

The archival tag data demonstrate that white marlin spend the majority of their time in the upper ten meters of the water column, although dives to depths of 200 m were noted for some individuals (Figure 2). Because we received the data back in serial format, it was possible to reconstruct specific dive behaviors. Each fish typically made frequent, short-duration (20 - 40 min) dives in excess of 60 m, although there was considerable variation in the nature of these dives between tagging locations, among individuals at a tagging location, and even for the same individual over time. Typically, deeper dives of long duration were followed by longer times in surface waters. In addition, strong day/night differences in diving behavior were noted for some white marlin (Figure 3a), and the behavior of some individuals was observed to change as they entered different water masses (Figure 3b).

The frequency, duration, and patterns of white marlin dives suggest that these movements are probably associated with feeding. Although white marlin have evolved a special organ to heat the eye, the extended periods in surface waters may help to warm core temperatures after forays into cooler waters. If white marlin are undertaking dives into cooler waters to forage, this behavior pattern may account for the surprisingly high catch rates of a supposed surface feeder on deep-set pelagic longline deployments.

While we plan to continue Archival Pop-up tag studies of white marlin survival and habitat utilization over the next few years, our preliminary data indicate that live release of the animals can significantly decrease fishing mortality. Furthermore, it would appear that a change in hook types in the recreational fishery can have a dramatic increase in post-release survival. ❖

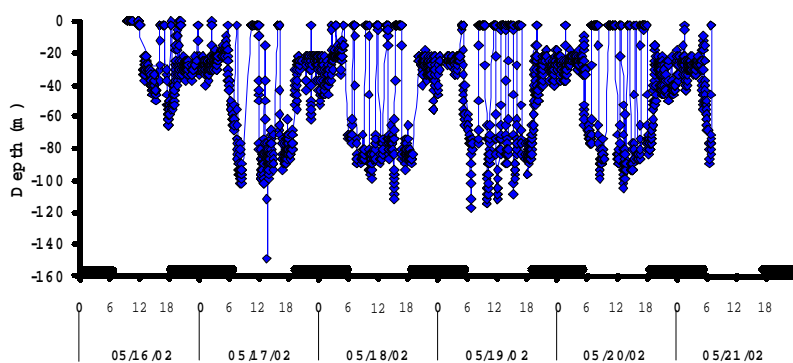


Fig. 3a. Strong day/night differences in the diving behavior of a white marlin tagged offshore of the Dominican Republic in May 2002 with a 5-day HR Archival Pop-up Tag. Black bars along the x-axis denote periods of darkness, derived from time-of-day and light level data archived by the tag.

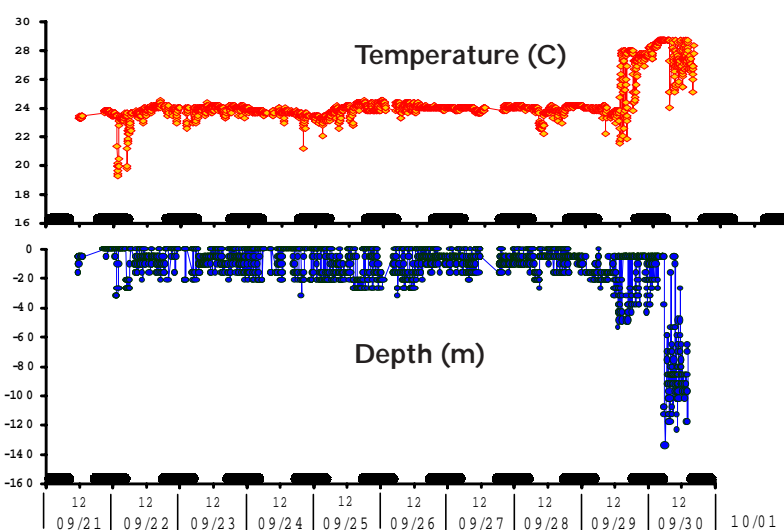


Fig. 3b. Change in the dive behavior of a white marlin tagged in the waters of the Mid-Atlantic in September 2002 with a 10-day HR Archival Pop-up Tag. Black bars along the x-axis denote periods of darkness, derived from time-of-day and light level data archived by the tag. The increase in dive depths concomitant with the increase in temperature readings and the general path of this animal (not presented) suggest that the change in diving behavior of this fish occurred as it entered the Gulf Stream on 29 September.

PTT Refurbishment

We know that utilization of satellite telemetry technology in your research projects is a major investment of precious resources. Fortunately, recovered PTTs can usually be refurbished and deployed again. Some guidelines are listed below to help you.

- ◆ To initiate refurbishment, call or email us for a two-page form and when completed, email or fax it back to us. Please also include a copy of the two-page form with your shipment.
- ◆ All PTTs returned for refurbishment should be sent via Federal Express, our preferred carrier. Refer to "Returning PTTs to Us" in the Field Manual shipped with your PTTs or the FAQ section of our website (www.microwavetelemetry.com) for instructions for international returns.
- ◆ Any damage to a reinforced antenna will result in a replacement of and charge for a new housing.
- ◆ Most of our PTTs, except the Archival Pop-up tags, can be refurbished. Archival Pop-up tags are

essentially rebuilt with new pressure sensor, new light sensor, new battery and new housing.

- ◆ We reserve the right to determine whether or not a PTT can be refurbished. For instance, we may not be able to refurbish PTTs that have been damaged while deployed (by bullet holes, corrosion, etc.). Also, if your PTTs are over three years old, please consult us before returning them for refurbishment.

Refurbishment of your PTTs and rebuilding of Archival Pop-up tags is offered as a courtesy to our customers and charges to you in no way reflect the actual cost. A complete list of charges for refurbishment or rebuilding may be found in the FAQ sections of our website.