

## Marking White Bass With Spaghetti Tags

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Studies of the use of mechanical tags and the newer practices of tattooing and branding fish have repeatedly exposed the shortcomings of these methods of marking fish. Many tagging operations are too time-consuming to be practical for marking large numbers of fish in a short time, some cause excessive mortality for various reasons, others have a mechanical influence on the recapture of the fish and cause inaccuracies in statistical data, while still other devices are either difficult to detect or are often lost by the fish. Because of these shortcomings, new tags and marking methods are constantly being developed and tried by fisheries workers. The new "spaghetti" tags, developed and used on tuna by the California Department of Fish and Game (Wilson, 1953), were used on white bass, *Roccus chrysops*, in 4,900-acre Canton Reservoir by the Oklahoma Department of Wildlife Conservation in an effort to determine whether some of these shortcomings could be overcome. A total of 491 fish were tagged in the early spring of 1957, and 27 (5.5 per cent) of these were returned by the first of June, at which time extreme flood conditions impaired the successful recapture of white bass.

### MATERIALS AND METHODS

White bass were captured by hook and line and in cylindrical double-throated wire traps, and were immediately placed in a live box. When tagging operations were ready to begin, the fish were put into an anesthetizing solution of 79 ppm of tricaine methanesulfonate (MS<sub>m</sub>), prepared by adding 1.5 grams of MS<sub>m</sub> to 5 gallons of water. Groups of 7 to 10 fish were added as needed. As soon as the fish floated stomach up and were immobile, they were placed on a measuring board and tagged. A 100-ppm. solution of malachite green was used as a disinfectant after the mechanical portion of the tagging procedure had been completed. This was made by dissolving 1.5 grams of malachite green in 4 gallons of water. Each fish was left (about one min.) in this solution until the next fish had been tagged. They were taken out of this and put into a container of fresh lake water where they revived. The water in this latter container was changed at regular intervals so that the oxygen content would remain high and the malachite green would be eliminated. A dip net was used to place the fish back into the lake where they began to swim freely. Both the MS<sub>m</sub> and the malachite green were weighed in desired lots and stored in paper envelopes in the laboratory. This enabled workers in the field to mix the proper solutions simply by emptying the contents of the envelopes into the proper amount of water.

The spaghetti tags of vinylite plastic tubing described by Tebo (1956), were cut in 8-inch sections from 250-foot hanks purchased from C. D. La-Moree, 1325 San Julian St., Los Angeles, California. The tubing (Number 20 white XTE-30) was one-sixteenth inch diameter, and was obtained at a cost of approximately \$12.00 per 1000 ft. Information was printed on one side of the middle section with a special ink, (No. 104 N5A4 Vinylite Black, from California Ink Co., 2939 East Pico Blvd., Los Angeles, California) which is absorbed by the tubing and apparently becomes permanent. A wooden board with several small grooves the width of a hand saw blade cut into the surface was used to hold the tubing while information was printed on it with a Number 64 lithographic pen. A Number 12 hypodermic needle was used to pierce the body of the fish through the musculature behind and about one-quarter inch below the posterior end of the dorsal fin. This area was chosen in order to avoid hitting any bones. A scale

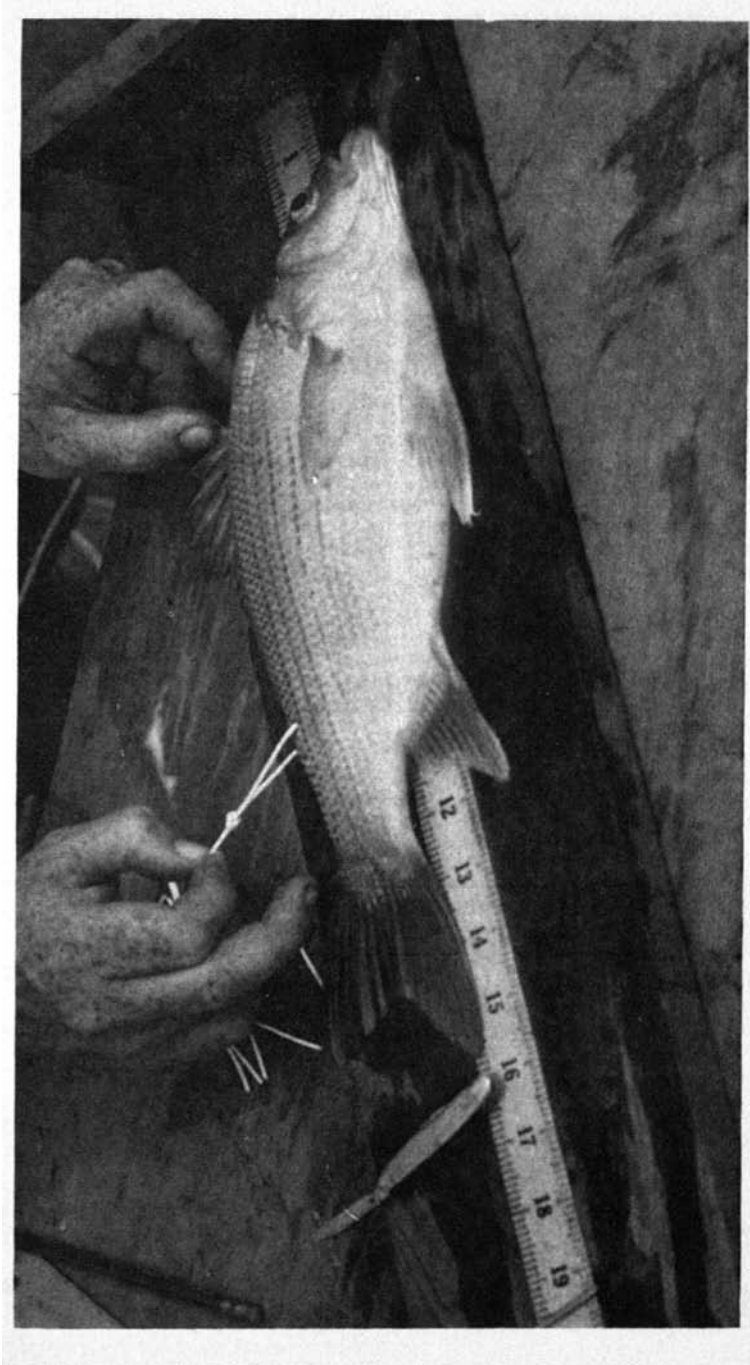


Figure 1. White bass marked with 8-inch long "spaghetti" tag. Insertion made one-quarter inch below and posterior to dorsal fin; ends matched and overhand knot tied.

sample was taken from this area before the needle was inserted, thus making the fish easier to pierce. The tubular spaghetti tag was pushed through this needle which was then removed from the fish's back while the tag was held in place. The two ends of the tag were then pulled together, tied in a simple overhand knot and the excess end removed by cutting. (Figure 1).

A one-inch hole was drilled through the measuring board beside the ruler, at the 12-inch mark, to facilitate insertion of the needle. By placing the fish in position so that the hypodermic needle passed through the fish and into this hole, the needle could be pushed through in one motion.

#### RESULTS

Tagging operations were carried on during the period of March 20 through April 22, 1957. A total of 491 fish were marked during the thirteen days when tagging was done. The average total-length of the tagged white bass was 9.2 inches: the range was 6.7 inches to 14.3 inches. The average weight was 0.37 pounds.

The first recovery was on April 15, a fish tagged on April 9. The average number of days of freedom for the recaptured fish was 34, the minimum number of days was 5, and the maximum, 60. Of a total of 27 recaptures, 3 were made in wire traps and 24 were made by angling. The 24 tagged fish caught by hook and line represent a theoretical angler harvest of 4.9 per cent of the total tagged fish during the period of April 23 to June 15. An annual harvest of approximately 10 per cent of the white bass population was indicated by tagging experiments in Lake Texoma (Bonn, 1956). Bonn stated that if the returns from one portion of his study were discounted, when high mortality was suspected, the returns would have represented 22.1 per cent during the year. Fishing for white bass was very good during the tagging period in Canton Reservoir, and if harvest rates are comparable to Lake Texoma, approximately 25 per cent of the annual catch occurred in the 54-day period from April 23 to June 15.

Early in June flood waters curtailed angling in Canton Reservoir and stopped tagging operations. Only one tag was returned (June 15) after high water levels were reached, and none were reported thereafter through November, 1957.

None of the three recaptured fish caught in wire traps showed any signs of infection or irritation in the area of the tag insertion, and none were reported by fishermen who returned tags. This method of tagging appears to be far superior to any previously employed in Oklahoma, and further experiments with it are planned for 1958.

It is desirable to have at least two workers when using "spaghetti" tags. With two men, the complete operation of anesthetization, tag insertion, recording data, and releasing requires about one minute for each fish, when handled in large numbers.

#### LITERATURE CITED

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