State funds shark study after increase in attacks

University of Hawaii scientists have tagged six tiger sharks off Maui to track their locations

By Timothy Hurley

University of Hawaii researchers have attached satellite transmitters to six more sharks in the second phase of a project to observe the movements of tiger sharks after a surge in the number of shark attacks recorded off Maui.

The state Department of Land and Natural Resources is paying for the two-year, $186,000 study in hopes of finding further guidance in managing shark populations in Hawaii.

Kim Holland, one of the study's lead scientists, said the data continue to support research that describes the tiger shark as a freewheeling creature frequently on the move, sometimes traveling over hundreds of miles of open water and up and down the island chain.

The DLNR used such research as part of the basis for its decision not to conduct shark hunts after the attacks.

There were 14 shark bites recorded in Hawaii last year. That's four more than the previous year's unprecedented total. Of the 24 shark attacks over 2012 and 2013, 14 of them were in Maui waters, two of them fatalities. Historically, Hawaii averaged between two and three shark attacks a year in the 1980s. During the past two decades, the annual average edged up to between three and four shark attacks.

In the latest phase of the shark-monitoring study, a team of researchers, led by Holland and UH colleague Carl Meyer, caught and released nine tiger sharks in the ocean off Maui last month. Six of the sharks were equipped with satellite transmitters: five off the north coast and one at Olowalu off West Maui.

The new satellite tracking data will be added to the eight tracks already on the Pacific Islands Ocean Observing System Hawaii Tiger Shark Tracking Web page at pacioos.org/projects/sharks/.

While the tracking is characterized as "near-real-time," the website adds a disclaimer: "This is not a warning system and does not provide real-time monitoring." In fact, while all of the six new satellite tags are working, so far only two have provided signals clean enough to glean location fixes.

Holland said real-time tracking isn't possible because satellites pick up signals only when a shark's dorsal fin breaches the water's surface.

"There may be different times of the year when they come to the surface more frequently," he said.

And if seas are rough, the tags may have less dry time even when sharks are swimming at the surface, he
said, or there could be limited satellite coverage — or a combination of these factors.

In any case, all of the sharks caught in January were also implanted with acoustic tags that transmit to underwater receivers deployed on the sea floor at various sites around Maui.

The January tagging trip was timed to coincide with the tiger shark mating season, a time of year when large males are easier to catch. All six sharks tagged in January bore fresh mating scars.

"Shark mating is not a delicate operation," Holland said.

As part of the study, researchers hope to determine whether pupping and mating draw tiger sharks to Maui and whether those sharks leave afterward.

The tagging study started in October, coinciding with the pupping season, a time when large pregnant females appear to be less active, Holland said. The research will continue at the end of this month or in March, working toward a goal of placing satellite tags on 35 tiger sharks by the end of the study.

In addition to the research funded by DLNR, Holland and Meyer maintain an existing data set for more than 150 electronically tagged tiger sharks captured at multiple islands and atolls throughout the Hawaiian archipelago. Previous tiger shark tagging locations include Hawaii island, Oahu, Mokumanamana, French Frigate Shoals, Pearl and Hermes Reef, and Kure Atoll.

Some of the historical data are available on the PacIOOS Voyager website at pacioos.org/voyager.

In addition to these historical data, the team is monitoring multiple, electronically tagged tiger sharks currently swimming around various locations in the Hawaiian chain. These include sharks that they have been tracking for more than five years.

Meyer said the team is planning additional satellite tagging for waters around Oahu to compare with the sharks tagged around Maui. The track of one tiger shark tagged off Kane-ohi last month is already available on the website.

PacIOOS and the Monterey Bay Aquarium are also providing additional funding for the project.

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A satellite transmitter tag is mounted to the shark’s dorsal fin. The tag transmits a signal to the satellite array whenever the shark’s fin breaks the surface of the water. The data from the transmissions produce geographical estimates of the shark’s location.

Popup Archival Transmitting tags (PATs) store data such as temperature and depth as the shark swims through the ocean. The PAT tag is preprogrammed to detach from the shark and float to the surface for data collection.
TRACKING SHARK MOVEMENT
These are the satellite tracks of two of the sharks originally tagged by University of Hawaii researchers in a study observing the movements of tiger sharks around Maui. The state Department of Land and Natural Resources is hoping the two-year study will help guide future decisions regarding management of shark populations in Hawaii.

#133369 MALE
Size: 9 feet 3 inches
Tagged: Oct. 19, 2013
Last signal: Feb. 2
Number of tracks: 293

#133372 FEMALE
Size: 12 feet 3 inches
Tagged: Oct. 19, 2013
Last signal: Feb. 2
Number of tracks: 141

Source: Pacific Islands Ocean Observing System
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