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BIOLOGICAL INVESTIGATION OF  
MOSQUITO LAKE, NORTHWEST TERRITORIES

by

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## ABSTRACT

Roberge, M.M., and J.B. Dunn. 1985. Biological investigation of Mosquito Lake, Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 505: iv + 24 p.

An experimental gillnetting and biological sampling program was conducted on Mosquito Lake, Northwest Territories in 1983. Biological data presented in this report include length, weight, age and maturity characteristics of the fish species caught. Water temperature and dissolved oxygen profiles are also provided.

Key words: angling, catch/effort; catch composition; gillnetting; lake trout; lake whitefish; population structure; sport fishing; tagging.

## RESUME

Roberge, M.M., and J.B. Dunn. 1985. Biological investigation of Mosquito Lake, Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 505: iv + 24 p.

En 1983, on a réalisé un programme de pêche expérimentale aux filets maillants et d'échantillonnage biologique au lac Mosquito (Territoires du Nord-Ouest). Les données biologiques présentées dans ce rapport portent sur la longueur, le poids, l'âge et les caractéristiques de maturité des espèces de poisson prises. On y présente aussi des profils sur l'oxygène dissout et la température de l'eau.

Mots-clés: pêche à la ligne; prises/effort; composition des prises; pêche au filet maillant; touladi; corégone, grand; composition de la population; pêche sportive; étiquetage.

## INTRODUCTION

In 1979, the Department of Fisheries and Oceans (DFO) began a five year program to evaluate sport fishing on the major lakes in the District of Keewatin, Northwest Territories; lake trout, *Salvelinus namaycush* (Walbaum) being the species of primary interest. This study was undertaken in response to increased sport fishing lodge development in the district and a proposal from the lodge owners to have the major sport fishing lakes in the area evaluated to determine if they could be designated as high quality fishing lakes. A "high quality fishery" for lake trout is one in which the population structure of lake trout is maintained such that large lake trout are available to anglers on a long-term basis. This is accomplished primarily by allowing very limited exploitation of the stock (i.e. reduced catch and possession limits).

The major lakes in the Keewatin under consideration are Kasba, North Henik, South Henik, Dubawnt, Nueltin, Snowbird and Mosquito lakes, all of which have existing or proposed sport fishing lodges (or outpost camps). It is intended that over the five year period these lakes will be surveyed to gain a better understanding of the sport fishing industry, to obtain lake trout population and harvest data and to assess the potential of these lakes to provide high quality fisheries for lake trout. Results of this program will culminate in a sport fishery management plan for these lakes.

The lakes surveyed and reported to date include Kasba Lake (Falk et al. 1982a), Dubawnt Lake (Roberge 1984), and North Henik, South Henik, Nueltin and Snowbird lakes (Roberge et al. 1984). This report presents information collected in 1983 on the biological status of the fish species from Mosquito Lake. Information on the sport fishery harvest was not available in 1983 as the lodge remained closed throughout the sport fishing season.

## STUDY AREA

Mosquito Lake (62°34'N, 103°19'W) situated 503 km west of Eskimo Point (Fig. 1), is part of the Dubawnt River system. The lake has a maximum length of 30.5 km, a maximum width of 23.7 km, elevation of 297 m and a total surface area of 33 439 ha (Inven. Can. Freshwater Lakes 1969) (Fig.2). The topography of Mosquito Lake is typical tundra, a rolling treeless landscape. MacDonald and Fudge (1979) describe the geology, climate and other limnological conditions of the area.

## METHODS AND MATERIALS

### EXPERIMENTAL GILLNETTING

Experimental gillnetting was carried out using standard gangs composed of 47.5 m lengths each of 38, 64, 89, 114 and 139 mm (stretched

measure) mesh nylon gillnets. Set locations are depicted in Fig. 3. The average set duration was 22 hours. Catches were recorded by site number, mesh size and species. Large, active and unharmed lake trout caught in the nets were measured for fork length ( $\pm 1$  mm), tagged and released.

### TAGGING

Lake trout were captured for tagging using small mesh gillnets and by angling. Gillnets, composed of varying lengths of 38 and 64 mm mesh, were set in shallow water and checked every 6 to 23 hours, weather permitting. Trout caught were placed in a measuring trough to obtain fork length ( $\pm 1$  mm). White Floy (spaghetti) tags containing a reference number and return address were attached using a Dennison tagging gun. Tags were inserted in the left side of the fish at the base of the dorsal fin and anchored between the pterygiophores. Fish were then returned to the water and released or, if necessary, held until they recuperated and then released.

### BIOLOGICAL SAMPLING

Fish were sampled from the experimental and tagging nets and from those angled for fork length ( $\pm 1$  mm), round weight ( $\pm 50$  g), aging structures (otoliths/scales), sex, and stage of maturity. Sex and the relative stage of maturity were determined by examination of the gonads and coded according to the stages described by Falk et al. (1982a,b).

Sagittal otoliths were taken from lake trout and burbot and stored dry in coin envelopes. In the laboratory, the otoliths were selectively ground on a carborundum stone and placed in a cleaning/clarifying solution of benzyl-benzoate before being read under a binocular dissecting microscope (x30). A reflecting light source against a black background was used to emphasize the annual growth zones which were counted to determine the ages.

Scales were taken from cisco, lake whitefish, round whitefish, northern pike and Arctic grayling as described by Hatfield et al. (1972) and stored dry in coin envelopes. In the laboratory, scales were mounted between glass slides and the completed annuli counted on the image produced by an Eberbach microprojector (x40).

Ovaries were removed from mature lake trout collected over the summer and placed in a 10% formalin solution. In the laboratory, the ovaries were weighed (wet weight  $\pm 1$  g) and total number of ova from each ovary were counted after removal of the ovarian tissue. Mean ovum diameter was determined from an average of 20 ova taken from each of the anterior, middle and posterior portions of both ovaries (n=120).

Weight-length relationships were calculated using least squares regression analysis on logarithmic transformations of fork length and round weights. The relationship is described by the following equation:

$$\log_{10} W = a + b (\log_{10} L)$$

where W = weight in grams  
L = fork length in millimeters

Relative condition factor (K), a measure of the plumpness of a fish, was determined using the formula:

$$K = \frac{W \times 10^5}{L^3}$$

where W = weight in grams  
L = fork length in millimeters

#### DATA ANALYSIS

The Statistical Analysis System (1979) was used to generate length, weight, sex, age and maturity tables.

#### WATER TEMPERATURE

Water temperatures (°C) were recorded every eight days during the course of the study. Temperatures were recorded at one metre intervals using a Yellow Spring temperature meter.

#### ACKNOWLEDGMENTS

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Table 1. Catch and catch per unit effort (CPE) data for fish caught by experimental gillnets from Mosquito Lake, 1983.

	No.	%	Mesh Size (mm)				Total Catch	CPE <sup>1</sup>
			38	64	89	114		
Lake trout	92	22.8	95	86	78	52	403	2.72
			23.6	21.3	19.4	12.9	40.3	
Lake whitefish	50	19.8	55	50	68	29	252	1.70
			21.8	19.8	27.0	11.5	25.3	
Round whitefish	15	42.9	17	3	-	-	35	0.24
			48.6	8.6	-	-	3.5	
Cisco (spp)	296	97.4	5	-	3	-	304	2.05
			1.6	-	1.0	-	30.5	
Arctic grayling	1	100.0	-	-	-	-	1	0.01
			-	-	-	-	<0.1	
Burbot	-	-	1	-	-	-	1	0.01
			100.0	-	-	-	<0.1	
Total	454	45.6	173	139	149	81	996	6.72
			17.4	14.0	15.0	8.1		

<sup>1</sup> No. fish caught/100 m gillnet/24 hours.







Table 5. Biological data by age group for lake whitefish caught by experimental gillnets from Mosquito Lake, 1983.

AGE (YR)	MALES										FEMALES										COMBINED									
	LENGTH(MM)		WEIGHT(G)		K	MAT	%	LENGTH(MM)		WEIGHT(G)		K	MAT	%	LENGTH(MM)		WEIGHT(G)		K	MAT	%									
	N	MEAN	SD	MEAN				SD	N	MEAN	SD				MEAN	SD	N	MEAN				SD	MEAN	SD						
1	2	176	14.8	50	0	0.95	0	-	-	-	-	-	-	-	4	178	11.4	50	0	0.90	0									
2	3	186	4.0	50	0	0.77	0	-	-	-	-	-	-	-	12	181	12.3	50	0	0.87	0									
3	4	216	11.2	100	0	1.01	0	-	-	-	-	-	-	-	10	207	15.8	100	24	1.14	0									
4	1	200	-	100	-	1.25	0	-	-	-	-	-	-	-	1	200	-	100	-	1.25	0									
5	3	279	47.6	250	180	1.01	0	-	-	-	-	-	-	-	3	279	47.6	250	180	1.01	0									
6	5	315	46.3	410	216	1.21	20	-	-	-	-	-	-	-	6	306	47.8	375	212	1.20	17									
7	5	319	30.7	400	106	1.21	0	3	344	66.7	567	375	1.26	0	9	323	44.7	439	229	1.22	0									
8	2	320	36.1	400	141	1.30	3	2	447	40.3	1375	530	1.50	0	4	383	79.7	888	646	1.35	0									
9	31	359	25.3	616	159	1.30	3	14	358	20.4	627	130	1.34	0	46	359	23.6	617	149	1.31	2									
10	7	415	51.8	1100	489	1.45	29	5	443	48.7	1280	462	1.41	40	12	427	50.4	1175	465	1.43	33									
11	8	488	32.1	1738	352	1.47	88	7	454	57.0	1443	645	1.47	57	15	472	47.2	1600	513	1.47	73									
12	4	492	11.5	1788	131	1.50	100	8	501	53.4	2013	703	1.52	88	12	498	43.3	1938	576	1.51	92									
13	12	483	49.3	1788	639	1.52	100	7	499	37.1	1964	458	1.55	57	19	489	44.9	1853	572	1.53	84									
14	3	526	59.5	2817	1616	1.80	100	5	521	66.1	2280	812	1.55	100	8	523	59.3	2481	1095	1.64	100									
15	8	524	49.3	2106	556	1.44	100	8	533	49.6	2325	583	1.51	100	16	528	48.0	2216	562	1.47	100									
16	9	533	44.0	2261	640	1.46	100	2	549	17.7	2525	35	1.54	100	11	536	40.2	2309	583	1.47	100									
17	5	548	5.4	2590	74	1.57	100	4	563	27.9	2750	436	1.54	100	9	555	19.0	2661	285	1.56	100									
18	4	554	35.1	2825	296	1.72	100	3	566	11.1	3150	377	1.73	100	7	559	26.4	2964	348	1.73	100									
19	1	565	-	2800	-	1.55	100	2	585	26.9	3200	283	1.60	100	3	578	22.2	3067	306	1.58	100									
20	6	549	21.3	2433	366	1.47	100	2	540	22.6	2450	71	1.57	100	8	546	20.3	2438	310	1.49	100									
21	1	602	-	3200	-	1.47	100	4	558	15.9	2988	214	1.72	100	5	567	24.0	3030	208	1.67	100									
22	3	559	26.6	2433	548	1.38	100	2	587	37.5	2825	460	1.40	100	5	570	30.6	2590	499	1.39	100									
23	1	575	-	2800	-	1.47	100	-	-	-	-	-	-	-	1	575	-	2800	-	1.47	100									
24	-	-	-	-	-	-	-	1	590	-	3150	-	1.53	100	1	590	-	3150	-	1.53	100									
TOTAL	128							79							227															
MEAN		426	114	1377	993	1.37			481	85.8	1862	945	1.49			426	124.6	1434	1042		1.38									
MEAN AGE	13.3							13.3								11.4														

Table 6. Biological data by length interval for round whitefish caught by experimental gillnets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES				FEMALES				COMBINED			
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT
160	-	-	-	-	-	-	-	-	1	162	50	1.18
170	-	-	-	-	-	-	-	-	1	171	50	1.00
180	-	-	-	-	1	189	50	0.74	3	187	50	0.77
210	-	-	-	-	-	-	-	-	1	210	50	0.54
300	1	304	300	1.07	1	307	200	0.69	2	306	250	0.88
310	-	-	-	-	2	315	375	1.20	2	315	375	1.20
320	2	326	375	1.09	3	326	367	1.06	5	326	370	1.07
330	-	-	-	-	3	331	367	1.01	3	331	367	1.01
340	3	343	417	1.03	2	345	425	1.03	5	344	420	1.03
350	1	358	500	1.09	4	353	500	1.13	5	354	500	1.12
360	2	366	550	1.13	2	366	525	1.07	4	366	538	1.10
370	1	378	700	1.30	2	372	575	1.12	3	374	617	1.18
400	-	-	-	-	1	406	650	0.97	1	406	650	0.97
440	-	-	-	-	1	442	1000	1.16	1	442	1000	1.16
TOTAL	10	345	460	1.10	22	342	450	1.05	37	321	399	1.04
MEAN												

00

Table 7. Biological data by age group for round whitefish caught by experimental gillnets from Mosquito Lake, 1983.

AGE (YR)	MALES				FEMALES				COMBINED			
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT
2	-	-	-	-	-	-	-	-	1	162	50	1.18
3	-	-	-	-	1	189	50	0.74	4	183	50	0.83
4	-	-	-	-	-	-	-	-	1	210	50	0.54
8	-	-	-	-	2	319	350	1.09	2	319	350	1.09
9	4	324	375	1.10	3	321	317	0.94	7	323	350	1.03
10	-	-	-	-	5	337	420	1.10	5	337	420	1.10
11	2	354	450	1.02	4	356	513	1.14	6	355	492	1.10
12	2	366	550	1.13	2	388	600	1.03	4	377	575	1.08
13	-	-	-	-	1	369	550	1.09	1	369	550	1.09
14	1	378	700	1.30	-	-	-	-	1	378	700	1.30
16	-	-	-	-	1	442	1000	1.16	1	442	1000	1.16
TOTAL	9	346	467	1.11	19	341	453	1.06	33	318	395	1.04
MEAN												
MEAN AGE	10.2				10.2				9.2			

Table 8. Biological data by length interval for cisco (spp) caught by experimental gillnets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES			FEMALES			COMBINED		
	N	LENGTH(MM) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	WEIGHT(G) SD
150	1	153	50	1	159	50	2	156	50
160	5	165	50	2	169	50	9	166	50
170	3	176	50	4	172	50	7	174	50
180	16	183	50	7	185	50	24	184	50
190	14	194	50	12	197	63	26	195	50
200	9	202	50	11	203	68	20	203	56
210	5	214	78	3	212	100	8	213	73
240	-	-	90	2	243	150	2	243	94
350	1	373	800	1	375	800	1	374	800
370	-	-	-	1	386	750	2	386	800
380	-	-	-	1	413	900	1	407	750
400	-	-	-	1	413	900	2	413	900
410	-	-	-	1	413	900	2	422	900
420	2	422	1000	1	413	900	1	422	1000
TOTAL	56	201	0.89	45	192	0.91	106	207	120
MEAN									

Table 9. Biological data by age group for cisco (spp) caught by experimental gillnets from Mosquito Lake, 1983.

AGE (YR)	MALES			FEMALES			COMBINED		
	N	LENGTH(MM) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	WEIGHT(G) SD
1	182	190	17.5	50	188	15.1	1	188	14.8
2	171	189	11.2	64	171	14.3	2	193	16.7
3	189	194	9.8	50	197	8.7	18	188	16.7
4	194	203	10.4	83	203	8.7	8	171	9.8
5	421	373	950	16	243	2.8	15	191	12.3
6	373	422	1050	2	243	2.8	40	195	9.4
7	203	52	108	2	400	19.1	5	203	7.4
8	206	52	206	1	375	800	2	243	2.8
9	206	52	206	1	375	800	1	421	2.8
10	206	52	206	1	375	800	1	421	2.8
11	206	52	206	1	375	800	1	421	2.8
12	206	52	206	1	375	800	1	421	2.8
13	206	52	206	1	375	800	1	421	2.8
14	206	52	206	1	375	800	1	421	2.8
15	206	52	206	1	375	800	1	421	2.8
16	206	52	206	1	375	800	1	421	2.8
17	206	52	206	1	375	800	1	421	2.8
18	206	52	206	1	375	800	1	421	2.8
19	206	52	206	1	375	800	1	421	2.8
20	206	52	206	1	375	800	1	421	2.8
21	206	52	206	1	375	800	1	421	2.8
22	206	52	206	1	375	800	1	421	2.8
23	206	52	206	1	375	800	1	421	2.8
24	206	52	206	1	375	800	1	421	2.8
25	206	52	206	1	375	800	1	421	2.8
26	206	52	206	1	375	800	1	421	2.8
27	206	52	206	1	375	800	1	421	2.8
28	206	52	206	1	375	800	1	421	2.8
29	206	52	206	1	375	800	1	421	2.8
30	206	52	206	1	375	800	1	421	2.8
31	206	52	206	1	375	800	1	421	2.8
32	206	52	206	1	375	800	1	421	2.8
33	206	52	206	1	375	800	1	421	2.8
34	206	52	206	1	375	800	1	421	2.8
35	206	52	206	1	375	800	1	421	2.8
36	206	52	206	1	375	800	1	421	2.8
37	206	52	206	1	375	800	1	421	2.8
38	206	52	206	1	375	800	1	421	2.8
39	206	52	206	1	375	800	1	421	2.8
40	206	52	206	1	375	800	1	421	2.8
41	206	52	206	1	375	800	1	421	2.8
42	206	52	206	1	375	800	1	421	2.8
43	206	52	206	1	375	800	1	421	2.8
44	206	52	206	1	375	800	1	421	2.8
45	206	52	206	1	375	800	1	421	2.8
46	206	52	206	1	375	800	1	421	2.8
47	206	52	206	1	375	800	1	421	2.8
48	206	52	206	1	375	800	1	421	2.8
49	206	52	206	1	375	800	1	421	2.8
50	206	52	206	1	375	800	1	421	2.8
51	206	52	206	1	375	800	1	421	2.8
52	206	52	206	1	375	800	1	421	2.8
53	206	52	206	1	375	800	1	421	2.8
54	206	52	206	1	375	800	1	421	2.8
55	206	52	206	1	375	800	1	421	2.8
56	206	52	206	1	375	800	1	421	2.8
57	206	52	206	1	375	800	1	421	2.8
58	206	52	206	1	375	800	1	421	2.8
59	206	52	206	1	375	800	1	421	2.8
60	206	52	206	1	375	800	1	421	2.8
61	206	52	206	1	375	800	1	421	2.8
62	206	52	206	1	375	800	1	421	2.8
63	206	52	206	1	375	800	1	421	2.8
64	206	52	206	1	375	800	1	421	2.8
65	206	52	206	1	375	800	1	421	2.8
66	206	52	206	1	375	800	1	421	2.8
67	206	52	206	1	375	800	1	421	2.8
68	206	52	206	1	375	800	1	421	2.8
69	206	52	206	1	375	800	1	421	2.8
70	206	52	206	1	375	800	1	421	2.8
71	206	52	206	1	375	800	1	421	2.8
72	206	52	206	1	375	800	1	421	2.8
73	206	52	206	1	375	800	1	421	2.8
74	206	52	206	1	375	800	1	421	2.8
75	206	52	206	1	375	800	1	421	2.8
76	206	52	206	1	375	800	1	421	2.8
77	206	52	206	1	375	800	1	421	2.8
78	206	52	206	1	375	800	1	421	2.8
79	206	52	206	1	375	800	1	421	2.8
80	206	52	206	1	375	800	1	421	2.8
81	206	52	206	1	375	800	1	421	2.8
82	206	52	206	1	375	800	1	421	2.8
83	206	52	206	1	375	800	1	421	2.8
84	206	52	206	1	375	800	1	421	2.8
85	206	52	206	1	375	800	1	421	2.8
86	206	52	206	1	375	800	1	421	2.8
87	206	52	206	1	375	800	1	421	2.8
88	206	52	206	1	375	800	1	421	2.8
89	206	52	206	1	375	800	1	421	2.8
90	206	52	206	1	375	800	1	421	2.8
91	206	52	206	1	375	800	1	421	2.8
92	206	52	206	1	375	800	1	421	2.8
93	206	52	206	1	375	800	1	421	2.8
94	206	52	206	1	375	800	1	421	2.8
95	206	52	206	1	375	800	1	421	2.8
96	206	52	206	1	375	800	1	421	2.8
97	206	52	206	1	375	800	1	421	2.8
98	206	52	206	1	375	800	1	421	2.8
99	206	52	206	1	375	800	1	421	2.8
100	206	52	206	1	375	800	1	421	2.8
101	206	52	206	1	375	800	1	421	2.8
102	206	52	206	1	375	800	1	421	2.8
103	206	52	206	1	375	800	1	421	2.8
104	206	52	206	1	375	800	1	421	2.8
105	206	52	206	1	375	800	1	421	2.8
106	206	52	206	1	375	800	1	421	2.8
107	206	52	206	1	375	800	1	421	2.8
108	206	52	206	1	375	800	1	421	2.8
109	206	52	206	1	375	800	1	421	2.8
110	206	52	206	1	375	800	1	421	2.8
111	206	52	206	1	375	800	1	421	2.8
112	206	52	206	1	375	800	1	421	2.8
113	206	52	206	1	375	800	1	421	2.8
114	206	52	206	1	375	800	1	421	2.8
115	206	52	206	1	375	800			

Table 10. Biological data by length interval for Arctic grayling caught by experimental gillnets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES				FEMALES				COMBINED			
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT
170	-	-	-	-	-	-	-	-	1	179	50	0.87
TOTAL MEAN	0	-	-	-	0	-	-	-	1	179	50	0.87

Table 11. Biological data by age group for Arctic grayling caught by experimental gillnets from Mosquito Lake, 1983.

AGE (YR)	MALES				FEMALES				COMBINED			
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT
2	-	-	-	-	-	-	-	-	1	179	50	0.87
TOTAL MEAN	0	-	-	-	0	-	-	-	1	179	50	0.87
MEAN AGE	-	-	-	-	-	-	-	-	2.0	-	-	-

Table 12. Biological data by length interval for burbot caught by experimental gillnets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES				FEMALES				COMBINED			
	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT	N	LENGTH(MM) MEAN	WEIGHT(G) MEAN	% MAT
380	1	382	350	0.63	100	-	-	-	1	382	350	0.63
TOTAL MEAN	1	382	350	0.63	0	-	-	-	1	382	350	0.63

Table 13. Biological data by age group for burbot caught by experimental gillnets from Mosquito Lake, 1983.

AGE (YR)	MALES					FEMALES					COMBINED						
	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	% MAT	% MAT
7	1	382	-	350	-	0.63	100	-	-	-	1	382	-	350	-	0.63	100
TOTAL	1	382	-	350	-	0.63	0	-	-	-	1	382	-	350	-	0.63	
MEAN AGE	-	-	-	-	-	-	-	-	-	-	7.0	-	-	-	-	-	-

Table 14. Biological data by length interval for lake trout caught by tagging nets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES					FEMALES					COMBINED						
	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	N	LENGTH(MM) MEAN	LENGTH(MM) SD	WEIGHT(G) MEAN	WEIGHT(G) SD	% MAT	% MAT
175	-	-	-	-	-	-	-	-	-	-	1	190	-	50	-	0.73	0
275	1	305	-	300	-	1.06	0	-	-	-	1	282	-	250	-	1.11	0
325	1	351	-	450	-	1.04	0	-	-	2	303	-	300	0	1.08	0	
375	1	411	-	775	35	1.12	0	-	-	2	330	-	375	35	1.04	0	
400	2	444	-	925	35	1.06	0	-	-	1	351	-	450	-	1.04	0	
425	1	469	-	1100	-	1.07	0	-	-	1	391	-	550	-	0.92	0	
450	1	477	-	1350	-	1.24	0	-	-	3	413	-	783	29	1.11	0	
500	2	511	-	1550	141	1.17	0	-	-	2	465	-	1100	0	1.09	0	
525	4	541	-	1925	119	1.22	100	-	-	2	486	-	1375	35	1.20	0	
550	2	560	-	2075	106	1.18	100	-	-	4	511	-	1550	141	1.17	0	
575	3	586	-	2167	355	1.07	67	-	-	15	541	-	1930	104	1.21	80	
600	1	620	-	2400	-	1.01	100	-	-	24	560	-	2075	106	1.18	100	
625	2	636	-	2950	141	1.15	100	-	-	24	589	-	2320	329	1.12	80	
650	-	-	-	-	-	-	-	-	-	35	610	-	2638	221	1.14	75	
675	-	-	-	-	-	-	-	-	-	21	638	-	2950	141	1.15	100	
700	1	712	-	3500	-	0.97	100	-	-	22	658	-	4000	-	1.42	100	
725	-	-	-	-	-	-	-	-	-	11	688	-	3700	283	1.10	100	
750	-	-	-	-	-	-	-	-	-	7	712	-	4100	849	1.11	100	
775	-	-	-	-	-	-	-	-	-	3	740	-	-	-	-	-	
800	-	-	-	-	-	-	-	-	-	4	761	-	-	-	-	-	
825	-	-	-	-	-	-	-	-	-	2	785	-	-	-	-	-	
850	-	-	-	-	-	-	-	-	-	3	817	-	-	-	-	-	
875	-	-	-	-	-	-	-	-	-	4	834	-	-	-	-	-	
900	-	-	-	-	-	-	-	-	-	2	862	-	-	-	-	-	
925	-	-	-	-	-	-	-	-	-	1	890	-	-	-	-	-	
TOTAL	23	521	-	1733	833	1.12	19	-	-	205	611	-	1761	1136	1.13		
MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

<sup>a</sup> Includes fish tagged and released

Table 15. Biological data by age group for lake trout caught by tagging nets from Mosquito Lake, 1983.

AGE (YR)	MALES										FEMALES										COMBINED			
	LENGTH(MM)		WEIGHT(G)		K	MAT	%	LENGTH(MM)		WEIGHT(G)		K	MAT	%	LENGTH(MM)		WEIGHT(G)		K	MAT				
	N	MEAN	SD	MEAN				SD	N	MEAN	SD				MEAN	SD	N	MEAN			SD	MEAN	SD	
4	1	305	-	300	-	1.06	0	-	-	-	-	-	-	1	190	-	50	-	0.73	0				
6	1	351	-	450	-	1.04	0	-	-	-	-	-	-	2	294	16.3	275	35	1.09	0				
7	1	401	-	750	-	1.16	0	-	-	-	-	-	-	1	300	-	300	-	1.11	0				
8	1	401	-	750	-	1.16	0	-	-	-	-	-	-	3	337	12.1	400	50	1.04	0				
10	1	401	-	750	-	1.16	0	-	-	-	-	-	-	1	401	-	750	-	1.16	0				
11	1	401	-	750	-	1.16	0	-	-	-	-	-	-	1	391	-	550	-	0.92	0				
12	2	505	50.9	1525	601	1.15	50	391	550	0.92	0	1	391	1	391	-	550	-	0.92	0				
13	4	455	39.3	1025	290	1.07	0	3	444	18.1	1017	189	1.15	5	468	43.9	1220	431	1.15	20				
14	3	539	26.1	1933	257	1.23	67	2	423	7.1	875	106	1.15	6	444	34.7	975	242	1.10	0				
15	1	530	-	1750	-	1.18	100	1	495	-	1400	-	1.15	4	528	30.8	1800	339	1.21	50				
16	1	477	-	1350	-	1.24	0	1	547	-	1950	-	1.19	2	539	12.0	1850	141	1.18	50				
20	2	590	2.1	2325	318	1.14	100	-	-	-	-	-	-	1	477	-	1350	-	1.24	0				
22	2	552	11.3	2000	0	1.19	100	1	595	-	2500	-	1.19	3	591	3.5	2383	247	1.15	100				
23	2	677	50.2	3275	318	1.06	100	1	599	-	2600	-	1.21	3	568	28.3	2200	346	1.20	100				
29	-	-	-	-	-	-	-	1	655	-	4000	-	1.42	3	669	37.6	3517	475	1.18	100				
30	1	620	-	2400	-	1.01	100	1	605	-	2850	-	1.29	1	605	-	2850	-	1.29	100				
32	-	-	-	-	-	-	-	1	693	-	3500	-	1.05	2	657	51.6	2950	778	1.03	100				
32	-	-	-	-	-	-	-	1	618	-	2800	-	1.19	1	618	-	2800	-	1.19	100				
TOTAL	21	513	98	1674	835	1.13	-	16	502	115.1	1731	1164	1.15	40	489	121.1	1586	1020	1.13	-				
MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
MEAN AGE	17.1	-	-	-	-	-	-	17.1	-	-	-	-	-	15.6	-	-	-	-	-	-	-			

Table 16. Biological data by length interval for lake whitefish caught by tagging nets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES										FEMALES										COMBINED						
	LENGTH(MM)		WEIGHT(G)		% MAT		K		N		LENGTH(MM)		WEIGHT(G)		% MAT		K		N		LENGTH(MM)		WEIGHT(G)		% MAT		
	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	N	MEAN	SD	MEAN	SD	K	MAT	
150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	155	50	-	-	1.34	0
160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	167	50	0	-	1.07	0
170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	170	50	0	-	1.01	0
180	-	-	-	-	-	-	-	-	3	184	58	14	0.93	0	-	-	-	-	-	-	5	184	65	22	22	1.03	0
190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	196	75	35	35	0.99	0
200	-	-	-	-	-	-	-	-	1	202	75	-	0.91	0	-	-	-	-	-	-	2	204	88	18	18	1.04	0
260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	262	250	-	-	1.39	0
300	1	304	350	-	1.25	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	304	350	-	-	1.25	0
310	1	316	400	-	1.27	0	1	311	350	-	-	1.16	0	-	-	-	-	-	-	2	314	375	35	35	1.22	0	
330	1	331	500	-	1.38	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	331	500	-	-	1.38	0
340	2	346	575	35	1.39	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	346	575	35	35	1.39	0
350	-	-	-	-	-	-	1	355	600	-	-	-	-	-	-	-	-	-	-	-	1	355	600	-	-	1.34	0
360	2	361	600	71	1.27	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	361	600	71	71	1.27	0
380	1	383	750	-	1.33	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	383	750	-	-	1.33	0
410	-	-	-	-	-	-	1	412	1050	-	-	-	-	-	1.50	0	-	-	-	-	1	412	1050	-	-	1.50	0
440	-	-	-	-	-	-	1	446	1250	-	-	-	-	-	1.41	0	-	-	-	-	1	446	1250	-	-	1.41	0
470	-	-	-	-	-	-	1	476	1500	-	-	-	-	-	1.39	0	-	-	-	-	1	476	1500	-	-	1.39	0
480	-	-	-	-	-	-	1	480	1650	-	-	-	-	-	1.49	0	-	-	-	-	1	480	1650	-	-	1.49	0
490	2	492	1875	106	1.57	100	-	-	-	2	492	1875	106	1.57	50	-	-	-	-	-	4	492	1875	87	87	1.57	75
510	1	514	2250	-	1.66	100	-	-	-	1	514	2250	-	-	-	-	-	-	-	-	1	514	2250	-	-	1.66	100
520	-	-	-	-	-	-	1	522	2050	-	-	-	-	-	1.44	100	-	-	-	-	1	522	2050	-	-	1.44	100
530	-	-	-	-	-	-	2	537	2450	71	71	1.58	100	-	-	-	-	-	-	2	537	2450	71	71	1.58	100	
540	-	-	-	-	-	-	2	547	2625	35	35	1.61	100	-	-	-	-	-	-	2	547	2625	35	35	1.61	100	
550	1	550	3500	-	2.10	100	-	-	-	1	550	3500	-	-	-	-	-	-	-	-	1	550	3500	-	-	2.10	100
560	1	569	2750	-	1.49	100	-	-	-	1	569	2750	-	-	-	-	-	-	-	-	1	569	2750	-	-	1.49	100
570	-	-	-	-	-	-	1	570	2750	-	-	-	-	-	1.48	100	-	-	-	-	1	570	2750	-	-	1.48	100
580	-	-	-	-	-	-	1	585	3000	-	-	-	-	-	1.50	100	-	-	-	-	1	585	3000	-	-	1.50	100
590	1	590	3150	-	1.53	100	-	-	-	1	590	3150	-	-	-	-	-	-	-	-	1	590	3150	-	-	1.53	100
TOTAL	14						19														45						
MEAN		425	1411	1125	1.46			424	1492	1039	1.37										361	1090	1094			1.33	





Table 21. Biological data by age group for cisco (spp) caught by tagging nets from Mosquito Lake, 1983.

AGE (YR)	MALES						FEMALES						COMBINED									
	LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT					
	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	
3	6	178	13.0	67	26	1.18	50	8	192	19.4	69	26	0.96	25	14	186	17.8	68	25	1.05	36	
4	3	173	14.2	50	0	1.00	33	4	188	10.3	63	25	0.92	50	7	181	13.6	57	19	0.95	43	
5	3	189	15.6	67	29	0.95	100	11	191	11.0	73	24	1.02	91	14	190	11.4	71	24	1.01	93	
6	18	194	12.0	74	25	1.00	78	14	195	7.3	86	23	1.14	93	32	194	10.1	79	25	1.06	84	
7	4	200	15.1	88	25	1.07	100	7	202	11.1	100	29	1.19	100	11	201	12.0	95	27	1.15	100	
10	-	-	-	-	-	-	-	1	422	-	1050	-	1.40	100	1	422	-	1050	-	1.40	100	
TOTAL	34	189	15	71	25	1.03		45	199	36.1	101	147	1.07		79	195	29.2	88	113	1.06		
MEAN AGE		5.3						5.3							5.3							

Table 22. Biological data by length interval for Arctic grayling caught by tagging nets from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED									
	LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT					
	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	
360	1	362		50		0.11	100	-							1	362		50		0.11	100	
410	-	-	-	-	-	-	-	1	410		100		0.15	100	1	410		100		0.15	100	
TOTAL	1	362		50		0.11		1	410		100		0.15		2	386		75		0.13		
MEAN																						

Table 23. Biological data by age group for Arctic grayling caught by tagging nets from Mosquito Lake, 1983.

AGE (YR)	MALES						FEMALES						COMBINED									
	LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT		LENGTH(MM)		WEIGHT(G)		% MAT					
	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	
6	-	-	-	-	-	-	-	1	410		100		0.15	100	1	410		100		0.15	100	
8	1	362		50		0.11	100	-	-	-	-	-	-	-	1	362		50		0.11	100	
TOTAL	1	362		50		0.11		1	410		100		0.15		2	386		75		0.13		
MEAN																						
MEAN AGE		6.0						6.0							7.0							



Table 26. Biological data by length interval for tagged lake trout from Mosquito Lake, 1983.

LENGTH INTERVAL (MM)	NO.	PERCENT	MEAN FORK LENGTH(MM)	ROUND WEIGHT(G)	
				MEAN	SD
500	3	1	509	-	-
525	21	8	538	-	-
550	39	14	562	-	-
575	47	17	587	-	-
600	54	20	611	-	-
625	26	9	639	-	-
650	29	11	658	-	-
675	17	6	687	-	-
700	9	3	709	-	-
725	5	2	740	-	-
750	5	2	761	-	-
775	3	1	788	-	-
800	3	1	817	-	-
825	4	1	834	-	-
850	3	1	859	-	-
875	2	1	885	-	-
900	2	1	916	-	-
925	1	0	945	-	-
975	1	0	999	-	-
1000	1	0	1020	-	-
1075	1	0	1090	-	-
TOTAL	276				
MEAN			634		

Table 27. Weight-length relationships,  $\log_{10} W = a + b (\log_{10} L)$ , for each fish species (sexes combined) from Mosquito Lake, Northwest Territories.

Species	N	Y-intercept (a)	Slope (b)	Standard Dev. of b ( $SD_b$ )	95% C.I.
Lake trout					
angled	8	-5.6041	3.2287	0.0949	2.9964-3.4609
gillnetted	303	-5.1166	3.0585	0.0302	2.9993-3.1177
combined	356	-5.1734	3.0794	0.0258	3.0289-3.1300
Lake whitefish	295	-5.9342	3.4108	0.01995	3.3717-3.4500
Round whitefish	51	-6.0397	3.4170	0.1058	3.2040-3.6300
Cisco (spp)	187	-5.9044	3.3816	0.1114	3.1633-3.6000
Arctic Grayling	3	0.4347	0.5514	0.7056	-8.4135-9.5163

Table 28. Fecundity of lake trout from Mosquito Lake, Northwest Territories.

Date	Fork Length (mm)	Weight (g)	Total Ovum Weight (g)	Ovum Diameter (mm)	Total Ovum Count
16 August	617	2700	264.0	5.0	2949
19 August	697	3900	530.3	5.3	4834
19 August	605	2850	452.6	5.2	4596
20 August	631	2500	224.5	3.8	4223
20 August	705	4000	455.4	4.4	6082
24 August	615	2250	409.8	4.9	4360
Mean	645	3033	389.4	4.8	4507

Table 29. Water temperature and dissolved oxygen profiles for Mosquito Lake, 1983.

Depth (m)	August 7		August 15		August 23	
	Temp (°C)	DO (ppm)	Temp (°C)	DO (ppm)	Temp (°C)	DO (ppm)
0	9.9	11.9	8.3	11.5	9.1	10.6
1	8.5	11.4	8.2	11.1	9.1	9.8
2	8.0	11.5	8.1	11.2	9.0	9.9
3	7.9	11.5	8.1	11.1	8.9	9.9
4	7.8	12.0	8.1	11.2	8.9	9.8
5	7.7	11.8	8.1	11.2	8.8	9.8
6	7.7	11.6	8.0	11.3	8.7	9.8
7	7.7	11.2	7.9	11.4	8.5	9.7
8	7.5	11.4	7.8	11.4	8.5	9.7
9	7.4	11.2	7.7	11.4	8.4	9.8
10	7.4	11.7	7.5	11.4	8.4	9.8
11	7.3	11.4	7.5	11.4	8.4	9.7
12	7.2	11.2	7.3	11.4	8.3	9.7
13	7.2	11.2	7.2	11.4	8.3	9.7
14	7.0	11.2	7.2	11.4	8.3	9.7
15	6.6	10.6	7.2	11.2	8.2	9.5
16	6.6	10.1	7.2	11.2		
17	6.6	10.1				
18	6.6	9.8				
19	6.6	9.8				
20	6.5	9.7				
21	6.5	9.6				
22	6.5	9.7				
23	6.5	9.7				
24	6.5	9.7				

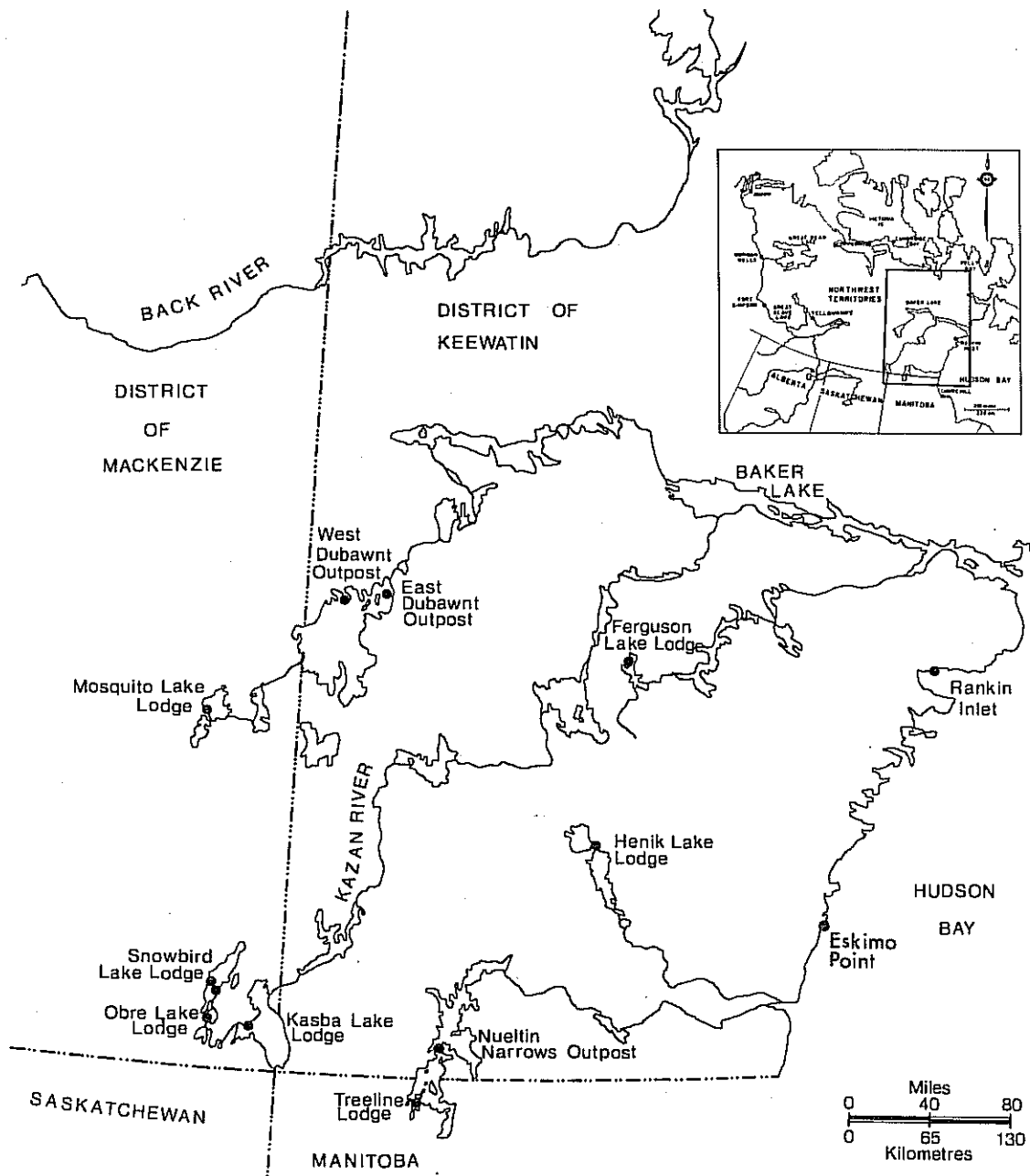


Fig. 1. Map of the District of Keewatin, N.W.T. showing the locations of sport fishing lodges and outpost camps.

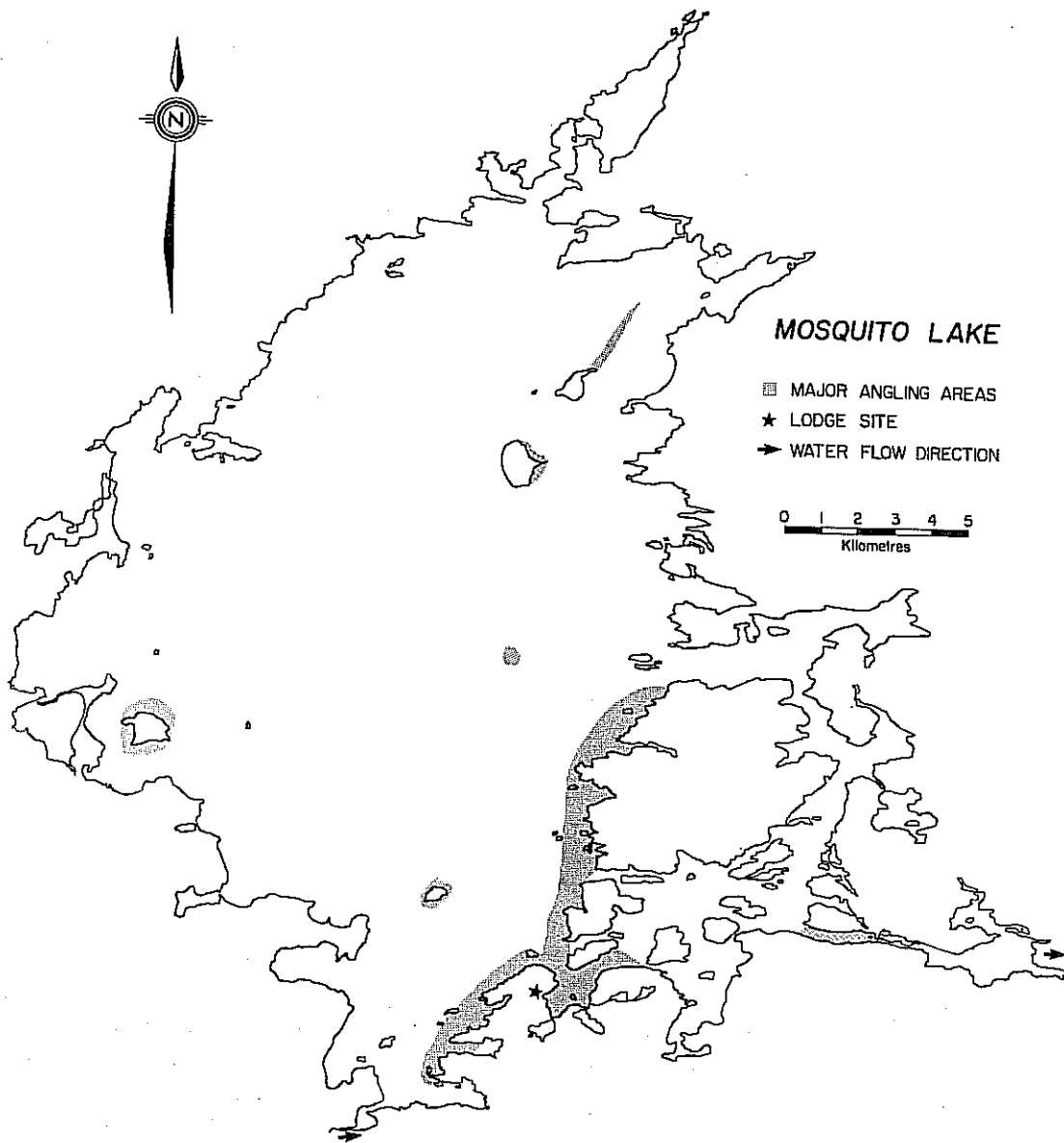


Fig. 2. Map of Mosquito Lake showing the locations of Tukto lodge and the areas generally fished for lake trout.

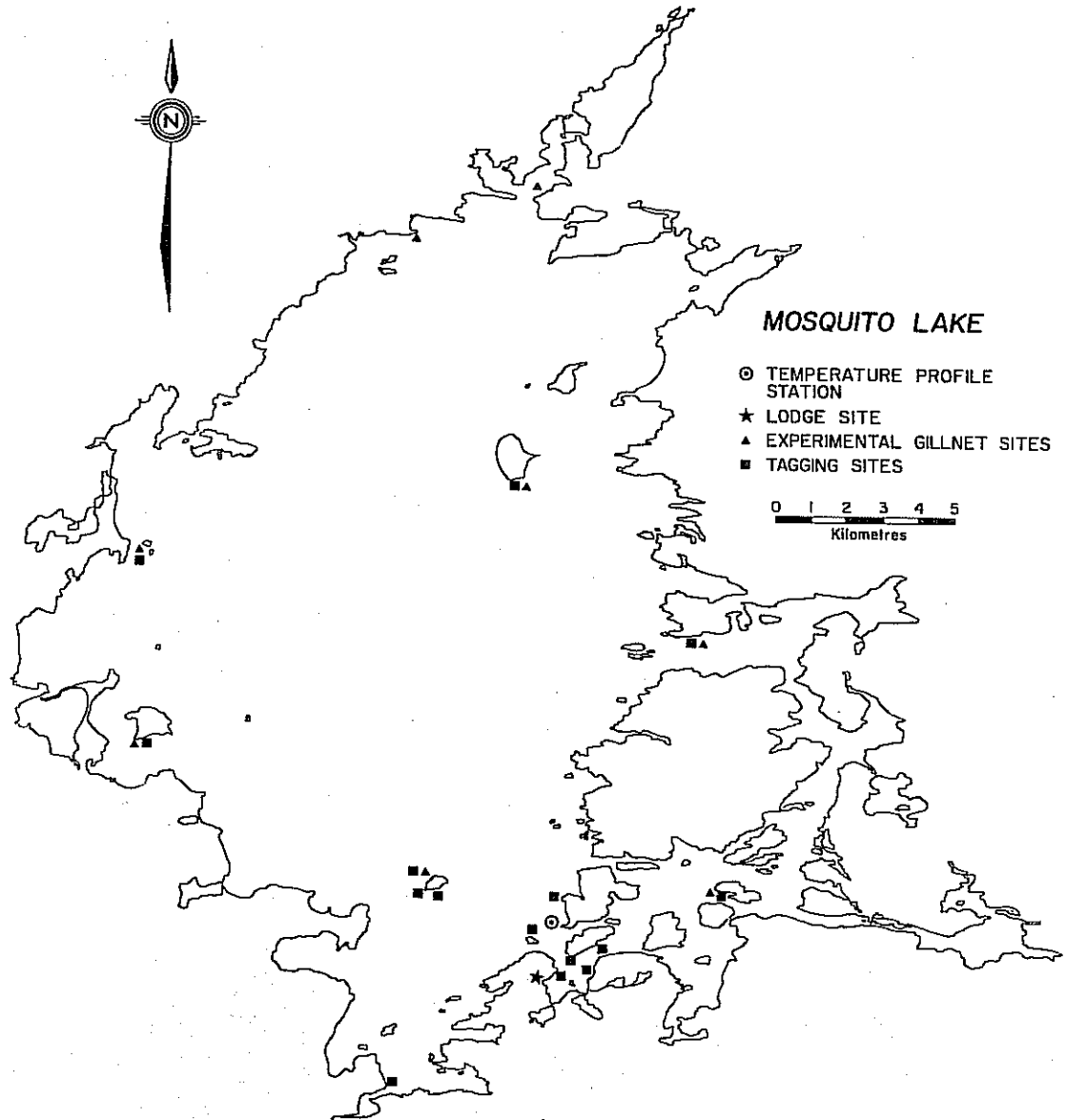


Fig. 3. Map of Mosquito Lake showing the experimental gillnet locations and tagging sites, 1983.

Appendix 1. Summary of information on sample dates, sample locations, set duration, depths and catch per unit of effort for experimental gillnets and tagging nets on Mosquito Lake, 1983.

Date <sup>1</sup>	Set Number	Location Number	Set Duration (h)	Water Depth (m)	Total <sup>2</sup> Catch (kg)	CPE <sup>3</sup>
August 1 T <sup>1</sup>	1	1	20.0	4.0-18.0	53.5	44.0
2	1	2	19.7	6.0-22.0	222.7	58.5
2 T <sup>1</sup>	2	1	23.1	4.0-18.0	66.9	26.3
2 T <sup>1</sup>	3	3	6.8	4.0-18.0	24.3	47.1
3 T <sup>1</sup>	4	2	6.8	8.0-18.0	2.6	4.7
4	2	4	22.5	3.0-2.0	233.2 <sup>4</sup>	61.9
6	3	3	39.3	4.5-6.5	316.2 <sup>4</sup>	38.1
7	4	5	17.4	4.5-7.0	211.3	56.3
8	5	4	18.2	2.0-19.0	163.7	64.4
9	6	5	17.4	3.0-8.0	29.6	77.2
10	7	6	19.4	2.5-14.0	53.1	27.7
12 T <sup>3</sup>	3	7	18.4	3.0-12.0	129.5	103.8
14 T <sup>3</sup>	3	6	21.7	6.0-19.0	149.3	111.9
16 T <sup>2</sup>	5	7	7.3	4.0-10.0	42.2	34.5
17 T <sup>2</sup>	5	8	6.8	3.0-7.0	10.5 <sup>4</sup>	7.1
18 T <sup>1</sup>	5	8	6.6	2.5-7.5	27.9	58.2
19 T <sup>1</sup>	5	9	6.8	3.5-7.0	46.9	87.1
20	8	10	24.0	11.0-5.5	110.6	62.0
20 T <sup>1</sup>	5	9	6.0	2.0-2.5	8.7	21.3
21 T <sup>1</sup>	1	11	6.2	5.5-21.0	2.0	46.5
21 T	1	10	5.7	5.0-11.0	24.1	33.7
22 T <sup>1</sup>	5	12	6.1	2.0-2.5	0.0	3.6
22 T <sup>1</sup>	1	11	5.4	5.0-11.0	3.8	5.9
23 T <sup>1</sup>	3	13	6.8	6.0-21.0	15.4	105.9
23 T <sup>1</sup>	3	14	6.9	3.0-12.5	9.3	7.0

<sup>1</sup> Date only indicates standard gang; T = tagging gang of 1x38 mm and 1x64 mm mesh. T = 100 m gang; T<sup>1</sup> = 150 m gang; T<sup>2</sup> = 200 m gang, T<sup>3</sup> = 250 m gang.

<sup>2</sup> Includes estimated weight of fish tagged and released only.

<sup>3</sup> Catch per unit of effort for standard gillnet sets (No. fish/100 m gillnet/24 h).

<sup>4</sup> Total catch weighed.