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**Title**

A study of the commercial fishery of Lake Winnipeg during the winter season 1950-51 with an account of the 1949-50 winter season as an appendix.

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# INTRODUCTION

The study of the winter commercial fishery on Lake Winnipeg, beginning in December 1949, was designed as a companion to the Great Slave Lake winter study which began in 1948-49. The methods used and the problems encountered have been similar in both studies. An important difference exists in the two fisheries, which complicates the study, in that quotas are not fixed for any area in the Lake Winnipeg winter sauger fisher, thus making it virtually impossible to record current production in any area. The study is further complicated by the fact that the fishery is widely dispersed, and occupies a large area making the percentage of coverage very small.

Winter fishing methods on Lake Winnipeg have been described separately in No. 2 of this series of "Manuscript Reports of Lake Winnipeg Investigation".

Although most of the species of fish appearing in the catches in the Lake Winnipeg winter fishery are commercial fish, only three commercial species are caught which are common to all the grounds fished. These 3 species made up 93% of the total catch. In order, they are: sauger, Stizostedion canadense making up 43%; yellow walleye, S. vitreum, 28% and cisco, Leucichthys spp. 22%. Of the remainder, 3% is burbot, Lota lota, commercially unsaleable, and 1% is yellow perch, Perca flavescens. All other species combined make up 3% of the total catch. In this paper

only the three most abundant species will be treated in detail.

Only four of the statistical areas defined in Appendix II contribute much to the winter fishery and only these four (D, E, F, and G) were studied. Each area was visited at least once at two-week intervals through the two-month study period. Within each section, randomly selected fishermen were visited upon the ice while they were actually engaged in lifting their gill-nets. The fishermen were interviewed regarding the length, depth, material and mesh size of their nets, as well as the interval between lifts. The total number of nets lifted for the day, together with the weight of the various species of fish taken, was recorded. Nets were selected at random and the weights of the individuals of the various species of fish appearing in the catch were recorded. The dominant species in all sections were sauger and yellow walleye and an attempt was made to record the weight of at least 500 individuals of these two species in each section during each two-week interval. Other pertinent data were recorded some of which were of an incidental nature.

Acknowledgements

The author is indebted to Mr. K. G. Roberts who ably assisted in the collection and arrangement of these data, and to Dr. W. A. Kennedy upon whose statistical knowledge and scientific experience the author has drawn very heavily. Many thanks are due

to Mr. G. E. Butler and Mr. B. Stephanson of the Game and Fisheries Branch of the Manitoba Government and to the Lake Winnipeg fishermen, etc.

Size composition of the catch

The randomly selected samples of sauger, yellow walleye and cisco were weighed on spring scales while still unfrozen. Tables I, III, and V show that in Area G the average size for all three species remained relatively constant throughout the season. Average size tended to vary in the other areas, but an examination of Table VII indicates fairly clearly that the variance is probably due to the differences in the mesh size composition in the areas rather than an actual change. Tables II, IV and VI show the frequency distribution of sauger, yellow walleye and cisco, respectively.

Effort

The practice among the Lake Winnipeg fishermen was to set as many nets as possible, and to leave them at least a week before lifting. As the season progressed the interval tended to increase. The average lift interval for the season was 9.5 days (based on about 20% of the nets). Less than 1% of the nets were lifted after 14 to 21 days. The increased lift intervals did not appear to increase the catch per net.

A variety of mesh sizes were encountered in the investigation. Seventy-four percent of the nets encountered were 3-inch mesh, 8% were from $3\frac{1}{8}$- to $3\frac{3}{4}$-inches, and 8% were from $2\frac{3}{4}$- to $2\frac{1}{2}$-inches, all mesh sizes stretched measure. The nets varied widely in number of meshes deep, ranging from 24 to 100 meshes. The average was 56 meshes. Of the total recorded 83% were from 50 to 60 meshes deep, 8% were from 70 to 100 meshes, and the remaining 9% were from 24 to 40 meshes. Of all nets encountered 16% were nylon and 1% linen, the remainder were cotton.

Table VIII shows the fishing effort in 100 yard lifts, defined in "Manuscript Reports of Great Slave Lake Investigation, No. 2". One hundred yards is used as the unit of length, although the average length of the nets encountered in the investigation was 87 yards. The decrease in fishing effort as the season progresses as shown in Table VIII represents an actual decrease in fishing, but not necessarily in the proportion indicated. The low effort figure shown in Area D for February results from fewer interviews rather than a decrease in fishing effort, which remained fairly constant all season.

Availability

Table IX and X show that the availability of sauger and yellow walleye was highest in the last half month of January. Table XI, which shows the availability for combined species,

includes all species of fish which appeared in the catches. Table XI indicates a higher availability for the same period. These availability figures probably do not reflect actual abundance, but rather the efficiency of the fishing gear. Beginning in late January a heavy phytoplankton pulse appeared almost simultaneously in all areas, occluding the nets and seriously impaired their catching ability.

Depths fishes

There was no tendency to move nets to a different locality, and nets were quite evenly distributed over all depths, so no attempt was made to record the depth of the water at any point. However, at times fishing was better at the surface than at the bottom, and at other times an intermediate depth was the most productive. Nets were fished more often at the surface in Areas E and F throughout the winter and in Area G there was a tendency to fish high toward the end of the season. The height of the nets in the water was not recorded in the majority of cases.

Table I. The average size of saugers, in lbs. round weight and its standard error in samples taken at random from the fish landed by commercial fishermen from Lake Winnipeg, during the winter season of 1950-51. The number of fish in each sample is shown in parenthesis.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 |
|---|---|---|---|---|
| D | - | 0.70±0.01 (409) | - | - |
| E | 0.60±0.01 (468) | 0.50±0.008 (470) | 0.48±0.009 (358) | 0.62±0.01 (421) |
| F | 0.61±0.009 (520) | 0.51±0.008 (481) | 0.51±0.007 (473) | 0.56±0.01 (253) |
| G | 0.58±0.01 (406) | 0.56±.008 (457) | 0.51±0.007 (466) | 0.54±0.01 (326) |

Table II. The frequency distribution of round weights of saugers in representative samples from the fish landed by commercial fishermen from Lake Winnipeg, during the winter season 1950-51.

| Wt. in lbs. | Area G | | | | Area F | | | | Area E | | | | Area D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 16-31 |
| .1 | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - |
| .2 | 1 | 2 | 9 | 2 | - | 3 | 2 | 2 | 1 | 1 | 2 | 5 | 1 |
| .3 | 8 | 11 | 31 | 15 | 9 | 53 | 43 | 15 | 16 | 68 | 72 | 25 | 5 |
| .4 | 48 | 84 | 133 | 88 | 61 | 132 | 139 | 41 | 96 | 158 | 132 | 55 | 6 |
| .5 | 154 | 179 | 171 | 108 | 189 | 168 | 155 | 85 | 142 | 131 | 70 | 113 | 73 |
| .6 | 101 | 83 | 60 | 63 | 123 | 59 | 60 | 55 | 61 | 39 | 27 | 74 | 95 |
| .7 | 44 | 49 | 32 | 19 | 58 | 21 | 40 | 30 | 48 | 36 | 18 | 51 | 118 |
| .8 | 18 | 21 | 14 | 14 | 23 | 13 | 10 | 9 | 46 | 10 | 17 | 31 | 41 |
| .9 | 9 | 8 | 5 | 6 | 23 | 11 | 9 | 9 | 30 | 8 | 10 | 24 | 27 |
| 1.0 | 12 | 13 | 5 | 6 | 11 | 9 | 12 | 4 | 12 | 6 | 8 | 20 | 17 |
| 1.1 | 5 | 3 | 3 | 0 | 11 | 6 | 2 | 1 | 9 | 8 | 1 | 11 | 11 |
| 1.2 | 6 | 3 | 1 | 1 | 5 | 3 | 1 | 1 | 2 | 5 | 1 | 2 | 8 |
| 1.3 | - | 0 | 1 | 0 | 1 | 1 | - | 1 | 1 | - | - | 3 | 1 |
| 1.4 | - | 0 | 0 | 0 | 2 | 0 | - | - | 3 | - | - | 4 | 4 |
| 1.5 | - | 0 | 1 | 0 | 0 | 1 | - | - | 1 | - | - | 2 | 1 |
| 1.6 | - | 1 | - | 1 | 0 | - | - | - | - | - | - | 1 | 0 |
| 1.7 | - | - | - | 0 | 3 | - | - | - | - | - | - | - | 0 |
| 1.8 | - | - | - | 0 | 1 | - | - | - | - | - | - | - | 0 |
| 1.9 | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 |
| 2.3 | - | - | - | 1 | - | - | - | - | - | - | - | - | - |

Table III. The average size of pikeperch 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 winter season of 1950-51. The number of fish in each sample is shown in parentheses.

| Area | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 |
|---|---|---|---|---|
| D | 1.17±0.01 (244) | 0.90±0.03 (92) | 1.25±0.02 (196) | - |
| E | 0.88±0.03 (211) | 0.96±0.03 (208) | 0.89±0.02 (269) | 0.86±0.05 (48) |
| F | 0.83±0.03 (192) | 0.87±0.04 (95) | 0.78±0.02 (128) | 0.74±0.008 (312) |
| G | 0.76±0.01 (256) | 0.74±0.02 (341) | 0.66±0.007 (614) | 0.68±0.01 (409) |

Table IV. The frequency distribution of round weights of yellow walleye in representative samples from the fish landed by commercial fishermen from Lake Winnipeg during the winter season of 1950-51.

| Wt. in lbs. | Area G | | | | Area F | | | | Area E | | | | Area D | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 |
| .2 | - | - | - | - | 5 | - | - | - | - | 1 | 1 | - | - | - | - |
| .3 | 1 | - | 3 | 2 | 1 | 2 | - | 1 | 1 | 1 | 3 | 1 | - | - | - |
| .4 | 3 | 4 | 15 | 13 | 4 | 2 | 2 | 10 | 6 | 17 | 11 | 1 | - | - | - |
| .5 | 25 | 67 | 165 | 105 | 26 | 19 | 25 | 65 | 38 | 26 | 32 | 10 | - | 4 | - |
| .6 | 52 | 86 | 169 | 101 | 41 | 11 | 30 | 97 | 26 | 14 | 18 | 6 | - | 9 | - |
| .7 | 73 | 83 | 137 | 99 | 21 | 12 | 20 | 58 | 30 | 6 | 21 | 5 | - | 16 | 1 |
| .8 | 36 | 36 | 41 | 31 | 11 | 4 | 9 | 20 | 10 | 9 | 25 | 1 | 6 | 15 | 2 |
| .9 | 21 | 14 | 29 | 12 | 17 | 6 | 6 | 9 | 13 | 17 | 32 | 3 | 12 | 13 | 7 |
| 1.0 | 15 | 10 | 21 | 15 | 13 | 11 | 8 | 18 | 16 | 36 | 52 | 5 | 57 | 11 | 26 |
| 1.1 | 12 | 14 | 18 | 8 | 14 | 7 | 12 | 10 | 29 | 24 | 34 | 5 | 44 | 12 | 44 |
| 1.2 | 11 | 11 | 11 | 14 | 18 | 7 | 10 | 12 | 19 | 27 | 22 | 7 | 61 | 6 | 47 |
| 1.3 | 3 | 6 | 3 | 6 | 7 | 6 | 4 | 3 | 8 | 13 | 4 | 1 | 23 | 2 | 23 |
| 1.4 | 3 | 5 | 1 | 3 | 5 | 4 | 1 | 2 | 5 | 6 | 5 | 0 | 16 | 1 | 15 |
| 1.5 | 0 | 3 | 1 | - | 3 | 2 | 0 | 2 | 5 | 3 | 4 | 2 | 15 | 1 | 15 |
| 1.6 | 1 | 0 | - | - | 2 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 4 | 0 | 1 |
| 1.7 | - | 0 | - | - | 1 | 0 | - | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 1.8 | - | 1 | - | - | 0 | 0 | - | 1 | 0 | 0 | 2 | 0 | 2 | 1 | 2 |
| 1.9 | - | 0 | - | - | 2 | 0 | - | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 2 |
| 2.0 | - | 0 | - | - | 0 | 0 | - | 0 | 0 | 1 | 0 | - | 1 | - | 3 |
| 2.1 | - | 0 | - | - | 0 | 0 | - | 0 | 1 | 0 | 0 | - | 2 | - | 2 |
| 2.2 | - | 0 | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | - | 1 | - | 1 |
| 2.3 | - | 0 | - | - | 0 | 0 | - | 1 | 0 | 1 | 0 | - | - | - | 1 |
| 2.4 | - | 0 | - | - | 0 | 0 | - | 0 | 0 | 1 | 0 | - | - | - | 0 |
| 2.6 | - | 0 | - | - | 1 | 0 | - | 0 | 0 | 2 | 0 | - | - | - | 2 |
| 2.7 | - | 0 | - | - | - | 0 | - | 0 | 1 | 0 | 0 | - | - | - | - |
| 3.0 | - | 0 | - | - | - | 1 | - | 0 | 0 | 0 | 0 | - | - | - | - |
| 3.1 | - | 0 | - | - | - | - | - | 0 | 0 | 1 | 0 | - | - | - | - |
| 3.2 | - | 0 | - | - | - | - | - | 0 | 1 | 1 | 0 | - | - | - | - |
| 3.4 | - | 0 | - | - | - | - | - | 0 | - | - | 1 | - | - | - | - |
| 7.0 | - | 1 | - | - | - | - | - | 0 | - | - | - | - | - | - | - |
| 10.0 | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - |

Table V. The average size of cisco 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 winter season of 1950-51. The number of fish in each sample is shown in parentheses.

| Area | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 |
|---|---|---|---|---|
| D | 0.81±0.04 (26) | 0.54±0.01 (86) | 0.91±0.01 (146) | - |
| E | 0.56±0.01 (194) | 0.54±0.03 (35) | 0.47±0.02 (102) | 0.65±0.15 (6) |
| F | 0.39±0.01 (142) | 0.39±0.02 (100) | 0.38±0.02 (90) | 0.32±0.08 (35) |
| G | 0.35±0.01 (87) | 0.30±0.02 (71) | 0.23±0.05 (23) | 0.28±0.16 (12) |

Table VI. The frequency distribution of round weights of cisco in representative samples from the fish landed by commercial fishermen from Lake Winnipeg during the winter season 1950-51.

| Wt. in lbs. | Area G | | | | Area F | | | | Area E | | | | Area D | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 |
| .1 | 1 | - | - | 2 | 2 | - | - | 5 | 2 | - | 2 | - | - | - | - |
| .2 | 15 | 5 | 18 | 3 | 13 | 8 | 7 | 7 | 3 | - | 3 | - | 1 | - | - |
| .3 | 26 | 57 | 3 | 4 | 34 | 52 | 49 | 9 | 15 | 5 | 18 | 2 | 0 | 1 | - |
| .4 | 27 | 9 | 1 | 1 | 63 | 11 | 13 | 10 | 39 | 6 | 25 | 0 | 1 | 5 | - |
| .5 | 16 | - | 1 | 2 | 19 | 17 | 8 | 1 | 41 | 9 | 33 | 1 | 2 | 58 | 1 |
| .6 | 2 | - | - | - | 5 | 6 | 6 | 1 | 35 | 5 | 12 | 0 | 0 | 10 | 6 |
| .7 | - | - | - | - | 2 | 2 | 4 | 2 | 29 | 5 | 5 | 2 | 3 | 7 | 17 |
| .8 | - | - | - | - | 2 | 1 | 2 | - | 19 | 5 | 0 | 0 | 6 | 3 | 36 |
| .9 | - | - | - | - | 2 | 1 | 1 | - | 7 | - | 0 | 0 | 8 | 2 | 34 |
| 1.0 | - | - | - | - | - | 0 | - | - | 3 | - | 3 | 0 | 4 | - | 23 |
| 1.1 | - | - | - | - | - | 0 | - | - | 0 | - | 0 | 0 | 0 | - | 14 |
| 1.2 | - | - | - | - | - | 2 | - | - | 1 | - | 1 | 0 | 0 | - | 9 |
| 1.3 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 | - | 3 |
| 1.4 | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | 2 |
| 1.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| 1.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |

Table VII. The percentage mesh size composition of the gill-nets used by the Lake Winnipeg commercial fishermen during the winter season of 1950-51 from which the random samples of fish were taken.

| Area | Mesh size (inches) | January 1-15 | January 16-31 | February 1-15 | February 16-31 |
|---|---|---|---|---|---|
| D | under 3 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 29 | 0 | 100 |
| | over 3 | 100 | 71 | 100 | 0 |
| E | under 3 | 35 | 41 | 24 | 2 |
| | 3 | 65 | 43 | 29 | 36 |
| | over 3 | 0 | 16 | 47 | 62 |
| F | under 3 | 16 | 2 | 0 | 0 |
| | 3 | 84 | 98 | 99 | 100 |
| | over 3 | 0 | 0 | 1 | 0 |
| G | under 3 | 0 | less than 1 | 0 | 0 |
| | 3 | 99 | 99 | 100 | 100 |
| | over 3 | 1 | less than 1 | 0 | 0 |

Table VIII. The fishing effort in hundred-yard-lifts (unit effort) exerted in Lake Winnipeg by the commercial fishermen who were interviewed on the ice during the winter season of 1950-51.

| Areas | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All winter |
|---|---|---|---|---|---|
| D | - | 28 | 12 | 5 | 45 |
| E | 69 | 162 | 91 | 29 | 351 |
| F | 134 | 127 | 80 | 90 | 431 |
| G | 279 | 205 | 191 | 71 | 746 |
| All areas | 482 | 522 | 374 | 195 | 1573 |

Table IX. The availability of sauger in pounds round weight caught per unit effort to the Lake Winnipeg fishermen during the winter season of 1950-51. An asterisk indicates a value based on less than 100 units of effort.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All season |
|---|---|---|---|---|---|
| D | - | 17* | 0.45* | 57* | 17* |
| E | 20* | 17 | 10* | 9* | 15 |
| F | 12 | 9 | 10* | 5* | 10 |
| G | 11 | 14 | 4 | 4* | 9 |
| All Areas | 13 | 14 | 7 | 7 | 11 |

Table X. The availability of yellow walleye in pounds round weight caught per unit of effort to the Lake Winnipeg fishermen during the winter season of 1950-51. An asterisk indicates a value based on less than 100 units of effort.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All season |
|---|---|---|---|---|---|
| D | - | 14* | 20* | 11* | 15* |
| E | 7* | 6 | 9* | 5* | 7 |
| F | 4 | 5 | 5* | 7* | 5 |
| G | 7 | 11 | 6 | 5* | 8 |
| All areas | 6 | 8 | 7 | 6 | 7 |

Table XI. The availability of combined species in pounds round weight caught per unit of effort to the Lake Winnipeg fishermen during the winter season of 1950-51. An asterisk indicates a value based on less than 100 units of effort.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All season |
|---|---|---|---|---|---|
| D | - | 23* | 57* | 90* | 171* |
| E | 42* | 28 | 23* | 14* | 28 |
| F | 19 | 19 | 20* | 15* | 19 |
| G | 19 | 28 | 11 | 9* | 19 |
| All areas | 23 | 37 | 17 | 15 | 25 |

# A P P E N D I X A

## A study of the 1949-50 winter fishing season

A STUDY OF THE 1949-50 WINTER FISHING SEASON.

Most of these data were collected at packing stations since a vehicle was not available for a more thorough investigation. Although the data are scarce, they are believed to be reasonably representative of the fishery during the 1949-50 winter season.

Table XII showing the average size of sauger, and Table XIV of yellow walleye suggest that the average size of both species may have been a little larger than in the 1950-51 winter season. The frequency distribution of sauger is given in Table XIII and for yellow walleye in Table XIV.

It was not possible to collect adequate data concerning the mesh size, depth, or length of the nets. Where any of these data were required in making Tables XVI and XVII, 1950-51 figures were substituted.

There are no availability figures for sauger and yellow walleye. Table XVI showing the fishing effort is more indicative of the coverage given the fishery rather than of the actual condition. Table XVII shows the availability of all species combined, and is derived mostly from fishermens' estimates. Availability is markedly higher than in the following 1950-51 season.

Table XII. The average size of sauger 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 winter season of 1949-50. The number of fish in each sample is shown in parentheses.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 |
|---|---|---|---|---|
| E | - | 0.52±0.02 (95) | - | 0.62±0.03 (56) |
| F | - | - | 0.60±0.01 (119) | 0.59±0.01 (67) |
| G | 0.66±0.02 (68) | 0.63±0.02 (64) | 0.56±0.01 (135) | 0.61±0.02 (122) |

Table XIII. The frequency distribution of sauger in representative samples from fish landed by commercial fishermen during the months of January and February from Lake Winnipeg during the winter season of 1949-50.

| Wt. in lbs. | Area G | | | | Area F | | Area E | |
|---|---|---|---|---|---|---|---|---|
| | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Feb. 1-15 | Feb. 16-28 | Jan. 16-31 | Jan. 16-31 |
| .3 | - | - | 4 | 3 | - | - | 2 | 4 |
| .4 | - | 2 | 18 | 8 | 10 | 4 | 32 | 6 |
| .5 | 12 | 17 | 64 | 38 | 44 | 30 | 37 | 21 |
| .6 | 32 | 26 | 19 | 36 | 27 | 17 | 7 | 7 |
| .7 | 14 | 11 | 17 | 18 | 23 | 9 | 10 | 3 |
| .8 | 6 | 2 | 6 | 6 | 10 | 2 | 3 | 4 |
| .9 | 0 | 2 | 2 | 7 | 1 | 2 | 0 | 3 |
| 1.0 | 2 | 2 | 3 | 5 | 2 | 2 | 2 | 5 |
| 1.1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1.2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 2 |
| 1.3 | 0 | 0 | - | 0 | 0 | - | - | - |
| 1.4 | 0 | 1 | - | 0 | 2 | - | - | - |
| 1.7 | 0 | - | - | 1 | - | - | - | - |
| 2.0 | 1 | - | - | - | - | - | - | - |

Table XIV. The average size of yellow walleye 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 winter season of 1949-50. The number of fish in each sample is shown in parentheses.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 |
|---|---|---|---|---|
| E | - | 1.02±0.03 (55) | - | 0.95±0.04 (45) |
| F | - | - | 0.77±0.02 (59) | 0.82±0.02 (53) |
| G | 0.98±0.02 (98) | 0.92±0.02 (125) | 0.86±0.01 (100) | 0.82±0.02 (72) |

Table XV. The frequency distribution of yellow walleye in representative samples from fish landed by commercial fishermen during the months of January and February from Lake Winnipeg during the winter season of 1949-50.

| Wt. in lbs. | Area G | | | | Area F | | Area E | |
|---|---|---|---|---|---|---|---|---|
| | Jan. 1-15 | Jan. 16-31 | Feb. 1-15 | Feb. 16-28 | Feb. 1-15 | Feb. 16-28 | Jan. 16-31 | Feb. 16-28 |
| .4 | - | - | - | - | 1 | - | - | - |
| .5 | 1 | 1 | - | 1 | 3 | 1 | - | 4 |
| .6 | 1 | 4 | 8 | 6 | 12 | 7 | 2 | 1 |
| .7 | 8 | 21 | 14 | 17 | 9 | 7 | 8 | 4 |
| .8 | 12 | 28 | 28 | 15 | 18 | 16 | 5 | 5 |
| .9 | 18 | 22 | 18 | 17 | 5 | 10 | 5 | 9 |
| 1.0 | 30 | 32 | 24 | 14 | 8 | 10 | 9 | 10 |
| 1.1 | 13 | 9 | 5 | 1 | 3 | 2 | 10 | 2 |
| 1.2 | 8 | 4 | 3 | 1 | - | - | 6 | 2 |
| 1.3 | 4 | 1 | - | - | - | - | 4 | 5 |
| 1.4 | 1 | 1 | - | - | - | - | 4 | 2 |
| 1.5 | 1 | 0 | - | - | - | - | 2 | 1 |
| 2.0 | 1 | 0 | - | - | - | - | - | - |
| 2.7 | - | 1 | - | - | - | - | - | - |
| 3.3 | - | 1 | - | - | - | - | - | - |

Table XVI. The fishing effort in 100-yard-lifts exerted in Lake Winnipeg by the commercial fishermen who were interviewed at the packing stations during the winter season of 1949-50.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All season |
|---|---|---|---|---|---|
| E | 80 | - | 40 | - | 122 |
| F | - | - | 168 | 194 | 366 |
| G | 37 | 134 | 220 | 25 | 416 |
| All Areas | 117 | 134 | 428 | 219 | 904 |

Table XVII. The availability of combined species in pounds round weight caught per unit of effort to the Lake Winnipeg fishermen who were interviewed at the packing stations during the winter season of 1949-50. Figures based on less than one hundred units of effort are marked with an asterisk.

| Area | January 1-15 | January 16-31 | February 1-15 | February 16-28 | All season |
|---|---|---|---|---|---|
| E | 189* | - | 183* | - | 187 |
| F | - | - | 33 | 34 | 34 |
| G | 35* | 58 | 18 | 21* | 32 |
| All Areas | 141* | 58 | 39 | 32 | 187 |

# A P P E N D I X B

W. A. Kennedy

## Subdivisions of Lake Winnipeg for statistical purposes

## SUBDIVISIONS OF LAKE WINNIPEG FOR STATISTICAL PURPOSES

Figure I shows the areas into which Lake Winnipeg has been arbitrarily divided for statistical purposes. These subdivisions are defined as "Area A", "Area B", etc.

Table XVIII gives some of the characteristics of the various areas. It was prepared as follows: On the navigation charts of Lake Winnipeg (numbers 6240 and 6241), submarine contour lines were drawn at 10 foot intervals, using the values for depths that were printed on the charts as a guide. For certain parts of the charts where no depths were shown the approximate positions of the contour lines were determined by asking people familiar with those parts of the lake. Then a "Lasico" model 123 planimeter was used to measure the areas between contour lines in each subdivision. The values so derived were used to calculate the values given in Table XVIII.

The total of all these calculated values, plus the total area of islands in the lake (i.e. the total are of the lake) was found to be 9120 square miles. Since this area disagreed with the published value for the total area of the lake, Mr. J. W. Watson, director of the Geographical Bureau, of the Department of Mines and Technical Surveys, Ottawa, was asked for his opinion on the discrepancy. On the basis of the latest aerial survey maps he calculated the total area of the lake to be 9,094 square miles.

The discrepancy of 26 square miles between the two values is assumed to be the result of slight inaccuracies in mapping the navigation charts. The correct total area of Lake Winnipeg is therefore assumed to be 9,094 square miles, of which 8829 square miles are water and 265 square miles are islands. Notice that accepting this value does not effect the values given in Table XVIII. Calculations involving area and depth indicate a total volume of about 10,700,000,000,000 cubic feet of water.

In Table XVIII the "+" values indicate very limited areas. These "holes" are, in every case, in narrow channels where strong currents seem to prevent sedimentation.

In Figure I, the location of scale sampling stations are also shown from which the fish for scale samples are to be taken. They are designated and located as follows: Station I, off Warrens Landing; Station II, off Mukatawa (Big Black) River; Station III, off Berens River; Station IV, off Loon Straits; and Station V, off Gimli. The actual stations are the water area enclosed by a circle 10 miles in radius of which the respective Roman numerals are the centres.

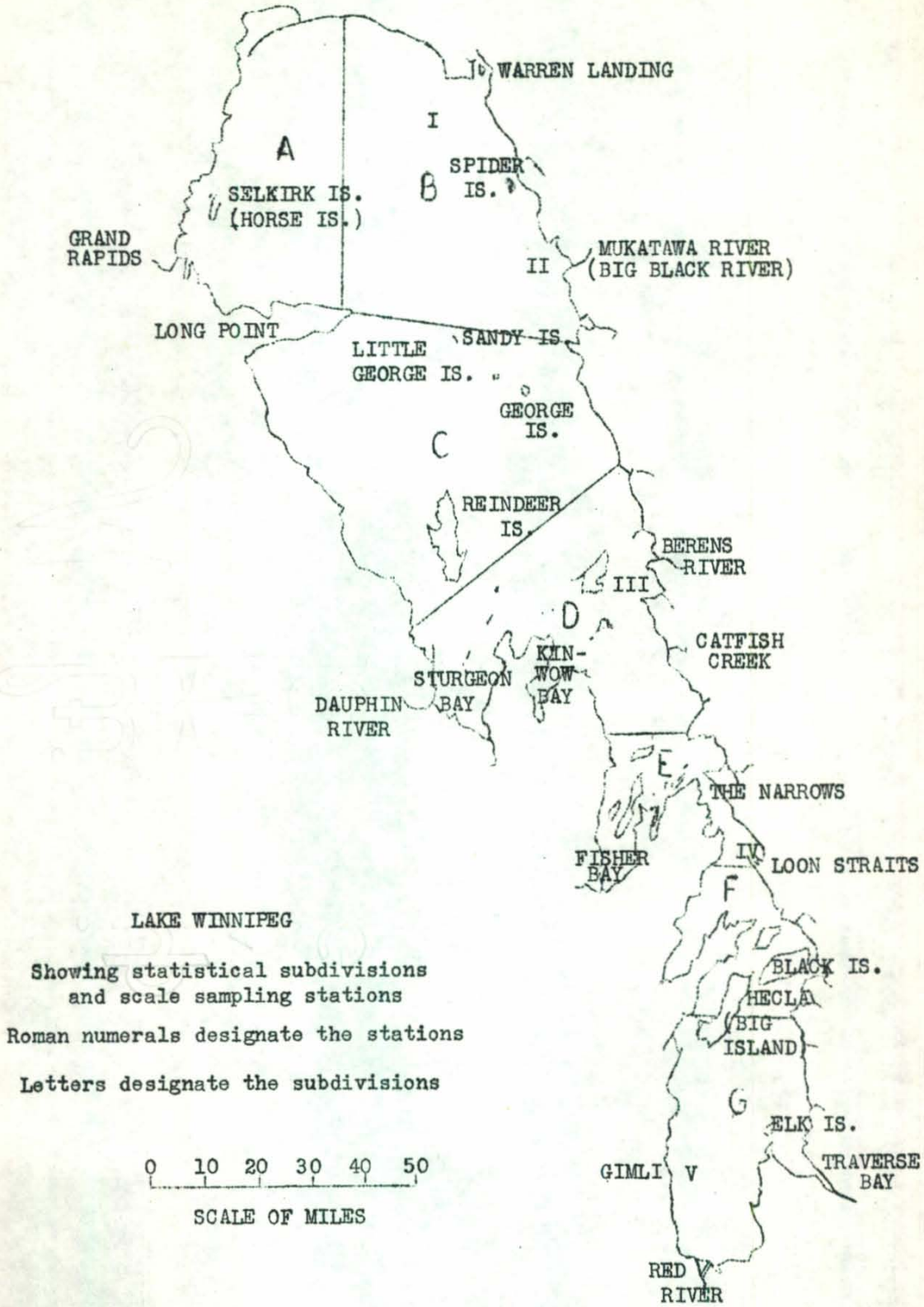


Figure I. Map of Lake Winnipeg.

Table XVIII. Some characteristics of the subdivisions--known as areas--into which Lake Winnipeg has been divided for statistical purposes.

| Area | Percentage of water surface included | Average depth feet | Percentage of each area where depth is: | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0-10 feet | 0-20 feet | 20-30 feet | 30-40 feet | 40-50 feet | 50-60 feet | over 60' |
| A | 15.4 | 48 | 3 | 7 | 7 | 2 | 46 | 35 | 0 |
| B | 20.5 | 51 | 4 | 6 | 5 | 6 | 12 | 61 | 6 |
| C | 27.4 | 48 | 2 | 7 | 9 | 10 | 29 | 37 | 6 |
| D | 16.0 | 37 | 9 | 16 | 22 | 17 | 14 | 19 | 3 |
| E | 4.6 | 29 | 20 | 32 | 27 | 9 | 9 | 3 | + |
| F | 5.3 | 30 | 16 | 17 | 28 | 33 | 6 | + | + |
| G | 10.8 | 33 | 8 | 13 | 21 | 50 | 8 | + | + |
| Whole lake | 100.0 | 43 | 6 | 11 | 13 | 15 | 21 | 31 | 3 |