

2. There is a narrow range of susceptibility of different species of fishes to Aqualin.

3. Aqualin is not suitable for collecting fishes in lotic waters because it requires a lethal dose to repel all fish.

ACKNOWLEDGMENTS

The writers wish to thank the Shell Chemical Company for supplying the test herbicide. We are also indebted to Mr. A. W. Dickson and Dr. Frederic F. Fish for their advice and suggestions throughout the study.

LITERATURE CITED

- American Public Health Association. 1960. Standard methods for the examination of water and waste water including bottom sediments and sludges. Eleventh Edition. Am. Pub. Hlth. Assoc., Inc., New York, pp. 457-473.
- Green, George C. 1960. The care and feeding of water weeds, Rept. April, 1960. Irr. Eng. and Maint. 2 pp.
- Harrison, Henry M. 1961. Personal communications.
- Meyer, Fred P. 1961. Notes from June 6, 1961 report. U. S. Dept. of Interior.
- Moen, Tom. 1961. Notes from panel discussion on herbicides taken from the Weed Control Soc. Conf., Chicago, Ill. Feb. 16, 1961.
- Shell Chemical Company. 1959. Aquatic herbicide process handbook. 31 pp.

A DESCRIPTION AND SOME RESULTS OF A FLORIDA STATE WIDE FISH TAGGING PROGRAM

By J. B. COPELAND and MELVIN T. HUISEH
Florida Game and Fresh Water Fish Commission
Leesburg, Florida

ABSTRACT

During the period 1960-1962 a state-wide fish tagging program employing substantial rewards to sport fishermen for tag returns was conducted in Florida. A total of 19,470 fish including 5,328 largemouth bass were captured, tagged, and released. There were 24.2 percent of the tagged bass, 4.5 percent of the bluegill, 3.8 percent of the shellcracker, and 8.9 percent of the crappie returned.

Little difference in returns was noted between fish which were transported prior to release and those which were released into the waters from which they were captured.

INTRODUCTION

During the period 1960-1962 a state-wide fresh water fish tagging study was conducted in Florida. Prior to this time, fresh water tagging studies in Florida were limited to a few areas of the state and were primarily concerned with the Florida largemouth bass (DeQuine, 1949; Herke, 1959; Moody, 1960; Freeman, undated). These past studies were conducted only within the drainage area of the St. Johns River.

In order to obtain general state-wide estimates of harvest rates and other information derived from tagging studies, it was desirable to release tagged fish into many of the diversified waters of the state.

The Joseph Schlitz Brewing Company made such a study possible by their offer to sponsor the program.

METHODS

Fish used in the study were caught by the use of an A.C. electrical fish shocker with a design similar to that of Loeb (1957). Captured fish were placed in a live well, measured, tagged and released.

The shocker unit consisted of a 14-foot, flat-bottom, plywood, scow type, fiber-glassed boat and was equipped with a live well having a capacity of 100

gallons. A Briggs and Stratton 240-120 volt generator, which was connected to two paddle type electrodes, was the power source.

The boat was wired and equipped for night shocking by having three sockets for 120-volt outdoor bulbs mounted at deck level on the bow. It was also equipped with a dead-man switch which served the dual purposes of instant cut-off in case of emergency and it enabled the unit to move into an area without electrically disturbing the fish prior to shocking (Clugston, 1962).

Best results from the shocker was attained by working close to the shore in water from 4 to 6 feet in depth. Very few fish were brought to the surface in deep water. Observations and underwater pictures taken from a glass bottom boat in water 10 to 12 feet deep showed many fish recovered from the effects of the shocker before they floated to the surface.

The length of time spent shocking and the number of fish tagged in a lake, depended on the effectiveness of the shocker, the size of the lake and the intensity of fishing pressure. In some waters difficulty was experienced in capturing fish. Therefore, they were obtained from other waters and transported to such waters. As many as 40 to 45 bass, in addition to panfish, were taken per hour in some waters.

The primary marking method was with monel metal strap tags applied as described by DeQuine (1949). Some Petersen tags were used and are reported by Huish (1962). Each tag had the name Schlitz and a number prefixed by a letter designating one of four geographical zones. At public drawings preceding the start of the "Derby" in each of the four zones, cash values were randomly assigned to tag numbers. The list of cash values was kept by the Joseph Schlitz Brewing Company. One fish in each of the zones carried a tag award of \$10,000. Other tags were worth \$1,000, \$100, \$50, and \$25.

After three months each zone was closed and the remaining tags had a cash value of \$3.00 through 1963. To further insure tag returns a \$500 conservation award was assigned to some of the \$3.00 tags.

During the 1961 Derby one \$10,000 tagged fish was caught. As of this date in the 1962 Derby, two \$10,000 tags have been returned.

A total of 19,470 fresh water fish were tagged in 1961 and 1962. The major species marked included bass (*Micropterus salmoides floridanus*), crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus purpurescens*), shellcracker (*Lepomis microlophus*), redbreast (*Lepomis auritus*), warmouth (*Chaenobrytus gulosus*), and stumpknocker (*Lepomis punctatus punctatus*).

When a tagged fish was caught, it was taken to the nearest Schlitz wholesaler. At that time all the requested data was recorded. This information included the date of catch, the body of water from which it was captured, its weight and its length. The tag was then removed and the fish returned to the fisherman. Copies of the information were forwarded to the Game and Fresh Water Fish Commission.

During 1961 and 1962 over one million dollars were assigned to tagged fish which were released in the waters of the State. The numbers and percents of fish returned are shown on Tables I and II. At this time all return figures are not final since some tagged fish are still at large and may be caught.

Two changes were made in the rules of the 1962 Derby from those of the 1961 Derby. In 1961 the first fish caught in each zone had a cash value of \$1,000. This plan was not used in 1962. The tag numbers of fish which were caught before officially opening the zone for the Derby were included in the public drawings. In other words a pre-caught fish in 1962 could have been the \$10,000 one. In 1961 all pre-caught fish carried a \$25 award only.

RESULTS

During 1961-1962 there were 5,328 largemouth bass, 8,997 bluegill, 2,926 shellcracker and 1,366 crappie tagged and released in 78 bodies of water in the state of Florida. Of these, sport fishermen returned 1,290 bass, 24.2%; 409 bluegill, 4.5%; 113 shellcracker, 3.8% and 122 crappie, 8.9% up to August 31, 1962 (Table I).

In addition to these species there were 356 warmouth, 48 stumpknocker, 79 chain pickerel, 255 redbreast, 100 nile perch, 2 speckled catfish and 3 channel catfish released. Returns of these species were 4.2% warmouth, 29.1% chain pickerel, 11.8% redbreast, 19% nile perch and 33% channel catfish.

TABLE I

A COMPARISON AND SUMMARY OF THE NUMBER TAGGED, NUMBER RETURNED AND THE PERCENT RETURNED OF EACH SPECIES DURING 1961-62

Species	1961			1962			Summary		
	Number Tagged	Number Return	Percent Return	Number Tagged	Number Return	Percent Return	Number Tagged	Number Return	Percent Return
Bass	1,791	423	23.6	3,537	867	24.5	5,328	1,290	24.2
Bluegill	6,054	215	3.6	2,943	194	6.5	8,997	409	4.5
Shellcracker	1,115	27	2.4	1,821	86	4.7	2,936	113	3.8
Black Crappie	760	73	9.6	606	49	8.0	1,366	122	8.9
Warmouth	246	11	4.5	110	4	3.6	356	15	4.2
Stumpknocker	21	0	0.0	27	0	0.0	48	0	0.0
Chain Pickerel	27	7	25.9	52	16	30.8	79	23	29.1
Redbreast	149	14	9.4	106	16	15.1	255	30	11.8
Nile Perch (Tilapia)	0	0	0.0	100	19	19.0	100	19	19.0
Speckled Catfish	2	0	0.0	0	0	0.0	2	0	0.0
Channel Catfish	3	1	33.3	0	0	0.0	3	1	33.3
Total	10,168	771	7.6	9,302	1,251	13.4	19,470	2,022	10.4

TABLE II

Species	Number Transplanted		Number Returned		Percent Returned		No. Bodies Water			
	1961	1962 Summary	1961	1962 Summary	1961	1962 Summary	1961	1962		
Bass	360	227	587	74	164	25.0	32.6	27.9	26	14
Bluegill	3,984	897	4,881	83	243	4.0	9.0	5.0	38	28
Shellicracker	460	768	1,228	9	50	2.0	5.3	4.1	24	28
Black crappie	65	42	107	4	21	26.0	9.5	19.6	10	6
Redbreast	28	10	38	0	0	0.0	0.0	0.0	6	2
Chain Pickerel	10	0	10	2	2	20.0	0.0	20.0	4	0
Warmouth	50	46	96	3	6	6.0	6.5	6.3	11	8
Channel catfish	3	0	3	1	0	33.3	0.0	33.3	3	0
Speckled catfish	2	0	2	0	0	0.0	0.0	0.0	2	0
TOTAL	4,962	1,990	6,952	282	487	6.0	10.3	7.0		

Since the waters in which tagging was done were selected for heavier fishing pressure, the tagged fish were more apt to be caught by anglers than if they had been released in randomly selected waters.

Results of tag returns from transplanted fish for both years showed rates of returns similar to those which were not transplanted. Of 587 bass which were transplanted, returns of 243 or 27.9% were obtained; 5.0% of the bluegill were returned. Black crappie recovered amounted to 19.6% and the shellcracker and warmouth were 4.1% and 6.3%.

The apparent increase of transplanted bass returns in 1962 over 1961 may have been the result of a smaller number being released in 1962. They were also released into fewer bodies of water in 1962. Returns of the other species followed a similar pattern. The variations which did occur may have been due to differences in the numbers tagged and fishing pressures.

It is believed the high value awards offered for tag returns assured a nearly 100% tag recovery from the fishermen. This was indicated by a comparison with a non-value award program in the St. Johns River during 1960. The data from that study is to be reported.

ACKNOWLEDGMENTS

The authors wish to express their gratitude to the personnel of the Florida Game and Fresh Water Fish Commission's Fish Management Division for their time and effort in making the tagging program a success.

The project was made possible by the Joseph Schlitz Brewing Company.

LITERATURE CITED

- Clugston, James P. 1961. Electrofishing safety or "surprise" switch for use in small boats. *Prog. Fish Cult.*, 23(4):186.
- DeQuine, John F. and Charles E. Hall, Jr. 1949. Results of some tagging studies of the Florida largemouth bass *Micropterus salmoides floridanus* (LeSueur). *Trans. Amer. Fish. Soc.*, Vol. 79, pp. 155-166.
- Freeman, Barry O. and Melvin T. Huish. A summary of a fish population control investigation conducted in two Florida lakes. Mimeographed. pp. 1-109.
- Herke, William H. 1959. Comparison of the length-weight relationship of several species of fish from two different, but connected, habitats. *Proc. Thirteenth Ann. Conf. of the S. E. Assoc. of Game and Fish Comm.*, pp. 299-313.
- Huish, Melvin T. and J. B. Copeland. 1962. Return rates of strap tags and Petersen tags. To be presented at the 16th Ann. Conf. of the S. E. Assoc. of Game and Fish Comm.
- Loeb, Howard A. 1957. Night collection of fish with electricity, *N. Y. Fish and Game Journ.*, Vol. 4 (1), pp. 109-118.
- Moody, Harold L. 1960. Recaptures of adult largemouth bass from the St. Johns River, Florida. *Trans. Amer. Fish. Soc.*, Vol. 89, (3), pp. 295-300.