RAMSEY LAKE: An Assessment of the Fish Community and a Review of the Fisheries Management History.

(1989 Urban Lakes Study)

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ABSTRACT

Ramsey Lake was surveyed as part of the Urban Lakes Study, a 1989 project of the Ontario Ministry of Natural Resources - Laurentian University Cooperative Fisheries Unit. By comparing fisheries survey results for Ramsey Lake to those for other similar lakes in the province, it was concluded that Ramsey Lake supports a healthy walleye population. This population is the combined result of MNR stocking in the late 1970's and recent CFIP hatchery stocking. There is some information to suggest that stocked walleye are reproducing in Ramsey Lake. Other species currently in Ramsey Lake are yellow perch, northern pike, white suckers, brown bullheads, rock bass, pumpkinseeds and golden shiners. Smallmouth bass are rare and lake trout appear to be extinct.

A detailed contour map was made of Ramsey Lake and a shoreline cruise was conducted to document all aquatic vegetation, shoreline substrate and vegetation, and shoreline development. Aquatic vegetation and walleye spawning substrate in Ramsey Lake appear to be very limited and need to be vigorously protected to ensure continued production of sport fish.

Dissolved oxygen and temperature profiles were taken weekly at three sampling stations and were typical of a mesotrophic lake.

Personal interviews, historic records, books, and newspapers, have been used to construct a history of Ramsey Lake. This review indicated that stocking of the lake began as early as 1891. Walleye, pike, smallmouth bass and lake trout were native to Ramsey Lake before pollution, stocking, and exploitation altered the species composition.

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INTRODUCTION

Ramsey Lake is located in the city of Sudbury in McKim and Neelon townships. It has a surface area of 795.2 hectares and a maximum depth of 20.5 m.

Ramsey Lake is used as a source of water for the city and for numerous recreational activities including angling, swimming, sailing, boating, and water skiing. The lake receives drainage from Minnow Lake and several other creeks on the north shore and Laurentian Lake on the south shore (Figure 1). Bethel Lake also occasionally flows into Ramsey Lake during high water periods. Ramsey drains into Lily Creek that connects through Robinson and Kelley Lakes (Figure 1), eventually emptying into Georgian Bay by way of the Spanish River.

There are approximately 405 private homes or cottages on Ramsey Lake in addition to public parks (Bell Park and Moonlight Beach), the Sudbury Yacht Club, Science North, Laurentian University and Ramsey Airways (Figure 2). Most of the remaining undeveloped shoreline is owned by the Nickel District Conservation Authority.

Walleye, pike and smallmouth bass were native to Ramsey Lake (Howey, 1938). Lake trout are also considered native to the lake although the occurrence of this species is not well documented (Appendix I).

During the past one hundred years, Ramsey Lake has been stocked on numerous occasions, but prior to 1989, only two fishery assessments had been conducted. The total catch during a netting survey in 1947 consisted of five northern pike and one yellow perch. A 1971 survey reported six pike, seven white suckers and nineteen perch.

To characterize the present status of the fish community in Ramsey Lake, a fishery assessment was conducted during the summer of 1989. This report presents the results of that survey and a summary of the lake's history.

Figure 1 Location of Ramsey Lake within the City of Sudbury

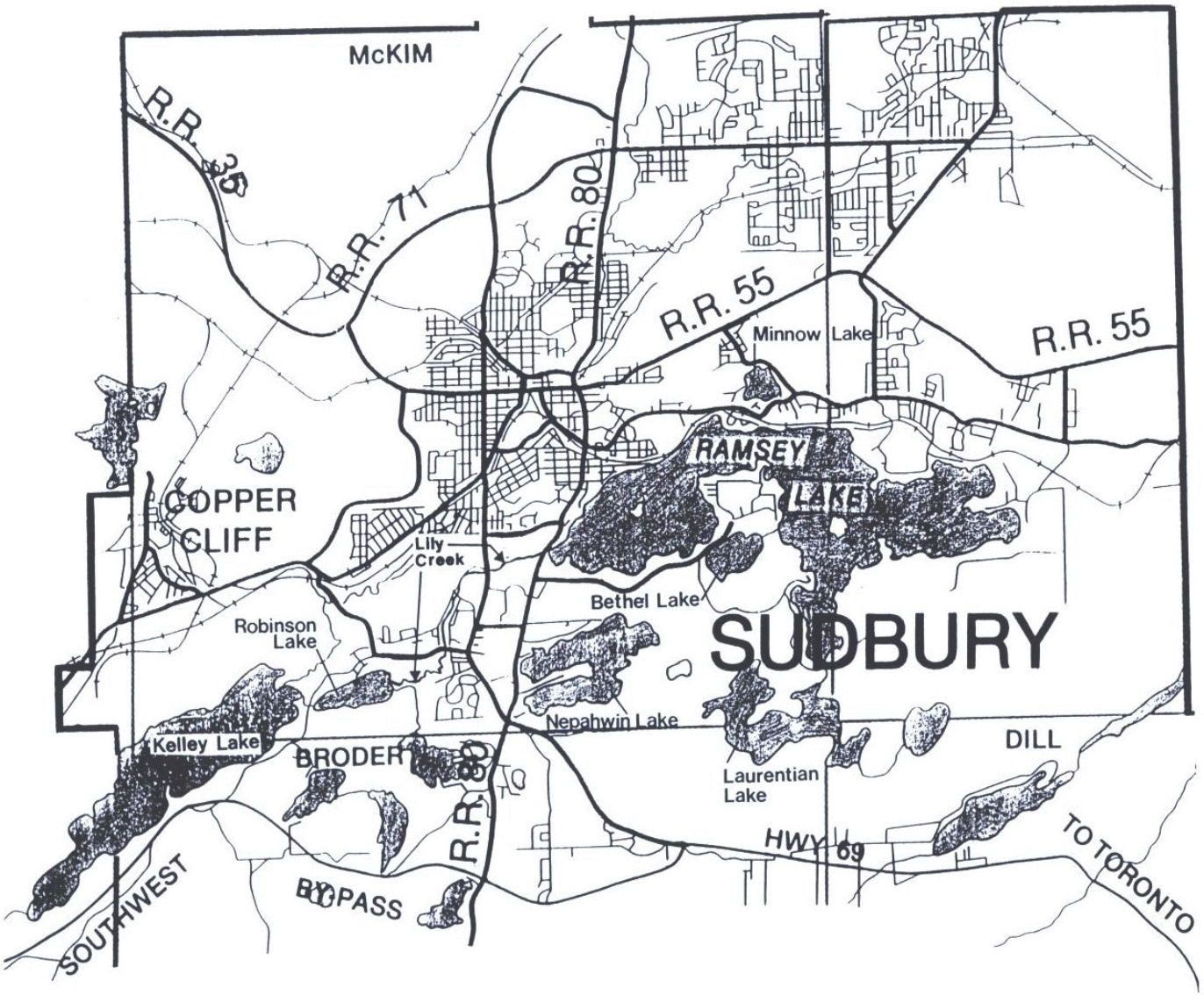
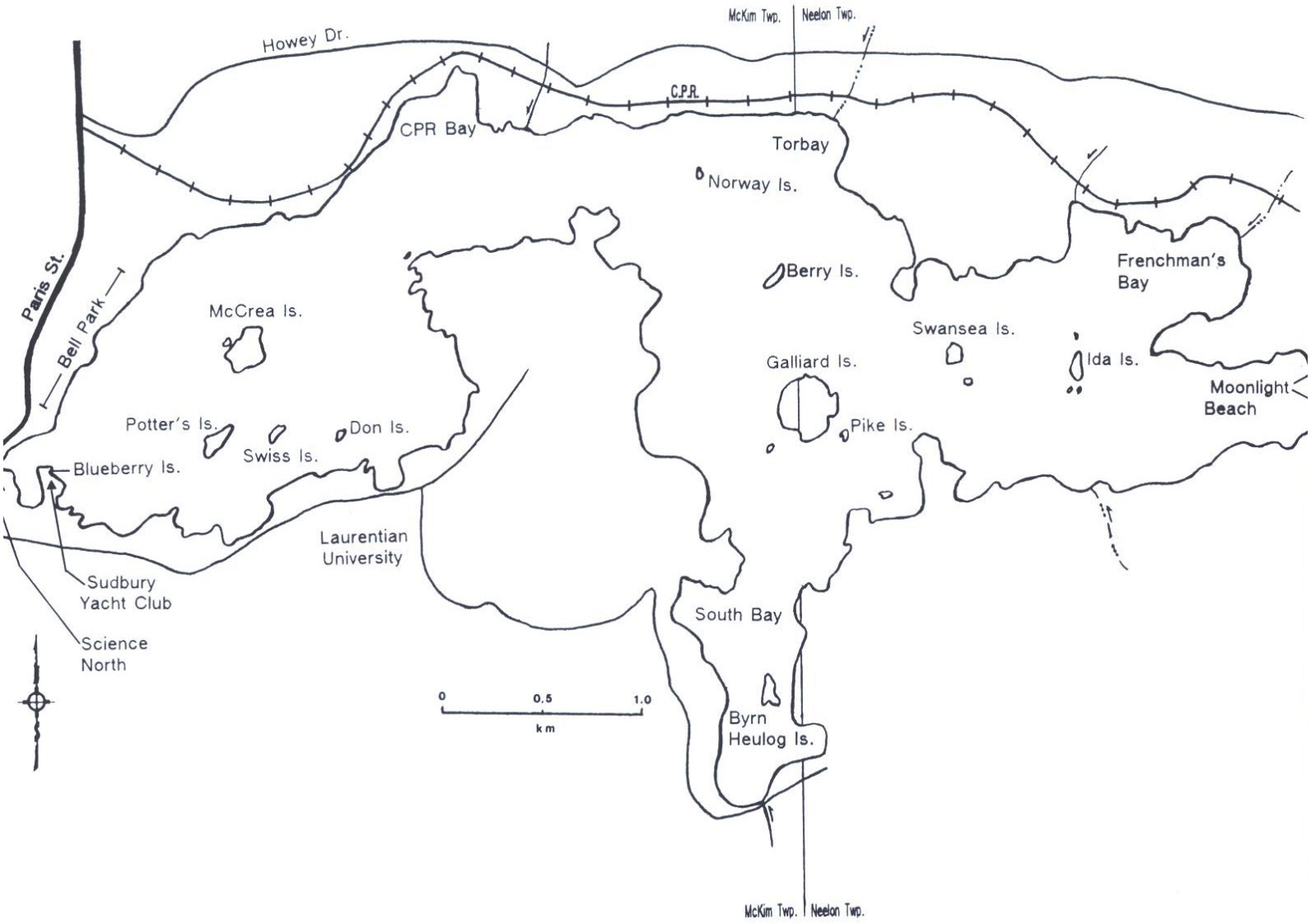


Figure 2 Islands, bays, and shoreline features of Ramsey Lake



RAMSEY LAKE

Location and Physical Description

Township	McKim and Neelon
Lat. / Long.	46'29' / 80'57'
MNR District	Sudbury
Watershed Code	2CF-08
Elevation (m)	251
Shoreline Development Factor	2.8
No. of Cottages and Homes	405 (in 1985)
No. of Lodges	0
Forest Type	Birch transition
Shoreline Type	Bedrock, urban development
Lake Area (ha)	795.2
Max. Depth (m)	20.5
Mean Depth (m)	8.4
Volume (x 10^4 m^3)	6,683.3
Secchi (m) - July 28, 1989	6.0
Access	Numerous city roads, parks and boat launches

FISHERIES ASSESSMENT

Methods

A fisheries assessment was conducted on Ramsey Lake during the periods of July 24-26 and July 31-August 3, 1989 using non-lethal fishing gear (four-foot trapnets, plexiglass minnow traps, wire mesh minnow traps).

Two four-foot trapnets (0.9 cm stretch mesh) were set overnight in 2 to 5 meters of water (mean set depth: 2.8 m) for six nights and a total effort of 11.5 days (Table 1). The location of the eleven sets and sample sites are indicated in Figure 3. Due to inclement weather, one trap fished for 38.7 hours during July 24 and 25. Mean set time of the remaining ten sets was 23.8 hours.

Two six-foot trapnets were set nightly for a total of 11.5 trapnet days in twelve sets (Table 1) at twelve different sites (Figure 3). These traps were set in 2 to 6 meters of water (mean depth: 4.4 m) with a mean set time of 23.0 hours.

Two plexiglass (PL) traps were set during the first week of sampling and two on each of three nights in the second week, for a total of 7.1 days (Table 1) in eight sets (Figure 4). One trap site is missing from Figure 4. The mean offshore depth was 1.2 m and ranged from 0.1 m to 1.5 m. Mean set duration was 21.2 hours.

Twenty wire mesh minnow traps were set in pairs with a total effort of 47.4 days (Table 1). The forty-nine sets sampled thirty-nine different sites (each pair is one set) (Figure 4). Minnow traps were not set on the night of July 25. The traps were set at depths of 0.5 m and 1.5 m at each site with a means set duration of 23.2 hours.

All fish captured had scale samples taken, were weighed, measured and released, except for yellow perch where only a sub-sample (199) was processed. The remaining perch were counted, group weighed and released.

Table 1 Summary of effort by gear type for Ramsey Lake

Gear	No. of Sets	Total Hours	Total Effort
TPS (4' traps)	11	276.91	11.54 days
TPL (6' traps)	12	275.64	11.49 days
PL (plexi traps)	8	169.68	7.07 days
MN (minnow traps)	49	1,137.34	47.39 days

Figure 3 Trapnet sites
Jul. 24 - Aug. 3, 1989

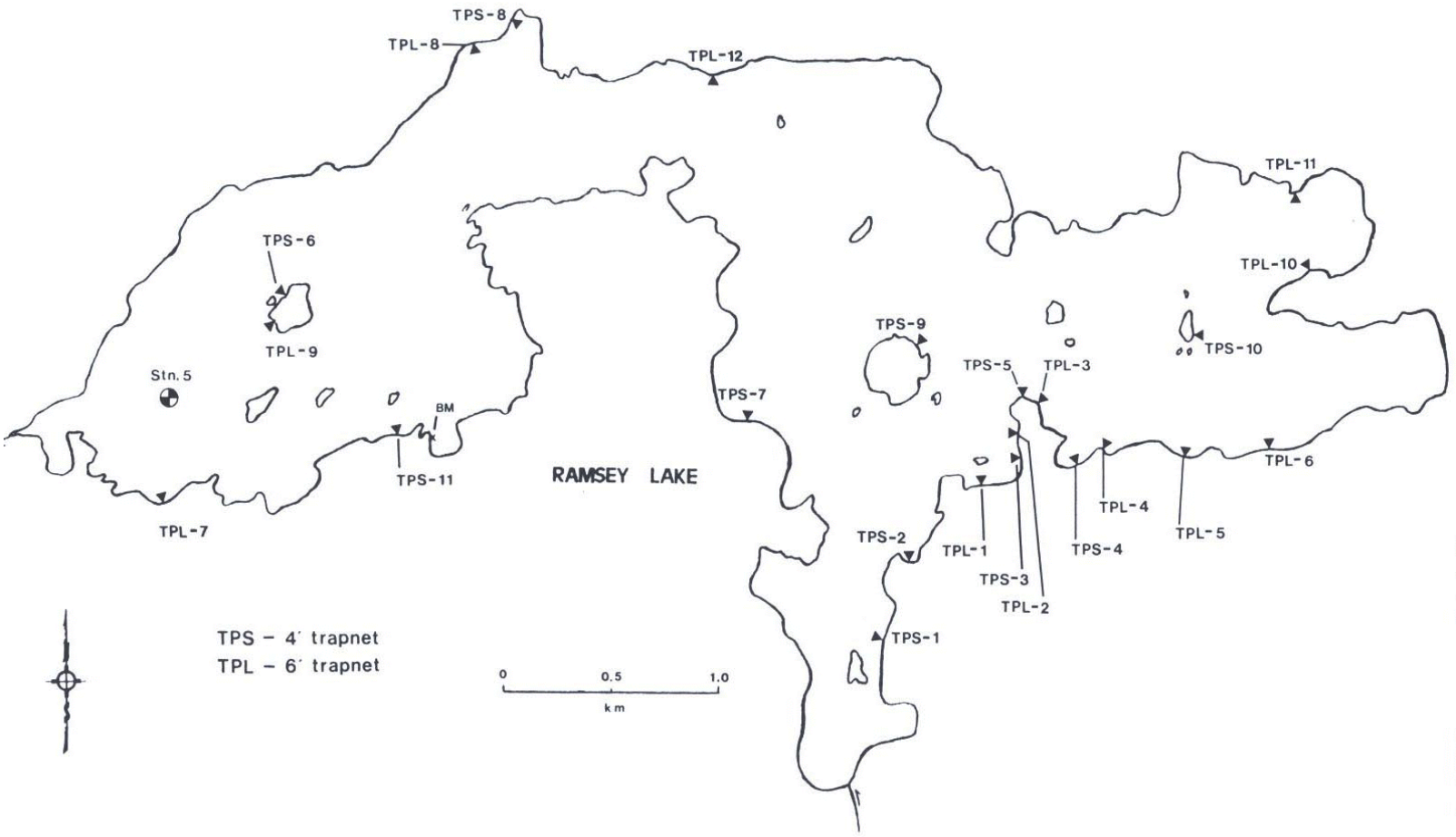
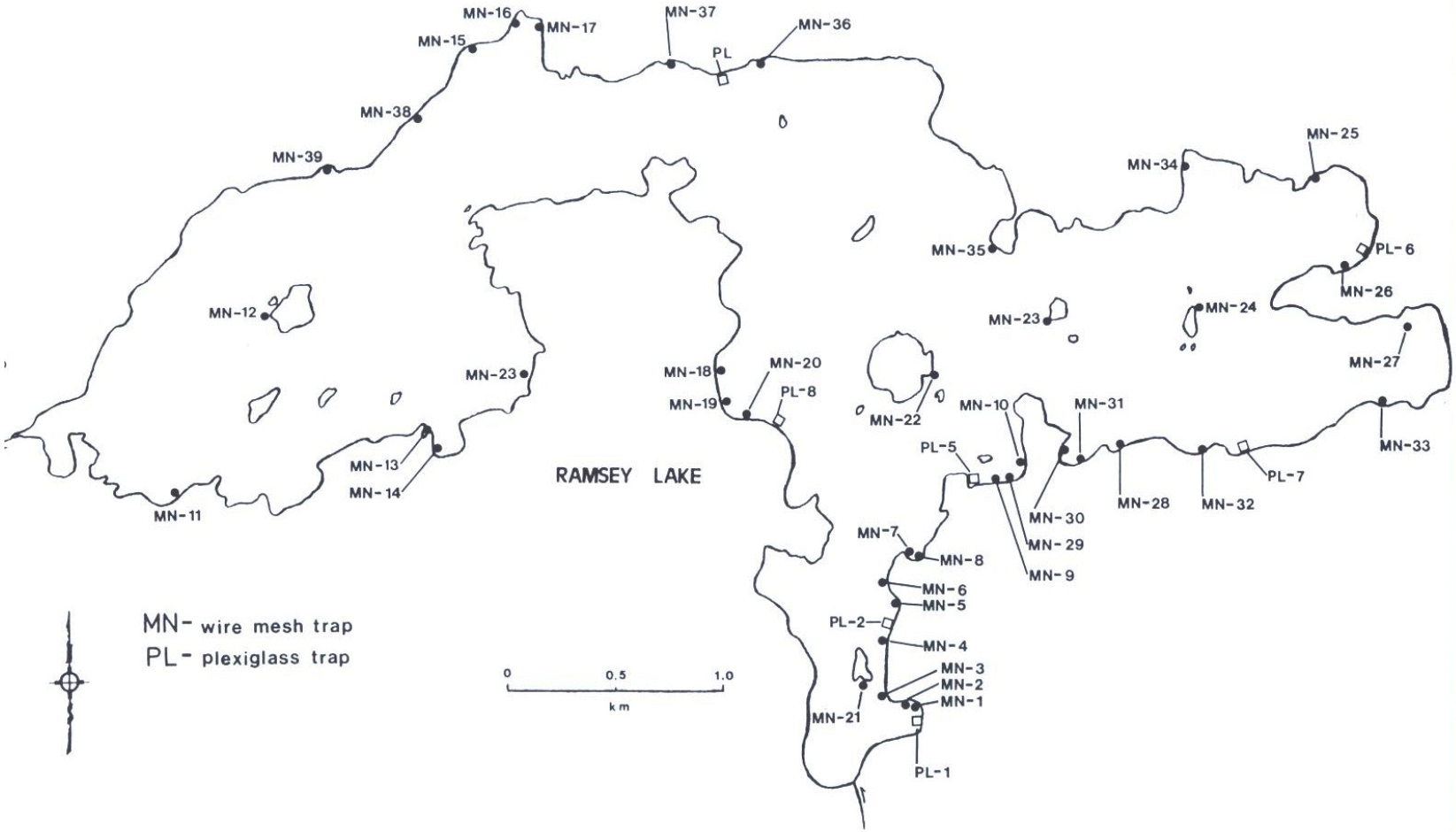


Figure 4 Minnow trap sites
Jul. 24 - Aug. 3, 1989



Water Quality

Commencing on May 10, 1989, dissolved oxygen and temperature profiles were determined weekly at Station 5 (Figure 3) using a YSI Model 57 Dissolved Oxygen/Temperature meter.

Water level was measured weekly from a bench mark located in a shallow bay on the south shore near Ramsey Lake Road (Figure 3).

Mapping

A contour map of the lake was produced from over one hundred transects with a Furuno FG-200 echo sounder. The entire shoreline was videotaped and aquatic vegetation, shoreline substrate, shoreline vegetation and shoreline development mapped in detail following the methods described in Snucins (1989).

RESULTS

The fisheries assessment of Ramsey Lake yielded a total of 369 walleye, 6 northern pike, 3,025 yellow perch, 1 smallmouth bass, 10 rock bass, 8 brown bullheads, 15 white suckers, 7 pumpkinseeds, 1 black crappie and 362 golden shiners (Table 2).

Four-foot trapnets caught a total of 168 walleye weighing approximately 61.8 kg. This results in a CUE by number of 14.558/day and Cue by weight of 5.362 kg/day (Table 3). CUE's of the six-foot trapnets are slightly higher with 201 walleye giving a CUE of 17.493/day. With a total weight of 104.2 kg, CUE by weight is 9.067 kg/day (Table 4). All six pike captured in this survey were found in the six-foot trapnets and weighed 11.85 kg. CUE by number for pike is 0.522/day, and CUE by weight is 1.031 kg/day (Table 4). Of the 759 yellow perch caught in trapnets, only one was from the six-foot nets. The other 758 give a CUE of 65.684/day for the four-foot nets. Total weight was approximately 14.4 kg, giving a CUE by weight of 1.251 kg/day (Table 5).

Both types of minnow traps caught only yellow perch and golden shiners, except for one pumpkinseed in a wire mesh trap. CUE's by number and weight are higher for both species in plexiglass traps (Tables 6 and 7). A total of 778 yellow perch and 203 golden shiners were captured in the plexiglass minnow traps for CUE's of 110.0 perch/day and 28.7 shiners/day. Yellow perch weighed 5.8 kg for a CUE of 0.82 kg/day and golden shiners weighed 1.2 kg for a CUE of 0.27 kg/day. Wire mesh traps set at 0.5 m collected 628 yellow perch (4.5 kg) and 77 golden shiners (0.8 kg). CUE's for these traps are 13.2 perch/day (0.10 kg perch/day) and 1.6 shiners/day (0.02 kg shiners/day). The 0.15 m traps caught 860 yellow perch (7.1 kg) and 82 golden shiners (0.8 kg). Yellow perch CUE is 18.2 fish/day (0.15 kg perch/day) and golden shiner CUE is 1.7 fish/day (0.17kg shiners/day).

Table 2 Catch summary for Ramsey Lake,
July 24 to Aug. 3, 1989

Species	Total No.	Total Wt. (kg)
Walleye	369	166.0
Northern Pike	6	11.9
Yellow Perch	3,025	32.0
Smallmouth bass	1	0.2
Rock Bass	10	1.1
Brown Bullhead	8	3.7
White Sucker	15	12.7
Pumpkinseed	7	0.2
Black Crappie	1	0.5
Golden Shiner	362	1.8

Table 3 Walleye catch summary and catch per unit effort (by number and by weight)

Gear	No.	C.U.E. (#/day)	kg	C.U.E. (kg/day)
TPS’	168	14.558	61.882	5.362
TPL”	201	17.493	104.175	9.067

‘TPS - 0.9 cm stretch mesh, four-foot box

“TPL - 3.5 cm stretch mesh, six-foot box

Table 4 Catch summary and catch per unit effort for species other than walleye captured in six-foot trapnets (TPL)

Species	No.	C.U.E. (#/day)	kg	C.U.E. (kg/day)
Yellow Perch	1	0.087	0.130	0.011
Northern Pike	6	0.522	11.85	1.031
Smallmouth Bass	1	0.087	0.175	0.015
Rock Bass	2	0.174	0.23	0.020
Brown Bullhead	6	0.522	2.69	0.234
White Sucker	15	1.305	12.69	1.104
Pumpkinseed	3	0.261	0.09	0.008
Black Crappie	1	0.087	0.50	0.043

Table 5 Catch summary and catch per unit effort for species other than walleye captured in four-foot trapnets (TPS)

Species	No.	C.U.E. (#/day)	kg	C.U.E. (kg/day)
Yellow Perch	758	65.684	14.44	1.251
Rock Bass	8	0.693	0.885	0.077
Brown Bullhead	2	0.173	1.050	0.091
Pumpkinseed	3	0.260	0.136	0.012

Table 6 Catch summary and catch per unit effort for all species captured in plexiglass minnow traps

Species	No.	C.U.E. (#/day)	kg	C.U.E. (kg/day)
Yellow Perch	778	110.042	5.810	0.822
Golden Shiner	203	28.713	1.194	0.271

Table 7 Catch summary and catch per unit effort for all species captured in wire mesh minnow traps

Effort'	Species	No.	C.U.E. (#/day)	kg	C.U.E. (kg/day)
005	Y. Perch	628	13.252	4.577	0.097
	G. Shiner	77	1.625	0.763	0.016
015	Y. Perch	860	18.147	7.062	0.149
	G. Shiner	82	1.730	0.818	0.017
	Pumpkinseed	1	0.021	0.007	<0.001

'005 traps set at 0.5 m, 015 traps set at 1.5 m

Fork lengths of the 323 processed walleye were between 8.7 cm to 52.4 cm and weighed from 3 g to 1400 g. Length and weight data are missing for forty-six walleye captured in the six-foot trapnets. Length frequency histograms for both trapnet sizes show a strong size class between approximately 30 and 40 cm (Figures 5 and 6). These fish probably represent the walleye planted in 1987 by the Sudbury Game and Fish Protective Association. Through their CFIP hatchery, the club planted fifty thousand one-month old and 400 three-month old walleye in Ramsey Lake in 1987. Ramsey Lake had not been stocked with walleye since 1978. A number of smaller walleye (20-26cm) were caught in the four-foot trapnets (Figure 5) and may represent the 1988 CFIP plant (2,000 three-month old walleye). Age assessments of the collected scales are not yet available to confirm these suggestions.

Pike ranged in size from 52.7 cm (110 g) to 82,5 cm (4000 g) and were all caught in the six-foot trapnets.

In the sub-sample of one hundred and ninety-nine yellow perch, fork lengths ranged from 7.2 to 21.6 cm, but most were between 10 and 11 cm (Figure 7).

Oxygen and temperature profiles were typical of a mesotrophic lake and isopleths were prepared from the data collected at Station 5 (Figures 8 and 9). At the time of the fisheries survey, Ramsey Lake was thermally stratified with a thermocline form 6 to 8 m at the beginning of the survey and 7 to 12 m by the end of the second week. Throughout the survey, dissolved oxygen levels ranged from 6.2 to 10.0 mg/l.

The highest water level for the summer of 1989 was observed in the third week of June when the bench mark was 5 cm below surface (Table 8). The lake level dropped gradually to 30 cm below the bench mark by the end of July and remained at that level until the end of August. By the end of October the lake level had fallen to 68 cm for a total drop of 73 cm from the high mark in June. In 1987 and 1988, levels peaked in late May to the middle of June.

Figure 5 Size class distribution of Ramsey Lake walleye from four-foot trapnets (TPS)

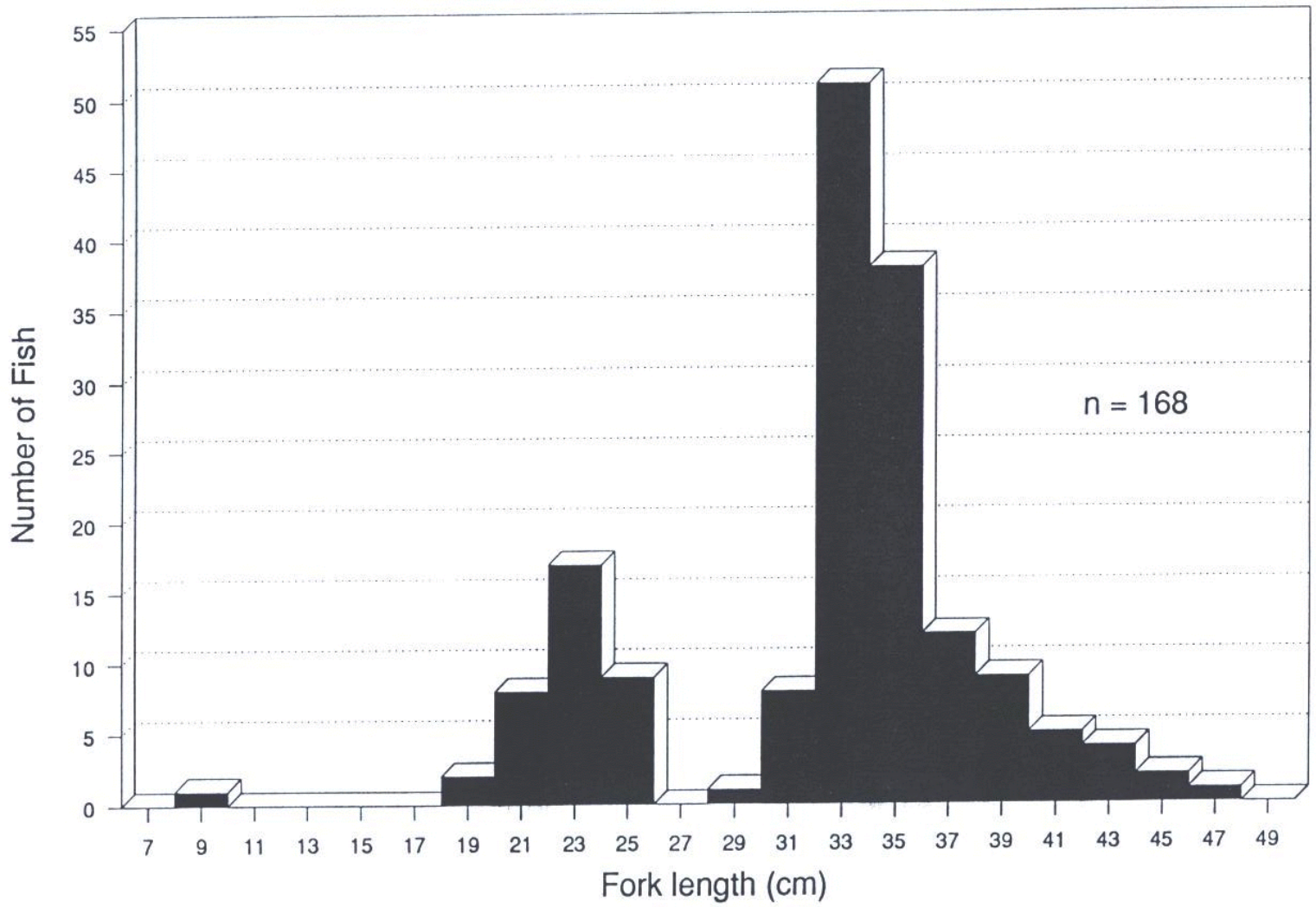


Figure 6 Size class distribution of Ramsey Lake walleye from six-foot trapnets (TPL)

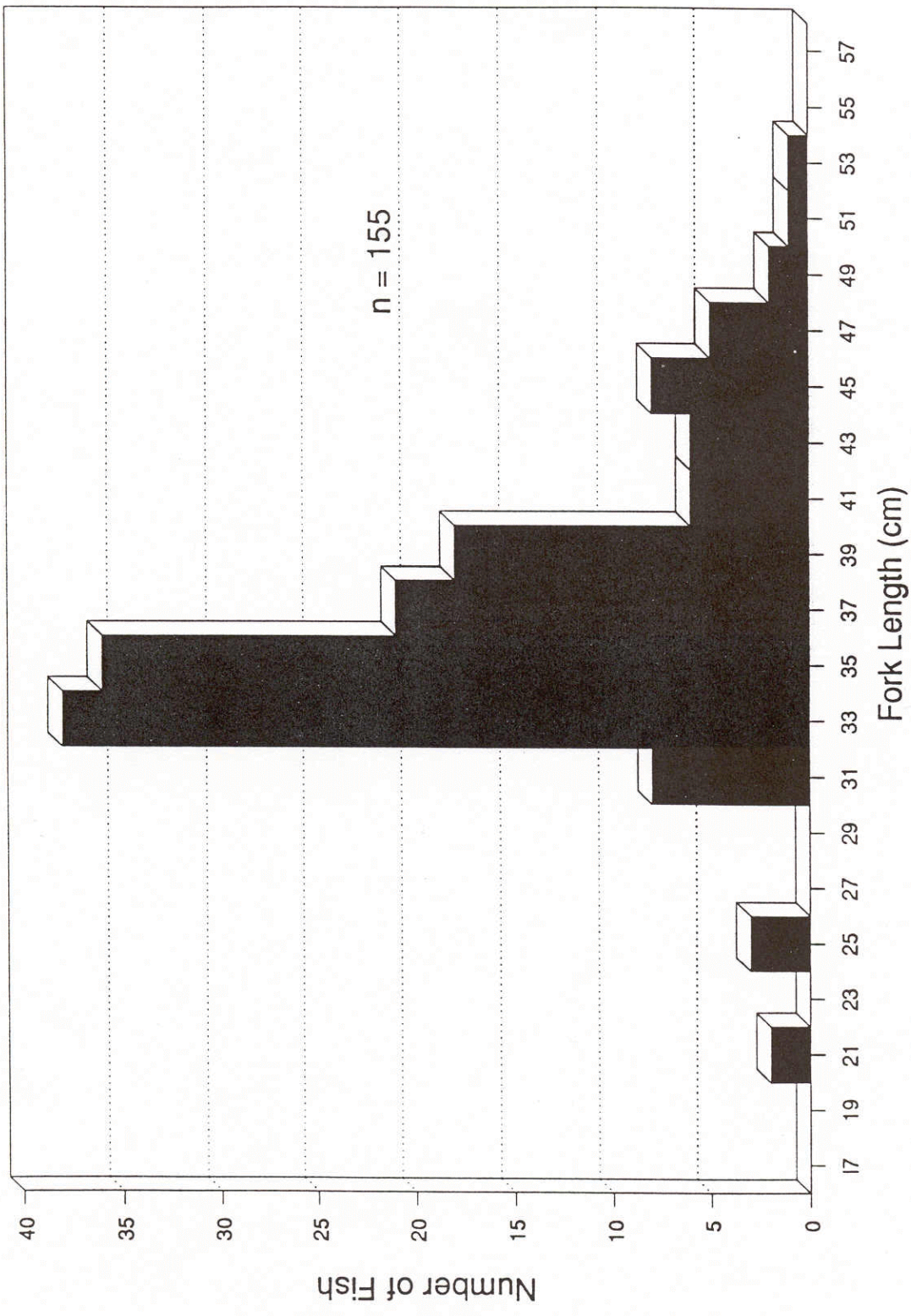
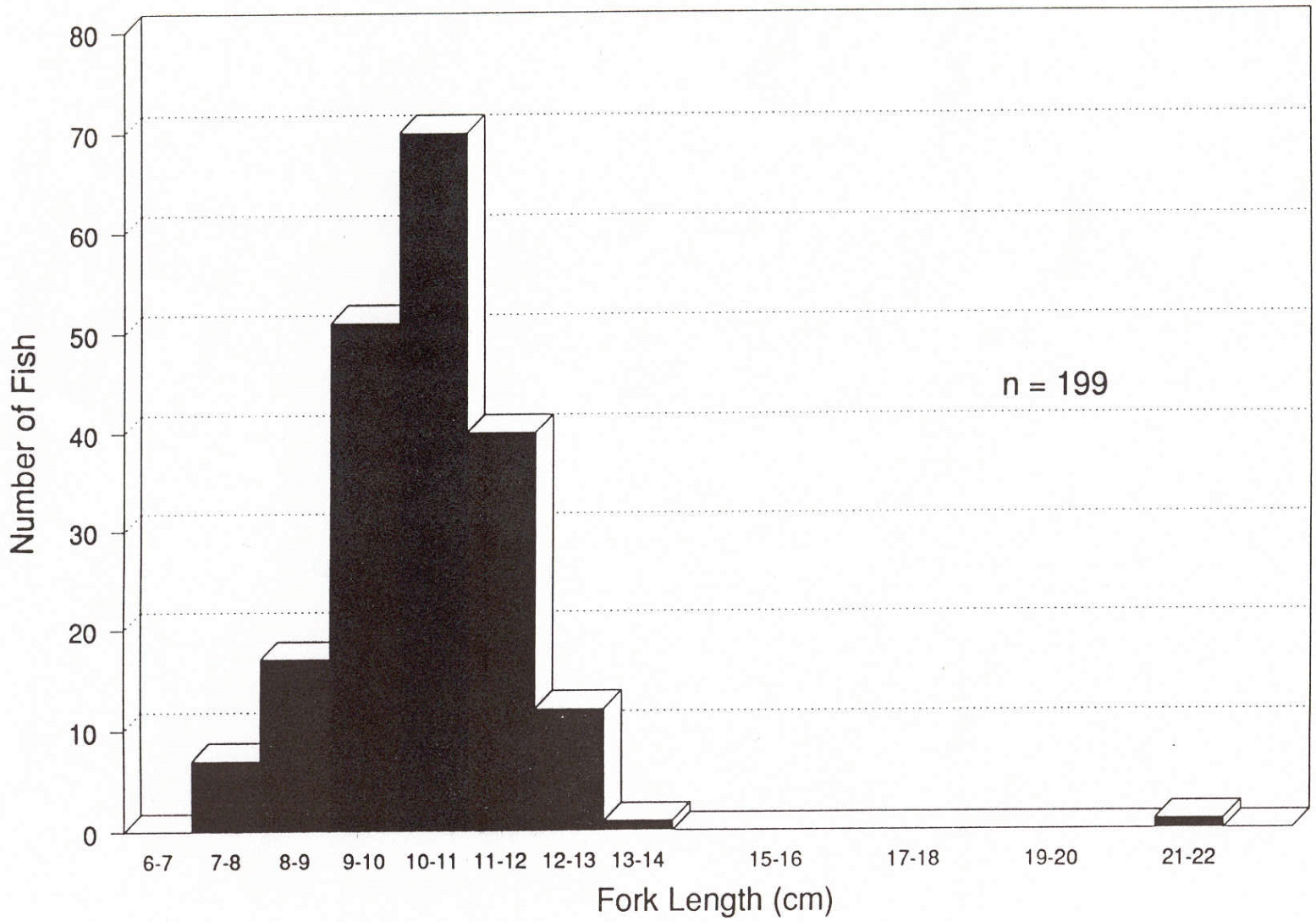


Figure 7 Size class distribution of Ramsey Lake yellow perch from four-foot trapnets (TPS)



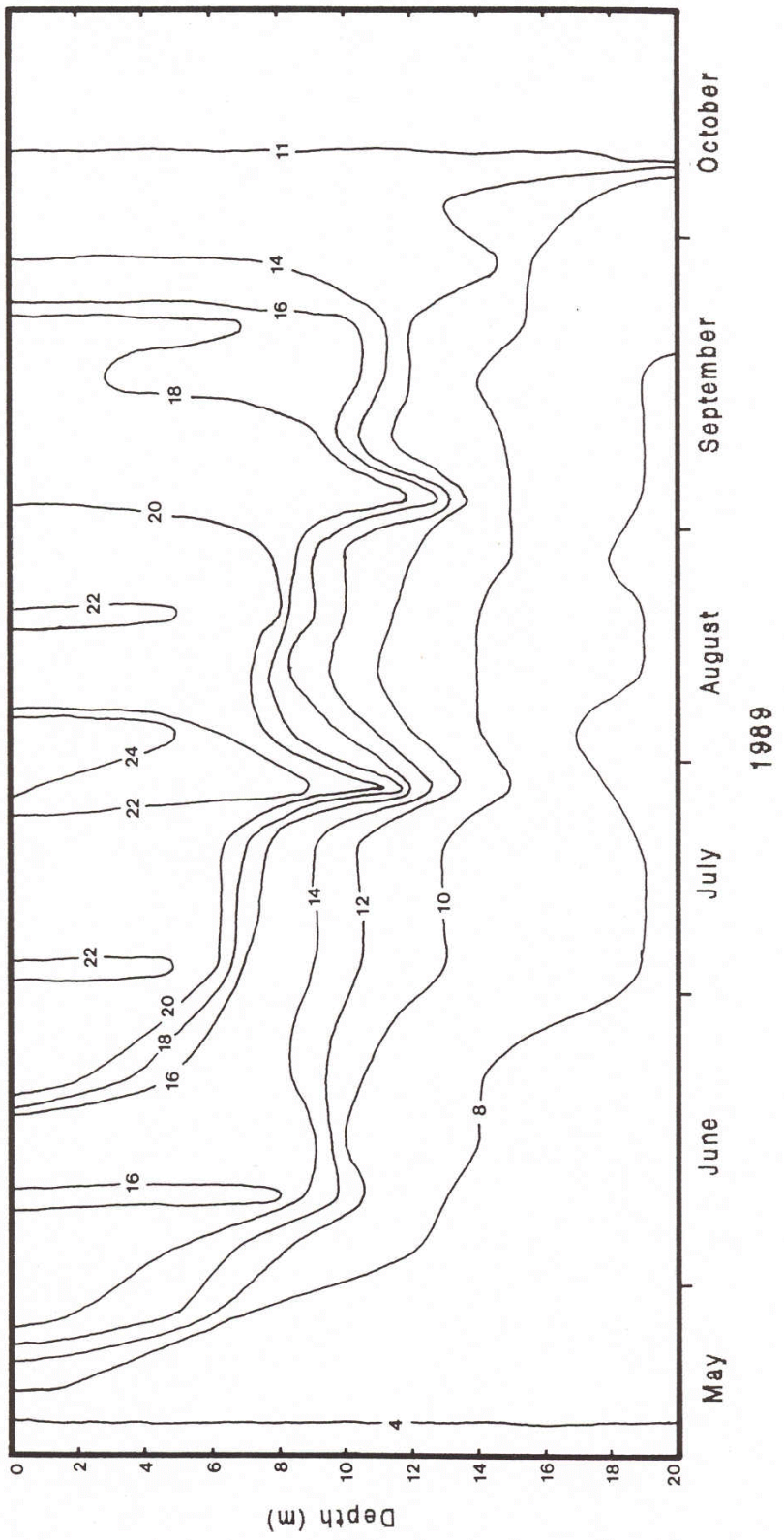


Figure 8 Temperature isopleths (in °C) for Ramsey Lake, Station 5 (May 10 to Oct. 26, 1989)

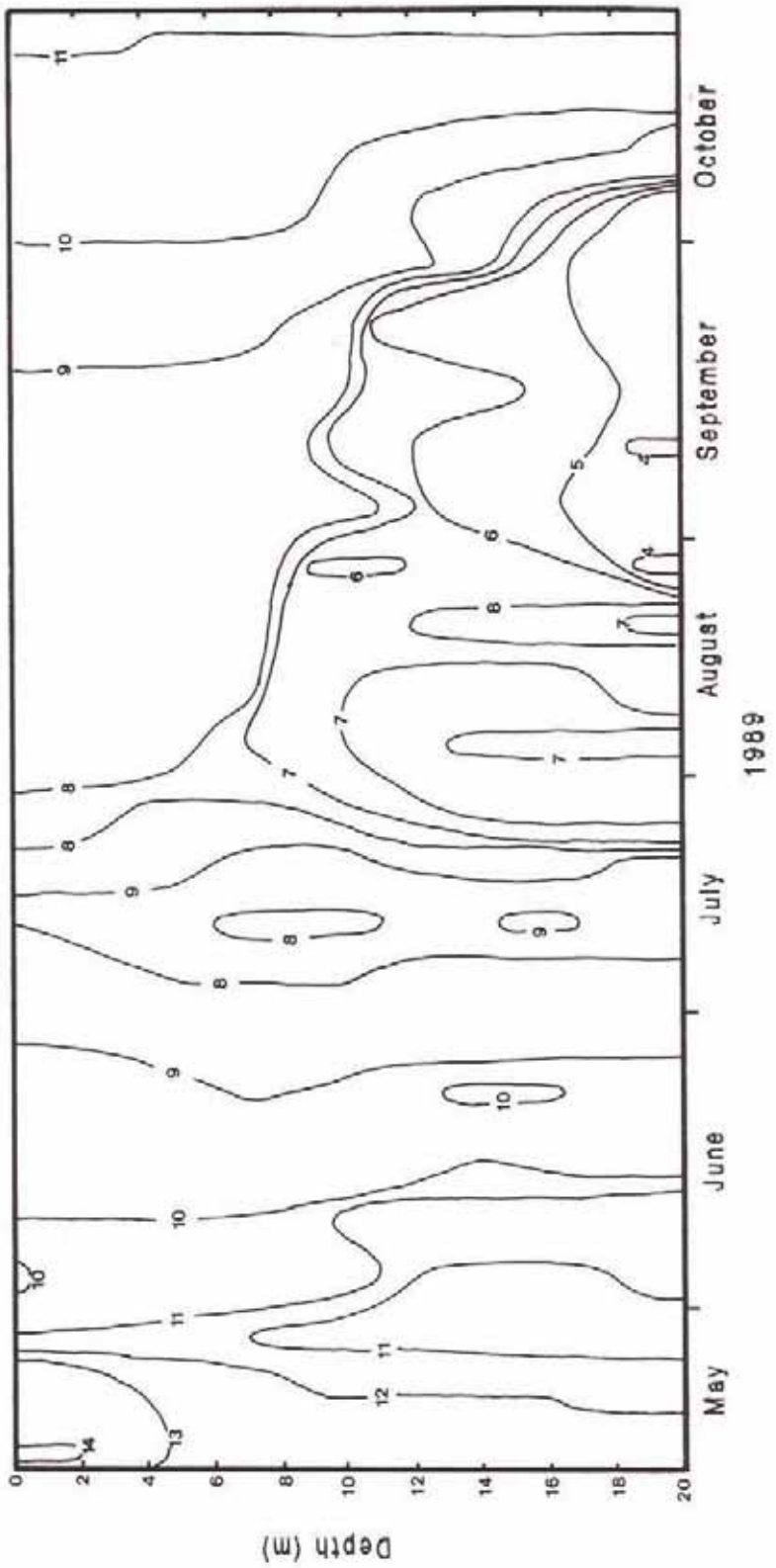


Figure 9 Dissolved oxygen isopleths (in mg/l) for Ramsey Lake, Station 5 (May 10 to Oct. 26, 1989)

Table 8 Ramsey Lake water level fluctuations; May 30 to Oct. 27, 1989

Date		Water Level (cm below bench mark)
May	30	18
June	1	16.5
	16	19.5
	23	+5
	29	7
July	7	17
	14	20
	21	25
	28	32
Aug.	4	31
	11	30
	18	31
	25	34
Sept.	1	39
	8	40
	15	missing
	22	48.5
	29	58
Oct.	6	59
	13	61
	20	missing
	27	68

Our contour map differs considerably from the previous map made in 1971. In particular, the deep basins at the extreme west end and in the north east bay in 1971 no longer exist (Figures 10 and 11). It is not known if these differences are due to sounding errors in 1971 or if they are the result of infilling.

In Ramsey Lake, suitable walleye spawning substrate is limited (Figure 12). Aquatic vegetation provides spawning habitat for pike and nursery habitat for both walleye and pike. All types of aquatic vegetation (submergent, emergent, floating) were mapped in June and early July (Figure 13). Since pike spawn immediately after ice melts in April to early May (water temperature 4.4 - 11.1 ˚C) potential pike spawning areas should be mapped in early spring.

Figure 10 Ramsey Lake, 1971

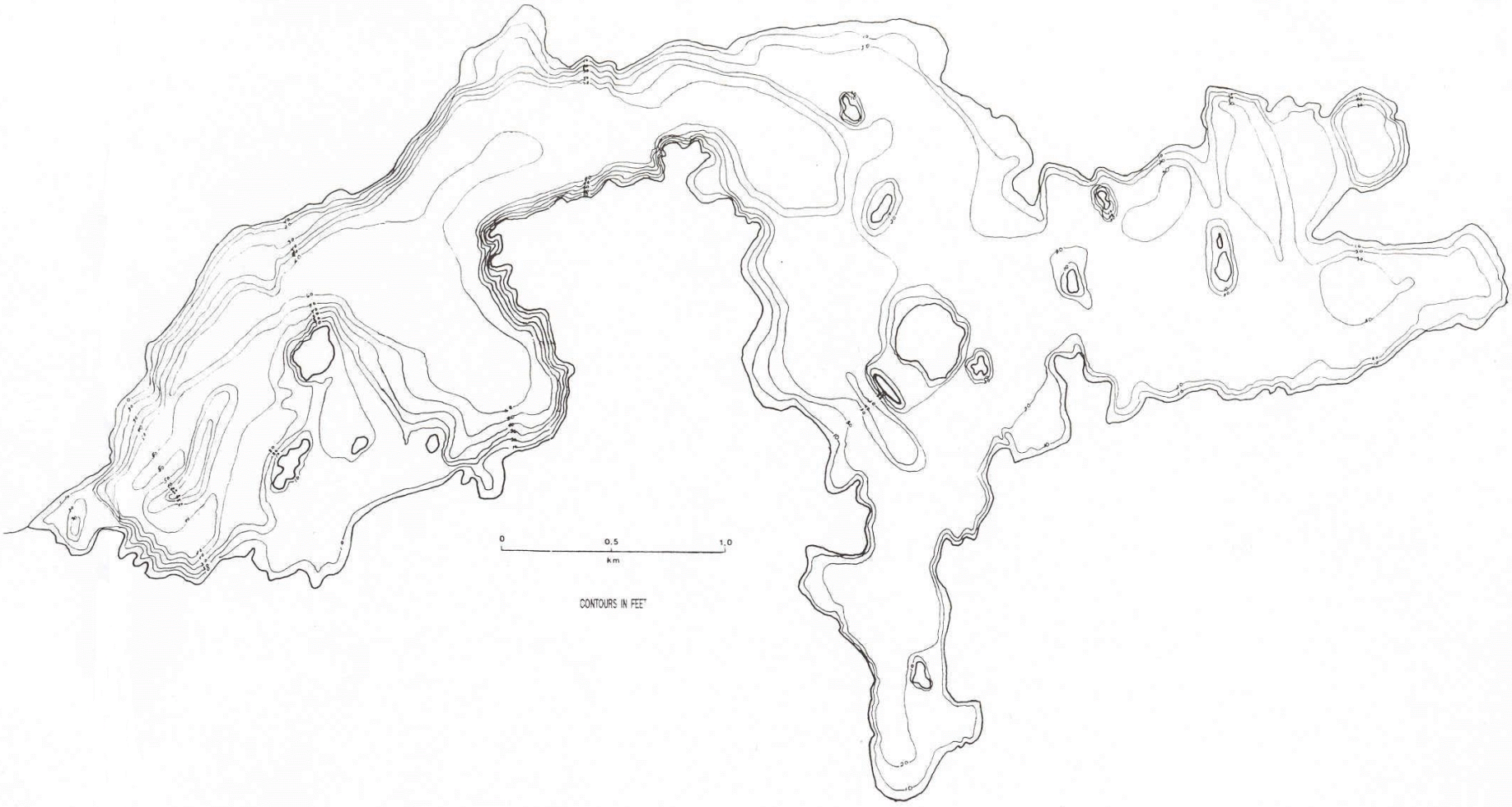


Figure 11 Ramsey Lake, 1989

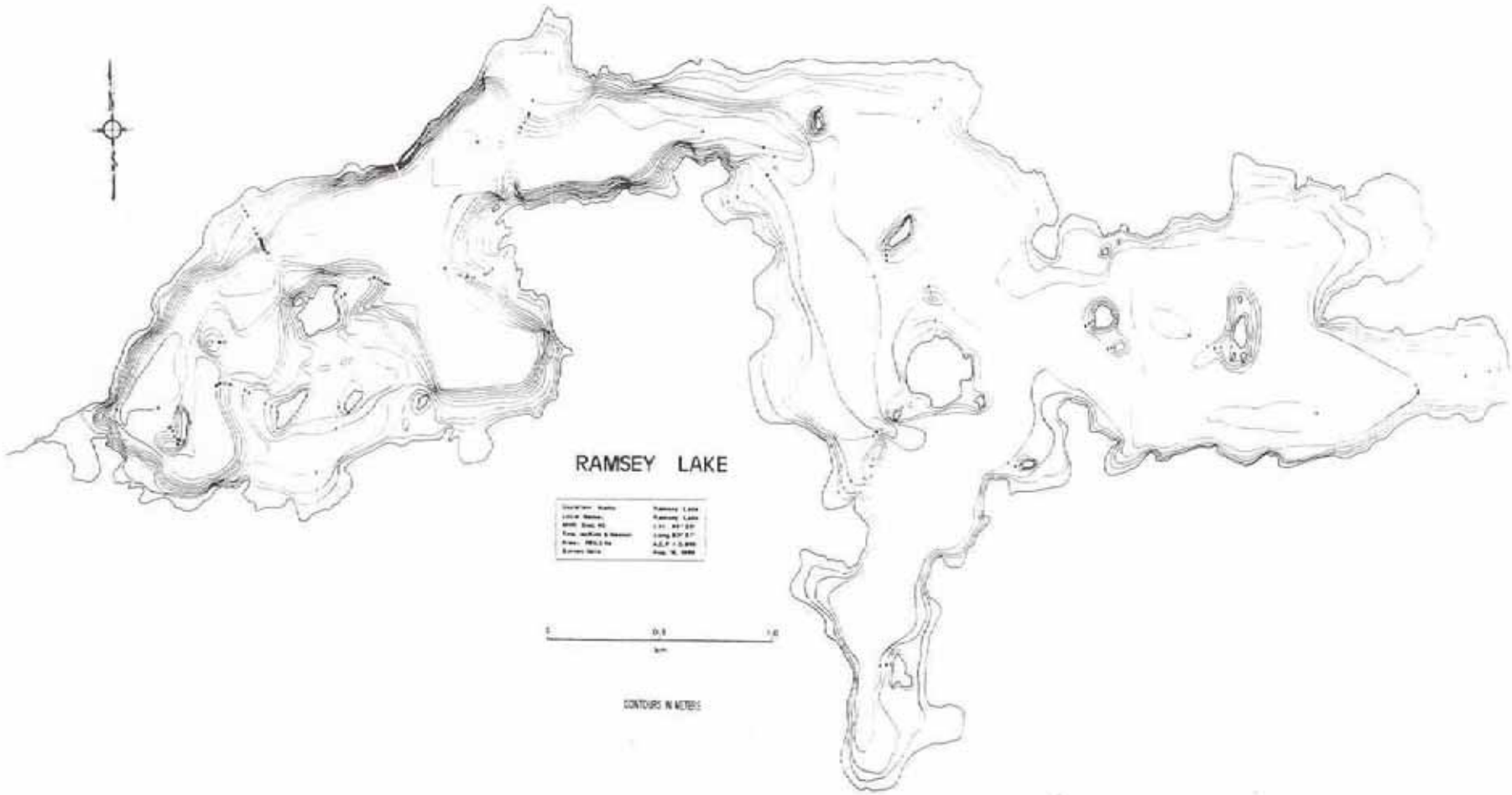


Figure 12 Suitable walleye spawning substrate and historical spawning sites

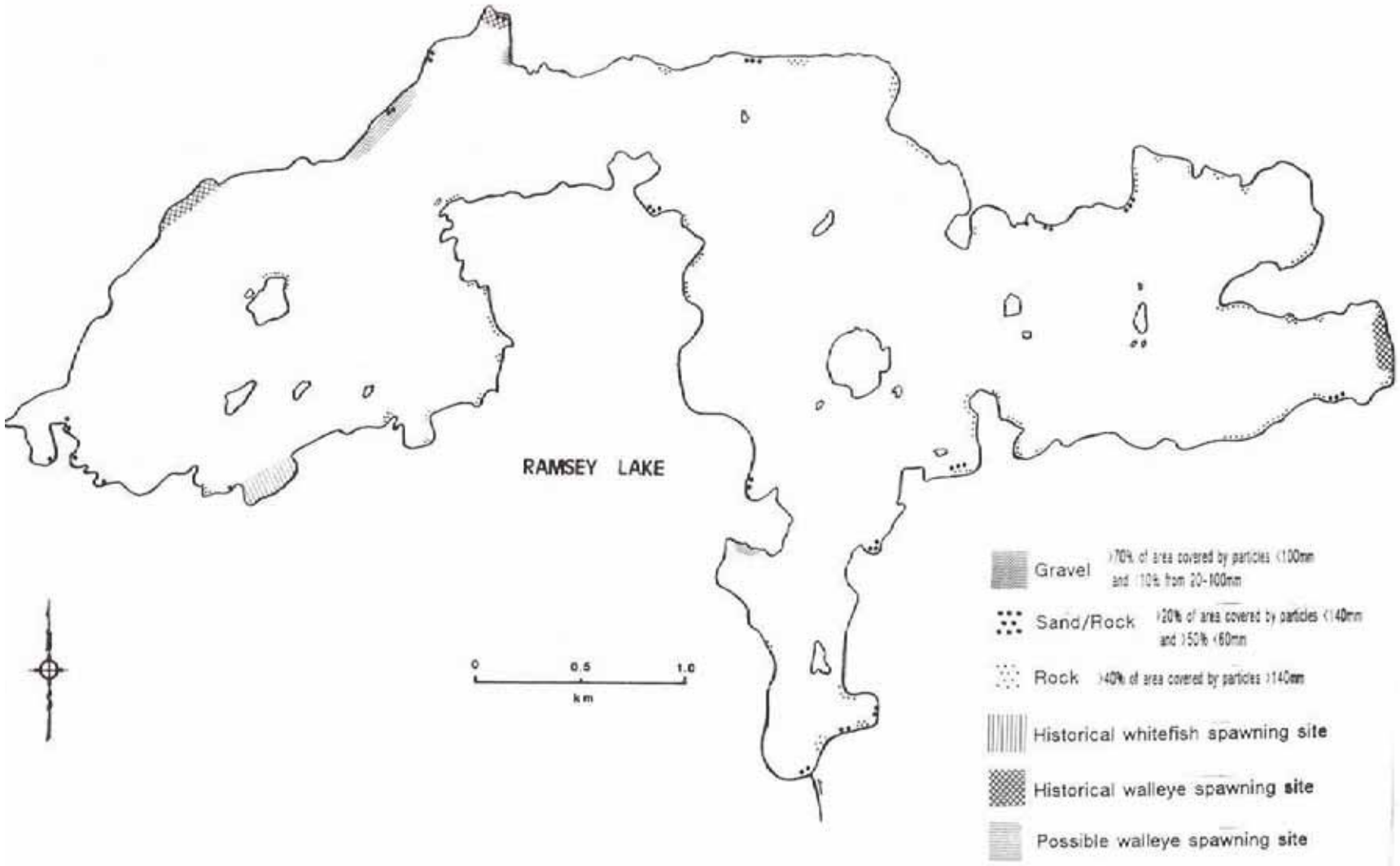
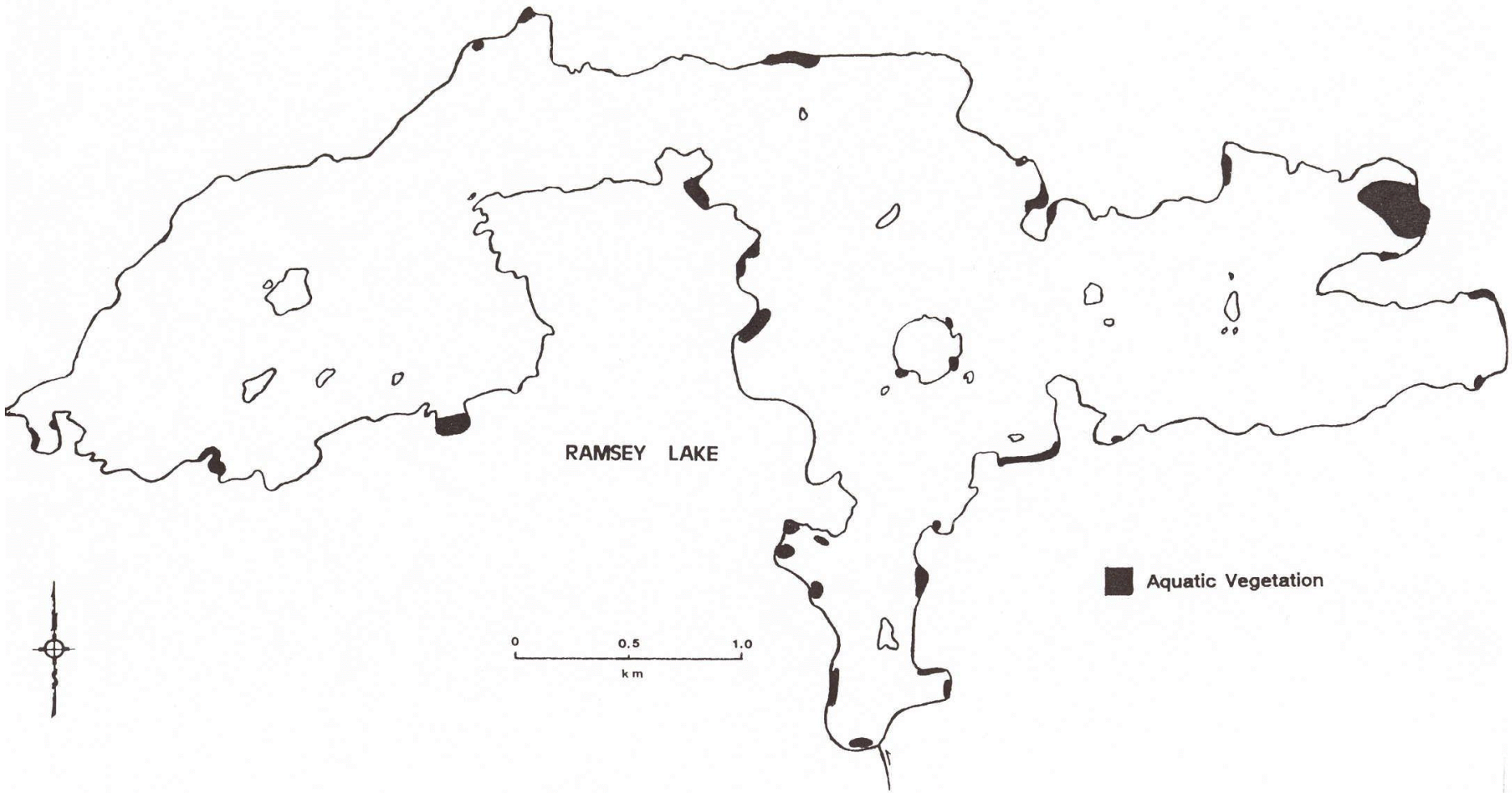


Figure 13 Aquatic vegetation observed in Ramsey Lake from June 2 to July 25, 1989



DISCUSSION

Ramsey Lake was first stocked with walleye in 1977 and 1978 in an effort to rehabilitate the lake. In September 1984, electro shocking was used to determine if the stocked population was reproducing. Thirty-nine small walleye and four pike were observed in this survey. Thirty-four walleye had fork lengths ranging from 15.3 to 17.6 cm (Figure 14) with a mean of 16.6 cm. Scale aging information is missing for these fish but a comparison of length and age data from the French River and Lake Nipissing suggests that these 34 fish were young-of-the-year (Table 9). In Lake Nipissing, the mean fork length of twenty-two young-of-the-year walleye sampled from 1972 to 1983 was 15.1 cm. In the Wolseley Bay area of French River, mean fork length of two young-of-the-year walleye sampled by electrofishing in 1984 was 16.6 cm (Table 9). The success of spawning boxes set up by the Game and Fish club in 1982 and 1983 is unknown but any walleye released in 1983 would have been age 1^{+} by September 1984 when electroshocking took place. It was concluded from this electrofishing survey that stocked walleye were reproducing in Ramsey Lake in 1984 (G. Haarmeyer and G. Stassen, pers. comm.).

The walleye catch per unit effort (CUE) during this assessment was 17.5 walleye per trapnet day. Trapnet data from both stocked and unstocked lakes in other regions of the province in the districts of Tweed, Napanee, and Carleton Place were stocked with walleye fingerlings for 3 to 6 years at a rate of 125 fish/ha per year. Fishery assessments were conducted in alternate years and CUE in 1988 ranged from 0.2 to 6.5 walleye/day using eight-foot trapnets. Walleye CUE's in these lakes varied through time but generally remained low, relative to the CUE observed in Ramsey Lake (Table 10a). However, due to differences in gear, lake histories and sampling season, comparisons of CUE's between lakes should be made with caution. These Eastern Region lakes were assessed using eight-foot trapnets and had been stocked at a rate of 125 fish/ha per year. Fishing in Ramsey Lake used six-foot nets and walleye have been stocked at a much lower rate (63 fish/ha in 1987 [1-month fry] and 2.5 fish/ha in 1988 [3-month fry]). In Ramsey lake, walleye were planted on top of a naturally reproducing population. Finally, Ramsey Lake was sampled in mid-summer while the Eastern Region lakes were sampled in spring.

Table 10b contains CUE data using six-foot trapnets in four unstocked walleye lakes in Lindsay District (Kawartha Lakes). Walleye CUE in Ramsey Lake is similar to that in Balsam and Buckhorn Lakes which are considered good angling lakes (Lois Deacon, pers. comm.). Mid-summer CUE in Ramsey Lake was 17.5 walleye/day, early spring CUE in Balsam and Buckhorn Lakes ranged from 6.3 to 17.3 walleye/day (Table 10b). Scugog and Rice Lakes are very productive, shallow eutrophic lakes with abundant aquatic vegetation. They are considered the best walleye lakes in the province and angling is very good (Lois Deacon, pers. comm.). Consequently, the spring trapnet CUE is also very high (16.3 to 70.1 walleye/day).

If trapnet CUE's can be used as an indicator of fishery status, Ramsey Lake currently supports a good walleye fishery.

There are no confirmed walleye spawning areas on Ramsey Lake. A rocky area on the south shore in the east end is one potential spawning site and there are other 'historical' sites reported by local residents (Figure 12). During the 1984 electrofishing survey, an area northeast of Bell Park was recorded as being a potential walleye spawning site. From shoreline substrate maps made in 1989, this area consists mainly of boulders and some sand. According to local residents, walleye used to spawn in an area to the southwest of this (Bell Park) (B. McInnes, pers. comm.), Moonlight beach and CPR Bay (B. Charmichael, pers. comm.).

The south end of South Bay has long been a pike spawning site. In the early 1980's, the Nickel District Conservation Authority had a boardwalk to observe pike spawning in the spring (P. Ceatavitch, pers. comm.). There are reports of spear-fishing during pike spawning as recently as the early 1980's. Before development of the shoreline between Science North and the Sudbury Yacht Club the bay contained dense aquatic vegetation and it was a pike spawning area (J. Chute, pers. comm.). This area was described in 1926 by the Sudbury Star: "The west end of the lake is inclined to be low and marshy, the swamp running into Johnson's Bay and up as far as Blueberry Island" (Sudbury Star, 20/202/26, p.1). Farther east along the south shore, the sandy bay southeast of Potter's Island was a whitefish spawning site in the early 1930's (Figure 12) (B. McInnes, pers. comm.). This site remains questionable because whitefish usually spawn over a hard or stony bottom (Scott and Crossman, 1979).

Figure 14 Length frequency of Ramsey Lake walleye sampled by electrofishing, September 1984

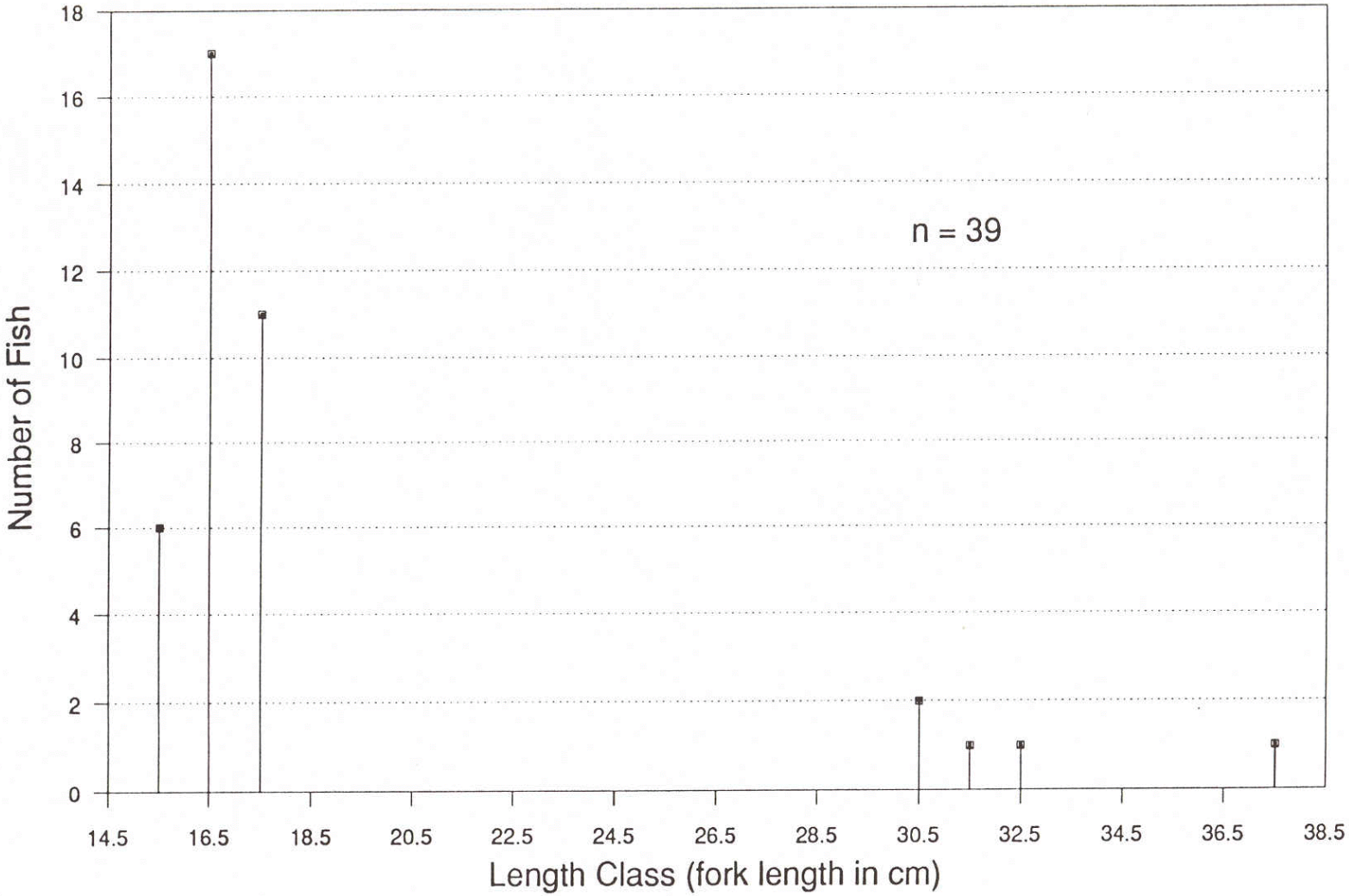


Table 9 Comparison of fork lengths of Ramsey Lake walleye (collected during electrofishing) to aged walleye from the French River and Lake Nipissing.

Location	Age	N	Fork length (cm)	
			Mean	Range
Ramsey Lake'	-	34	16.6	15.3 - 17.6
French River"				
Wolseley Bay	Y.O.Y	2	15.8	10.7 - 20.8
	1	7	23.0	21.4 - 26.5
Dry Pine	1	3	18.8	16.7 - 20.1
L. Nipissing"'	Y.O.Y	22	15.1	missing

' Stassen and Haarmeyer, 1984

" Lowerey, 1985

"'OMNR, year unknown

Table 10a Walleye CUE's using 8-foot trapnets in stocked lakes (Eastern Region)

Lakes (by District)	Survey Year	C.U.E. (#/day)	Years Stocked'
Ramsey Lake	1989	17.5	1987, 1988
Tweed District			
Sand (Plevna)	1984	4.2	1983 - 1988
	1986	2.1	
	1988	1.1	
Marble	1984	4.3	1983 - 1985
	1986	0.1	
	1988	3.0	
Mississagagon	1988	0.3	1983, 1984, 1986, 1987
Big Clear	1984	8.4	1984 - 1987
	1986	3.1	
	1988	1.9	
Napannee District			
Sand (Bedford)	1987	3.8	1984 - 1987
First Depot	1987	2.8	CONTROL
Hambly	1987	0.9	1984 - 1988
Thirteen Island	1985	0.1	1984 - 1988
	1987	0.9	
Carleton Place District			
Joe	1988	2.4	1984, 1985, 1987, 1988
Flower Round	1984	0.0	1984 - 1987
	1986	0.0	
	1988	0.2	
Robertson	1984	3.0	CONTROL
	1986	2.3	
	1988	1.1	
Park	1984	6.4	1983 - 1988
	1986	8.5	
	1988	6.5	

* all lakes (except Ramsey) stocked at a rate of 125 fish/hectare

Table 10b Walleye CUE's in unstocked Kawartha lakes

Lake	Survey Date	C.U.E.
Ramsey	July 24 - August 3, 1989	17.5
Kawartha Lakes (6-foot trapnets)		
Scugog	May 29 - June 6, 1984	44.5
	June 5 - June 15, 1986	19.1
	June 1 - June 11, 1988	70.1
Rice	May 2 - May 29, 1983	16.3
	April 29 - May 21, 1985	53.7
	April 28 - May 21, 1987	34.1
Balsam	May 1 - May 10, 1984	6.3
	May 6 - May 16, 1986	6.8
	May 3 - May 12, 1988	17.3
Buckhorn	June 4 - June 13, 1983	10.7
	May 20 - June 7, 1985	10.5
	May 28 - June 6, 1987	17.1

CONCLUSIONS AND RECOMMENDATIONS

The fisheries assessment of Ramsey Lake indicated that the lake currently supports a healthy population of stocked walleye and abundant forage fish (yellow perch, golden shiners). Smallmouth bass are rare and the presence of lake trout was unconfirmed.

In spring 1989, a small number of juvenile and adult walleye were the only fish planted in Ramsey Lake (D. Wickenden, pers. comm.). Therefore, in subsequent fisheries assessments, walleye belonging to the 1989 year class will likely be natural recruits. Stocking of walleye fry by the CFIP hatchery should continue until natural recruitment has been confirmed and the population is self-sustained.

Trapnetting in the spring before water temperatures begin to rise would provide walleye CUE data comparable with other walleye lakes in the province. (eg. Kawarthas) where most trapnetting is conducted during May and June. Lake trout, if present, would be more vulnerable to the survey gear in the spring.

A walleye spawning assessment is necessary to locate spawning sites and aid in recruitment confirmation. Spawning sites need to be identified to be protected from shoreline development. Suitable spawning substrate exists on the south shore of Ramsey Lake near the east end of the lake. This area is not threatened since the adjacent land belongs to the Nickel District Conservation Authority. Existing aquatic vegetation on the lake should be protected as these areas are limited and provide nursery habitat for walleye and pike.

Creel surveys should be conducted to determine angling pressure and pike and walleye harvest.

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APPENDIX I - History of Ramsey Lake

Ramsey Lake was named after William Allen Ramsey, a CPR engineer and chief of a survey party in 1879 that became lost in heavy fog in the vicinity of the lake. Upon relocating the lake, he named it Lost Lake. It was later named after him but was spelled Ramsay form 1891 to 1929. The correct spelling was researched and the official spelling is Ramsey (Sudbury Star, 04/01/79, p.3).

Prior to the establishment of the reserve system for Indians, the Whitefish Lake Ojibway hunted and occupied a huge territory well beyond the boundaries of their present reserve. Until approximately the 1850's, Indians from the Naughton Indian Reserve hunted and trapped in the Sudbury Region. They regularly paddled canoes through Lily Creek to Ramsey Lake which at that time was called Lake Bimitimigamasing (T. Kujanpaa, 1984).

In 1883 the CPR was being built through the area that is now Sudbury. At that time, Ramsey Lake supported abundant populations of smallmouth bass, walleye, pike, and rock bass (Howey, 1938). The only boats on the lake were CPR freight boats, therefore angling was done from shore. Eventually, rowboats provided access to the lake and there were "plenty of fish...; anglers never failed to catch fish in a short period of time" (Howey, 1938).

There was a CPR lumber mill (Potter's Mill) on Ramsey Lake at the foot of what later became Annie Street. Nolin and Junction Creeks were used to drive logs to this mill and others in the area (Dorian, year unknown). This mill was likely one of the first sources of pollution on Ramsey Lake. In 1885 a mill operating on Minnow Lake also contributed to the pollution of Ramsey Lake (Dorian, year unknown).

Lake trout were probably native to Ramsey Lake (local residents, pers. comm.) but there is no reference to them by Howey (1938) in her book when she described the abundance of walleye, bass and pike that existed in the lake in 1883. A newspaper article in 1891 (Sudbury Journal, 07/05/91, p.1), states that 250,000 whitefish fry were planted that year and that lake trout 'will be planted in the near future'. But newspapers from May 1891 to the end of 1893 did not report any lake trout stocking. Four years later, a news article concerning illegal fishing activity stated that "A few years ago Lake Ramsey was well stocked with bass, pickerel and lake trout..." (Sudbury Journal, 20/06, 1895). This could simply mean that these species were very abundant or it could be interpreted to mean that they were actually 'stocked'. Table A-1 is a

complete stocking history of Ramsey Lake from 1891 to 1989.

In 1894-95 illegal fishing in Ramsey Lake was not uncommon (Sudbury Journal, 1894-1895). "The use of dynamite, spears and nets in the past few years has almost cleaned the bass out of [Ramsey] lake which at one time was not excelled in Canada" (Sudbury Journal, 03/05/94, p.4). Whitefish were also taken using spears. Approximately one year later, another article claimed that "sport fishing has been almost completely destroyed because of illegal fishing" (Sudbury Journal, 20/06/95). Spearing and netting continued to be a problem into the 1900's (Sudbury Journal, 03/05, 1900).

Around 1912, Ramsey Lake supported populations of walleye, lake trout, herring, ling, bass, white sucker, pike, whitefish, and yellow perch. At this time, fish could migrate to Ramsey Lake from the Vermilion River system via Kelley Lake and Lily Creek.

However, during the years 1912-1914, mining production increased, resulting in increased use of open roast beds and dumping of poisonous wastes into Kelley Lake. By 1924, Kelley Lake had become impassable to fish, and Ramsey Lake was isolated from the rest of the river system (MNR Lake Survey File, 1947).

Table A-1 Stocking history of Ramsey Lake, 1891 to 1989

Year	Species	Quantity	Age	Source
1891	whitefish	250,000	fry	Sudbury Journal
1922	'various kinds'	?	Fry	Sudbury Star
1923	bass	250	adult	Sudbury Star
1925	bass	5,000	?	Sudbury Star
1925	lake trout	25,000	?	Sudbury Star
1929	brook trout	500	adult	Sudbury Star
1932	lake trout	?	fry	Sudbury Star
1943	bass	10,000	fry	Sudbury Star
1949	herring	250,000	?	1971 LS file
1952	lake trout	5,000	?	MNR records
1976	bass	8,000	?	MNR records
1976	walleye	10,000	fingerling	MNR records
1977	bass	19,875	?	MNR records
1977	walleye	10,000	fingerling	MNR records
1978	bass	5,000	?	MNR records
1978	walleye	10,000	fingerling	MNR records
1979	rainbow trout	?	adult	F & G club
1982	walleye	?		{from MNR/ F & G
1983	walleye	?		spawning boxes}
1987	walleye	400	3 months	CFIP / F & G club
1987	walleye	50,000	1 month	CFIP / F & G club
1988	walleye	2,000	3 months	CFIP / F & G club
1989	walleye	60	1 year	D. Wickenden (F&G club)

One effect of this isolation was reduced angling success. In 1923, the Sudbury Star reported that pike and walleye were still plentiful in Ramsey Lake but bass had become scarce in the previous few years (Table A-2). Up to about 1913, bass fishing had been quite good, particularly around Galliard's Island (Sudbury Star, 29/08/23, p.5). In 1923, on a recommendation by the Sudbury Game and Fish Protective Association, adult bass ranging from one to four pounds were stocked and bass season closed Aug. 1 every year for several years (Sudbury Star, 29/08/23/, p.5). Bass were stocked again in 1925 (see Table A-1).

Up until 1926, walleye, bass and lake trout were present in Ramsey Lake and a fair amount of aquatic vegetation existed in the lake (MNR Lake Survey File, 1947).

Five hundred adult brook trout from overcrowded provincial hatcheries were planted in 1929. It was estimated that over one hundred of these were angled within 24 hours of planting (Sudbury Star, 18/05/29, p.3) and they were virtually fished out within several days of planting.

By the 1930's, walleye fishing was still generally good and whitefish appeared to be thriving. Not only was whitefish angling good but Al Chalmers of Sudbury Boat and Canoe operated a commercial fishery. There is no information on the success or the duration of this fishery. Lake trout fishing was also fairly successful in certain parts of the lake, specifically a thirty-foot basin that was present in the extreme west end of the lake A contour map produced in 1971 shows this basin but sounding in July and August 1989 indicates that the entire bay is less than 2m deep (Figures 10 and 11). In the 1930's, Sudbury resident Bob McInnes would troll in this bay and often catch several lake trout in one evening (B. McInnes, pers. comm.). Newspaper clippings from the mid-1930's picture anglers with lake trout weighing 2.7 and 3.7 kg (Table A-3). During the same period, poaching was not uncommon and sewage from the Minnow Lake area was draining into Ramsey Lake.

Table A-2 Changes in sport fish populations in Ramsey Lake from 1893 to present

Year	Fishery Status
1883	- abundant populations of smallmouth bass, walleye, pike, and rock bass
1912	- walleye, lake trout, herring, ling, bass, white sucker, pike, whitefish and perch - increased mining production leads to dumping of poisonous wastes into Kelley Lake - up to about 1913, bass fishing had been quite good
1923	- pike and walleye still plentiful but bass had become scarce in the previous few years
1923	- adult bass ranging from one to four pounds were stocked
1924	- Ramsey Lake isolated from the rest of the river system (Vermilion) by pollution of Kelley Lake - up until 1926, walleye, bass and lake trout were present and a fair amount of aquatic vegetation existed in the lake
1930's	- lake trout fishing was fairly successful in certain parts of the lake; by the 1930's, walleye fishing was still generally good and whitefish appeared to be thriving; ling present in the late 1930's
1947	- angling poor; only pike and perch in survey
1949	- lake trout re-habilitation; herring stocked as a forage base; followed by lake trout stocking in 1952
1971	- survey: pike, suckers, perch
1976	- walleye rehabilitation (2 years)
1984	- walleye recruitment confirmed
1987	- walleye stocking re-commenced (CFIP)
1989	- healthy stocked walleye population

Table A-3 Angler catches as reported in the Sudbury Journal and Sudbury Star

Year	Weight (kg) / species
1891	3.2 / bass
1892	1.2 / bass
1894	6.1 / pike
1895	5.0 / pike
1896	4.1 / lake trout
1896	4.1 / lake trout
1898	2.7 / lake trout are common
1899	2.5 / walleye
1930's	2.7 / lake trout
	3.7 / lake trout
1952	4.1 / pike
1982	5.2 / pike
1983	6.4 / lake trout (82.5 cm long)

In the early 1940's, the Sudbury Game and Fish club built a fish ladder at the dam in the west end of Ramsey Lake. Any fish lost over the dam in summer could get back upstream from the drying creek bed (Sudbury Star, 29/07/89, p.9). In addition to recorded stocking activity, Ramsey Lake was stocked with walleye and lake trout from Sandfield hatchery several times in the 1940's (B. McInnes, pers. comm.). Walleye were stocked around 1942-43 (no records) and lake trout originally intended for other lakes were put in Ramsey when personnel in charge of stocking those lakes failed to pick up their fish. Quantities stocked are unknown.

In 1947, despite twenty-five years of stocking, angling was poor. The Game and Fish club appealed to the Lands and Forests (later OMNR) for a study of the lake. Four nights of netting by Lands and Forests biologist R.E. Whitefield yielded five skinny, pike and on yellow perch. He set 1,500 ft (457 m) of net for twenty-four hours each night. He concluded that the lack of aquatic vegetation (no submergent vegetation and only isolated patches of littoral zone plants) resulted in the depletion of bottom fauna, and therefore decreased fish populations (MNR Lake Survey File, 1947).

After these discouraging results, a lake trout rehabilitation plan was proposed in 1949. The Lands and Forests planted 250,000 herring (cisco) as a food supply for a potential stocked lake trout population. But there were doubts if the cisco would survive due to the scarcity of plant life. Lake trout would not be planted until ample time had passed to study subsequent lake surveys but in 1952 lake trout were re-stocked. This was the last recorded stocking of Lake Ramsey until 1976.

With a growing city and increasing population, pollution was a problem during the 1960's. In 1958, after a load of ‘fill’ was dumped into the lake at the end of Bayview Lane (near John St.) Testing showed silt and silica deposits in the water (Sudbury Star, 18/09/58). Between 1960 and 1964, there were problems with leaking septic tanks along the north shore (CPR Bay, Torbay), causing high pollution counts and closure of public beaches. This pollution is believed to have caused the algal bloom in 1961. During fall turnover, the decaying algae resulted in ‘stinking and foul-tasting water’ (Sudbury Star, 25/10/61).

Problems with foul water re-occurred in 1965 and the bad odour and taste were finally attributed to a species of algae never seen in Ramsey or any surrounding lakes (Sudbury Star, 08/10/89, p.1). The problem was a blue-green algae (Aphanizomenon) that had never previously been observed in Canada (but occurred in the United States) (Sudbury Star, 04/12/65, p.1). It was

first found in Sudbury in the fall of 1964 and a study was undertaken by Laurentian University and the University of Waterloo to find the source of the contamination (Sudbury Star, 18/12/65). The Ontario Water Resources Commission (later MOE) recommended treatment with copper sulphate to kill the problem algae (Sudbury Star, 16/10/65). The OWRC had no previous experience with copper sulphate application in water bodies as copper sulphate crystals were spread by crop-spraying planes over the west end of Ramsey Lake (40% of the surface area) in early November, 1965. Five days after the application, it was determined that the treatment had been only partially successful and a second treatment would be required to complete the job (Sudbury Star, 02/12/65, p. 5). The second treatment consisted of fifty tons of copper sulphate applied in early December as ice was forming on the lake. This time it was spread over the whole lake and tugboats were required to break up the ice.

In July 1966, Laurentian University's professor Watson stated that 'there is no evidence so far that copper sulphate is affecting the natural life of the lake' (Sudbury Star, 19/07/66, p. 11). The copper was supposed to 'disappear' from the lake within three weeks of treatment. However traces were still present nine months later (Sudbury Star, 28/09/66, p.1). In February 1966 (2months after second treatment), the copper concentration in Ramsey Lake was 0.40 mg/l and had fallen to 0.10mg/l by August of 1966 (Duthie, 1967).

The algal bloom was caused by high levels of inorganic nutrients; especially phosphate and nitrate. Minnow Lake and Laurentian Lake were identified as the sources of these nutrients (Duthie, 1967).

Unfortunately, a lake survey was not conducted prior to copper sulphate treatment, so the status of the fishery at that time is unknown. A survey was not conducted until 1971 when gill netting caught six pike, seven white suckers and nineteen yellow perch. A total of six 122 m nets were set during the day for 7.5 to 8 hours each. As in the 1947 survey, aquatic vegetation (emergent, submergent, and floating) was listed as sparse.

In 1976 the MNR planned a walleye and bass planting program for Ramsey Lake. The walleye program was to last several years depending on planting success. The Sudbury Star reported that 10,000 walleye and 5,000 bass were stocked (Sudbury Star, 30/06/76, p.1) in June, 1976. MNR records indicate that 19,875 smallmouth bass were also stocked that year. In 1978 10,000 walleye fingerlings and 5,000 smallmouth bass were planted. To monitor the success of the

stocking program, a creel survey was conducted by the Sudbury Game and Fish Club members in August of 1980. The results of this survey are unknown.

To protect walleye stocked in the late 1970's from over-exploitation, Ramsey Lake was declared a sanctuary in January and February of 1984 (Sudbury Star, 18/12/84, p. 3). In 1984, walleye recruitment was confirmed by an MNR electro fishing survey (G. Haarmeyer, pers. comm.).

In the summer of 1987, 1988 and 1989 MCTV and the Sudbury Game and Fish club held a pike derby in the Sudbury District. Fish angled anywhere in the District could be entered in the contest but unfortunately, no records were kept with respect to where each fish was caught. As a result, it is not know how many pike were caught in Ramsey Lake or if fishing pressure increased as anglers attempted to catch a tagged pike for prize money. A weigh-in station was operated by members of the Sudbury Game and Fish club at Sudbury Boat and Canoe.

In addition to the summer 1989 fishery assessment, a six-foot trapnet was set for two nights (October 30, November 1) off the beach beside the main building of Science North. In two nights, numerous walleye were caught in addition to yellow perch, brown bullheads, rock bass, white sucker and one splake. The splake was positively identified by counting the pyloric caeca (65). It had a fork length of 44.5 cm, weighed 992 g and a clipped adipose fin.

APPENDIX II - Additional History

1984 - Lemieux's Island (Sudbury Journal, 19/07, 1894) - now called Galliard's Island.
- a beautiful island, covered in natural growth of evergreens, birch, and poplar.
- a large cottage has been built on the island and the owner has cleared a garden patch in the middle of the island, growing a lot of potatoes and other vegetables.
- wild strawberries grow in abundance in the rest of the little clearing and around the edge of the bush

1895 - fire on McCrea Island

1897 - by-law exists prohibiting bathing in Ramsey Lake; to protect the town's water supply (Sudbury Journal, 08/07, 1897)

1902 - Sudbury Boat Club established

1921 - a by-law is proposed to restrict all public bathing to an area fronting Lakeside Park (now Bell Park). Summer campers are to be given the right to go swimming in the lake adjoining their camps.

1954 - Galliard Island purchased by the YMCA
- used as a day camp for two years then became a resident camp with pre-fabricated cabins, dining hall, nature trails, docks and a man-made beach (southeast shore)
- current ruins of an old cabin on the north side of the island were not part of the Y camp; it was an abandoned cottage visited by hikers on the island.
- transportation was provided by renting boats from Sudbury Boat and Canoe
- the camp closed in 1972 and the island was purchased by the Nickel District Conservation Authority
- prior to 1954 the Don Island was the site of the YMCA day camp

1956 - impossible to swim in area lakes (including Ramsey) die to an "orangey-red greasy sticky substance" on the surface (Sudbury Star, 20/08/56). Rusty Blakey of Austin Airways commented that the lake used to get a lot of train soot but there was too much to be from trains and it looked completely different.
- was believed to originate from a furnace at INCO's new iron plant; samples were turned over to INCO labs to determine its nature and origin. The substance was reported to be non-injurious to humans but any effects on fish had yet to be determined.