



Does Environment Need Management?

Tourism & coral reefs - an ambivalent relationship.

by Dr Reinhard Kikinger

While reefs are good for tourism, tourism is not necessarily good for reefs.

Coral reefs belong to the most complex ecosystems on planet Earth and they have the highest biodiversity of all marine habitats. This makes them attractive for snorkelers and divers, who want to enjoy the fantastic underwater world. That was how tourism started in the Maldives some 30 years ago: simple facilities on a few hotel islands with healthy, luxuriant coral reefs. In the meantime the number of hotel islands increased enormously. Together with them the number of guests, boats, air taxis, and infrastructure is increasing. An impressive leisure industry developed on the Maldives within a short time. Beside diving and snorkeling rapid diversification offers additional water sports, freshwater pools, Spas, gourmet restaurants, tennis courts and much more. The standards of the hotel resorts are continuously rising and all the numerous departments are managed by professionals. Despite these rapid changes above water, one compartment is still the same: the coral reef. Who is responsible for its management? Most of the island based activities affect the reefs in a direct or indirect way, because reefs are delicate ecosystems. The reefs of the Maldives developed over thousands of years in the unspoiled waters of the Indian Ocean. Now they are confronted with a new situation, which includes the problems of sewage outlets, trash dumping, underwater activities and more. To minimize negative effects on the underwater world a holistic approach is necessary. Resort managers, tour operators, and guests can contribute in the protection of the reefs. The following list gives a short overview about anthropogenic stresses for coral reefs around resort islands. Information about sources, effects, biological background, and recommendations could help to develop and to implement sustainable management strategies.

Eutrophication

Definition: Increase of nutrients, especially of nitrogen (N) and phosphorus (P).

Main sources: Sewage outlets, laundry outlet, island runoff.

Effects: Healthy reefs can be damaged or even killed. The reef can develop in a different („wrong“) direction.

Biological background: Coral reefs are specialized to nutrient poor conditions. Too many nutrients promote fast growing algae, which overgrow the corals. This is disastrous for the corals. Furthermore, sewage outlets increase the density of bacteria in the seawater. The number of bacteria-feeding organisms, for example sponges, can increase. Where sponges cover large areas, re-colonization with corals is difficult or impossible. In addition, some sponges are bio-erosive. If erosion is dominating over reef-building processes, the reef will decline and in consequence the protective function for the island will decline as well.

Recommendations: Optimal sewage treatment. Use biodegradable, N- and P-poor washing liquids or powders. Reduce the amount of washing liquids and powders to the necessary minimum. Be careful with land-fertilizers, which can be washed into the sea during heavy rainfalls.

Sedimentation

Definition: Sinking of suspended particles on to the reef.

Main sources: Stirring up sediments by waves, by boat propellers, by sand pumping, by fin strokes of divers and snorkelers. Island runoff after rainfalls. Sewage outlets.

Effects: Sediments on top of the corals damage or kill the corals. Sediment-rich water is turbid and therefore reduces coral growth.

Biological background: At high sedimentation rates, corals need much energy for constantly cleaning their surface from sediments. They do this by mucus production and cilia movement, both highly energy consuming activities. If the sediment load is too big, corals will die. In addition, suspended sediment reduces water transparency. That means, less light is available for the photosynthesis of symbiotic algae (zooxanthellae), which live in the tissue of the coral polyps. The result is less production of calcium carbonate and decreasing rates of reef growth.

Recommendations: Reduce sediment producing processes to a minimum: sand pumping, high rpm of boat propellers in shallow water, near shore building activities. Information of boat crews, divers and snorkelers.

“...shells, corals, & other marine life are collected & killed.”

Oil Pollution

Definition: self explaining.

Main sources: Boat engines, fuel transport and storage, island runoff, Spa outlets, sun oils, cooking oils.

Effects: Damage or death of reef organisms including corals.

Biological background: Corals and other marine life feed additionally on dissolved organic material (DOM) directly from the surrounding seawater. Under natural conditions these are amino acids and sugars. High amounts of dissolved material from fuels, oils, sun lotions, shampoos etc. are poisonous for the reef community. In addition, oil films which are swept onto sandy beaches kill the interstitial micro fauna living there. The consequence is a breakdown of the important filter function of the beaches.

Recommendations: Best maintenance of boat engines. Information and training of boat crews and of the power house staff (run off). Collection, treatment and/or recycling of old

oils. Careful use of bio-degradable Spa products. Guest information about responsible use of sun lotion.

Garbage

Definition: Artificial solid objects drifting on the sea surface, lying on the sea floor, swept onto the beach.

Main sources: Poor sorted dustbins, which are emptied into the sea by hotel operators and safari boats.

Effects: Aesthetic problem due to pollution of the sea and the beaches. Dangerous for marine life.

Biological background: Sea turtles feed on drifting objects like medusae and other mega plankton. Some drifting garbage is also ingested by them. Stomach analyses of dead sea turtles yielded large amounts of plastic bags, cigarette ends and –lighters, and other trash.

Recommendations: Reduction of packing material. Sorting and environmentally responsible treatment and/or deposition of rubbish. Careful sorting of kitchen remains and regular control of the dustbin contents. Dustbins, which are emptied into the sea, should have different colour, for example green, indicating bio-degradable contents.

“ Night fishing is no problem as long as local people do it...”

Destructive Fishing Methods

Definition: Night fishing for tourists.

Effects: Anchored night fishing boats break the corals. Fishing lines of inexperienced tourists get entangled in the corals and damage them. Wrong fish species and juvenile fish are caught by this unselective, unprofessional and destructive way of fishing.

Biological background: Night fishing is no problem as long as local people do it. However, it is a big problem when additionally thousands of tourists do it. The reef is damaged and the fish population will decrease on night fishing spots. Even from the economic point of view night fishing is ignorant: after the 98-coral bleaching the fish fauna is the main underwater attraction in the Maldives. To reduce this treasure „just for fun” and to damage the slowly regenerating reefs is in contradiction to all sustainable marketing.

Recommendations: Offer sustainable alternatives, for example a “Sunset Cruise”. The guests watch a spectacular sunset on board of a silently drifting dhoni and are offered a glass of sparkling wine. After this contemplative entertainment they return to the jetty and have not done any damage to the reef. Big game fishing: support “tag and release” for rare pelagic fish as marlins and sailfish.

Snorkelling & Diving

Definition: Self explaining.

Main sources: Snorkelers, who stand or walk on the reef. Divers with poor buoyancy control. Boat anchors. Collecting of shells and corals.

Effects: Walking and standing on the reef is a main threat for reefs around hotel islands. Divers with poor buoyancy damage corals. They also increase the sedimentation by stirring up sand with their fins. Boat anchors dropped into the reef destroy corals. Big and attractive gastropods (snails) are rare in the meantime, which indicates that their shells are collected.

Biological background: Coral reefs are living structures. Standing on them makes damages within minutes, which take years to recover. The reefs shelter the islands from erosion by waves, but only healthy reefs can do that. Reef walking destroys the near surface reef. Scuba diving concentrates at the most attractive reef areas, which have been less damaged by the coral bleaching in 1998. These areas are important „coral reproduction centers” now. From here the recolonization of damaged reefs can occur. Therefore damages have to be avoided especially at these hot spots.

Recommendations: Optimal information for all snorkelers and divers about the delicate coral reef. Construction, marking, and maintenance of channels, where snorkelers can cross the reef. Destructive activities such as reef walking should be banned consequently. Offer information about the negative aspects of the curio trade: for this trade shells, corals, and other marine life are collected and killed. To buy their shells results in decreasing attractiveness and diversity of the underwater world.

The above points are examples for environmentally responsible resort management on coral islands. If environmental aspects are not taken in account, the well known process of „recreational succession“ will start: pristine coral reefs are discovered by a pioneer group and a small and simple tourism infrastructure will develop. Over the years the number and size of the facilities will grow, as well as the number of visitors. The gradual increase of comfort and luxury is frequently accompanied by a gradual decrease of environmental quality. Therefore the initial group, which was mainly looking for luxuriant coral reefs, is replaced by an increasing number of visitors with other preferences. In the meantime the pioneering group has discovered new unspoiled destinations and starts there the chain of recreational succession again. On a planet with limited size, such consumption of ecosystems is limited as well. The long term goal has to be an environmentally friendly tourism, which can help to protect its beautiful destinations instead of threatening them.

In the Maldives the coral reefs are the key factor for tourism and for fisheries. Beside their economic value the reefs are of outstanding importance for the physical survival of this oceanic nation. These jewels in the Indian Ocean were produced by reef building organisms, mainly by hard corals (Scleractinia). Only when they continue to do their work the Maldives can hope to survive as the splendid islands which they are today. Let’s help to keep the reefs alive!

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