

## 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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