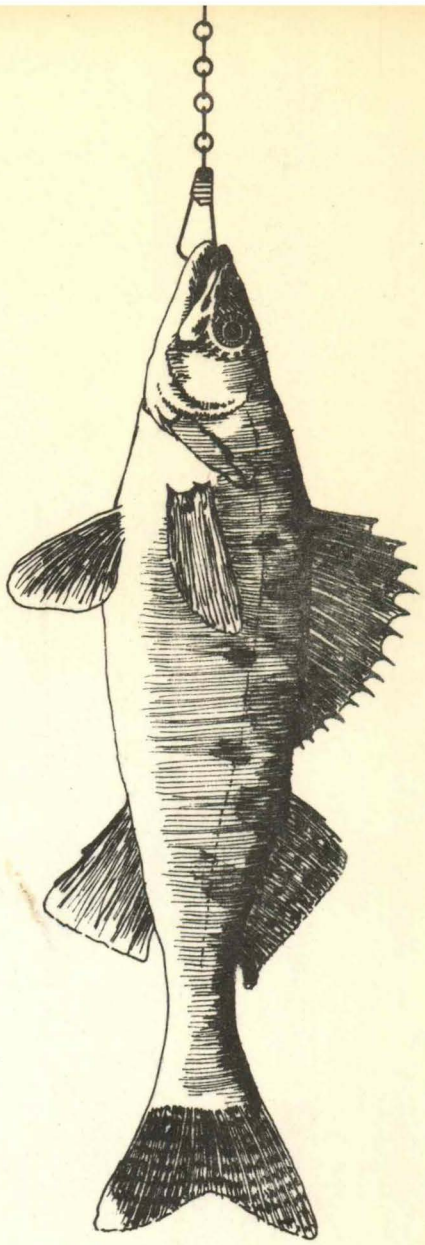
SPORT FISHERY HARVEST AT SPIRIT LAKE, 1973



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JOB COMPLETION REPORT 102-4

FISHERIES SECTION
STATE CONSERVATION COMMISSION
DES MOINES, IOWA

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SYNOPSIS

An expandable creel survey was conducted at Spirit Lake between 1 May, 1973 and 15 February, 1974. An estimated 69,983 anglers expended 175,698 hrs harvesting 387,064 fish which weighed 82,282 kg (177,023 lbs). Bullhead, yellow perch and walleye made up 85.2%, 11.4% and 1.7% of the numerical catch and 77.1%, 12.5% and 4.2% of the catch by weight, respectively. Shore anglers caught 74.7% of the numerical harvest, boat anglers 21.3% and winter fishermen 4.0%. Bullhead, yellow perch and walleye were most sought by fishermen.

INTRODUCTION

Fishery surveys have been conducted at Spirit Lake to estimate catch statistics since the 1940's. From 1945 through 1953 a contact survey was used, collecting data from angler interviews, from boat rental liveries and interested parties. From 1953 to 1956, anglers were contacted and interviewed as they fished. Since 1956 an expandable creel survey has been used. Previous results have been reported by Rose (Quarterly Biology Reports, Vol. I-Vol. XI), Moen (Quarterly Biology Reports, Vol. XII-Vol. XXV), Jennings (Quarterly Biology Reports, Vol. XVII-Vol. XXV), and McWilliams (1972, 1973).

Spirit Lake, adjacent to the Iowa-Minnesota border, is part of a chain of lakes formed by the Wisconsin glacier drift. It is the largest natural lake in Iowa, containing 2,300 ha (5,684 a), with a maximum depth of 7.3 m (24 ft). The bowl-shaped basin has gradually sloping sides, rocky shoal areas and several prominent rock reefs. The surrounding land is flat to gently rolling. The lake is subject to prevailing winds which are partially responsible for the lack of thermal stratification. Overflow from the lake drains into adjoining East Okoboji Lake through a man-made spillway located in the southeast part of the lake.

The objectives of the present creel survey were four-fold. First, estimate the total number of anglers and hours expended; second, estimate the number and weight of the fish caught by species; third, determine the order of species preference; and fourth, record the ratio of marked to unmarked walleye for population estimates.

SURVEY METHODS

There are two major fishing seasons at Spirit Lake, open water fishing, from May through November, and winter fishing, from December through mid-February. During open water fishing, the survey was conducted between 6 AM and 10 PM. The 16-hr period was divided into two 8-hr survey periods, 6 AM to 2 PM, designated A, and 2 PM to 10 PM, designated B. Using a current calendar the A or B designation was assigned, first to week days, and then to weekend days (including holidays). Days not surveyed were staggered so all days were surveyed during the month (Table 1).

Table 1. A tentative monthly survey schedule.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 A	2 B	3 A	4 *	5 B	6 A
7 B	8 B	9 A	10 *	11 B	12 A	13 *
14 *	15 A	16 *	17 B	18 A	19 B	20 B
21 A	22 *	23 B	24 A	25 B	26 *	27 A
28 B	29 B	30 A	31 B			

*Denotes days not surveyed.

Anglers were interviewed to determine numbers and weight of each species caught, hours expended, and species sought. To determine total numbers of boat and shore anglers counts were made every two hours during the survey day, i.e., for a B day counts were made at 3, 5, 7 and 9 PM. The data were expanded into total counts for each month.

The winter survey was conducted between 9 AM and 6 PM. The time surveyed was changed because early morning fishing pressure was light and most anglers were off the ice by dark. For data compilation and expansion, the total number of vehicles on the ice were counted each two hours and substituted for the number of fishing craft. The method of data compilation and expansion are described and discussed by Rose (1956).

SURVEY FINDINGS

Angler Harvest

An estimated 69,983 anglers expended 175,698 hrs fishing at Spirit Lake during the 1973-74 season. Total catch was 387,064 fish weighing 82,282 kg (177,023 lbs). Average catch success for each angler was 2.2 fish per hour (FH) or 5.5 fish per trip (FT). Shore anglers caught 74.7% of the fish recorded while the major portion of the boat anglers caught 21.3% and winter fishermen 4.0%.

Shore anglers caught over 289,000 fish and had the highest catch success rates of 3.0 FH and 6.5 FT (Table 2). Boat anglers ranked second in all categories, harvesting over 82,000 fish, averaging 1.2 FH and 4.1 FT. Winter fishermen caught 15,531 fish with an average catch success of .9 FH and 3.0 FT. Winter fishermen expended the most effort per trip, 3.2 hrs, followed by mean trip lengths of 3.1 hrs and 2.2 hrs for boat and shore anglers, respectively.

Table 2. Spirit Lake sport fishery statistics, 1973-74.

	Type of fishing		
	Shore	Boat	Winter
Anglers	44,462	20,268	5,253
Effort in hours	95,677	63,070	16,951
Estimated number of fish harvested	289,226	82,307	15,531
Fish per trip	6.5	4.1	3.0
Fish per hour	3.0	1.3	0.9
Mean trip length	2.2	3.1	3.2

Species Composition

The major portion of the sport fishery was comprised of bullhead, yellow perch and walleye, 98.3% of the numerical catch and 93.8% of the catch making up weight. For the entire season bullhead made up 85.2% of the numerical catch, yellow perch 11.4% and walleye 1.7%. By weight, bullhead constituted 77.1%, yellow perch 12.5% and walleye 4.2% of the catch. Northern pike and freshwater drum each made up < 1% of the numerical catch, but contributed 2% of the catch by weight. Bluegill, black crappie, largemouth bass, smallmouth bass and channel catfish comprised a minor portion of the fishery.

Bullhead dominated the open water fishery comprising nearly 97% of the numerical catch and 92% of the catch by weight (Table 3). Yellow perch and walleye ranked second and third in both numbers and weight caught. Boat anglers harvest was made up of 61.4% bullhead, 30.9% yellow perch and 4.5% walleye. These fish species constituted 51.9%, 29.2% and 8.3% of the catch by weight, respectively.

Table 3. Species composition of the sport fishery at Spirit Lake, 1973-74.

Species	Type of fishing					
	Shore		Boat		Winter	
	Number	Wt (kg)	Number	Wt (kg)	Number	Wt (kg)
Bullhead	279,255	52,036	50,572	9,927	---	---
Y perch	4,964	1,074	25,490	5,590	13,550	3,372
Walleye	975	572	3,679	1,594	1,868	1,152
N pike	166	205	1,049	980	99	148
Sm bass	117	78	172	234	14	18
Lm bass	27	27	---	---	---	---
Bluegill	1,048	324	408	131	---	---
Bl crappie	1,514	330	450	114	---	---
C catfish	335	675	36	78	---	---
F drum	825	1,165	366	482	---	---
Total	289,226	56,486	82,307	19,130	15,531	4,690

During the winter fishery, yellow perch was predominant, comprising 87.0% of the numerical catch and 71.8% of the weight caught. Walleye made up most of the remaining catch, with northern pike and smallmouth bass contributing only a minor portion of the fishery.

Angler Preference

Species preference of anglers was based on interviews with 3,644 fishermen. Fifty-seven percent of the anglers interviewed were fishing for bullhead, 28% for yellow perch, and 13.7% for walleye. Anglers preferring other species made

up < 3% of the total. Fishermen also expressed a desire to catch channel catfish, freshwater drum, black crappie, bluegill, smallmouth bass and northern pike in descending order.

Shore anglers were most interested in bullhead fishing with 88% stating this as their main fishing interest. Other species of interest included yellow perch, 3.8%; walleye, 3.2%; channel catfish, 1.5%; and freshwater drum, 1.3%. Few anglers indicated preference for bluegill, smallmouth bass or northern pike.

An angler was considered successful when at least one fish of the preferred species was caught. Based on this criteria bullhead anglers were 93.9% successful, yellow perch anglers 81.9%, walleye anglers 54.8%, channel catfish anglers 82.1%, and freshwater drum anglers 80.0% (Table 4).

Table 4. Species preferred and percent success of Spirit Lake anglers, 1973-74.

Species	Type of fishing					
	Shore		Boat		Winter	
	No anglers	% Success	No anglers	% Success	No anglers	% Success
Bullhead	1,701	93.9	329	91.5	---	---
Y perch	72	81.9	554	90.6	394	99.5
Walleye	62	54.8	223	78.0	214	92.5
N pike	3	0.0	10	100.0	---	---
Bl crappie	13	100.0	---	---	---	---
C catfish	28	82.1	1	100.0	---	---
Sm bass	1	100.0	5	100.0	---	---
Bluegill	7	100.0	2	100.0	---	---
F drum	25	80.0	---	---	---	---
Total	1,912		1,124		608	

There were 1,124 boat anglers interviewed. Yellow perch was sought by 49.3% of the anglers, bullhead 29.3% and walley 19.8%. Other species made up only 1.6% of the angler preference. Yellow perch anglers were 90.6% successful, with success rates of 91.5% for bullhead and 78.0% for walleye.

Yellow perch were the highest priority for winter fishermen with 64.8% of which nearly all were successful. The remaining 35.2% preferred walleye and 92.5% caught at least one fish.

DISCUSSION OF THE SURVEY

During 1973-74 fishing season nearly 10,000 fewer anglers fished in Spirit Lake compared with the previous year. There was also an accompanying decrease of nearly 30,000 hrs in fishing effort. Catch success remained near the 1973-73 averages of 2.2 FH and 5.8 FT.

Total harvest by weight was 34.8 kg/ha (31.1 lbs/acre), third highest since 1956, but down about 7.8 kg/ha (7 lbs/a) from the 1972-73 harvest. Although the bullhead harvest declined nearly 50,000 fish between 1972-73 and 1973-74, it remained nearly three times above the 10 yr average. Yellow perch harvest was about 10,000 fish below both the previous year and the 10 yr average. Walleye declined about 4,000 fish from the 1972-73 harvest, and was nearly one-fourth of the 10 yr average, and nearly equalled the previous recorded low harvest in 1969-70. Northern pike, smallmouth bass, black crappie and channel catfish harvests all decreased between 1972-73 and 1973-74, with slight increases in the largemouth bass, bluegill and freshwater drum catches.

Bullhead angling continued to dominate the shore fishery, comprising 86.2% of the anglers in 1972-73 and 88.9% in 1973-74. Anglers preferring yellow perch increased slightly from 3.2% to 3.8% and walleye fishermen decreased from 6.5%

to 3.2%. Anglers preferring other species were about the same as in 1972-73.

Boat angling for yellow perch increased from 34.3% of the fishermen in 1972-73 to 49.3% in 1973-74. Bullhead and walleye anglers were next in importance but contributed a much smaller percent of the total anglers. Changes in preferences for other species were slight.

Winter fishermen preferred either yellow perch or walleye. Yellow perch anglers decreased slightly with a corresponding increase in walleye fishermen. Generally, about 70% of the winter fishermen prefer yellow perch and 30% walleye.

ACKNOWLEDGEMENTS

I thank Harold Dexter for his work in collecting and compiling the field data.

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