

# **Present Status of Coral Reefs in Sri Lanka**

by

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## **Introduction**

The coastline of Sri Lanka, which is about 1,585 kilometres in length support extensive areas of salt marshes, mangroves, estuaries, lagoons, sandy beaches and dunes. SeaWards, the continental shelf covers about 26,000 square kilometres, which is approximately half the land area of the island. The coastal waters is characterised by highly productive marine habitats. It supports a number of important eco-systems such as coral reefs and Sea Grass Beds. This narrow coastal belt supports 34 percent of the country's total population in 24 percent of its land area. In the coastal belt, fishing is the most important economic activity. Marine fisheries contribute almost 65 percent of the total animal protein consumed by the population. Coastal fisheries classified as within 40 kilometres of the shore consitute over 90 percent of the marine fish production. All of Sri Lanka's coral reefs and sea grass beds are within 25 to 30 kilometres from the shore. Therefore the major part of the fisheries production depends on the well being of these highly productive but fragile eco-systems.

In the past fishing activities in the coastal region have mainly been confined to non-destructive, traditional methods such as the use of hand lines and beach seines. However, fishing in coastal waters has increased tremendously during the past two to three decades due to a rapid increase of the population, mechanisation of fishing crafts together with more efficient fishing methods to increase production. As a result, once highly productive coastal habitats have been adversely affected within a very short period. Recognizing the need of proper management practices for the sustainability of these important eco-systems, the Government of Sri Lanka formed the National Aquatic Resources Agency (NARA) in 1981, with a mandate to carry out research and development on all aquatic eco-systems.

NARA commenced a Coral Reef Research Programme in 1985 with the primary aim of monitoring the status of the coastal reefs, identify causes and issues related to reef degradation and to formulate practical management plans. Since 1985, the Coral Reef Research Project has carried out investigations at 23 locations from the Kalpitiya Peninsular in the north-west to Tangalle in the south. Over 10 seperate sites have been investigated at each location. Several species of stony corals new to Sri Lanka were discovered including one genus which was not previously recorded for the Indian Ocean. In addition two locations were recommended to be made into Marine Sanctuaries based on the research conducted during these surveys. One of these areas is in Hikkaduwa in the south-west and the other is Bar Reef in the north-west, The Hikkaduwa Marine Sanctuary has a size of .5 km<sup>2</sup> and the Bar Reef 306.7 km<sup>2</sup>.

### Types and Locations of Reefs

Reefs within the coastal waters of Sri Lanka are found mainly as nearshore fringing reefs and deep water reefs, located several kilometres from the shore (Figure 1). They are found mainly on the bathymetric contours formed as a result of fluctuating sea levels in the past, and on consolidated marine substrates such as hard calcareous growths as well as rock substrates. The majority of them are confined to within the 30 metre bathymetric contour. They can be divided into three major groups, based on their different structures. Namely, coral reefs, beachrock or sandstone reefs and rock boulder reefs.

True coral reefs occur as fringing reefs around the Jaffna Peninsular in the north, from Trincomalee to Kalmunai in the east coast, from Tangalle in the south to Akuralla in the south-west. Coral reefs in the north-west are found from Mannar Island to west of the Kalpitiya Peninsular. Some are located several kilometres offshore on the shallow continental shelf of the north-west. Coral reefs also found on two underwater ridges off the south-eastern coast called the Great and Little Basses Reefs.

Beachrock reefs occur as discontinuous bands on the bathymetric contours around the Island. Rock boulder reefs, are common in the south and eastern shores of Sri Lanka, where corresponding rock outcrops could be seen on land. A superficial coral cover of reef building or stony corals are found on the both substrates.

Nearshore coral reefs are lagoonal reefs which tend to form small lagoons with coral patches on their leeward side. Offshore, they form shallow banks and patch reefs,

### Diversity of Reefs

A high diversity of corals and other reef organisms are found in Sri Lanka. A total of 171 species of stony corals divided among 65 genera have been recorded for Sri Lanka, one species new to the Indian Ocean (Zoopilus echinatus) was discovered on the sandstone reefs at Kandakuliya. Common reef building corals belong to the families of Acroporidae, Faviidae, Poritidae, Pocilloporidae, Agariciidae, Caryophyllidae, Mussidae, Merulinidae and Oculinidae. Fungid corals are generally found at a depth of greater than 15 metres.

A coral reference collection for Sri Lanka is being built by the coral reef research project of NARA. This collection contains over 300 specimens including 64 species of hermatypic corals which had not been previously recorded for Sri Lanka. A field guide to the corals of Sri Lanka is also under preparation based on this reference collection and the field investigations carried out since 1985.

There are 30 species of butterfly fish that inhabit the coastal waters. Six species are very rare, (Chaetodon unimaculatus, C. bennetti, C. ephippium, C. raffelsi, C. ornatissimus and C. semeion). The Semeion butterfly fish is the

rarest of them, only four specimens have been sighted in the country (in the Bar Reef Marine Sanctuary).

#### Utilization of Coral Reefs and their Present Status

In Sri Lanka coral reefs are utilized mainly for commercial purposes. Main uses are for fishing, removal of corals for building construction, extraction of live marine organisms for the aquarium industry and for tourism.

Reefs in coastal waters of Sri Lanka are easily accessible. As mentioned initially, fishing pressure has been increasing rapidly due to a rising population and mechanisation of fishing crafts and the introduction of new techniques. Traditionally, coastal waters have been fished using non-destructive methods. Recently reefs have been adversely affected due to coral mining, destructive fishing methods such as the use of 'tangle nets' or 'bottom-set nets', Uncontrolled collection of ornamental reef organisms and destructive collecting methods, blast fishing, negative impacts of tourism and pollution.

Corals within lagoon reefs are damaged due to boat anchoring and the discharge of waste oil into the sea. Glass bottom boats also damage corals at the Hikkaduwa Marine Sanctuary.

The marine environment is the dumping ground for solid wastes and sewage from cities and towns located in the coastal areas. Effluents from industrial establishments eventually end up in the sea. In addition unplanned land clearance practices and deforestation in the central hills contribute to an increasing load of siltation discharged into coastal waters.

In the south a cottage industry that manufacture coconut fibre products utilize calm back waters of fringing reef to season the fibre. Health of corals have been affected in such areas.

Coral are also destroyed by natural causes such as the 'Crown of Thorns starfish' (*Acanthaster planci*). A population explosion in the 1970's caused large scale damage to reefs in the north-west and eastern coasts. Recent investigations have revealed that their numbers are increasing in the same areas.

Tropical storms and cyclone damage is not common. A cyclone in the late 1970's caused minor damage to the fringing reefs in the east coast around Batticaloa.

Anthropogenic activities, their impacts and the level of natural causes of reef damage are listed in table 1.

**TABLE 1.**

<b>CAUSES</b>	<b>IMPACT</b>
<b>Coral mining</b>	<b>Very High</b>
<b>Dynamite fishing</b>	<b>High</b>
<b>Tourism</b>	<b>High (Site specific)</b>
<b>Collection of souvenirs</b>	<b>Moderate</b>
<b>Ornamental fish collection</b>	<b>High</b>
<b>Destructive fishing methods</b>	<b>Very High</b>
<b>Anchoring of boats</b>	<b>High (Site specific)</b>
<b>Discharge of waste oil</b>	<b>High (Site specific)</b>
<b>Pollution</b>	<b>Unknown</b>
<b>Seasoning coconut fibre</b>	<b>Unknown</b>
<b>Siltation</b>	<b>High (Site specific)</b>
<b>Crown of Thorns starfish</b>	<b>Very High (Site specific]</b>

Research conducted by NARA has revealed that the nerashore reefs in the west and southern coasts have been seriously affected due to the reasons given above. More than half the reefs in the south-western and southern coasts have disappeared due to coral mining.

Reefs in the north-west (Between Mannar Island and the Kalpitiya Peninsular) and south-east (Great and Little Basses) remain relatively undamaged. These reefs are located in remote areas, further they are several kilometres away from the coast and are not easily accessible due to difficulties encountered in transport and other infrastructure facilities,

The status of the reefs in the east coast except Trincomalee is not known, as they have not been investigated due to civil unrest in recent times.

### **Protected Areas (Marine Parks and Sanctuaries).**

As mentioned above there are two Marine Sanctuaries in Sri Lanka. They are both established under the Fauna and Flora Protection Ordinance of the Department of Wild Life Conservation. The Hikkaduwa Marine Sanctuary in the south-west and the Bar Reef Marine Sanctuary west of the Kalpitiya Peninsular was established in 1989 and 1992 respectively. They were established based on recommendations forwarded by NARA to the Interministerial Committee on Marine Parks and Sanctuaries.

### **Legislative Framework and Management Aspects of Coral Reefs**

In Sri Lanka, protection of coral reefs is the responsibility of several Departments and Ministries. These are: Department of Coast Conservation, Department of Wild Life Conservation, Ministry of Fisheries and Aquatic Resources, National Aquatic Resources Agency and the Central Environmental Authority .

Coral mining is regarded as a traditional activity in southern parts of the island, therefore implementation of the Coast Conservation Act has been difficult. Recently the Department of Coast Conservation has taken positive steps to control coral mining and the removal of sand in the southern coast. However, in some areas this has not been successful mainly due to lack of alternative employment for displaced miners and others affected due to government action.

Steps are also being taken by the Ministry of Fisheries and Aquatic Resources to control the collection and export of ornamental aquarium fishes and invertebrates.

Although two Marine Sanctuaries have been established, presently they are not managed. This is mainly due to lack of trained personnel, funding and a concerted effort in maintaining the protected areas. As a result destructive fishing practices will undoubtedly affect the Bar Reef Marine Sanctuary in the future. The Hikkaduwa Marine Sanctuary continues to degrade mainly due to tourist related activities.

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Figure 1

