COMMERCIAL GILL NETTING AND ITS EFFECTS ON SPORTFISHES IN TEXAS RESERVOIRS

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ABSTRACT

This study was designed to compare the catch of sport and rough fishes and to determine the survival of sport fishes captured by commercial gill nets in Texas reservoirs. Commercial fishermen were required to submit monthly reports for 1 yr (April, 1973 through March, 1974) on their rough fish harvest and on the number and species of sport fishes caught and released. The catch was recorded from monthly samples of commercial harvest on Lakes Sam Rayburn, Whitney, Somerville and B. A. Steinhagen and from quarterly samples on Lakes Livingston and Cedar Creek. Netting mortality of sport fishes was determined by holding the fish for 17 days following their capture. Data indicated commercial fishermen did not report their catch accurately. Mortality studies showed largemouth bass and crappie suffered almost total netting mortality; catfishes exhibited better survival (63-100%). Losses were small and apparently not harmful to the sport fish populations. The continuation of commercial fishing was recommended on reservoirs having high populations of rough fishes and no striped bass.

A controversy between commercial and sport fishermen has long existed in Texas. Poor sport fishing success has often been attributed to commercial fishing activities. Commercial fishermen claim no harm is done to sport fisheries since their large mesh nets (3½-in. bar mesh or larger) catch very few sport fish.

Whether commercial fishing activities harm sport fisheries in large reservoirs has not been fully documented, particularly in Texas. As opposed to fishing regulations of most other states, Texas law defines blue, channel and flathead catfishes as sport species. Therefore, these fishes were not sought and little netting mortality data were available for these species. This study was designed to compare the catch of sport and rough fishes and determine the survival of sport fishes captured by commercial gill nets.

MATERIALS AND METHODS

Rough fish removal contracts were issued on the following lakes: Sam Rayburn, Whitney, Cedar Creek, Livingston, Somerville and B. A. Steinhagen (Dam B). These contracts were extended with the conditions that fishermen must report (1) the total length and mesh size of commercial gill nets fished each day; (2) the number and size of rough fishes caught daily; and (3) the number of sport fishes captured and released each day by species (largemouth bass, crappie, channel catfish, blue catfish, flathead catfish, and other sport fishes). Contract fishermen were required to mark their nets in 100-ft intervals with waterproof pigment to allow accurate determination of 1,000-ft samples. Only nets with 3½-in. bar mesh or larger were legal for rough fish removal under these contracts, and in all instances nets were fished overnight.

Ten 1,000-ft sections of commercial net were inspected on Lakes Whitney and Sam Rayburn monthly from April, 1973 through March, 1974. Some sampling trips were announced to the commercial fishermen and others were made without prior notification. In addition to the regular monthly samples, spot checks were occasionally made on commercial fishermen at Lake Sam Rayburn.

Twenty 1,000-ft sections of commercial net were inspected on Lakes Livingston and Cedar Creek in April, June, September and December, 1973. Lakes Somerville and Dam B were checked monthly; however, only 2,000 ft of net were examined on each lake.

During each sampling trip, Project personnel accompanied the commercial fishermen in their boats while the nets were being worked. The total number of sport and rough fishes captured was recorded for each 1,000-ft section of netting. The total length of each fish was

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also recorded. Other parameters noted at this time included location of net, size of mesh, approximate depth of the net below the lake surface and the presence or absence of submerged living or dead vegetation or other natural structures.

Observations of the mortality of sport fishes captured in commercial gill nets were made monthly from April, 1973 through March, 1974 on Lakes Whitney and Sam Rayburn. Those sport fish dead in the nets were immediately weighed and measured (total length) and the probable cause of death determined (handling, disease or net damage). Live sport fishes were transported in aerated live boxes to a holding pen (15 ft x 30 ft x 6 ft) located nearby and observed for 3 days. Dead fish were removed daily and processed as outlined above. Beginning in June, 1973, fish remaining alive after 3 days were transported to the closest State fish hatchery for an additional 14 days of observation. Mortalities were expressed as a percentage of the total number of fish of a particular species.

The maximum catch of each sport fish species from the study lakes was obtained by multiplying the total netting effort by the highest recorded individual catch (either commercial fishermen data or Project data). Sport fish losses attributable to commercial netting were calculated on the basis of surface area.

RESULTS

The summary of commercial harvest, as reported by commercial fishermen (Table 1), indicated an average catch of 15.51 rough fish per 1,000 ft of gill net (range 9.44 - 26.11). The highest catches were made during December, February and March. Lowest catches of rough fish were reported in August and September. The primary rough fish taken in commercial nets was smallmouth buffalo. This species was the most commercially valuable rough fish in the study reservoirs. Commercial netters reported sport fishes were most abundant during March through June. The average reported catch of sport fishes (Table 2) was 0.29 fish per 1,000 ft of net (range 0.10 - 0.50). Almost half of this reported catch consisted of flathead catfish, which are very susceptible to the large mesh gill nets.

Commercial harvest data collected by Project personnel (Table 1) indicated an average catch of 23.67 rough fish per 1,000 ft of gill net (range 8.61 - 39.42). Monthly variations in catch rate roughly corresponded with those reported by commercial fishermen. The average annual catch of sport fishes (Table 2) was 0.87 per 1,000 ft of net (range 0.64 - 2.54). Almost half of this catch consisted of flathead catfish (0.39 per 1,000 ft of net).

Table 1. A comparison of commercial gill net rough fish catches (Number/1,000 ft of net) as determined from (C) commercial fishermen data and (P) project data, April, 1973-March, 1974.

Lake	*Data Type*	*Total Net Effort (ft)*	*Buffalo*	*Carp*	*Gar*	*Drum*	*Shad*	*Carpsucker*	*Total Catch*
Sam Rayburn	C	13,559,500	10.50	0.84	0.03	0.17	T	T	11.54
	P	128,100	15.70	2.02	0.16	0.60	0.01	0.00	18.49
Whitney	C	2,570,900	9.00	0.31	0.11	0.02	0.00	0.00	9.44
	P	120,000	15.95	0.76	0.19	0.04	0.00	0.22	17.16
Cedar Creek	C	4,597,900	23.61	0.41	0.05	0.29	0.00	0.08	24.44
	P	76,000	27.83	0.43	0.04	0.67	0.00	0.14	29.11
Livingston	C	2,866,700	16.45	9.07	0.01	0.58	T	T	26.11
	P	76,000	32.80	5.46	0.00	1.16	0.00	0.00	39.42
Dam B	C	685,750	10.82	0.29	0.52	0.59	0.01	0.00	12.23
	P	13,000	7.38	0.15	0.46	0.54	0.08	0.00	8.61
Somerville	C	1,277,000	14.44	0.55	0.11	0.62	T	0.01	15.73
	P	26,000	22.00	0.96	0.26	1.41	0.04	0.27	24.94
All Lakes Combined Total	C	25,557,750	13.58	1.60	0.06	0.25	<0.01	0.01	15.51
	P	439,100	20.95	1.88	0.13	0.60	0.01	0.10	23.67

Table 2. A comparison of commercial gill net sport fish catches (Number/1,000 ft. of net) as determined from (C) commercial fishermen data and (P) project data, April, 1973-March, 1974.

Lake	*Data Type*	*Total Net Effort (ft)*	*Largemouth Bass*	*Channel Catfish*	*Blue Catfish*	*Flathead Catfish*	*Crappie*	*Other Sport Fish*	*Total Catch*
Sam Rayburn	C	13,559,500	0.08	0.01	0.03	0.13	0.03	<0.01	0.28
	P	128,100	0.12	0.03	0.08	0.40	0.10	0.01	0.74
Whitney	C	2,570,900	0.01	<0.01	0.00	0.08	0.01	<0.01	0.10
	P	120,000	0.06	0.10	0.01	0.54	0.04	0.02	0.76
Cedar Creek	C	4,597,900	0.01	0.02	0.02	0.23	0.03	<0.01	0.31
	P	76,000	0.04	0.08	0.02	0.39	0.08	0.03	0.64
Livingston	C	2,866,700	0.02	0.14	0.09	0.11	0.02	0.06	0.44
	P	76,000	0.00	0.34	0.30	0.06	0.00	0.19	0.90
Dam B	C	685,750	0.00	0.01	0.01	0.13	0.01	0.00	0.16
	P	13,000	0.00	0.08	0.08	0.77	0.00	0.00	0.92
Somerville	C	1,277,000	0.01	0.07	0.03	0.13	0.25	0.01	0.50
	P	26,000	0.15	0.69	0.04	0.47	1.19	0.00	2.54
All Lakes Combined Total	C	25,557,750	0.05	0.03	0.03	0.14	0.04	0.01	0.29
	P	439,100	0.07	0.15	0.09	0.39	0.12	0.05	0.87

Table 3. Results of mortality study conducted on sport fishes taken from commercial gill nets, Lakes Whitney and Sam Rayburn data, April, 1973-March, 1974.

Species	*Fish Collected (Number)*	*Mortality (Number)*	*Total Percent Mortality*
Flathead catfish	126	16	12.7
Channel catfish	14	0	0.0
Blue catfish	11	4	36.7
Largemouth bass	25	22	88.0
Crappie	14	14	100.00

Project harvest data indicated catches were higher (by 19 - 660%) than reported by commercial fishermen on all lakes except Dam B (Tables 1 and 2). This was particularly true on the commercially valuable rough fishes (buffalo and drum) as well as the commercially valuable sport fishes (blue, channel and flathead catfishes). Sport fishes, as a group, were also underestimated by commercial fishermen. However, most catches, according to Project data, were less than one sport fish per 1,000 ft of gill net.

Largemouth bass and crappie from Lakes Whitney and Sam Rayburn (Table 3) suffered almost total mortality after being removed from commercial gill nets. Catfishes survived better than scale fishes. Losses of flathead catfish amounted to only 12.7% while mortality of blue catfish was 36.7%. No channel catfish died during this test, although the sample sizes for channel catfish, as well as for blue catfish and crappie, were probably too small for accurate determination of netting mortality.

Maximum possible losses of sport fish on the study lakes were insignificant (Table 4). The highest loss of any sport fish was one crappie per 5 acres (Lake Somerville). Losses of flathead catfish, the most common sport fish taken in commercial nets, ranged from one per 72 acres on Lake Whitney to one per 1,915 acres on Lake Livingston. Largemouth bass losses ranged from one bass per 49 acres on Lake Somerville to one per 2,368 acres on Lake Livingston.

Table 4. Highest theoretical mortality of game fishes captured in commercial gill nets, based on maximum catches, April, 1973-March, 1974 (X = deaths / 1,000 ft. of net; Y = deaths / 100 surface acres).

	Reservoir											
	Sam Rayburn		*Whitney*		*Cedar Creek*		*Livingston*		*Dam B*		*Somerville*	
Species	*X*	*Y*	*X*	*Y*	*X*	*Y*	*X*	*Y*	*X*	*Y*	*X*	*Y*
Flathead catfish	0.06	0.67	0.08	1.39	0.05	0.67	0.02	0.05	0.10	0.54	0.08	0.96
Channel catfish*	0.01	0.10	0.05	0.93	0.02	0.27	0.11	0.36	0.02	0.12	0.25	2.78
Blue catfish	0.04	0.53	0.004	0.06	0.007	0.10	0.15	0.49	0.12	0.64	0.03	0.29
Largemouth bass	0.13	1.59	0.09	1.59	0.04	0.60	0.01	0.04	0.00	0.00	0.18	2.04
Crappie	0.12	1.43	0.04	1.89	0.09	1.22	0.02	0.07	0.01	0.07	1.89	20.00

*Experimental data from Federal Aid Project F-12-R-12, Job E-4, Texas was used to compute deaths because of the small sample size of channel catfish in this study.

DISCUSSION

Under the contract bid system utilized during this study, most contract fishermen were required to pay a fee for every pound of rough fish harvested from the study lakes. These fees varied according to the contract bids and ranged from $0.01 to $0.05 per pound. This system may have encouraged fishermen to report less than they actually harvested in order to reduce their payments to the Department.

The contract bid system did not permit control of rough fish removal, since one contract fisherman could have any number of netters working under his contract and these netters could easily switch from one contract to another. Thus, it was difficult to maintain accurate records of the number and location of commercial netters on the study lakes.

Contract holders were responsible for reporting the footage of gill net fished each day by all netters under their contract. Thus, the more fishermen under each contract, the more error that could be introduced into reported data. Also, some netters may have reported less fish than were actually harvested because they believed the Internal Revenue Service might have access to this information.

Crappie appeared to be the sport fish most likely to suffer severe mortality from netting. But even the highest mortality rate (100%) in this study, which would result in a maximum loss of crappie per five acres, could hardly be considered a significant reduction in population size. Flathead catfish are also relatively susceptible to commercial nets; however, catch and mortality rates for this species were so low that their populations were probably unaffected by commercial netting. It should be noted though that contract netters were not allowed to keep this species; thus, the catch of flathead catfish was much less than if they were a sought-after commercial species. Effects of netting on other sport fishes were insignificant.

The continuation of commercial contract fishing is recommended because the total losses of sport fish were regarded as small. While the removal of rough fishes with commercial gill nets (3½-in. bar mesh or larger) does not appear to control rough fish populations, it does allow utilization of fishes not normally taken by sport fishermen. Commercial gill netting for rough fishes should be permitted on a controlled basis in reservoirs that support good populations of rough fish species, but only if these reservoirs have not been stocked with valuable fish, such as striped bass, which are highly susceptible to gill nets.