ENVIRONMENTAL PROTECTION SERVICE
ENVIRONMENTAL PROTECTION BRANCH
PACIFIC REGION
(Yukon District Office)

AN ENVIRONMENTAL SURVEY OF SELECTED YUKON RIVER HEADWATERS LAKES IMPACTED BY COMMUNITIES

Regional Program Report No. 79-26

by

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November, 1979

ABSTRACT

Biological and water chemistry data were collected from six Yukon lakes in the summer of 1977.

High dissolved oxygen contents and an absence of any significant concentrations of deleterious substances characterized the pristine waters of these oligotrophic lakes. The biological data may be considered to be typical of an unpolluted northern fresh water system. The result presented here may be used as pre-development baseline data if any future environmental impact work is necessary in these areas.

RÉSUMÉ

Des données sur la biologie et la chimie de six lacs du Yukon ont été recueillies au cours de l'été de 1977.

Ces lacs oligotrophes se caractérisent par la haute toneur en oxygéne dissous et l'absence de concentrations notables de substances indésirables dans leurs eaux. La biologie de ces lacs peut être considérée comme typique d'un milieu d'eau donce non pollué. Rendant compte de la situation existant avant toute intervention humaine, ces données pourraient servir de point de référence aux études d'éventuelles réprecussions environnementales dans ces régions.

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CONCLUSIONS

The seven lakes sampled during this survey were characteristic of northern oligotrophic lakes with regard to both chemistry and biota. All exhibited low concentrations of metals with only a few exceptions probably attributable to natural mineralization. The more populated areas such as the Carcross area (Nares Lake), Marsh Lake cottage areas, Lake Laberge (Deep Creek), and Kluane Lake near Burwash Landing all had countable coliform results. Periodic checks on the areas may be advisable as communities expand. At the present time the pristine quality of these lakes remains virtually unaltered by man.

1 INTRODUCTION

The community lakes survey was undertaken by the Environmental Protection Service to obtain data on the water quality of lakes which may be affected by human settlements. These lakes were in the headwaters of the Yukon River and several of them are upstream of the City of Whitehorse water intake on the Yukon River.

The lakes studied were: Tagish Lake, Bennett Lake (and Nares Lake) at Carcross; Teslin Lake at Teslin; Marsh Lake at the cottage community; Lake Laberge at Deep Creek and at Jackfish Bay; and Kluane Lake at Burwash Landing and at Destruction Bay.

The locations of these lakes are shown in Figure 1.

With inevitable population growth and community development, this data will be useful in the interpretation of community impacts on the receiving waters.

1.1 Sample Locations

The following are the lakes which were sampled in the community lakes study:

Tagish Lake - (60°19' N, 134°16' W) on August 11 and September 26, 1977 at the five stations shown on Figure 2.

Bennett Lake (and Nares Lake) - (60°10' N, 134°42' W) at the eight stations shown on Figure 3, on July 4 and September 9, 1977;

Teslin Lake - (60°10' N, 132°43' W) on July 12 and September 7, 1977 at the eight stations shown on Figure 4;

Marsh Lake - (60°31' N, 134°20' W) at the seven stations shown in Figure 5, on August 8 and September 13, 1977;

Lake Laberge - (61°11' N, 135°12' W) was sampled on July 3 and August 29, 1977 at the eight stations shown on Figure 6.

Kluane Lake - sampled in two areas: Burwash Landing (61°21' N, 139°00' W) at the eight stations shown on Figure 7, on July 7, 1977; and Destruction Bay (61°15' N, 138°48' W) on July 9, 1977 at the eight stations shown on Figure 8.

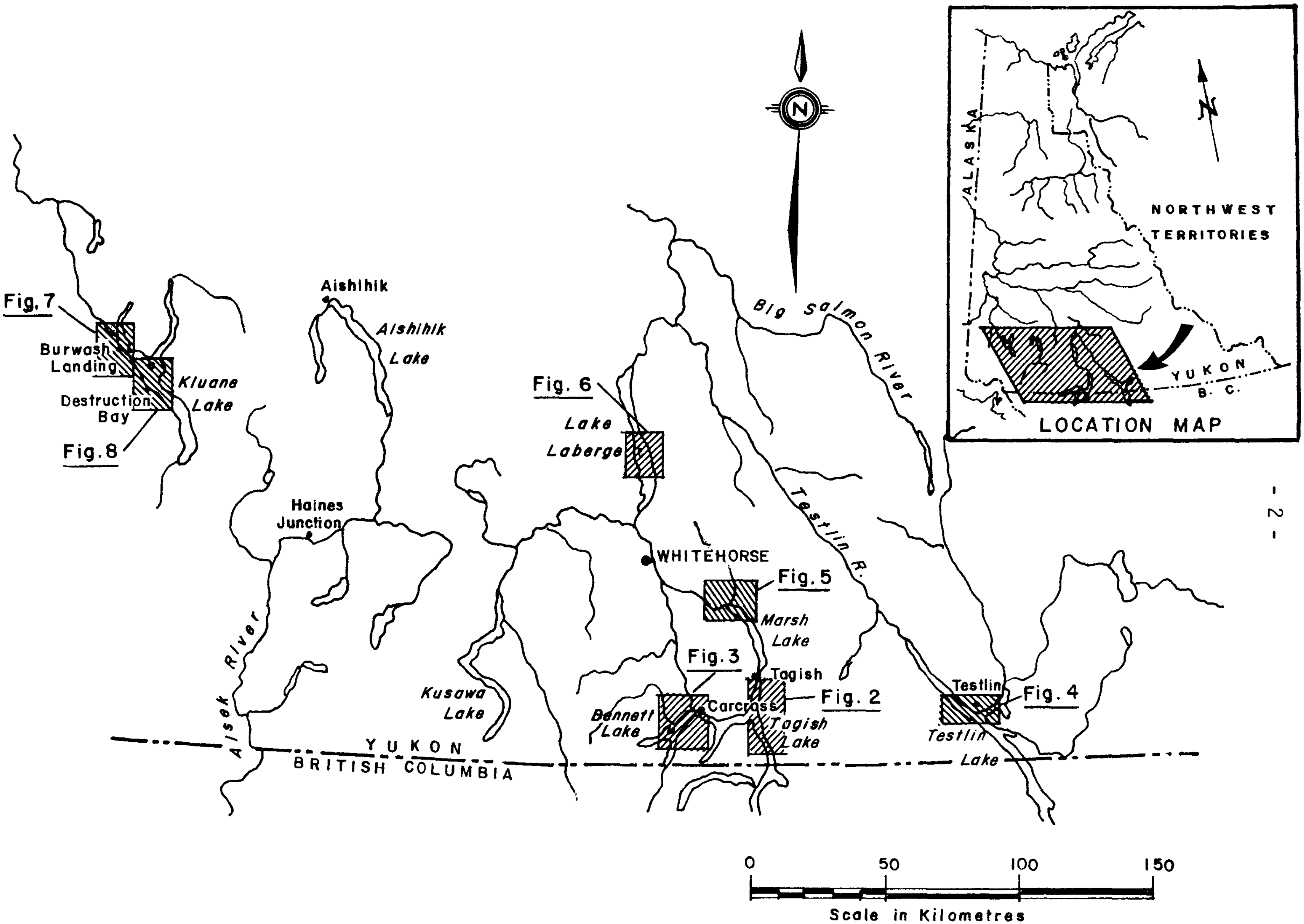

FIGURE 1 LOCATION OF SAMPLE AREAS

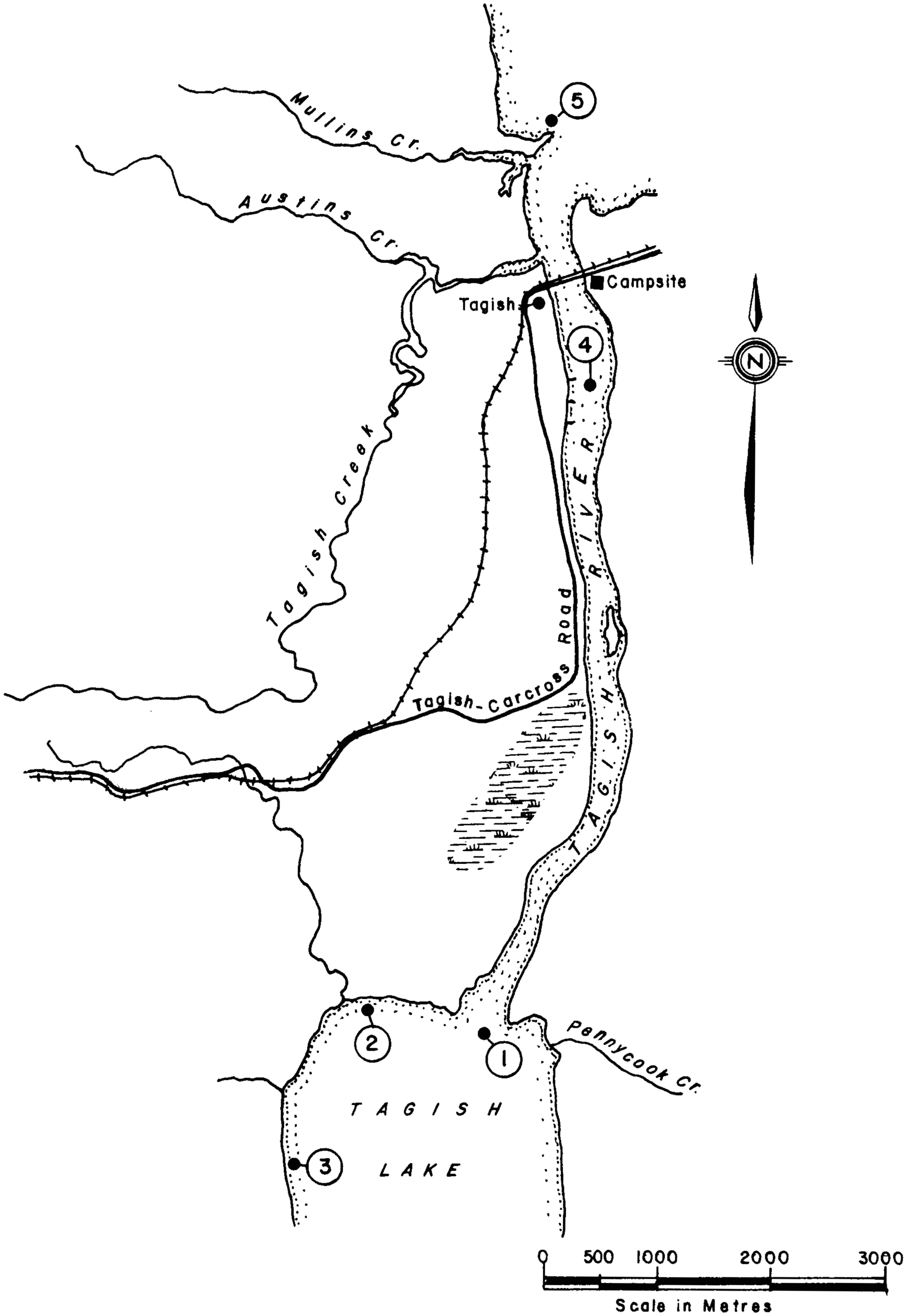

FIGURE 2 SAMPLE STATIONS ON TAGISH LAKE

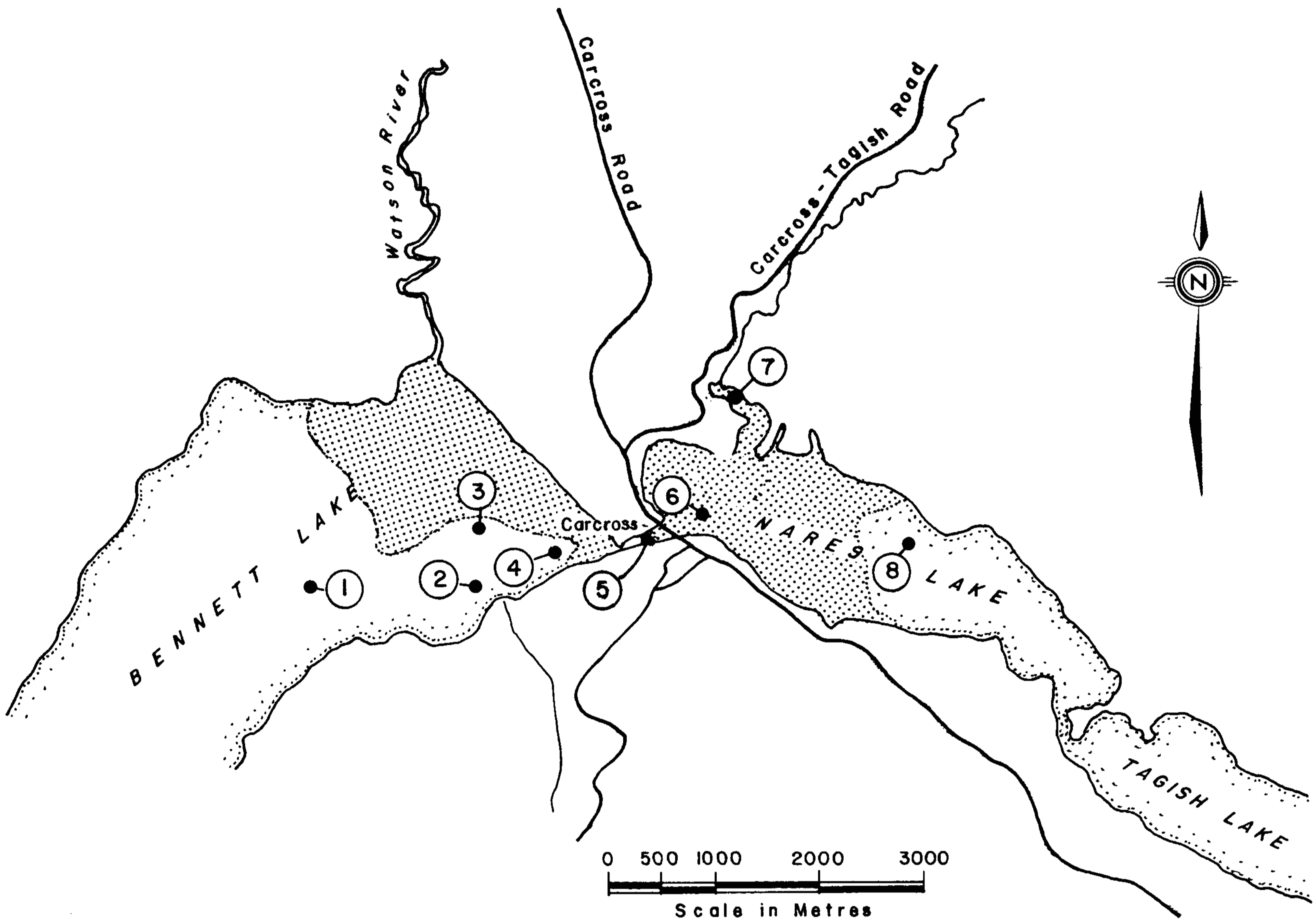

FIGURE 3 SAMPLE STATIONS ON BENNETT AND NARES LAKE

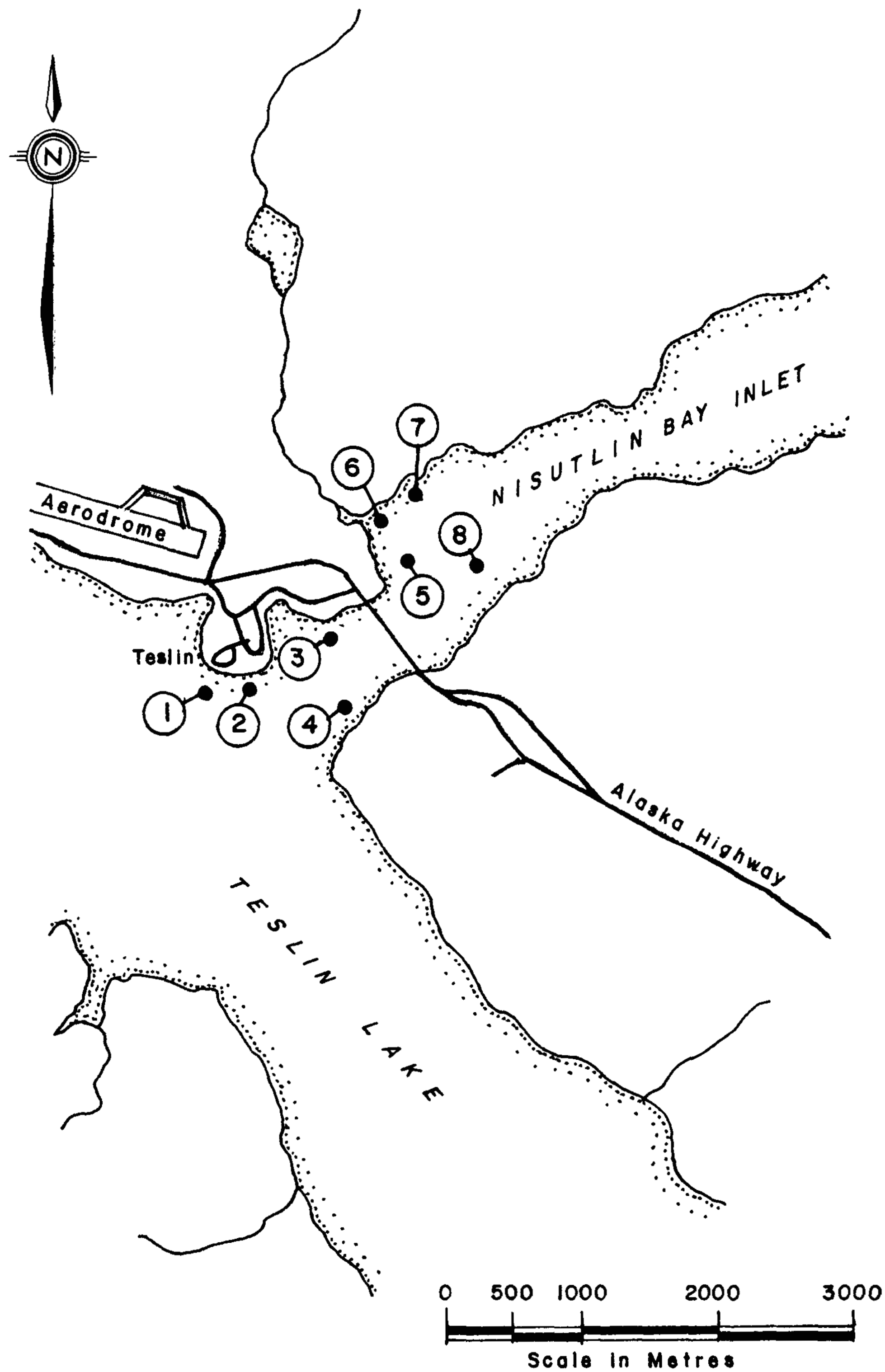

FIGURE 4 SAMPLE STATIONS ON TESLIN LAKE

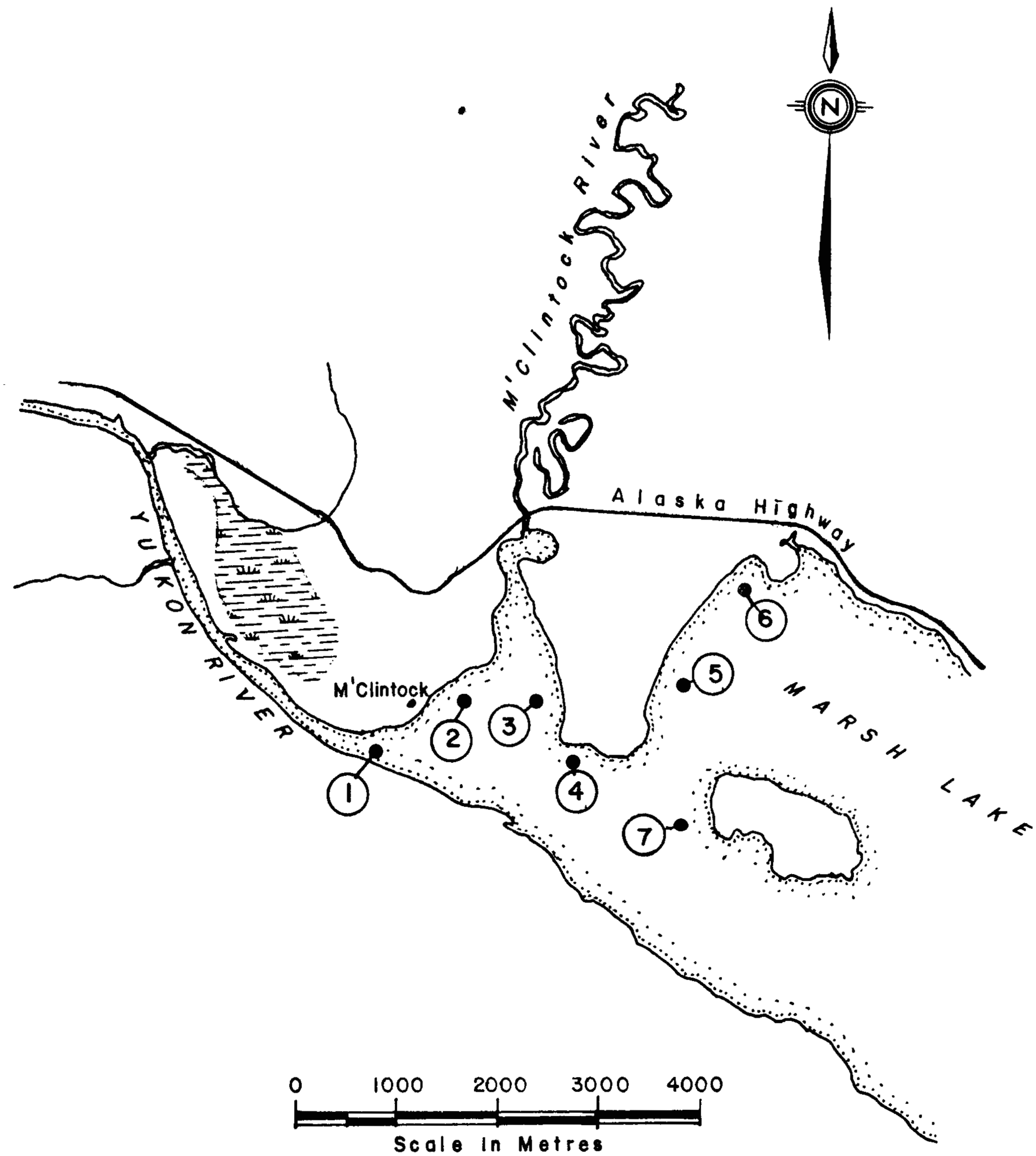

FIGURE 5 SAMPLE STATIONS ON MARSH LAKE

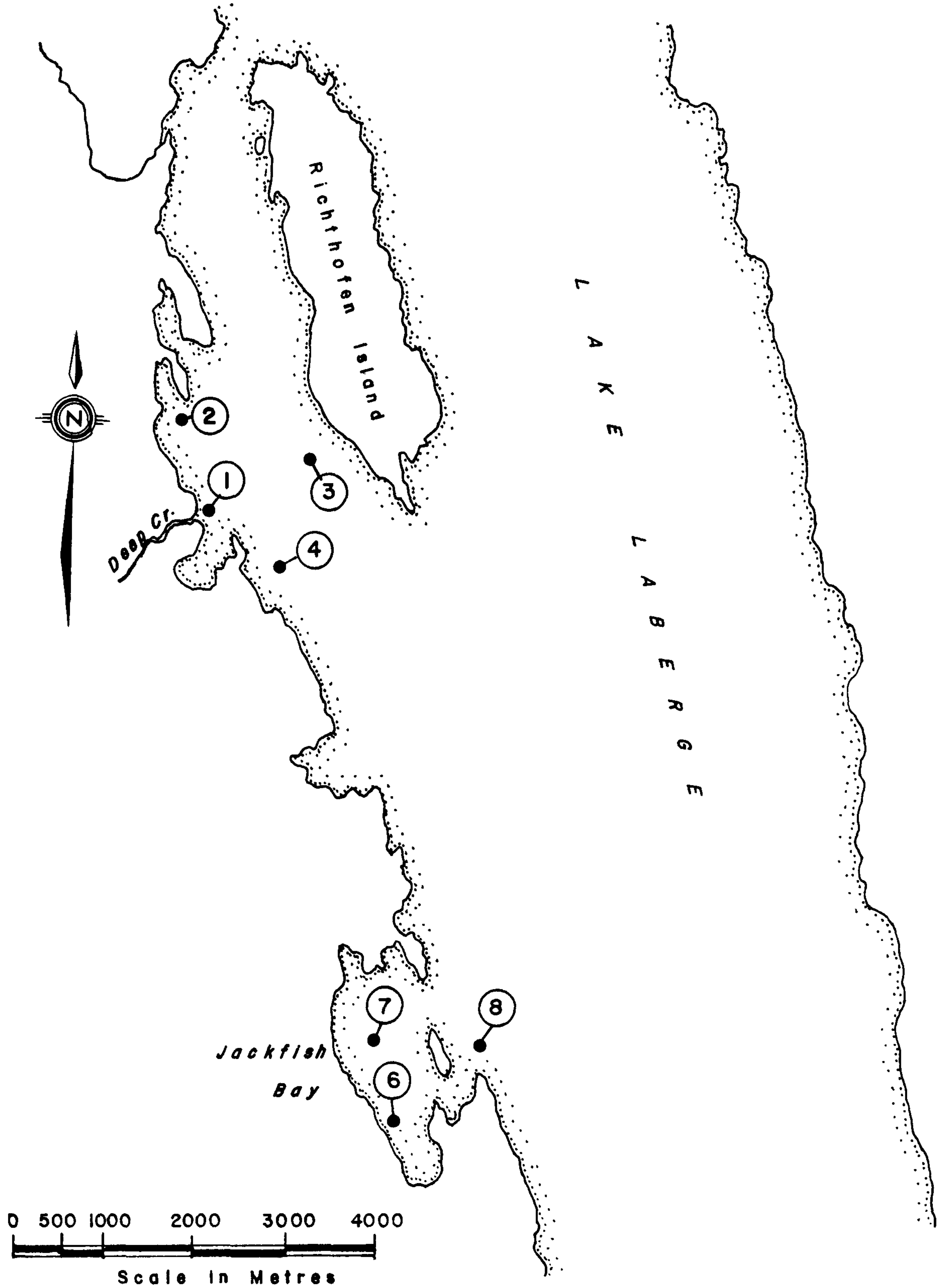

FIGURE 6 SAMPLE STATIONS ON LAKE LABERGE

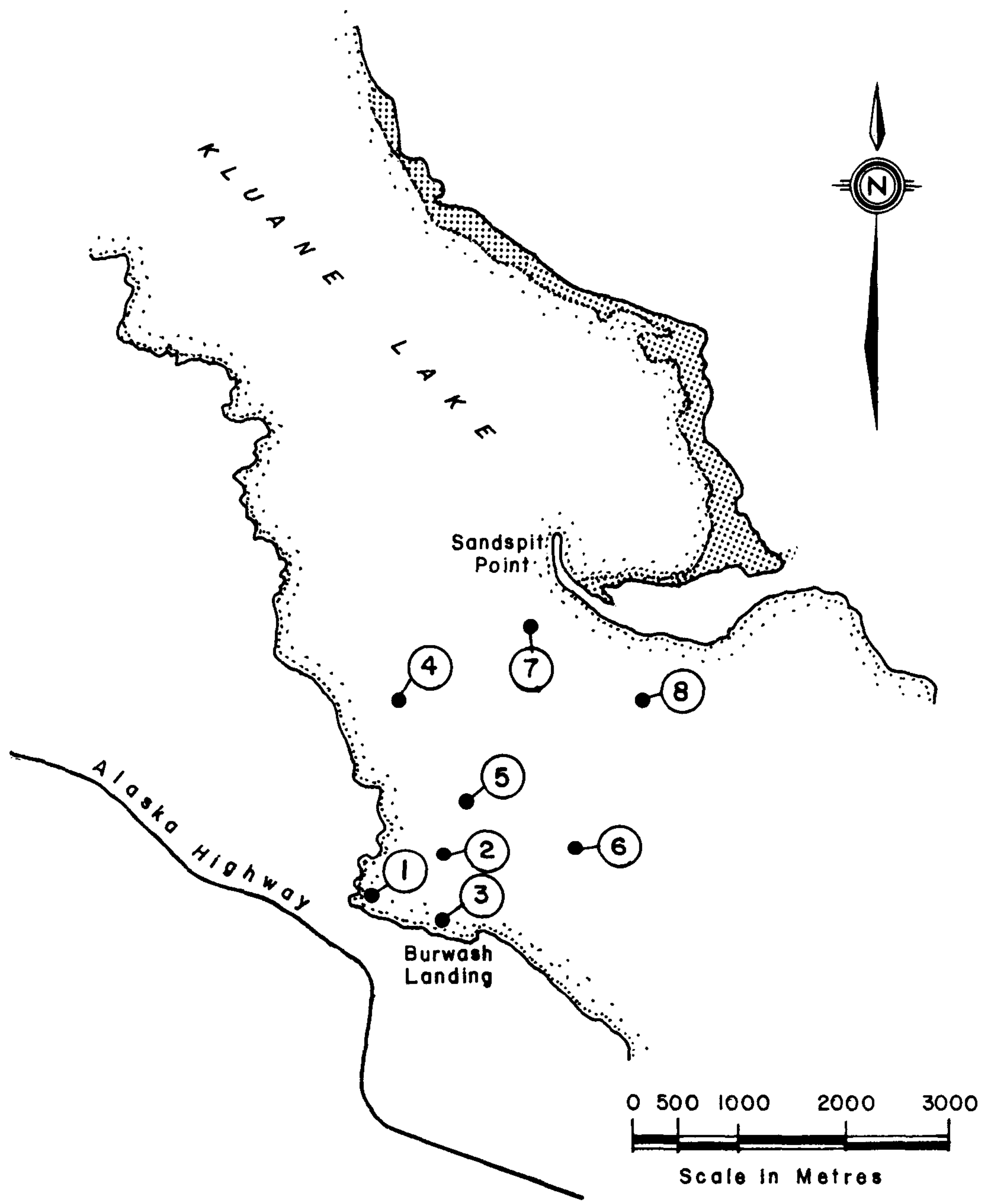

FIGURE 7 SAMPLE STATIONS ON KLUANE LAKE
(BURWASH LANDING)

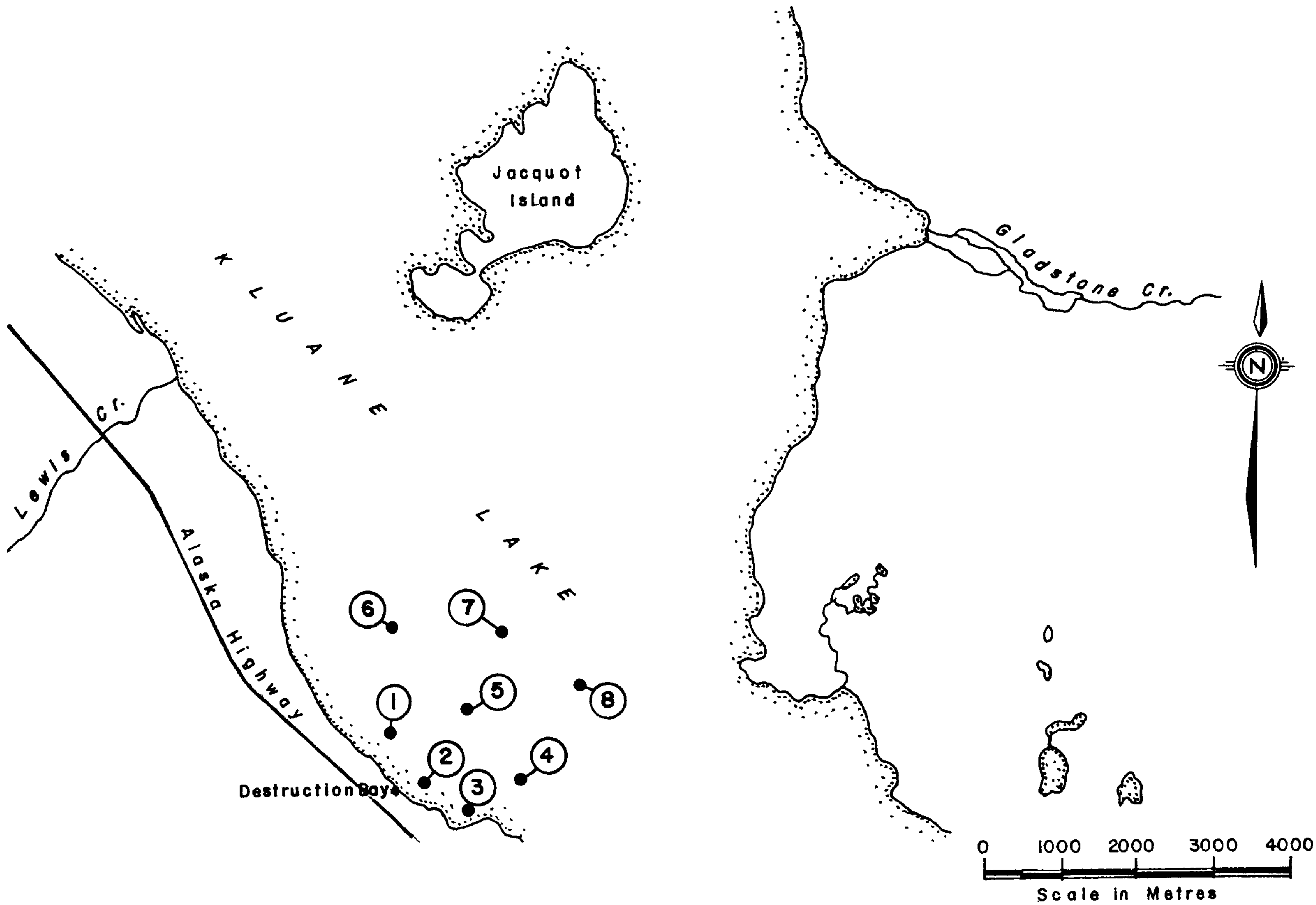

FIGURE 8 SAMPLE STATIONS ON KLUANE LAKE (DESTRUCTION BAY)

2 METHODS

Water and benthic samples were collected using a sixteen foot Boston Whaler. Subsurface water was collected using a 3 litre Van Dorn water sampler suspended from a metered hand line.

2.1 Bottom Fauna

Benthic invertebrate and mud samples were collected using a 15 cm x 15 cm x 23 cm Ekman dredge. Organic carbon sediment samples were taken from the top 5 cm of sediment, kept in labelled whirl-pack bags and frozen until shipment. Benthic invertebrate samples collected (one completed dredge) were washed using a number 30 standard screen. All organisms collected were fixed in 10% formalin, cleaned and sorted at the EPS Yukon Branch laboratory. The sorted samples were preserved in 70% methanol and then shipped to Envirocon Limited for species determination and counting.

Species diversity and evenness indices were calculated for the organisms collected using the following formulae:

Species diversity (H')		$\Sigma P_i \log P_i$
Where:	P	n /N
	n	the number of individuals in the 1th species
	N	the total number of individuals sampled
Evenness (J)		$\frac{\Sigma P_i \log P_i}{\log s}$
Where:	s	the total number of species/samples
	Jmax	1

These formulae are described by Pielou (1966, 1967).

2.2 Water Chemistry

Samples were collected at the surface, 3 m and 12 m depths, where possible. Water samples were analyzed in the field for temperature, conductivity and pH using a Y.S.I. Model 33 (salinity, conductivity, temperature) meter and a Radiometer type 29B pH meter. Oxygen was anlyzed using the Winkler azide modification (Rand et al, 1976). Bacterial examination (total coliforms) was carried out using a membrane filtration technique. Total coliform counts were all converted to number of coliform bacteria per 100 cc sample water.

The water samples were analyzed for the following extractable and dissolved metals: calcium, copper, lead, zinc, iron, magnesium, manganese, cadmium, molybdenum and nickel.

Extractable metal samples were acidified to less than pH 1.5 with nitric acid for preservation. Dissolved metals were first filtered through a 0.45 micron filter and then preserved with nitric acid to pH less than 1.5. Total hardness was determined from the extractable metal samples.

A sample for nutrients (nitrite, nitrate, ammonia, total phosphate, total organic carbon, total inorganic carbon), total alkalinity and turbidity was taken and kept either frozen or cool (4°C) until shipment to Vancouver and subsequent analysis.

A sample for analysis of mercury was taken, preserved with 10 ml of nitric dichromate solution per 100 ml sample, then shipped to Vancouver for analysis. Water samples were also taken for arsenic analysis; these samples were refrigerated or frozen until shipment.

All water samples were collected and preserved in linear polyethylene bottles. Preservation techniques for samples were the most current published in the Pollution Sampling Handbook (EPS Publication). As the analytical capacity of the EPS laboratory in Whitehorse was limited at this time, analysis for metals and nutrients were performed by the Pacific Environment Institute, West Vancouver, B.C.

3 RESULTS AND DISCUSSION

3.1 Water Chemistry

3.1.1 Tagish Lake

Tagish Lake (results in Appendix I [a] and [a-1]). In Tagish Lake the dissolved oxygen was high at all stations on both sampling dates. The lowest value was 93% saturation (at 2 m depth on September 26, 1977 - Station 3). This is "near saturation" which is the recommended objective for a public water supply as outlined by the Working Group on Water Quality Objectives (July 1977).

The pH readings taken in situ (September 20, 1977) were all slightly below the recommended "acceptable limits" for public water supply, but were well within the "maximum limits". Total alkalinity values were between 32 and 39 for both dates.

Total phosphate (TPO_4) was below the dectection limit in all but one analysis, when it was 0.094 at the surface at Station 1 (September 26, 1977).

Nitrate and nitrite values were below detection limits at all stations for both sample dates.

Turbidity values (in Formazin Turbidity Units, which are comparable to Jackson Turbidity Units) were all within the acceptable limit of less than 5 JTU.

Total organic carbon was below the detection limit of 1.0 for all stations on August 11, 1977, and on September 26 all values were 2.0. The difference may be due to a greater load of organic material with autumn precipitation and freshette. Inorganic carbon concentrations were similarly consistent at 10.0 for all stations and depths on August 11 and 8.0 for all stations and depths on September 26, 1977.

Conductivity values ranged from 62 to 69 on August 11 and from 55 to 58 on September 26. These values were all low.

Extractable metals were only analyzed on the second date - September 26, 1977. Concentrations of copper, iron, zinc, cadmium, nickel, molybdenum and mercury were all less than detectable, as were all but one value for manganese. The only detectable concentration was 0.06 ppm at Station 5 (surface); this value is slightly higher than the acceptable concentration of 0.05 ppm as recommended by the Working Group on Water Quality Objectives (1977).

Extractable calcium was 11 or 12 at all stations for September. Extractable hardness values ranged from 36 to 39 in September. Acceptable hardness values are determined by consumer preference and all these values represent very "soft" water, which is considered most desirable.

Dissolved metals were analyzed on both dates. In August, the results for copper, lead, zinc, cadmium, nickel, manganese, molybdenum and mercury were all below the detection limits; the only detectable value for heavy metals was a concentration of 0.06 ppm Fe at Station 2 at 3 m depth. Similar results were obtained for September, with all metals at less than detectable concentrations except for a value of 0.08 ppm Fe in surface water at Station 3. There is a possibility that both of these anomalous values could be due to an analytical error or sample contamination, as neither was consistent with results from other samples.

Dissolved calcium concentrations were all 12 ppm on August 11 and either 11 or 12 on September 26, 1977. The dissolved magnesium concentrations ranged from 1.8 to 2.1 ppm in August and from 2.0 to 2.2 in September. Both the Mg and Ca concentrations are low and these are the major constituents of "hardness"; it is therefore not surprising to find the hardness value to be low. The hardness values ranged from 38 to 39 in August and from 36 to 39 in September which is indicative of "soft" water, which is most desirable from the point of view of the consumer.

Total coliform per 100 ml of water proved very low. The only positive counts were found in August at Station 4 (surface water) where 1 coliform per 100 ml was the count. At Station 5 (same date) the count was 30 coliforms per 100 ml, which is still well below the safe limit of 100 coliforms per 100 ml in "raw water" as recommended by the Working Group on Water Objectives (1977).

3.1.2 Bennett Lake (results in Appendix I [b] and [b-1]). In Bennett Lake, the results for dissolved oxygen tests showed the lake to be super-saturated for all but two samples in July. The lowest result was 92% saturation at Station 8, surface water. The percentage saturation in September ranged from 94% to super-saturated. These results are certainly acceptable and "close to saturation" as recommended by the Working Group on Water Quality Objectives (1977).

The pH results for some samples were slightly below the "acceptable limits" of 8.3 to 9.0 as recommended by the Working Group on Water Quality Objectives (1977). They were, however, well within the maximum limits of 5.0 to 9.6 ranging from 7.90 to 8.31 in July and from 7.5 to 8.3 in September.

Total alkalinity values ranged from 21 to 28 for all but one sample (Station 7, surface water), which was 71. This inconsistency was repeated in September when Station 7 had a total alkalinity of 82 while all the other samples ranged from 16 to 29.

Total phosphate was undetectable in July at Stations 1, 2, 3, 4, and 7. Stations 5, 6 and 8 had values ranging from 0.018 to 0.069, which are low concentrations. In September, all samples were below the detection limit except for Station 1 at 20 m and Station 8 at 12 m. The concentrations for these samples were 0.020 and 0.017 respectively. There is no health-related limit for PO_4 concentration but it is a nutrient which encourages algal growth and eutrophication. The PO_4 concentrations in Bennett Lake are very low and unlikely, at these levels, to contribute to any such problems.

Nitrite concentrations were below detection limits on both sample dates. Nitrate concentrations were also well below the "acceptable limit" of 10 ppm as recommended by the Working Group on Water Quality Objectives (1977). The July sample concentrations ranged from less than 0.01 to 0.03 ppm and the September sample concentrations ranged from less than 0.01 ppm NO_3 to 0.037 ppm NO_3.

The "acceptable limit" for ammonia was set at 0.5 ppm (as N) and in July the sample concentrations were well below this level, ranging from 0.005 to 0.018 ppm (as N). The September samples all had "less than detectable" concentrations.

Turbidity values were quite varied, ranging from 0.05 to 23 FTU in July. The acceptable limit is 5 JTU (the units are comparable) so several stations exceeded this recommendation. Station 5 values were 14 FTU at the surface and 12 FTU at 3.5 m; Station 6 was 6.7 FTU at 0 m and

6.5 FTU at 2.5 m; Station 7 was 5.3 FTU at 0 m depth; Station 6 was 6.5 FTU at 0 m, 23 FTU at 4 m and 3.3 FTU at 12 m depth. The September values for turbidity were much lower, ranging from 0.05 FTU to 7.9 FTU. The only elevated samples were Station 7 with a value of 7.9 FTU at the surface and Station 8 with 5.4 FTU at 12 m depth. The differences in overall turbidity values were probably due to more silty and turbid run-off in July from melting snow or heavy precipitation. Wind conditions may also have contributed to increased mixing and turbidity.

Total organic carbon is a measure of organic input from industrial, domestic, agricultural and natural sources. It may contribute to problems such as odour, bad taste or toxicity of water and will tend to depress the dissolved oxygen content of water (Environment Canada, 1976). The total organic carbon values for Bennett Lake, July 14, 1977, were all less than or equal to 1.00 ppm with the exception of Station 7 at the surface where the concentration was 4.0 ppm. The results were similar on September 9 when all values were less than or equal to 1.0 ppm except Station 7, surface water, which had a concentration of 2 ppm TOC. These values were all low and the percent saturation by dissolved oxygen at all stations reflected a healthy state.

Inorganic carbon values for July were all either 7 or 8 ppm, except Station 7 which had 21 ppm in surface water. In September, the values were all in the range of 5 to 7 ppm except Station 7 which was again high at 16.0 ppm.

Results for conductivity ranged from 41 Mmhos/cm to 53 Mmhos/cm in July and from 30 Mmhos/cm to 54 Mmhos/cm in September at all but Station 7; the value there was 170 Mmhos/cm in July and 155 Mmhos/cm in September, at the surface. There is no recommendation regarding a safety limit for conductance but waterways supporting a healthy mixed population of fish usually have conductance values in the range of 150 to 500 Mmhos/cm (Environment Canada, 1974). In view of this generalization, the values for Bennett Lake are low.

Extractable metals results were below the detection limits for both sample dates at all stations for copper, lead, zinc, cadmium, nickel, molybdenum, mercury and arsenic.

The results for July for extractable iron were below the 0.3 ppm "acceptable limit" as recommended by the Working Group on Water Quality Objectives (1977) at Stations 1, 2, 3, 4 and 7. At Station 5, values of 1.7 ppm Fe and 1.6 ppm Fe were recorded at depths of 0 m respectively.

At Station 6, values of 0.69, 0.85, 1.6 and 0.63 ppm Fe were recorded at depths of 0 m, 4 m and 12 m respectively. In September the only results in excess of the 0.3 ppm limit were at Station 6 (2.5 m) and at Station 8 (12 m) where the values were 0.37 ppm and 0.46 ppm Fe respectively. A possible source of this iron is nearby Montana Mountain which is highly mineralized.

Extractable calcium results ranged from 7.1 to 11 ppm at all but Station 7, which had a value of 39 ppm. Extractable calcium values for September ranged from 7.6 to 12.0 ppm at most stations. Stations 5 and 7 surface samples were slightly higher with values of 20 and 39 ppm respectively.

There are no criteria for acceptable calcium concentrations. Calcium does relate to hardness values and both calcium and hardness values are low, so this water is considered "soft".

The recommended acceptable concentration for magnesium is 50 ppm according to the Working Group on Water Quality Objectives (1977). The results obtained from Bennett Lake for July and September were well below this level; the highest magnesium concentrations were recorded at Station 7.

Extractable hardness (as mentioned above) was low, ranging from 22 to 35 ppm at all but Station 7 (surface sample) for the July 14 sampling. Station 7 had 120 ppm ($CaCO_3$) as a hardness value. The September 9 sampling results ranged from 24 to 37 ppm ($CaCO_{3U}$) at all but stations 7 and 5 (surface waters); these two stations were 120 and 56 ppm respectively. The acceptable limit for hardness (as $CaCO_3$) as recommended by th Working Group on Water Quality Objectives (1977) is 100 mg/l. This limit is primarily geared to consumer preference. The two values at Station 7 exceed the 100 ppm value and perhaps this location should be monitored.

The acceptable limit for mangenese is 0.05 ppm. The results of the July sampling were all less than or equal to this value.

All the dissolved heavy metal concentrations were below detection limits at all stations on both dates, with the exception of results for iron. In July, two results at Station 5, surface water, with 0.35 ppm, and Station 8 and at 12 m depth with 0.44 ppm were in excess of the 0.3 ppm recommended acceptable limit. In September, the only sample above 0.3 ppm was at Station 8 at 12 m depth with a value of 0.54 ppm Fe.

Dissolved calcium values ranged from 8.5 to 10 ppm at all but Station 7 (surface water), which was 38 ppm. Dissolved magnesium values ranged from 1.1 ppm at all but Station 7 (surface water) which had a value of 4.8 ppm. Calcium and magnesium are the two major constituents of hardness. Hardness values ranged from 26 ppm $CaCO_3$ to 34 ppm $CaCO_3$ (which are all low values) at all stations except Station 7; here the hardness value reflected the results of calcium and magnesium testing, with a high value of 110 ppm $CaCO_3$. This is above the 100 ppm $CaCO_3$ recommended limit in the standards of the Working Group on Water Quality Objectives (1977).

Total coliform values were low in all samples for both dates. The safe limit as proposed by the Working Group on Water Quality Objectives (1977) is 100 units/100 mls and the results obtained at these stations were all less than 15/100 mls in July and all were zero in September except Station 7 (surface water) which had a value of 40/100 mls.

The sediment organic carbon content was determined at each station and, as may be seen from the tables, results are quite varied but all reflect fairly low organic carbon content.

The overriding observation about the water quality results for Bennett Lake is that Station 7 stands out as having most of the unusual results. Station 7 was located in a shallow weedy bay; a stream flowing into the bay may contribute to the turbidity and metal concentrations of the water. The Carcross Community School is on the shore of the bay and may be the reason for the relatively higher coliform count at this station, although the concentration was still within "safe" limits.

3.1.3 Teslin Lake (results in Appendix I [c] and [c-1]). Dissolved oxygen results from Teslin Lake showed a minimum saturation of 88% (at Station 1, 4 m depth, in July) with all other stations and depths showing over 90% saturation.

The pH of all stations were found to be between 7.4 and 8.4.

Total alkalinity ranged from 48 to 80 ppm in July and from 50 to 95 ppm in September. Alkalinity is an indication of the buffering capacity of a system. There are no health-related recommendations for alkalinity.

Total phosphate was below the detection limit of 0.01 ppm in all samples except Station 7 (3 m depth) in September; on that date, the value was 0.12 ppm.

Most of the nitrite concentrations were undetectable in both July and September, and all were below the Working Group on Water Quality Objectives (1977) recommendation of 1.0 ppm as a safe limit. Nitrates showed similar results with all July and September recordings being well below the Working Group's (1977) recommended safe level of 10 ppm.

The results for ammonia testing were all below the recommended acceptable level of 0.5 ppm (Working Group on Water Quality Objectives, 1977), but at least a factor of 10.

The acceptable turbidity value, by the Working Group on Water Quality Objectives (1977) recommendation, is 5 JTU. The values obtained in Teslin Lake were all below this level, with the exception of Station 4; in July at 6 m depth, that station had a result of 14.0 FTU, which is unusually high.

In Teslin Lake, the TOC values were in the range of 1 to 3 ppm in July and 3 to 4 ppm in September. The dissolved oxygen saturation values are all fairly high, indicating an apparent healthy situation in this lake.

Total inorganic carbon values in July ranged from 18 to 20 ppm for all samples except Station 1 at 20 m and Station 2 at 20 m, both which had values of only 13 ppm. In September, the results ranged from 12 to 22 ppm for total inorganic carbon.

The conductivity values, from Teslin Lake, for July showed a few inconsistencies. Again, the two 20 m stations had values which differed from the other stations and depths. The results of these two stations were the same at 72 Mmhos/cm. The other stations ranged from 113 Mmhos/cm to 145 Mmhos/cm. Similarly, in September, the conductivity values showed some variation. Stations 1 and 2, at all depths, had results that were lower than most of the other results; they were between 75 and 79 Mmhos/cm. Station 4 at 0 m and 2 m depths had values of 80 and 79 Mmhos/cm respectively. All other results for September ranged from 110 to 135 Mmhos/cm.

The heavy metals analysis revealed no detectable concentrations of dissolved or extractable metals on either sample date for the following metals: copper, lead, zinc, cadmium, nickel, molybdenum and arsenic. Of all the iron results, only Station 4 at a depth of 6 m (in July) exceeded the 0.3 ppm acceptable limit (Working Group on Water Quality Objectives, 1977) with a value of 1.2 ppm of extractable iron. It is possible that this anomaly was due to sample contamination. Manganese results (both dissolved and extractable) were undetectable in July with the exception of a value of 0.08 ppm at 6 m depth at Station 4. Similarly, in September dissolved Mn concentrations were undetectable except for a level of 0.59 ppm at 0 m at Station 8. Extractable Mn values were variable in September; some were undetectable, while at Station 5 (0 and 3 m) and at Station 8 (4.5 m) concentrations were at the acceptable limit of 0.05 ppm. At Station 3 (6 m) a value of 0.59 ppm was obtained. One mercury sample had a concentration of 0.43 ppm, which is well over the 0.05 ppm acceptable limit (Working Group on Water Quality Objectives, 1977). Concentrations of mercury in sediments and fish of Teslin Lake were also found to be above recommended levels and the source of mercury in this area is believed to be natural mineralization (Atkins, in publication).

Dissolved and extractable calcium concentrations for July were almost unvaried in all samples except from the two 20 m depths, where values were low. The range was 22 to 25 ppm with the two 20 m samples having values of 14 or 15 ppm. In September, the concentration of dissolved calcium was in the range of 14 to 28 ppm. Extractable calcium values were within the same range.

Magnesium concentrations were well below the 50 ppm acceptable limit (Working Group on Water Quality Objectives, 1977) for all stations, depths and dates. With low Ca and Mg concentrations, it is surprising that the hardness values are quite high in some cases. None exceed the 100 ppm ($CaCO_3$) acceptable limit (Working Group on Water Quality Objectives, 1977) but several are very close at 99 ppm $CaCO_3$).

Total coliform counts for Teslin Lake were very low.

3.1.4 Marsh Lake (results in Appendix I [d] and [d-1]). Marsh Lake was sampled on August 8, 1977, and again on September 13, 1977. All parameters were sampled, however, several sample bottles from the August cruise were destroyed in shipping. Consequently, data is missing for Stations 4, 5, 6 and 7 for lab-pH, total alkalinity, total phosphate, nitrite, nitrate, ammonia, turbidity, total organic carbon and inorganic carbon.

The dissolved oxygen results for both dates were satisfactory with a minimum saturation of 92%. Alkalinity values appeared to be quite variable in July with a range from 15 to 37 ppm. The September values were between 37 and 39 ppm at Stations 3 to 7 and between 46 and 48 ppm at Stations 1 and 2.

Total phosphate analysis resulted in low values for this parameter. As in Bennett Lake, phospahte is not in high enough concentration to be considered a substantial nutrient for the encouragement of excessive algae growth.

All the results for nitrite and nitrate were well below the acceptable limit of 10 ppm (Working Group on Water Quality Objectives, 1977). The possible source of any nitrate could be effluent or runoff from the nearby campsite or cottage development. All ammonia concentrations were well below the acceptable limit of 0.5 ppm; the highest value was at Station 6, 0 m depth, in September, again possibly due to input from the campsite and cottages.

Turbidity values were below the recommended limit of 5 FTU (Working Group on Water Quality Objectives, 1977) except at Station 2 (2 m depth) in September which had a value of 12 JTU. This was likely due to input from the McClintock River.

Total organic carbon concentrations were low in July, with a maximum value of 4 ppm. In September, all the values were at or below the detection limit of 1.0 ppm. Inorganic carbon vlaues were variable in July. Stations 1 and 2 values were 9 ppm and 10 ppm respectively; Station 3 was only 3 ppm and Station 6 was 7 ppm. In September, the inorganic carbon values were more consistent, ranging from 8 to 11 ppm at all stations.

Conductivity readings in July ranged from 69 to 80 Mmhos and in September ranged from 60 to 70 Mmhos/cm at all but Station 1; Station 1 values in September were 122 to 125 Mmhos/cm - considerably higher than the rest. All values were below the 150 to 500 Mmhos/cm regarded as adequate for support of a good fish population (Environment Canada, 1976).

The heavy metals analysis revealed undetectable dissolved and extractable concentrations for the following metals: copper, lead, zinc, cadmium, nickel, manganese, molybdenum, mercury and arsenic. The concentrations of iron were all low, with the following exceptions: Station 1 at 7 m depth had a value of 0.53 ppm dissolved Fe (in September); Station 2 (2 m) had a concentration of 0.33 ppm extractable Fe (in August) and 0.37 extractable Fe (in September). Station 2 is located offshore near a cottage development.

Dissolved and extractable calcium concentrations in August for all stations were in the range of 12 to 15 ppm. The results for magnesium were similar, and all were below the recommended safe limit (Working Group on Water Quality Objectives, 1977). Hardness values in July were all less than half the recommended limit of 100 ppm ($CaCO_3$). In September no dissolved calcium and hardness analyses were done; the dissolved Mg values were similar to those obtained in August. The extractable Ca, Mg and hardness results were also similar to those of August; in the same range of concentrations, the same "soft water" condition would therefore likely result.

The total coliform results were all well below the recommended safe limit of 100/100 ml. The highest values were found at Station 3, which is adjacent to a cottage development and across a small bay from another such development. Although there is no pollution problem at present, monitoring this sort of development should be encouraged to prevent any problems from occurring in future.

3.1.5 Lake Laberge (results in Appendix I [e] and [e-1]). In Lake Laberge, dissolved oxygen was consistently high and percentage saturation values ranged from 93% to 100%, all of which are satisfactory.

The pH values taken *in situ* in July were all close to the optimum pH range of 8.3 to 9.0 (Working Group on Water Quality Objectives, 1977). In August, the *in situ* pH values were somewhat lower than optimum, ranging from 7.6 to 8.2. These values were still within the acceptable range for public water quality supply (Working Group on Water Quality Objectives, 1977) and safe for aquatic life.

Total alkalinity ranged from 37 to 53 ppm ($CaCO_3$); these values are all moderately low and present no taste problem as is sometimes associated with very high alkalinity.

Total phosphate results for July were all below the detection limit of 0.010 ppm PO_4. In August, all were again undetectable with the exception of Station 4 at 11 m depth where the total phosphate concentration was 0.015 ppm PO_4.

The concentrations of nitrite and nitrate were almost all undetectable at all stations for both dates and all were well below the acceptable concentrations of 1 ppm (NO_3) (Working Group on Water Quality Objectives, 1977). The results for ammonia were all below the acceptable concentration of 0.5 ppm (N). In July, the values ranged from below the detection limit (0.005 ppm) to 0.009 ppm (as N). In August, all samples had undetectable concentrations.

Turbidity values ranged from 0.9 to 2.2 FTU in July and from 1 to 5 FTU in August. The 5 FTU at Station 6, 3 m depth, is equivalent to the "acceptable limit" of 5 JTU as recommended by the Working Group on Water Quality Objectives (1977).

Total organic carbon concentrations ranged from less than 1 to 3 ppm in July and from 1 to 3 ppm in August. The inorganic carbon values varied from 11 to 13 ppm in July and from 10 to 15 ppm in August.

Conductivity readings ranged from 60 Mmhos/cm to 85 Mmhos/cm in July. In August most stations were between 61 and 70 Mmhos/cm. Station 1 (at 2 m depth) was an exception to these low values; it had a conductance value of 100 Mmhos/cm. All of these conductivity values are low in relation to levels in other fresh water bodies supporting good mixed populations of fish (Environment Canada, 1976).

Extractable metals results were below detectable concentrations at all stations and depths on both sample dates, for copper (less than [L] 0.01 ppm), lead (L0.02 ppm), cadmium (L0.01 ppm), nickel (L0.05 ppm) and molybdenum (0.03 ppm) and in August the concentrations of zinc (L0.01 ppm) and mercury (L0.20 ppb) were undetectable in all samples. The extractable iron concentration at Station 6 (3 m) was 0.67 ppm; this was the only value which exceeded the 0.3 ppm limit (Working Group on Water Quality Objectives, 1977).

Although detectable concentrations of extractable zinc, mercury, arsenic and manganese were found, all were very low and none exceeded the recommended limits (Working Group on Water Quality Objectives, 1977).

Extractable calcium concentrations ranged from 11 to 16 ppm in July and from 12 to 18 ppm in August.

The results for magnesium concentrations in Lake Laberge for July were 2.5 to 4.5 ppm in August ranged from 2.1 to 4.5 ppm - well below the "acceptable limit" (Working Group on Water Quality Objectives, 1977).

These calcium and magnesium values, coupled with the extractable hardness values (39 to 53 ppm in July and 39 to 64 ppm in August) are indicative of "soft" water.

Dissolved metals results were even more indicative of purity than were the extractable metals results. Concentrations of copper, lead, cadmium, nickel, manganese and molybdenum were all undetectable; dissolved zinc was at the detection limit at only two stations in July and was undetectable in the August sampling run. Iron concentrations were all much below the recommended acceptable limit on both dates.

The dissolved calcium and magnesium concentrations were only slightly higher than the extractable concentrations. July calcium values were from 13 to 16 ppm and August values ranged from 12 to 19 ppm. Magnesium values were 2.6 to 4.5 in July and 2.0 to 4.9 ppm in August. The hardness values were correspondingly low, from 43 to 58 ppm in July and from 38 to 68 ppm in August, again supportive of the "soft" water conclusion.

The total coliform counts in July were very low at all stations, with the exception of Station 1 at 2 m depth; here, the concentration was 295 cells/100 ml, which is almost three times the recommended acceptable limit of 100/100 ml but less than the recommended maximum limit of 1000/100 ml (Working Group on Water Quality Objectives, 1977). This station is located just offshore at Deep Creek, a small community where sewage treatment is limit to septic systems. The high coliform counts is in a range considered unhealthy for human consumption. All of the coliform counts of samples obtained in August were very low. The previous extremely high value was not repeated, although the count at Station 1 was somewhat higher than those at other stations during the August samplng run. This area had consistently elevated coliform concentrations in 1978 (EPS unpublished data).

3.1.6. Kluane Lake - at Burwash Landing (results in Appendix I [f]). In Kluane Lake at Burwash Landing, the dissolved oxygen content of the water ranged from 92 to 100 percent saturation.

The *in situ* pH values were slightly below the recommended acceptable limit of 8.3 units (Working Group on Water Quality Objectives, 1977) but were within the maximum range.

Total alkalinity values ranged from 60 to 82 ppm. These values are higher than the other values obtained in this survey but the only unfavourable aspect of alkalinity is that highly alkaline waters may have a bad flavour due to the contributing salts.

Nitrite, nitrate and ammonia concentrations were also undetectable at all stations and depths.

All turbidity results were well below the 5 JTU recommended limit (Working Group on Water Quality Objectives, 1977).

The values for total organic carbon were all at or below the detection limit of 1 ppm; this reflects a state of very little organic input to the lake. The inorganic carbon concentrations ranged from 16 to 21 ppm. These inorganic carbon concentrations are similar to levels in Teslin Lake but are considerably higher than those at the other lakes in this study.

The conductivity values ranged from 165 to 182 Mmhos/cm. These are again higher than most of the previously discussed values. This area of Kluane Lake has potential to support a good fish population, based on the statement that a healthy mixed fished population would exist at conductivities of 150 to 500 Mmhos/cm (Environment Canada, 1976).

The concentrations, both extractable and dissolved, were undetectable for the following metals: copper, lead, zinc, cadmium, nickel, manganese and molybdenum. Iron concentrations were all below the recommended and acceptable levels. Extractable mercury concentrations were undetectable and arsenic concentrations were at or below detectable limits.

Extractable calcium concentrations ranged from 29 to 36 ppm, which is higher than those found in other lakes (e.g., Bennett Lake and Teslin Lake). The dissolved calcium results were similar, ranging from 29 to 32 ppm. The magnesium concentrations ranged from 7.9 to 9.2 ppm (extractable) and from 7.5 to 8.4 ppm (dissolved). These magnesium results are higher than the "soft water" lakes but are still well below the recommended safe limit of 50 ppm (Working Group on Water Quality Objectives, 1977). With hardness values ranging from 100 to 130 ppm (extractable) and from 110 to 120 ppm (dissolved), this area exceeds the 100 ppm recommended "maximum limit" (Working Group on Water Quality Objectives, 1977). In relation to human consumption, hardness is important with regard to consumer preference: hard water causes soaps to form precipitates or soap films, but hardness is not known to be hazardous to health.

Total coliform counts were done at all sample locations and depths. Station 3 was the only one with any evidence of coliform with 1/100 and 10/100 ml at 0 and 3 m respectively. Station 3 is the closest station to the community of Burwash Landing, which is the most likely source of these bacteria. These values were well below the 100/100 ml recommended limit (Working Group on Water Quality Objectives, 1977).

3.1.7 Kluane Lake - at Destruction Bay (results in Appendix I [g]). In Kluane Lake at Destruction Bay, dissolved oxygen concentrations were all high, ranging from 97% saturation to super-saturation. The pH values were all very close to the low end of the 8.3 to 9.0 recommended range (Working Group on Water Quality Objectives, 1977). Total alkalinity ranged from 63 to 80 ppm. With no health-related restrictions, these values are certainly acceptable for human consumption.

The total phosphate, nitrite, nitrate and ammonia concentrations at all stations and depths were below the detection limits. Turbidity values were all below the 5 FTU acceptable level (Working Group on Water Quality Objectives, 1977). Total organic carbon values were at or less than the detectable concentration at all stations and depths. Inorganic carbon values ranged from 16 ppm to 19 ppm; these values are similar to those obtained at Burwash Landing and, again, are considerably higher than the values of other lakes surveyed in this study.

Conductivity results were between 150 and 172 Mmhos/cm. These are in the range required for support of a healthy mixed population of fish, as were the results from this lake at Burwash Landing.

The concentrations of copper, lead, zinc, cadmium, nickel, manganese and molybdenum were below detection limits for both dissolved and extractable determinations. Dissolved and extractable iron concentrations were below 0.3 ppm, the acceptable limit (Working Group on Water Quality Objectives, 1977). Dissolved mercury concentrations were undetectable in all samples except Station 8 at 4 m depth where the concentration was 0.95 ppb; this high concentration of mercury could be due to sample contamination or analytical error as no other values reflect the presence of mercury. Dissolved arsenic concentrations were all low, ranging from less than 0.001 ppm (detection limit) to 0.002 ppm.

The concentration of dissolved calcium was between 29 and 32 ppm. Dissolved magnesium concentrations ranged from 6.9 to 8.8 ppm. The dissolved hardness values were between 100 to 120 ppm. Extractable calcium concentrations ranged from 29 to 32 ppm and extractable magnesium concentrations ranged from 7.5 to 8.6 ppm.

Extractable hardness was 110 ppm in all samples. These values for hardness are above the recommended 100 ppm limit (Working Group on Water Quality Objectives, 1977) but are not hazardous to health.

Total coliform counts were low, ranging from 0/100 ml to 10/100 ml. As was the situation near Burwash Landing, the highest total coliform counts were found in the samples taken closest to the community; however, they are low enough to be of no cause for concern at the present time.

3.2 Bottom Fauna

The invertebrate data collected in this survey may be otained on request from the Environmental Protection Service's Yukon office (Room 225 Federal Building, Whitehorse, Yukon) (request to file #4400-5-14/1).

The diversity and evenness values were calculated and tabled (Table 1). In considering the diversity and evenness values, none are exceptional. The lowest values for both of these invertebrate community characteristics were obtained at Station 1 on Marsh Lake where the Yukon River flows out of the north end of the lake. Stations 5, 6, 7 and on Teslin Lake seemed to have some of the highest of all the diversity and evenness values; these could possibly be coupled with somewhat higher alkalinity values. Tagish Lake stations also had some of the higher values, although the only water chemistry result which showed anything unusual was a slightly higher coliform count at Station 5 than at other stations. The rest of the diversity and evenness values showed fairly similar values in all the lakes. Most invertebrate communities shared the characteristic of low diversity (relative to southern waters) and moderate evenness. None of the stations seemed particularly unusual or affected by any disturbances in the pristine water quality of the lakes.

TABLE 1 SPECIES DIVERSITY AND EVENNESS

Location			STATION 1	2	3	4	5	6	7	8
Marsh Lake	Aug.	D	0.7052	1.8693	1.7845	1.9350	0.9089	1.5292	1.0566	
		E	0.5087	0.8989	0.7750	0.7544	0.5647	0.8535	0.7324	
	Sept.	D	0.2641	1.8271	2.8786	1.9907	1.9633	1.2105	1.7845	
		E	0.3809	0.6449	0.8734	0.7761	0.8527	0.7521	0.9170	
Tagish Lake	Aug.	D	1.7985	1.7925	2.0140	2.0760	2.5920			
		E	0.8649	0.8158	0.9166	0.8354	0.8514			
	Sept.	D	2.1322	2.1928	2.1701	1.7886	1.8900			
		E	0.9260	0.8825	0.8733	0.7459	0.7606			
Bennett Lake	July	D		0.6931		1.4314			1.3705	1.3786
		E		1.0000		0.7356			0.5952	0.7085
	Sept.	D	1.0751	1.0397		2.1749	0.0000	1.4611	2.3153	1.3538
		E	0.7755	0.9464		0.8241	-	0.6093	0.8773	0.6511
Kluane Lake: (a) Burwash Landing	July	D	1.0986	0.6365	1.7368	1.4001	1.2968	1.9167		0.0000
		E	1.0000	0.9183	0.7243	0.7814	0.9355	0.7713		-
(b) Destruction Day	July	D	1.4819	1.6612	1.8408	2.2993	1.4942	0.3768	1.3209	0.8600
		E	0.7616	0.9271	0.8378	0.8491	0.9284	0.5436	0.9528	0.7828
Teslin Lake	Aug.	D	0.6365	0.6931	2.0500	0.9003	0.0000	1.9929		
		E	0.9183	1.0000	0.8903	0.8194	-	0.8311		
	Sept.	D	1.6726	1.0397	1.9876	2.0460	2.2503	2.2643	2.9627	2.0131
		E	0.9335	0.9464	0.8632	0.7977	0.9384	0.7325	0.9731	0.8743
Lake Laberge	July	D	1.1164	1.0114	2.0947	1.8065		1.5449	2.1852	1.9650
		E	0.8053	0.9206	0.9534	0.9284		0.7939	0.9490	0.8943
	Aug.	D	2.0859	1.3626	1.8735	1.8541		2.2131	1.7523	1.0986
		E	0.8699	0.7605	0.8527	0.8438		0.8628	0.9005	1.0000

Base e - natural logarithms.
D = Diversity E = Evenness

In Tagish Lake the most common invertebrates were Dipterans and Oligochaetes, followed closely by Gastropods and Pelecypods (Table 2). Station 5 had the greatest variety of types of invertebrates. The only water chemistry results which indicate any difference at this station are detectable manganese concentration and a total coliform count of 20 per 100 ml.

In Bennett Lake (and Nares Lake)(Table 3) Diptera and Oligochaeta were again the most common invertebrate groups. There were higher diverstiy values at the Nares Lake Stations 7 and 8; Station 7 was located in a small shallow bay and had high values for alkalinity, hardness, turbidity, organic and inorganic carbon, conductivity, calcium, magnesium and a coliform count of 40 per 100 ml; Station 8 had high values for turbidity, iron and total phosphate.

Teslin Lake was again dominated by Dipterans and Oligochaetes although there were a variety of other species also present.

Marsh Lake had Dipterans, Oligochaetes and Pelecypods in equal numbers at all stations. Gastropods were almost as common as the first three. Stations 5, 6 and 7 all had sandy bottoms, to which the lower diversities may have been attributable.

Lake Laberge was also dominated by Dipterans and Oligochaetes. Gastropods and Pelecypods were also present in the shallower stations but were not found at Stations 3 and 8, which are both deeper than 12 meters.

At Kluane Lake, the Burwash Landing Stations 1, 2, 7 and 8 all showed very little in the way of invertebrates, while stations 3, 4, 5 and 6 had greater variety. The sparsely populated samples all had a gravel or coarse sand substrate, while the others had fine sand to silt substrates. At Destruction Bay, Diptera was the most commonly found group of invertebrates. The only stations with limited variety of types were 6 and 7, both of which had very fine silt substrate.

The benthic fauna from the lakes studied in this survey were compared with results found by Whithler (1956) on Atlin and Tagish lakes, Clemens et al (1968) on Teslin Lake and Kussat (1972) on Aishihik Lake. Benthic community composition was similar (in this 1977 survey work) to those of the three above-mentioned studies. Apparently human impact has not substantially altered the environment and the seven locations covered by this report may be considered typical of northern lakes in relation to their benthic faunal characteristics.

TABLE 2 TAGISH LAKE - SPECIES PRESENCE

Group	STATION															
	1		2		3		4		5		6		7		8	
Gastropoda	x	xx	x	xx	x	xx	x	-	x	xx	-	-	-	-	-	-
Pelecypoda	x	xx	x	xx	x	xx	x	-	x	xx	-	-	-	-	-	-
Oligochaeta	x	xx	x	xx	x	xx	x	xx	x	xx	-	-	-	-	-	-
Diptera	x	xx	x	xx	x	xx	x	xx	x	xx	-	-	-	-	-	-
Ephemeroptera	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-
Amphipoda	-	xx	-	-	-	-	-	-	x	xx	-	-	-	-	-	-
Ostracoda	-	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-
Hirudinea	-	-	-	-	-	-	-	-	x	xx	-	-	-	-	-	-
Trichoptera	-	-	-	-	-	xx	-	xx	-	xx	-	-	-	-	-	-
% C Sed.	0.3		L0.3		0.5		0.5		0.4							

x = 1st sampling, 11 August, 1977
xx = 2nd sampling, 26 September, 1977
L = less than

TABLE 3 BENNETT LAKE - SPECIES PRESENCE

Group	STATION															
	1		2		3		4		5		6		7		8	
Gastropoda	x	xx	-	xx	-	-	-	xx	-	-	-	xx	x	-	-	xx
Pelecypoda	-	xx	-	-	-	-	-	-	-	-	-	-	x	xx	x	xx
Oligochaeta	x	-	-	-	-	-	x	xx	-	-	-	xx	x	xx	x	xx
Ostracoda	-	-	-	-	-	-	-	-	-	-	-	-	-	xx	-	xx
Diptera	-	xx	-	xx	-	-	x	xx	-	-	-	xx	x	xx	x	xx
Nematoda	-	-	-	-	-	-	-	-	-	xx	-	-	x	xx	-	-
Acari	-	-	-	-	-	-	-	-	-	-	-	-	-	xx	-	-
% C Sed.	0.67	0.6	0.92	0.6	0.07	L0.3	0.37	0.3	0.33	1.2	-	0.6	0.78	2.7	1.5	0.8

x = 1st sampling, 14 July, 1977

xx = 2nd sampling, 9 September, 1977

L = less than

TABLE 4 TESLIN LAKE - SPECIES PRESENCE

Group	STATION 1		2		3		4		5		6		7		8	
Gastropoda	-	-	-	-	x	-	-	xx	-	-	x	xx		xx		xx
Pelecypoda	-	xx	-	-	x	xx	-	xx	-	-	x	xx	L	xx	L	xx
Diptera	-	xx	x	xx	x	xx	x	xx	-	xx	x	xx	O	xx	O	xx
Oligochaeta	-	xx	x	xx	x	xx	x	xx	x	xx	x	xx	S	xx	S	xx
Nematoda	x	-	-	-	x	xx	-	xx	-	-	-	-	T	-	T	-
Seeds	x	-	-	-	-	-	-	-	-	-	-	-		-		-
Ostracoda	-	-	-	-	-	xx	-	xx	-	xx	-	xx		-		-
Acari	-	-	-	-	-	-	-	xx	-	xx	-	-	B	xx	B	xx
Cladocera	-	-	-	-	-	-	-	-	-	xx	-	-	U	-	U	-
Hirudinea	-	-	-	-	-	-	-	-	-	xx	-	-	G	-	G	-
Amphipoda	-	-	-	-	-	-	-	-	-	-	-	-	S	xx	S	-
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-		xx		-
% C Sed.	0.9	1.1	1.3	1.1	1.3	1.1	1.1	1.2	L0.3	1.4	0.6	0.7	1.9	1.0	1.3	1.0

x = 1st sampling, 10 July, 1977

xx = 2nd sampling, 7 September, 1977

L = less than

TABLE 5 MARSH LAKE - SPECIES PRESENCE

Group	STATION															
	1		2		3		4		5		6		7		8	
Gastropoda	-	xx	x	xx	x	xx	x	xx	-	xx	x	-	-	xx	-	-
Pelecypoda	-	xx	x	-	x	xx	x	xx	x	xx	x	xx	x	xx	-	-
Amphipoda	-	-	x	xx	x	xx	-	xx	-	-	-	-	-	xx	-	-
Hirudinea	-	-	x	-	x	xx	x	-	-	-	-	-	-	-	-	-
Oligochaeta	x	xx	-	xx	x	xx	x	xx	x	xx	x	xx	x	xx	-	-
Diptera	-	xx	x	xx	x	xx	x	xx	x	xx	x	xx	-	xx	-	-
Cladocera	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-
Trichoptera	-	-	-	-	-	-	x	xx	-	-	-	-	-	-	-	-
Ephemeroptera	-	xx	-	-	-	xx	-	-	-	-	-	-	-	-	-	-
Nematoda	-	-	-	-	-	xx	-	-	-	-	-	-	-	-	-	-
Plecoptera	-	-	-	-	-	-	-	-	-	xx	-	-	-	-	-	-
Ostracoda	-	-	-	-	-	-	-	-	-	-	-	-	-	xx	-	-
% C Sed.	0.5	0.7	1.1	1.3	3.6	6.8	0.5	0.24	L0.3	0.12	L0.3	0.16	0.3	0.97	-	-

x = 1st sampling, 8 August, 1977

xx = 2nd sampling, 13 September, 1977

L = less than

TABLE 6 LAKE LABERGE - SPECIES PRESENCE

Group	STATION															
	1		2		3		4		5		6		7		8	
	Sandy		Fine Silt		Fine Silt		Silt				Black Silt and Vegetation		Fine Silt and Vegetation		Silt and Sand	
Gastropoda	x	xx	-	-	-	-	x	xx	-	-	x	xx	x	xx	-	-
Pelecypoda	-	xx	-	xx	-	-	-	xx	-	-	x	xx	x	xx	-	-
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Ostracoda	-	xx	-	-	-	-	-	-	-	-	-	xx	-	-	x	-
Diptera	x	xx	x	xx	x	xx	x	xx	-	-	x	xx	x	xx	x	xx
Oligochaeta	x	xx	x	xx	x	xx	x	xx	-	-	x	-	x	-	x	-
Nematoda	-	-	-	-	-	xx	-	-	-	-	-	-	-	-	-	-
Amphipoda	-	-	-	-	-	-	-	-	-	-	-	-	-	xx	-	-
% C Sed.	0.91		1.4		0.69		1.1				2.4		2.5		0.53	

x = 1st sampling, 5 July, 1977

xx = 2nd sampling, 29 August, 1977

TABLE 7 BURWASH LANDING - SPECIES PRESENCE

Group	STATION 1 Sandy		2 Gravel		3 Black Org. & brown detritus layer		4 Dense Sand		5 Fine Sand		6		7 Coarse Sand		8 V. Coarse Sand	
Gastropoda	x	-	x	-	x	-	x	-	x	-	x	-	-	-	x	-
Pelecypoda	-	-	-	-	x	-	x	-	x	-	x	-	-	-	-	-
Diptera	x	-	-	-	x	-	x	-	x	-	x	-	-	-	-	-
Oligochaeta	-	-	-	-	x	-	x	-	-	-	x	-	-	-	-	-
Nematoda	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
% C Sed.	L0.3		N.S.		1.0		L0.3		L0.3		1.0		L0.3		N.S.	

x = 1st sampling, 7 July, 1977

L = less than

TABLE 8 DESTRUCTION BAY - SPECIES PRESENCE

Group	STATION 1	2 Rich Organic	3	4	5 Silty	6 Very Fine Silt	7 Very Fine Silt	8 Fine Silt
Gastropoda	x -	x -	x -	- -	x -	- -	- -	- -
Pelecypoda	x -	x -	x -	x -	- -	- -	- -	x -
Diptera	x -	- -	x -	x -	x -	x -	x -	x -
Oligochaeta	- -	x -	x -	x -	x -	- -	- -	- -
Amphopoda	- -	x -	- -	- -	- -	- -	- -	- -
Nematoda	- -	- -	- -	x -	- -	- -	- -	- -
% C Sed.	0.5	0.4	0.9	0.7	lost	1.1	1.1	1.0

x = 1st sampling, 9 July, 1977

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ACKNOWLEDGEMENTS

The author acknowledges G. Hebert and G. Packman for supervision of data collection; the assistance of D. Kittle, D. Tilden, P. Bosely and (the late) R. Feil in field work; L. Pearson for a fine drafting job; and K. Weagle for general guidance with the complete project.

APPENDIX I

RESULTS OF CHEMICAL ANALYSES

APPENDIX I (a) RESULTS FROM TAGISH LAKE (11/08/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos /cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/ 100 ml
1 - 0 m	16.0	9.3	100	7.8	NOT AVAILABLE	36	L0.010	L0.005	L0.010	L0.005	L0.50	L1.0	10.0	65	-	0
3 m	17.0	9.1	100	7.7		35	L0.010	L0.005	L0.010	L0.005	L0.50	L1.0	10.0	68	-	0
2 - 0 m	16.0	9.1	99	7.8		37	L0.010	L0.005	L0.010	L0.005	L0.50	L1.0	10.0	65	-	0
3 m	16.5	9.1	100	7.8		35	L0.010	L0.005	L0.010	L0.005	0.90	L1.0	10.0	69	-	0
3 - 0 m	16.0	9.3	100	7.7		32	L0.010	L0.005	L0.010	L0.005	0.55	L1.0	10.0	65	-	0
2 m	16.0	9.1	99	7.8		33	L0.010	L0.005	L0.010	L0.005	0.60	L1.0	10.0	68	-	0
4 - 0 m	16.0	9.4	100	7.8		33	L0.010	L0.005	L0.010	L0.005	2.1	L1.0	10.0	62	-	1
3 m	16.5	9.4	100	7.8		33	L0.010	L0.005	L0.010	L0.005	0.90	L1.0	10.0	64	-	0
5 - 0 m	16.0	9.4	100	7.8		33	L0.010	L0.005	L0.010	L0.005	1.1	L1.0	10.0	62	-	20
4 m	16.5	9.3	100	7.8		33	L0.010	L0.005	L0.010	L0.005	1.6	L1.0	10.0	62	-	0

APPENDIX I (a) RESULTS FROM TAGISH LAKE (11/08/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
3 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
2 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
3 m	L0.01	0.23	L0.02	L0.01	12	2.0	38	L0.01	L0.05	0.04	L0.03	L0.20	L0.001
3 - 0 m	L0.01	0.04	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
2 m	L0.01	L0.03	L0.02	L0.01	11	2.1	36	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
3 m	L0.01	0.05	L0.02	L0.01	13	2.0	41	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001
4 m	L0.01	0.10	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.03	L0.20	L0.001

APPENDIX I (a) RESULTS FROM TAGISH LAKE (11/08/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3
2 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.06	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	1.8	37	L0.01	L0.05	L0.03	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3

APPENDIX I (a-1) RESULTS FROM TAGISH LAKE (26/09/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos /cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/ 100 ml
1 - 0 m	10.5	9.8	96	7.5	7.6	39	0.094	L0.005	L0.010	L0.005	0.60	2.0	8.0	56	0.3	0
3 m	10.0	9.8	94	7.5	7.7	37	L0.010	L0.005	L0.010	L0.005	0.60	2.0	8.0	56		0
2 - 0 m	10.0	9.8	94	7.5	7.8	36	L0.010	L0.005	L0.010	L0.005	L0.50	2.0	8.0	58	L0.3	0
3 m	10.0	10.0	96	7.5	7.9	36	L0.010	L0.005	L0.010	L0.005	0.50	2.0	8.0	57		0
3 - 0 m	10.0	9.8	94	7.5	7.8	37	L0.010	L0.005	L0.010	L0.005	0.65	2.0	8.0	57	0.5	2
2 m	10.0	9.7	93	7.6	7.8	38	L0.010	L0.005	L0.010	L0.005	0.60	2.0	8.0	58		0
4 - 0 m	10.0	10.3	99	7.5	7.7	37	L0.010	L0.005	L0.10	0.007	0.55	2.0	8.0	55	0.5	0
3 m	9.5	9.8	94	7.5	7.7	36	L0.010	L0.005	L0.010	L0.005	0.65	2.0	8.0	55		0
5 - 0 m	10.0	9.8	94	7.5	7.7	36	L0.010	L0.005	L0.010	0.007	0.60	2.0	8.0	55	0.4	0
4 m	9.5	9.8	94	7.5	7.7	35	L0.010	L0.005	L0.010	L0.005	L0.50	2.0	8.0	55		0

APPENDIX I (a-1) RESULTS FROM TAGISH LAKE (26/09/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10^{-3}	As
1 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.2	-
3 m	L0.01	L0.03	L0.02	L0.01	11	2.0	36	L0.01	L0.05	L0.03	L0.3	L0.2	-
2 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.2	-
3 m	L0.01	L0.03	L0.02	L0.01	11	2.2	37	L0.01	L0.05	L0.03	L0.3	L0.2	-
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.2	-
2 m	L0.01	L0.03	L0.02	L0.01	11	2.2	37	L0.01	L0.05	L0.03	L0.3	L0.2	-
4 - 0 m	L0.01	L0.03	L0.02	L0.01	11	2.1	36	L0.01	L0.05	L0.03	L0.3	L0.2	-
3 m	L0.01	L0.03	L0.02	L0.01	11	2.0	36	L0.01	L0.05	L0.03	L0.3	L0.2	-
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	0.06	L0.3	L0.2	-
4 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.2	-

APPENDIX I (a-1) RESULTS FROM TAGISH LAKE (26/09/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	L0.03	L0.02	L0.01	11	2.1	36	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
2 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
3 - 0 m	L0.01	0.08	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	11	2.1	36	L0.01	L0.05	L0.03	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	L0.03	L0.02	L0.01	11	2.1	36	L0.01	L0.05	L0.03	L0.3

APPENDIX I (b) RESULTS FROM BENNETT LAKE (CARCROSS) (14/07/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	12.0	10.5	100+	7.90	7.90	-	-	-	-	-	-	-	-	41.0	0.67	0
4 m	11.0	10.3	100+	7.97	7.97	22	L.01	L.005	.03	.005	L.05	L1.0	7.0	41.0		0
30 m	10.0	10.5	100+	7.99	7.99	23	L.01	L.005	.03	.007	1.20	L1.0	7.0	41.0		0
2 - 0 m	11.0	10.5	100+	7.99	7.99	25	L.01	L.005	.027	.005	L.05	L1.0	7.0	41.0	0.92	0
4 m	11.0	10.5	100+	7.99	7.99	23	L.01	L.005	.027	.008	L.05	L1.0	7.0	41.0		0
30 m	10.0	10.5	100+	7.92	7.92	24	L.01	L.005	.030	.007	L.05	L1.0	7.0	41.0		0
3 - 0 m	-	10.3	100	8.11	8.11	23	L.01	L.005	.026	.008	.55	L1.0	7.0	41.0	0.07	0
2 m	11.0	10.3	100+	8.09	8.09	22	L.01	L.005	.026	.009	.75	L1.0	7.0	41.0		0
4 - 0 m	11.0	10.3	100+	8.21	8.21	23	L.01	L.005	.027	.018	1.20	L1.0	7.0	41.0	0.37	0
2 m	11.0	10.3	100+	8.15	8.15	23	L.01	L.005	.026	.006	1.50	1.0	7.0	41.0		0
5 - 0 m	12.0	10.1	100+	8.10	8.10	26	.069	L.005	.024	.005	14.00	1.0	8.0	47.0	0.33	3
3.5 m	11.5	10.1	100+	8.11	8.11	26	.018	L.005	.024	.012	12.00	1.0	8.0	48.0		14
6 - 0 m	11.5	10.2	100+	8.20	8.20	21	.024	L.005	.014	.007	6.7	1.0	7.0	45.0	-	0
2.5 m	11.5	10.2	100+	8.10	8.10	24	.023	L.005	.024	.009	6.5	1.0	7.0	46.0		2
7 - 0 m	16.0	10.4	100+	8.31	8.31	71	L.01	L.005	L.01	.011	5.3	4.0	21.0	170.0	0.78	7
8 - 0 m	13.8	8.8	92	8.25	8.25	27	.029	L.005	.018	.015	6.5	1.0	8.0	50.0	1.5	1
4 m	12.0	9.6	97	8.19	8.19	24	.034	L.005	.010	.014	23.00	1.0	7.0	53.0		15
12 m	10.5	10.7	100+	8.19	8.19	28	.020	L.005	.020	.015	3.3	1.0	7.0	48.0		6

APPENDIX I (b) RESULTS FROM BENNETT LAKE (CARCROSS) (14/07/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L.01	.04	L.02	L.01	8.2	1.1	25	L.01	L.05	L.03	L.3	L0.20	L0.001
4 m	L.01	.04	L.02	L.01	10.0	1.3	30	L.01	L.05	L.03	L.3	L0.20	L0.001
30 m	L.01	.14	L.02	L.01	8.5	1.1	26	L.01	L.05	L.03	L.3	L0.20	L0.001
2 - 0 m	L.01	.04	L.02	L.01	9.0	1.3	28	L.01	L.05	L.03	L.3	L0.20	L0.001
4 m	L.01	.04	L.02	L.01	8.7	1.1	26	L.01	L.05	L.03	L.3	L0.20	L0.001
30 m	L.01	.04	L.02	L.01	7.1	1.1	22	L.01	L.05	L.03	L.3	L0.20	L0.001
3 - 0 m	L.01	.06	L.02	L.01	8.8	1.1	27	L.01	L.05	L.03	L.3	L0.20	L0.001
2 m	L.01	.08	L.02	L.01	8.9	1.2	27	L.01	L.05	L.03	L.3	L0.20	L0.001
4 - 0 m	L.01	.26	L.02	L.01	9.0	1.2	27	L.01	L.05	L.03	L.3	L0.20	L0.001
2 m	L.01	.22	L.02	L.01	9.0	1.1	27	L.01	L.05	L.03	L.3	L0.20	L0.001
5 - 0 m	L.01	1.7	L.02	L.01	10.0	1.7	32	L.01	L.05	.05	L.3	L0.20	0.001
3.5 m	L.01	1.6	L.02	L.01	9.9	1.6	31	L.01	L.05	.04	-	L0.20	0.001
6 - 0 m	L.01	.69	L.02	L.01	9.7	1.3	30	L.01	L.05	L.03	-	L0.20	L0.001
2.5 m	L.01	.85	L.02	L.01	9.4	1.4	29	L.01	L.05	L.03	-	L0.20	L0.001
7 - 0 m	L.01	.04	L.02	L.01	39.0	4.8	120	L.01	L.05	L.03	-	L0.20	0.001
8 - 0 m	L.01	.59	L.02	L.01	9.8	1.5	31	L.01	L.05	.05	-	L0.20	L0.001
4 m	L.01	1.6	L.02	L.01	11.0	1.8	35	L.01	L.05	L.03	-	L0.20	0.001
12 m	L.01	.63	L.02	L.01	9.8	1.4	30	L.01	L.05	L.03	-	L0.20	L0.001

APPENDIX I (b) RESULTS FROM BENNETT LAKE (CARCROSS) (14/07/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L.01	.07	L.02	L.01	8.9	1.2	27	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	8.9	1.1	27	.09	L.05	L.03	L.3
30 m	L.01	.08	L.02	L.01	8.7	1.1	26	L.01	L.05	L.03	L.3
2 - 0 m	L.01	L.03	L.02	L.01	8.5	1.1	26	L.01	L.05	L.03	L.3
4 m	L.01	.04	L.02	L.01	8.7	1.1	26	L.01	L.05	L.03	L.3
30 m	L.01	L.03	L.02	L.01	8.7	1.2	27	L.01	L.05	L.03	L.3
3 - 0 m	L.01	.04	L.02	L.01	8.8	1.1	27	L.01	L.05	L.03	L.3
2 m	L.01	.08	L.02	L.01	9.0	1.2	27	L.01	L.05	L.03	L.3
4 - 0 m	L.01	.10	L.02	L.01	9.2	1.2	28	L.01	L.05	L.03	L.3
2 m	L.01	.10	L.02	L.01	8.7	1.1	26	L.01	L.05	L.03	L.3
5 - 0 m	L.01	.35	L.02	L.01	10.0	1.4	31	L.01	L.05	L.03	L.3
3.5 m	L.01	-	-	-	-	-	-	-	-	-	-
6 - 0 m	L.01	.14	L.02	L.01	9.5	1.2	29	L.01	L.05	L.03	L.3
2.5 m	L.01	.18	L.02	L.01	9.1	1.2	28	L.01	L.05	L.03	L.3
7 - 0 m	L.01	L.03	L.02	L.01	38.0	4.8	110	L.01	L.05	L.03	L.3
8 - 0 m	L.01	.28	L.02	L.01	10.0	1.4	31	L.01	L.05	L.03	L.3
4 m	L.01	.23	L.02	L.01	11.0	1.5	34	L.01	L.05	L.03	L.3
12 m	L.01	.44	L.02	L.01	9.8	1.3	30	L.01	L.05	L.03	L.3

APPENDIX I (b-1) RESULTS FROM BENNETT LAKE (CARCROSS) (09/09/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO (mg/l)	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	12.0	9.8	99	7.8	7.6	22	L0.01	L0.005	0.032	L0.005	L0.50	L1.0	6.0	39	0.6	0
4 m	12.0	9.8	99	7.9	7.6	16	L0.01	L0.005	0.018	L0.005	0.70	L1.0	6.0	40		2
30 m	12.0	9.6	97	8.3	7.6	17	0.02	L0.005	0.037	L0.005	0.75	L1.0	6.0	40		0
2 - 0 m	12.5	9.5	97	8.3	7.6	24	L0.01	L0.005	0.036	L0.005	L0.50	1.0	6.0	41	0.6	0
4 m	12.0	9.7	98	-	7.7	-	-	-	-	-	-	-	-	41		0
30 m	12.0	9.6	97	7.5	7.8	22	L0.01	L0.005	0.035	L0.005	0.80	L1.0	6.0	41		0
3 - 0 m	12.2	9.6	97	7.9	7.8	23	L0.01	L0.005	0.025	L0.005	0.60	1.0	6.0	36	L0.3	0
2 m	12.2	9.7	98	7.9	7.9	19	L0.01	L0.005	0.035	L0.005	3.5	1.0	5.0	40		0
4 - 0 m	12.2	9.4	95	7.8	7.6	20	L0.01	L0.005	0.035	L0.005	0.85	L1.0	5.0	40	0.3	0
2 m	12.0	9.5	96	7.9	7.7	24	L0.01	L0.005	0.035	L0.005	L0.50	L1.0	6.0	41		0
5 - 0 m	12.0	10.0	100+	7.7	7.5	29	L0.01	L0.005	0.034	L0.005	0.70	L1.0	7.0	44	1.2	0
3.5 m	12.0	10.3	100+	8.0	7.7	26	L0.01	L0.005	0.035	L0.005	0.75	L1.0	7.0	43		0
6 - 0 m	12.0	10.0	100+	8.0	7.5	24	L0.01	L0.005	0.027	L0.005	0.85	L1.0	6.0	45	0.6	0
2.5 m	12.0	9.9	100	8.1	7.7	27	L0.01	L0.005	0.036	L0.005	1.0	L1.0	6.0	46		0
7 - 0 m	11.0	9.7	95	8.3	7.8	82	L0.01	L0.005	L0.01	L0.005	7.9	2.0	16.0	155	2.7	40
8 - 0 m	12.0	9.3	94	8.0	7.8	28	L0.01	L0.005	0.030	L0.005	0.85	L1.0	7.0	48	0.8	0
4 m	-	9.5	96	8.1	7.9	28	L0.01	L0.005	0.022	L0.005	0.85	L1.0	7.0	51		1
12 m	12.0	9.7	98	8.1	7.9	29	0.017	L0.005	0.023	L0.005	5.4	1.0	7.0	54		0

APPENDIX I (b-1) RESULTS FROM BENNETT LAKE (CARCROSS) (09/09/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L0.01	L0.03	L0.02	L0.01	8.1	1.0	24	L0.01	L0.05	-	L0.3	L0.20	L0.001
4 m	L0.01	L0.03	L0.02	L0.01	8.4	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
30 m	L0.01	0.06	L0.02	L0.01	8.1	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
2 - 0 m	L0.01	L0.03	L0.02	L0.01	8.4	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
4 m	L0.01	0.04	L0.02	L0.01	8.9	1.0	26	L0.01	L0.05	-	L0.3	L0.20	L0.001
30 m	L0.01	L0.03	L0.02	L0.01	8.3	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
3 - 0 m	L0.01	0.08	L0.02	L0.01	8.5	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
2 m	L0.01	0.04	L0.02	L0.01	7.6	1.1	24	L0.01	L0.05	-	L0.3	L0.20	L0.001
4 - 0 m	L0.01	L0.03	L0.02	L0.01	8.8	1.0	26	L0.01	L0.05	-	L0.3	L0.20	L0.001
2 m	L0.01	0.04	L0.02	L0.01	8.5	1.0	25	L0.01	L0.05	-	L0.3	L0.20	L0.001
5 - 0 m	L0.01	0.14	L0.02	L0.01	20.0	1.4	56	L0.01	L0.05	-	L0.3	L0.20	L0.001
3.5 m	L0.01	0.14	L0.02	L0.01	10.0	1.2	30	L0.01	L0.05	-	L0.3	L0.20	L0.001
6 - 0 m	L0.01	0.06	L0.02	L0.01	9.0	1.2	27	L0.01	L0.05	-	L0.3	L0.20	L0.001
2.5 m	L0.01	0.37	L0.02	L0.01	9.4	1.3	29	L0.01	L0.05	-	L0.3	L0.20	L0.001
7 - 0 m	L0.01	0.06	L0.02	L0.01	39.0	5.5	120	L0.01	L0.05	-	L0.3	L0.20	L0.001
8 - 0 m	L0.01	0.08	L0.02	L0.01	10.0	1.3	30	L0.01	L0.05	-	L0.3	L0.20	L0.001
4 m	L0.01	0.11	L0.02	L0.01	10.0	1.4	31	L0.01	L0.05	-	L0.3	L0.20	L0.001
12 m	L0.01	0.46	L0.02	L0.01	12.0	1.7	37	L0.01	L0.05	-	L0.3	L0.20	L0.001

APPENDIX I (b-1) RESULTS FROM BENNETT LAKE (CARCROSS) (09/09/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	L0.03	L0.02	L0.01	8.5	1.0	25	L0.01	L0.05	-	L0.3
4 m	L0.01	0.10	L0.02	L0.01	8.7	1.0	26	L0.01	L0.05	-	L0.3
30 m	L0.01	0.03	L0.02	L0.01	8.2	1.0	25	L0.01	L0.05	-	L0.3
2 - 0 m	L0.01	L0.03	L0.02	L0.01	8.5	1.0	25	L0.01	L0.05	-	L0.3
4 m	L0.01	L0.03	L0.02	L0.01	8.2	1.0	25	L0.01	L0.05	-	L0.3
30 m	L0.01	L0.03	L0.02	L0.01	8.2	1.0	25	L0.01	L0.05	-	L0.3
3 - 0 m	L0.01	L0.03	L0.02	L0.01	8.2	1.0	25	L0.01	L0.05	-	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	8.2	1.0	25	L0.01	L0.05	-	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	7.8	1.1	24	L0.01	L0.05	-	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	7.9	1.0	24	L0.01	L0.05	-	L0.3
5 - 0 m	L0.01	L0.03	L0.02	L0.01	8.8	1.2	27	L0.01	L0.05	-	L0.3
3.5 m	L0.01	0.07	L0.02	L0.01	8.8	1.3	27	L0.01	L0.05	-	L0.3
6 - 0 m	L0.01	L0.03	L0.02	L0.01	9.3	1.2	28	L0.01	L0.05	-	L0.3
2.5 m	L0.01	0.05	L0.02	L0.01	9.3	1.2	28	L0.01	L0.05	-	L0.3
7 - 0 m	L0.01	0.04	L0.02	L0.01	39.0	5.4	120	L0.01	L0.05	-	L0.3
8 - 0 m	L0.01	0.06	L0.02	L0.01	10.0	1.3	30	L0.01	L0.05	-	L0.3
4 m	L0.01	0.04	L0.02	L0.01	11.0	1.4	33	L0.01	L0.05	-	L0.3
12 m	L0.01	0.54	L0.02	L0.01	12.0	1.6	37	L0.01	L0.05	-	L0.3

APPENDIX I (c) RESULTS FROM TESLIN LAKE (12/07/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos /cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/ 100 ml
1 - 0 m	16.0	8.9	97	8.0	7.5	75.0	L0.01	L0.005	L0.01	L0.005	0.70	3.0	19.0	113	0.9	0
4 m	11.0	9.0	88	8.1	7.9	75.0	L0.01	L0.005	L0.01	L0.005	1.0	3.0	19.0	121		2
20 m	8.0	10.0	100	7.6	8.0	48.0	L0.01	0.006	0.018	L0.005	L0.50	3.0	13.0	72		1
2 - 0 m	16.0	8.9	97	-	8.0	-	-	-	-	-	-	-	-	116	1.3	0
4 m	11.0	9.1	89	8.0	8.2	71.0	L0.01	L0.005	L0.01	L0.005	0.65	3.0	18.0	118		3
20 m	8.0	10.0	100	7.7	8.1	49.0	L0.01	0.006	0.019	L0.005	0.55	4.0	13.0	72		0
3 - 0 m	16.0	8.4	91	8.1	8.2	79.0	L0.01	L0.005	L0.01	L0.005	0.75	2.0	20.0	129	1.3	2
2 m	11.0	8.6	84	8.1	8.3	78.0	L0.01	L0.005	L0.01	L0.005	0.70	2.0	20.0	130		1
6 m	10.5	8.8	86	8.1	8.3	78.0	L0.01	L0.005	L0.01	L0.005	0.80	2.0	21.0	130		0
4 - 0 m	16.0	8.8	96	8.1	8.2	75.0	L0.01	L0.005	L0.01	L0.005	0.85	3.0	19.0	125	1.1	1
2 m	16.0	8.9	97	8.1	8.2	76.0	L0.01	L0.005	L0.01	L0.005	0.60	2.0	22.0	128		0
6 m	14.0	9.4	98	8.1	8.2	77.0	L0.01	L0.005	L0.01	L0.005	14.0	2.0	20.0	130		0
5 - 0 m	16.0	8.7	95	8.2	8.4	78.0	L0.01	L0.005	L0.01	L0.005	0.80	2.0	20.0	130	L0.3	0
3 m	16.0	8.95	97	8.1	8.3	80.0	L0.01	L0.005	L0.01	0.005	0.75	2.0	20.0	133		1
6 - 0 m	16.0	8.8	96	8.1	8.2	79.0	L0.01	L0.005	L0.01	0.005	0.60	2.0	20.0	145	0.6	7
1.5 m	16.0	8.9	97	8.1	8.2	78.0	L0.01	L0.005	L0.01	L0.005	0.75	2.0	20.0	143		3
7 - 0 m	16.0	8.7	95	8.2	8.3	78.0	L0.01	L0.005	L0.01	0.005	1.5	2.0	20.0	132	1.9	0
3 m	16.0	9.1	99	8.1	8.3	78.0	L0.01	L0.005	L0.01	0.005	1.8	2.0	20.0	130		2
8 - 0 m	16.0	8.8	96	8.1	8.4	79.0	L0.01	L0.005	L0.01	L0.005	0.70	1.0	20.0	126	1.3	0
4.5 m	14.0	8.9	93	8.1	8.3	75.0	L0.01	L0.005	L0.01	L0.005	2.2	2.0	20.0	132		0

APPENDIX I (c) RESULTS FROM TESLIN LAKE (12/07/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg $\times 10^{-3}$	As
1 - 0 m	L.01	.11	L.02	L.01	24	5.7	83	L.01	L.05	L.03	L.3	-	L0.001
4 m	L.01	.07	L.02	L.01	23	5.7	81	L.01	L.05	L.03	L.3	-	L0.001
20 m	L.01	.04	L.02	L.01	14	3.6	50	L.01	L.05	L.03	L.3	L0.20	L0.001
2 - 0 m	L.01	.05	L.02	L.01	22	5.2	76	L.01	L.05	L.03	L.3	L0.20	L0.001
4 m	L.01	.09	L.02	L.01	21	5.3	74	L.01	L.05	L.03	L.3	L0.20	L0.001
20 m	L.01	.04	L.02	L.01	14	3.7	50	L.01	L.05	L.03	L.3	L0.20	L0.001
3 - 0 m	L.01	.09	L.02	L.01	24	5.7	83	L.01	L.05	L.03	L.3	L0.20	L0.001
2 m	L.01	.11	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3	L0.20	0.001
6 m	L.01	.08	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3	L0.20	L0.001
4 - 0 m	L.01	.06	L.02	L.01	23	5.7	81	L.01	L.05	L.03	L.3	L0.20	L0.001
2 m	L.01	.07	L.02	L.01	24	5.7	83	L.01	L.05	L.03	L.3	L0.20	L0.001
6 m	L.01	1.2	L.02	L.01	24	5.9	84	L.01	L.05	.08	L.3	0.43	L0.001
5 - 0 m	L.01	.10	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3	L0.20	L0.001
3 m	L.01	.13	L.02	L.01	25	6.1	88	L.01	L.05	L.03	L.3	L0.20	L0.001
6 - 0 m	L.01	.09	L.02	L.01	25	6.3	88	L.01	L.05	L.03	L.2	L0.20	L0.001
1.5 m	L.01	.10	L.02	L.01	25	6.2	88	L.01	L.05	L.03	L.3	L0.20	L0.001
7 - 0 m	L.01	.07	L.02	L.01	25	5.9	87	L.01	L.05	L.03	L.3	L0.20	L0.001
3 m	L.01	.10	L.02	L.01	24	6.0	85	L.01	L.05	L.03	L.3	L0.20	L0.001
8 - 0 m	L.01	.08	L.02	L.01	25	5.9	87	L.01	L.05	L.03	L.3	L0.20	L0.001
4.5 m	L.01	.12	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3	L0.20	L0.001

APPENDIX I (c) RESULTS FROM TESLIN LAKE (12/07/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L.01	L.03	L.02	L.01	24	5.4	82	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	23	5.6	80	L.01	L.05	L.03	L.3
20 m	L.01	.05	L.02	L.01	14	3.8	51	L.01	L.05	L.03	L.3
2 - 0 m	L.01	L.03	L.02	L.01	23	5.6	80	L.01	L.05	L.03	L.3
4 m	L.01	.03	L.02	L.01	23	5.6	80	L.01	L.05	L.03	L.3
20 m	L.01	L.03	L.02	L.01	15	3.8	53	L.01	L.05	L.03	L.3
3 - 0 m	L.01	.03	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3
2 m	L.01	.04	L.02	L.01	25	5.7	86	L.01	L.05	L.03	L.3
6 m	L.01	L.03	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3
4 - 0 m	L.01	.05	L.02	L.01	23	5.5	80	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	23	5.5	80	L.01	L.05	L.03	L.3
6 m	L.01	.12	L.02	L.01	24	6.0	85	L.01	L.05	L.03	L.3
5 - 0 m	L.01	.05	L.02	L.01	25	6.0	87	L.01	L.05	L.03	L.3
3 m	L.01	.05	L.02	L.01	25	6.1	88	L.01	L.05	L.03	L.3
6 - 0 m	L.01	.05	L.02	L.01	24	6.1	85	L.01	L.05	L.03	L.3
1.5 m	L.01	L.03	L.02	L.01	24	5.9	84	L.01	L.05	L.03	L.3
7 - 0 m	L.01	.05	L.02	L.01	24	5.8	84	L.01	L.05	L.03	L.3
3 m	L.01	.09	L.02	L.01	25	6.1	88	L.01	L.05	L.03	L.3
8 - 0 m	L.01	.04	L.02	L.01	24	5.9	84	L.01	L.05	L.03	L.3
4.5 m	L.01	.04	L.02	L.01	23	5.6	80	L.01	L.05	L.03	L.3

APPENDIX I (c-1) RESULTS FROM TESLIN LAKE (07/09/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos /cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/ 100 ml
1 - 0 m	12.0	9.3	94	7.9	7.3	51	L0.010	L0.005	L0.010	0.011	L0.50	4.0	12.0	78	1.1	1
4 m	12.0	9.3	94	7.9	7.3	50	L0.010	L0.005	L0.010	0.013	L0.50	3.0	12.0	76		1
20 m	13.0	9.3	95	7.9	7.3	50	L0.010	L0.005	L0.010	0.012	0.50	3.0	12.0	79		3
2 - 0 m	11.5	9.4	95	7.8	7.3	51	L0.010	L0.005	L0.010	0.012	L0.50	3.0	12.0	78	1.1	0
4 m	12.5	9.3	95	7.9	7.1	51	L0.010	L0.005	L0.010	0.014	L0.50	3.0	12.0	75		0
20 m	12.5	9.4	96	7.9	7.4	50	L0.010	L0.005	L0.010	0.013	L0.50	3.0	12.0	75		1
3 - 0 m	12.0	9.3	94	8.1	7.6	76	L0.010	L0.005	L0.010	L0.005	L0.50	3.0	17.0	110	1.1	0
2 m	12.0	9.3	94	8.0	7.6	74	L0.010	L0.005	L0.010	0.006	0.50	3.0	17.0	113		5
6 m	12.0	9.3	94	8.0	7.7	83	L0.010	L0.005	L0.010	0.008	1.6	3.0	19.0	121		2
4 - 0 m	12.5	9.4	96	7.9	7.2	51	L0.010	L0.005	L0.010	0.013	L0.50	4.0	12.0	80	1.2	0
2 m	12.5	9.4	96	7.9	7.5	52	L0.010	L0.005	L0.010	0.020	0.95	4.0	12.0	79		0
6 m	11.0	9.2	90	8.1	7.5	87	L0.010	L0.005	L0.010	0.012	2.8	5.0	19.0	125		2
5 - 0 m	11.0	9.3	91	8.2	7.6	92	L0.010	L0.005	L0.010	0.015	0.95	4.0	21.0	130	1.4	0
3 m	11.5	9.4	95	8.2	7.6	93	L0.010	L0.005	L0.010	0.012	0.80	3.0	22.0	128		0
6 - 0 m	11.5	9.5	96	8.2	7.7	93	L0.010	L0.005	L0.010	0.020	0.60	3.0	22.0	135	0.7	3
1.5 m	11.5	9.5	96	8.2	7.8	92	L0.010	L0.005	L0.010	0.009	0.70	2.0	22.0	132		1
7 - 0 m	11.0	9.3	91	8.2	7.7	93	L0.010	L0.005	L0.010	0.013	0.60	3.0	22.0	129	1.0	0
3 m	11.5	9.4	95	8.2	7.8	93	0.012	L0.005	L0.010	0.009	3.4	3.0	22.0	132		1
8 - 0 m	11.0	9.2	90	8.2	7.9	95	L0.010	L0.005	L0.010	0.013	1.6	3.0	22.0	131	1.0	1
4.5 m	11.5	9.5	96	8.2	7.8	95	L0.010	L0.005	L0.010	0.012	1.1	4.0	22.0	135		0

APPENDIX I (c-1) RESULTS FROM TESLIN LAKE (07/09/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L0.01	0.10	L0.02	L0.01	14	3.8	51	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
4 m	L0.01	0.07	L0.02	L0.01	14	3.7	50	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
20 m	L0.01	0.16	L0.02	L0.01	14	4.0	51	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 - 0 m	L0.01	0.04	L0.02	L0.01	15	3.8	53	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
4 m	L0.01	L0.03	L0.02	L0.01	14	4.0	51	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
20 m	L0.01	L0.03	L0.02	L0.01	14	3.6	50	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
3 - 0 m	L0.01	0.12	L0.02	L0.01	21	5.5	75	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 m	L0.01	0.11	L0.02	L0.01	22	5.7	78	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
6 m	L0.01	0.24	L0.02	L0.01	25	6.2	88	L0.01	L0.05	0.59	L0.3	L0.20	L0.001
4 - 0 m	L0.01	0.13	L0.02	L0.01	15	4.0	54	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 m	L0.01	0.03	L0.02	L0.01	15	3.9	54	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
6 m	L0.01	0.17	L0.02	L0.01	26	6.6	92	L0.01	L0.05	0.04	L0.3	L0.20	L0.001
5 - 0 m	L0.01	0.28	L0.02	L0.01	28	7.1	99	L0.01	L0.05	0.05	L0.3	L0.20	L0.001
3 m	L0.01	0.11	L0.02	L0.01	27	6.8	95	L0.01	L0.05	0.05	L0.3	L0.20	L0.001
6 - 0 m	L0.01	0.12	L0.02	L0.01	27	6.8	95	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
1.5 m	L0.01	0.14	L0.02	L0.01	27	7.1	97	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
7 - 0 m	L0.01	0.12	L0.02	L0.01	28	6.9	98	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
3 m	L0.01	0.20	L0.02	L0.01	27	7.1	97	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
8 - 0 m	L0.01	0.14	L0.02	L0.01	27	7.1	97	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
4.5 m	L0.01	0.16	L0.02	L0.01	27	7.0	96	L0.01	L0.05	0.05	L0.3	L0.20	L0.001

APPENDIX I (c-1) RESULTS FROM TESLIN LAKE (07/09/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	L0.03	L0.02	L0.01	15	3.9	54	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	L0.03	L0.02	L0.01	26	6.6	92	L0.01	L0.05	L0.03	L0.3
20 m	L0.01	0.04	L0.02	L0.01	27	7.3	98	L0.01	L0.05	L0.03	L0.3
2 - 0 m	L0.01	0.05	L0.02	L0.01	28	7.0	99	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	0.04	L0.02	L0.01	27	7.0	96	L0.01	L0.05	L0.03	L0.3
20 m	L0.01	0.05	L0.02	L0.01	28	7.1	99	L0.01	L0.05	L0.03	L0.3
3 - 0 m	L0.01	0.09	L0.02	L0.01	28	6.9	98	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	0.06	L0.02	L0.01	27	6.9	96	L0.01	L0.05	L0.03	L0.3
6 m	L0.01	0.11	L0.02	L0.01	27	7.0	96	L0.01	L0.05	L0.03	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	28	6.9	98	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	0.10	L0.02	L0.01	14	3.8	51	L0.01	L0.05	L0.03	L0.3
6 m	L0.01	0.05	L0.02	L0.01	14	3.7	50	L0.01	L0.05	L0.03	L0.3
5 - 0 m	L0.01	0.04	L0.02	L0.01	14	4.0	51	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.04	L0.02	L0.01	15	3.8	52	L0.01	L0.05	L0.03	L0.3
6 - 0 m	L0.01	0.04	L0.02	L0.01	14	4.0	51	L0.01	L0.05	L0.03	L0.3
1.5 m	L0.01	0.10	L0.02	L0.01	14	3.6	50	L0.01	L0.05	L0.03	L0.3
7 - 0 m	L0.01	L0.03	L0.02	L0.01	21	5.5	75	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.09	L0.02	L0.01	22	5.7	78	L0.01	L0.05	L0.03	L0.3
8 - 0 m	L0.01	0.04	L0.02	L0.01	25	6.2	88	L0.01	L0.05	0.59	L0.3
4.5 m	L0.01	0.03	L0.02	L0.01	15	4.0	54	L0.01	L0.05	L0.03	L0.3

APPENDIX I (d) RESULTS FROM MARSH LAKE (08/08/77)
(i) Chemical Analyses

Station No.	Temp-era-ture (°C)	DO (mg/l)	% Sat-ura-tion	pH (lab)	pH (in situ)	Total Alka-lin-ity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Tur-bid-ity (FTU)	TOC (mg/l)	TIC (mg/l)	Con-duc-tiv-ity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	16.0	-	-	-	7.95	-	-	-	-	-	-	-	-	75	0.5	3
4 m	16.0	8.5	92	7.8	8.05	28	0.019	L0.005	L0.010	L0.005	3.0	1.0	9.0	69		1
7 m	16.0	8.5	92	-	8.05	-	-	-	-	-	-	-	-	70		3
2 - 0 m	16.5	8.8	99	7.8	8.06	30	L0.01	L0.005	L0.010	L0.005	2.3	1.0	9.0	80	1.1	3
2 m	16.5	-	-	7.9	8.06	37	0.022	L0.005	L0.010	0.018	4.2	3.0	10.0	80		3
3 - 0 m	17.0	8.6	97	-	8.01	-	-	-						70	3.6	12
2 m	17.0	8.7	98	8.1	8.08	15	L0.010	L0.005	L0.010	L0.005	1.2	1.0	3.0	70		7
4 - 0 m	17.0	-	-	-	8.10	-	-	-	-	-	-	-	-	70	0.5	0
2 m	17.0	8.8	99	-	8.20	-	-	-	-	-	-	-	-	70		0
5 - 0 m	17.0	8.8	99	-	-	-	-	-	-	-	-	-	-	70	L0.3	0
3 m	17.0	8.6	97	-	-	-	-	-	-	-	-	-	-	70		1
6 - 0 m	17.0	8.6	97	-	-	-	-	-	-	-	-	-	-	70	L0.3	1
3 m	17.0	8.3	93	8.1	-	25	L0.010	L0.005	L0.010	L0.005	2.0	4.0	7.0	70		0
7 - 0 m	17.0	8.8	99	-	-	-	-	-	-	-	-	-	-	69	0.3	2
3 m	17.0	8.7	98	-	-	-	-	-	-	-	-	-	-	69		7

APPENDIX I (d) RESULTS FROM MARSH LAKE (08/08/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L0.01	0.11	L0.02	L0.01	13	2.4	42	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
4 m	L0.01	-	-	-	-	-	-	-	-	-	-	L0.20	L0.001
7 m	L0.01	0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 - 0 m	L0.01	0.16	L0.02	L0.01	15	2.4	47	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 m	L0.01	0.33	L0.02	L0.01	14	2.7	46	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 m	L0.01	0.05	L0.02	L0.01	13	2.3	42	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
4 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.3	42	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
2 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
3 m	L0.01	0.04	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3	L0.20	L0.001
6 - 0 m	L0.01	0.06	L0.02	L0.01	13	2.4	42	-	L0.05	L0.03	L0.3	L0.20	L0.001
3 m	L0.01	0.06	L0.02	L0.01	12	2.2	39	-	L0.05	L0.03	L0.3	L0.20	L0.001
7 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	-	L0.05	L0.03	L0.3	L0.20	L0.001
3 m	L0.01	0.07	L0.02	L0.01	12	2.1	39	-	L0.05	L0.03	L0.3	L0.20	L0.001

APPENDIX I (d) RESULTS FROM MARSH LAKE (08/08/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	0.04	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
7 m	L0.01	0.06	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
2 - 0 m	L0.01	0.07	L0.02	L0.01	14	2.7	46	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	0.07	L0.02	L0.01	14	2.4	45	L0.01	L0.05	L0.03	L0.3
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	1.9	38	L0.01	L0.05	L0.03	L0.3
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.5	40	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.03	L0.02	L0.01	12	2.3	39	L0.01	L0.05	L0.03	L0.3
6 - 0 m	L0.01	0.07	L0.02	L0.01	13	2.3	42	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	L0.03	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
7 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.04	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3

APPENDIX I (d-1) RESULTS FROM MARSH LAKE (13/09/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO (mg/l)	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	12.5	9.2	94	8.0	7.7	48.0	0.015	L0.005	L0.010	L0.005	1.3	1.0	11.0	122	0.70	9
4 m	12.5	9.3	95	8.0	7.9	47.0	L0.010	L0.005	L0.010	L0.005	1.0	1.0	11.0	125		2
7 m	12.5	9.3	95	8.0	7.9	47.0	L0.010	L0.005	L0.010	L0.005	1.0	L1.0	11.0	123		4
2 - 0 m	13.0	9.4	96	7.9	7.6	47.0	0.020	L0.005	L0.010	0.005	0.6	L1.0	11.0	70	1.3	3
2 m	13.0	9.4	96	8.0	7.6	46.0	0.043	L0.005	L0.010	L0.005	12	L1.0	11.0	70		1
3 - 0 m	13.0	9.2	94	7.6	7.6	39.0	0.039	L0.005	L0.010	L0.005	1.2	L1.0	9.0	60	6.8	25
2 m	13.0	9.5	97	7.9	7.4	39.0	L0.010	L0.005	L0.010	L0.005	L0.5	1.0	9.0	60		17
4 - 0 m	13.0	9.4	96	7.8	7.6	38.0	0.017	L0.005	L0.010	L0.005	L0.5	L1.0	9.0	61	0.24	2
2 m	13.0	9.2	94	7.8	7.5	37.0	L0.010	L0.005	L0.010	L0.005	L0.5	1.0	8.0	62		0
5 - 0 m	13.0	9.2	94	7.8	7.3	38.0	L0.010	L0.005	L0.010	0.006	L0.5	1.0	8.0	61	0.12	0
3 m	13.0	9.1	93	7.8	7.5	37.0	L0.010	L0.005	L0.010	0.006	L0.5	L1.0	9.0	62		0
6 - 0 m	13.0	9.1	93	7.8	7.6	37.0	L0.010	L0.005	0.082	0.014	L0.5	L1.0	9.0	62	0.16	0
3 m	13.0	9.0	92	7.8	7.6	37.0	L0.010	L0.005	L0.010	L0.005	L0.5	L1.0	9.0	62		0
7 - 0 m	13.0	9.2	94	7.9	7.8	37.0	L0.010	L0.005	L0.010	L0.005	L0.5	L1.0	9.0	62	0.97	0
3 m	13.0	9.2	94	7.8	7.9	37.0	0.013	L0.005	L0.010	L0.005	2.3	L1.0	9.0	64		7

APPENDIX I (d-1) RESULTS FROM MARSH LAKE (13/09/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10^{-3}	As
1 - 0 m	L0.01	0.10	L0.02	L0.01	16	3.0	52	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
4 m	L0.01	0.10	L0.02	L0.01	15	3.0	50	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
7 m	L0.01	0.07	L0.02	L0.01	15	2.7	49	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
2 - 0 m	L0.01	0.07	L0.02	L0.01	14	2.7	46	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
2 m	L0.01	0.37	L0.02	L0.01	15	2.6	48	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
3 - 0 m	L0.01	0.04	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
2 m	L0.01	L0.03	L0.02	L0.01	14	2.1	44	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
4 - 0 m	L0.01	0.03	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
2 m	L0.01	0.04	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
5 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
3 m	L0.01	L0.03	L0.02	L0.01	13	2.1	41	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
6 - 0 m	L0.01	0.09	L0.02	L0.01	13	2.1	41	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
3 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
7 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.1	41	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001
3 m	L0.01	0.10	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.03	L0.2	L0.001

APPENDIX I (d-1) RESULTS FROM MARSH LAKE (13/09/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	0.07	L0.02	L0.01	A	3.0	A	L0.01	L0.05	L0.03	L0.03
4 m	L0.01	0.03	L0.02	L0.01	N	2.9	N	L0.01	L0.05	L0.03	L0.03
7 m	L0.01	0.53	L0.02	L0.01	A	2.8	A	L0.01	L0.05	L0.03	L0.03
					L		L				
2 - 0 m	L0.01	0.03	L0.02	L0.01	Y	2.7	Y	L0.01	L0.05	L0.03	L0.03
2 m	L0.01	0.13	L0.02	L0.01	S	2.7	S	L0.01	L0.05	L0.03	L0.03
					I		I				
3 - 0 m	L0.01	0.08	L0.02	L0.01	S	2.2	S	L0.01	L0.05	L0.03	L0.03
2 m	L0.01	L0.03	L0.02	L0.01		2.2		L0.01	L0.05	L0.03	L0.03
					N		N				
4 - 0 m	L0.01	0.04	L0.02	L0.01	O	2.3	O	L0.01	L0.05	L0.03	L0.03
2 m	L0.01	L0.03	L0.02	L0.01	T	2.0	T	L0.01	L0.05	L0.03	L0.03
5 - 0 m	L0.01	0.06	L0.02	L0.01	P	2.3	P	L0.01	L0.05	L0.03	L0.03
3 m	L0.01	L0.03	L0.02	L0.01	E	2.1	E	L0.01	L0.05	L0.03	L0.03
					R		R				
6 - 0 m	L0.01	L0.03	L0.02	L0.01	F	2.1	F	L0.01	L0.05	L0.03	L0.03
3 m	L0.01	L0.03	L0.02	L0.01	O	2.1	O	L0.01	L0.05	L0.03	L0.03
					R		R				
7 - 0 m	L0.01	0.07	L0.02	L0.01	M	2.2	M	L0.01	L0.05	L0.03	L0.03
3 m	L0.01	L0.03	L0.02	L0.01	E	2.1	E	L0.01	L0.05	L0.03	L0.03
					D		D				

APPENDIX I (e) RESULTS FROM LAKE LABERGE (05/07/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO (mg/l)	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	11.0	10.1	99	8.13	8.13	51	L.01	L.005	L.01	.009	1.7	3.0	13.0	85	0.91	0
2 m	10.6	10.31	100	7.86	7.86	53	L.01	L.005	L.01	.055	1.5	3.0	13.0	85		295
2 - 0 m	11.0	10.31	100	8.20	8.20	44	L.01	L.005	L.01	L.005	1.5	2.0	12.0	70	1.4	0
2 m	11.0	10.3	100	8.15	8.15	44	L.01	L.005	L.01	.005	1.9	2.0	12.0	70		4
8 m	10.0	10.4	100	8.10	8.10	43	L.01	L.005	L.01	.005	2.0	1.0	12.0	68		1
3 - 0 m	10.0	10.2	98	8.30	8.30	43	L.01	L.005	L.01	.005	1.2	L1.0	12.0	67	0.69	0
2 m	10.0	10.2	98	8.31	8.31	43	L.01	L.005	L.01	L.005	1.7	1.0	12.0	69		9
14 m	5.0	11.0	93	8.00	8.00	44	L.01	L.005	L.01	L.005	1.5	1.0	12.0	60		5
4 - 0 m	10.0	10.1	97	8.39	8.39	44	L.01	L.005	L.01	L.005	2.2	1.0	12.0	68	1.1	0
2 m	10.4	10.1	97	8.35	8.35	43	L.01	L.005	L.01	L.005	2.0	2.0	11.0	71		1
11 m	6.9	10.41	93	8.29	8.29	44	L.01	L.005	.012	.005	2.0	2.0	12.0	65		0
5	NO SAMPLE															
6 - 0 m	12.3	10.0	100	8.28	8.28	44	L.01	L.005	L.01	L.005	1.3	2.0	11.0	73	2.4	0
3 m	9.1	10.7	100	8.35	8.35	43	L.01	L.005	L.01	.005	1.5	2.0	11.0	69		1
7 - 0 m	11.8	10.2	97	8.31	8.31	44	L.01	L.005	L.01	L.005	1.2	2.0	11.0	71	2.5	0
4 m	9.0	10.3	96	8.25	8.25	43	L.01	L.005	L.01	L.005	1.6	2.0	11.0	67		6
8 - 0 m	11.2	10.1	99	8.11	8.11	44	L.01	L.005	L.01	L.005	1.2	2.0	11.0	70	0.53	0
4 m	5.1	11.1	94	8.20	8.20	43	L.01	L.005	.022	.006	0.9	2.0	11.0	64		2

APPENDIX I (e) RESULTS FROM LAKE LABERGE (05/07/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L.01	.12	L.02	.01	14	4.5	53	L.01	L.05	L.03	L.3
2 m	-	-	-	-	-	-	-	-	-	-	-
2 - 0 m	L.01	.05	L.02	L.01	14	3.1	48	L.01	L.05	L.03	L.3
2 m	L.01	.11	L.02	.02	14	2.9	47	L.01	L.05	L.03	L.3
8 m	L.01	.06	L.02	L.01	11	2.8	39	L.01	L.05	L.03	L.3
3 - 0 m	L.01	.05	L.02	L.01	13	2.8	44	L.01	L.05	L.03	L.3
2 m	L.01	.04	L.02	L.01	14	2.8	46	L.01	L.05	L.03	L.3
14 m	L.01	.04	L.02	L.01	14	2.8	46	L.01	L.05	L.03	L.3
4 - 0 m	L.01	.07	L.02	L.01	14	2.7	46	L.01	L.05	L.03	L.3
2 m	L.01	.12	L.02	L.01	14	2.9	47	L.01	L.05	L.03	L.3
11 m	L.01	.09	L.02	L.01	16	3.0	52	L.01	L.05	L.03	L.3
5	NO SAMPLE										
6 - 0 m	L.01	.03	L.02	L.01	14	2.8	46	L.01	L.05	L.03	L.3
3 m	L.01	.07	L.02	L.01	14	2.9	47	L.01	L.05	L.03	L.3
7 - 0 m	L.01	.07	L.02	L.01	14	2.8	46	L.01	L.05	L.03	L.3
4 m	L.01	.06	L.02	L.01	14	2.7	46	L.01	L.05	L.03	L.3
8 - 0 m	L.01	L.03	L.02	L.01	11	2.9	39	L.01	L.05	L.03	L.3
4 m	L.01	.03	L.02	L.01	13	2.5	43	L.01	L.05	L.03	L.3

APPENDIX I (e) RESULTS FROM LAKE LABERGE (05/07/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10^{-3}	As
1 - 0 m	L.01	.06	L.02	L.01	16	4.4	58	L.01	L.05	L.03	L.3	L.20	0.002
2 m	L.01	.03	L.02	.01	16	4.5	58	L.01	L.05	L.03	L.3	-	0.001
2 - 0 m	L.01	.04	L.02	L.01	14	3.0	47	L.01	L.05	L.03	L.3	L.20	0.001
2 m	L.01	.05	L.02	.01	15	2.9	49	L.01	L.05	L.03	L.3	L.20	L0.001
8 m	L.01	.04	L.02	L.01	14	2.6	46	L.01	L.05	L.03	L.3	.20	L0.001
3 - 0 m	L.01	L.03	L.02	L.01	14	2.6	46	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	L.03	L.02	L.01	15	2.7	49	1.01	1.05	L.03	L.3	L.20	L0.001
14 m	L.01	.05	L.02	L.01	14	2.7	46	L.01	L.05	L.03	L.3	L.20	L0.001
4 - 0 m	L.01	.06	L.02	L.01	14	3.0	47	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	.04	L.02	L.01	15	3.0	50	L.01	L.05	L.03	L.3	L.20	L0.001
11 m	L.01	.05	L.02	L.01	13	2.6	43	L.01	L.05	L.03	L.3	L.20	L0.001
5	----------	----------	----------	----------	----------	N O	S A M	P L	E ----------	----------	----------	----------	----------
6 - 0 m	L.01	L.03	L.02	L.01	14	2.8	46	L.01	L.05	L.03	L.3	L.20	0.001
3 m	L.01	L.03	L.02	L.01	15	2.8	49	L.01	L.05	L.03	L.3	L.20	L0.001
7 - 0 m	L.01	L.03	L.02	L.01	16	3.4	54	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	.04	L.02	L.01	14	2.6	46	L.01	L.05	L.03	L.3	L.20	L0.001
8 - 0 m	L.01	L.03	L.02	L.01	15	2.6	48	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	L.03	L.02	L.01	15	2.9	49	L.01	L.05	L.03	L.3	L.20	L0.001

APPENDIX I (e-1) RESULTS FROM LAKE LABERGE (29/08/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO mg/l	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	14.5	9.2	98	8.0	7.9	40	L0.010	L0.005	L0.010	L0.005	1.3	1.0	11.0	70	-	1
2 m	14.5	9.1	97	8.1	8.2	53	L0.010	L0.005	L0.010	L0.005	1.7	1.0	15.0	100		10
2 - 0 m	15.0	9.1	97	8.0	7.8	39	L0.010	L0.005	L0.010	L0.005	1.3	1.0	11.0	68	-	0
2 m	15.0	9.0	96	8.0	7.8	38	L0.010	L0.005	L0.010	L0.005	1.0	1.0	11.0	68		2
8 m	14.8	9.3	99	8.0	7.9	39	L0.010	L0.005	L0.010	L0.005	3.3	1.0	11.0	65		0
3 - 0 m	15.2	8.9	95	8.0	7.6	37	L0.010	L0.005	L0.010	L0.005	1.5	2.0	11.0	68	-	0
2 m	15.5	8.9	97	7.9	7.7	38	L0.010	L0.005	L0.010	L0.005	1.3	1.0	10.0	69		0
14 m	15.0	9.0	96	7.9	7.7	39	0.028	L0.005	L0.010	L0.005	1.7	2.0	11.0	65		2
4 - 0 m	15.2	8.7	93	7.9	7.7	38	L0.010	L0.005	L0.010	L0.005	1.3	1.0	11.0	65	-	1
2 m	15.2	9.0	96	8.0	7.9	39	L0.010	L0.005	L0.010	L0.005	1.3	1.0	11.0	68		0
11 m	15.0	9.0	96	7.9	7.8	39	0.015	L0.005	L0.010	L0.005	7.5	2.0	10.0	68		0
5	NO SAMPLE															
6 - 0 m	14.5	9.0	96	7.9	7.9	39	L0.010	L0.005	L0.010	L0.005	1.5	4.0	10.0	68	-	0
3 m	14.2	8.9	93	7.9	7.8	38	L0.010	L0.005	L0.010	L0.005	5.0	3.0	10.0	67		3
7 - 0 m	15.0	9.0	96	7.9	7.8	39	L0.010	L0.005	L0.010	L0.005	1.3	2.0	10.0	65	-	0
4 m	14.5	9.0	96	7.9	7.9	39	L0.010	L0.005	L0.010	L0.005	2.5	2.0	10.0	65		0
8 - 0 m	15.0	8.8	94	7.9	7.7	37	L0.010	L0.005	L0.010	L0.005	2.0	2.0	10.0	61	-	1
4 m	15.0	8.9	95	8.0	7.7	37	L0.010	L0.005	L0.010	L0.005	2.3	3.0	10.0	68		2

APPENDIX I (e-1) RESULTS FROM LAKE LABERGE (29/08/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10^{-3}	As
1 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.5	43	L0.01	L0.05	L0.03	L0.3	L0.20	-
2 m	L0.01	0.11	L0.02	L0.01	18	4.5	64	L0.01	L0.05	L0.03	L0.3	L0.20	-
2 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
2 m	L0.01	L0.03	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3	L0.20	-
8 m	L0.01	0.07	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3	L0.20	-
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
2 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
14 m	L0.01	0.13	L0.02	L0.01	13	2.2	42	L0.01	L0.05	0.03	L0.3	L0.20	-
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
2 m	L0.01	0.05	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
11 m	L0.01	0.08	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3	L0.20	-
5	----------	----------	----------	----------	----------	---------- N O	S A M	P L E ----------	----------	----------	----------	----------	----------
6 - 0 m	L0.01	0.04	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
3 m	L0.01	0.67	L0.02	L0.01	12	2.4	40	L0.01	L0.05	0.04	L0.3	L0.20	-
7 - 0 m	L0.01	0.07	L0.02	L0.01	12	2.1	39	L0.01	L0.05	0.04	L0.3	L0.20	-
4 m	L0.01	0.06	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-
8 - 0 m	L0.01	0.08	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3	L0.20	-
4 m	L0.01	0.07	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3	L0.20	-

APPENDIX I (e-1) RESULTS FROM LAKE LABERGE (29/08/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.3	42	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	19	4.9	68	L0.01	L0.05	L0.03	L0.3
2 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.1	41	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
8 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
3 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	2.0	38	L0.01	L0.05	L0.03	L0.3
14 m	L0.01	0.06	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
4 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
2 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
11 m	L0.01	L0.03	L0.02	L0.01	13	2.1	41	L0.01	L0.05	L0.03	L0.3
5	----------	----------	----------	----------	---------- N O	S A M	P L E ----------	----------	----------	----------	----------
6 - 0 m	L0.01	L0.03	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
3 m	L0.01	0.20	L0.02	L0.01	13	2.2	42	L0.01	L0.05	L0.03	L0.3
7 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.2	39	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	0.04	L0.02	L0.01	12	2.3	39	L0.01	L0.05	L0.03	L0.3
8 - 0 m	L0.01	L0.03	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3
4 m	L0.01	0.04	L0.02	L0.01	12	2.1	39	L0.01	L0.05	L0.03	L0.3

APPENDIX I (f) RESULTS FROM BURWASH LANDING (07/07/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO (mg/l)	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPUV%) (mg/kg)	TC/100 ml
1 - 0 m	12.9	9.8	100	8.10	8.10	82	L.01	L.05	L.01	.005	.85	1.0	21.0	178	L0.3	0
2 - 0 m	11.9	9.4	95	7.90	7.90	81	L.01	L.05	L.01	L.005	.81	1.0	21.0	172		0
2 m	11.8	9.4	95	7.52	7.52	80	L.01	L.05	L.01	L.005	1.10	1.0	21.0	174		0
3 - 0 m	11.0	9.8	96	8.22	8.22	78	L.01	L.05	L.01	L.005	.68	L1.0	21.0	165	1.0	1
3 m	11.3	9.7	94	8.22	8.22	77	L.01	L.05	L.01	L.005	.95	1.0	21.0	170		10
4 - 0 m	12.0	9.6	97	8.30	8.30	79	L.01	L.05	L.01	L.005	.81	L1.0	21.0	166	L0.3	0
2 m	11.9	9.4	95	8.30	8.30	68	L.01	L.05	L.01	L.005	.86	1.0	18.0	175		0
5 m	11.5	9.5	96	7.91	7.91	60	L.01	L.05	L.01	L.005	1.10	1.0	16.0	169		0
5 - 0 m	12.0	9.4	95	8.24	8.24	78	L.01	L.05	L.01	L.005	.57	1.0	20.0	171	L0.3	0
2 m	11.7	9.4	95	7.98	7.98	80	L.01	L.05	L.01	L.005	.70	L1.0	21.0	173		0
4 m	11.0	9.4	92	8.15	8.15	78	L.01	L.05	L.01	L.005	.64	1.0	20.0	172		0
6 - 0 m	12.0	9.3	94	8.22	8.22	77	L.01	L.05	L.01	L.005	L.50	L1.0	20.0	170	1.0	0
2 m	11.5	9.3	94	8.30	8.30	77	L.01	L.05	L.01	L.005	L.50	L1.0	20.0	171		3
7.5 m	10.6	9.6	94	8.00	8.00	73	L.01	L.05	L.01	L.005	L.50	L1.0	19.0	165		0
7 - 0 m	13.2	10.3	95	8.25	8.25	78	L.01	L.05	L.01	L.005	L.50	1.0	19.0	178	L.03	0
2 m	12.0	9.4	95	8.25	8.25	76	L.01	L.05	L.01	L.005	L.50	1.0	19.0	178		0
4 m	11.8	9.6	97	8.25	8.25	77	L.01	L.05	L.01	L.005	L.50	1.0	19.0	182		0
8 - 0 m	13.0	9.4	96	8.15	8.15	77	L.01	L.05	L.01	L.005	L.50	1.0	19.0	175	-	0
2 m	12.0	9.6	97	8.27	8.27	76	L.01	L.05	L.01	L.005	L.50	1.0	19.0	171		0
6 m	11.4	9.6	94	8.28	8.28	77	L.01	L.05	L.01	L.005	L.50	L1.0	19.0	175		0

APPENDIX I (f) RESULTS FROM BURWASH LANDING (07/07/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L.01	.07	L.02	L.01	33	8.3	120	L.01	L.05	L.03	L.3	L.20	L0.001
2 - 0 m	L.01	.07	L.02	L.01	31	8.4	110	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	.04	L.02	L.01	30	8.3	110	L.01	L.05	L.03	L.3	L.20	L0.001
3 - 0 m	L.01	.05	L.02	L.01	30	7.8	110	L.01	L.05	L.03	L.3	L.20	L0.001
3 m	L.01	.08	L.02	L.01	32	8.6	120	L.01	L.05	L.03	L.3	L.20	0.001
4 - 0 m	L.01	.03	L.02	L.01	29	8.2	110	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	.06	L.02	L.01	31	8.3	110	L.01	L.05	L.03	L.3	L.20	0.001
5 m	L.01	.06	L.02	L.01	30	8.2	110	L.01	L.05	L.03	L.3	L.20	0.002
5 - 0 m	L.01	.04	L.02	L.01	30	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	.04	L.02	L.01	31	7.5	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	L.03	L.02	L.01	30	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
6 - 0 m	L.01	L.03	L.02	L.01	29	7.9	100	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	L.03	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
7.5 m	L.01	L.03	L.02	L.01	29	7.9	100	L.01	L.05	L.03	L.3	L.20	L0.001
7 - 0 m	L.01	L.03	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3	L.20	0.001
2 m	L.01	L.03	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	L.03	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3	L.20	L0.001
8 - 0 m	L.01	L.03	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
2 m	L.01	.06	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3	L.20	0.001
6 m	L.01	L.03	L.02	L.01	31	7.7	110	L.01	L.05	L.03	L.3	L.20	L0.001

APPENDIX I (f) RESULTS FROM BURWASH LANDING (07/07/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L.01	.04	L.02	L.01	31	8.3	110	L.01	L.05	L.03	L.3
2 - 0 m	L.01	.04	L.02	L.01	31	8.4	110	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	31	7.9	110	L.01	L.05	L.03	L.3
3 - 0 m	L.01	.03	L.02	L.01	32	8.3	110	L.01	L.05	L.03	L.3
3 m	L.01	.04	L.02	L.01	30	8.6	110	L.01	L.05	L.03	L.3
4 - 0 m	L.01	.04	L.02	L.01	29	8.2	110	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	30	8.0	110	L.01	L.05	L.03	L.3
5 m	L.01	.03	L.02	L.01	30	8.5	110	L.01	L.05	L.03	L.3
5 - 0 m	L.01	.05	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3
2 m	L.01	.04	L.02	L.01	31	8.3	110	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	36	9.2	130	L.01	L.05	L.03	L.3
6 - 0 m	L.01	L.03	L.02	L.01	29	8.0	110	L.01	L.05	L.03	L.3
2 m	L.01	.03	L.02	L.01	31	7.8	110	L.01	L.05	L.03	L.3
7.5 m	L.01	L.03	L.02	L.01	31	7.9	110	L.01	L.05	L.03	L.3
7 - 0 m	L.01	L.03	L.02	L.01	30	7.7	110	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	30	7.8	110	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3
8 - 0 m	L.01	L.03	L.02	L.01	30	7.8	110	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	30	7.8	110	L.01	L.05	L.03	L.3
6 m	L.01	L.03	L.02	L.01	29	7.5	100	L.01	L.05	L.03	L.3

APPENDIX I (g) RESULTS FROM DESTRUCTION BAY (09/07/77)
(i) Chemical Analyses

Station No.	Temperature (°C)	DO (mg/l)	% Saturation	pH (lab)	pH (in situ)	Total Alkalinity (mg/l)	TPO_4 (mg/l)	NO_2 (mg/l)	NO_3 (mg/l)	NH_3 (mg/l)	Turbidity (FTU)	TOC (mg/l)	TIC (mg/l)	Conductivity (umhos/cm)	Sediment Organic Carbon Content (CPOV%) (mg/kg)	TC/100 ml
1 - 0 m	12.0	10.0	100+	8.10	8.10	75	L.01	L.005	L.01	L.005	L.50	1.0	19.0	154	0.5	1
2 m	12.0	10.4	100+	8.22	8.22	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	162		0
6 m	12.0	10.1	100+	8.23	8.23	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	165		0
2 - 0 m	12.0	10.0	100+	8.08	8.08	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	162	0.4	2
2 m	12.0	10.0	100+	8.20	8.20	76	L.01	L.005	L.01	L.005	L.50	1.0	19.0	162		0
4.5 m	12.2	10.0	100+	8.23	8.23	76	L.01	L.005	L.01	L.005	L.50	1.0	19.0	172		10
3 - 0 m	12.0	9.7	98	8.19	8.19	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	162	0.9	0
2.5 m	12.0	9.9	100	8.24	8.24	77	L.01	L.005	L.01	L.005	.55	1.0	19.0	165		0
4 - 0 m	12.0	9.9	100	8.28	8.28	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	156	0.7	3
4 m	11.5	10.1	100+	8.32	8.32	77	L.01	L.005	L.01	L.005	L.50	1.0	19.0	159		2
14 m	9.0	10.5	98	8.32	8.32	78	L.01	L.005	L.01	L.005	.85	1.0	19.0	161		2
5 - 0 m	12.0	9.9	100	8.24	8.24	77	L.01	L.005	L.01	L.005	.65	1.0	19.0	158	*	0
4 m	11.0	10.0	98	8.30	8.30	79	L.01	L.005	L.01	L.005	.61	1.0	19.0	158		2
20 m	8.0	10.7	100	8.30	8.30	79	L.01	L.005	L.01	L.005	.66	1.0	19.0	161		2
6 - 0 m	12.8	9.9	100+	8.25	8.25	68	L.01	L.005	L.01	L.005	1.20	1.0	16.0	150	1.1	0
4 m	10.5	10.1	99	8.32	8.32	67	L.01	L.005	L.01	L.005	1.80	1.0	18.0	155		0
20 m	8.5	10.4	97	8.31	8.31	63	L.01	L.005	L.01	L.005	.70	L1.0	18.0	160		1
7 - 0 m	12.0	9.8	99	8.30	8.30	79	L.01	L.005	L.01	L.005	1.50	1.0	19.0	160	1.1	0
4 m	10.0	10.3	99	8.36	8.36	79	L.01	L.005	L.01	L.005	.98	1.0	19.0	162		0
20 m	9.0	10.7	100	8.30	8.30	76	L.01	L.005	L.01	.010	.55	1.0	19.0	165		0
8 - 0 m	12.0	10.0	100+	8.33	8.33	76	L.01	L.005	L.01	L.005	L.50	L1.0	19.0	152	1.0	0
4 m	11.0	-	-	8.38	8.38	80	L.01	L.005	L.01	L.005	L.50	1.0	19.0	155		2
20 m	8.5	10.6	99	8.30	8.30	*	*	*	*	*	*	*	*	160		1

* Data missing.

APPENDIX I (g) RESULTS FROM DESTRUCTION BAY (09/07/77)
(ii) Extractable Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo	Hg x 10-3	As
1 - 0 m	L.01	.04	L.02	L.01	31	8.4	110	L.01	L.05	L.03	L.3	L.20	L0.001
2 m	L.01	L.03	L.02	L.01	29	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
6 m	L.01	.05	L.02	L.01	32	7.9	110	L.01	L.05	L.03	L.3	L.20	L0.001
2 - 0 m	L.01	L.03	L.02	L.01	29	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
2 m	L.01	L.03	L.02	L.01	30	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
4.5 m	L.01	L.03	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3	L.20	L0.001
3 - 0 m	L.01	L.03	L.02	L.01	30	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
2.5 m	L.01	.07	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 - 0 m	L.01	L.03	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	.04	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3	L.20	L0.001
14 m	L.01	.13	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3	L.20	L0.001
5 - 0 m	L.01	.03	L.02	L.01	32	7.7	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	L.03	L.02	L.01	30	7.7	110	L.01	L.05	L.03	L.3	L.20	0.002
20 m	L.01	.06	L.02	L.01	31	8.6	110	L.01	L.05	L.03	L.3	L.20	0.001
6 - 0 m	L.01	.04	L.02	L.01	30	7.5	110	L.01	L.05	L.03	L.3	L.20	0.001
4 m	L.01	L.03	L.02	L.01	31	8.0	110	L.01	L.05	L.03	L.3	L.20	L0.001
20 m	L.01	L.03	L.02	L.01	32	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
7 - 0 m	L.01	L.03	L.02	L.01	30	7.5	110	L.01	L.05	L.03	L.3	L.20	0.001
4 m	L.01	.05	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3	L.20	0.001
20 m	L.01	L.03	L.02	L.01	32	8.3	110	L.01	L.05	L.03	L.3	L.20	0.001
8 - 0 m	L.01	.18	L.02	L.01	30	7.7	110	L.01	L.05	L.03	L.3	L.20	L0.001
4 m	L.01	.03	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3	.95	0.001
20 m	L.01	L.03	L.02	L.01	32	8.3	110	L.01	L.05	L.03	L.3	L.20	*

* Data missing

APPENDIX I (g) RESULTS FROM DESTRUCTION BAY (09/07/77)
(iii) Dissolved Metals (mg/l)

Station No.	Cu	Fe	Pb	Zn	Ca	Mg	Hard-ness	Cd	Ni	Mn	Mo
1 - 0 m	L.01	.04	L.02	L.01	32	8.2	110	L.01	L.05	L.03	L.3
2 m	L.01	.04	L.02	L.01	30	8.1	110	L.01	L.05	L.03	L.3
6 m	L.01	L.03	L.02	L.01	29	7.8	100	L.01	L.05	L.03	L.3
2 - 0 m	L.01	.04	L.02	L.01	29	7.9	100	L.01	L.05	L.03	L.3
2 m	L.01	L.03	L.02	L.01	31	8.3	110	L.01	L.05	L.03	L.3
4.5 m	L.01	.05	L.02	L.01	32	8.3	110	L.01	L.05	L.03	L.3
3 - 0 m	L.01	L.03	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3
2.5 m	L.01	L.03	L.02	L.01	30	8.0	110	L.01	L.05	L.03	L.3
4 - 0 m	L.01	L.03	L.02	L.01	30	7.9	110	L.01	L.05	L.03	L.3
4 m	L.01	.03	L.02	L.01	32	8.2	110	L.01	L.05	L.03	L.3
14 m	L.01	.04	L.02	L.01	30	8.3	110	L.01	L.05	L.03	L.3
5 - 0 m	L.01	L.03	L.02	L.01	34	8.8	120	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	30	8.0	110	L.01	L.05	L.03	L.3
20 m	L.01	L.03	L.02	L.01	32	8.3	110	L.01	L.05	L.03	L.3
6 - 0 m	L.01	L.03	L.02	L.01	29	6.9	100	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	32	8.1	110	L.01	L.05	L.03	L.3
20 m	L.01	.06	L.02	L.01	32	8.4	110	L.01	L.05	L.03	L.3
7 - 0 m	L.01	L.03	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	31	8.1	110	L.01	L.05	L.03	L.3
20 m	L.01	L.03	L.02	L.01	33	8.3	120	L.01	L.05	L.03	L.3
8 - 0 m	L.01	L.03	L.02	L.01	32	8.0	110	L.01	L.05	L.03	L.3
4 m	L.01	L.03	L.02	L.01	30	7.7	110	L.01	L.05	L.03	L.3
20 m	L.01	.04	L.02	L.01	33	8.5	120	L.01	L.05	L.03	L.3