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Seychelles whale shark tagging project - pilot project report

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Introduction

This report details the first whale shark (*Rhincodon typus* Linnaeus, 1756) tagging project to be undertaken in Seychelles between 9th-23rd November 1996. The project was conceived by Marie Levine, Executive Directory of the Shark Research Institute and David Rowat, Chairman of the Association of Professional Divers, Seychelles (APDS) and conducted under the auspices of the Shark Research Institute. Its implementation was a co-operative effort between Andrew Gifford, Director of the Shark Research Institute, South Africa and Project Director of the Institute's Tagging Programme, members of the S.R.I. whale shark tagging team and staff members of the Underwater Centre Seychelles, representing the APDS.

The presence of whale sharks in Seychelles coastal waters is well known but little research has been done on their populations or life history in this sector of the Indian Ocean. Global populations of all shark species are declining rapidly due to over-fishing. Although whale sharks are not commercially harvested, they are caught as by-catch in other fishing activities and in some countries (eg. India and Indonesia) they are slaughtered for their meat. Whale sharks are planktonic feeders and not considered dangerous to man, thus there was scant interest in this species until the development of the dive tourism industry. Today the economic value of whale sharks as an eco-tourism resource is well documented in areas such as the Western Australian Exmouth/Ningaloo Reef and the Sea of Cortez.

It had been agreed at a meeting of the Minister of Tourism and Transport and the APDS that research should be instigated to ascertain whale shark numbers around Seychelles. This would investigate what they are doing in the coastal waters, frequency of visits and whether they could be utilised as a sustainable eco-tourism resource. Activities were supported in part by grant aid from the Professional Association of Diving Instructors Project A.W.A.R.E. Foundation. A number of local sponsors supported the project: funding for flights and air cargo from Cable & Wireless Seychelles, accommodation provided by the Coral Strand Hotel and boats, diving and logistical support from the Underwater Centre Seychelles.

Methods

The Shark Research Institute, South Africa, began tagging whale sharks along the South African/Mozambique coast in December 1993. By November 1996

they had successfully tagged 116 sharks using tags, tagging applicators and a system of locating the sharks by aerial survey developed by the Shark Research Institute, South Africa. This has proved to be an effective method for assessing the population of the species. By tagging the whale sharks with a comparatively large, fluorescent, passive tag it is possible, though follow-up sightings, to ascertain local population sizes and short term movement patterns. Because the tags remain embedded in the thick skin of the shark, it is also possible to determine if the same sharks return to the same areas in subsequent years or seasons.

Whale sharks often bask, cruise or feed close to the sea's surface where they can be observed from boats; however, due to the low vantage point that most small boats have this can be a very inefficient method for finding the animals. the Shark Research Institute had very successfully used a micro-light aircraft for aerial location of the sharks off South Africa and Mozambique and this was freighted to Seychelles for the pilot project.

Rob Allen, the pilot of the S.R.I. micro-light aircraft and the designer of the tagging concept and associated equipment, conducted a training session with members of the Underwater Centre Staff to acquaint them with the equipment and the tagging procedures. The micro-light was used in a preliminary survey around Mahé to establish shark distribution and to co-ordinate boat movements to allow the animals to be examined and tagged. This proved to be an extremely efficient system and resulted in a high tagging rate.

On finding a shark the team would first check to see if the animal had already been tagged, either in Seychelles or elsewhere. If the shark had a tag details of the tag number were recorded and notes made of any distinguishing features for comparison with previous records. If the shark was untagged it was sexed, tagged and pertinent details recorded.

The tags are imbedded into the skin with a purpose built "Tag Applicator" based on tried and tested spear-gun technology. The tags consist of a 5cm long stainless steel head attached to a double braid of stainless steel wire which is covered by a fluorescent green plastic tubing. The plastic is printed with the tag number and the contact information for S.R.I. This is then covered in a tough, clear, heat-shrink tubing to protect the inscriptions and prolong tag life.

The tags are imbedded in the skin next to the dorsal fin in the first of the ridges which run longitudinally down the animal. This is one of the thickest areas of the skin (about 11cm in a 5m animal). Tagging is done by a snorkeller swimming alongside the shark. The applicator has a rubber stop to ensure that the tags can only be inserted to a standard 8cm depth. Once a tag is inserted, it is tested to ensure it is securely attached by a quick tug on the trailing braid.

Results

The micro-light performed preliminary survey circuits of Mahé daily between 09.00-10.00am and when weather conditions allowed. It was soon apparent that there were a good number of sharks present. Most sharks were seen in

two main areas; one in the north and one in the south. The northern group was the larger and sharks were often concentrated in a feeding aggregation between North-East Point and St. Anne island. In view of this and the ease of accessibility to the latter area, this was chosen as the preferred tagging site. Not all sharks seen were on the surface; in areas where water visibility was clear animals 15-20m below the surface could be seen.

21 sharks were tagged (which exhausted the tag supply for this pilot project). Two tags were lost in deep water through handling mistakes and two sharks were mistakenly tagged twice; these errors highlighted areas where the inexperience tagging team had to be more vigilant and were quickly remedied. Of the sharks which were tagged, a number were sighted again, mostly in the same area. During the period of the study only two unassisted boat encounters with whale sharks occurred, although every flight found 11-18 animals in the area. A single flight around Praslin on 22/11/96 found only one whale shark between Praslin and Cousin; there had been only one opportunistic boat encounter from Praslin.

Collisions with power boat propellers is a constant risk to the sharks, due to their habit of travelling just below the surface, and a number of animals had scars, cuts to the body or pieces of fins missing. Some sharks which were re-sighted a few days after their original tagging bore new marks of contact with boats.

Conclusions

In terms of the implementation of the techniques and the tagging of the sharks, the project was a great success and showed that such an operation can be successfully supported in Seychelles. It has also shown that there are substantially more whale sharks around the islands than were previously thought and consequently they could be a potential eco-tourism resource.

From the number of sharks seen form the air relative to the number tagged and the number of untagged animals entering the area on subsequent days, it appears that the population around Mahé may have been as high as 40 or more. Comparison of the aerial sightings versus the two unassisted boat encounters is also of note: from June 4th to the end of August 1996 the Underwater Centre recorded a total of 48 such opportunistic boat encounters. Assuming a similar pattern of contact this would indicate that there was a substantially larger shark population in the area at this time.

Recommendations

In view of the major differences between the aerial sightings and the opportunistic boat encounters, it is unlikely that numbers from these unassisted sightings will accurately reflect the populations around the islands. Similarly, repeat sightings of tagged animals will be sporadic at best and will provide only sketchy information of the movements or migration patterns of the sharks.

It is recommended that this pilot study be extended into a long-term project with a micro-light aircraft being based in Seychelles to conduct aerial surveys,