



Caring For Coral

Mature student and regular diver

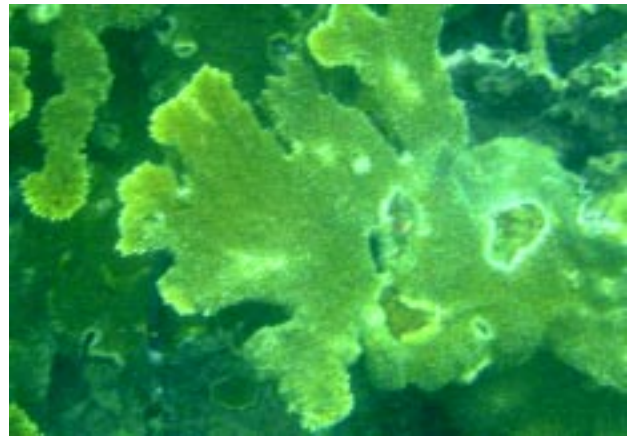
Johanna Carrie recently visited

Tobago as part of her ecotourism

course. She reports on some of

the issues related to the

protection of coral reefs there ...



IN THE summer of 2008 I had the good fortune to visit Tobago as part of my MSc Ecotourism course at Napier University. As I have taken part in many Seasearch dives over the years, I was keen to be involved in monitoring the coral reefs. We were staying in an idyllic fishing village, with no dive centre.

As most of my fellow students were not divers, our survey work was snorkelling – quite a different experience. When diving I can kid myself that I am comfortable in the marine environment. Bobbing about on top is much more alien. Staying in place to record the corals or take photographs is hard, and I found focusing on top views of fish most unsatisfactory. As it turned out, I fin much more slowly than my young companions and I did not carry out as much of the work as I had hoped. As a grandmother I should know that I can no longer pretend to be in my 20s!

Impressive rays were an incentive to fin fast! They came close inshore when the fishermen threw out the scraps from their catch, at the end of the day. Seeing 'wings' lift from the surface, and whip tails actually on the sand made us nervous. The locals were not so con-

cerned; their children played in the shallows after school.

Coral monitoring at sites on the west coast of Tobago has been carried out by Napier students since 2005. They have tracked some recovery of the coral following a coral bleaching event in 2005 and the damage caused by hurricane Ivan in 2004. In the Caribbean the most abundant hard coral is the genus *Acropora*, Elkhorn coral, which we were studying. In other regions there is a wider range of hard coral types. All corals have preferred temperature ranges. Tropical species can be harmed if the average night time sea surface temperature rises by as little as 20°C. This makes them very vulnerable to climate change. Some scientific papers discuss the dangers of a 'phase shift'. By this they mean that there could be an ecological change from a predominance of hard coral to a predominance of brown algae, especially in shallow waters.

On an earlier, diving, holiday to Tobago, I had noticed more algae than I associate with, say, Red Sea diving. There were loads of fish and many of the Tobagan dive sites were spectacular.

How much would it matter if there was more weed and less coral? Tourist destinations like to take their visitors to coral reefs and drop offs. There is some documentation of operators who are quite aware of diver expectations and how they vary. The inexperienced divers, who find any tropical dive fabulous, are taken to the less than perfect sites, while more experienced divers are taken to the better sites. As the better sites may be further away from the resorts, and possibly may be more demanding dives, this does not seem to be merely fobbing off the less critical people with a poorer dive; more a case of horses for courses, and even protecting the ecological resource that earns the tourist dollars.

Corals are made up of living animals. They obtain some nutrition from plant cells living in their tissues, which can make sugars in sunlight by photosynthesis. The coral animals have stinging cells and can catch tiny fragments of material to eat also. In the natural way of things coral polyps (animals) are eaten by other animals. If you watch the fish on a reef you can see them biting at the coral;

parrotfish can often be seen feeding like this. Damselfish not only bite at coral but are said to maintain tiny 'gardens' of green weed on the coral surface. Worms and snails burrow into the coral for shelter, which damages part of the coral.

The whole ecosystem is complex, but at least one aspect will be familiar to Scottish divers. In the Caribbean the most abundant urchin is *Diadema antillarum*. It is one of those nasty black ones with long spines which you do not want to walk on. In some areas numbers have dropped, caused by an urchin disease. With no urchins to graze on brown algae, the algal cover increased, possibly moving the ecosystem towards a phase shift. In Scotland, we would not have a phase shift, since algae are predominant and we have few hard corals, but it is noticeable that more urchins grazing reduces the cover of algae on rocky reefs.

It is also possible that we, or the tourist resorts we visit, are 'killing the goose that lays the golden eggs'. On-shore development often causes increased sediment in the water, this reduces the light reaching the corals and damages the surfaces too. Minerals washing into the water, carried by rain water or rivers, can make algae grow faster and so upset the ecological balance. These minerals, most importantly phosphates, and nitrates, can come from agricultural fertilisers and from sewage. More people, more development, more agriculture to feed the people, locals and tourists, and more sewage to be disposed of, by treatment or coastal outfalls.

Tourism development can upset the ecological balance. The reefs in many places provide services to the locality, not just a diving and snorkelling destination, but a source of fish for food (also sport and income from the aquarium trade),

and shelter for the coast line, sometimes coral is also a building material. There are therefore many reasons why local communities, or governments, want to protect reefs. Marine reserves may be established. If these allow diving but not fishing they are not always popular, but some work has been done which shows increases in fish available for catching just outside such reserves.

Setting up and protecting a marine reserve is expensive. Education of dive operators, other tourist guides and of fishermen can all help to reduce the damage to coral caused by human activities. The strategies may range from the 'legal' where boats must use mooring points rather than drop anchors, to the 'personal' where individual tourists are taught how to control their buoyancy and the damage that even touching the coral can do is explained.



The snorkel team



Local children playing at Castara beach, Tobago

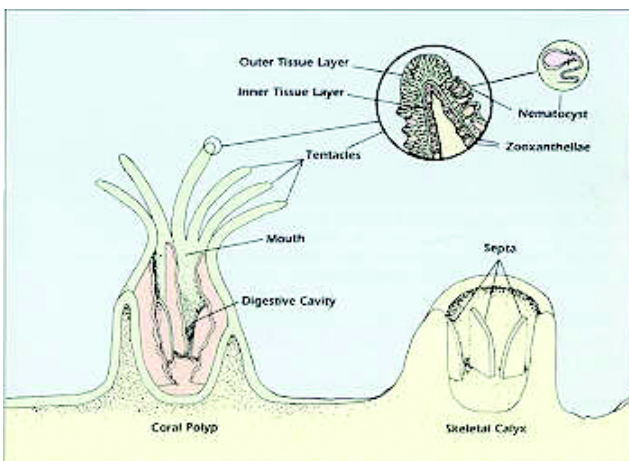


Diagram of coral polyp and calyx structures - Nematocysts are stinging cells. Zooxanthellae are cells of algae in the coral body; these often give the coral its colour.

CAN YOU HELP?

Johanna Carrie is interested to find out what divers know about the harm that can befall coral, and about what features of a coral reef holiday divers value most. This kind of information is valuable to those responsible for managing dive destinations. Johanna is inviting readers to complete a questionnaire. It can be found at www.scotsac.com and can be completed electronically or by post via the Scottish Sub Aqua Club headquarters. It will help Johanna if you return your response while dreaming of holidays – that is by the end of April 2009. She will write a summary of the findings which we plan to publish in **SCOTTISH DIVER** towards the end of 2009.

The two photographs on Page 16 show coral in contrasting states of health. The main photo is the healthy coral.