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## The Crustacean Plankton of Lake Winnipeg, June to October, 1969

A.G. Salki and K. Patalas



Central and Arctic Region  
Department of Fisheries and Oceans  
Winnipeg, Manitoba R3T 2N6

1992

Canadian Data Report of  
Fisheries and Aquatic Sciences  
868



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This is the 71st Data Report  
from the Central and Arctic Region, Winnipeg

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Cat no. 97-13/868E

ISSN 0706-6465

Correct citation for this publication is:

Salki, A.G., and K. Patalas. 1992. The crustacean plankton of Lake Winnipeg, June to October, 1969. Can. Data Rep. Fish. Aquat. Sci. 868: iv + 16 p.

## TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT/RÉSUMÉ .....	iv
INTRODUCTION .....	1
METHODS .....	1
DATA SUMMARY .....	2
ACKNOWLEDGMENTS .....	2
REFERENCES .....	2

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 Zooplankton sampling stations on Lake Winnipeg, June to October, 1969 . . .	3

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Abundance of crustacean plankton species at 36 stations in 8 regions of Lake Winnipeg, June 4-12, 1969 .....	4
2 Abundance of crustacean plankton species at 56 stations in 8 regions of Lake Winnipeg, July 9-16, 1969 .....	6
3 Abundance of crustacean plankton species at 50 stations in 8 regions of Lake Winnipeg, July 24 - August 1, 1969 .....	8
4 Abundance of crustacean plankton species at 37 stations in 8 regions of Lake Winnipeg, September 2-10, 1969 .....	10
5 Abundance of crustacean plankton species at 49 stations in 8 regions of Lake Winnipeg, October 3-13, 1969 .....	12
6 Abundance of crustacean plankton species at 25 stations in 8 regions of Lake Winnipeg, October 27-31, 1969 .....	14
7 Settled net plankton volumes in Lake Winnipeg, June to October 1969 . . . .	16

### ABSTRACT

Salki, A.G., and K. Patalas. 1992. The crustacean plankton of Lake Winnipeg, June to October, 1969. Can. Data Rep. Fish. Aquat. Sci 868: iv + 16 p.

The species composition and abundance of the crustacean plankton community found in Lake Winnipeg on six sampling cruises during the period June to October, 1969 are given. Total settled volume of the net plankton collected on these cruises is also reported.

Key words: Lake Winnipeg; zooplankton; seasonal distribution; species composition; abundance.

### RÉSUMÉ

Salki, A.G., and K. Patalas. 1992. The crustacean plankton of Lake Winnipeg, June to October, 1969. Can. Data Rep. Fish. Aquat. Sci. 868: iv + 16 p.

Ce rapport présente la composition spécifique et l'abondance de la communauté des crustacés planctoniques du lac Winnipeg, telles qu'établies après six campagnes d'échantillonnage qui ont eu lieu de juin à octobre 1969. Le volume total au repos du microplancton prélevé lors de ces campagnes est également indiqué.

Mots clés: Lac Winnipeg; zooplancton; distribution saisonnière; composition spécifique; abondance.

## INTRODUCTION

Lake Winnipeg, with a surface area of 23,750 km<sup>2</sup> (Brunskill et al. 1980) is the largest remnant of glacial Lake Agassiz in western Canada. A limnological study of the lake was conducted in 1929 by Bajkov (1930) who described biological conditions, including the zooplankton community, existing at that time. In 1969, the Freshwater Institute undertook a study to characterize the physical, chemical and biological conditions of Lake Winnipeg (see Brunskill et al. 1979; Brunskill et al. 1980; Brunskill and Graham 1979; Brunskill, Schindler, Elliott et al. 1979; Brunskill, Schindler, Holmgren et al. 1980; Kenny 1979). During the intervening 40 years, Lake Winnipeg received increased nutrient loads from municipal and agricultural sources and became a regulated storage reservoir for hydroelectric power generation. Brunskill et al. (1980) describe the regional economic growth, the increased fertilizer application and the flow and level regulation impacting the lake since 1950. The purpose of this report is to document the basic data on species composition and abundance of the crustacean plankton community found in Lake Winnipeg during the period June to October, 1969. A thorough description of the spatial and temporal distributions of species and an assessment of factors affecting these variations is presented in Patalas and Salki (1992). The publication also includes a consideration of the observed differences between this study and that of Bajkov.

## METHODS

Zooplankton samples were collected from a network of 59 stations located within eight regions of Lake Winnipeg: R, W, SB (comprising the South Basin), N (Narrows separating the South and North Basins), and NBw, NBe, NBn, S (comprising the North Basin) (Fig. 1). Regionalization was based on geographic, morphometric and hydrologic features of the lake and allowed an evaluation of the effects of these parameters of plankton distributions and dynamics. Samples to study the seasonal dynamics of zooplankton were obtained during six lakewide cruises over the period June 4 to October 31, 1969.

Cruise 1	June 4-12	36 stations
Cruise 2	July 9-16	51 stations
Cruise 3	July 24 - August 1	49 stations
Cruise 4	September 2-10	37 stations
Cruise 5	October 3-13	49 stations
Cruise 6	October 27-31	25 stations

Although the number of stations sampled in each cruise varied due to weather conditions, the lake area represented by each station in North Basin regions was roughly comparable as were those in the South Basin regions (see Patalas and Salki 1992).

At each station during daylight hours, a Wisconsin net of 25 cm mouth diameter and 73  $\mu$ m mesh size was hauled vertically from just above the lake bottom to the surface at a rate of 0.5 m·s<sup>-1</sup>. Plankton samples were preserved in 10% formalin.

In the laboratory, net plankton volumes were measured after 24 hr settling in 8 x 600 mm glass tubes following the method of Bajkov (1930, 1934). Quantitative and qualitative analysis of zooplankton samples were conducted using a 63x compound microscope. At least 200 individuals were counted in 1 mL subsamples withdrawn from 40 mL samples using a calibrated 4 mm I.D. glass tube and placed in a Sedgwick-Rafter counting cell. This method provided estimates of total abundance with counting errors not exceeding 7%. Generally, more than 40 individuals of each dominant species were counted as recommended by Cassie (1971). All mature specimens and immature cyclopoid copepodids were identified to species using keys of Yeatman (1959), Wilson (1959), and Brooks (1957). Calanoid copepodids I-V, enumerated collectively, were apportioned among calanoid species in accordance with the relative abundance of adults present in the sample. Copepod nauplii were identified to family Cyclopidae and to sub-order Calanoida. Larger and/or rarer animals (*Leptodora*, *Limnocalanus*, *Holopedium*, etc.) were enumerated in the whole or a large (1/4-1/2) fraction of the sample under a 12x dissecting microscope. Zooplankton abundance was expressed as the number of specimens per litre, assuming the filtration efficiency of the net to be 100%. In fact, the efficiency was between 45 and 85%, averaging 63%, as indicated by later experiments. The South

and North Basin means presented for each cruise were considered to be weighted since stations within the South Basin regions represented comparable lake areas as did those in North Basin regions.

#### DATA SUMMARY

Tables 1 to 6 provide data on the composition and abundance per litre of the crustacean plankton community at individual stations in Lake Winnipeg during six sampling cruises in 1969. Weighted mean total abundances in the South and North Basins as well as the abundance of cyclopoid copepods, calanoid copepods and cladocerans found at each station during each cruise are also presented. Table 7 presents the settled net plankton volumes in lake Winnipeg during the period June to October, 1969.

#### ACKNOWLEDGMENTS

We thank the crew of the S.S. Bradbury and staff of the Freshwater Institute led by Dr. Gregg Brunskill for the many hours spent collecting the zooplankton samples for this report.

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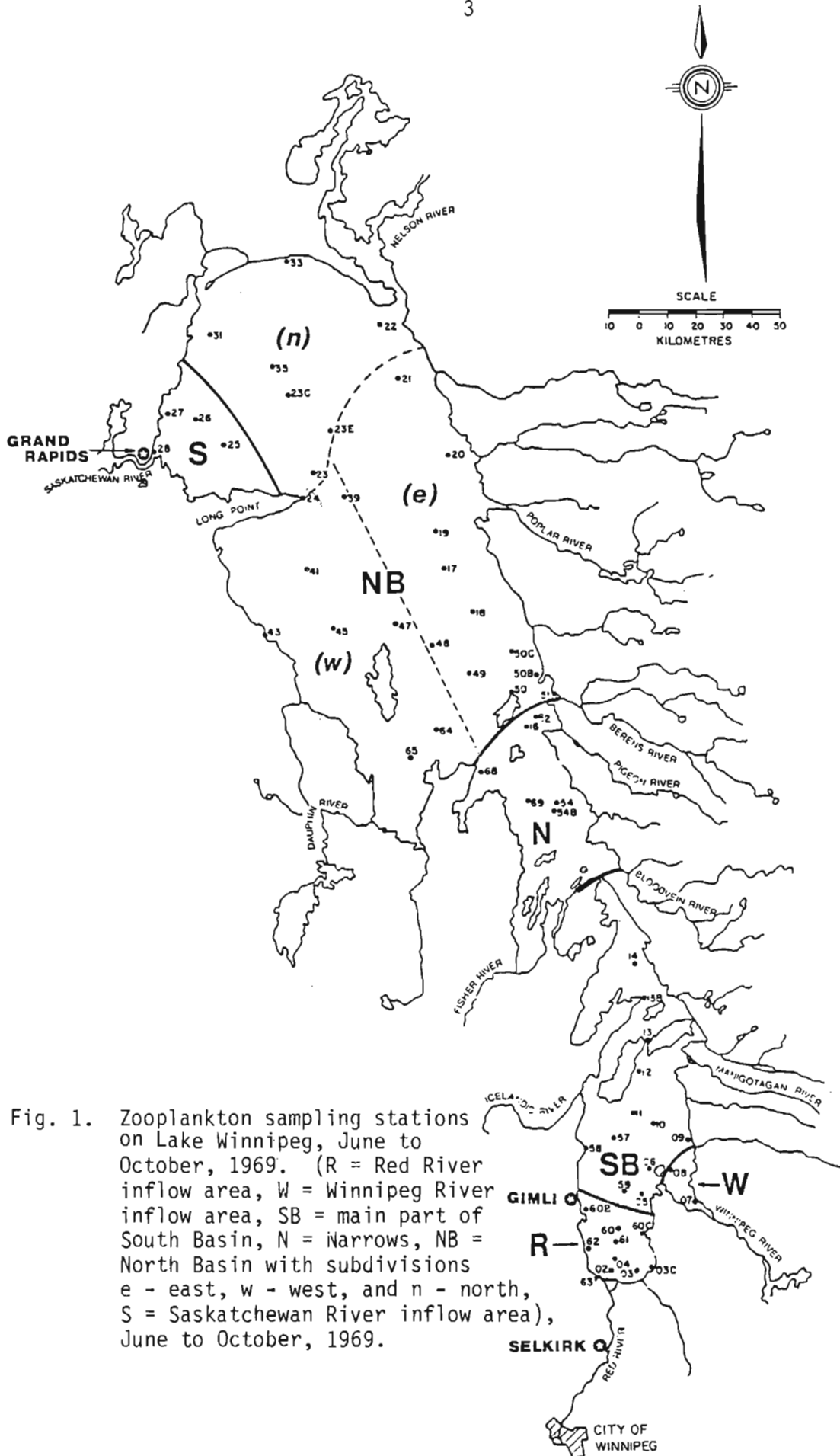


Table 1. Abundance (individuals per litre) of crustacean plankton species at 36 stations in 8 regions of Lake Winnipeg, June 4 - 12, 1969. South and North Basin means (weighted) also provided.

SPECIES	Region Station	R					SB								W		South Basin (R, SB, W) (n = 19)
		2	60	61	62	63	5	6	10	12	13	57	59	7	8		
																	MEAN
<i>L. macrurus</i>					0.03	0.06		0.02		0.07	0.14	0.01		0.02	0.02		0.026
<i>E. lacustris</i>			0.21	0.12	1.34												0.464
<i>E. nevadensis</i>	0.12	2.96	1.05	6.05	2.43	0.47	0.32	1.17	0.18	0.18	2.61	0.68					1.335
<i>D. ashlandi</i>		8.97	5.56	14.64	7.42	0.28	1.53	3.71	4.22	3.51	7.27	7.3					4.601
<i>D. oregonensis</i>	3.34					0.16											0.250
<i>D. siciloides</i>	0.34						0.22	1.23		0.22							0.144
<i>D. sicilis</i>																	
<i>D. minutus</i>																	
<i>D. leptopus</i>																	
<i>D. clavipes</i>																	
Diaptomidae copepodids													0.03	0.021			0.004
Calanoida nauplii	8.9	4.84	1.8	12.15	9.16	2.62	0.44	10.17	13.23	7.68	8.08	2.99	0.04	0.01			5.865
<i>D. c. bicuspidatus</i>	0.52	0.24	0.65			3.49	2.18	1.45		0.1		0.74	0.01	0.02			0.671
<i>A. vernalis</i>	27.24	1.21	2.79	2.8	2.4	27.47	7.41	4.94	1.01	0.21	0.17	2.43	0.07	0.06			5.729
<i>M. edax</i>																	
<i>M. albidus</i>																	
<i>E. agilis</i>	0.03				0.22		0.15		0.15	0.21							0.054
Cyclopidae copepodids	5.24	11.14	6.21	8.42	6.1	9.59	10.25	6.97	1.89	2.28	3.07	7.1	0.12	0.09			5.605
Cycopidae nauplii	49.78	17.44	15.55	14.02	13.32	50.58	15.04	20.93	6.83	3.73	8.08	20.95	0.13	0.11			16.892
<i>D. retrocurva</i>	0.01	0.49	0.81	0.02		0.454	0.06	0.05	0.01	0.01	0.07	0.38	0.01	0.01			0.170
<i>D. g. mendotae</i>		0.01		0.01			0.03			0.01	0.01	0.02	0.01				0.007
<i>D. longiremis</i>																	
<i>D. parvula</i>	0.01																0.001
<i>D. ambigua</i>																	
<i>D. pulex</i>		0.02			0.01										0.01		0.003
<i>D. schoedleri</i>	0.03					0.01	0.06										0.007
<i>C. quadrangula</i>					0.03		0.02				0.16	0.19					0.029
<i>S. vetulus</i>																	
<i>B. longirostris</i>	1.04	0.24		1.25	0.22		0.03	0.29	1.16	0.72	0.97	0.93					0.489
<i>C. sphaericus</i>																	
<i>H. gibberum</i>																	
<i>D. leuchtenbergianum</i>		0.02						0.01		0.1							0.009
<i>S. crystallina</i>																	
<i>L. kindtii</i>			0.019	0.025				0.001	0.013								0.004
<i>A. guttata</i>																	
<i>L. quadrangularis</i>																	
<i>E. lamellatus</i>																	
<i>L. setifera</i>																	
TOTAL CALANOIDA	ind L-1	12.70	16.98	8.53	34.21	19.07	3.53	2.53	19.80	18.25	12.27	17.97	11.65	0.09	0.05		12.69
TOTAL CYCLOPOIDA	ind L-1	82.81	30.03	25.20	25.24	22.04	91.13	35.03	34.29	9.88	6.53	11.32	31.22	0.33	0.28		28.95
TOTAL CLADOCERA	ind L-1	1.09	0.78	0.83	1.31	0.26	0.46	0.20	0.35	1.18	0.84	1.21	1.53	0.02	0.01		0.72
TOTAL CRUSTACEANS	ind L-1	96.60	47.79	34.56	60.76	41.37	95.12	37.76	54.44	29.31	19.64	30.50	44.40	0.44	0.34		42.36

Table 1 (cont.).

SPECIES	Region Station	Narrows			NBw			NBe					NBn							S			NORTH BASIN (NBw, NBe, NBn, S) (n = 19)		
		16	52	54	39	45	47	48	17	18	19	21	22	23e	24	31	33	35	41	43	25	26		28	
																								Mean	
<i>L. macrurus</i>		0.24	0.02	0.06	0.31	0.09	0.1	0.69	0.74	0.12	0.42	1.01	0.62	0.49	0.03	0.01	0.06	0.11	0.02	0.03	0.03	0.01	0.01	0.01	0.258
<i>E. lacustris</i>		0.19	3.7	2.47																0.03			0.61	0.034	
<i>E. nevadensis</i>				2.47																			0.12	0.006	
<i>D. ashlandi</i>		4.86	9.61	11.86	2.18	0.34	0.56	6.16	1.17	2.2	0.31	1.46	0.82	0.35	0.34	2.23	2.18	0.58	0.62		2.58	0.91	5.56	1.608	
<i>D. oregonensis</i>																									
<i>D. siciloides</i>																									
<i>D. sicilis</i>																									
<i>D. minutus</i>																									
<i>D. leptopus</i>																									
<i>D. clavipes</i>																									
Diaptomidae copepodids																							0.66	0.035	
Calanoida nauplii		0.47	4.3	3.06	6.68	1.35	3.91	11.53	6.04	10.93	5.66	2.69	7.89	3.39	2.46	3.4	2.5	2.77	2.91	3.28	5.46	6.04	2.95	4.834	
<i>D. c. bicuspidatus</i>		0.28	0.41	0.41	0.68	3.18	3.02	0.26	0.23	0.33	0.36	0.12	0.41	0.12	0.51	2.09	0.47	3.13	2.08	3.6	1.15	2.11	1.31	1.324	
<i>A. vernalis</i>		0.19	2.05	2.05	0.75	1	2.35	0.64	0.14		0.05	0.03	0.06	1.01	0.08	0.39	0.15	2.18	0.21	0.98	0.15	0.3	1.31	0.620	
<i>M. edax</i>																									
<i>M. albidus</i>																									
<i>E. agilis</i>																									
Cyclopidae copepodids		2.9	4.5	4.5	0.54	0.84	0.78	1.28	0.37	0.22	0.26	0.12	0.23	0.39	0.34	1.44	1.08	1.02	0.41	6.86	2.01	1.41	8.18	1.462	
Cyclopidae nauplii		5.42	12.68	14.31	4.43	21.8	6.71	3.46	1.73	2.53	1.51	0.82	3.79	0.86	13.67	18.72	21.67	2.69	14.84	51.04	43.69	9.77	45.8	14.186	
<i>D. retrocurva</i>			0.61	0.41		0.01																		0.001	
<i>D. g. mendotae</i>		0.09	0.2		0.03		0.01	0.01		0.02		0.01			0.01	0.02	0.05		0.02	0.03	0.01	0.01		0.012	
<i>D. longiremis</i>															0.08			0.01			0.15		0.04	0.015	
<i>D. parvula</i>																									
<i>D. ambigua</i>																									
<i>D. pulex</i>																									
<i>D. schoedleri</i>																									
<i>C. quadrangula</i>																									
<i>S. vetulus</i>																									
<i>B. longirostris</i>		0.28	1.03	2.45	0.34		0.45					0.03	0.06		0.08			0.58	0.31	0.32	2.3	1.11	0.33	0.311	
<i>C. sphaericus</i>																					0.86		1.64	0.132	
<i>H. gibberum</i>																									
<i>D. leuchtenbergianum</i>				0.2																					
<i>S. crystallina</i>																									
<i>L. kindtii</i>			0.060	0.040											0.014								0.005	0.001	
<i>A. guttata</i>																									
<i>L. quadrangularis</i>																									
<i>E. lamellatus</i>																									
<i>L. setifera</i>																									
CALANOIDA TOTAL ind L-1		5.76	17.63	19.92	9.17	1.78	4.57	18.38	7.95	13.25	6.39	5.16	9.33	4.23	2.83	5.64	4.74	3.46	3.55	4.00	8.07	6.96	9.25	6.77	
CYCLOPOIDA TOTAL ind L-1		8.79	19.64	21.27	6.40	26.82	12.86	5.64	2.47	3.08	2.18	1.09	4.49	2.38	14.60	22.64	23.37	9.02	17.54	62.48	47.00	13.59	56.60	17.59	
CLADOCERA TOTAL ind L-1		0.37	1.90	3.10	0.37	0.01	0.46	0.01		0.02		0.04	0.06		0.18	0.02	0.05	0.59	0.33	0.35	3.32	1.12	2.02	0.47	
TOTAL CRUSTACEANS ind L-1		14.92	39.17	44.29	15.94	28.61	17.89	24.03	10.42	16.35	8.57	6.29	13.88	6.61	17.61	28.30	28.16	13.07	21.42	66.83	58.39	21.67	67.87	24.84	

Table 2. Abundance (individuals per litre) of crustacean plankton species at 56 stations in 8 regions of Lake Winnipeg, July 9 - 16, 1969.  
South and North basin means (weighted) also provided.

SPECIES	Region Station	R										SB										7	W 8	South Basin (R, SB, W) (n = 23)								
		1	2	3	3c	4	60	60b	61	62	63	5	6	9	10	11	12	13b	14	57	58				59							
<i>L. macrurus</i>												0.01		0.01		0.01	0.03													Mean	0.003	
<i>E. lacustris</i>			1.38	0.13	1.18	0.13	0.25	0.03	0.18	1.28	0.66	0.39	3.19	4.94	2.09	0.08	1.92	0.90	0.33	0.91	0.70	0.42									0.916	
<i>E. nevadensis</i>			1.65	2.11	1.05	0.25	1.48	0.04	0.13	0.43	0.38	0.79	0.31		2.14	0.32	0.01	0.12		0.39	0.70	2.16	0.21									0.638
<i>D. ashlandi</i>			8.92	5.10	4.15	11.09	8.70	6.37	6.77	5.60	18.19	31.27	7.60	1.66	11.12	11.14	4.82	7.14	5.58	3.65	11.66	17.60	0.01									8.180
<i>D. oregonensis</i>		0.46	0.88	0.86	1.04	0.63		0.02		0.44	5.86	1.34	0.83	2.14	2.67		0.31	0.40		0.68	0.88	0.02									0.833	
<i>D. siciloides</i>					0.69																										0.030	
<i>D. sicilis</i>																					0.68										0.025	
<i>D. minutus</i>																																
<i>D. leptopus</i>																																
<i>D. clavipes</i>				0.01																											0.000	
Diaptomidae copepodids																						0.03									0.001	
Calanoida nauplii		10.60	11.52	7.66	20.38	49.39	37.42	37.32	44.16	7.64	38.87	25.64	29.81	39.60	41.03	41.57	10.38	22.65	30.88	15.48	14.83	37.77	0.16								24.980	
<i>D. c. bicuspidatus</i>							0.38				0.72		0.34			1.33	1.93	2.21	0.33	0.15	1.48									0.386		
<i>A. vernalis</i>		15.02	5.38	12.86	1.73	1.25	0.38	0.49	0.30	14.07	7.85	4.42	1.33	2.21	8.70	1.33	2.17	1.66	5.64	2.13	0.43	7.64	0.16								4.224	
<i>M. edax</i>																																
<i>M. albidus</i>																																
<i>E. agilis</i>				0.38											3.09														0.06		0.153	
Cyclopidae copepodids			0.48	0.38	0.18	1.66	0.38	0.49		0.80	0.36	0.44	1.00		1.24	1.77	3.85	2.21	2.32	1.36	1.25	2.41	9.00	0.29							1.386	
Cyclopidae nauplii		47.30	5.63	18.14	4.67	4.15	3.21	4.18	7.07	12.85	6.06	0.44	3.31	5.63	4.14	9.73	13.97	10.60	17.60	2.13	3.76	5.23	0.91								8.283	
<i>D. retrocurva</i>		0.10	10.30	17.00	6.68	12.45	3.97	2.70	4.72	20.09	0.72	15.03	14.25	4.70	9.64	8.85	3.14	6.35	2.65	1.67	1.48	16.07	0.01	0.12							7.065	
<i>D. g. mendotae</i>		0.01	0.25							0.80								0.03													0.047	
<i>D. longiremis</i>																																
<i>D. parvula</i>																																
<i>D. ambigua</i>				0.38																											0.017	
<i>D. pulex</i>			0.02																												0.001	
<i>D. schoedleri</i>										0.80					0.02																0.036	
<i>C. quadrangula</i>				0.38						0.40																					0.034	
<i>S. vetulus</i>																																
<i>B. longirostris</i>		5.30	2.93	12.10	4.33	0.83	0.57	0.24	0.30	8.44	3.92	1.77	3.98	1.10	12.43	13.71	5.78	1.11	3.98	3.49	3.15	1.61	0.22								3.969	
<i>C. sphaericus</i>																																
<i>H. gibberum</i>																																
<i>D. leuchtenbergianum</i>		0.22	0.25		0.18	0.08			0.17	0.40	1.55	0.44	1.33	0.18	0.04		0.01	0.03	0.09			0.03									0.217	
<i>S. crystallina</i>																																
<i>L. kindtii</i>		0.120	0.020		0.02		0.030			0.020	0.060		0.110	0.130	0.006	0.060	0.080	0.13	0.110		0.030										0.040	
<i>A. guttata</i>		0.44																													0.019	
<i>L. quadrangularis</i>																																
<i>E. lamellatus</i>																																
<i>L. setifera</i>																													0.03		0.001	
CALANOIDA TOTAL ind L-1		11.08	24.35	15.77	28.49	61.39	47.85	43.78	51.24	15.37	57.44	64.22	39.48	45.18	61.38	57.69	15.28	32.17	37.76	19.85	29.25	59.11	0.19	0.66							35.61	
CYCLOPOIDA TOTAL ind L-1		62.32	11.49	31.76	6.68	7.06	4.36	5.16	7.37	27.72	14.99	5.30	5.98	7.74	14.08	17.25	21.92	16.58	25.89	5.77	6.91	15.28	9.00	1.42							14.43	
CLADOCERA TOTAL ind L-1		6.19	13.77	29.66	11.11	13.34	4.57	2.94	5.19	30.95	6.25	17.24	19.67	6.11	22.02	22.63	9.01	7.65	6.83	5.16	4.66	17.68	0.01	0.40							11.45	
TOTAL CRUSTACEANS ind L-1		79.57	49.61	77.39	46.18	81.79	56.77	51.88	63.80	74.04	78.68	86.76	65.11	59.03	97.48	97.57	46.21	56.40	70.48	30.78	40.82	92.07	9.20	2.48							61.48	

Table 2 (cont.).

SPECIES	Region Station	Narrows					NBw				NBe										NBn						S				North Basin (NBw, NBe, NBn, S) (n = 28)
		68	69	52	54	16	39	64	45	41	17	18	19	20	21	48	50	50c	51	22	23c	23e	31	33	35	25	26	27	28	Mean	
<i>L. macrurus</i>		0.15	0.05	0.06	0.01	0.06		0.41	0.01	0.01	0.08	0.18	0.18	0.16	0.56	0.31	0.06	0.01	0.01		0.17		0.01	0.07					0.01	0.091	
<i>E. lacustris</i>		0.01	0.77	0.17	0.32	0.81			0.44	0.44	0.05		0.01	0.36		0.02	0.16	0.12			0.01	0.01	0.22	0.42	0.01		0.62	0.51	0.192		
<i>E. nevadensis</i>		0.02	0.29	0.13	0.02	0.11	0.4				0.15		0.01	0.36	0.84		0.05	0.1	4.47	1.59	0.77	0.05	0.45		0.04	0.07	1.05	0.09	0.395		
<i>D. ashlandi</i>		6.99	13.75	2.74	11.7	8.42	0.65	1.05	1.05	1.33	3.73	1.51	2.79	23.69	3.24	0.6	4.03	4.78	0.01	4.21	0.06	2.08	1.81	2.22	2.9	0.44	0.91	1.23	1.35	3.903	
<i>D. oregonensis</i>			0.69	0.13	0.69	0.8			0.04								0.21	0.19											0.11	0.102	
<i>D. siciloides</i>							0.07																						0.11	0.006	
<i>D. sicilis</i>					0.69		0.07				0.09																			0.030	
<i>D. minutus</i>																				0.01									0.11	0.004	
<i>D. leptopus</i>																															
<i>D. clavipes</i>																															
Diaptomidae copepodids																															
Calanoida nauplii		33.47	14.61	7.09	35.54	15.21	3.51	5.8	3.64	1.77	6.11	2.93	5.64	5.55	2.9	9.05	17.41	30.93	4.43	3.12	4.03	0.6	8.67	2.9	2.21	1.83	2.86		8.279		
<i>D. c. bicuspidatus</i>		0.73	0.52	0.09		1.86		0.83	0.58	0.89	0.34	0.03	0.42	0.36	0.25	0.11	0.27	0.35	1.99	3.12	0.13	1.21		0.41	0.44	2.29	0.27	0.48		0.642	
<i>A. vernalis</i>		3.35	2.24	0.48	4.42	0.66	0.78	0.74	0.15	0.89	0.51	0.15	0.78	0.83	0.99	0.39		1.03	3.1											0.764	
<i>M. edax</i>																															
<i>M. albidus</i>																															
<i>E. agilis</i>																															
Cyclopidae copepodids		1.02	0.69	0.19	0.92	0.74	20.66	1.99	8.87	21.22	2.72	0.86	2.44	4.84	4.39	3.3	0.94	1.89	30.78	120.07	10.53	23.51	6.67	22.78	42.01	37.49	20.08	5.3	14.175		
Cyclopidae nauplii		2.33	3.44	4.35	6.63	4.08	44.4	4.14	36.2	42.45	1.44	0.74	2.08	3.07	1.83	1.96	4.18	2.75	5.1	154.38	6.37	82.57	24.01	47.24	53.51	84.12	10.68	11.33	23.046		
<i>D. retrocurva</i>		0.58	0.34	0.86	1.66	0.19	0.39	0.09	0.44	0.44			0.24	0.24		0.06	1.22	0.52	0.01	1.56			0.22				1.37	1.44	0.424		
<i>D. g. mendotae</i>						0.56	1.17	0.09	0.29					0.08	0.06	0.13	0.17										0.27	1.93	0.170		
<i>D. longiremis</i>							2.34													0.44								5.06	0.280		
<i>D. parvula</i>																															
<i>D. ambigua</i>																															
<i>D. pulex</i>																															
<i>D. schoedleri</i>																															
<i>C. quadrangula</i>																															
<i>S. vetulus</i>																															
<i>B. longirostris</i>		1.31	0.52	1.04	1.29	1.49	3.12	0.74	4.65	10.61	0.17		0.12	0.36	0.58	0.39	1.09	1.72	0.02	3.32	17.15	2.6	6.43	1.33	11.6	1.77	15.54	1.09	7.71	3.458	
<i>C. sphaericus</i>										0.44																0.46		0.48		0.049	
<i>H. gibberum</i>																															
<i>D. leuchtenbergianum</i>									0.02																				0.96	0.035	
<i>S. crystallina</i>																															
<i>L. kindtii</i>		0.010	0.009	0.010	0.008	0.040							0.006				0.006	0.030						0.006			0.030	0.100	0.050	0.011	
<i>A. guttata</i>																															
<i>L. quadrangularis</i>																															
<i>E. lamellatus</i>																															
<i>L. setifera</i>																															
CALANOIDA TOTAL	Ind L <sup>-1</sup>	40.64	30.16	10.32	48.97	25.41	4.70	7.26	5.18	3.55	10.21	4.60	8.63	30.12	7.54	9.98	21.92	36.13	0.01	13.12	4.78	7.06	2.47	11.57	6.29	2.70	2.81	5.66	2.29	13.00	
CYCLOPOIDA TOTAL	Ind L <sup>-1</sup>	7.43	6.89	5.11	11.97	7.24	65.84	7.70	45.80	65.45	5.01	1.78	5.72	9.10	7.46	5.76	5.39	6.02	40.97	277.57	17.03	107.29	30.68		95.96	123.90	30.93	17.11	38.63		
CLADOCERA TOTAL	Ind L <sup>-1</sup>	1.90	0.87	1.91	2.96	2.28	7.02	0.92	5.40	11.49	0.17		0.37	0.60	0.66	0.51	2.45	2.44	0.03	3.32	18.71	2.60	5.43	1.55	11.61	2.21	18.03	2.83	17.63	4.42	
TOTAL CRUSTACEANS	Ind L <sup>-1</sup>	49.97	37.92	17.34	63.90	34.93	77.56	15.88	56.38	80.49	15.39	6.38	14.72	39.82	15.66	16.25	29.78	44.59	0.04	57.41	301.06	26.69	115.19	43.80	88.33	100.87	142.74	39.42	37.03	56.05	

Table 3. Abundance (individuals per litre) of crustacean plankton species at 50 stations in 8 regions of Lake Winnipeg, July 24 - August 1, 1969. South and North basin means (weighted) also presented.

SPECIES	Region Station	R									SB									W		South Basin (R,SB,W) (n = 19) Mean	
		3	3c	4	60	60b	60c	61	62	63	5	6	9	12	14	57	58	59	7	8			
<i>L. macrurus</i>						0.04			0.07														0.01
<i>E. lacustris</i>		0.23	2.72	0.71	1.46	2.4	0.39	1.52	5.07	0.7	2.29	4.94	11.31	3.14	1.88	3.78	0.53	1.81			1.65		2.45
<i>E. nevadensis</i>		1.41	8.12	5.91	10.21	3.54	5.07	3.94	3.95	2.79	9.14	9.18	0.47	1.79	5	0.79	0.33	4.37			2.75		4.145
<i>D. ashlandi</i>		15.22	20.88	29.02	16.3	48.21	30.94	19.33	89.3	39.14	13.06	10.1	9.8	14.7	20.21	14.78	86.35	11.52	0.13	1.58			25.819
<i>D. oregonensis</i>		7.6	11.6	1.38	1.26				1.38	0.91	1.31	0.53	2.17	1.13		0.7	3.08	1.16			1.74		2.016
<i>D. siciloides</i>						0.99		0.69		0.91													0.136
<i>D. sicilis</i>																							
<i>D. minutus</i>																							
<i>D. leptopus</i>																							
<i>D. clavipes</i>																							
Diaptomidae copepodids																							
Calanoida nauplii		74.94	41.82	39.24	41.97	43.73	42.48	40.99	135.53	12.99	33.53	28.24	12.8	18.3	28.37	26.05	82.55	23	0.03	20.07			39.296
<i>D. c. bicuspidatus</i>						0.04			2.58	0.5				1.06	2.15	0.7	0.3						0.386
<i>A. vernalis</i>		32.59	60.4	2.77	2.06	3.65	7.28	4.09	28.39	3.99	0.37		0.83	5.98	2.16	3.87	1.71	0.59	0.07				8.463
<i>M. edax</i>																							
<i>M. albidus</i>																							
<i>E. agilis</i>																							
Cyclopidae copepodids		4.88	3.08	1.1	1.38		1.82		1.29		0.37			3.17	1.72	2.82	2.58	0.89					1.321
Cyclopidae nauplii		115.71	111.5	6.09		11.39	21.25	2.73	16.79	49.46	1.85	2.05	2.89	17.6	28.39	13.73	16.33	1.77		2.22			22.197
<i>D. retrocurva</i>		45.62	21.76	8.3	3.43	4.6	6.07	3.74	23.24	3.99	2.95	3.82	1.41	2.11	3.44	2.45	3.45	7.09	0.2	1.28			7.839
<i>D. g. mendotae</i>			4.64	0.09	0.02	0.65	0.81	0.02		0.01	0.02	0.17	0.02	0.02	0.07		0.13	0.12					0.347
<i>D. longiremis</i>																							
<i>D. parvula</i>																							
<i>D. ambigua</i>																							
<i>D. pulex</i>							0.61	0.46									0.87						0.102
<i>D. schoedleri</i>																							
<i>C. quadrangula</i>																							
<i>S. vetulus</i>																							
<i>B. longirostris</i>		4.88			0.34	2.73	3.03	0.91	14.17		1.48	0.59	0.41	0.35		1.05	3.44	7.37		0.73			2.183
<i>C. sphaericus</i>																							
<i>H. gibberum</i>																							
<i>D. leuchtenbergianum</i>		3.26	10.84	2.77	1.38	1.47	6.07	0.73	11.62	6.99	0.37	2.94	0.21	0.7	3.44	0.7	0.87	0.89		0.18			2.917
<i>S. crystallina</i>																							
<i>L. kindtii</i>		0.080	1.040	0.200	0.090	0.020	0.070	0.090	0.530	0.090	0.040	0.020	0.050	0.070	0.090	0.180	0.180	0.040					0.152
<i>A. guttata</i>																							
<i>L. quadrangularis</i>		1.62	1.56																0.07				0.171
<i>E. lamellatus</i>																							
<i>L. setifera</i>																							
TOTAL CALANOIDA ind L-1		99.40	85.14	76.26	71.20	98.91	78.88	67.85	236.27	57.44	59.33	52.99	36.55	39.06	55.46	46.10	172.84	41.86	0.16	27.79			73.87
TOTAL CYCLOPOIDA ind L-1		153.18	174.98	9.96	3.44	15.08	30.35	6.82	49.05	53.95	2.59	2.05	3.72	27.81	34.42	21.12	20.62	3.55	0.07	2.22			32.37
TOTAL CLADOCERA ind L-1		55.46	39.84	11.36	5.26	9.47	16.46	5.95	49.56	11.08	4.86	7.54	2.10	3.25	7.04	4.38	8.94	15.51	0.27	2.19			13.71
TOTAL CRUSTACEANS ind L-1		308.04	299.96	97.58	79.90	123.46	125.69	80.62	334.88	122.47	66.78	62.58	42.37	70.12	96.92	71.60	202.40	60.92	0.50	32.20			119.95

Table 3 (cont.).

SPECIES	Region Station	Narrows					NBw						NBe						NBn						S				North Basin (NBw, NBe, NBn, S (n = 30))			
		68	69	62	64	16	39	64	85	45	41	43	48	50b	50c	51	17	18	19	20	21	22	23c	23e	31	33	35	25	26	27	28	Mean
<i>L. macrurus</i>		0.08	0.06	0.06	0.03	0.04	0.04	0.85				0.03				0.03	0.03	0.45	0.22	0.04		0.03	0.48		0.01						0.02	0.076
<i>E. lacustris</i>		0.22	0.94	0.51	3.75	0.86	0.04	0.05	1.29	0.16	0.24	0.08	2.22	0.12	0.05		1.01	0.02	0.17	0.04	0.01	0.01	0.31	0.05	0.31	0.01		0.03	0.11	0.04	0.432	
<i>E. nevadensis</i>		0.45	1.51	0.82	1.41	0.86	0.04	0.03	4.51	0.11	0.07	0.1	0.37	0.06		0.02	0.6	0.22	0.11	0.01	0.01	0.08	0.04		0.03	0.04	0.03	0.06	0.15	0.397		
<i>D. ashlandi</i>		4.08	19.16	4.92	19.66	8.89	3.19	9.74	21.74	2.38	5.09	11.62	6.45	3.87	0.1	2.04	14.55	5.56	2.21	2.31	2.21	3.19	3.37	1.47	0.57	2.9	1.07	1.42	3.38	5.71	5.882	
<i>D. oregonensis</i>				0.27					0.34	1.02	0.27									0.1		0.01	0.31	0.29			0.24	0.69	3.61	0.238		
<i>D. siciloides</i>										0.27																		0.22	0.6	0.036		
<i>D. sicilis</i>																													0.29	0.010		
<i>D. minutus</i>										0.56													0.59	0.07			0.69	2.1	0.134			
<i>D. leptopus</i>																																
<i>D. clavipes</i>																																
Diaptomidae copepodids																																
Calanoida nauplii		7.05	9.83	11.71	15.79	19.49	6.38	13.23	37.86	8.5	9.68	14.26	11.05	24.5		16.49	29.03	18.81	11.88	8.95	8.29	3.91	6.18	4.23	9.79	1.13	0.53	2.21	11.61	14.05	11.636	
<i>D. c. bicuspidatus</i>		0.43	0.49	0.11	0.65	0.29	2.28	2.5	5.17	1.53	2.04	1.94	0.18			2.64	2.58	1.21	1.11	4.82		0.97	2.91	1.88		0.64	1.8	1.66	2.77	2.82	1.648	
<i>A. vernalis</i>		0.34	2.21	0.44	2.26	4.59	2.28	4.99	3.88	1.19	2.04	1.94	1.47	1.81	0.05	1.02	1.61	0.48	0.14	3.1		0.64	1.94		0.31	3.87	1.6	2.21	5.63	1.766		
<i>M. edax</i>																																
<i>M. albidus</i>																																
<i>E. agilis</i>																																
Cyclopidae copepodids		0.85	2.46	0.44	1.61	0.57	33.25	3.74	5.81	14.81	48.86	1.69	0.55	2.06		3.14	4.2	3.39	2.9	23.4	7.74	29.36	6.58	56.31	28.43	9.88	47.53	45.91	48.66	10.2	15.754	
Cyclopidae nauplii		4	10.07	3.87	28.99	7.45	25.05	11.49	29.69	17.01	26.48	11.61	3.13	11.09	0.1	14.29	10.97	10.16	9.13	15.49	21.28	17.74	8.91	26.28	42.03	4.38	40.05	42.59	21.01	13.02	17.661	
<i>D. retrocurva</i>		0.25	1.22	0.66	3.55	2.92	1.36	2.75	6.31	1.36	1.53	0.48	1.28	3.09	0.1	1.87	2.59	1.69	0.55	0.69	0.28	0.64	0.78	1.88	0.63	0.33	1.07	1.66	4.97	1.4	1.644	
<i>D. g. mendotae</i>		0.96	0.25	0.88	0.64	0.08	1.36	0.75	3.51	0.64	1.16	0.73	1.65	0.77		0.17	1.94	0.97	0.28	0.01	0.28	0.2	0.58		0.09	0.13	0.63	0.09	3.87	5.28	0.927	
<i>D. longiremis</i>							5.02		0.34	4.08													0.58	1.41	0.03	0.16	1.6	3.31	1.66	5.98	0.806	
<i>D. parvula</i>																																
<i>D. ambigua</i>																																
<i>D. pulex</i>																																
<i>D. schoedleri</i>																																
<i>C. quadrangula</i>																																
<i>S. vetulus</i>																																
<i>B. longirostris</i>		0.42	0.01	0.88	1.29	2.01	6.82	0.25	1.4	3.23	8.15	0.24	2.03	2.64	0.4	1.36	1.94	2.42	1.66	8.95	8.57	6.45	4.64	6.56	22.41	2.26	3.74	12.71	8.84	1.05	4.212	
<i>C. sphaericus</i>							0.45				0.47				0.65						0.28	0.32	0.19			0.16			4.93	0.248		
<i>H. gibberum</i>																																
<i>D. leuchtenbergianum</i>		0.08	0.98	0.44	2.89	0.29		0.75	0.7	0.03	0.47		0.18	0.26							0.01	0.01			0.31						0.247	
<i>S. crystallina</i>																																
<i>L. kindtii</i>		0.020	0.004	0.020	0.150	0.020	0.020	0.030	0.050	0.030	0.080	0.290	0.200	0.130		0.020	0.010	0.050	0.010	0.030		0.010	0.030	0.060	0.090	0.006	0.010	0.010	0.090	0.020	0.050	
<i>A. guttata</i>																																
<i>L. quadrangularis</i>																																
<i>E. lamellatus</i>																																
<i>L. setifera</i>																																
TOTAL CALANOIDA	Ind L <sup>-1</sup>	11.88	31.50	18.29	40.64	30.14	9.65	23.09	66.05	11.48	16.10	17.82	26.09	20.09	28.55	0.15	18.58	45.22	25.06	14.59	11.45	10.51	7.16	10.71	6.67	10.74	4.08	1.64	3.93	16.78	26.57	18.84
TOTAL CYCLOPOIDA	Ind L <sup>-1</sup>	5.62	15.23	4.86	33.51	12.90	62.86	22.72	44.55	34.54	77.42	78.14	17.18	5.33	14.96	0.15	21.09	19.36	15.24	13.28	46.81	29.02	48.71	20.34	84.47	70.77	18.55	90.78	90.16	74.65	31.67	36.83
TOTAL CLADOCERA	Ind L <sup>-1</sup>	1.73	2.48	2.88	8.52	5.32	15.03	4.53	11.97	5.60	15.03	5.47	1.45	5.34	7.09	1.15	3.42	6.48	5.13	2.50	9.68	9.42	7.63	6.80	9.91	23.56	3.05	6.95	17.78	19.43	18.66	8.13
TOTAL CRUSTACEANS	Ind L <sup>-1</sup>	19.23	49.19	26.03	82.67	48.36	87.54	50.34	122.6	51.62	108.6	101.4	44.72	30.76	50.60	1.45	43.09	71.06	45.43	30.37	67.94	48.95	63.50	37.85	101.1	105.1	25.68	99.37	111.9	110.8	76.90	63.80

Table 4. Abundance (individuals per litre) of crustacean plankton species at 37 stations in 8 regions of Lake Winnipeg, September 2 - 10, 1969. South and North basin means (weighted) also presented.

SPECIES	Region Station	R									SB								W		South Basin (R,SB,W) (n = 19)				
		2	3	3c	4	60	60b	60c	61	62	5	6	10	12	14	57	58	59	7	8					
<i>L. macrurus</i>				0.07	0.35	0.04	0.1	0.04	0.04				1		0.01		0.01							Mean	
<i>E. lacustris</i>				0.28	1.19	0.03	0.28	0.29	0.04	0.2	0.01	0.18	0.73	0.28	1.09	1.82	3.12	1.01	0.01	0.01				0.054	
<i>E. nevadensis</i>		0.35		0.07	0.35	0.04	0.1	0.04	0.04															0.468	
<i>D. ashlandi</i>		83.94	4.9	8.34	51.12	11.92	17.78	35.61	39.57	84.59	10.33	2.46	16.02	16.07	19.79	23.09	98.83	25.37	0.06	0.01				0.276	
<i>D. oregonensis</i>		8.39	0.54	9.12	2.56	0.61	0.32	0.99	2.41	2.38	2.44	0.94	1.02	0.87	1.21	1.27	5.62	1.95		0.01				2.245	
<i>D. siciloides</i>		117.54	1.1	3.8	2.56	2.74		3.95	7.18	9.67	1.21	1.89		0.29				1.31						8.065	
<i>D. sicilis</i>																									
<i>D. minutus</i>																									
<i>D. leptopus</i>																									
<i>D. clavipes</i>																									
Diaptomidae copepodids																									
Calanoida nauplii		80.18	3.7	12.36	20.88	21.32	7.98	18.72	27.08	49.26	10.19	6.81	25.13	9.1	13.47	14.96	7.11	14.01	0.01	0.34				18.032	
<i>D. c. bicuspidatus</i>																			0.01						0.001
<i>A. vernalis</i>		69.94	4.26	27.7	6.4	4.72	2.13	11.95	14.05	25.58	9.72	2.82	1.07	1.16	6.2	6.16	12.8	11.88	0.01	0.05				11.505	
<i>M. edax</i>												0.01													0.001
<i>M. albidus</i>																									
<i>E. agilis</i>																			0.01						0.001
Cyclopidae copepodids		1.7													0.54	0.29									0.146
Cyclopidae nauplii		80.18	12.08	34.5	8.94	3.59	3.37	40.04	32.6	44.53	8.54	4.82	3.2	5.62	8.62	14.38	4.27	5.48			0.19			16.576	
<i>D. retrocurva</i>		3.42	0.84	5.96	0.42	0.72	2.6	1.02	2.85		0.24	0.24	0.85	0.19	2.69	0.29	0.61		0.01	0.03				1.209	
<i>D. g. mendotae</i>		20.46	1.12	2.14	4.7	1.58	3.56	14.56	5.52	5.69	4.97	2.35		1.16	2.14	2.93	12.8	3.35		0.04				4.688	
<i>D. longiremis</i>																									
<i>D. parvula</i>			0.14	0.06																					0.011
<i>D. ambigua</i>																									
<i>D. pulex</i>																									
<i>D. schoedleri</i>																									
<i>C. quadrangula</i>		5.12	0.42	0.03						0.03										0.01					0.295
<i>S. vetulus</i>																									
<i>B. longirostris</i>			0.28			1.13			0.51			0.35	0.21	0.97	1.07	0.88				0.01	0.03				0.286
<i>C. sphaericus</i>																									
<i>H. gibberum</i>																				0.01					0.001
<i>D. leuchtenbergianum</i>		13.64		2.13	2.56	0.45	0.17	1.58	1.51	6.62	0.94	0.47	1.28	0.19	0.54	0.59	2.13	1.83			0.01				1.927
<i>S. crystallina</i>																									
<i>L. kindtii</i>		0.030	0.010	0.030	0.030			0.020	0.200		0.010	0.003	0.006		0.020		0.030					0.060			0.024
<i>A. guttata</i>																									
<i>L. quadrangularis</i>																				0.01					0.001
<i>E. lamellatus</i>																									
<i>L. setifera</i>																									
CALANOIDA TOTAL	ind L-1	290.40	10.24	33.97	78.66	36.66	26.46	59.60	76.32	146.10	24.24	12.28	43.28	27.65	36.57	42.02	114.90	43.66	0.08	0.37					58.08
CYCLOPOIDA TOTAL	ind L-1	151.82	16.34	62.20	15.34	8.31	5.50	51.99	46.65	70.11	18.50	7.65	4.27	6.78	15.36	20.83	17.07	17.36	0.03	0.24					28.23
CLADOCERA TOTAL	ind L-1	42.67	2.81	10.35	7.71	3.16	4.45	18.74	8.56	15.39	6.16	3.41	2.35	2.51	6.46	4.69	14.96	5.79	0.05	0.17					8.44
TOTAL CRUSTACEANS	ind L-1	484.89	29.39	106.52	101.71	48.13	36.41	130.33	131.53	231.60	48.90	23.34	49.90	35.94	58.39	67.54	146.93	66.81	0.16	0.78					94.69



Table 4 (cont.).

SPECIES	Region Station	NBw			NBe				NBn			S			North Basin (NBw,NBe,NBn,S) (n = 13)
		45	39	64	18	19	21	50c	22	23c	31	25	26	28	Mean
<i>L. macrurus</i>			0.09	0.1	0.05	0.01	0.01	0.18					0.01		0.029
<i>E. lacustris</i>		0.98	0.26	0.29	0.14	0.1	0.34	0.61		0.1	0.07	0.03		0.19	0.313
<i>E. nevadensis</i>		0.59	0.12	0.09	0.14	0.06	0.05	0.54	0.01	0.02		0.02	0.32		0.137
<i>D. ashlandi</i>		7.98	5.68	8.59	9.62	5.52	17.16	11.8	8.91	3.33	1.56	2.41	3.92		7.157
<i>D. oregonensis</i>		0.72	0.58	0.2	0.88	0.17	1.07		2.99	2.65	0.42	2.64	1.59	3.08	1.074
<i>D. siciloides</i>												1.53	0.19	0.27	0.184
<i>D. sicilis</i>					0.03		0.54	0.2							0.072
<i>D. minutus</i>			0.19				2.68		0.89	0.99	0.06	1.11	0.29	0.7	0.384
<i>D. leptopus</i>															
<i>D. clavipes</i>															
Diaptomidae copepodids															
Calanoida nauplii		21.49	12.88	14.39	8.99	4.41	21.06	16.55	8.1	7.54	4.57	4.55	8.81	1.16	11.102
<i>D. c. bicuspidatus</i>		6.14	2.15		1.2	2.47	15.32		13.64	3.9	3.47	2.27	1.42	0.19	2.898
<i>A. vernalis</i>		14.33	3.44	2.8	6.99	0.96	11.11	3.31	13.21	5.46	2.36	8.24	5.69	5.82	5.931
<i>M. edax</i>														0.39	0.022
<i>M. albidus</i>															
<i>E. agilis</i>															
Cyclopidae copepodids		4.1	2.58		2.2	1.72	18.38	0.42	23.45	8.06	3.31	6.82	3.98	0.19	4.223
Cyclopidae nauplii		54.74	24.72	16.59	12.39	7.2	42.5	51.32	57.56	20.79	17.64	17.91	20.75	4.45	24.613
<i>D. retrocurva</i>		1.02	1.08		0.2	0.22	1.15		2.99	0.78		2.87	0.29		0.651
<i>D. g. mendotae</i>		2.04	1.51	0.8	1.4	1.07	3.45	0.83	0.43	1.82	0.48	1.89	4.83		1.367
<i>D. longiremis</i>						0.01	0.06		4.27		0.63		0.57		0.308
<i>D. parvula</i>															
<i>D. ambigua</i>															
<i>D. pulex</i>															
<i>D. schoedleri</i>															
<i>C. quadrangula</i>														0.01	0.001
<i>S. vetulus</i>														0.19	0.011
<i>B. longirostris</i>			0.22						0.43	0.26			0.29	9.88	0.748
<i>C. sphaericus</i>		0.51								3.9		5.69	4.83	14.54	1.637
<i>H. gibberum</i>															
<i>D. leuchtenbergianum</i>		0.65	0.43	0.6	0.4	0.11	2.3		0.43	1.04	0.16	1.13	0.85	0.77	0.622
<i>S. crystallina</i>															
<i>L. kindtii</i>			0.020		0.009	0.009	0.050		0.040	0.009		0.010	0.010	0.040	0.012
<i>A. guttata</i>															
<i>L. quadrangularis</i>															
<i>E. lamellatus</i>															
<i>L. setifera</i>															
CALANOIDA TOTAL ind L-1		31.76	19.80	24.66	19.85	10.27	42.91	29.88	20.90	15.95	6.68	12.29	15.13	5.40	20.45
CYCLOPOIDA TOTAL ind L-1		79.31	32.89	19.39	22.78	12.35	87.31	55.05	107.86	38.21	26.78	35.24	31.84	11.04	37.69
CLADOCERA TOTAL ind L-1		4.22	3.26	1.40	2.01	1.42	7.01	0.83	8.59	7.81	1.27	11.69	11.67	25.43	5.36
TOTAL CRUSTACEANS ind L-1		115.29	55.95	45.45	44.64	24.04	137.23	85.76	137.35	61.97	34.73	59.22	58.64	41.87	63.49

Table 5. Abundance (individuals per litre) of crustacean plankton species at 49 stations in 8 regions of Lake Winnipeg, October 3 - 13, 1969. South and North basin means (weighted) also presented.

SPECIES	Region Station	R										SB									W		South Basin (R,SB,W) (n = 21)			
		2	3	3c	4	60	60b	60c	61	62	63	5	6	9	10	12	14	57	58	59	7	8	Mean			
<i>L. macrurus</i>																										
<i>E. lacustris</i>				0.13	0.01	0.01		0.49							0.18	0.69	0.12	0.07	0.15	0.14	0.02	0.1	0.01		0.13	0.107
<i>E. nevadensis</i>		0.02	0.09			0.01	0.01	0.04						0.07		0.02		0.04	0.03	0.07						0.019
<i>D. ashlandi</i>		4.11	4.7	3.56	5.44	18.52	5.9	18	4.9	0.11	0.74			3.26	8.97	5.22	6.98	5	17.6	4.42	4.56	3		0.01	5.952	
<i>D. oregonensis</i>		1.47	1.75	3.2	0.35	5.44		9.9	1.23		0.06			5.21	3.84	0.28	1.05	0.5	1.47	5.89	2.48	3.46		0.05	2.267	
<i>D. siciloides</i>		2.05	8.45	2.49	3.75	3.27	9.58	0.9	3.28	0.06	0.74														1.551	
<i>D. sicilis</i>																										
<i>D. minutus</i>																										
<i>D. leptopus</i>		0.01					0.01				0.06															0.004
<i>D. clavipes</i>																										
Diaptomidae copepodids																								0.03		0.001
Calanoida nauplii		3.62	4.37	3.6	3.79	11.47	6.85	4.6	4.98	0.14	1.78			4.51	3.7	1.15	2.54	1.62	5.7	3.79	6.09	1.55		0.01	0.04	3.614
<i>D. c. bicuspidatus</i>			0.25								0.08															0.016
<i>A. vernalis</i>		8.45	12.9	3	2.95	8.89	6.41	9.68	4.84	0.23	3.62				0.5	0.25	2.45	2.07	4.5	1.68	2	4.91			0.03	3.779
<i>M. edax</i>									0.01															0.01	0.01	0.001
<i>M. albidus</i>																									0.01	0.000
<i>E. agilis</i>																										
Cyclopidae copepodids		0.4	1.03		0.15			0.24			0.08			0.09					0.3							0.131
Cyclopidae nauplii		7.04	16.93	3.71	6.16	9.47	10.4	2.18	5.66	0.37	4.2			2.07	1.9	3.5	2.7	3.87	4.8	6.42	2.6	7.1			0.06	4.816
<i>D. retrocurva</i>		0.2		0.22	0.43	1.44	0.21	0.97	0.14	0.03					0.5						0.1			0.02	0.01	0.203
<i>D. g. mendotae</i>		1.8	0.53	2.91	0.43	1.14	0.66	0.24	0.96	0.03	0.38			0.72	0.2	0.01	0.24	0.09	0.16	0.11	0.3	0.65		0.01	0.01	0.551
<i>D. longiremis</i>																										
<i>D. parvula</i>		0.01	0.25		0.15																					0.020
<i>D. ambigua</i>																										
<i>D. pulex</i>																										
<i>D. schoedleri</i>																										
<i>C. quadrangula</i>		0.02	0.25				0.21		0.01		0.08															0.027
<i>S. vetulus</i>																										
<i>B. longirostris</i>		1.4	3.35	0.71	1.4	0.58	3.31	1.94	1.8	0.23	2.22			2.43	1	0.05	1.72	0.72	1.66	3.16	1.4	2.58		0.01	0.03	1.510
<i>C. sphaericus</i>																										
<i>H. gibberum</i>																										
<i>D. leuchtenbergianum</i>		0.2	0.25	0.11	0.15		0.44	0.24	0.14	0.03				0.36	0.2			0.18	0.16	0.11	0.2	0.13				0.138
<i>S. crystallina</i>																									0.01	0.000
<i>L. kindtii</i>		0.018		0.030	0.003	0.008	0.010	0.010																		0.004
<i>A. guttata</i>																										
<i>L. quadrangularis</i>			0.25						0.01											0.11		0.01		0.01		0.018
<i>E. lamellatus</i>																										
<i>L. setifera</i>																										
CALANOIDA TOTAL	Ind L-1	11.28	17.36	12.98	13.34	38.72	22.35	33.93	14.39	0.31	3.45			13.16	17.22	6.77	10.68	7.30	24.98	14.12	13.21	8.02		0.04	0.23	13.52
CYCLOPOIDA TOTAL	Ind L-1	15.89	31.11	6.71	9.26	18.36	16.81	12.10	10.51	0.60	7.98			2.16	2.40	3.75	5.23	5.94	9.60	8.10	4.60	12.40		0.01	0.11	8.74
CLADOCERA TOTAL	Ind L-1	3.65	4.88	3.98	2.58	3.17	4.84	3.40	3.06	0.32	2.68			3.51	1.90	0.06	1.96	0.99	1.98	3.49	2.00	3.37		0.05	0.06	2.47
TOTAL CRUSTACEANS	Ind L-1	30.82	53.35	23.67	25.16	60.25	44.00	49.43	27.96	1.23	14.11			18.83	21.52	10.58	17.87	14.23	36.56	25.71	19.81	23.79		0.10	0.40	24.73

Table 5 (cont.).

SPECIES	Region	Narrows					NBw					NBe					NBn					S					North Basin (NBw, NBe, NBn, S) (n = 28)					
	Station	16	54	52	68	69	39	41	43	45	64	17	18	19	20	21	48	50c	22	23c	23	31	33	35	25	26	27	28	29	Mean		
<i>L. macrurus</i>		0.01	0.01	0.03	0.04	0.02	0.01				0.02	0.17	0.04	0.07	0.19	0.01	0.05	0.02	0.02	0.01	0.01				0.01	0.01					0.027	
<i>E. lacustris</i>		0.16	0.09	0.29	0.07	0.114	0.03	0.01	0.16			0.01	0.01	0.01	0.01			0.08	0.01	0.6	0.04	0.03	0.09	0.02	0.05	0.02					0.068	
<i>E. nevadensis</i>		0.03	0.01	0.01		0.02	0.03		0.07	0.01		0.01	0.01	0.01	0.01		0.02			0.01	0.02	0.02	0.01		0.02	0.02		0.01			0.013	
<i>D. ashlandi</i>		5.05	6.55	3.74	6.49	4.5	0.4	2.39	4.73	0.15	7.01	5.46	2.28	8.88	11.73	8.08	2.5	4.9	9.46	3.83	2.81	2.69	8.69	0.47	6.25	3.61	2.97	0.62	0.15		4.514	
<i>D. oregonensis</i>		0.25	0.42	0.55	0.16	0.87	0.56	1.74	1.48	1.41					0.01	0.56	0.09	0.15		2.38	0.31	1.35	3.04	1.05	1.5	1.52	0.48	0.93	2.43		0.829	
<i>D. sicloides</i>					0.16		0.04		0.6	0.15												0.01	0.01				0.12			0.039		
<i>D. sicilis</i>					0.16		0.04			0.39					0.03	0.19	0.09						0.09								0.035	
<i>D. minutus</i>										0.08				0.23					0.27								0.01				0.021	
<i>D. leptopus</i>																																
<i>D. clavipes</i>																																
Diaptomidae copepodids																																
Calanoida nauplii		1.98	2.3	3.85	1.36	0.17	1.73	2.07	0.26	0.74	1.24	2.18	0.72	0.97	3.23	2.06	0.97	1.85	1.33	2.89	1.82	3.35	5.76	0.59	1.29	0.87	1.48	0.28	0.85		1.715	
<i>D. c. bicuspidatus</i>							0.09	0.86	0.15	0.16	0.69			0.29	0.48	0.12	0.33		0.29	0.63	0.52	0.53	1.33	0.29	2.19	1.42	0.43	0.42			0.408	
<i>A. vernalis</i>		1.58	1.64	2.28	0.59	0.72	5.83	11.53	4.98	3.76	3.87	8.5	1.68	6.68	8.88	3.14	10.01	1.49	8.73	22.71	11.19	7.56	3.1	8.11	7.49	5.29	1.72	4.36	10		6.015	
<i>M. edax</i>																																
<i>M. albidus</i>																																
<i>E. agilis</i>																																
Cyclopidae copepodids			0.2	0.09	0.13	0.17	0.82	1.72	0.15	0.65	0.14	0.37		0.19	1.29	2.42	0.97	0.09	2.07	10.73	4.16	3.7	5.53	1.33	3.87	1.11	0.62	0.56	1.3		1.585	
Cyclopidae nauplii		3.89	1.25	5.09	0.3	0.17	8.2	16.18	2.78	5.16	1.94	4.01	7.27	2.23	5.81	8.59	7.85	3.61	10.03	29.32	24.98	14.61	11.72	16.37	11.1	3.4	4.07	5.07	16.78		8.278	
<i>D. retrocurva</i>			0.66					0.17	0.15	0.01												0.01	0.15								0.041	
<i>D. g. mandotae</i>		0.24		0.09	0.01	0.06	0.63	0.86	3.88	0.65	0.07	0.24		0.09	0.16	0.12	0.32	0.05		4.54	0.78	1.22	0.65	2.21	0.64	0.08	0.19		0.33		0.647	
<i>D. longiremis</i>										0.08												0.53	0.15								0.027	
<i>D. parvula</i>																																
<i>D. ambigua</i>																																
<i>D. pulex</i>																																
<i>D. schoedleri</i>																																
<i>C. quadrangula</i>																																
<i>S. vetulus</i>																																
<i>B. longirostris</i>		0.23	0.32	0.09	0.38	0.61	0.55	2.41	1.53	3.27	0.14			0.09			0.64	0.05		5.37	1.82	3.16	0.21	1.77	0.13		0.12	7.6	16.15		1.668	
<i>C. sphaericus</i>								5.68	2.9	2.86										6.61	1.04	0.35	0.89	2.8	0.13			6.05	21.3		1.808	
<i>H. gibberum</i>																																
<i>D. leuchtenbergianum</i>		0.11					0.18	0.17	0.15	0.16	0.04		0.06		0.12	0.21					0.78	0.35	0.89	0.15	0.13	0.24	0.18				0.140	
<i>S. crystallina</i>																																
<i>L. kindtii</i>																						0.008			0.008			0.008	0.045			0.002
<i>A. guttata</i>																																
<i>L. quadrangularis</i>																																
<i>E. lamellatus</i>																					0.01											0.000
<i>L. setifera</i>																																
CALANOIDA TOTAL	Ind L-1	7.48	9.38	8.47	8.44	5.69	2.84	6.21	7.32	2.53	8.67	7.83	3.06	10.17	16.21	10.90	3.72	7.00	11.09	9.70	5.01	7.45	17.59	2.23	9.12	6.05	5.06	1.84	3.23		7.26	
CYCLOPOIDA TOTAL	Ind L-1	5.47	3.09	7.46	1.02	1.06	14.94	30.29	8.06	9.73	6.84	12.88	8.95	9.39	16.46	14.27	19.18	5.19	22.12	63.59	40.85	26.40	21.68	26.10	24.65	11.22	6.84	10.41	28.08		16.29	
CLADOCERA TOTAL	Ind L-1	0.58	0.98	0.18	0.39	0.67	1.36	9.29	8.61	7.03	0.25	0.24	0.06	0.18	0.16	0.24	1.17	0.10		16.53	4.42	5.63	2.64	7.23	1.04	0.32	0.49	13.66	37.83		4.33	
TOTAL CRUSTACEANS	Ind L-1	13.63	13.45	16.11	9.85	7.42	19.14	45.79	23.99	19.29	15.56	20.95	12.07	19.74	31.83	25.41	24.05	12.29	33.21	89.82	50.28	39.48	41.91	35.56	34.81	17.59	12.39	25.91	69.14		27.88	

Table 6. Abundance (individuals per litre) of crustacean plankton species at 25 stations in 8 regions of Lake Winnipeg, October 27 - 31, 1969. South and North basin means (weighted) also presented.

SPECIES	Region Station	R				SB					W		South Basin (R,SB,W) (n = 11)
		2	4	60	61	6	10	11	14	59	7	8	
													Mean
<i>L. macrurus</i>							0.01						0.001
<i>E. lacustris</i>			0.01			0.02	0.02	0.02	0.02				0.008
<i>E. nevadensis</i>				0.01			0.01			0.01			0.003
<i>D. ashlandi</i>		1.58	13.54	0.25	1.03	0.26	4.76	8.85	2.21	2.28	0.01		3.161
<i>D. oregonensis</i>				0.11	0.66	0.03	0.14	0.89		0.3			0.194
<i>D. siciloides</i>		0.28	4.66	0.08	0.19	0.05					0.01		0.479
<i>D. sicilis</i>													
<i>D. minutus</i>													
<i>D. leptopus</i>			0.01										0.001
<i>D. clavipes</i>													
Diaptomidae copepodids											0.01	0.01	0.002
Calanoida nauplii		0.9	3.48	0.59	1.16	0.04	0.26	0.89	0.2	0.33			0.714
<i>D. c. bicuspidatus</i>		0.08			0.06								0.013
<i>A. vernalis</i>		0.2	3.68	1.95	2.77	0.11	0.62	3.06	0.65	0.81	0.01	0.01	1.261
<i>M. edax</i>													
<i>M. albidus</i>													
<i>E. agilis</i>													
Cyclopidae copepodids		0.43	4.26	0.41	0.55	0.17	0.57	0.96	0.26	0.37	0.01	0.01	0.727
Cyclopidae nauplii		2.83	3.87	3.17	4.48		1.91	2.87	0.39	1.77			1.935
<i>D. retrocurva</i>				0.04						0.01			0.005
<i>D. g. mendotae</i>		0.02	0.96	0.06	0.11	0.01	0.01	0.06	0.01	0.02			0.115
<i>D. longiremis</i>													
<i>D. parvula</i>													
<i>D. ambigua</i>													
<i>D. pulex</i>													
<i>D. schoedleri</i>													
<i>C. quadrangula</i>													
<i>S. vetulus</i>													
<i>B. longirostris</i>		2.16	3.29	1.11	1.05	0.07	0.57	1.33	0.09	0.29	0.01		0.906
<i>C. sphaericus</i>													
<i>H. gibberum</i>													
<i>D. leuchtenbergianum</i>			0.01	0.01	0.03		0.01	0.06		0.01			0.012
<i>S. crystallina</i>													
<i>L. kindtii</i>													
<i>A. guttata</i>													
<i>L. quadrangularis</i>										0.01			0.001
<i>E. lamellatus</i>													
<i>L. setifera</i>													
CALANOIDA TOTAL	ind L-1	2.76	21.70	1.04	3.04	0.40	5.20	10.65	2.43	2.92	0.03	0.01	4.56
CYCLOPOIDA TOTAL	ind L-1	3.54	11.81	5.53	7.86	0.28	3.10	6.89	1.30	2.95	0.02	0.02	3.94
CLADOCERA TOTAL	ind L-1	2.17	4.26	1.22	1.19	0.08	0.59	1.45	0.10	0.34	0.01		1.04
TOTAL CRUSTACEANS	ind L-1	8.47	37.77	7.79	12.09	0.76	8.89	18.99	3.83	6.21	0.06	0.03	9.54

Table 6 (cont.).

SPECIES	Region Station	Narrows					NBw		NBe			NBn		S		North Basin (NBw, NBe, NBn, S) (n = 14)
		16	54	54b	68	69	39	64	20	21	48	22	23c	25	28	
																Mean
<i>L. macrurus</i>		0.01	0.01		0.05	0.01	0.01	0.03	0.03	0.11	0.09	0.01	0.01			0.026
<i>E. lacustris</i>		0.02	0.01	0.01	0.01	0.03	0.01	0.01	0.05	0.01			0.01			0.012
<i>E. nevadensis</i>		0.01	0.01	0.03	0.01		0.01	0.01	0.05			0.01	0.01	0.01		0.011
<i>D. ashlandi</i>		3.99	2.67	2.86	4.12	6.13	1.85	4.4	6.75	25.8	4.46	1.36	0.23	1.31	0.73	4.761
<i>D. oregonensis</i>			0.01	0.1	0.09	0.18		0.09	0.17	0.02	0.01	0.12	0.1	0.51	0.73	0.152
<i>D. siciloides</i>																
<i>D. sicilis</i>			0.01		0.09		0.05	0.09		0.01			0.01			0.019
<i>D. minutus</i>																
<i>D. leptopus</i>																
<i>D. clavipes</i>																
Diaptomidae copepodids																
Calanoida nauplii		0.27	0.07	0.07	0.29	0.69	0.47	0.17	0.74	2.82	0.44	0.25		0.08	0.12	0.463
<i>D. c. bicuspidatus</i>								0.04	0.09	0.7	0.04	0.08	0.04	0.08		0.076
<i>A. vernalis</i>		0.85	0.09	0.35	0.59	0.87	2.84	1.03	2.95	11.73	1.85	2.38	0.61	2.76	1.41	2.165
<i>M. edax</i>																
<i>M. albidus</i>																
<i>E. agilis</i>																
Cyclopidae copepodids		0.03	0.13	0.05		0.05	1.49	0.47	1.01	3.05	0.33	0.64	0.14	1.03	0.68	0.650
Cyclopidae nauplii		0.25	0.05	0.13	0.44	0.6	3.88	1.51	5.26	34.74	0.99	4.38	1.36	5.53	6.33	4.675
<i>D. retrocurva</i>										0.01					0.03	0.003
<i>D. g. mendotae</i>		0.01			0.01		0.01	0.01	0.08	0.11		0.24	0.11	0.23	0.3	0.079
<i>D. longiremis</i>										0.01			0.02			0.002
<i>D. parvula</i>																
<i>D. ambigua</i>																
<i>D. pulex</i>																
<i>D. schoedleri</i>																
<i>C. quadrangula</i>																
<i>S. vetulus</i>																
<i>B. longirostris</i>		0.03	0.04	0.03	0.04		0.1	0.04		0.24		0.51	0.64	1.98	3.69	0.524
<i>C. sphaericus</i>												0.05	0.34	0.55	0.31	0.089
<i>H. gibberum</i>																
<i>D. leuchtenbergianum</i>		0.01					0.01		0.02	0.04	0.01		0.01			0.007
<i>S. crystallina</i>																
<i>L. kindtii</i>																
<i>A. guttata</i>																
<i>L. quadrangularis</i>																
<i>E. lamellatus</i>																
<i>L. setifera</i>																
CALANOIDA TOTAL	ind L-1	4.30	2.79	3.07	4.66	7.04	2.40	4.80	7.79	28.77	5.00	1.75	0.37	1.91	1.58	5.44
CYCLOPOIDA TOTAL	ind L-1	1.13	0.27	0.53	1.03	1.52	8.21	3.05	9.31	50.22	3.21	7.48	2.15	9.40	8.42	7.57
CLADOCERA TOTAL	ind L-1	0.05	0.04	0.03	0.05		0.12	0.05	0.10	0.41	0.01	0.80	1.12	2.76	4.33	0.70
TOTAL CRUSTACEANS	ind L-1	5.48	3.10	3.63	5.74	8.56	10.73	7.90	17.20	79.40	8.22	10.03	3.64	14.07	14.33	13.72

Table 7. Settled net plankton volumes ( $\text{mm}^3 \text{L}^{-1}$ ) in Lake Winnipeg, June to October 1969.

Region	Station	June 4-12	July 9-16	Date July 24 Aug 1	Sept 2-10	Oct 3-13	Oct 27-31
R	1		10.20				
	2	6.40	7.10		44.91	7.47	5.28
	3		8.51	14.51	8.42	15.40	
	3c		8.51	8.05	9.83	6.08	
	4		8.51	9.85	25.25	4.56	6.34
	60	8.89	13.61	8.94	4.43	5.32	1.69
	60b		3.78	13.52	4.77	4.89	
	60c			8.11	10.27	6.84	
	61	4.00	6.62	10.81	11.55	5.13	
	62	7.12	13.92	28.72	23.39	3.16	
	63	5.34	11.24	8.89		10.95	
	Mean	6.35	9.20	12.38	15.87	6.98	4.44
	W	7	2.66	2.00		4.04	1.23
8		2.88	2.60	2.77	3.34	0.61	2.37
Mean		2.77	2.30	2.77	3.69	0.92	2.77
SB	5	11.52	20.36	5.74	5.90	3.10	
	6	6.40	11.03	11.04	2.71	3.10	1.35
	9		6.79	7.41		2.06	
	10	7.68	10.19		4.42	3.38	3.36
	11						4.49
	12	2.57	7.40	10.12	4.03	1.24	4.04
	13	6.40					
	13b		16.97				
	14		13.57	8.24	9.33	2.65	2.02
	57	7.12	17.28	2.53	5.42	3.72	
	58		11.88	14.42	16.41	8.25	
	59	8.22		7.07		2.48	4.71
	Mean	7.13	12.83	8.32	6.89	3.33	3.33
N	16	1.68	2.50	5.19	2.43	1.87	2.37
	52	10.22	2.62	5.14	2.50	2.80	
	54	1.81	2.81	7.78	2.53	1.87	2.10
	54b						1.90
	68		2.89	3.95	2.31	3.44	1.75
	69		2.39	5.34	3.43	2.23	
	Mean	4.57	2.64	5.48	2.64	2.44	2.03
NBe	17	2.28	3.78	2.97		4.10	
	18	2.35		3.75	9.70	2.13	
	19	1.58	4.96	3.75	6.83	4.65	
	20		4.26	2.15		8.65	2.76
	21	6.04	6.03	7.43	13.15	5.32	6.68
	48	18.40	2.68	3.22		5.66	2.21
	50						
	50b		4.86	9.29			
	50c		4.64	6.86	25.09	3.19	
	51			4.29			
Mean	6.13	4.46	4.86	13.69	4.82	3.88	
NBw	39	11.40		3.02	16.73	6.27	2.21
	41	13.85	4.54	3.66		14.19	
	43	15.98		11.69		37.27	
	45	7.04	3.06	2.97	8.28	14.52	
	47	13.97					
	64		4.26	7.19	6.47	2.67	3.30
	65			7.51			
	Mean	12.45	3.95	6.01	10.50	14.98	2.76
NBn	22	4.63	6.81	3.67	10.33	2.83	5.09
	23						
	23c		14.69	2.95		26.98	3.44
	23e	4.63	2.68	2.68		16.91	
	24	4.65					
	31	2.28	7.23	3.50	5.56	5.81	
	33	2.85	5.34	3.67		3.04	
	35	2.66	6.74	2.68		14.90	
	Mean	3.61	7.25	3.19	7.95	11.75	4.27
	S	25	6.79	4.08	3.00	12.37	4.34
26		6.79	6.03	4.66	12.37	3.09	
27			5.62			4.22	
28		7.01	5.96	4.94	8.43	8.21	2.99
29						27.09	
Mean		6.86	5.42	4.20	11.06	9.39	3.99