Do we damage the places we visit when we 'go out to play'?

by Taymour Bagheri

Editor - With a day job that can make many activities mundane, instructors often look to try something new for their personal adventure and there is a lot to be gained professionally from being a novice again or experiencing a new environment. One increasingly popular activity is diving, and the attraction of diving in warm and sunny places is undoubtedly strong. But while we are often very aware of the environmental impact of our work activities, how aware are we of our recreational activities and the impact we have on the places we go?

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Assessing Coral Reef Damage from Recreational Diving

Recreational scuba diving has increased rapidly since its inception around 60 years ago and its popularity has spread around the world, particularly in warm tropical waters where corals are abundant. Corals are however easily damaged and ecosystems are at risk because of their high biodiversity, which is difficult to regain once disturbance and degradation has occurred. Damage can occur for a variety of reasons including the diving operations themselves and environmental managers around the world are becoming more and more aware of the need to implement policies that will ensure sustainable management of these ecosystems so that the tourist industry can be maintained, and so that future generations can continue to enjoy coral reefs to the full.

It has been estimated that 20% of coral reefs worldwide have already been destroyed, 24% are in imminent danger and a further 26% are in long-term danger of collapse⁽¹⁾. Corals cover less than 1% of the world's surface, however, it has been estimated that one third of known marine species directly depend on coral reefs for survival ⁽²⁾. Since the advent of scuba diving, reefs have become an increasing focus for recreational pursuits in tropical and subtropical regions.

The aim of our study was to identify the extent of damage that is being inflicted on corals by recreational scuba diving. Corals are however under a constant threat of other conflicts. The subject of climate change is one that is affecting coral reefs around the world, due to corals having a narrow optimum temperature range. Some areas of coral around the study area have been subjected to bleaching, damage caused by a prolonged change in water temperature, although the extent of this damage is minor in comparison to the mechanical damage that was identified. Pollution is another contributor to the decline of coral reefs. This study showed that not only were coral reefs showing signs of damage as a result of litter and pollution caused by boat traffic, but that some of these influences, namely discarded equipment from fishing boats, were also significantly damaging the marine life that was inhabiting the area.

Damage from diving activities results from a number of causes; first of all indiscriminate anchoring of dive boats can cause daily damage to corals. In addition, lack of buoyancy skills in beginner divers can cause further damage from direct contact with the reef corals.

Corals are of two main types, Scleractinian (hard) corals that have a protective external calcareous skeleton, and Octocorals or soft corals that have no external skeleton. Scleractinian corals are the most important in establishing permanent reef structures and are often slow growing and are the most susceptible to mechanical damage ⁽³⁾.



The study carried out surveys at five shallow water coastal sites in and around Bander Khayran, near Muscat in the Sultanate of Oman in August 2012, with the aim of quantifying damage to reefs due to diving operations. We wanted to develop a simple method that could be repeated at these sites in subsequent years to monitor further damage or recovery and could also be used at other dive sites around the world to give a comparative measure of reef damage due to recreational diving.

Methodology **Line Intercept Transect surveys were carried out along four, twenty metre long transects at each site at depths of less than 12m that includes the optimum depth for coral growth. The number of damaged and undamaged corals was recorded so that a mean percentage figure for coral damage could be calculated for each site. Photographic and video evidence was recorded throughout each of the dives, which enabled data that had been recorded during the dives to be checked back using the video footage and this helped to improve the accuracy of results. To make sure that transects covered as wide an area as possible, the divers started from a central point where a weighted belt was positioned as a marker. Each transect extended to a distance of 20m from this marker with a 90º bearing between successive transects. The central point and primary bearing was planned from the boat prior to the dive.

The results showed statistically that there was much less damage to corals at the control site (3.2% compared with 6.5-25.6% at the dive sites). When level of boat traffic was compared with the level of coral damage it could be seen that as dive boat traffic increased the percentage of damaged corals increased. The one exception was the site where a mooring buoy had been in operation.

This report shows that considerable damage to corals reefs in the vicinity of Muscat has already occurred and a conservation strategy should be implemented to prevent further decline, and to establish conditions where reef regeneration can take place. Regeneration should be monitored, as it is not certain whether the same assemblages would become re-established in areas that have deteriorated due to damage.

Brief summary of recommendations**

- It should be a compulsory to install mooring buoys at all recreational dive sites as the dive site where a mooring buoy had been operational had sustained relatively less damage.
- Evidence suggests that divers and dive boat traffic make a major contribution to the damage that was recorded here.
- This study did not distinguish between anchor damage and direct damage from divers themselves, and collection of such information by direct observation

of divers would allow simple strategies for improvement, such as targeted education programmes.

- 4) More detailed scientific studies are needed to consolidate the findings and determine the relative damage to different species and forms of coral. Branching corals and table corals are thought to be more susceptible to damage. This would provide information about the fragility of different sites..
- 5) Determine capacity threshold for diving sites. The introduction of a capacity threshold for each site would enable a controlled number of divers to visit each of the sites, but ensure that the number of divers will not cause further damage and will not jeopardise the regeneration of damaged coral in the area. Capacity threshold regulations could be developed further with more information available from diver studies so that only experienced divers would be allowed to visit sites with more fragile species that are the most susceptible to damage. Obviously there are commercial implications from this.

* for a full version of the methodology used and the detailed recommendations from the study please contact the author direct on tay_bag@hotmail.co.uk or see the Horizons web page to download it.

References

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About the Author Taymour Bagheri graduated from

Taymour Bagheri graduated from Manchester Metropolitan University in 2013 with First Class Honours in Outdoor Studies. He developed a love of the marine

environment whilst growing up in the Sultanate of Oman and as a certified PADI diver and subsequently as a Dive Master he was aware of the increasing damage to coral reefs in the vicinity of Muscat. As his dissertation project he chose to conduct a study to measure coral damage at dive sites in relation to frequency of use by local diving companies. Taymour has recently moved back to Muscat to work as a Marine Consultant with Al Safa Environmental and Technical Services to carry out environmental impact assessment of sites around the coast of Oman. This role will provide him opportunity to work towards a healthier marine environment in Oman.

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