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Title

A report on the possibility of fur farmers using coarse fish
from Great Slave Lake at Hay River

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INTRODUCTION

As a result of an enquiry from some Alberta mink ranchers regarding the possibility of keeping mink at Hay River, the Fisheries Research Board was requested to investigate the advisability of permitting a fishery for "coarse" fish in that part of Great Slave Lake adjacent to Hay River. To gather the necessary data Mr. L. Knoll (in charge) and the junior author caught fish in the vicinity of Hay River from June 23 to August 6, 1948.

Material and Methods

The fishing was done with gill-nets ranging from $1\frac{1}{2}$ -inch to $5\frac{1}{2}$ -inch mesh (stretched measure). These gill-nets were hung to be about five feet deep as fished. The thread size varied from 30 to 60.

An attempt was made to lift daily, but weather frequently prevented this. Of the 18 occasions on which nets were lifted, four were after two nights fishing, four after three nights, and two after four nights. No correction has been made for the extra fishing time, since experience elsewhere indicates that at the level of abundance prevailing, the additional time would probably not greatly increase the catch. The amount of fishing done is indicated in Table I.

The fish were removed from the nets whenever they were lifted. For each fish, the species, weight, mesh size, place, date and depth of capture were recorded.

Species Found

The following species were taken in the nets: whitefish, Coregonus clupeaformis, lake trout, Cristivomer namaycush, tullibee, Leucichthys spp., inconnu, Stenodus leucichthys, round whitefish, Prosopium cylindraceum, northern sucker, Catostomus catostomus, common sucker, Catostomus commersoni, pike-perch, Stizostedion vitreum, pike, Esox lucius, and burbot, Lota lota.

Variation with Place

Although most of the fishing was done within 15 miles of Hay River, sets also were made at Jones Point and Big Buffalo River. Since there was no appreciable difference between these more distant sets and the ones made nearer to Hay River, it is assumed that that part of the lake within 30 miles of Hay River was adequately represented by the samples.

Variations with Time and Depth

As the season advanced each species apparently moved to deeper water. There was some tendency for catch per net to decrease with time when this shift is taken into account. Only whitefish, lake trout, tullibee, and burbot were taken in water more than 60 feet deep.

The depth-time relationships were such that more than one-half of the net sets were probably made in the most advantageous

places for taking tullibee at the respective times.

The Catch

Tables II and III show the average availabilities (that is catch per unit) and Table IV shows the average size of fish caught in all nets regardless of time, place, or depth. It is obvious that there is no mesh size which could be set in the vicinity of Hay River that would take predominantly non-commercial fish. Any small mesh net suitable for taking tullibee would take quantities of small whitefish and other commercial fish.

The average sizes for lake trout in the small mesh nets are somewhat misleading since a few big lake trout caught by their teeth are included, which obscures the fact that many small lake trout are also taken. The same is true to a lesser extent for inconnu and pike-perch.

Possible Alternatives

A fishery for coarse fish in Yellowknife Bay might be advisable. A random sample of 111 whitefish taken there in 1948 consisted of 65 per cent "black" whitefish. This confirms previous reports. Therefore, Yellowknife Bay probably can not be successfully exploited for market fish, since it is well known that "black" whitefish spoil quickly, have an unappealing appearance, and tend to be heavily infested with Triaenophorus crassus. The random sample

proved to be no exception to the latter general rule, in that the "black" whitefish in it had an average of 73.9 cysts per hundred pounds while the others had an average of 22.8 cysts per hundred pounds. One "black" whitefish contained 42 cysts while the greatest number found in any of the others was three cysts.

A summary of the catches made in Yellowknife Bay by Dr. D. S. Rawson during the original survey of Great Slave Lake are shown in Table V.

"Black" whitefish are reported to be plentiful in Deep Bay. They are also, no doubt, plentiful in other local areas. Perhaps fishing should be allowed in such areas for rough fish ("black" whitefish are, of course, regarded as rough fish). Perhaps intensive fishing with small mesh nets in such places would reduce the overall rate of infestation in Great Slave Lake.

Possible use of by-products of the fishing industry which at present are discarded should also be considered. Slightly over one million pounds per annum has been discarded up until the present time, and in the contemplated expanded fishery this will probably reach two or three million pounds per annum. The discarded material is approximately 80 per cent offal, 15 per cent rough fish, 5 per cent spoiled commercial fish. It should be kept in mind, however, that this material is at present returned to the lake, and that for all anyone knows the ultimate benefits from this fertilizer may be greater than any benefit from their use by fur farmers.

Recommendations

1. No fishery should be allowed in Great Slave Lake in the vicinity of Hay River for the express purpose of taking fish for ranch fur animals.

2. Some alternative suggestions are presented but not necessarily recommended.

Table I. The amount of experimental fishing done at Hay River in 1948 by dates and depths, expressed in yard-sets. (One hundred yards set once, or 50 yards set twice would be expressed as one hundred yard sets.

Depth range	Mesh size inches	Time		
		June 23 to July 7 yard-sets	July 8 to July 22 yard-sets	July 23 to August 6 yard-sets
0 to 30'	1½	50	0	100
	2	50	0	100
	2½	50	0	100
	3	50	0	100
	3½	50	0	100
	4	50	0	100
	4½	50	0	100
30' to 60'	5½	50	0	100
	1½	350	200	100
	2	350	200	100
	2½	250	200	100
	3	350	150	100
	3½	250	200	100
	4	350	200	100
60' to 200'	4½	250	200	100
	5	350	200	100
	5½	350	200	100
	1½	50	150	0
60'	2	50	150	0
	2½	50	150	0
to	3	50	150	0
	3½	50	150	0
200'	4	50	150	0
	4½	50	150	0
	5	50	150	0
	5½	50	150	0
		50	150	0

Table II. The average availability of fish taken by experimental fishing at Hay River in 1948 expressed in pounds per hundred yards of net.

Species	Mesh size								
	1½"	2"	2½"	3"	3½"	4"	4½"	5"	5½"
Whitefish	12.6	42.6	42.4	83.7	83.1	114.9	84	92.9	50.1
Lake trout	27.4	54	16.7	33.6	54.7	43.1	57.9	37.7	71
Tullibee	18.1	20.7	10.4	15.7	25.8	13.2	2.8	2.1	1.9
Inconnu	0.0	3	1.3	1.4	5.7	0.8	4.2	3.8	7.4
Round whitefish	0.1		0.2		0.0	0.0	0.0	0.0	0.0
Northern suckers	0.7	3.9	4.4	6.6	13.0	16.2	16.4	12.3	7.2
Common suckers	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pike-perch	0.5	0.3	0.2	0.6	1.8	0.6	0.0	0.0	0.0
Pike	0.0		0.0	0.0	0.0	0.0	0.0	0.8	0.0
Burbot	0.1	0.0	0.0	0.8	0.9	4.3	2.6	5.6	12.9

Table III. The average availability of fish taken by experimental fishing at Hay River in 1948 expressed in numbers of individuals per 100 yards of net.

Species	Mesh size								
	1½"	2"	2½"	3"	3½"	4"	4½"	5"	5½"
Whitefish	28.4	56.1	49.9	62.8	47.6	48.8	36.7	31.3	16.0
Lake trout	3.2	6.4	4.4	4.5	4.6	3.5	4.7	3.1	5.3
Tullibee	141.4	68.1	18.9	15.8	19.9	7.4	2.0	1.0	1.2
Inconnu	0.0	0.7	0.2	0.5	1.0	0.2	0.5	0.4	0.5
Round whitefish	0.3	0.2	0.5	0.1	0.0	0.0	0.0	0.0	0.0
Northern sucker	2.0	8.5	4.5	5.4	7.2	6.7	5.1	3.8	2.1
Common sucker	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pike-perch	0.4	0.4	0.1	0.5	1.1	0.3	0.0	0.0	0.0
Pike	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Burbot	0.1	0.0	0.0	0.8	0.5	1.7	0.6	1.3	2.3

Table IV. The average size of fish taken by experimental fishing at Hay River in 1948 expressed in pounds.

Species	Mesh size								
	1½"	2"	2½"	3"	3½"	4"	4½"	5"	5½"
Whitefish	0.5	0.7	0.8	1.3	1.7	2.3	2.1	3.0	3.1
Lake trout	8.5	8.1	6.0	7.5	11.8	12.1	11.4	11.1	13.3
Tullibee	0.12	0.3	0.5	1.0	1.3	2.8	1.3	2.1	1.6
Inconnu	0.0	3.9	5.2	3.0	5.7	3.7	8.0	8.5	11.4
Round whitefish	0.4	0.3	0.5	0.4	0.0	0.0	0.0	0.0	0.0
Northern suckers	0.3	0.4	1.0	1.2	1.8	2.4	3.0	3.2	3.4
Common suckers	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pike-perch	1.2	0.8	2.0	1.3	2.6	1.9	0.0	0.0	0.0
Pike	0.0	0.6	0.0	0.0	0.0	0.0	0.0	7.0	0.0
Burbot	0.0	0.0	0.0	1.0	2.0	2.6	4.0	4.2	5.5

Table V. The average availability of fish taken by experimental fishing in Yellowknife Bay in 1944, 1945 and 1946 expressed in number of individuals per hundred yards of net.

Depth in feet	Species	Mesh Size					
		5.0	17.0	11.0	11.3	11.0	6.6
0-35	Whitefish	5.0	17.0	11.0	11.3	11.0	6.6
	Lake trout	0.6	3.3	1.6	0.3	1.3	0.6
	Tullibee	17.6	50.0	6.3	12.0	2.0	0.6
	Round whitefish	0.0	0.3	0.6	0.0	0.0	0.0
	Northern suckers	1.3	15.0	11.3	0.0	0.0	0.6
	Common suckers	0.0	0.0	0.0	0.0	0.0	0.0
	Pike	0.0	0.3	0.3	0.3	0.0	0.0
	Burbot	0.0	2.0	0.3	3.0	2.3	4.3
35-200	Whitefish	5.6	7.0	4.6	3.3	3.0	0.8
	Lake trout	0.0	0.3	0.0	0.0	0.0	0.0
	Tullibee	2.6	1.3	0.0	0.0	0.0	0.0
	Round whitefish	0.0	2.3	1.0	0.0	0.0	0.0
	Northern suckers	0.3	1.3	6.6	3.3	0.3	0.0
	Common suckers	1.0	1.3	6.6	2.0	0.3	0.0
	Pike	1.3	6.3	10.3	7.3	0.3	0.3
	Burbot	0.0	0.0	0.0	0.0	0.0	0.0

