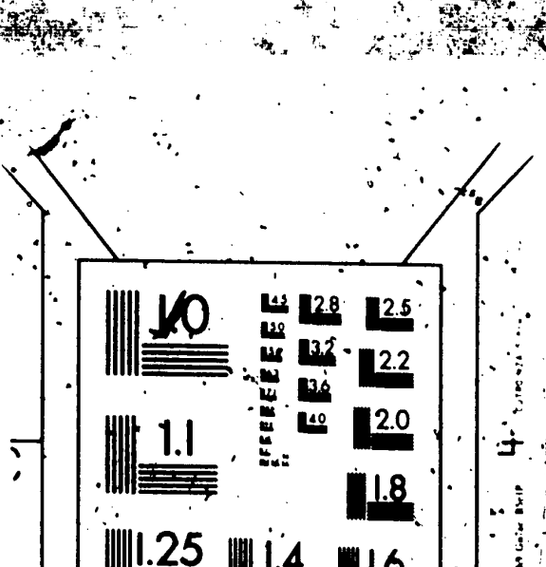
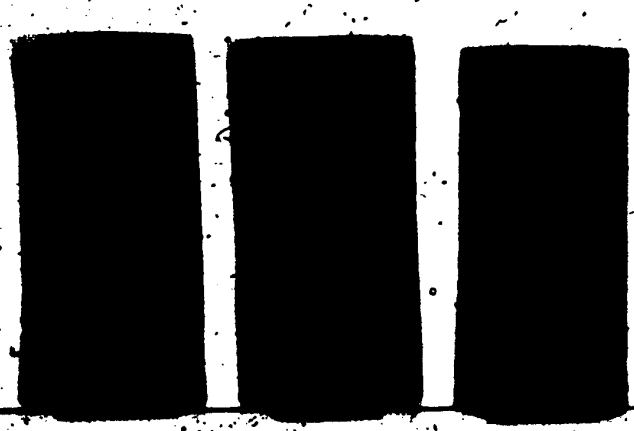
OF/DE



ARC - 374

FISHERIES & MARINE SERVICE TRANSLATION SERIES NO



FISHERIES RESEARCH BOARD OF CANADA

MANUSCRIPT REPORTS OF THE BIOLOGICAL STATIONS

No.

490

Title

A study of the commercial fishery of Great Slave Lake, N.W.T. during the winter season, 1949-50

Author

W. A. Kennedy and L. J. Stephen
Central Fisheries Research Station

1951

INTRODUCTION

The study of the winter commercial fishery which was begun during the winter of 1948-49 was continued during the winter of 1949-50. All the data were gathered by the junior author and D. C. Gibson. This study is complementary to the study of the summer fishery which has been pursued since 1946 by the Central Fisheries Research Station of the Fisheries Research Board of Canada.

In this paper only lake trout, Cristivomer namaycush and lake whitefish, Coregonus clupeaformis are regarded as commercial fish, although some of the inconnu Stenodus leucichthys mackenzii; pike, Esox lucius, and yellow pikeperch Stizostedion vitreum vitreum caught were sold.

The fishing methods and our sampling techniques were the same as those described in the report on the 1948-49 winter fishery. Larger samples were taken for determining size and as a result it was not possible to get as much information on catch per net.

ACKNOWLEDGEMENTS

We are indebted to various fishermen for their excellent co-operation in providing information. All of the fish companies who bought fish on Great Slave Lake helped us in various way. We would like particularly to acknowledge the help of Mr. G. McInnes of the McInnes Products Corp. and Mr. W. Heno of the W. R. Menzies Company.

SIZE COMPOSITION OF THE CATCH

Some trout and whitefish were taken at random from the catch and weighed individually on small spring scales. The recorded weights are considered to be samples of the commercial catch in the areas and at the times that they represent. Actually, in some cases at least, there is reason to suspect that the samples are not actually representative of the area as a whole, but rather that they represent only a small part of it. However, as they are the only samples available, they are presented here. Tables I and III show average weights of trout and whitefish respectively and their standard errors, while Tables II and IV show the corresponding distribution of the values that make up these averages.

There may have been a slight decrease in the average size of trout within Area A during the season. Apart from this the average size of each species appeared to remain unchanged throughout the season.

The average size both of trout and of whitefish seemed to be slightly less than during the previous summer season and during the previous winter season. Inadequate sampling alone may account for the observed differences.

CATCH

From data supplied by the Officers of the Dominion Department of Fisheries the total catches of trout and whitefish

have been estimated. These totals are shown in the first line of Table V. The last line of Table V indicates that all the commercial fish that were caught were also sold. The estimated proportion of the total catch which was taken in the various areas fished is as follows: Area A 51 per cent; Area C 1 per cent; Area D 31 per cent; Area E 8 per cent; and Area F 9 per cent. These estimates are based on information supplied by about 5 per cent of the fishermen as Table V indicates, supplemented by general knowledge of the fishery.

An estimated 1,400,000 pounds of rough fish were also caught, mostly in Area A. Besides the inconnu, pike, and pikeperch mentioned above, burbot Lota lota, ciscoes Leucichthys spp. and suckers Catostomus catostomus (also rarely Catostomus commersonnii) were taken. Rough estimates of the amount of each species caught, based on the known catch from the 5 per cent of the fishermen who supplied information are as follows: suckers 500,000 pounds; inconnu 300,000 pounds; burbot 300,000 pounds, pike 200,000 pounds, tullibee 70,000 pounds and pikeperch 1,000 pounds. Of the rough fish caught, about 196,000 pounds of inconnu, 93,000 pounds of pike and 300 pounds of pikeperch were sold. These weights are probably dressed weights although the fact is not altogether clear from the records.

EFFORT

The fishermen who supplied information lifted their nets after an average interval of 2.4 days. Fifteen per cent of the nets were lifted daily, 45 per cent after two, 30 per cent after three, 9 per cent after four and 1 per cent after five days. The interval tended to increase throughout the season.

One net-lift is used as the unit of fishing effort where one net-lift is the fishing effort exerted by one net during the interval between lifts whatever that interval may be. It is of course assumed that variations in the interval between lifts are of little importance.

The fishermen who supplied information used gill nets of 5½-inch mesh that were 100 yards long and an average of 43 meshes deep. They ranged from 20 to 80 meshes deep with 67 per cent between 30 and 40 meshes deep. Rough observations indicate that depth of net probably is not an important factor in the relative efficiency of gill nets in Great Slave Lake.

Table VI shows the fishing effort for which reliable data were recorded. The decreasing proportion recorded for the later part of the season probably represents an actual decrease in the amount of fishing. The proportion of fishing effort in December was probably greater than Table VI would indicate because it was not as easy to get the necessary information at that time.

AVAILABILITY

Tables VII, VIII, IX and X show the respective availabilities of trout, whitefish and inconnu and of the three combined in terms of pounds of round fish caught per net-lift. The statements given in the report on the 1948-49 winter fishery regarding the reliability of such estimates, apply equally to these data.

Apart from Area F availability remained relatively constant throughout the season with, perhaps, a slight increase towards the end. This increase was entirely the result of bigger whitefish catches. Availabilities of trout and inconnu tended to decrease. Fisheries Research Board personnel did not observe the early fishery in Area F, but verbal reports indicate that it was based mainly on spawning whitefish.

The overall catch per net during the winter 1949-50 appears to have been about one-half that of the previous winter. Approximately the same proportion of each of the three species was taken during each of the two winters.

Changes in availability do not of course reflect changes in the abundance of fish. In this case two facts indicate that the drastic change in availability was probably not indicative of a similar drastic change in abundance. In the first place availability did not decrease during the season, in fact if anything, it increased. Secondly, the availability of trout, which move considerably, was reduced by the same proportion as was the availability of whitefish which generally move very little.

Although the decrease in availability apparently does not reflect a proportionate decrease in abundance, still the possibility that there was some decrease cannot be overlooked. The fact that availability is based on only 5 per cent of the fishery makes definite conclusions inadvisable.

DEPTHS FISHED

Table XI shows the average depths fished at various times and places, based on information from about 5 per cent of the fishermen. The tendency to fish deeper as the season progressed is quite obvious as is the tendency to fish deeper in Area D than in Area A.

SUMMARY

1. The study of the winter fishery on Great Slave Lake was continued.

2. Average size was slightly less than during the previous winter.

3. Availability was about one-half that of the previous winter.

4. These changes may indicate a decrease in abundance of fish in the vicinity of Hay River. No definite decision is possible because of the paucity of the data.

RECOMMENDATIONS

The fishery should be observed closely to determine whether the abundance of fish is changing in the vicinity of Hay River.

Table I. The average size of lake trout in pounds round weight and its standard error in samples taken at random from the fish landed by commercial fishermen from Great Slave Lake during the winter season 1949-50. The number of fish in each sample is shown in brackets.

Area	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15
A	6.3 ± 0.3 (228)	6.3 ± 0.3 (228)	10.3 ± 0.6 (111)	5.9 ± 0.3 (155)	7.4 ± 0.8 (24)	4.6 ± 0.4 (118)
C	-	-	-	14.2 ± 1.9 (13)	12.2 ± 0.8 (52)	12.6 ± 0.9 (53)
D	-	10.9 ± 1.3 (28)	10.6 ± 0.7 (88)	6.8 ± 0.9 (6)	11.7 ± 1.3 (15)	13.2 ± 4.0 (6)
E	-	-	-	-	7.6 ± 1.5 (14)	7.5 ± 0.8 (44)

Table II. The frequency distribution of round weights of lake trout in representative samples from the fish landed by commercial fishermen from Great Slave Lake during the winter season 1949-50.

Weight in pounds	Area A						Area C			Area D				Area E	
	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15	Feb. 1-15	Feb. 16-28	March 1-15	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15	Feb. 15-28	March 1-15
1	3	2	4	1	-	12	-	2	1	-	-	-	-	-	-	3
2	12	16	1	17	-	18	-	1	1	-	2	-	-	-	1	5
3	22	24	-	12	-	22	-	-	1	2	2	-	-	-	1	3
4	37	46	7	28	5	25	-	1	-	-	8	1	-	1	3	6
5	58	37	15	26	7	18	2	2	3	2	8	1	1	-	2	4
6	21	34	13	18	3	7	-	2	3	3	8	1	2	1	1	4
7	23	13	8	11	1	1	1	3	2	4	15	-	1	-	1	2
8	15	11	9	15	2	4	1	3	4	-	8	2	1	1	2	2
9	14	10	4	11	-	-	1	4	5	5	5	-	-	1	-	2
10	4	5	6	3	2	2	-	2	6	3	-	1	1	-	-	2
11	5	8	5	4	-	2	-	4	2	-	-	-	2	-	-	1
12	1	5	5	3	1	-	-	4	2	2	1	-	1	1	1	1
13	2	5	5	2	1	2	1	5	4	-	5	-	1	-	-	2
14	3	4	4	3	-	-	1	3	2	1	4	-	1	1	-	1
15	1	4	3	-	-	1	-	3	3	2	2	-	-	-	-	1
16	1	1	3	-	-	1	2	1	2	-	1	-	1	-	-	1
17	-	-	2	-	-	1	1	2	1	1	3	-	-	-	1	1
18	-	-	2	-	2	-	-	1	2	-	-	-	1	-	-	-
19	1	2	4	-	-	-	-	3	4	-	1	-	1	-	-	1
20	1	-	2	-	-	-	-	1	1	-	6	-	1	-	-	1
21	-	3	3	-	-	1	-	5	-	-	3	-	-	-	-	1
22	-	-	4	-	-	-	-	-	1	1	1	-	-	-	1	-
23	1	-	3	-	-	-	1	-	-	-	2	-	-	-	-	-
24	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-
25	1	1	-	-	-	-	1	1	2	-	1	-	-	-	-	-
26	-	1	-	1	-	-	1	-	1	1	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-
30	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-

Table III. The average size of whitefish in pounds round weight and its standard error in samples taken at random from the fish landed by commercial fishermen from Great Slave Lake during the winter season 1949-50. The number of fish in each sample is shown in brackets.

Area	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15
A	2.4 ± 0.02 (561)	2.5 ± 0.02 (574)	2.7 ± 0.02 (535)	2.8 ± 0.03 (583)	2.7 ± 0.03 (586)	2.7 ± 0.03 (529)
C	-	-	-	2.9 ± 0.04 (378)	2.9 ± 0.06 (287)	2.9 ± 0.04 (431)
D	2.6 ± 0.08 (55)	2.8 ± 0.03 (529)	2.6 ± 0.03 (469)	2.3 ± 0.03 (89)	2.9 ± 0.04 (264)	2.9 ± 0.10 (137)
E	-	-	-	2.4 ± 0.03 (203)	-	2.6 ± 0.03 (241)

Table IV. The frequency distribution of round weights of whitefish in representative samples from the fish landed by commercial fishermen from Great Slave Lake during the winter season, 1949-50.

Weight in pounds	Area A						Area C			Area D						Area E	
	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15	Feb. 1-15	Feb. 16-28	March 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	March 1-15	Feb. 1-15	March 1-15
¾	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-
1	1	2	-	-	2	2	1	-	1	-	-	1	-	-	-	-	-
1¼	8	6	1	3	0	7	1	1	0	1	-	1	-	-	-	-	-
1½	15	10	2	11	4	6	2	1	0	0	6	5	1	-	1	1	1
1¾	35	32	10	25	17	20	3	7	5	0	29	26	7	3	4	9	8
2	107	88	48	68	71	61	32	28	19	7	64	60	14	16	13	41	31
2¼	117	90	80	61	59	76	47	45	71	11	52	111	31	53	20	53	52
2½	112	130	115	89	121	106	75	39	84	16	114	95	24	44	19	43	50
2¾	67	82	126	71	117	82	45	41	79	5	86	59	6	34	20	25	43
3	39	48	42	57	58	47	49	36	52	2	55	38	6	29	13	16	28
3¼	36	36	56	81	57	50	34	22	29	6	39	34	-	25	12	9	14
3½	15	24	29	45	34	27	24	22	21	4	26	15	-	15	13	2	5
3¾	4	7	9	24	22	13	14	14	19	1	13	13	-	16	8	2	6
4	1	11	8	20	11	17	16	12	17	2	18	6	-	13	6	1	2
4¼	2	2	3	12	9	9	14	7	7	-	9	1	-	7	2	0	1
4½	1	2	2	8	1	4	10	3	7	-	4	2	-	3	2	1	-
4¾	0	4	2	3	0	1	4	3	2	-	8	2	-	3	3	-	-
5	0	-	1	1	2	-	3	3	6	-	2	-	-	1	1	-	-
5¼	0	-	1	0	0	-	0	1	5	-	3	-	-	2	-	-	-
5½	1	-	-	1	0	-	2	2	4	-	0	-	-	-	-	-	-
5¾	-	-	-	0	0	-	0	-	1	-	0	-	-	-	-	-	-
6	-	-	-	1	0	-	1	-	0	-	1	-	-	-	-	-	-
6¼	-	-	-	0	0	-	0	-	1	-	-	-	-	-	-	-	-
6½	-	-	-	0	0	-	0	-	0	-	-	-	-	-	-	-	-
6¾	-	-	-	0	0	-	0	-	0	-	-	-	-	-	-	-	-
7	-	-	-	1	0	-	1	-	0	-	-	-	-	-	-	-	-
7¼	-	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-
7½	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-	-
7¾	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-

Table V. An analysis of estimated catches in calculated round weights taken by the commercial fishery in Great Slave Lake during the winter season of 1949-50.

	Lake trout	Whitefish	Combined
Estimated total catch in thousands of pounds.....	955	2,957	3,912
Estimated percentage landed by fishermen the location and number of whose nets were known.....	4.8	5.0	5.0
Estimated percentage landed by other fishermen.....	95.2	95.0	95.0
Estimated percentage caught but not landed.....	0.0	0.0	0.0

Table VI. The fishing effort in net lifts exerted in Great Slave Lake by the fishermen who supplied reliable information during the winter season of 1949-50.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	All winter
A	46	672	639	420	91	45	1913
C	0	0	0	41	0	0	41
D	7	179	370	290	82	27	955
E	0	0	117	196	0	0	213
F	90	94	0	0	0	0	184
Whole lake	143	945	1,126	847	173	72	3,306

Table VII. The availability of lake trout in pounds round weight caught per net-lift to the Great Slave Lake fishermen who supplied reliable information during the winter season of 1949-50. An asterisk indicates a value based on less than 200 net-lifts.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	All winter
A	18*	17	22	8	6*	2*	16
C	-	-	-	26*	-	-	26*
D	13*	22	11	11	7*	6*	13
E	-	-	5*	10*	-	-	7
F	+*	+*	-	-	-	-	+*
Whole lake	7*	17	17	10	6*	3*	14

Table VIII. The availability of whitefish in pounds round weight caught per net-lift to the Great Slave Lake fishermen who supplied reliable information during the winter season of 1949-50. An asterisk indicates a value based on less than 200 net-nights.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	All winter
A	70*	39	31	38	48*	71*	38
C	-	-	-	20*	-	-	20*
D	22*	29	45	33	55*	76*	40
E	-	-	32*	51*	-	-	41
F	287*	81*	-	-	-	-	160*
Whole lake	204*	37	36	37	52*	73*	45

Table IX. The availability of inconnu in pounds round weight caught per net-lift to the Great Slave Lake fishermen who supplied reliable information during the winter season of 1949-50. An asterisk indicates a value based on less than 200 net-nights.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	All winter
A	9*	9	8	2	0*	0*	7
C	-	-	-	2*	-	-	2*
D	3*	3	+	3	1*	0*	2
E	-	-	0*	0*	-	-	0
F	0*	1*	-	-	-	-	+*
Whole lake	3*	7	5	2	1*	0*	4

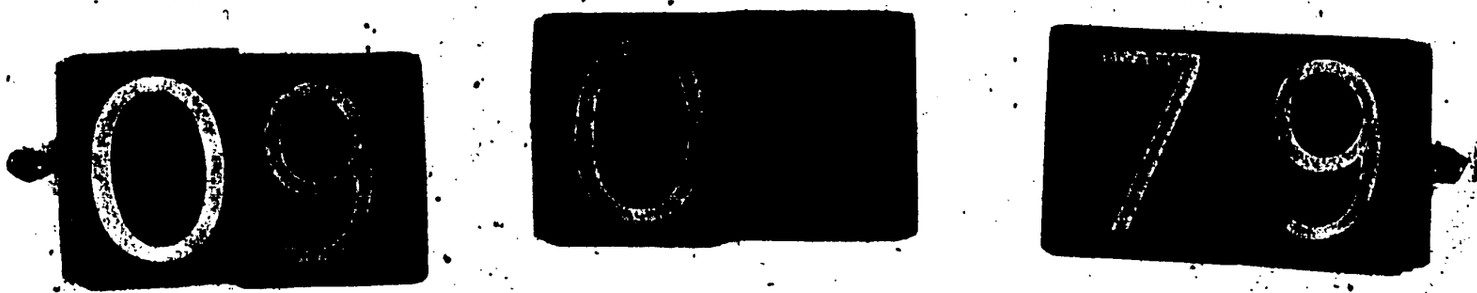
Table X. The availability of lake trout, whitefish and inconnu combined in pounds round weight caught per net-lift to the Great Slave Lake fishermen who supplied reliable information during the winter season of 1949-50. An asterisk indicates a value based on less than 200 net-nights.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28	All winter
A	97*	65	62	48	54*	73*	60
C	-	-	-	49*	-	-	49*
D	37*	55	56	48	63*	82*	55
E	-	-	37*	61*	-	-	48
F	287*	82*	-	-	-	-	160*
Whole lake	212*	60	57	49	58*	76*	63

Table XI. The average depth in feet of the water in which the Great Slave Lake fishermen, who supplied reliable information, set their nets during the winter season of 1949-50.

Area	Dec. 1-15	Dec. 16-31	Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-28
A	24	45	48	73	70	100
C	-	-	-	80	-	-
D	30	52	80	63	126	150
E	-	-	70	60	-	-
F	12	17	-	-	-	-

END



FIN