

## Archival Pop-Up Satellite Tagging of Whale Sharks (*Rhincodon typus*) in Honduras and the Galapagos Islands

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Whale sharks (*Rhincodon typus*) appear seasonally in the waters surrounding Utila, Bay Islands, Honduras and at Darwin Island in the Galapagos. In 2000 and 2001, the Shark Research Institute deployed archival pop-up tags on five whale sharks in Honduras and the Galapagos in an effort to gather data about their long-term and short-term movements. In addition to tracking data, behavioral data was also collected.

The whale shark, *Rhincodon typus*, is the largest fish in the sea, attaining a length of 12, possibly 18 meters. The first whale shark known to science was a specimen from Table Bay, South Africa, in 1838. By 1986, there had only been 320 recorded sightings of the shark in all of Western scientific literature, a measure of the rarity of the species. One of the objectives of this study has been to determine the annual movements of whale sharks in the Pacific Ocean and Caribbean Sea in order to concentrate our resources on securing government protection for the sharks in these areas.

SRI's goal is worldwide protection of whale sharks, including a global ban on trade in whale shark products. To achieve this objective it is necessary to accumulate baseline data. Scant data exists because the species was never considered commercially viable. However, in the mid-1990s whale sharks became a target species for the Asian market. For example, in 1999 three towns in India accounted for the slaughter of 1,000 whale sharks, all for the export market. Although whale sharks are slaughtered for their fins and flesh, they have far greater economic value as living resources for the dive tourism industry, and protection has been legislated for these ocean giants in the territorial waters of Australia, Honduras, India, the Maldiv Islands, the Philippine Islands, and the eastern seaboard of the United States.

The Shark Research Institute tracked three whale sharks using satellite telemetry along the coast of East Africa (1998-2000) and two whale sharks off the coast of Utila, Honduras, but none of the tags remained attached to the host animal for more than a month. The size and drag of the satellite tags resulted in their premature detachment from the host animals. The development of new pop-up archival tags manufactured by Microwave Telemetry has helped overcome this hurdle; their small size and minimal drag coefficient permits them to remain attached to the host animal for much longer time periods.

Attachment of satellite, ultrasonic, data recording (archival) or passive visual tags usually involves baiting a shark, capturing it by hook and line and restraining the shark either on or along the side of the support vessel. In the case of whale sharks, a species that feeds on zooplankton and reaches lengths of 40' and longer, this is not possible. In this study, free-swimming whale sharks were tagged by divers using modified spearguns.

Divers in this study attached the tags using a rubber-powered speargun (manufactured by JBL Enterprises, Inc.), modified with a plastic stop-ring 15 cm from the



The whale shark is the largest fish in the sea and can attain a length of up to 18 meters.



The small size and minimal drag coefficient of the new pop-up archival tags permits them to remain attached to the host animal for much longer time periods.



The whale shark is tagged with a modified speargun to prevent the tag anchor from penetrating the musculature of the shark.



Photos courtesy of Alex Antoniou

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## PTTs Awarded at Holiday Party

To close out our tenth anniversary celebration, we offered our customers a chance to win either a 70 gram Argos/GPS PTT or an 18 gram Solar PTT. The drawing was held at our annual holiday party on December 7, 2001.

### **Congratulations to:**

**Peter Nye** of the New York State Department of Environmental Conservation—winner of an 18 gram Solar PTT

**Claire Mirande** of the International Crane Foundation—winner of a 70 gram Argos/GPS PTT.



Employees, friends, supporters and colleagues gathered at the Columbia Sheraton for a luncheon and party to close out our tenth anniversary. There were so many people to thank for their support.

A chocolate covered raspberry filled cake slightly larger than our 95 gram PTT—suitable for tracking ostrich perhaps...



### *Tagging of Whale Sharks, Continued from page 5*

end of the spear (tag applicator) which prevented the tag-anchor from penetrating the musculature of the shark, but leaving it securely fastened in the epidermis. The tag is attached to the tag-anchor by a 15-20 cm monofilament tether. Each tag was preprogrammed by the manufacturer to detach itself from the host animal on a specific date. When detached, the positively buoyant tag floated to the surface and transmitted archived data to the Argos Satellite System.

To date, five Microwave Telemetry archival pop-up satellite tags have been deployed on whale sharks: three in Honduran waters, and two in the Galapagos. In addition to locational data, water temperature and depths were recorded. The tags deployed in this study were programmed to remain attached to the host animals for periods ranging from twelve days to six months. Data received from these tags has provided a glimpse into the habitat use and day-to-day lives of the whale shark. For example, until recently, it was thought that whale sharks spent their adult lives close to the surface. Data accumulated in this study reveals that the sharks spend time at depths in excess of 2,000 feet in water temperatures colder than 10°C!

Deployment of additional tags in 2002 will provide important information on seasonal movements of whale sharks and we may find additional areas that the sharks visit. The lessons we have learned regarding the use of this new technology has potential application to the conservation of other threatened and endangered species. ❖



Above: Paul Howey from Microwave Telemetry, Inc. looks on as Debbie Shaw, from Service Argos, Inc., announces the winner of the 18g Solar PTT.

Santa surprised everyone when he arrived at the holiday party with a sack full of goodies. Santa must know someone on the inside—he really did know who had been naughty or nice!



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