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FINAL REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-6-R-18

FISHERIES INVESTIGATIONS - REGION 5-B

Job No. III Trotline Study

Project Leader: Roger L. McCabe

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June 8, 1971

SUMMARY

Project personnel researched the literature, interviewed trotline fishermen, and conducted actual experimental trotlining and bait trapping on Lake Corpus Christi to procure information on trotlining.

A literature search revealed that trotlining was the least effective fishing method in terms of average catch per man-hour. According to two creel census, trotline fishermen averaged .15 and .17 fish per man-hour, respectively.

Fishermen interviews provided data on the individuals doing trotline fishing, their methods, and their equipment. The fishermen were male residents of the state. Their lines averaged 189 feet in length and contained a mean number of 40 hooks each.

Experimental trotlining by project personnel yielded 118 fish in 54,590 hook-bait-hours for an average catch of .00216 fish per hook-bait-hour. All trap types and baits were selective for trotline bait species. The catch consisted of 95.97 per cent trotline bait species, 2.77 per cent rough fish, and 1.26 per cent game fish.

Job No. 111 - Trotline Study

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FINAL REPORT

State Texas

Project No. F-6-R-18

Project Title: Fisheries Investigations -
Region 5-B

Job No. III

Job Title: Trotline Study

Period Covered: January 1, 1970 to December 31, 1970

Background:

Trotlining is a widespread fishing technique employed by both sport and commercial fishermen. Lake Corpus Christi is a popular trotline fishing lake in South Texas which provides a suitable area for studying the sport. Currently, a hook interval regulation, limiting the distance between hooks to no less than three feet, is the only law governing trotline fishing on this lake. Unfortunately, there is little available scientific data upon which to base management regulations. More information regarding the effects of this form of fish harvesting is essential.

During the course of this study (January 1, 1968 through December 31, 1970), project personnel have researched the literature, interviewed trotline fishermen and conducted experimental trotlining and bait trapping. Literature pertaining to trotlining is scarce, consisting mainly of nonscientific articles in outdoor magazines and saltwater oriented research publications. Fishermen interviews furnished information about the individuals involved in trotline fishing, their methods, and their equipment.

Experimental trotlining and bait trapping by project personnel furnished data on materials, methods, and yields. Bait trapping exhibited a high degree of selectivity toward trotline bait species.

Objectives:

To study the trotline fishery of Lake Corpus Christi.

1. To conduct a literature search for publications pertaining to trotlining.
2. To gather trotline fishing information through the use of fishermen interviews at Lake Corpus Christi.
3. To obtain data on actual trotline yields from Lake Corpus Christi.
4. To determine the feasibility of trapping live bait (Cichlasoma cyanoguttatum (Filippi), Lepomis spp. (Rafinesque)) for use on trotlines.

Procedures:

Project personnel examined bibliographies and a list of unpublished Federal Aid Reports furnished by the Denver Public Library and utilized departmental facilities to procure information regarding trotlining. Fishermen interviews were conducted using a form designed specifically to obtain data concerning trotline fishing and fishermen, their methods and equipment, their preferred locations, as well as baits and catches.

Experimental trotlining on Lake Corpus Christi was initiated on May 29, 1969, and continued through July 29, 1970. Trotlines of various construction were fished at different locations in a variety of habitat types.

Seven 105-foot trotlines were used, each containing a different hook size ranging from 2/0 to 8/0. Eagle Claw, Kirby, O'Shaughnessey, and Limerick hooks were arranged in sequence with each line containing 20 hooks. Staging (drop or hook) lines were from 12 to 26 inches in length. Hook interval length (distance between hooks) was either 3, 4, or 4½ feet. Fourteen bait types were fished in various combinations with hook sizes. Trotline clips and/or swivels were used to attach staging lines to main lines.

Trotlines were set by tying one end of the main line to an object at or above the water surface and sinking the other end, thus enabling baits to be fished at a variety of depths.

Experimental bait trapping was conducted in conjunction with experimental trotlining, using traps constructed of one-half of an inch square mesh hardware cloth (see Job Progress Report F-6-R-16), designed specifically to trap deep-bodied, laterally compressed, Rio Grande perch and sunfish. Traps were baited with milo, cob corn, range cubes, cottonseed cubes, or cottonseed cake in various combinations and set in different locations on the lake in suitable habitat.

Findings:

Literature pertaining to the subject of trotlining is scarce and consists mainly of non-scientific articles in outdoor magazines and technical publications concerning saltwater research. According to a 10-month creel census by Alvin Flury (September 1953 through June 1954) on Lake Corpus Christi, trotline fishermen comprised 61 per cent of the fishermen contacted. They expended 79 per cent of the man-hours (man-hours calculated by multiplying the number of men fishing, times the number of hours the line was set), were 77 per cent successful and caught 68 per cent of the fish recorded. Fishermen contacted in this census caught one fish every 6.53 man-hours for an average of .15 fish per man-hour and used mainly cut fish, white naphtha laundry soap, and sunfish for bait. A creel census of eight Texas lakes by William H. Brown, published in the March 1957 issue of the Texas Game and Fish magazine, states that trotlines caught .17 fish per man-hour. On the basis of the data presented in this article, trotlining was the least effective method of sport fishing in terms of average catch per man-hour.

Findings: (Con.)

A total of 71 trotline fishermen was interviewed by project personnel. These fishermen were male residents of the state between the ages of 14 and 74. Trotline parties on Lake Corpus Christi contained an average of 4 persons fishing 3.4 trotlines.

Trotlines usually were constructed of nylon from 20 to 750 feet in length. Mean length per trotline was 189 feet. Hook size preference varied from 1/0 to 9/0 with some trotliners using several hook sizes. Each trotline contained an average of 40 hooks. The length of staging lines varied from 8 to 26 inches.

Fishermen checked their lines every 10.94 hours and rebaited 46 per cent of their hooks on each run. Trotlines were left in water for lengths of time ranging from one day to an indefinite period. Fishermen indicated no particular preference between mid-lake (open water) and near-shore fishing locations. Preferred seasons, weather and water conditions were similar to those considered optimum by rod-and-reel fishermen.

Mean depth of the water fished was 16.8 feet while actual depths fished varied from 3 to 40 feet. Hooks were set at an average depth of 11 feet, with individual sets ranging from surface to 40 feet.

Fishermen interviewed specified 22 preferred bait types (Table 1). Rio Grande perch was the most popular bait for flathead catfish (Pylodictis olivaris (Rafinesque)) (Table 1). Cut bait, bar soap, and shrimp were the preferred baits for channel catfish (Ictalurus punctatus (Rafinesque)), while bar soap, cut bait, Rio Grande perch, and sunfish were their favorite baits for blue catfish (I. furcatus (LeSueur)) (Table 1).

Experimental trotlining by project personnel yielded 118 fish (Table 2) in 54,590 hook-bait-hours (hook-bait-hours are calculated by multiplying the number of baited hooks times the number of hours fished) for an average catch of .00216 fish per hook-bait-hour (Table 3). Results are expressed in hook-bait-hours instead of man-hours because man-hours fail to take into consideration the number of hooks fished. The most efficient bait was beef kidney which caught .00618 fish per hook-bait-hour followed by shrimp, blood bait, sunfish, and fisherman's bait soap (Table 3). Several baits (cheese bait, heart, Rio Grande perch and Mexican tetra (Astyanax mexicanus (Filippi)) failed to catch any fish. Obviously, some of the baits are more productive than the results indicate; otherwise, they could not maintain their popularity among the fishermen interviewed (Table 1). Hook size 2/0 accounted for the most fish while size 6/0 caught the most by weight (Table 4).

Fish were caught at an average depth of 4.7 feet, while the mean depth of the water where fish were caught was 13.7 feet.

There was no substantial difference in the hooking abilities of the different hook makes tested. Swivels were more effective than trotline clips as a means of attaching staging lines to main lines. Trotline clips were more susceptible to rust than brass swivels and occasionally broke as a result. In addition, trotline clips frequently become entangled with the main line.

Table 1

Fishermen Interview Bait Preference

Bait	Species Caught				Total
	Blue Catfish	Channel Catfish	Flathead Catfish	Largemouth Bass	
Blood bait	5	5	2		12
Crayfish	5	5	1		11
Cut bait	18	24	6		48
Dough bait	1				1
Dry gar	1				1
Frogs	2	1	1		4
Goldfish	7	3	9		19
Grasshopper	1	1			2
Heart	4	4	3		11
Kidney	1	1	1		3
Liver	5	4	3		12
Minnows	6	5			11
Mussels	2	1	1		4
Pork skin	1				1
Rio Grande perch	14	2	37	1	54
Salamander	1	1			2
Shrimp	7	12	2		21
Soap	20	22	5		47
Spleen	1	2	1		4
Sunfish	9	5	11	1	26
Tripe	1				1
Worms		1			1
¹ Total	112	99	83	2	296

1

Some fishermen interviewed cited numerous bait preferences accounting for the large number of responses.

Table 2
Experimental Trotlining Catch

Species	Number Caught	Per Cent of Total
<u>Game Fish</u>		
Channel catfish	55	46.61
Blue catfish	47	39.83
Flathead catfish	3	2.54
Largemouth bass	<u>6</u>	<u>5.08</u>
	111	94.06
<hr/>		
<u>Rough Fish</u>		
Yellow bullhead	1	0.85
Freshwater drum	1	0.85
Spotted gar	<u>5</u>	<u>4.24</u>
	7	5.94
<hr/>		
Total	118	100.00

Table 3

Number of Fish Caught per Hook-Bait-Hour by Bait Type

Bait Type	Hook-Bait-Hrs.	Number of Fish	No. of Fish per Hook-Bait-Hour
Blood bait	3,053	13	.00425
Cheese bait	1,600	0	.00000
Cut bait	2,642	4	.00151
Dried liver	6,729	4	.00059
Fel's soap	7,641	4	.00052
Fisherman's bait soap	8,613	26	.00301
Fresh liver	7,572	19	.00250
Heart	4,724	0	.00000
Kidney	808	5	.00618
Live shad	946	2	.00211
Rio Grande perch	396	0	.00000
Shrimp	3,580	19	.00530
Sunfish	6,187	22	.00355
Mexican tetra	99	0	.00000
Total	54,590	118	.00216

Table 4
Experimental Trotlining Catch by Hook Size

Hook Size	No. Fish Caught	Weight Caught (ounces)	Hook-Bait-Hours	Weight Caught Per Hook-Bait-Hr. (ounces)	No. Caught Per Hook-Bait-Hr.	Average Wt. of Fish Caught (ounces)
2/0	37	390	8,262	.047	.00447	10.54
3/0	25	328	7,886	.041	.00317	13.12
4/0	24	366	8,143	.044	.00294	15.25
5/0	11	135	7,799	.017	.00141	12.27
6/0	13	458	8,693	.0526	.00149	35.23
7/0	3	96	7,593	.0012	.00039	32.00
8/0	5	329	6,214	.0529	.00080	71.8
Total	118	2,102	54,590			

Table 5

Catch of Traps in Lake Corpus Christi

Common Name	Scientific Name	Number
<u>Trotline Bait Fish</u>		
Bluegill	<u>Lepomis macrochirus</u> (Rafinesque)	507
Redear sunfish	<u>Lepomis microlophus</u> (Gunther)	94
Longear sunfish	<u>Lepomis megalotis</u> (Rafinesque)	75
Warmouth	<u>Lepomis gulosus</u> (Cuvier)	40
Golden shiner	<u>Notemigonus crysoleucas</u> (Mitchill)	24
Rio Grande perch	<u>Cichlasoma cyanoguttatum</u> (Baird & Girard)	21
Green sunfish	<u>Lepomis cyanellus</u> (Rafinesque)	1
Redbreast sunfish	<u>Lepomis auritus</u> (Linnaeus)	<u>1</u>
		763

<u>Game Fish</u>		
Channel catfish	<u>Ictalurus punctatus</u> (Rafinesque)	6
White bass	<u>Morone chrysops</u> (Rafinesque)	2
Largemouth bass	<u>Micropterus salmoides</u> (Lacepede)	9
White crappie	<u>Pomoxis annularis</u> (Rafinesque)	<u>5</u>
		22

<u>Rough Fish</u>		
Carp	<u>Cyprinus carpio</u> (Linnaeus)	8
Gizzard shad	<u>Dorosoma cepedianum</u> (LeSueur)	<u>2</u>
		10

Total		795

Findings: (Con.)

All trap types and baits were selective toward the capture of the desired trotline bait species (Table 5). Of the 795 fishes trapped, 95.97 per cent were trotline bait fish, 2.77 per cent rough fishes and 1.26 per cent game fishes (Table 5).

Recommendations:

The Experimental Trotline Study was reevaluated by Federal Aid and project personnel, during the third year of a proposed four-year study. It was evident that many variables were present. As a result, some of the findings were inconclusive and the continued involvement of project personnel and funds could no longer be justified. It was decided to terminate this study upon completion of the third job segment.

Prepared by Ben S. Watson
Asst. Project Leader

Approved by

Marion Toole
Coordinator

Date June 8, 1971

Elgin M. C. Dietz
Inland Supervisor

LITERATURE CITED

Brown, William H. 1957. Creel census of Texas lakes. Texas Game and Fish Commission. 5:No. 3, p. 8.

Flury, Alvin. 1954. Creel census and check of commercial catch of rough fish from Lake Corpus Christi. Job Completion Report, Project No. F-6-R-1, Job B-6 (Unpublished).

