

Switch to Circle Hooks Would Benefit White Marlin

On-going studies by VIMS researchers suggest that a minor change in hook type could significantly improve the survival rate of white marlin released by recreational anglers.

Voluntary catch and release efforts by U.S. recreational anglers are one small part of an international effort to help conserve white marlin stocks. Scientists consider white marlin the most depleted billfish species in the Atlantic, with a population at less than 10% of its original level. Most white marlin mortality occurs as incidental catch on longline gear set for tuna and swordfish.

The VIMS studies, conducted by Dr. John Graves and his graduate student Andrij Horodysky, found that white marlin caught on traditional straight-shank “J” hooks were far less likely to survive a catch-and-release episode than those caught on circle hooks (see sidebar on page 2).

“There’s a greater incidence of deep-hooking and tissue trauma associated with “J” hooks,” say Graves. “Fish

caught on circle hooks are more likely to be hooked in the jaw and less likely to incur serious injury.”

Continued on page 2

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concentrations has been linked to molting problems in copepods and to imposex in marine snails, a condition in which females develop male sex organs. At higher concentrations, say 100 ppt, experiments show that exposure to TBT will kill half a group of exposed organisms within a few days. Affected species

include oysters, clams, and mussels.

Concern over these environmental effects has driven regulation of TBT worldwide. Virginia has enacted some of the world’s most stringent TBT legislation. In 1987, the Commonwealth set a TBT water quality standard of 1 ppt, and, based on research showing

Continued on page 6

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The researchers studied the post-release survival of white marlin by

tethering a new kind of electronic tag near the dorsal fin of 24 captured fish just before their return to the water. Tagging sites included the Dominican Republic, the mid-Atlantic bight, Mexico, and Venezuela.

The team uses tags that they program to release from the fish after a certain time. For these studies, they set a release time of 5 or 10 days.

Earlier studies indicated that billfish mortalities typically occur within 24 to 48 hours of release, and they wanted to be sure to account for any deaths resulting from the catch-and-release that might take place.

Once a tag breaks free from its tether at the specified time, it floats to the surface and transmits its recorded data via a satellite link to Graves and his team for analysis.

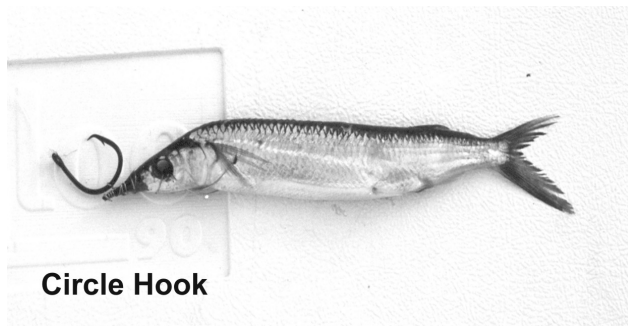
The returned data suggest that a switch to circle hooks in the recreational fishery could dramatically increase post-release survival, says Graves. To date, they show

that five of fifteen fish released from “J” hooks died, whereas none of the nine fish caught on circle hooks died following release. More work is planned for this summer.

For more information on the use and benefits of circle hooks visit the Atlantic States

Marine Fisheries Commission website at www.asmfc.org

Circle hooks have been around for centuries, but with the increasing popularity of catch-and-release fishing, they are receiving renewed attention. Compared to traditional “J” hooks, circle hooks are more likely to hook in a fish’s jaw (rather than deeper in the throat or gut), and thus increase the odds of post-release survival.



When a fish swallows a baited circle hook and moves away, the movement pulls the hook from the throat. Because the hook tip points back at the hook shaft, it is less likely to puncture internal organs, decreasing the chance of gut hooking. As the hook shaft begins to exit the mouth, its shape causes it to rotate toward the corner of the mouth, embedding the barb in the corner of the jaw—adapted from ASMFC *Fisheries Focus*.

Tags Throw Light on White Marlin Diving Behavior

Graves’ team has also been using the new tags to better understand the diving behavior of white marlin. Unlike earlier tags, which averaged the time a fish spent within certain depth ranges, the new tags can record and store individual light, temperature, and depth readings every few minutes.

“Data from these tags allow us to reconstruct the diving behavior of each fish in detail,” says Graves. Whereas data from earlier tags suggested that white marlin spend most of their time near the surface, the new tags reveal that the fish also make frequent, 20-40 minute dives to 200 ft, and sometimes dive as deep as 600 ft.

These dive patterns suggest to Graves that they are associated with feeding. The extended periods at the surface may help the fish warm their core temperature after forays into deeper, cooler waters.

“If white marlin are diving into cooler waters to feed, it may account for the surprisingly high catch rates of a supposed surface feeder on deep-set pelagic longlines,” says Graves.

The new data will help scientists adjust historical white marlin catch rates for changes through time in the depth of longline gear deployments. During the last 30 years, commercial longliners have shifted from surface to deep-set longlines as their target species changed from yellowfin to bigeye tuna. However, the expected decrease in bycatch of the surface-swimming white marlin did not follow. This may reflect the incursion of longline gear into white marlin feeding depths.

“By putting their baits deeper for bigeye tuna,” adds Graves, “the longliners may also be putting them right in the white marlin dining room.”