

## What's Happening to Coral Reefs? - Part II\*

### What is Being Done to Halt the Damage?

There is a long tradition of coral reef resource management, particularly in the Pacific and parts of the Indian Ocean where villages or clans had rights over certain parts of reefs and restricted entry systems were operated. However, with the introduction of export economies and the tourist industry, many of these traditions have broken down. Fortunately, the last ten years have seen an acceleration of activity in the field of reef conservation covering management-oriented research, creation of protected areas and major international conservation programs.

#### *Harvesting of reef resources*

The World Conservation Strategy recommends that the maintenance of coral reef fisheries at sustainable levels be considered a requirement of global priority and this is discussed in other articles in this issue. Many non-food invertebrate reef species also require improved management. Considerable efforts are going into the control of the ornamental coral and shell trades, both nationally and internationally. Black coral (*Antipatharia*) and the giant clams *Tridacna gigas* and *T. derasa* are listed in Appendix II of CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. This

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means that an export permit is required from the country of origin, thus providing a means of monitoring the trade and controlling it where necessary. The US controls the import of corals under the Lacey Act, which bans the import of species collected or exported illegally from their country of origin. In the Philippines, the collection and export of corals is banned although there have been considerable problems enforcing this. Consideration is now being given to the listing of some of the stony corals under CITES. The shell trade provides an important source of income in many countries and many molluscs can probably support such exploitation. However, efforts must be directed to improved management, to prevent damage to the reef environment and local exploitation of the more popular species. Mariculture of overexploited species such as giant clams and *Trochus* is underway in several countries and such programs will provide a number of benefits including employment for local people and the possibility of reseeding depleted reef areas with hatchery reared specimens.

### *National parks and protected areas*

Reef management through a system of reserves can help halt further degradation, facilitate the recovery of devastated areas, protect breeding stocks and improve recruitment in neighboring areas and maintain the sustainable utilization of reef resources. However, as pointed out in the World Conservation Strategy, marine ecosystems are at present poorly represented in protected areas. Only three (Great Barrier Reef, Aldabra, Everglades) of the 50 World Heritage Sites and five (Atoll de Taiaro, Malindi/Watamu, Virgin Islands, Fort Jefferson, Puerta Galera) of the 226 Man and the Biosphere Reserves contain reefs. Of the 1,162 national parks on the UN list, probably only about 100 include or are adjacent to reefs. Furthermore, many of the designated coral reef reserves are not yet properly managed. In such cases, reefs may come under increased pressure as at Hikkaduwa National Park in Sri Lanka where reefs have been damaged by large numbers of diving and spearfishing visitors since the area was made a park. Enforcement of park regulations is often difficult, as unlike terrestrial reserves, there is no way of erecting fences to keep people

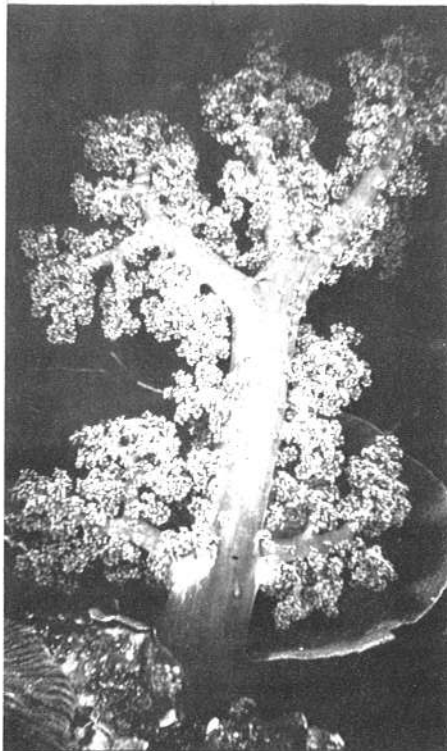
\*Part I appeared in the October 1984 issue.

out. An additional concern is that protected areas have often never been surveyed and may not protect the most important reef areas. For example, the major reef areas in the Bahamas have no forms of management although marine parks have been designated in other areas; the second largest barrier reef in the world in Belize, as yet has no form of management; in the Pacific reserves have been declared on remote unstudied atolls, leaving accessible reefs of importance to fisheries and tourism without any form of management.

Nevertheless, coral reef reserves are being created in increasing numbers as in the Caribbean region where there are about 52 parks and protected areas which include or are immediately adjacent to coral reefs, and about 70 additional areas recommended for protection. Increasingly the short-term economic benefits of marine parks in terms of entrance fees, guides, boat rental and tourist facilities is being recognized. For example, the Virgin Islands National Park received over 566,000 recreational visitors in 1981 generating considerable income. Several countries such as the US, the British Virgin Islands, the Netherlands Antilles and Australia now have comprehensive marine park programs with a strong emphasis on associated tourism and recreational benefits and in others such programs are being developed. In the Philippines, the Bureau of Fisheries and Aquatic Resources is running a program to establish reef reserves; in Malaysia the World Wildlife Fund (WWF) is providing assistance for survey work and the establishment of reserves; in Indonesia the WWF and government-run marine conservation program has recently been expanded; and India will be hosting a symposium on marine parks and endangered marine animals in January 1985 which will stimulate interest in this region.

Marine park management was discussed at the Third World National Parks Congress in Bali in 1982 and particular emphasis was placed on the concept of multiple-use reserves as exemplified by the Great Barrier Reef Marine Park in Australia. Large multiple use areas are recognized as being more useful than small reserves since marine species do not stay within the boundaries and zoning and rotation of activities tend

to be easier to plan and carry out in marine parks than on land as there is no need for roads or fences. For example, New Caledonia has a rotating reserve consisting of three sections which are closed to certain activities alternately over 3 years. Strict sanctuary type reserves will still be required for the most critical habitat areas, such as nutrient sources, areas of high biological diversity and nesting, or to protect breeding stocks of important fish. Attention must now be paid to ensuring that a complete range of ecosystems representative of the different types of reef, e.g., fringing, barrier and atoll reefs, are protected.



Corals, Noumea, New Caledonia. Photo by P. Laboute. Courtesy of Noumea Aquarium, Noumea, New Caledonia.

Although parks and reserves may be the most immediately effective method of preserving coral reef resources, they will only function if they have been set up for the benefit of people and do not represent 'no-go' areas. Local people must be involved at the start and the most successful reserves seem to be those where local people are still allowed to fish in certain areas using traditional methods, as at Sumilon Island in the

Philippines, and at Owea Island in the Loyalty Islands where fishing by anyone other than the villagers is banned and tourists are restricted to one side of the lagoon.

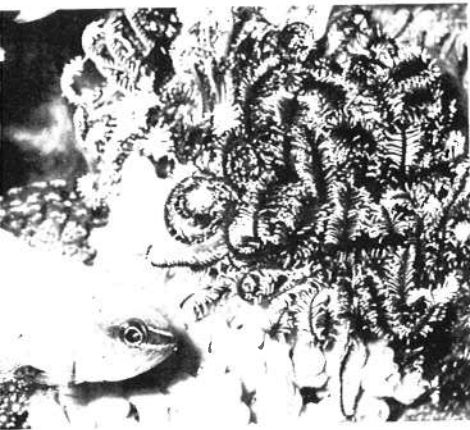
Marine reserves should preferably include the adjacent coastal area as well as associated mangrove and sea grass beds. Reef flats and seagrass beds are often overlooked at present but are very important in the recycling of nutrients in the reef ecosystem, and several fish have life cycles which involve two or more of these systems. Reserves around islands if the entire island can also be protected, as at Sumilon Island in the Philippines and Buck Island on St. Croix, can achieve these aims, as does the extension seaward of the boundaries of an existing terrestrial reserve. For example in Indonesia, the reserve at Bali Barat now includes an important marine component and there are plans to extend the boundaries of three other reserves; in the Seychelles there are proposals to extend the reserves at Cousin and Aride islands.

#### *Research and monitoring*

Until recently information on reefs has been widely scattered and for some countries virtually non-existent. With the development of scuba techniques, reef research has been revolutionized and over the last 20 years there has been an avalanche of studies on reef structure, ecology and biology. Monitoring changes on reefs is now seen as a high priority and national surveys of reefs are underway in several countries such as the Philippines, Indonesia and Trinidad and Tobago. UNESCO is encouraging management-oriented research in several countries, such as Thailand where research on siltation is being carried out at Phuket Marine Biological Station. The South Pacific Commission has produced a Coral Reef Monitoring Handbook which suggests simple methods for monitoring a number of parameters on the reef appropriate for a variety of management techniques. A long-term monitoring program called Reefwatch has been set up by the Tropical Marine Research Unit at York University, UK. This relies on diving expeditions, amateur divers and snorkellers and reef scientists to collect basic data on simple check sheets. Work

in the Red Sea has already led to the identification of areas suitable for parks and reserves.

The IUCN Conservation Monitoring Center is compiling a Directory of Coral Reefs of International Importance, to include both protected and unprotected



Ringtail cardinalfish (*Apogon aureus*). Photo by Yves Magnier. Courtesy of Noumea Aquarium, Noumea, New Caledonia.

reef areas. The aim of the publication is to provide a broad survey of the reefs of the world giving sufficient detail to enable priorities for reef conservation to be established at both national and international levels. An additional aim is to identify those areas where further research and conservation action is required

and to establish to what extent those reefs currently receiving protection are representative of the full range of reef types. The Directory will be produced in a series of volumes, the Neotropical volume to be completed by the end of this year and provisional drafts of all volumes to be available for comment and review in time for the 5th International Coral Reef Congress in Tahiti in 1985.

#### *General management of coastal waters*

In the long term, improved environmental legislation on a much broader scale is essential and major coastal zone management planning is required. UNESCO has prepared the *Coral reef management handbook* which discusses many of these issues.\* In many countries reefs, although overutilized in some areas, are still underutilized in others and constitute a valuable resource. A major investment in education is probably one of the most important requirements at the moment. Education programs in schools and villages will

\*R.A. Kenchington and B.E.T. Hudson, editors. 1984. *Coral reef management handbook*. UNESCO Regional Office for Science and Technology for South-East Asia Jl. Thamrin 14, Tromolpos 273/JKT, Jakarta, Indonesia. 280 p.



Soft corals at Puerto Galera, Mindoro, Philippines. Photo by Roger Pullin.

help local people to understand the importance of their reef resources, leading to improved enforcement of planning controls and regulations. Foreign visitors and tourists also need to understand the reef ecosystem, and marine parks are increasingly playing a role in education, with interpretive centers, underwater viewing chambers as at Eilat in Israel and Green Island in Australia, and underwater trails as at Buck Island, St. Croix.

#### *International initiatives*

Marine resources are often shared by several countries and multinational collaboration and regional strategies may be necessary for their conservation and management. The UNEP Regional Seas program is closely involved with multinational efforts and has recently concluded the Regional Seas Convention and Protocols which place considerable emphasis on the importance of coastal zone management and the necessity of preserving important natural habitats, although at the moment its main emphasis is on the control of pollution. Action plans and legislative back-up in the form of conventions have been drawn up for the regions covering the South Pacific, the Wider Caribbean, the Red Sea and Gulf of Aden, Kuwait and the five ASEAN countries.

There is considerable scope for adjacent countries to cooperate in the protection of important reef ecosystems. Suggestions for such joint reserves include the NE Kalimantan-Sabah-Philippines proposed reserve in the Sulu Sea and a proposed St. Thomas-British Virgin Islands reserve in the Caribbean. The international community must support and strengthen the initiatives of individual states in protecting their reefs. Few of the international and regional treaties or conventions concerned with the protection of wildlands, such as the World Heritage Convention and the Wetlands Convention consider marine areas, let alone reefs. This is largely because awareness of the need for marine protected areas is relatively new, and the authorities concerned with such treaties are usually only competent in the terrestrial field. It is to be hoped that this will gradually change in the future and perhaps consideration should even be given to a convention specifically designed for reefs. ●