2), Pp 129-139; 2 ref.

Abstract: Six 1-ha plots were established in a coastal savanna, called Fathala Forest, in Delta du Saloum National Park, Senegal. Two plots were placed in woodland, two in wooded grassland, and two in transition woodland in order to describe structure and floristic composition of the vegetation. All trees \geq 5 cm diameter at breast height were sampled. The three selected vegetation types showed distinct differences in structure as well as in species composition. Woodland had high density (440-449 trees per ha), many small trees, and high basal area (13.4 m² per ha). Transition woodland was characterized by low density (54-118 individuals per ha) but many large trees and a relatively large basal area (8.6-12.8 m² per ha). Wooded grassland was characterized by medium sized trees, it had low density (86-102 individuals per ha) and low basal area (3.8-5.7 m² per ha). Species richness ranged between 17 and 27 species per ha in the six plots. Only two species were found in all plots, *Daniellia oliveri* (Caesalpiniaceae) and *Prosopis africana* (Mimosaceae). Legumes dominated all plots. Wooded grassland and transition woodland had many characteristics of fire-affected vegetation in contrast to woodland. Today wooded grassland encroaches on woodland and transition woodland. It is considered that management of the latter two vegetation types should be given priority as they maintain structural and floristic characteristics that are essential to conserve biodiversity and original features of the vegetation, and they are also important for local people who are allowed to make sustainable use of the vegetation.

Mann, B., Taylor, R., & Densham, D. (1998). A synthesis of the current status of marine and estuarine protected areas along the KwaZulu-Natal coast. *In: Lammergeyer*, (45), 48-64, 35 ref.

Abstract: Notes are given on the location, size, functions, management, evidence in support of protected area function (active protection of existing resources) and some management problems experienced within 2 marine reserves and 10 estuarine protected areas on the

KwaZulu-Natal coast of South Africa. Management problems include illegal fishing, tourism pressure, destruction of swamp and mangrove forests and large-scale afforestation with *Eucalyptus* sp. in adjacent catchments, pollution, and altered hydrological regimes in rivers.

Muthiga, N. (1998). National perspective of marine protected areas management in Kenya. *In: Partnership for Conservation Report of the Regional Workshop on Marine Protected Areas, Tourism and Communities*. Nairobi Kenya: IUCN EARO.

Abstract: There are four marine national parks and six marine national reserves in Kenya, which encompass a diverse selection of marine habitats including coral reefs, mangrove forests, and seagrass beds. Endangered species occur in the waters of all marine protected areas (MPAs). Some lie adjacent to the most heavily developed tourist beaches in Kenya, and the Mombasa Marine Reserve is next to the port of Mombasa, which raises concerns about the threat of pollution. Even with government subsidy, there would still be a need to develop ways to enhance the management of MPAs. Several programmes are running with the aim to develop integrated MPA management plans that will incorporate a framework for collaboration among stakeholders. Finding alternative resource uses for the communities utilising marine reserves has also been initiated at the Mpunguti Marine National Reserve. The development of other alternatives, including aquaculture, reef restoration, and artificial reefs, are also being explored

Sousa, M. I. (1998). National perspective of management of marine protected areas in Mozambique. *In: Partnership for Conservation Report of the Regional Workshop on Marine Protected Areas, Tourism and Communities*. Nairobi Kenya: IUCN EARO.

Abstract: The coast of Mozambique is the country's most valuable natural resource requiring conservation. It has so far gazetted only two marine protected areas (MPAs) and three coastal game reserves. The National Directorate for Forestry and Wildlife is managing these protected areas and implementing the following activities : preparation of a plan for coastal zone conservation and management, development of community based sustainable use programmes in support of the conservation of biological diversity, training of staff and building of capacity to carry out the programme, establishment of linkages and networks with institutions and other countries undertaking similar programmes

Babcock, R. C. et al. (1999). Changes in community structure in temperate marine reserves. *In: Marine Ecology Progress Series*, 189, 125-134.

Abstract: 'No-take' marine reserves provide a valuable tool for managing marine resources as well as for providing relatively undisturbed habitat with which to assess modifications to ecosystems. We studied 2 marine reserves in northeastern New Zealand, the Leigh Marine Reserve (established 1975) and Tawharanui Marine Park (established 1982) in order to assess whether changes in protected predator populations had resulted in other indirect changes to grazers and consequently to algal abundance. Estimates of abundance of the most common demersal predatory fish *Pagrus auratus* indicated that adults of this species (i.e. large enough to prey upon urchins) were at least 5.75 and 8.70 times more abundant inside reserves than in adjacent unprotected areas. Overall, *P. auratus* were also much larger inside reserves with mean total lengths of 316 mm compared with 186 mm in fished areas. The spiny lobster *Jasus edwardsii* displayed similar trends, and was approximately 1.6 to 3.7 times more abundant inside the reserves than outside. Lobsters within the reserves had a mean carapace length of 109.9 mm, compared with 93.5 mm outside the reserves. In one of the reserves, densities of the sea urchin *Evechinus chloroticus* had declined from 4.9 to 1.4 m⁻² since 1978 in areas formerly dominated by it. Consequently, kelp forests were more extensive in 1998 than they were at the time of reserve creation. Urchin-dominated barrens occupied only 14% of available reef substratum in reserves as opposed to 40% in unprotected areas. These changes in community structure, which have persisted since at least 1994, demonstrate not only higher

trophic complexity than anticipated in Australasian ecosystems but also increased primary and secondary productivity in marine reserves as a consequence of protection. Trends inside reserves indicate large-scale reduction of benthic primary production as an indirect result of fishing activity in unprotected areas

Gossling, S. (1999). Ecotourism: a means to safeguard biodiversity and ecosystem functions ? *In: Ecological Economics*, 29(2), 303-320.

Abstract: This paper argues that, at present, ecotourism can contribute to safeguard biodiversity and ecosystem functions in developing countries, even though meeting the requirements for ecotourism is extremely difficult. A cost-benefit analysis of those ecosystems richest in species diversity, i.e. tropical rainforests, leads to the conclusion that non-use values often outweigh the values of conventional uses (clear-cutting, pasture, etc.), but are hardly considered in development decisions. Therefore, tourism and its high direct use value can play an important role as an incentive for protection. As tourism causes significant emissions, e.g. by flying, the concept of Environmental Damage Costs is introduced and integrated into the calculations. Further, international tourism development is analyzed and related to protection goals. Visitation rates of sensitive areas need to be limited; education, management, and control measures have to be integrated; and the proportion of money captured from tourists has to be increased. In the long run, tourism needs to undergo substantial changes.

Johnson, A. K. L., Ebert, S. P., & Murray, A. E. (1999). Distribution of coastal freshwater wetlands and riparian forests in the Herbert River catchment and implications for management of catchments adjacent the Great Barrier Reef Marine Park. *In: Environmental Conservation*, 26(3), 229-235, 20 ref.

Abstract: Because coral reefs are sensitive to land derived inputs of nutrient and sediment, there is concern worldwide for the effects of anthropogenic change in river catchments on reefs. Thirty-one river catchments drain directly into the waters of the Great Barrier Reef, NE Australia. This case study was undertaken on the floodplain of the Herbert River catchment in north Queensland, utilizing remote sensing and GIS to assess both spatial and temporal changes in freshwater wetlands and riparian forests. It is demonstrated that there has been a very large reduction in the area of these ecosystems since European settlement in the mid nineteenth century, with an 80% decline in their extent since 1943. A range of quantitative measures show that the landscape diversity of these ecosystems has also declined. These changes are of importance in terms of regional, national and international trends. It is argued that policy, planning and management reform is required if the remaining ecological, economic and social values of these systems and the adjacent Great Barrier Reef Marine Park are to be maintained.

Kremen, C. et al. (1999). Designing the Masoala National Park in Madagascar based on biological and socioeconomic data. *In: Conservation Biology*, 13(5), 1055-1068, 3 pp. of ref.

Abstract: The design principles of a new national park in Madagascar are described. The data gathered for the work included (1) spatial distribution and quality of habitat, (2) the areas and species at greatest risk, (3) the relationship between environmental gradients and species distributions, (4) current and predicted human settlement and land and resource use, and (5) the economic potential of natural forest management as an alternative to deforestation. A geographic information system was used to integrate these data layers and to apply the design criteria to develop a park proposal that balanced human and wildlife needs. The proposal won the approval of local residents, and a national decree in 1997 designated 2100 km² of rainforest and three satellite marine reserves as the Masoala National Park, with a surrounding multiple-use zone of approximately 1000 km². The new park is Madagascar's largest protected area and protects more lowland (<400 m) humid forest habitat than the entire reserve system combined, a significant step forward in conserving a globally important ecoregion. Consideration of local

needs and the national economy was a key element in gaining approval for the Masoala Park. Such an approach toward reserve design could be applied elsewhere to improve chances of establishing and maintaining protected areas over the long term.

Lindholm, J. (1999). Habitat-mediated Survivorship of Juvenile Atlantic Cod (*Gadus morhua*): Fish Population Responses To Fishing-induced Alteration of the Seafloor in the Northwest Atlantic and Implications for the Design of Marine Protected Areas. *In: Diss. Abst. Int.*, 59, Pt B Sci. and Eng.(12), 6168 .

Abstract: Much scientific research has focused on large- scale planktonic egg and larval mortality as a factor contributing to annual fluctuations in year-class strength of fishes. Significantly less attention has focused on small-scale, localized processes affecting survivorship of early benthic- phase juvenile fish, although mortality during this life history stage is sufficient to significantly modify population size. The sustainability of Atlantic cod (*Gadus morhua*) populations, a species with ecological, economic and cultural significance for New England, is dependent on the continued productivity of off- shore nursery grounds currently at risk from alteration by fishing activity. Key questions in this regard are: (1) the role of seafloor habitat in mediating the survivorship of early benthic- phase cod; and (2) the implications of predator- prey-habitat interactions for the design and allocation of marine protected areas (MPAs) for fish conservation and management in the northwest Atlantic. Laboratory experiments quantify the effect of fishing impacts to seafloor habitat on mortality rates for juvenile cod. Results indicate that the presence of emergent epifauna (habitat undisturbed by fishing) resulted in a significant decrease in juvenile cod mortality when compared to flat sand (habitat disturbed by fishing) and that density of emergent epifauna is more significant than epifaunal height in reducing juvenile cod mortality. a computer model, parameterized with lab-derived mortality rates and spatial variation in habitat type from seafloor mapping, captures non-linearities in the responses of fish populations to seafloor habitat alteration given variations in fish movement rates, fish densities and MPA size. Comparison of the existing National Marine Sanctuaries to the National Parks, Forests and Wildlife Refuges illuminates a significant disparity in the designation of protected areas between marine and terrestrial systems with respect to the size of protected areas, their number, and the total area and the proportion of U.S. land and waters currently under protection. Primary conclusions include: (1) fishing alteration of the seafloor has a significant deleterious impact on associated Atlantic cod populations; (2) there is a need to incorporate seafloor habitat protection in the designation of MPAs for fish management; and (3) habitat-specific MPAs should be designated in the northwest Atlantic to buffer against environmental and managerial uncertainty

Sochaczewski, P. (1999). Life reserves: opportunities to use spiritual values and partnerships in forest conservation. Part IV seeking a wider range of partners and values 84. *In: S. Stolton, & N. Dudley (ed.), Partnerships for Protection New strategies for planning and management for protected areas* (pp. 137-143). U. K.: Earthscan Publications Ltd.

Stolton, S., Dudley, N., & Beland-Lindahl, K. (1999). The role of large companies in forest protection in Sweden. Part IV seeking a wider range of partners and values. *In: S. Stolton, & N. Dudley (ed.), Partnerships for Protection New strategies for planning and management for protected areas* (pp. 184-192). U. K.: Earthscan Publications Ltd.

Yanez-Arancibia, A. et al. (1999). Integrating science and management on coastal marine protected areas in the Southern Gulf of Mexico. *In: Ocean & Coastal Management*, 42(2-4), 319-344.

Abstract: The coastal zone of the State of Campeche have some of the Gulf of Mexico's

richest ecosystems characterized by extensive seagrasses, mangrove forests, low-land tidal wetlands, a broad deltaic environment, including the UsumacintaLaguna de Terminos estuarine ecosystem, and extensive low salinities and brackish wetlands in the Petenes region. Commercial and artisanal fishing, maritime transport, agriculture and cattle grazing in low-land areas, urban expansion, building of highways, and tourism, are important economics activities that are increasing in the State of Campeche. However, the growth needs to occur in a sustainable manner with adequate protection of the coastal ecosystems. The theoretical approach and conceptual basis of the integrated coastal management plan are based on 20 years of scientific research in the region; and from 1990 to the present, a number of projects have been completed which serve as case studies of coastal management coupling science, technology, public participation, and policymaking in the southern Gulf of Mexico. After developing seven "study case" integrating science into policymaking, a management approach was developed considering four main actions: promotion of institutional arrangements, so that the multi-sectorial planning approach be considered in coastal resources development; strengthening of public awareness related to coastal resources management policies and capabilities; gathering, analysis and dissemination of information related to coastal resources development; and provision of technical solutions to coastal resources uses in conflict. Finally this is a case study where science played a significant role in the politics of the policy process, both in protecting key estuarine ecosystem and the planning process defining the ICZM plans.

Anderson, S. et al. (2000). Estimating forest crown area removed by selection cutting: a linked regression-GIS approach based on stump diameters. *In: Forest Ecology and Management*, 137(1-3), 171-177.

Abstract: The purpose of this research was to develop a model that could be used to provide a spatial representation of uneven-aged silvicultural treatments on forest crown area. We began by developing species-specific linear regression equations relating tree DBH to crown area for eight bottomland tree species at White River National Wildlife Refuge, Arkansas, USA. The relationships were highly significant for all species, with coefficients of determination (r^2) ranging from 0.37 for *Ulmus crassifolia* to nearly 0.80 for *Quercus nuttallii* and *Taxodium distichum*. We next located and measured the diameters of more than 4000 stumps from a single tree-group selection timber harvest. Stump locations were recorded with respect to an established grid point system and entered into a Geographic Information System (ARC/INFO). The area occupied by the crown of each logged individual was then estimated by using the stump dimensions (adjusted to DBHs) and the regression equations relating tree DBH to crown area. Our model projected that the selection cuts removed roughly 300 m² of basal area from the logged sites resulting in the loss of [ap]55 m² of crown area. The model developed in this research represents a tool that can be used in conjunction with remote sensing applications to assist in forest inventory and management, as well as to estimate the impacts of selective timber harvest on wildlife.

Buchan, K. C. (2000). The Bahamas. *In: Marine Pollution Bulletin*, 41(1-6), 94-111.

Abstract: The archipelago of the Bahamas contains the largest tropical shallow water area in the Western Atlantic. Located on the northern and eastern margins of two large submerged banks and a number of smaller more isolated banks, the Bahama Islands, of which there are over 700, are low-lying and composed of limestone. A sub-tropical climate and a geographic position between two major warm ocean currents affect the region with seasonal variability, which influences the biological communities inhabiting the ocean and coastal areas. The Bahama Banks are separated from the North American continent by the Florida Straits and from each other by deep channels, some in excess of 2000 m. Two deep water channels cut into the larger Great Bahama Bank. Most of the marine area is shallow (marine resource with both ecological and economic value). The Bahama Islands are dependent on their seas to maintain a

GDP of US\$ 2.7 billion through tourism and harvest of marine resources. To date, the fishing industry has benefited from the relatively high ecological productivity of the shallow banks and their related habitats. Commercially important fisheries include Spiny Lobster, conch and nassau grouper which, together, make up the bulk of fisheries income. Clear warm waters and white sand beaches, along with its close proximity to the USA, make the Bahamas a prime tourist destination. Tourism is the mainstay of the Bahamian economy, accounting for 60% of the gross domestic product. Agricultural and forestry operations are limited and impacts in the coastal zone from these are negligible. However, land reclamation and construction for tourism development, along with sand mining, dredging, over-fishing, poor fishing practices and their respective impacts of habitat loss, beach erosion and over-exploitation of target and non-target marine resources are becoming increasingly apparent as developmental pressures grow. Environmental regulations are in place through a number of parliamentary acts. Management of established marine and coastal protected areas has been undertaken by the Bahamas National Trust (BNT), which along with other organisations, carry out environmental education programs to increase awareness and reduce impact on the marine and coastal areas of the archipelago

Froescheis, O. et al. (2000). The deep-sea as a final global sink of semivolatile persistent organic pollutants? Part I: PCBs in surface and deep-sea dwelling fish of the North and South Atlantic and the Monterey Bay Canyon (California). *In: Chemosphère*, 40(6), 651-660.

Abstract: The understanding of the global environmental multiphase distribution of persistent organic pollutants (POPs) as a result of the physico-chemical properties of the respective compounds is well established. We have analysed the results of a vertical transport of POPs from upper water layers (0-200 m) to the deepwater region (>800 m) in terms of the contamination of the biophase in both water layers. The contents of persistent organochlorine compounds like polychlorinated biphenyls (PCBs) in fish living in the upper water layers of the North Atlantic and the South Atlantic, and at the continental shelf of California (Marine Sanctuary Monterey Bay and its deep-sea Canyon) are compared to the levels in deep-sea or bottom dwelling fish within the same geographic area. The deep-sea biota show significantly higher burdens as compared to surface-living species of the same region. There are also indications for recycling processes of POPs - in this case the PCBs - in the biophase of the abyss as well. It can be concluded that the bio- and geo phase of the deep-sea may act similarly as the upper horizons of forest and grasslands on the continents as an ultimate global sink for POPs in the marine environment

Nierenberg, T. R., & Hibbs, D. E. (2000). A characterization of unmanaged riparian areas in the central Coast Range of western Oregon. *In: Forest Ecology and Management*, 129(1-3), 195-206.

Abstract: As an approach to providing baseline information about riparian ecosystems, this study characterized the dominant riparian vegetation along unmanaged streams in central Oregon Coast Range forests. We systematically sampled along various reaches of nine first- to fourth-order streams, all of which were subject to stand-replacing fires ca. 145 year ago. The near-stream communities were divided into different vegetative and/or topographic units called landscape units (LUs); LU1s were closest to the stream, and LU2s were farther from the stream. Fifty-two percent of LU1s had no trees, and among all LUs, red alder was the most frequently found tree species. Although in some cases sample plots simply fell between widely spaced trees, we hypothesize that red alder originally dominated many of the current treeless patches and has since senesced to release understory shrubs. With increased distance from the stream, hardwoods decreased in compositional importance relative to conifers, not because hardwood frequency changed, but because conifer frequency increased. Our results suggest that the competitive advantage of hardwoods and shrubs is the biggest limiting factor of conifer

growth in the near-stream micro-environment and that without vigorous competition, conifers have the potential to grow over more of the riparian area than that on which they occurred in unmanaged areas. Calculations of disturbance frequency, based on ages of shade-intolerant stand dominants, indicate that along the stream reaches we sampled, a minimum of 2.6 disturbances per stream km per century occurred since the last stand-resetting fire. Riparian areas are spatially and temporally diverse, and any riparian management model should incorporate this variability.

Paddack, M. J., & Estes, J. A. (2000). Kelp forest fish populations in marine reserves and adjacent exploited areas of central California. *In: Ecological Applications*, 10(3), 855-870.
Abstract: Population structure (density and size distribution) of 10 species of epibenthic kelp forest fishes was compared between three marine reserves and adjacent exploited areas in central California. We also contrasted substrate relief, algal turf cover, and kelp population density among these areas. Densities of fishes were 12-35% greater within the reserves, but this difference was not statistically significant. Habitat features explained only 4% of the variation in fish density and did not vary consistently between reserves and nonreserves. The average length of rockfish (genus *Sebastes*) was significantly greater in two of the three reserve sites, as was the proportion of larger fish. Population density and size differences combined to produce substantially greater biomass and, therefore, greater reproductive potential per unit of area within the reserves. The magnitude of these effects seems to be influenced by the reserve's age. Our findings demonstrate that current levels of fishing pressure influence kelp forest rockfish populations and suggest that this effect is widespread in central California. Existing marine reserves in central California kelp forests may help sustain exploited populations both through adult emigration and larval pool augmentation. The magnitude of these effects remains uncertain, however, because the spatial scale of both larval and adult dispersal relative to the size of existing reserves is unknown.

Schaeffer-Novelli, Y. et al. (2000). Brazilian mangroves. *In: Aquatic Ecosystem Health and Management*, 3(4), 561-570.

Abstract: Of Brazil's 7408 km of coastline 6786 km contain mangrove forests, covering some 25,000 km². Only one coastal state, Rio Grande do Sul, lacks mangrove coverage. Mangroves occur from the border with French Guiana, just above the Equator (04[deg]30'N) to well beyond the Tropic of Capricorn, reaching 28[deg]30'S, near Laguna (Santa Catarina State). Because the term mangrove may be applied to various levels of observation, specifying the proper spacio-temporal scale is important to describe system behavior. In this paper we describe a nested hierarchy of organization levels constituted of patches, stands, settings, coastal segments and large marine ecosystems. Each of these describes an organization that has evolved to facilitate energy dissipation at its relevant scale, and can be related to a geographic unit. We expect that the framework presented here will be useful for the study of mangrove ecosystem health, assessment of ecosystem pathology, and the development of models for the management and conservation of this resource.

Tegner, M. J., & Dayton, P. K. (2000). Ecosystem effects of fishing in kelp forest communities. *In: ICES Journal of Marine Science* , 57(3), 579-589.

Abstract: Kelp forests, highly diverse cold water communities organized around the primary productivity and physical structure provided by members of the Laminariales, support a variety of fisheries, and the kelp itself is harvested for alginates. Worldwide, these communities generally share susceptibility to destructive overgrazing by sea urchins. The impact of sea-urchin grazing is governed by the ratio between food availability and grazing pressure, thus factors affecting the abundance of both urchins and kelps are central to ecosystem integrity. Some kelp ecosystems share a second generality, the association of exploitation of various

urchin predators with destructive levels of urchin grazing, leading to cascading implications for other species dependent on the productivity and habitat provided by the kelps. Competition between abalones and sea urchins also affects some kelp communities. These ecosystem-structuring processes are complicated by a variety of bottom-up and top-down factors, including variability in ocean climate affecting kelp productivity and recruitment of key species, and echinoid disease. Potential ecosystem effects of fisheries for predators, abalones, sea urchins, and kelps are reviewed biogeographically. Given the hundreds to thousands of years that many nearshore marine ecosystems have been exploited, no-take marine reserves may be the only way to determine the true ecosystem effects of fishing

Thorburn, C. C. (2000). Changing Customary Marine Resource Management Practice and Institutions: The Case of Sasi Lola in the Kei Islands, Indonesia. *In: World Development*, 28(8), 1461-1479.

Abstract: Sasi, the spatial and temporal closure of fields, forests, reefs and fishing grounds, is a conspicuous feature of many Moluccan societies. Despite increasing domestic and international awareness and praise of what is considered by many analysts to be an exemplary indigenous resource conservation tradition, the practice is in decline in many parts of the Thousand Island province, and in many villages has disappeared altogether. This study examines the practice of managing *Trochus niloticus* (Topshell) harvests in Ohoirenan, a village on the eastern coast of Kei Besar in the District of Southeast Maluku. *Trochus* is one of the most important sources of cash income for Kei villagers, and until recently, for the district government as well. Since 1987, trochus has been classified as a protected species in Indonesia, and regulations have been issued to regulate the cultivation, harvest and transport of this and other protected species. This article briefly introduces Kei customary law and property relations, followed by a description of sasi and its application to reef habitats and trochus harvests. Examining a territorial conflict between Ohoirenan and a neighboring village, and more recent contention arising from government efforts to protect the species, the article explores issues of society-nature and state-society relations as pertain to natural resource management in Indonesia. Sasi continues to function as an exemplary common property resource (CPR) management institution in Ohoirenan, assuring equitable distribution of the benefits deriving from controlled extraction of a local resource. But, erratic and uneven enforcement of "one-size-fits-all" centralized conservation policy and law, combined with collusion and self-interest on the part of various parties, combine to threaten both the resource and the institutions that have successfully and sustainably managed it in this region. Within the context of a centralized, state-led natural resource management system, the national species protection precludes the establishment of sensible, mutually beneficial co-management regimes that could serve the interests and employ the inherent knowledge and capabilities of local communities, traders, and government agents

Yap, H. T. (2000). The case for restoration of tropical coastal ecosystems. *In: Ocean & Coastal Management*, 43(8-9), 841-851.

Abstract: At no time have humans so altered their natural environment than the present. Marine ecosystems have not been spared, and the degradation of coastal habitats has reached severe proportions in many parts of the world. The mere setting aside of areas for protection may not be enough to ensure adequate production and provision of services for a growing global human population. Hence, the active restoration of habitats, in addition to protection and preservation, is probably the more desirable conservation strategy. Accumulated experience over several decades has demonstrated that the rehabilitation or even restoration of damaged coastal ecosystems is feasible. However, the degree of difficulty and expense involved vary, with coral reefs being the most complicated habitats to restore, followed by seagrass beds and then mangrove forests. In ecosystem restoration, a comprehensive strategy based on sound biological and ecological principles, and proven techniques must be developed. A concrete,

achievable goal must be articulated. Because of the dynamic nature of ecosystems, and the inability to accurately predict pathways of succession after a community is established through artificial means, subsequent modifications to a project must proceed within a flexible framework of adaptive management. Finally, for restoration efforts to be successful, local communities must participate actively in cooperation with local governments in accordance with the principle of co-management.

Jackson, J. B. C. (2001). What was natural in the coastal oceans? *In: Proceedings Of The National Academy Of Sciences Of The United States Of America*, 98(10), 5411-5418.

Abstract: Humans transformed Western Atlantic coastal marine ecosystems before modern ecological investigations began. Paleocological, archeological, and historical reconstructions demonstrate incredible losses of large vertebrates and oysters from the entire Atlantic coast. Untold millions of large fishes, sharks, sea turtles, and manatees were removed from the Caribbean in the 17th to 19th centuries. Recent collapses of reef corals and seagrasses are due ultimately to losses of these large consumers as much as to more recent changes in climate, eutrophication, or outbreaks of disease. Overfishing in the 19th century reduced vast beds of oysters in Chesapeake Bay and other estuaries to a few percent of pristine abundances and promoted eutrophication. Mechanized harvesting of bottom fishes like cod set off a series of trophic cascades that eliminated kelp forests and then brought them back again as fishers fished their way down food webs to small invertebrates. Lastly, but most pervasively, mechanized harvesting of the entire continental shelf decimated large, long-lived fishes and destroyed three-dimensional habitats built up by sessile corals, bryozoans, and sponges. The universal pattern of losses demonstrates that no coastal ecosystem is pristine and few wild fisheries are sustainable along the entire Western Atlantic coast. Reconstructions of ecosystems lost only a century or two ago demonstrate attainable goals of establishing large and effective marine reserves if society is willing to pay the costs. Historical reconstructions provide a new scientific framework for manipulative experiments at the ecosystem scale to explore the feasibility and benefits of protection of our living coastal resources.

Jackson, J. B. C., & Sala, E. (2001). Unnatural oceans. *In: Scientia Marina*, 65 Suppl. 2, 273-281.

Abstract: Ecological understanding of the oceans is based on an unnatural mix of mostly small species whose trophic relations are distorted to an unknown degree by the overfishing of megafauna including sharks, sea turtles, sea cows, seals, and whales. Living habitats like seagrass beds, kelp forests, and coral reefs that once provided critical 3-dimensional habitats for refuge and reproduction of most of the biodiversity of the oceans are also greatly reduced by fishing and other factors. Successful restoration and conservation require a more realistic understanding of the ecology of pristine marine ecosystems that can only be obtained by a combination of retrospective analyses, modeling, and intensive studies of succession in very large marine reserves.

Lindholm, J., & Barr, B. (2001). Comparison of marine and terrestrial protected areas under federal jurisdiction in the United States. *In: Conservation Biology*, 15(5), 1441-1444.

Abstract: There is a significant disparity in the protection of terrestrial and marine environments in the United States. Despite the considerable literature dedicated to the subject of protected areas, both terrestrial and marine, in the United States, we are not aware of work explicitly describing this dichotomy. We compared marine and terrestrial areas under federal jurisdiction to provide a quantitative assessment of the differences between the conservation of land and sea in the United States. Specifically, we compared national marine sanctuaries (including sanctuary preservation areas and ecological reserves) with national parks, national forests, and national wildlife refuges (including national wilderness preservation areas). Our

results suggest that marine sanctuaries are fewer in number, smaller in total area, and smaller in percentage of area covered than are terrestrial protected areas.

WWF. (2001) Eau douce: le WWF annonce la création de la plus grande zone protégée en Amérique latine [Web Page]. URL

<http://www.panda.org/news/press/news.cfm?id=2491&language=French>.

Abstract: GLAND, Suisse - Le WWF s'est félicité aujourd'hui de l'inscription, par le gouvernement bolivien, de trois zones humides sur la liste de la Convention de Ramsar. Totalisant une superficie de 46'000 kilomètres carrés - soit un peu plus que celle de la Suisse - ces zones humides représentent le plus vaste écosystème d'eau douce protégé en Amérique latine

Diadiou, H. D., Dème, M., & Thiam, D. (2002). Déforestation de la Mangrove et Durabilité de l'Exploitation des Ressources Malacologiques dans l'Ecosystème Estuarien du Delta du Fleuve Saloum. Dakar: Projet Valeurs, UICN.

[Anon.]. ([s. d.]). Ecology of extinctions in kelp forest communities. *In: Conservation Biology*, (3), 252-264.

[Anon.]. ([s. d.]) Threats To Protected Areas Part 3: What do we know already? [Web Page]. URL www.panda.org/forests4life/spotlights/trees/section3.pdf .

Abstract: This section summarises information previously or currently being collected about the status of protected areas

Eghenter, C. ([s. d.]). Mapping peoples' Forests: the role of mapping in planning community based management of conservation areas in Indonesia. Washington, D. C.: Biodiversity support program *Peoples, Forest and Reefs (PeFoR) program discussion paper series:*