

Tracking the Fate and Habitat Preferences of White Marlin Released from Commercial Fishing Gear with Archival Pop-up Tags

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Of all the billfish species in the Atlantic, white marlin are the most depleted—current population estimates are less than 10 percent of the virgin or unfished stock. The majority of white marlin mortality occurs as incidental catch on pelagic longline gear set for tunas and swordfish, although they are also the target of a directed recreational fishery. More than 90 percent of the white marlin caught by recreational anglers are released alive, and international management now requires longline vessels to release all live white marlin (about one-half of them are alive when the gear is retrieved). We have been employing Archival Pop-up Tags to determine the fate of white marlin after capture, and to better understand the vertical behavior of white marlin in order to adjust historical catch rates for changes over time in the depth of longline gear deployments.

To study post-release survival and habitat preferences, we required high resolution information over a relatively short duration period. We selected the HR Archival Pop-up Tag programmed to record light, temperature, and pressure (depth) every one to four minutes and to release after five or ten days (mortalities noted in previous acoustic tracking studies of other billfish species typically occurred within the first 24 or 48 hours). This tag provides serial (as opposed to summarized) data allowing us to reconstruct the actual diving behavior of each fish. To date, we have deployed a total of 24 tags, 22 on fish taken on recreational gear, and two on fish released from the longline fishery (Figure 1a, 1b). Tagging locations include the Dominican Republic (5), U.S. mid-Atlantic region (11), Georges Bank (2), and Venezuela (6).

Overall, 23 of 24 tags responded and approximately 80 percent of the light, temperature, and pressure (depth) measurements from each reporting tag were received. Data were consistent with survival for one of two white marlin released from the longline fishery. The fish that died sank to the bottom within an hour after release. The tag was apparently consumed on the bottom by a shark about ten hours later, and regurgitated a few days after the expected release date, allowing us to retrieve the unusual data set (see the Microwave Telemetry Winter 2002 Newsletter for details).

Five of 21 white marlin released from the recreational fishery died. Three of the mortalities occurred within one hour of release, one at fifteen hours, and the longest time at liberty before death was 64 hours. A higher post-release mortality was noted for white marlin caught on standard straight shank (J) hooks (5 of 15) relative to those caught on circle hooks (0 of 6), presumably due to the greater incidence of deep-hooking and tissue trauma associated with the use of straight shank hooks (four of the five fish caught on straight shank hooks that died were deeply hooked, while all six fish caught on circle hooks were hooked in the jaw). If this trend persists, it suggests that a minor change in hook types could have a profound effect on post-release survival.



Photo courtesy of Guy Harvey

Fig. 1a. White marlin carrying 10-day MT HR Archival Pop-up Tag offshore of La Guaira Bank, Venezuela.



Photo courtesy of John Graves

Fig. 1b. Positions of archival and conventional tags on a white marlin tagged in the Mid-Atlantic region.

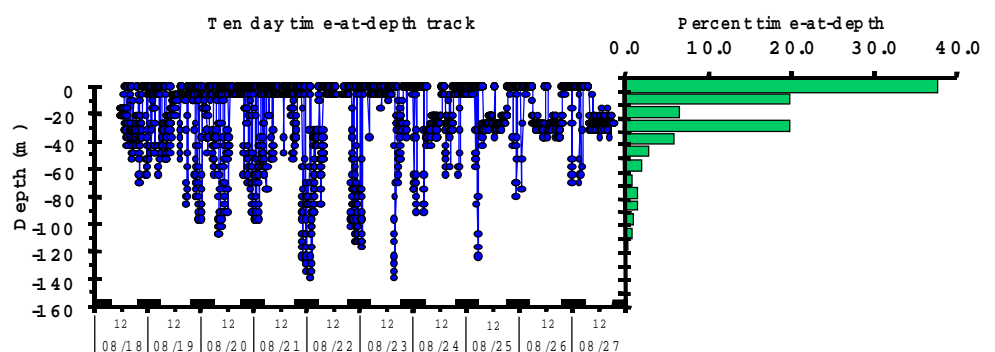


Fig. 2. Overlay of the ten-day depth track and summarized time-at-depth histogram of a white marlin tagged offshore of the Mid Atlantic in August 2002. This figure reveals both the overall depth preferences of the animal and the specific, high-resolution signature of individual dives. Note that many of the deeper dives are not readily apparent in the histogram.

Continued on page 6