OBSERVATIONS ON SLAT TRAPS AND WIRE CAGES FOR CAPTURING CATFISH

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Reprinted from The Proceedings of the Louisiana Academy of Sciences
Vol. XLVIII, December 1985
Made in United States of America
OBSERVATIONS ON SLAT TRAPS AND WIRE CAGES FOR CAPTURING CATFISH

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ABSTRACT. The relative efficiency and selectivity of slat traps and wire cages can have substantial impacts on harvest and management of channel catfish, Ictalurus punctatus, in the southeast. Slat traps and wire cages fished for a total of 543 trap days yielded 4,771 channel catfish weighing 1,875.7 lb. Wire cages accounted for 77% by number and 74% by weight of captured catfish averaging 5.2 lb/day. Slat traps caught 1.7 lb/day. A large percent (77%) of fish captured in wire cages were less than the legal size restriction of 11 in. total length and 65% of the catfish captured in slat traps were below the size limit. Both gear were highly selective for channel catfish. A total of 40% and 37% of the catfish caught in slat traps were captured using cheese and soybean baits, respectively. Wire cages baited with soybean chips caught 58% of the fish recorded for that gear; cheese and cotton seed cake produced 32% and 10%, respectively.

Key words: commercial gear, slat traps, wire cages, channel catfish.

INTRODUCTION

Commercially harvested catfish contribute approximately 60% of the $4,000,000 reported annually for Louisiana's freshwater finfish. Channel catfish, Ictalurus punctatus, and blue catfish, I. furcatus, are considered the most important species followed by flathead catfish, Pylodictis olivaris. Management for these species in Louisiana has been attempted by setting total length size limits, regulating gear types, regulating minimum mesh size, and licensing harvest and transport of the fish. Law enforcement is a vital part of the program.

Unfortunately, a limited amount of research has been published concerning various aspects of catfish life histories and effects of fishing gear on these fish in Louisiana which leads to continual controversy. In the past, commercial gear restrictions have been established according to political boundaries and size restrictions have not been imposed or assigned to some species due to legal or political pressure upon the Department resulting from a lack of conclusive data.

The catch of game fish associated with commercial gear has been a source of concern. Sport fishing interests contend gear such as wire cages catch and kill large numbers of game fish. Historically, wire cages have been used to take game fish illegally in Louisiana.

Studies beginning in the late 1950's have gradually improved the Department's understanding of the management of this resource. Commercial size limits were set to allow enough immature fish to escape harvest in order to perpetuate the fishery. Consequently, channel catfish maturity has received the most attention (Davis and Posey 1958, Lantz 1970, Schafer et al. 1965, Perry and Carver 1972) followed by blue catfish (Perry and Carver 1972, 1977) and flathead catfish (Perry and Carver 1977).
Davis and Posey (1959) published the first studies on gear selectivity in Louisiana. Their study, apparently patterned after Starrett and Barnickol's (1955) evaluation of gear used on the Mississippi River was concerned with various mesh sizes of trammel nets, gill nets, hoop nets, wire cages, basket traps, trot lines, and seines. This was followed by studies of specific gear such as cans (Schafer et al. 1965) and slat traps (Posey and Schafer 1964, Perry 1978). All of the studies on slat traps reported catches primarily of catfish with little effect on other species. However, the wire cages tested were single throated and very effective in the capture of sport fish. In 1982, commercial fishing interests asked the Department to consider legalization of wire cages of a unique design developed in Florida. Because of the unique design of the second throat they reported the traps to be highly selective for channel catfish. The Fish Division initiated a study in the winter of 1984, dealing with the effectiveness of different designs of wire cages.

Since 1979, a channel catfish movement study has been conducted in Southeast Louisiana. Collections of fish on the Salvador Wildlife Management Area were made with various gear and information on recaptured fish received from fishermen.

The present paper is an analysis of catch data relative to the efficiency and selectivity of two gear types, slat trap and wire cages of the Florida design, used during the latter portion of the tagging study. Also evaluated were three bait types, i.e., cheese, soybean chips, and cottonseed cake.

**METHODS AND MATERIALS**

Data for the study were collected from the 31,000 acre Salvador Wildlife Management Area located in St. Charles parish along the northwestern shore of Lake Salvador. The area which is 12 miles southwest of New Orleans, Louisiana is owned by the Louisiana Department of Wildlife and Fisheries and is primarily a fresh marsh type, broken by numerous ponds.

Four sample stations were located on the area: Headquarters site, Upper Baie du Cabanage, Lower Baie du Cabanage, and Gulf Canal. Water depths were similar between stations, ranging from 4 to 6 feet depending upon rainfall and wind. During the study waters were turbid, with less than 2.0 ppt salinity. However, area fishermen report higher salinity water is not uncommon. The management area is popular with sport fishermen and numerous families in this area derive a portion of their income from the commercial harvest of catfish from the surrounding waters of Lake Carquois, Lake Salvador, Bayou des Allemands and Lac des Allemands. Gear types popular to the area are slat traps, hoop nets, trot lines, and cans.

The two gear types (Fig. 1) evaluated in this study were slat traps and wire cages (of the Florida Design). One of each type was fished simultaneously at each of the four stations. The baits selected for comparison were cheese, cotton seed cake, and soybean chips. Only one bait type placed in a nylon bait bag was used at each station for a two week period.

The slat traps were basically similar to the types popular with area commercial fishermen. Each measured 5 ft in length, 11 in. square, and was
constructed of 0.2×2 and 3 in. oak strips. Each had 2 cone shaped throats. The first throat was constructed of flexible wooden strips and the second was made of a flexible plastic cone of the Kennedy® design. Slat spacings on the slides and ends were 1 in. Each trap had a removable top to facilitate baiting and removal of fish.

The wire cages used in the study were constructed of 1 in. mesh Sheppard® coated poultry wire. They were cylindrical in shape with a diameter of approximately 23 in. and a length of 48 in. and had two cone shaped throats on one end. The bottom of the wire traps were flattened to permit them to lay in a horizontal position without rolling. The throats were constructed of poultry netting. The first was located at the front of the cylinder and the second positioned approximately 7 in. to the rear of the first. A 16 in. extension of ⅝ in. mesh nylon was attached to the second throat. A strand of #15 nylon twine was attached to the top of the smallest end of the nylon throat and stretched rearward away from the throat toward the top of the cylinder. Another strand attached to the lower part of the nylon throat and extended rearward to the bottom of the trap to hold the opening of this throat vertically taut. A door near the rear of the trap permitted removal of the fish and rebaiting.

Results

From 31 January 1984 through 18 April 1984 four slat traps and four wire cages were fished for a total of 543 trap-days (Table 1). The catch in

<table>
<thead>
<tr>
<th>Station</th>
<th>Slat traps</th>
<th></th>
<th></th>
<th>Wire cages</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight lbs</td>
<td>Days</td>
<td>Catch lbs/day</td>
<td>Weight lbs</td>
<td>Days</td>
<td>Catch lbs/day</td>
</tr>
<tr>
<td>Headquarters</td>
<td>159.1</td>
<td>70</td>
<td>2.3</td>
<td>387.7</td>
<td>74</td>
<td>5.2</td>
</tr>
<tr>
<td>Lower Baie du Cabanage</td>
<td>139.2</td>
<td>70</td>
<td>2.0</td>
<td>432.9</td>
<td>74</td>
<td>6.0</td>
</tr>
<tr>
<td>Upper Baie du Cabanage</td>
<td>107.6</td>
<td>70</td>
<td>1.5</td>
<td>263.0</td>
<td>76</td>
<td>3.5</td>
</tr>
<tr>
<td>Gulf Canal</td>
<td>67.4</td>
<td>59</td>
<td>1.1</td>
<td>317.1</td>
<td>52</td>
<td>6.1</td>
</tr>
<tr>
<td>Total</td>
<td>473.3¹</td>
<td>269</td>
<td></td>
<td>1,400.7²</td>
<td>274</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1.7</td>
<td></td>
<td></td>
<td>5.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Includes one (1) blue crab, carapace width 3.0 in.
² Includes sixteen (16) blue crabs, carapace width 3.5–3.5 in., and one 12 in. (total length) bullhead.

Individual slat traps ranged from 0.5 lb to a maximum of 66.5 lbs ($\bar{x}=15.7$ lb). Totals harvested by slat traps from each station ranged from 67.4 to 159.1 lb ($\bar{x}=118.3$ lb) with the Headquarters Station producing the most. Individual catch in wire cages ranged from 1.0 to 191.0 lb ($\bar{x}=41.3$ lb) and station totals for this gear ranged from 263 to 432.9 lb ($\bar{x}=350$ lb).

Wire cages caught a total of 1,400 lb or 5.2 lb of catfish per net-day. The slat traps harvested a total of 473.3 lb or 1.7 lb per net-day. An analysis of weight of catfish captured by each gear resulted in a highly significant difference ($F=8.80$, $P>0.01$).

The difference between baits approached statistical significance ($F=2.34$) at a probability level of 0.10. There was no significant interaction between gear x bait ($F=1.33$, $P>0.27$) for differences in weight of catfish harvested. A total of 41% by number of the catfish caught in slat traps were baited with cheese, 37% were baited with soybean chips and 22% were caught using cottonseed cake as bait. The catch of species other than catfish in slat traps was not common (Table 2). Only 6 bluegill, *Lepomis macrochirus*, 2 spotted sunfish, *L. punctatus*, and 24 blue crabs, *Callinectes sapidus* were recorded. These were not influenced by bait type.

The catch in wire cages showed significant differences between baits. Those baited with soybean chips yielded 58% of the 3,687 catfish captured. Next was cheese with 32% and cotton seed cake with 10%. Nontarget species captured in cages in decreasing order of abundance were blue crab (*N=111*), bluegill (*N=71*), yellow bullhead, *I. natalis*, *L. gulosus*, *S. salmoides*, *N=6*, warmouth, *S. crysoleucas*, *N=1*, and blue catfish (*N=1*). Collectively, these species amounted to 5% of the total catch in wire cages.

Catch per trap-day for wire cages averaged 9.8 lb when baited with soybean chips, 8.3 lb when cheese was used and 2.4 lb when cotton seed cake was used (Fig. 2). Average catches per day of slat traps baited with
cheese was 3.3 lb, 2.1 lb with soybean and 0.4 lb when cotton seed was used. When harvests of all gear was combined and analyzed by bait type, soybean chips caught 53%, cheese caught 35%, and cotton seed caught 12%, of the 1,874 lbs of catfish collected during this study.

An analysis of the length-frequency histogram prepared for numbers of catfish captured in each gear revealed that cages caught a larger percentage of small fish than slat traps (Fig. 3). A total of 77% of catfish captured in
cages were less than the legal size restriction of 11 in. Slat traps contained 65% undersized fish. The difference observed between the numbers of illegal size fish in these gear was highly significant ($F=10.76$, $P>0.01$). However, there was no statistically significant effect of bait type ($F=0.61$, $P>0.81$) or bait×gear interaction ($F=0.61$, $P>0.55$) on harvest of illegal-sized fish.

**DISCUSSION**

It is clearly evident that wire cages of the Florida design took a much greater total catch by weight of catfish than slat traps. Incidental catch of game fish was slightly higher in cages but not as extreme as described for other cage designs (Carter 1954, Cobb 1954, Davis and Posey 1959). Evidently, the second vertical throat in traps of the Florida design tended to discourage the entry of centrarchids.

Though population samples were not conducted during the exact time of this trial, rotenone samples conducted in July 1984 documented that game fish made up 66% of the total number of fish (Carver 1984). With continued enforced regulations requiring commercial fishermen to release game species, the effect on game fish should be negligible.

From public relations and biological standpoints, it would be most
beneficial if commercial gear only harvest a small percentage of game species. The cage of the Florida design did this when fished in waters of the Salvador Game Management Area.

Florida studies of wire cages in the St. Johns River revealed similar results (Hale et al. 1982). This gear proved very selective with commercial species comprising 94.0% of the total catch and game species 5.9%. Bluegill was the dominant game fish comprising 97.3% of all game fish. Recommendations of the Florida study were to continue the use of this gear maintaining the following gear restrictions: maximum length to be 7.0 ft, maximum width 32 in., and a 1.0 in. minimum mesh; the traps must have two funnels on one end; and there must be at least 3.0 ft clearance between the highest point on the trap and water surface.

In comparison with the slat trap, an older accepted gear in Louisiana, the cage selectively harvested catfish. It cost approximately the same, $13.00 to construct (Gary Tilyou, personal communication) and life expectancy was similar. The cost of operating cages was less. Soybean chips, $0.21/lb, was the best bait whereas cheese, the preferred bait for slat traps cost $0.24/lb. Cottonseed cake cost $0.49/lb. Mortality was negligible in both and they required approximately the same amount of time to operate.

The most serious concern resulting from this study was the average size of catfish harvested in wire traps. Wire traps contained a larger percentage of smaller fish than slat traps. Perhaps larger wire mesh sizes should be
evaluated as was done with slat traps (Perry 1978). Limitations on this gear should be imposed only if it is destructive to the resource, not because it is efficient. However, due to its relatively low cost and short life expectancy some control must be exercised to insure fishermen are not negligent in their deployment. Enforcement of the unique design of the second funnel may be necessary. These data should be incorporated with studies of other aquatic habitats in Louisiana before specific recommendations are made.

ACKNOWLEDGMENTS

The authors wish to express their sincere appreciation to Louisiana State University Statistical Research Associate Diana Williamson for her assistance in data analysis and interpretation. We thank Mary Lou Joann, Secretary, Louisiana Department of Wildlife and Fisheries for typing and constructive criticism of this paper; Jessie Guillot, Draftsman for the Department of Wildlife and Fisheries, for his preparation of the figures used in this report; Ward Breaux, Barry White, and Warren Mones, technicians of the Department of Wildlife and Fisheries deserve special thanks for their aid in data collection and maintenance of the sample gear.

LITERATURE CITED


