EFFECTIVENESS AND COMMERCIAL POTENTIAL OF THE WHIP-SET TRAMMEL NET IN VARIOUS OKLAHOMA RESERVOIRS

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Whip-set trammel netting was conducted in 1971 and 1972 in various state reservoirs. A total 2,203.9 lb of fish were taken in 3.0 bar mesh trammel nets; of these 95.8% were rough fish. The average catch per 100 ft-net-day was 25.6 lb with the whip-set method. Game fish accounted for only 4.2% of the total weight. Results with whip-set trammel nets are compared to those reported for stationary gill nets used for commercial catches. Capture rates and mortality of game species, particularly striped bass, are evaluated. Highest catch rates of rough fish occurred in late winter and summer and during trips assisted by cooperating commercial fishermen.

Commercial fishing has existed in Oklahoma for many years. A limited number of small commercial fishing operations were reported in 1931 by Houser (1). The Oklahoma Department of Wildlife Conservation initiated a commercial fishing harvest reporting system in 1957. Elkin (2) reported total harvest in that year as 646,041 lb. Commercial catches were summarized by Jones (3) for the period 1958-1960 and by Mensinger (4) for 1961-1969. Parrack, *et al.* (5) estimated 1,625,637 lb of commercial species (live-weight) were harvested in Oklahoma from July, 1967 to June, 1968. In the next two years harvest dropped sharply. The 1970 commercial harvest was the lowest in reporting history.

In an attempt to modernize the present commercial fishery, the Oklahoma Department of Wildlife Conservation, utilizing PL88-309 funds administered by the National Marine Fisheries Service, initiated a program to evaluate fishing gear and methods with potential for providing a greater harvest of commercial fish. The whip-set trammel net method was one gear type to be investigated.

The whip-set technique has demonstrated its effectiveness on commercial fishes in Oklahoma and other states. Houser (1) reported its use by commercial fishermen on Lake Texoma in 1931. While conducting research on Ft. Gibson Reservoir in 1959, Summers (unpublished report, Job Compl. Rept. F-6-R-3, 1960), in only 27 sets using the whip-set trammel technique, collected 2,025 lb of fish, of which 2,010 lb were rough fish. The whip-trammel was the most effective gear type used in the Tennessee River by White (6). In another study by White (7) the whip-set was indicated as a gear type that commercial fishermen could use to increase the harvest of rough fish. The average catch of rough species was 163 lb per 100 yard-net-day as compared to only 12 lb using stationary gill nets.

This investigation evaluated the effectiveness and potential of the whip-set trammel method by comparing the commercial catch of whip trammel nets with data reported from stationary gill nets. Catch rates and mortality of game species, particularly striped bass, were also evaluated. For this reason, most of the sampling was conducted on Keystone and Texoma Reservoirs where striped bass populations exist.

MATERIALS AND METHODS

The whip-set trammel method utilized a standard trammel net 300 ft long by 6 ft deep. The mesh sizes were 3-inch inner webbing and 12-inch outer walls made from No. 177 and No. 9 twine size, respectively. The net was hung on a ½ basis.

The whip-set technique was used experimentally from September, 1971 through June, 1972. When possible, commercial fishermen assisted with development of technique and collection of data. Sets were generally made by two individuals, but some fishermen indicated one person could handle the entire procedure effectively. The operation was performed by encircling a concentration of fish, driving the fish into

the net by causing a disturbance in the water, and retrieving the net immediately. The length of net used per set varied from 600 to 1800 ft, depending on the number of nets used. Differences in type of set, depth of set, time of day, season, and location were noted and recorded. Sets were made throughout the year in Keystone and Texoma reservoirs at different locations to gain information on the catch of striped bass. Data included a description of the area and set, and individual length and weight of all fish. Whip trammel sets were also tested in Ft. Gibson, Eufaula, and Wister reservoirs.

Application of the whip-set trammel net has been evaluated as to the following parameters: (a) catch per unit effort, (b) species composition, and (c) capture and mortality of game species. To compare catches of the whip-set trammel net with those of commercial stationary-type gill nets required a common unit of measure. Although the approximate time required to make a single 600 ft whip-set is included in this report, a comparison between the two methods in actual time involved to set is not considered here. The average number of pounds of fish taken with 100 ft of net per day is used to measure the relative effectiveness of the two types of fishing. A 100 ft-net-day for gill netting is defined as 100 ft of netting fished for a period of 24 hr. During the trial fishing period, the total number of whip-sets made with the 3-inch trammel net in 30 days was 168.8, an average of 5.6 sets per day. Since whip-sets utilized several sets made each day, a 100-ft-net-day for whip-sets is defined as 100 ft of netting fished the average number of sets per 24-hr period.

When comparing the two types of fishing, gill netting information was taken from a study conducted on the total state commercial harvest by commercial fishermen during July, 1967 through June, 1968 (5).

TABLE 1. *Whip-set trammel net catch from five Oklahoma reservoirs, June 1, 1971 - August 31, 1972.*

	Keystone		Texoma		Ft. Gibson		Wister		Eufaula			
Number of 100 yd. sets	117.3		26.3		20.0		3.2		2.0		Total weight	
	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	lb	%
Rough fish												
Buffalo	59	403.7	35	346.2	174	755.4	12	58.0	5	19.0	1582.3	71.4
Carp	11	20.6	65	344.1	15	60.0	2	8.0	2	11.0	443.7	20.2
River carpsucker			9	29.2							29.2	1.4
Drum	7	15.6									15.6	0.7
Gar			6	7.2			1	1.0			8.2	0.4
Flathead	4	35.7									35.7	1.7
Game fish									Total		2114.7	95.8
Channel catfish	3	5.9	3	15.5	2	4.6					26.0	1.2
Largemouth bass	2	7.3			2	7.2			1	5.0	19.5	0.9
White bass	3	5.7									5.7	0.3
White crappie							1	2.5			2.5	0.1
Striped bass	5	35.5							Total		35.5	1.7
GRAND TOTAL											2203.9	100.0

RESULTS AND DISCUSSION

A total of 2,203.9 lb of fish was taken from whip-set trammel nets from June 1, 1971 through August 31, 1972. Rough fish comprised 2,114.7 lb of the total or 95.8% by weight. A list of the species taken at each reservoir by number and weight appears in Table 1. The predominant rough

fish were buffalofish, carp, and flathead catfish which made up 71.4%, 20.2%, and 1.7% of the total weight, respectively.

Comparisons between gill netting and whip-set data illustrates the effectiveness and potential of the trammel set. The average catch per 100 ft-net-day with gill nets was reported as 4.4 lb (5). Whip-set data taken during this study indicated the average catch per 100 ft-net-day to be 25.6 lb of fish. Gill nets caught buffalo and flathead with average weights of 5.3 and 7.5 lb respectively, while whip-sets produced buffalo averaging 5.6 lb and flathead at 8.9 lb.

Gill nets were reported to be most effective in the spring and fall months of the year (8). Whip-sets harvested the most fish during late winter, early spring, and summer. This indicates the potential of the gear as a supplemental tool to increase harvest of commercial species during the period of the year when gill netting is least productive.

Game fish contributed to 4.0% of the total catch with gill nets as opposed to 4.2% by whip-sets. It would appear that gill netting takes less game fish than does the whip-set method. However, the figure used here for gill netting was taken from the harvest reports of licensed commercial fishermen and may not accurately reflect true catch rates. All game fish taken with the whip-set trammel net were released, unharmed into the water, except for one 7 lb striped bass. This single mortality occurred as a result of mechanical problems.

Time of day seemed to have considerable effect on catch. Night sets were always more effective on buffalo than were day sets. Carp were taken mostly in day sets. Wind velocity was important in determining the location of a set. Sheltered coves produced more fish than windy banks; reasons for this are not entirely known. Depths of sets varied, but sets made in 6 to 8 ft of water produced more fish than did deeper or shallower sets. Different kinds of sets were used but the one that produced the best catch was the semi-circle set. It was performed by anchoring one end of the net to the bank. The boat operator would then reverse gear or paddle perpendicular to the bank for approximately 100 ft, turn, and run the remainder of the net parallel to the shoreline. The other end of the net would also be anchored to the bank before the fish were driven into the net. When making a set, the least amount of noise created, the better. Sets were made with motor or with oars; setting with oars created less disturbance and was possibly more effective. Once the net was set, use of any kind of noise-making device or flailing device was effective in driving the fish into the net. Smacking the water surface with a long limber pole or weighted rope produced good results. Time required to set, drive fish, and retrieve varied with amount of net used, but a 600-ft set averaged 25 minutes.

Baiting was attempted but had little success. Cottonseed pellets were broadcast over likely whip-set sites and left to deteriorate momentarily. Results were not conclusive.

The most productive results were experienced when commercial fishermen assisted with sets. Experience and knowledge of the lakes and habits of the fish proved essential for consistently good catches. On two different occasions a Ft. Gibson fisherman produced over 750 lb of buffalo in only four sets. One trip to Lake Texoma with a former Texoma fisherman resulted in nearly 350 lb of buffalo in two sets. A total of 20 past and present commercial fishermen were contacted (by telephone or letter) to request their assistance. Many times, scheduled outings were cancelled due to bad weather conditions.

The standard 3-inch mesh trammel net was used for this study, but larger mesh sizes may be utilized for a greater degree of selectivity. One commercial fisherman explained it was his experience that 3¼-inch mesh would take fewer less desirable carp than would 3-inch mesh.

The whip-set trammel net has the potential of providing a greater harvest of commercial fish. In the hands of the experienced fisherman, the whip-set technique can increase the normal harvest of rough species with little or no effect on game fish populations. Sport fish, including striped bass, captured in a whip-set net can be released without apparent harm. The fisherman carries the net to the fish rather than waiting for the fish to come to the fisherman. The net is picked up almost immediately after it is set and attended at all times.

The whip-set trammel method is recommended as an effective gear type to increase harvest of commercial fish. However, it should be considered a supplemental tool and used with other gear types currently under investigation by the Oklahoma Department of Wildlife Conservation. The combination of these gear types, once thoroughly evaluated, may provide commercial fishermen with a functioning, profitable fishery once again.

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