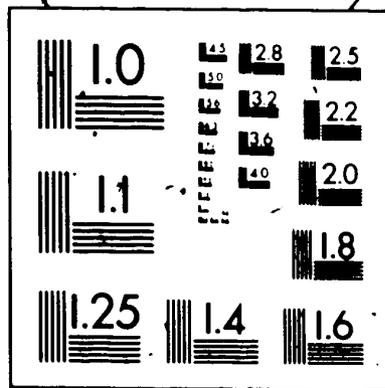


# 1

OF/DE

# 1

## PUBLIC ARCHIVES ARCHIVES PUBLIQUES CANADA



**FISHERIES &**

**MARINE SERVICE**

**TRANSLATION**

**SERIES NO**

**NO**

**FISHERIES RESEARCH BOARD  
OF CANADA**

**MANUSCRIPT REPORTS OF THE BIOLOGICAL STATIONS**

**No.**

445

**Title**

A study of the commercial whitefish fishery on Lake Winnipeg,  
during the summer season of 1951, with 1950 and 1948 data included.

**Author**

L. C. Hewson

Central Fisheries Research Station

1952

A STUDY OF THE COMMERCIAL WHITEFISH FISHERY ON LAKE WINNIPEG,  
DURING THE SUMMER SEASON OF 1951, WITH 1950 AND 1948 DATA INCLUDED.

L. C. Hewson

Central Fisheries Research Station.

INTRODUCTION

The study of the commercial lake whitefish fishery on Lake Winnipeg began in 1948, and was designed as a companion to the study of the commercial fishery on Great Slave Lake. The method of approach in the Lake Winnipeg study has been much the same as that on Great Slave Lake, except that the present study has not been as intensive as the former. Statistical data in the Lake Winnipeg study are collected at one point only, at Big Black River. The harbor there is the base for about twenty fishing boats. These fishermen have supplied data during daily interviews over three seasons, 1948, 1950 and 1951. It was not possible to collect data during the 1949 summer season.

Although the design of this study is the same as that on Great Slave, differences in the conduct of the fishery, the species appearing in the catches, fishing methods, and other factors contrast at times with the companion study.

A description of the commercial whitefish fishery has been presented in Report No. 2 of this series. Following is a list of the species of fish which appear in the catches, together with their scientific names. The fish are arranged generally in the order of their abundance in the catches.

Lake whitefish - Coregonus clupeaformis

Burbot - Lota lota

Cisco - Leucichthys spp.

Sucker . . . . - Catostomus spp.  
Pikeperch . . . - Stizostedion vitreum  
Sauger . . . . - S. canadense  
Pike . . . . . - Esox lucius  
Yellow perch - Perca flavescens

#### ACKNOWLEDGEMENTS

The collection and arrangement of these data have been supervised by Dr. W. A. Kennedy. The 1948 data were collected by R. Himsel and the 1950 and 1951 data were collected by the author with the valuable assistance of Wm. Porth and K. Roberts, respectively. The co-operation of the fishermen and buyers who supplied data is much appreciated.

#### SIZE COMPOSITION OF THE CATCH

The whitefish, and in 1948, the ciscoes, were sampled at random in the round from the catches of commercial fishermen fishing within the various statistical areas, and weighed individually on small spring scales graduated in tenths of pounds. The daily catches were usually small, rarely exceeding 300 pounds, and the boats tended to arrive in a group. Research personnel were on hand immediately the boats docked so that the fish could be sampled directly from the holds, before the dressing operation was started. Data pertinent to the day's catch were recorded at this time. The circumstance of the boats arriving in a group minimized the number of sub-samples of whitefish that could be taken a day, because the catches were quickly unloaded and dressed. Consequently, the daily whitefish sample was often the entire catch of one boat. Care was taken not to select the same

boat more than its "share" during each two-week sampling interval.

Only a few boats landed suckers or ciscoes for marketing, and then at infrequent intervals. The quantities landed were so small that it made adequate sampling impractical. Ciscoes were not sampled after 1948.

In 1951, samples totalling 2291 whitefish were taken from the catches from two statistical areas as shown in Table I. The average size through the four two-week intervals at which the fish were sampled, remained remarkably uniform at nearly 2.5 pounds in Area B. In 1950, whitefish samples totalling 1241 fish were taken from the commercial fishermen's catches from Area B, and in 1948, from the same Area, samples totalled 783 whitefish. In each of these years the fish remained a uniform size. In 1950 during August the average dropped only slightly from 2.4 pounds recorded in July. The 1948 average was uniform at 2.7 pounds all season. The average weights for whitefish for 1950 and 1948 are given in Tables IX and XVI respectively. Table XVII shows the average weight of samples totalling 239 ciscoes taken from the commercial catches landed from Area B during July 1948.

The frequency distribution of whitefish samples is shown in Tables II, X and XVIII for the years 1951, 1950 and 1948. Table IX shows the frequency distribution of the cisco samples which were sampled in 1948.

#### CATCH

The estimated weights of whitefish, perch, pikeperch, sauger, and a few of the pike, ciscoes and suckers, recorded in this paper for each of the three years, were based on the records of the dressed or round weights of those fish bought by the two companies at Big Black River, and represent only the Big Black

River fishery. The estimated weights of species of fish other than those just mentioned, notably burbot but including the majority of the suckers and ciscoes, were based on the fishermen's estimates of either pounds or numbers of fish that had been caught but not marketed. Some culled commercial species are sometimes included in the fishermen's estimates, but the amount is negligible.

In order to arrive at an estimate of the round or original weights of these fish, recorded weights of commercial species, (mostly in dressed weights) were multiplied by a factor representing the loss of weight incurred in the dressing process. A 5 per cent shrinkage allowance was deducted by the companies whether the fish were bought dressed or in the round, and was also accounted for in the final estimated totals. The factors used in the conversion of dressed weights to round weights were calculated using data collected during the commercial fishery study, and from experimental fishing at other times of the year. In cases where numbers of fish were dealt with, an average weight was computed for each species using data at hand. The values used to convert dressed weights to round weights and numbers of fish to pounds are given in Table VIII.

The 1951 catch at Big Black River was estimated at 400 thousand pounds, of which 54 per cent was whitefish and 17 per cent burbot. The 1948 catch at Big Black River, estimated at 300 thousand pounds, was similar, with 41 per cent whitefish and 28 per cent burbot. The 1950 percentages of the estimated catch, about 700 thousand pounds, were 49 per cent for burbot with whitefish in second place at 34 per cent. Although the figures for burbot are derived from fishermen's estimates with

the possibility of considerable error, the increase in the proportion of burbot is probably a real one.

Few suckers and ciscoes were marketed in any of the three seasons but they appeared in the catches in appreciable numbers. In 1951, 14 per cent of the estimated total seasonal catch were ciscoes and 7 per cent suckers; in 1950 the figures for these two species were 7 per cent and 8 per cent respectively, and in 1948, 17 per cent ciscoes and 12 per cent suckers of the season total for that year at Big Black River.

Other fish appearing in the catch in smaller quantities during the three years, were as follows: In 1951, pikeperch, sauger, pike, and yellow perch combined totalled about 8 per cent of the season total catch. For the other two years, 1950 and 1948, these four species combined amounted to about 2 per cent of the respective estimated total catch for each season. Of the higher figure of 8 per cent estimated for 1951, 5 per cent was pikeperch alone. During that year the nets were fished in-shore for a longer period than usual.

#### FISHING EFFORT

The fishing effort at Big Black River was recorded daily during interviews with each fisherman by listing the number of boxes of nets that each had fished that day. From time to time a check was made of the total yardage per box for each man, particularly after storms when some parts of nets had to be discarded. On the daily catch record cards kept for each fisherman, the number of boxes of nets were converted to yards.

Tables III, XI and XX show the fishing effort exerted by those commercial fishermen at Big Black River who were inter-

viewed during 1951, 1950, and 1948. Nearly 100 per cent coverage was possible each year. The unit of effort used is the hundred-yard-night, which is defined as 100 yards of 5/4" mesh gill-net, 32 to 40 meshes in depth, lifted after one night only in the water. This unit was chosen so that a comparison of fishing effort can be drawn directly between Lake Winnipeg and Great Slave Lake, in which latter study a similar unit of effort is used.

The fishermen at Big Black River attempted to lift their gill-nets after a one-night interval, but storms and other circumstances did not always permit. The majority of nets, 69 per cent, were lifted after a one-night interval, and 22 per cent after a two-night interval. The remaining 9 per cent could not be classified as either one or two night sets, and in this group, are included nets that were lifted after intervals longer than two nights. Data concerning the lift intervals for the 1951 season are shown in Table IV. Tables XII and XXI furnish comparable data for the 1950 and 1948 seasons, respectively.

It will be noted from Tables IV, XII and XXI, that in each year the effort of the Big Black River fishermen was concentrated in Area B. The percentage effort figure for this area was 94 in 1951, 85 in 1950 and 93 per cent in 1948.

#### Availability

Availability is defined in this study as the round weight of fish, in pounds, produced by 100 yards of gill-net lifted after an interval of one night. Table V shows the availability of whitefish for the 1951 season. There was considerable variation in availability for each area during each half-month

period, and no particular trend is apparent. The all-season availability figure of 6.2 pounds per net of whitefish in 1951 coincided closely with the availability figure for whitefish for the 1950 season which stood at 6.0 pounds. In 1948 the all-season availability of whitefish was 3.7 pounds per net. More detailed figures for the two latter seasons are presented in Tables XIII and XXII. In each of the three tables, the figures for Area B are probably the most reliable since they are computed on the major part of the effort for each season. Since the relationship, if any, between availability and abundance is imperfectly understood, it seems unwise to draw conclusions regarding abundance from changes in the former.

When all species of fish are combined, the all-season availability for Area B is highest in 1951 at 16.2 pounds per net as compared to 10.9 pounds per net for the 1950 season. In 1948, the all-season availability figure for combined species was 8.5 pounds per net for the same area. Availability figures for each half-month period for various areas are given for the 1951, 1950 and 1948 seasons in Tables VI, XIV and XXIII, respectively.

Table VII shows the relative availability of combined species of fish when nets were lifted after one- and two-night intervals during 1951. In Area B one-night sets caught approximately 16 pounds per 100 yards, and the two-night sets caught 36 pounds, approximately. Table XV, for 1950, and Table XXIV for 1948 show approximately the same relationship between one- and two-night sets for each of the two years. In 1950 availability figures for one- and two-night sets were 11 and 10 pounds

per 100 yards, respectively, in Area B, and in this area in 1948, one-night sets showed an availability figure of 8 pounds per 100 yards as compared to 15 pounds for the two-night sets. Comparisons between the remainder column and the one- and two-night interval columns in each of these three tables are not warranted for reasons previously mentioned, namely that the nets in the "Remainder" column are not homogeneous for any one lift interval.

#### RELATED DATA

During 1950, scale samples from 500 randomly selected whitefish, caught by commercial fishermen at the sampling station off Big Black River, were taken for age determination of the fish. A similar series was taken early in the 1951 season, and a second series near the end of the season. In addition, a series of 500 scale samples from whitefish were taken from each of two other sampling stations, one at Loon Straits and the other at Warren's Landing. Data from these scale sample series are not presently available.

At intervals during the 1950 and the 1951 seasons, water temperatures were recorded on the fishing grounds, and elsewhere. Presumably, these data will be presented, and their significance to the whitefish fishery discussed, at another opportunity.

Table I. 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 Lake Winnipeg during the summer of 1951. The number of fish in each sample is shown in parentheses.

Area	June 1-15	June 16-30	July 1-15	July 16-31
B	2.2±0.04 (127)	2.3±0.02 (845)	2.5±0.02 (732)	2.4±0.03 (520)
C	-	-	2.6±0.07 (67)	-

Table II. The frequency distribution of round weights of whitefish in samples taken at random from the fish landed by commercial fishermen from Lake Winnipeg during the summer of 1951.

Weight in pounds	Area B				Area C
	June 1-15	June 16-30	July 1-15	July 16-31	July 1-15
.5	-	-	1	-	-
.6	-	-	0	-	-
.7	-	-	0	-	-
.8	-	1	0	-	-
.9	-	0	1	-	-
1.0	-	0	0	1	-
1.1	1	0	0	0	-
1.2	1	3	0	0	-
1.3	0	4	2	0	-
1.4	1	5	0	6	1
1.5	4	18	1	10	0
1.6	7	19	4	8	0
1.7	4	25	15	13	2
1.8	7	38	12	27	1
1.9	7	56	39	19	1
2.0	11	78	39	53	4
2.1	14	67	57	48	7
2.2	18	69	49	50	2
2.3	13	75	50	35	4
2.4	5	76	75	38	4
2.5	9	81	70	43	6
2.6	6	53	55	33	5
2.7	6	38	48	17	4
2.8	5	38	35	21	5
2.9	4	25	44	16	5
3.0	3	24	39	17	3
3.1	1	11	21	15	5
3.2	-	19	27	9	3
3.3	-	7	15	4	2
3.4	-	3	9	5	2
3.5	-	3	3	7	0
3.6	-	3	1	8	0
3.7	-	1	4	0	0
3.8	-	0	7	3	0
3.9	-	1	2	1	0
4.0	-	0	1	2	0
4.1	-	0	1	2	0
4.2	-	0	2	0	0
4.3	-	0	0	0	0
4.4	-	0	0	0	0
4.5	-	0	0	1	0
4.9	-	0	1	0	0
5.0	-	0	0	0	0
5.1	-	1	0	0	0
5.2	-	0	0	0	0
5.3	-	0	1	3	0
5.4	-	0	-	1	0
5.5	-	1	-	0	0
6.5	-	-	-	2	-

Table III. The recorded fishing effort for one night sets only expressed in hundreds of hundred-yard-nights (see text for definition) exerted by commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1951.

Area	June		July		All season
	1-15	16-30	1-15	16-31	
A	-	-	-	1.1	1.1
B	30.5	66.6	57.1	55.1	209.3
C	0.3	0.7	2.3	2.5	5.8
D	-	0.5	-	-	0.5
All areas	30.8	67.8	59.4	58.7	216.7

Table IV. The recorded fishing effort for various lift intervals exerted by the commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1951. The unit of effort in each case is defined as 100 yards of gill-net lifted once.

Area	One night	Two nights	Remainder
A	113	72	380
B	20936	6713	1835
C	585	66	479
D	54	0	0
All areas	21688	6851	2694
Percent	69	22	9

Table V. The availability (see text for definition) of whitefish in pounds round weight per unit of effort to commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1951.

Area	June		July		All summer
	1-15	16-30	1-15	16-31	
A	-	-	-	13.2	13.2
B	6.0	5.0	8.3	5.3	6.1
C	11.9	2.0	14.7	2.1	7.6
D	-	0	-	-	0
All areas	6.1	4.9	8.5	5.3	6.2

Table VI. The availability (see text for definition) of all species of fish combined, in pounds round weight per unit of effort to the commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1951.

Area	June		July		All season
	1-15	16-30	1-15	16-31	
A	-	-	-	24.1	24.1
B	11.6	10.7	13.9	8.6	16.2
C	16.1	12.4	18.0	12.3	14.7
D	-	35.4	-	-	35.4
All areas	11.7	10.9	14.0	9.0	11.4

Table VII. The availability of combined species of fish, in pounds round weight, to the commercial fishermen at Big Black River on Lake Winnipeg when gill-nets were lifted after one, two, and more than two-night intervals during the summer season of 1951.

Area	One night	Two nights	Remainder
A	24	83	35
B	16	36	14
C	15	19	7
D	35	1	-

Table VIII. Conversion factors used to estimate the round weight of fish, which is its weight when first removed from the water. These figures were calculated using data obtained from the commercial fishery and also from experimental fishing.

To convert the following to round weight	multiply by
Dressed whitefish, gills removed, no shrinkage allowance	1.1864
" " " " 5%	1.2457
" cisco " " no	1.1070
" " " " 5%	1.1623
" pikeperch, " " no	1.1958
" " " " 5%	1.2556
" headless pikeperch,..... no	1.5516
" " " " 5%	1.6292
" " sauger, (called "drawn") no	1.5161
" " " " 5%	1.5919
" headless pike,.....no	1.5344
" " " " 5%	1.6111
" " sucker, any species..no	1.5414
" " " " 5%	1.6185
One individual whitefish .....	2.5
" " cisco .....	0.75
" " burbot .....	3.4
" " sucker, any species .....	4.0
" " pikeperch .....	2.0
" " freshwater drum .....	2.0
" " sauger .....	1.25

Table IX. 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 at Big Black River on Lake Winnipeg during the summer of 1950. The number of fish in each sample is shown in parentheses.

Area	July 1-15	July 16-31	August 1-15
B	2.4±0.02 (264)	2.4±0.02 (455)	2.3±0.01 (522)

Table X. The frequency distribution of round weights of whitefish in samples taken at random from the fish landed by commercial fishermen at Big Black River on Lake Winnipeg during the summer of 1950.

Weight in pounds	Area B		
	July 1-15	July 16-31	August 1-15
.8	1	-	-
.9	0	-	-
1.0	0	-	1
1.1	1	-	0
1.2	0	7	8
1.3	2	3	3
1.4	1	3	6
1.5	1	1	7
1.6	1	6	12
1.7	2	1	10
1.8	11	14	25
1.9	15	24	33
2.0	20	39	65
2.1	7	14	43
2.2	36	51	25
2.3	24	37	44
2.4	48	58	51
2.5	20	35	36
2.6	25	50	51
2.7	7	26	18
2.8	19	33	25
2.9	4	7	19
3.0	11	19	18
3.1	1	4	3
3.2	2	7	3
3.3	0	3	3
3.4	3	5	4
3.5	0	0	5
3.6	1	3	1
3.9	0	0	1
4.0	1	0	1
4.1	1	0	0
4.2	1	1	0
4.4	1	1	0
4.5	1	1	0
4.6	1	1	0
5.0	1	1	1

Table XI. The recorded fishing effort for one night sets only expressed in hundreds of hundred-yard-nights (see text for definition) exerted by commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1950.

Area	June 16-30	July 1-15	July 16-31	August 1-15	All season
B	42.8	56.3	103.6	46.3	249.0
C	4.6	0.6	-	-	5.2
D	19.9	27.9	-	-	47.8
All areas	67.3	84.8	103.6	46.3	302.0

Table XII. The recorded fishing effort for various lift intervals exerted by the commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1950. The unit of effort in each case is defined as 100 yards of gill-net lifted once.

Area	One night	Two nights	Remainder
B	24900	3686	3410
C	520	-	-
D	4798	58	311
All areas	30218	3744	3721
Percent	80	10	10

Table XIII. The availability (see text for definition) of whitefish in pounds round weight per unit of effort to commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1950.

Area	June	July		August	All season
	16-30	1-15	16-31	1-15	
B	3.3	6.0	7.9	4.3	6.0
C	2.7	0.6	-	-	2.5
D	6.2	6.8	-	-	6.5
All areas	4.1	6.2	7.9	4.3	6.0

Table XIV. The availability (see text for definition) of all species of fish combined, in pounds round weight, per unit of effort to the commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1950.

Area	June	July		August	All season
	16-30	1-15	16-31	1-15	
B	10.9	12.1	12.1	12.3	10.9
C	8.8	3.8	-	-	8.2
D	12.6	17.5	-	-	15.5
All areas	11.3	13.8	12.1	12.3	11.6

Table XV. The availability of combined species of fish, in pounds round weight, to the commercial fishermen at Big Black River on Lake Winnipeg when gill-nets were lifted after one, two, and more than two-night intervals during the summer season of 1950.

Area	One night	Two nights	Remainder
B	11	18	19
C	8	-	-
D	10	19	33

Table XVI. 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 at Big Black River on Lake Winnipeg during the summer of 1948. The number of fish in each sample is shown in parentheses.

Area	July 1-15	July 16-31
B	2.7±0.04 (312)	2.7±0.02 (471)

Table XVII. The average size of ciscoes in pounds round weight and its standard error in samples taken at random from the fish landed by commercial fishermen at Big Black River on Lake Winnipeg during the summer of 1948. The number of fish in each sample is shown in parentheses.

Area	July 1-15	July 16-31
B	0.7±0.01 (161)	0.7±0.02 (78)

Table XVIII. The frequency distribution of round weights of whitefish in samples taken at random from the fish landed by commercial fishermen at Big Black River on Lake Winnipeg during the summer of 1948. (All area B)

Weight in pounds	July 1-15	July 16-31
1.0	0	0
1.1	1	2
1.2	2	0
1.3	1	1
1.4	0	5
1.5	3	5
1.6	4	4
1.7	2	5
1.8	2	5
1.9	2	13
2.0	6	10
2.1	15	15
2.2	16	22
2.3	9	16
2.4	20	31
2.5	33	47
2.6	35	50
2.7	21	27
2.8	24	29
2.9	23	37
3.0	27	40
3.1	18	29
3.2	10	16
3.3	7	12
3.4	8	14
3.5	5	10
3.6	5	7
3.7	0	2
3.8	2	2
3.9	2	6
4.0	3	5
4.1	1	2
4.2	0	2
4.3	0	0
4.4	0	-
4.5	1	-
4.6	0	-
4.7	1	-
4.8	1	-
4.9	0	-
5.0	0	-
6.0	1	-
9.0	1	-

Table IX. The frequency distribution of round weights of ciscoes in samples taken at random from the fish landed by commercial fishermen at Big Black River on Lake Winnipeg during the summer of 1948. (All area B)

Weight in pounds	July 1-15	July 16-31
.2	-	-
.3	1	-
.4	8	2
.5	23	9
.6	31	15
.7	30	20
.8	29	15
.9	23	10
1.0	11	4
1.1	3	2
1.2	1	1
1.3	1	0
1.4	0	-

Table XX. The recorded fishing effort for one night sets only expressed in hundreds of hundred-yard-nights (see text for definition) exerted by commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1948.

Area	June 16-30	July 1-15	July 16-31	August 1-15	All season
A	1.3	0.6	-	-	1.9
B	16.6	83.1	89.0	3.0	191.7
C	1.2	4.0	-	-	5.2
D	0.6	3.7	-	-	4.3
<del>All</del> areas	19.7	91.4	89.0	3.0	203.1

Table XXI. The recorded fishing effort for various lift intervals exerted by the commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1948. The unit of effort in each case is defined as 100 yards of gill-net lifted once.

Area	One night	Two nights	Remainder
A	189	57	57
B	19176	3507	4242
C	514	206	240
D	435	63	247
All areas	20314	3833	4786
Per cent	70	13	17

Table XXII. The availability (see text for definition) of whitefish in pounds round weight per unit of effort to commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1948.

Area	June 16-30	July 1-15	July 16-31	August 1-15	All season
A	7.1	5.3	-	-	6.5
B	2.6	4.2	3.2	5.9	3.6
C	3.2	2.1	-	-	2.4
D	1.8	4.9	-	-	4.5
All areas	3.0	4.2	3.2	5.9	3.7

Table XXIII. The availability (see text for definition) of all species of fish combined in pounds round weight to commercial fishermen at Big Black River on Lake Winnipeg during the summer season of 1948.

Area	June 16-30	July 1-15	July 16-31	August 1-15	All season
A	40.2	9.4	-	-	29.9
B	9.0	9.2	7.7	10.2	8.5
C	11.1	24.8	-	-	21.6
D	31.2	14.3	-	-	16.7
All areas	11.0	10.0	7.7	10.2	9.2

Table XXIV. The availability of combined species of fish, in pounds round weight, to the commercial fishermen at Big Black River on Lake Winnipeg, when gill-nets were lifted after one, two, and more than two-night intervals during the summer season of 1948.

Area	One night	Two nights	Remainder
A	30	29	17
B	8	15	10
C	22	26	4
D	17	20	85

END

07

03

79

FIN