AUSTRALIAN NATIONAL ANTARCTIC RESEARCH EXPEDITIONS

ANARE RESEARCH NOTES 67

Temperature profiles of saline lakes of the Vestfold Hills

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and Harry R. Burton

ANTARCTIC DIVISION
DEPARTMENT OF THE ARTS, SPORT,
THE ENVIRONMENT, TOURISM AND TERRITORIES

ANARE RESEARCH NOTES (ISSN 0729-6533)

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Published May 1989
ISBN: 0 642 14594 6

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TEMPERATURE PROFILES OF SALINE LAKES OF THE VESTFOLD HILLS

by

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ABSTRACT

Temperature profiles for 16 saline lakes in the Vestfold Hills, obtained during the 1985-86 summer and the latter half of 1987, are presented in tabular and graphic form. These lakes can be grouped into two classes: those with maximum salinities (anywhere in the water column) greater than 100 g kg^{-1} (ppt) and those with less. The saltier group are usually shallower, tend to be warmer in summer, colder in winter and have thinner ice-cover.

Salinity gradients in the water column can completely dominate temperature gradients as determinants of density and thus warmer water is not infrequently found beneath colder water. Temperature, in this situation, can be a sensitive tracer of brine movements. Winter freeze-out of brines during the growth of surface ice can produce both a deepened well-mixed layer and discrete brine flows from the lake edge to intermediate depths of equivalent density near the lakes deepest point. The process is clearly shown in the profiles of Organic Lake.

1. INTRODUCTION

The Vestfold Hills region contains a large number of saline lakes. Studies of these lakes have centred on their biota and the adaptations required for survival in these diverse environments, and the physical processes (e.g. mixing) that occur in the lakes. A knowledge of the thermal structure is important in studying a lake's biota. Any permanent organisms in the lakes have to survive the harsh conditions of winter, when temperatures as low as -17.5°C may be recorded. The distribution of biota within the water column is influenced *inter alia* by the water temperature's fundamental control over metabolic rate. Previous studies in the Vestfold Hills have highlighted the seasonal changes in the biota (Bayly 1986, Bayly and Burton 1987, Franzmann et al. 1987, Burke and Burton 1988, Burch 1988), the survival and reproduction rate of Antarctic bacteria at low temperatures (McMeekin 1988) and the motility at low temperatures of unicellular algae (Burch and Marchant 1983). Study of the thermal properties has also led to a greater understanding of the mixing processes that occur in these lakes.

Temperature profile data were collected during the summer of 1985-86 summer and from August to December 1987. Some interpretation of the profiles is provided: discussion of both the biological and physical implications of the results will be published elsewhere.

2. METHODS

Profiles were recorded while the lakes had a cover of ice. Holes were drilled using a Jiffy ice Drill, and the zero level for each cast was taken as the water/air interface. All temperatures are reported in degrees centigrade.

Temperature and depth data for profiles obtained during the 1985-86 summer (except for Pendant Lake) were measured using a Yeo-Kal model 606 submersible data logger (SDL). Factory calibration of both sensors was relied upon. The thermistor was accurate to ±0.05°C. The pressure transducer was comparatively insensitive, resulting in an accuracy of circa ±0.1 m. The pressure transducer was calibrated in seawater and some overestimation of true depth occurred in lakes hypersaline relative to seawater and underestimation in hyposaline lakes. The maximum extent of this error is estimated to be circa +15% in the most saline lakes for which data are presented, and circa -2% for the least saline. The SDL was usually lowered in discrete intervals and held stationary for 15-20 seconds, providing three to four temperature and depth registrations for each depth; only one data point for each depth is given. Data presented here are from lowering casts only. The temperature profile of Pendant Lake was recorded using a Phox oxygen/ temperature meter model number 62 TE.

During 1987, a Platypus conductivity-temperature-depth recording unit (Platypus Engineering, Loyetea, Tasmania) was used for profiling. Factory calibration of temperature was relied upon and on that basis the data presented are accurate to ±0.05°C (with a precision of ±0.01°C). The unit, set to record every 5 seconds, was lowered in measured 10 cm intervals and held at each depth for 30 seconds.

3. RESULTS

Figure 1 shows the position of the sixteen lakes for which profiles are given. Physical parameters of the lakes are given in Table 1. Figure 2 is a bathymetric map of Organic Lake showing the

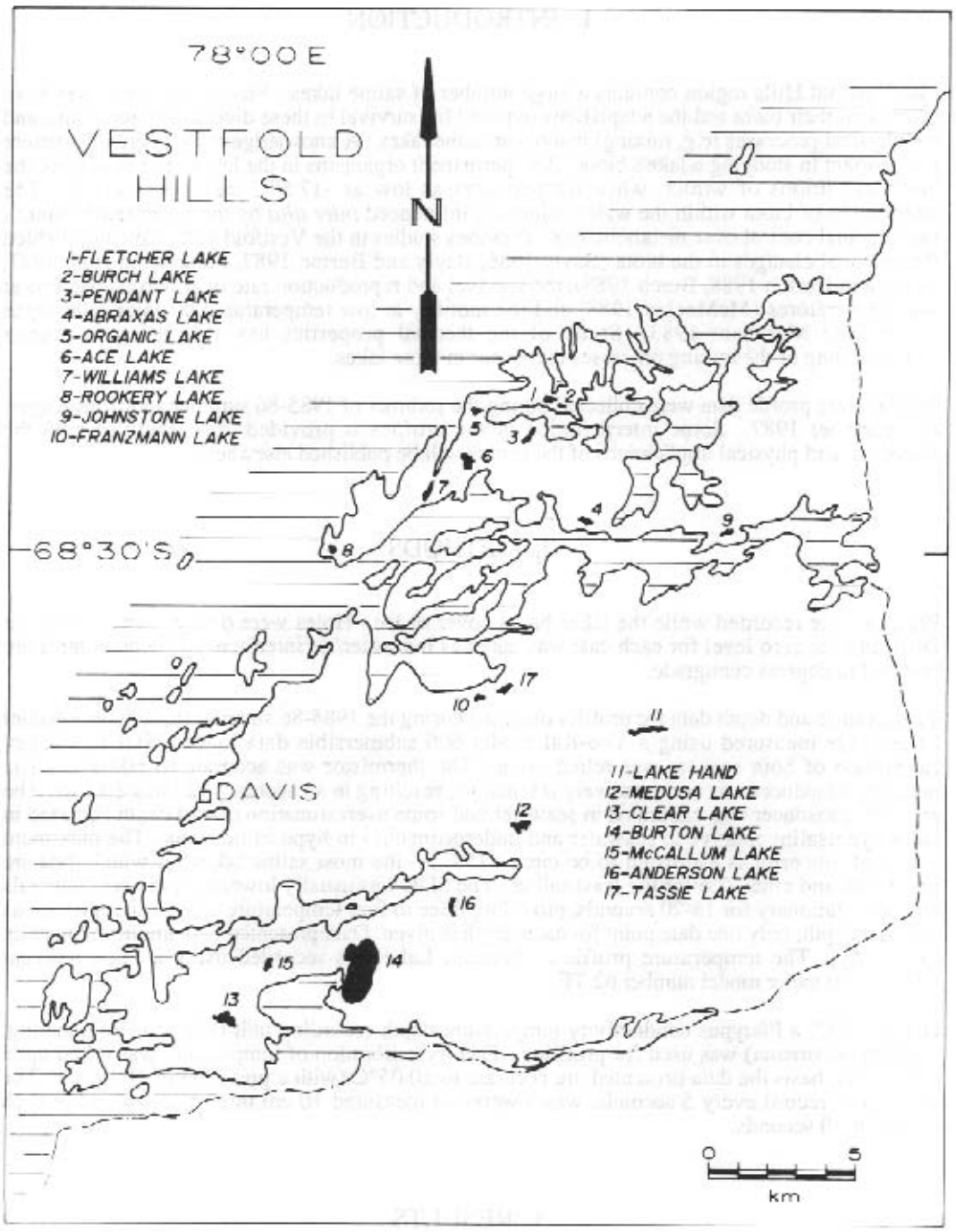


Figure 1. Map of the Vestfold Hills showing the 16 lakes for which profiles are given. The names 'Burch Lake','Franzmann Lake' and 'Johnstone Lake' are not approved by the Australian Antarctic Names and Medals Committee.

Table 1. Physical characteristics of the lakes

Lake	Max. Salinity ‰	Depth, metres	Oxic/Anoxic Boundary metres	Mixing Status
Abraxas	20	24	18	meromictic
Ace	40	23	11	meromictic
Anderson	150	21	4	meromictic
Burch	180	7	5	?meromictic
Burton	44	18	11	meromictic
Clear	14	52	30	meromictic
Fletcher	110	12	7	meromictic
Franzmann	15	4	*	uncertain
Hand	7	29	*	uncertain
Johnstone	200	12	8	meromictic
McCallum	24	32	19	meromictic
Organic	200	7	4	meromictic
Pendant	24	13	9	meromictic
Rookery	135	2	*	seasonally anoxic
Tassie	200	4	*	uncertain
Williams	160	7	5	meromictic

*Not applicable.

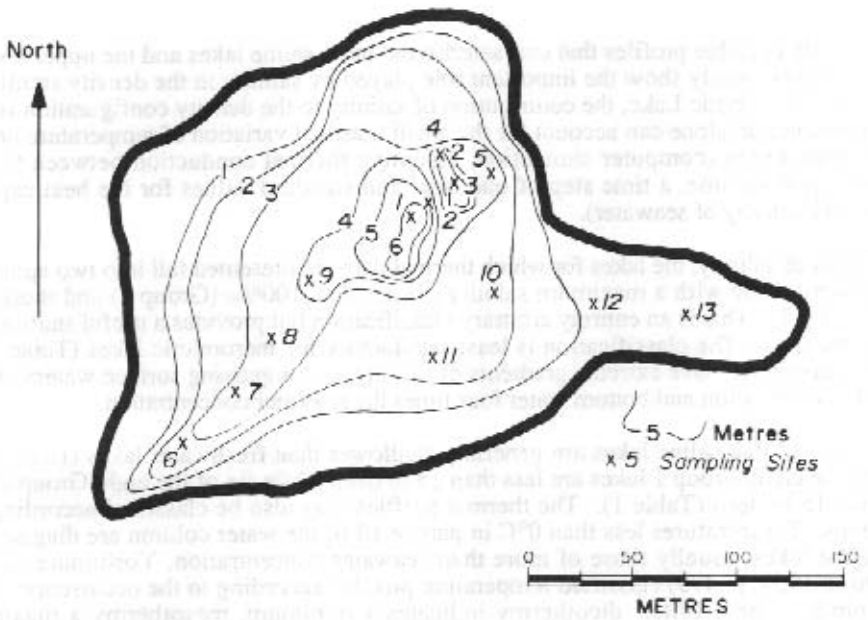


Figure 2. Profiling sites in Organic Lake, 1987

various sites at which temperature profiles were obtained during 1987. The map was drawn from data collected in 1978; the lake water level has risen approximately 1 m since that time and thus the bathymetric lines shown on the map will be inaccurate to at least that extent.

The profiles obtained are presented both in tabular and graphic form, arranged in the following order:

(i) Data collected during the 1985-86 summer in alphabetical order by lake.
(ii) Data collected during 1987 from lakes other than Organic Lake, in alphabetical order by lake.
(iii) Data collected from Organic Lake during 1987, presented in chronological order.

Thermal profiles usually extend to the lake bottom at the profile site: exceptions are Burton Lake (19 November 1987, Figure 19) which simply continues to warm below 9 m, and Lake Fletcher, which cools below the limit of data presented in Figure 21.

Temperatures that appear to be measured within the ice sheet are those of water entering the drill hole from below if the ice sheet is fully frozen and may reflect some lateral drainage when the ice begins to melt. The August profile for Tassie Lake (Figure 24) is a good example of the former case, while the 30 November profile for Burch Lake (Figure 18) shows, by its nonuniformity and temperatures well above those found immediately beneath the ice, that the ice sheet has begun to melt.

The position of the interface between oxic and anoxic water is indicated in the figures for the meromictic lakes.

4. DISCUSSION

The thermally unstable profiles that characterise the more saline lakes and the upper layers of the less saline lakes clearly show the important role played by salinity in the density stratification of these lakes. In Organic Lake, the contribution of salinity to the density configuration is such that thermal conduction alone can account for the small seasonal variation of temperature observed in the monimolimnion (computer simulation, assuming thermal conduction between 0.1 m thick layers of equal volume, a time step of one hour and standard values for the heat capacity and thermal conductivity of seawater).

On the basis of salinity, the lakes for which thermal data are presented fall into two approximately equal groups: those with a maximum salinity greater than 100‰ (Group 1) and those less than 50‰ (Group 2). This is an entirely arbitrary classification but provides a useful starting point for viewing the data. The classification is least satisfactory for meromictic lakes (Table 1, Burton 1981) because some have extreme gradients of salinity, encompassing surface waters of less than seawater concentration and bottom water four times the seawater concentration.

It is recognised that saline lakes are generally shallower than freshwater lakes (Hammer 1986). Seven of the eight Group 1 lakes are less than 15 m deep while six of the eight Group 2 lakes are more than 15 m deep (Table 1). The thermal profiles may also be classified according to these two groups. Temperatures less than 0°C in part or all of the water column are diagnostic of the more saline lakes, usually those of more than seawater concentration. Yoshimura (reported in Hutchinson 1957, p. 479) classified temperature profiles according to the occurrence of maxima and minima in the profile: dicothermy indicates a minimum, mesothermy a maximum and poikilothermy the coexistence of at least one maximum with at least one minimum. The more saline lakes tend to show dicothermal or poikilothermal profiles while the less saline group is

typified by mesothermy. Exceptions to this generalisation include Anderson Lake (Group 1, Figure 5) which has a mesothermal profile similar to that of Ace Lake (Group 2, Figure 4) and Lake Hand (Group 2, Figure 10), where a mildly poikilothermal profile results from exceptionally deep warming.

Thermal profiles are not fixed over time and the dicothermy in some of the Group 1 lakes will tend, in winter, towards inverse thermal stratification (e.g. Tassie and Burch Lakes) or mesothermy if a lower water maximum is present (e.g. Organic and Williams Lakes). A particularly important winter mixing process occurs in the more saline lakes beneath complete ice cover. Haline convection results from the exclusion of brine as surface ice is formed. This relatively dense brine drains from the ice and sinks into the underlying water column, causing mixing (Foster 1968). Consequently, a layer of well mixed water at close to its freezing temperature forms beneath the ice. This layer, or a remnant of it, is obvious in the November profiles of Burch and Fletcher Lakes (Figures 17, 18 and 21). In very shallow lakes, like Rookery and the Western Lobe of Burton Lake, this mixed layer extends to the sediment during winter and spring (Figures 20 and 23).

Another general observation is that the Group 2 lakes tend to be markedly warmer than those of Group 1, with mesothermal maxima commonly in the range +8°C to +12°C (e.g. Ace, McCallum, Abraxas, Clear and Hand Lakes). This difference has biological significance and indicates that increasing salinity may, by its attendant effects on thermal conditions, place more than simply osmotic stress upon the phyto- and bacterio-plankton of these lakes (Wright and Burton 1981, Ferris and Burton 1988). Seasonal change in thermal structure of Group 2 lakes is comparatively poorly known. The authors interpret the warm isothermal layers seen in Abraxas, Clear, Hand, McCallum and Pendant Lakes (Figures 3, 7, 10, 12 and 13) as remnants of a prior summer mixed layer, except that Burton and Hammond (1981) provide a winter profile for Abraxas Lake in which a 13 m isothermal layer of near freezing water (-0.9 C) underlies the ice cover. A detailed understanding of the thermal processes leading to these profiles has yet to be attained.

The development of ice is also affected by salinity and a step-down multiple linear regression of ice thickness (November - January profiles only) on time, depth and maximum salinity yields a significant relationship explaining 56.7% of the variation in ice thickness by its regression on maximum salinity and time.

Ice thickness (m) =	-0.141 Time	-0.003 Salinity + 1.936	(n = 19; r^2 = 0.567; P = 0.0012)
Standard Error	0.066	0.001	

Depth is rejected because it is significantly correlated with maximum salinity. Time, expressed as real number from 0.33 (10 November) to 2.58 (18 January), is found to be negatively related to ice thickness. This is reasonable given that the period of sampling covered a significant part of the annual melt. The intercept, 1.936 m for freshwater ice at 31 October, accords well with Heath's (1988) report of 1.9 m thick ice for Watts Lake which has a salinity of only 2-3‰. The comparatively large standard errors indicate that this regression is not particularly satisfactory for prediction of ice thickness; a regression using maximum surface salinity (i.e. in winter-spring) may provide a closer relationship.

During winter, a number of aberrant temperature profiles were recorded in Organic Lake (Figures 25, 28, 29 and 31). These profiles show significant lowering of temperature at some depths compared to other sites on the same day. This can be interpreted as resulting from the formation of particularly cold brines in the lake shallows which gravitate down the basin sides to a depth where their density equals that of the surrounding water and then flow across the lake. Evidence of such flows was found after periods of especially cold weather and we believe the flows result from the accumulation of brine, excluded from newly formed ice, in areas shallower than the mixed layer produced by haline convection. It is initially surprising that such seemingly unstable thermal configurations can exist, but it must always be borne in mind that temperature plays a

very slight role in determining the density of Organic Lake water; this fact makes temperature an especially successful indicator of these intruding flows.

Summer thermal profiles (November onwards) generally have a warm lens of water beneath the ice cover. This lens forms as solar heating melts the ice and produces a nearly freshwater layer, which cannot be much colder than 0 °C.

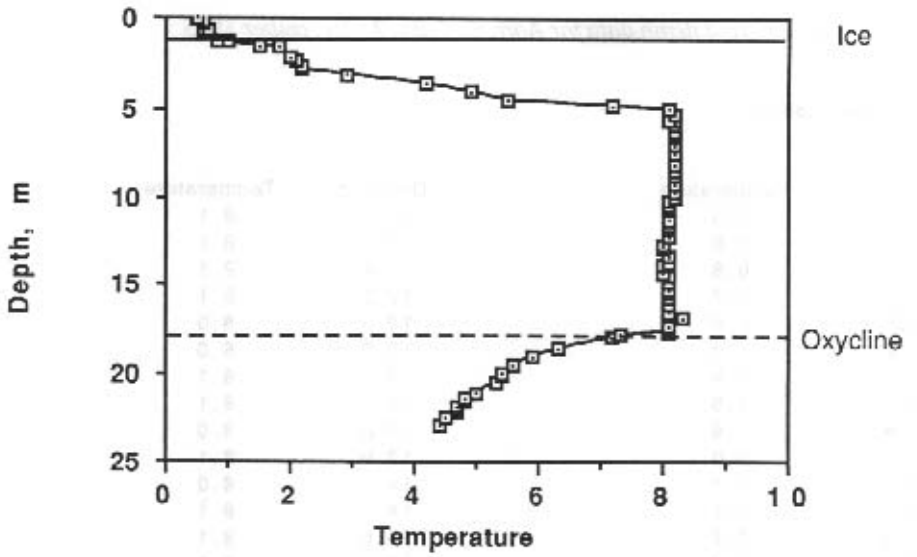


Figure 3. Thermal profile for Abraxas Lake, 21 December 1985

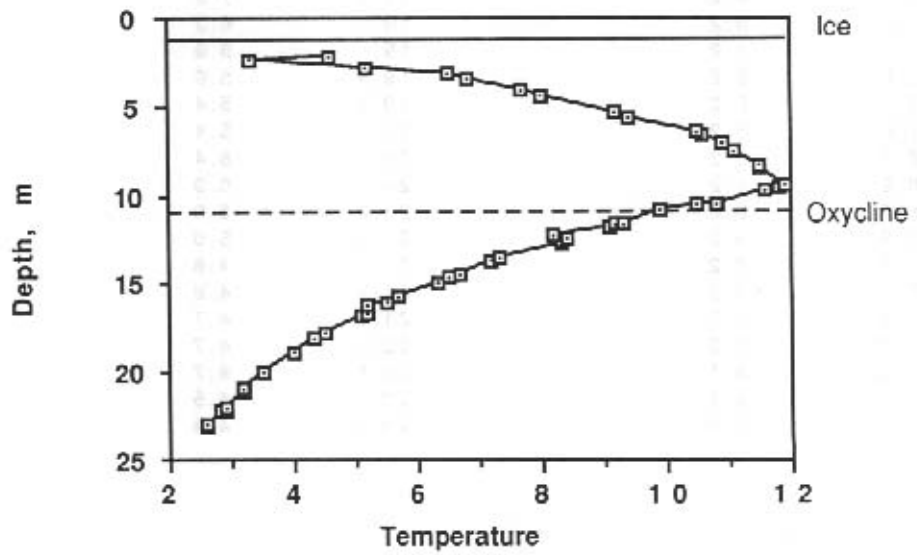


Figure 4. Thermal profile for Ace Lake, 18 January 1986

Table 2. Temperature and depth data for Abraxas Lake, 21 December 1985

Ice Thickness: 1.38 m

Depth, m	Temperature	Depth, m	Temperature
0.0	0.5	11.3	8.1
0.2	0.6	11.7	8.1
0.3	0.6	11.8	8.1
0.6	0.7	12.3	8.1
0.7	0.6	12.8	8.0
1.2	1.0	12.9	8.0
1.3	0.8	13.3	8.1
1.5	1.5	13.7	8.1
1.6	1.8	13.8	8.0
2.2	2.0	13.9	8.1
2.4	2.1	14.3	8.0
2.6	2.2	14.4	8.1
2.9	2.2	14.8	8.1
3.2	2.9	15.2	8.1
3.6	4.2	15.4	8.1
4.1	4.9	15.8	8.1
4.6	5.5	16.0	8.1
4.8	7.2	16.5	8.1
5.1	8.1	16.9	8.3
5.4	8.2	17.3	8.1
5.6	8.1	17.6	8.1
5.7	8.2	17.8	7.3
6.0	8.2	18.0	7.2
6.3	8.2	18.5	6.3
6.5	8.2	19.1	5.9
6.6	8.2	19.5	5.6
7.1	8.2	19.9	5.4
7.6	8.2	20.0	5.4
8.1	8.2	20.1	5.4
8.2	8.2	20.5	5.3
8.5	8.2	21.0	5.0
8.8	8.2	21.1	5.0
9.2	8.2	21.4	4.8
9.7	8.2	21.5	4.8
9.8	8.2	21.9	4.7
10.0	8.2	22.0	4.7
10.2	8.1	22.1	4.7
10.5	8.1	22.5	4.5
10.6	8.1	23.0	4.4
10.7	8.1		

Table 3. Temperature and depth data for Ace Lake, 18 January 1986

Ice Thickness: 1.58 m

Depth, m	Temperature	Depth, m	Temperature
2.2	4.6	17.8	4.5
2.4	3.3	18.1	4.3
2.8	5.2	18.9	4.0
3.2	6.5	19.9	3.5
3.4	6.8	20.0	3.5
4.1	7.7	20.9	3.2
4.4	8.0	21.0	3.2
5.4	9.2	22.0	2.9
5.7	9.4	22.1	2.8
6.4	10.5	22.2	2.9
6.5	10.5	23.0	2.6
6.6	10.6	23.1	2.6
7.0	10.9		
7.5	11.1		
7.6	11.1		
8.4	11.5		
8.5	11.5		
9.5	11.9		
9.6	11.8		
9.8	11.6		
10.5	10.8		
10.6	10.5		
10.9	9.9		
11.6	9.3		
11.7	9.2		
11.8	9.1		
12.2	8.2		
12.4	8.4		
12.6	8.3		
12.7	8.3		
13.6	7.3		
13.7	7.2		
14.4	6.7		
14.7	6.5		
15.0	6.3		
15.7	5.7		
16.0	5.5		
16.2	5.2		
16.7	5.2		
16.9	5.1		
17.7	4.5		

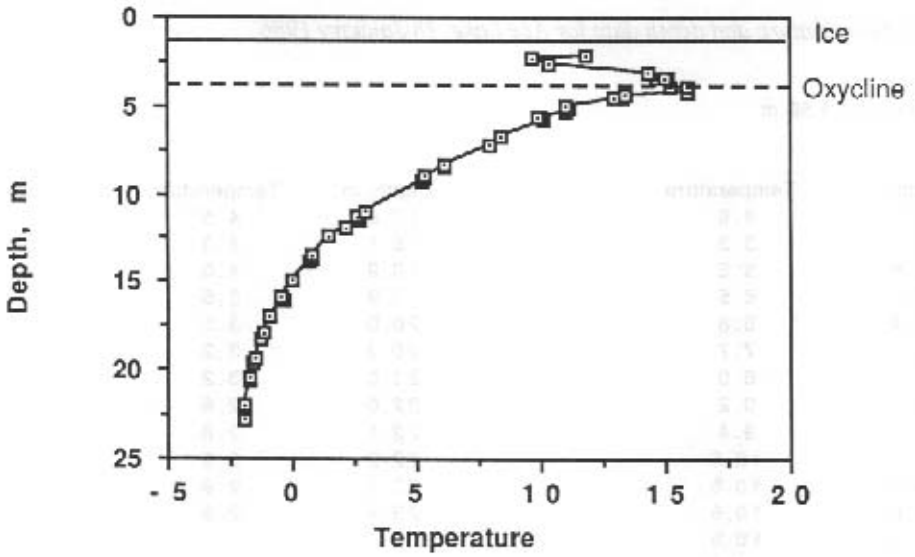


Figure 5. Thermal profile for Anderson Lake, 14 January 1986

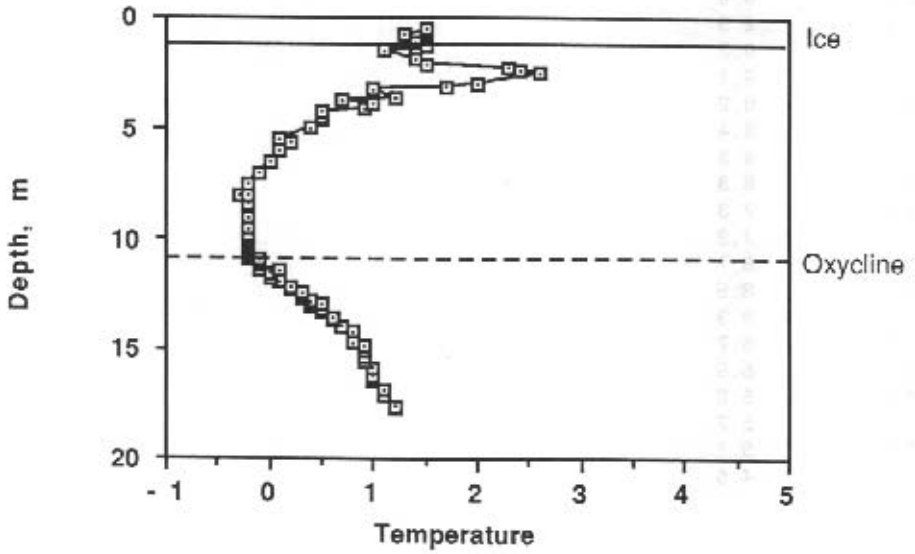


Figure 6. Thermal profile for Burton Lake, 11 January 1986

Table 4. Temperature and depth data for Anderson Lake, 14 January 1986

Ice Thickness: 1.56 m

Depth, m	Temperature	Depth, m	Temperature
2.2	11.8	17.9	-1.2
2.3	9.6	18.3	-1.2
2.6	10.3	19.3	-1.5
3.1	14.3	19.7	-1.6
3.4	15.0	20.5	-1.7
3.5	14.6	20.6	-1.7
3.5	15.2	22.0	-1.9
3.9	15.3	22.1	-2.0
4.0	16.0	22.8	-1.9
4.2	15.9		
4.4	13.4		
4.5	13.0		
4.6	13.3		
5.1	11.0		
5.2	11.1		
5.3	11.1		
5.6	9.9		
5.7	10.0		
5.8	10.1		
6.8	8.4		
7.2	7.9		
8.4	6.2		
8.5	6.1		
9.0	5.3		
9.1	5.3		
9.2	5.2		
11.0	3.0		
11.3	2.6		
11.4	2.7		
11.9	2.1		
12.5	1.5		
13.6	0.8		
13.7	0.8		
13.8	0.7		
15.0	0.0		
15.9	-0.4		
16.0	-0.4		
17.0	-0.9		

Table 5. Temperature and depth data for Burton Lake, 11 January 1986

Ice Thickness: 1.41 m

Depth, m	Temperature	Depth, m	Temperature
0.5	1.5	10.3	-0.2
0.6	1.5	10.4	-0.2
0.7	1.3	10.6	-0.2
1.1	1.4	10.7	-0.2
1.2	1.5	10.8	-0.2
1.4	1.4	10.9	-0.2
1.5	1.1	11.0	-0.1
1.9	1.4	11.1	-0.1
2.1	1.5	11.2	-0.1
2.3	2.3	11.4	-0.1
2.4	2.4	11.5	0.1
2.5	2.6	11.6	0.0
3.0	2.0	11.8	0.0
3.1	1.7	11.9	0.1
3.3	1.0	12.0	0.1
3.6	1.2	12.2	0.2
3.8	0.7	12.3	0.2
3.9	1.0	12.5	0.3
4.1	0.9	12.6	0.3
4.3	0.5	12.7	0.3
4.5	0.5	12.8	0.4
4.7	0.5	12.9	0.4
5.0	0.4	13.0	0.5
5.5	0.1	13.1	0.4
5.6	0.2	13.2	0.5
6.1	0.1	13.3	0.5
6.5	0.0	13.6	0.6
6.6	0.0	13.7	0.6
7.0	-0.1	14.0	0.7
7.1	-0.1	14.2	0.8
7.5	-0.2	14.7	0.8
8.0	-0.2	14.9	0.9
8.1	-0.3	15.1	0.9
8.4	-0.2	15.3	0.9
8.5	-0.2	15.6	0.9
8.6	-0.2	15.8	1.0
9.1	-0.2	16.2	1.0
9.5	0.2	16.3	1.0
9.6	-0.2	16.5	1.0
9.8	-0.2	16.8	1.1
9.9	-0.2	17.1	1.1
10.1	-0.2	17.6	1.2
10.2	-0.2	17.7	1.2

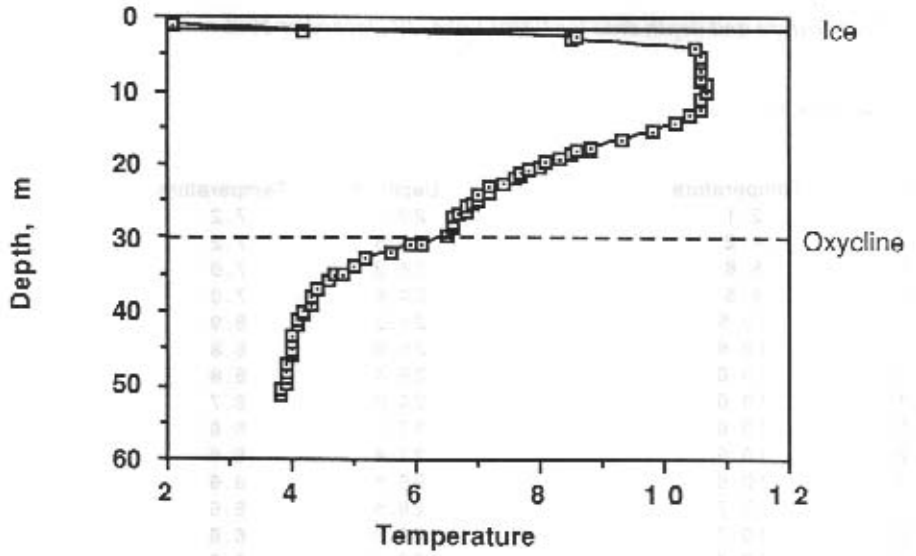


Figure 7. Thermal profile for Clear Lake, 29 December 1985

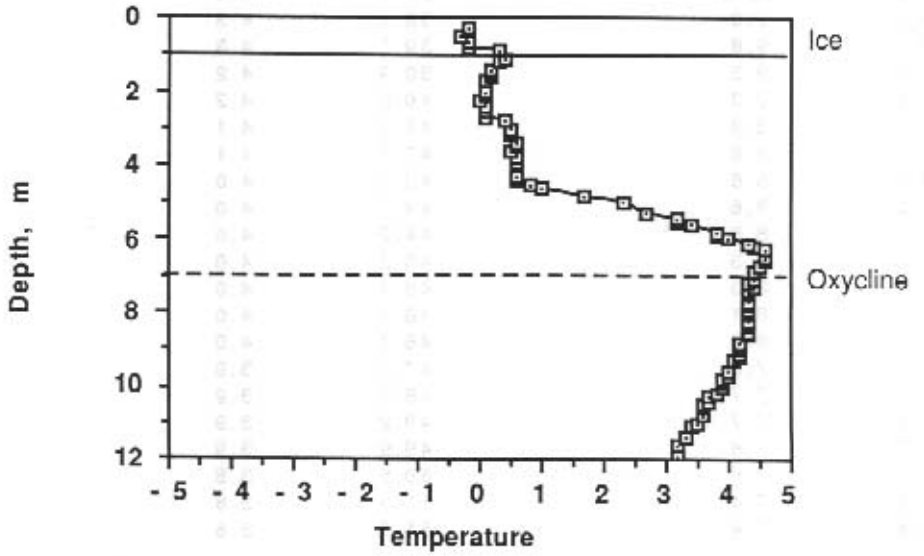


Figure 8. Thermal profile for Lake Fletcher, 16 December 1985

Table 6. Temperature and depth data for Clear Lake, 29 December 1985

Ice Thickness: 1.74 m

Depth, m	Temperature	Depth, m	Temperature
1.2	2.1	23.2	7.2
2.0	4.2	23.8	7.2
2.8	8.6	24.3	7.0
3.0	8.5	24.8	7.0
4.1	10.5	25.3	6.9
5.1	10.8	25.8	6.8
6.1	10.8	26.4	6.8
7.1	10.6	26.9	6.7
7.2	10.6	27.2	6.6
8.2	10.6	27.8	6.6
8.7	10.6	28.4	6.6
9.1	10.7	28.5	6.6
9.2	10.7	28.8	6.6
10.1	10.7	29.8	6.5
11.1	10.6	30.8	6.1
11.2	10.6	31.0	5.9
11.3	10.6	31.9	5.6
11.5	10.6	32.9	5.2
12.3	10.6	33.9	5.0
12.6	10.6	35.0	4.8
13.3	10.4	35.2	4.7
14.4	10.2	36.0	4.6
14.5	10.2	37.1	4.4
15.4	9.8	38.1	4.3
15.6	9.8	39.1	4.3
16.5	9.3	39.9	4.2
16.6	9.3	40.5	4.2
16.7	9.3	41.3	4.1
17.6	8.8	42.0	4.1
18.0	8.8	43.3	4.0
18.2	8.6	44.1	4.0
18.6	8.5	44.2	4.0
19.1	8.3	45.2	4.0
19.2	8.3	45.7	4.0
19.7	8.1	46.1	4.0
20.2	8.0	46.2	4.0
20.6	7.8	47.3	3.9
21.0	7.7	48.4	3.9
21.4	7.7	49.2	3.9
21.7	7.6	49.9	3.9
21.8	7.6	50.5	3.8
22.6	7.4	51.3	3.8
22.8	7.4	51.4	3.8

Table 7. Temperature and depth data for Lake Fletcher, 16 December 1985

Ice Thickness: 1.2 m

Depth, m	Temperature	Depth, m	Temperature
0.3	-0.2	6.2	4.4
0.4	-0.2	6.3	4.6
0.5	-0.3	6.5	4.6
0.7	-0.2	6.6	4.6
0.8	-0.2	6.7	4.5
0.9	0.3	6.9	4.4
1.1	0.4	7.1	4.4
1.2	0.3	7.2	4.3
1.4	0.2	7.3	4.4
1.5	0.2	7.4	4.3
1.6	0.2	7.5	4.3
1.7	0.1	7.7	4.3
2.0	0.1	7.8	4.3
2.1	0.1	7.9	4.3
2.3	0.0	8.0	4.3
2.4	0.1	8.2	4.3
2.6	0.1	8.3	4.3
2.7	0.1	8.4	4.3
2.8	0.4	8.5	4.3
3.0	0.5	8.6	4.3
3.1	0.5	8.8	4.2
3.2	0.5	8.9	4.2
3.4	0.6	9.0	4.2
3.5	0.6	9.1	4.2
3.6	0.5	9.2	4.2
3.8	0.6	9.3	4.1
3.9	0.6	9.6	4.0
4.0	0.6	9.7	4.0
4.3	0.6	9.8	3.9
4.4	0.6	9.9	3.9
4.5	0.8	10.0	3.9
4.6	1.0	10.2	3.8
4.8	1.7	10.3	3.7
5.0	2.3	10.4	3.7
5.3	2.7	10.5	3.6
5.4	3.2	10.6	3.6
5.5	3.2	10.8	3.6
5.6	3.4	11.0	3.5
5.8	3.8	11.1	3.4
5.9	3.8	11.4	3.3
6.0	4.0	11.6	3.2
6.1	4.3	11.9	3.2

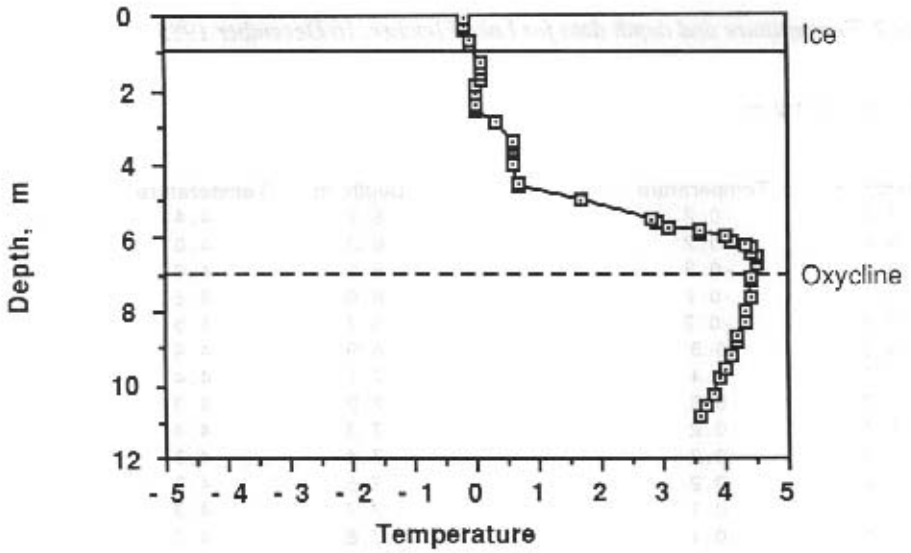


Figure 9. Thermal profile for Lake Fletcher, 22 December 1985

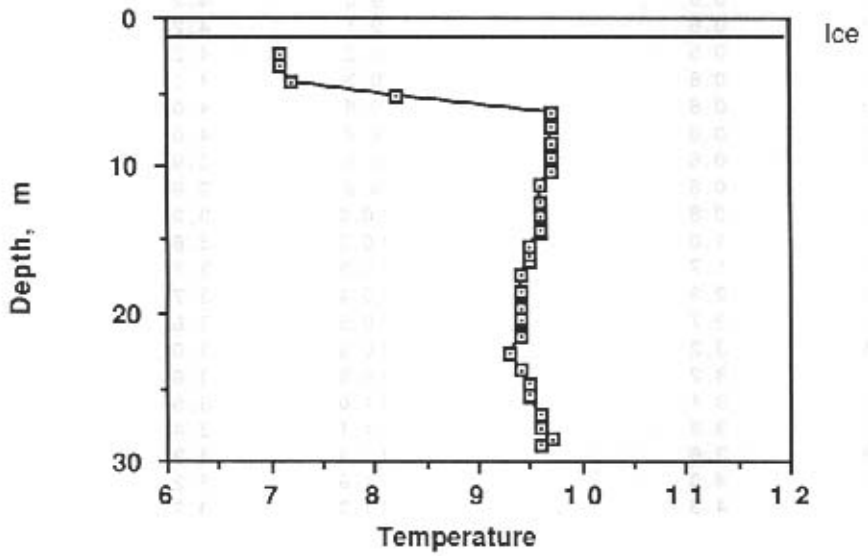


Figure 10. Thermal profile for Lake Hand, 17 January 1986

Table 8. Temperature and depth data for Lake Fletcher, 22 December 1985

Ice Thickness: 1.15 m

Depth, m	Temperature
0.1	-0.2
0.3	-0.2
0.4	-0.2
0.7	-0.1
0.8	-0.1
1.3	0.1
1.4	0.1
1.6	0.1
1.7	0.1
1.9	0.0
2.1	0.0
2.4	0.0
2.5	0.0
2.6	0.0
2.9	0.3
3.4	0.6
3.5	0.6
3.6	0.6
3.7	0.6
4.0	0.6
4.5	0.7
4.6	0.7
5.0	1.7
5.5	2.8
5.6	2.9
5.7	3.1
5.8	3.6
5.9	3.6
6.0	4.0
6.1	4.1
6.2	4.3
6.3	4.4
6.4	4.4
6.5	4.5
6.6	4.5
6.7	4.5
7.1	4.4
7.2	4.4
7.6	4.4
8.0	4.3
8.3	4.3
8.7	4.2
8.8	4.2
9.2	4.1
9.6	4.0
9.8	3.9
10.3	3.8
10.6	3.7
10.9	3.6

Table 9. Temperature and depth data for Lake Hand, 17 January 1986

Ice Thickness: 1.3 m

Depth, m	Temperature
2.4	7.1
3.3	7.1
4.3	7.2
5.3	8.2
6.4	9.7
7.4	9.7
8.4	9.7
9.4	9.7
10.3	9.7
11.4	9.6
12.4	9.6
13.4	9.6
14.4	9.6
14.5	9.6
15.5	9.5
16.1	9.5
16.5	9.5
17.4	9.4
18.5	9.4
18.7	9.4
19.6	9.4
20.4	9.4
20.5	9.4
21.5	9.4
22.6	9.3
23.7	9.4
24.7	9.5
25.4	9.5
25.7	9.5
26.7	9.6
27.8	9.6
28.5	9.7
28.9	9.6

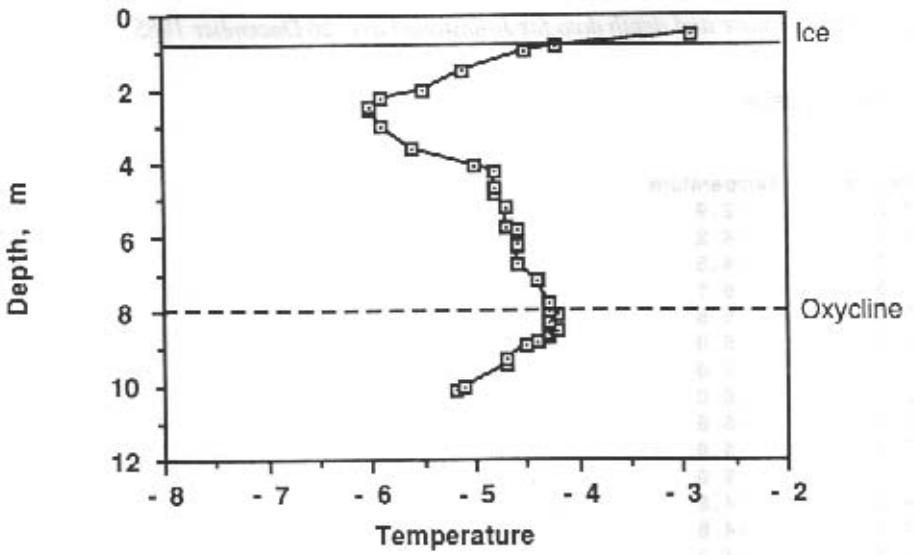


Figure 11. Thermal profile for Johnstone Lake, 26 December 1985

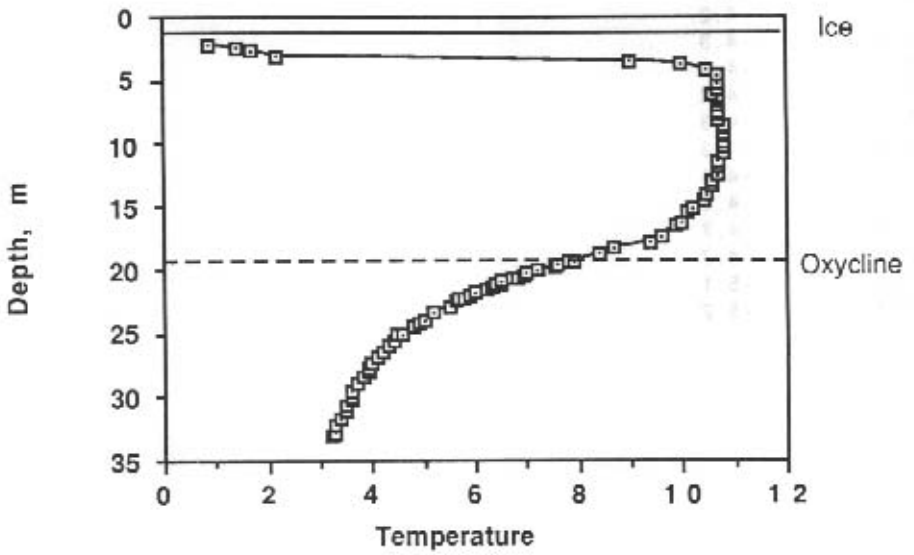


Figure 12. Thermal profile for McCallum Lake, 5 January 1986

Table 10. Temperature and depth data for Johnstone Lake, 26 December 1985

Ice Thickness: 0.85 m

Depth, m	Temperature
0.5	-2.9
0.8	-4.2
1.0	-4.5
1.5	-5.1
2.0	-5.5
2.3	-5.9
2.5	-6.0
2.6	-6.0
3.0	-5.9
3.6	-5.6
4.1	-5.0
4.2	-4.8
4.7	-4.8
4.8	-4.8
5.2	-4.7
5.7	-4.7
5.8	-4.6
6.2	-4.6
6.3	-4.6
6.7	-4.6
7.2	-4.4
7.8	-4.3
8.0	-4.3
8.1	-4.2
8.3	-4.3
8.4	-4.3
8.5	-4.2
8.6	-4.3
8.7	-4.3
8.8	-4.4
8.9	-4.5
9.3	-4.7
9.4	-4.7
10.0	-5.1
10.1	-5.2

Table 11. Temperature and depth data for McCallum Lake, 5 January 1986

Ice Thickness: 1.70 m

Depth, m	Temperature	Depth, m	Temperature	Depth, m	Temperature
2.1	0.9	19.7	7.6	31.7	3.4
2.4	1.4	19.8	7.5	31.8	3.4
2.7	1.7	19.9	7.5	32.2	3.3
3.0	2.2	20.0	7.2	32.7	3.3
3.6	9.0	20.3	7.0	32.8	3.3
3.7	10.0	20.5	6.9	33.0	3.2
4.2	10.5	20.7	6.8		
4.7	10.7	20.8	6.7		
5.2	10.7	21.0	6.5		
5.7	10.7	21.1	6.5		
6.2	10.6	21.2	6.4		
6.4	10.7	21.4	6.3		
6.6	10.7	21.5	6.2		
7.1	10.7	21.6	6.2		
7.5	10.7	21.8	6.0		
7.8	10.7	21.9	6.0		
8.2	10.7	22.0	5.9		
8.5	10.8	22.2	5.8		
8.8	10.8	22.3	5.7		
9.2	10.8	22.4	5.6		
9.4	10.8	22.8	5.5		
9.8	10.8	23.3	5.2		
10.3	10.8	23.9	5.0		
10.8	10.8	24.3	4.9		
11.4	10.7	24.5	4.8		
11.9	10.7	25.0	4.6		
12.5	10.7	25.1	4.5		
13.0	10.6	25.5	4.4		
13.5	10.6	26.0	4.3		
14.1	10.5	26.5	4.2		
14.5	10.4	26.9	4.1		
15.1	10.2	27.4	4.0		
15.5	10.1	27.8	3.9		
16.3	10.0	28.0	3.9		
16.5	9.9	28.5	3.8		
17.3	9.6	28.9	3.7		
17.8	9.4	29.5	3.6		
18.2	8.7	30.0	3.6		
18.8	8.4	30.1	3.6		
19.3	7.9	30.7	3.5		
19.4	7.8	31.1	3.5		

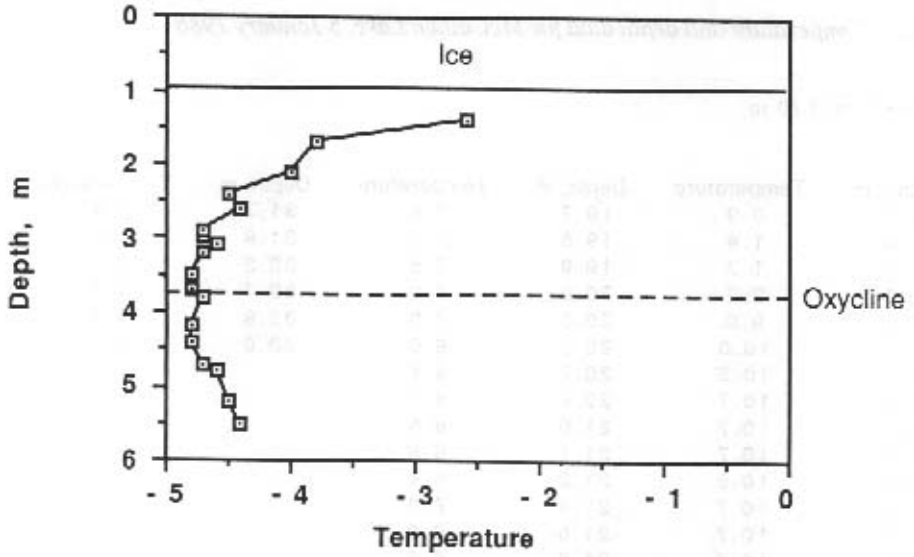


Figure 13. Thermal profile for Organic Lake, 12 January 1986

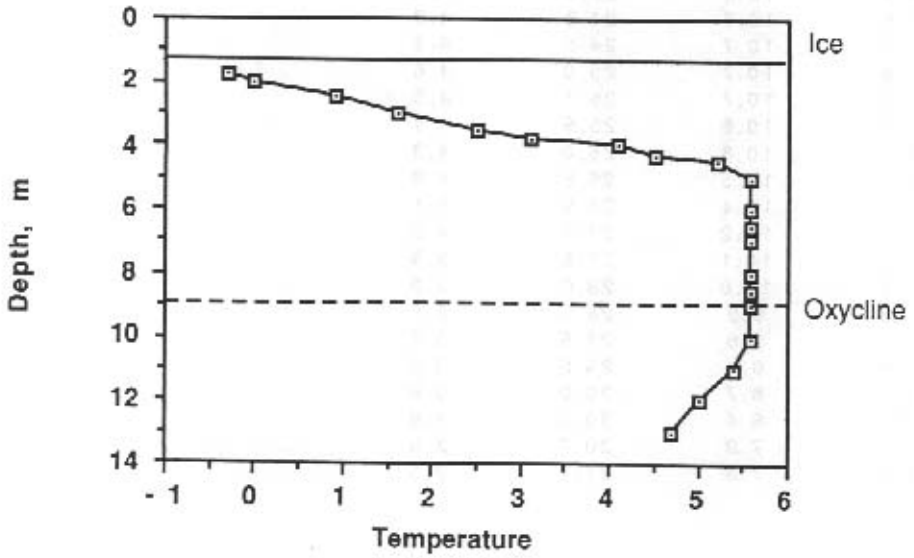


Figure 14. Thermal profile for Pendant Lake, 1 January 1986

Table 12. Temperature and depth data for Organic Lake, 12 January 1986

Ice Thickness: 0.99 m

Depth, m	Temperature
1.4	-2.6
1.7	-3.8
2.1	-4.0
2.4	-4.5
2.6	-4.4
2.9	-4.7
3.0	-4.7
3.1	-4.6
3.2	-4.7
3.5	-4.8
3.7	-4.8
3.8	-4.7
4.2	-4.8
4.4	-4.8
4.7	-4.7
4.8	-4.6
5.2	-4.5
5.5	-4.4

Table 13. Temperature and depth data for Pendant Lake, 1 January 1986

Ice Thickness: 1.7 m

Depth, m	Temperature
1.8	-0.3
2.0	0.0
2.5	0.9
3.0	1.6
3.5	2.5
3.8	3.1
4.0	4.1
4.3	4.5
4.5	5.2
5.0	5.6
6.0	5.6
6.5	5.6
7.0	5.6
8.0	5.6
8.5	5.6
9.0	5.6
10.0	5.6
11.0	5.4
12.0	5.0
13.0	4.7

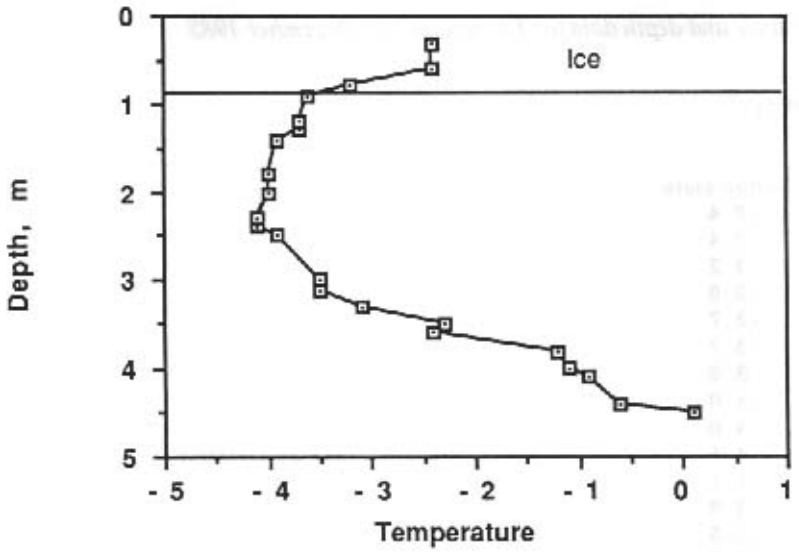


Figure 15. Thermal profile for Tassie Lake, 31 December 1985

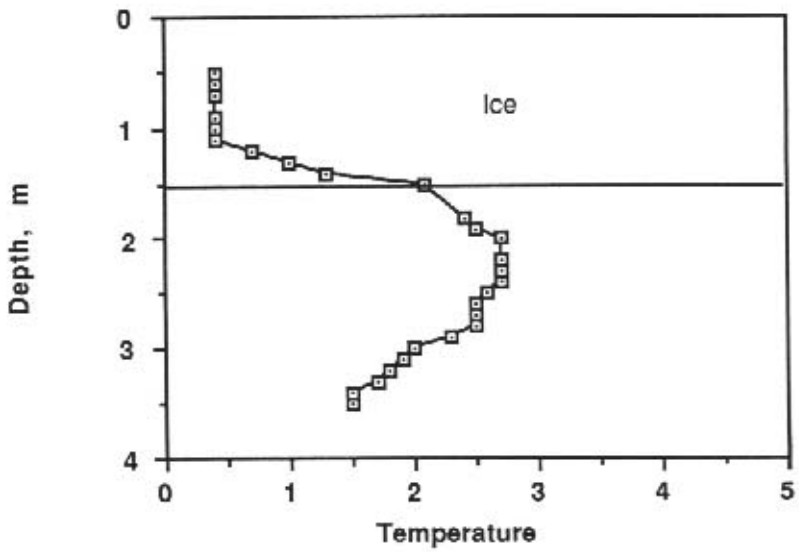


Figure 16. Thermal profile for Franzmann Lake, 30 December 1985

Table 14. Temperature and depth data for Tussie Lake, 31 December 1985

Ice Thickness: 0.84 m

Depth, m	Temperature
0.3	-2.4
0.6	-2.4
0.8	-3.2
0.9	-3.6
1.2	-3.7
1.3	-3.7
1.4	-3.9
1.8	-4.0
2.0	-4.0
2.3	-4.1
2.4	-4.1
2.5	-3.9
3.0	-3.5
3.1	-3.5
3.3	-3.1
3.5	-2.3
3.6	-2.4
3.8	-1.2
4.0	-1.1
4.1	-0.9
4.4	-0.6
4.5	0.1

Table 15. Temperature and depth data for Franzmann Lake, 30 December 1985

Ice Thickness: 1.56 m

Depth, m	Temperature
0.5	0.4
0.6	0.4
0.7	0.4
0.9	0.4
1.0	0.4
1.1	0.4
1.2	0.7
1.3	1.0
1.4	1.3
1.5	2.1
1.8	2.4
1.9	2.5
2.0	2.7
2.2	2.7
2.3	2.7
2.4	2.7
2.5	2.6
2.6	2.5
2.7	2.5
2.8	2.5
2.9	2.3
3.0	2.0
3.1	1.9
3.2	1.8
3.3	1.7
3.4	1.5
3.5	1.5

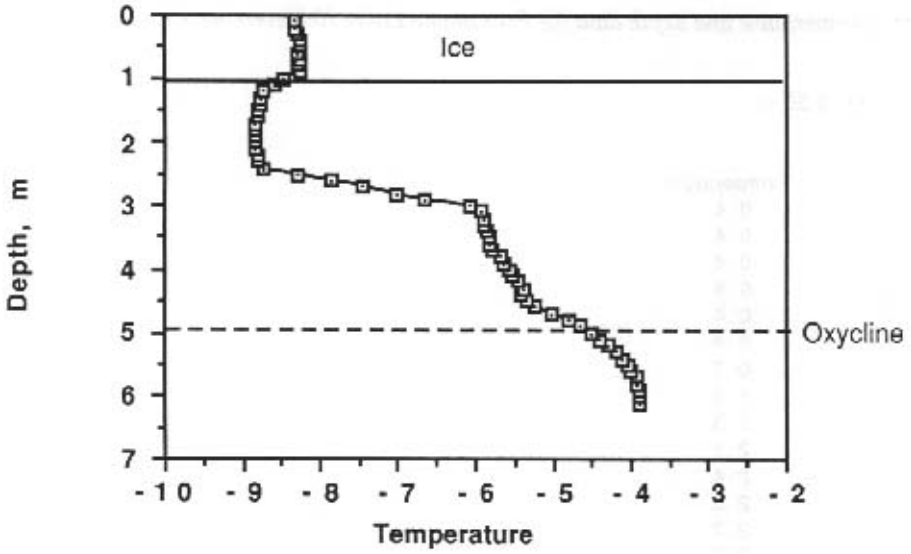


Figure 17. Thermal profile for Burch Lake, 23 November 1987

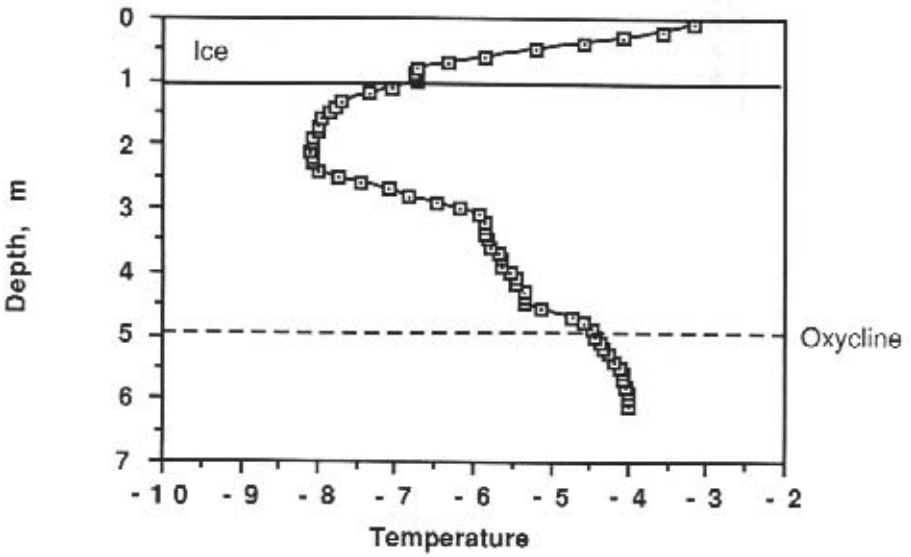


Figure 18. Thermal profile for Burch Lake, 30 November 1987

Table 16. Temperature and depth data for Burch Lake, 23 November 1987

Ice Thickness: 1.1 m

Depth, m	Temperature
0.1	-8.3
0.2	-8.3
0.3	-8.3
0.4	-8.3
0.5	-8.2
0.6	-8.3
0.7	-8.3
0.8	-8.3
0.9	-8.3
1.0	-8.5
1.1	-8.6
1.2	-8.7
1.3	-8.8
1.4	-8.8
1.5	-8.8
1.6	-8.8
1.7	-8.8
1.8	-8.8
1.9	-8.8
2.0	-8.8
2.1	-8.8
2.2	-8.8
2.3	-8.8
2.4	-8.7
2.5	-8.3
2.6	-7.8
2.7	-7.5
2.8	-7.0
2.9	-6.6
3.0	-6.1
3.1	-5.9
3.2	-5.9
3.3	-5.9
3.4	-5.9
3.5	-5.8
3.6	-5.8
3.7	-5.8
3.8	-5.7
3.9	-5.6
4.0	-5.6
4.1	-5.5
4.2	-5.5
4.3	-5.4
4.4	-5.4
4.5	-5.4
4.6	-5.2
4.7	-5.0
4.8	-4.8
4.9	-4.8
5.0	-4.5
5.1	-4.4
5.2	-4.3
5.3	-4.2
5.4	-4.1
5.5	-4.1
5.6	-4.0
5.7	-3.9
5.8	-3.9
5.9	-3.9
6.0	-3.9
6.1	-3.9

Table 17. Temperature and depth data for Burch Lake, 30 November 1987

Ice Thickness: 1.1 m

Depth, m	Temperature
0.1	-3.2
0.2	-3.6
0.3	-4.1
0.4	-4.6
0.5	-5.2
0.6	-5.8
0.7	-6.3
0.8	-6.7
0.9	-6.8
1.0	-6.7
1.1	-7.0
1.2	-7.3
1.3	-7.7
1.4	-7.8
1.5	-7.9
1.6	-8.0
1.7	-8.0
1.8	-8.0
1.9	-8.1
2.0	-8.1
2.1	-8.1
2.2	-8.1
2.3	-8.1
2.4	-8.0
2.5	-7.8
2.6	-7.5
2.7	-7.1
2.8	-6.8
2.9	-6.5
3.0	-6.2
3.1	-5.9
3.2	-5.9
3.3	-5.8
3.4	-5.8
3.5	-5.8
3.6	-5.8
3.7	-5.7
3.8	-5.6
3.9	-5.6
4.0	-5.5
4.1	-5.5
4.2	-5.5
4.3	-5.3
4.4	-5.3
4.5	-5.3
4.6	-5.1
4.7	-4.7
4.8	-4.6
4.9	-4.5
5.0	-4.4
5.1	-4.4
5.2	-4.3
5.3	-4.3
5.4	-4.2
5.5	-4.1
5.6	-4.1
5.7	-4.1
5.8	-4.0
5.9	-4.0
6.0	-4.0
6.1	-4.0

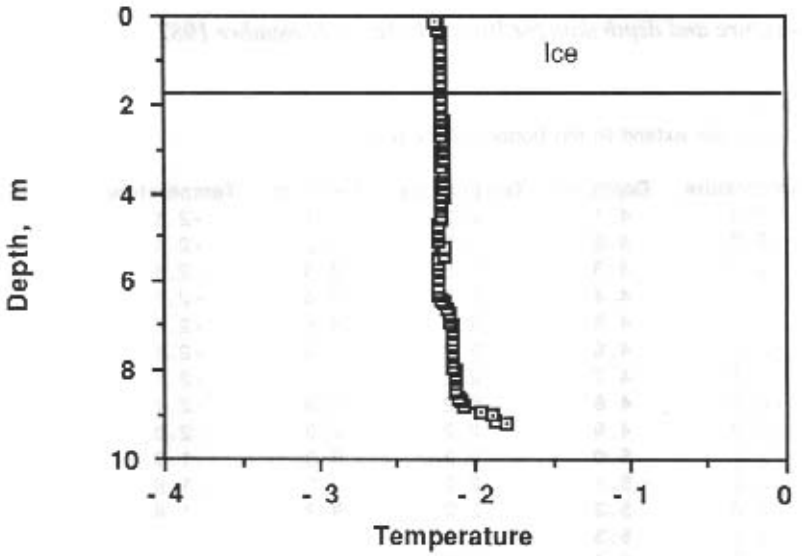


Figure 19. Thermal profile for Burton Lake, 19 November 1987

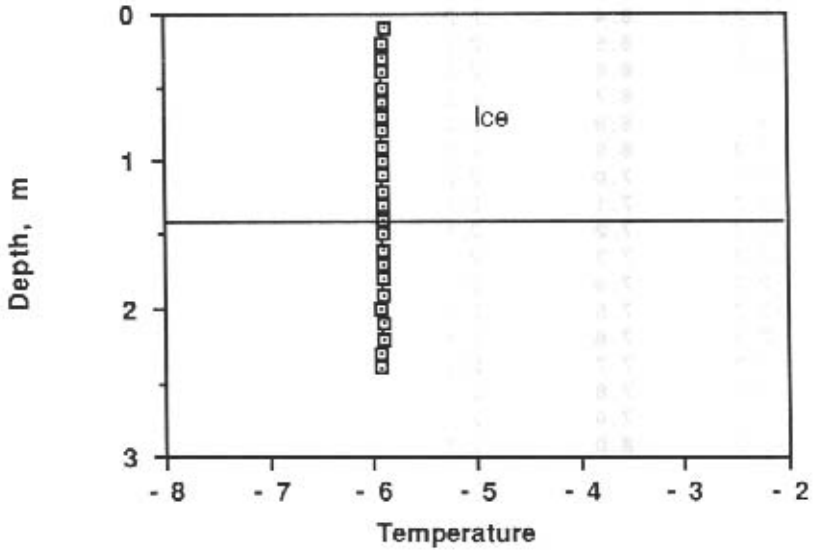


Figure 20. Thermal profile for Western Lobe, Burton Lake, 19 November 1987

Table 18. Temperature and depth data for Burton Lake, 19 November 1987

Ice Thickness: 1.8 m
Note: This profile does not extend to the bottom of the lake

Depth, m	Temperature	Depth, m	Temperature	Depth, m	Temperature
0.1	-2.2	4.1	-2.2	8.1	-2.1
0.2	-2.2	4.2	-2.2	8.2	-2.1
0.3	-2.2	4.3	-2.2	8.3	-2.1
0.4	-2.2	4.4	-2.2	8.4	-2.1
0.5	-2.2	4.5	-2.2	8.5	-2.1
0.6	-2.2	4.6	-2.2	8.6	-2.1
0.7	-2.2	4.7	-2.2	8.7	-2.1
0.8	-2.2	4.8	-2.2	8.8	-2.1
0.9	-2.2	4.9	-2.2	8.9	-2.0
1.0	-2.2	5.0	-2.2	9.0	-1.9
1.1	-2.2	5.1	-2.2	9.1	-1.9
1.2	-2.2	5.2	-2.2	9.2	-1.8
1.3	-2.2	5.3	-2.2		
1.4	-2.2	5.4	-2.2		
1.5	-2.2	5.5	-2.2		
1.6	-2.2	5.6	-2.2		
1.7	-2.2	5.7	-2.2		
1.8	-2.2	5.8	-2.2		
1.9	-2.2	5.9	-2.2		
2.0	-2.2	6.0	-2.2		
2.1	-2.2	6.1	-2.2		
2.2	-2.2	6.2	-2.2		
2.3	-2.2	6.3	-2.2		
2.4	-2.2	6.4	-2.2		
2.5	-2.2	6.5	-2.2		
2.6	-2.2	6.6	-2.2		
2.7	-2.2	6.7	-2.2		
2.8	-2.2	6.8	-2.2		
2.9	-2.2	6.9	-2.2		
3.0	-2.2	7.0	-2.2		
3.1	-2.2	7.1	-2.1		
3.2	-2.2	7.2	-2.1		
3.3	-2.2	7.3	-2.1		
3.4	-2.2	7.4	-2.1		
3.5	-2.2	7.5	-2.1		
3.6	-2.2	7.6	-2.1		
3.7	-2.2	7.7	-2.1		
3.8	-2.2	7.8	-2.1		
3.9	-2.2	7.9	-2.1		
4.0	-2.2	8.0	-2.1		

Table 19. Temperature and depth data for Western Lobe, Burton Lake, 19 November 1987

Ice Thickness: 1.4 m

Depth, m	Temperature
0.1	-5.9
0.2	-5.9
0.3	-5.9
0.4	-5.9
0.5	-5.9
0.6	-5.9
0.7	-5.9
0.8	-5.9
0.9	-5.9
1.0	-5.9
1.1	-5.9
1.2	-5.9
1.3	-5.9
1.4	-5.9
1.5	-5.9
1.6	-5.9
1.7	-5.9
1.8	-5.9
1.9	-5.9
2.0	-5.9
2.1	-5.9
2.2	-5.9
2.3	-5.9
2.4	-5.9

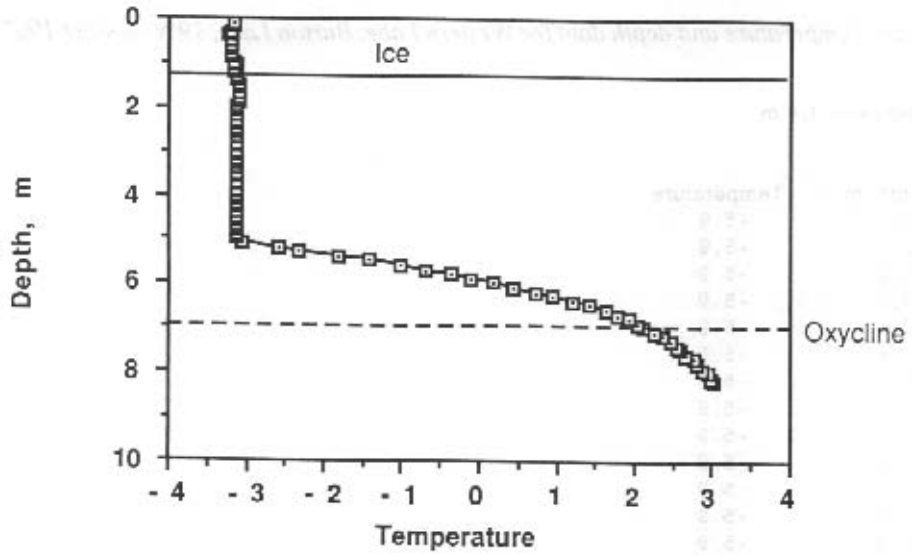


Figure 21. Thermal profile for Lake Fletcher, 15 November 1987

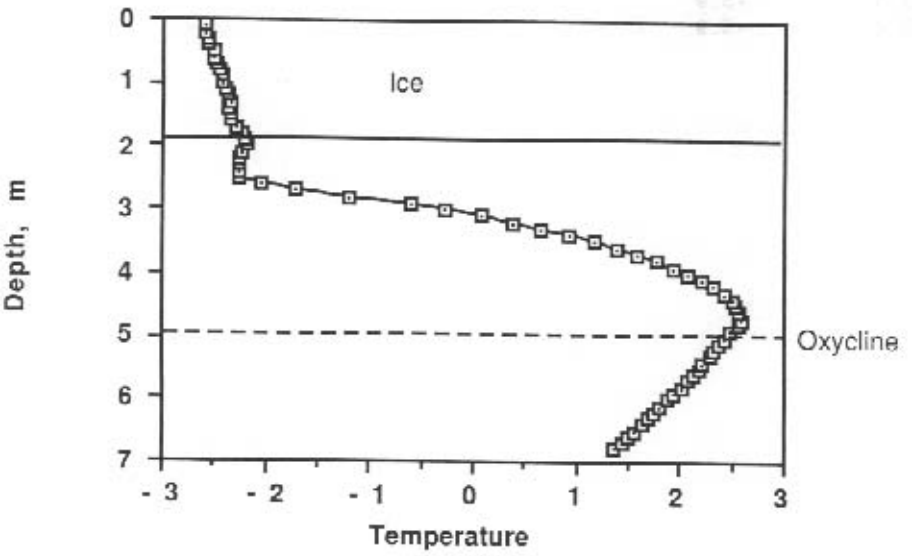


Figure 22. Thermal profile for Williams Lake, 10 November 1987

Table 20. Temperature and depth data for Lake Fletcher, 15 November 1987

Ice Thickness: 1.4 m
Note: This profile does not extend to the bottom of the lake.

Depth, m	Temperature	Depth, m	Temperature
0.1	-3.2	4.2	-3.1
0.2	-3.2	4.3	-3.1
0.3	-3.2	4.4	-3.1
0.4	-3.2	4.5	-3.1
0.5	-3.2	4.6	-3.1
0.6	-3.2	4.7	-3.1
0.7	-3.2	4.8	-3.1
0.8	-3.2	4.9	-3.1
0.9	-3.2	5.0	-3.1
1.0	-3.2	5.1	-3.0
1.1	-3.1	5.2	-2.6
1.2	-3.2	5.3	-2.3
1.3	-3.1	5.4	-1.8
1.4	-3.1	5.5	-1.4
1.5	-3.1	5.6	-1.0
1.6	-3.1	5.7	-0.7
1.7	-3.1	5.8	-0.4
1.8	-3.1	5.9	-0.1
1.9	-3.1	6.0	0.2
2.0	-3.1	6.1	0.4
2.1	-3.1	6.2	0.7
2.2	-3.1	6.3	0.9
2.3	-3.1	6.4	1.2
2.4	-3.1	6.5	1.4
2.5	-3.1	6.6	1.8
2.6	-3.1	6.7	1.8
2.7	-3.1	6.8	1.9
2.8	-3.1	6.9	2.0
2.9	-3.1	7.0	2.1
3.0	-3.1	7.1	2.3
3.1	-3.1	7.2	2.4
3.2	-3.1	7.3	2.5
3.3	-3.1	7.4	2.5
3.4	-3.1	7.5	2.6
3.5	-3.1	7.6	2.7
3.6	-3.1	7.7	2.7
3.7	-3.1	7.8	2.8
3.8	-3.1	7.9	2.9
3.9	-3.1	8.0	2.9
4.0	-3.1	8.1	3.0
4.1	-3.1	8.2	3.0

Table 21. Temperature and depth data for Williams Lake, 10 November 1987

Ice Thickness: 1.8 m

Depth, m	Temperature
0.1	-2.6
0.2	-2.6
0.3	-2.6
0.4	-2.6
0.5	-2.5
0.6	-2.5
0.7	-2.5
0.8	-2.5
0.9	-2.4
1.0	-2.4
1.1	-2.4
1.2	-2.4
1.3	-2.4
1.4	-2.4
1.5	-2.3
1.6	-2.4
1.7	-2.3
1.8	-2.2
1.9	-2.2
2.0	-2.2
2.1	-2.2
2.2	-2.3
2.3	-2.3
2.4	-2.3
2.5	-2.3
2.6	-2.0
2.7	-1.7
2.8	-1.2
2.9	-0.6
3.0	-0.3
3.1	0.1
3.2	0.4
3.3	0.7
3.4	0.9
3.5	1.2
3.6	1.4
3.7	1.6
3.8	1.8
3.9	1.9
4.0	2.1
4.1	2.2
4.2	2.3
4.3	2.4
4.4	2.5
4.5	2.5
4.6	2.6
4.7	2.6
4.8	2.6
4.9	2.5
5.0	2.4
5.1	2.4
5.2	2.3
5.3	2.3
5.4	2.2
5.5	2.2
5.6	2.1
5.7	2.1
5.8	2.0
5.9	1.9
6.0	1.9
6.1	1.8
6.2	1.7
6.3	1.7
6.4	1.6
6.5	1.6
6.6	1.5
6.7	1.4
6.8	1.4

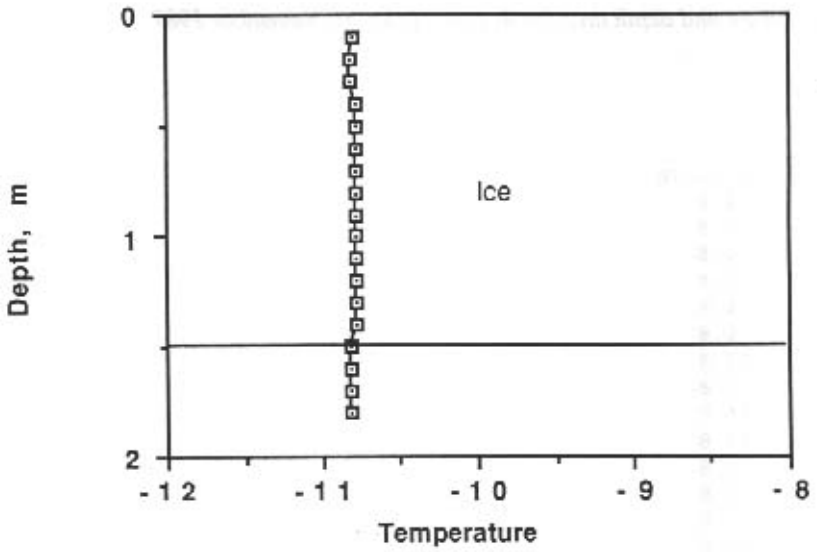


Figure 23. Thermal profile for Rookery Lake, 10 November 1987

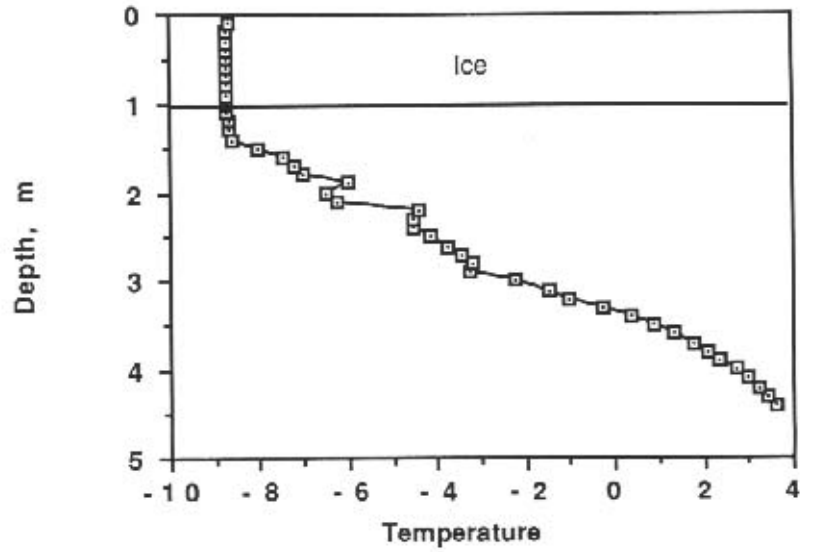


Figure 24. Thermal profile for Tassie Lake, 23 August 1987

Table 22. Temperature and depth data for Rookery Lake, 10 November 1987

Ice Thickness: 1.5 m

Depth, m	Temperature
0.1	-10.8
0.2	-10.8
0.3	-10.8
0.4	-10.8
0.5	-10.8
0.6	-10.8
0.7	-10.8
0.8	-10.8
0.9	-10.8
1.0	-10.8
1.1	-10.8
1.2	-10.8
1.3	-10.8
1.4	-10.8
1.5	-10.8
1.6	-10.8
1.7	-10.8
1.8	-10.8

Table 23. Temperature and depth data for Tassie Lake, 23 August 1987

Ice Thickness: 1.05 m

Depth, m	Temperature
0.1	-8.7
0.2	-8.7
0.3	-8.7
0.4	-8.7
0.5	-8.7
0.6	-8.7
0.7	-8.7
0.8	-8.7
0.9	-8.7
1.0	-8.7
1.1	-8.7
1.2	-8.7
1.3	-8.7
1.4	-8.6
1.5	-8.0
1.6	-7.4
1.7	-7.2
1.8	-7.0
1.9	-6.0
2.0	-6.5
2.1	-6.2
2.2	-4.4
2.3	-4.5
2.4	-4.5
2.5	-4.1
2.6	-3.7
2.7	-3.5
2.8	-3.2
2.9	-3.3
3.0	-2.2
3.1	-1.5
3.2	-1.0
3.3	-0.3
3.4	0.4
3.5	0.9
3.6	1.3
3.7	1.8
3.8	2.1
3.9	2.4
4.0	2.7
4.1	3.0
4.2	3.2
4.3	3.5
4.4	3.6

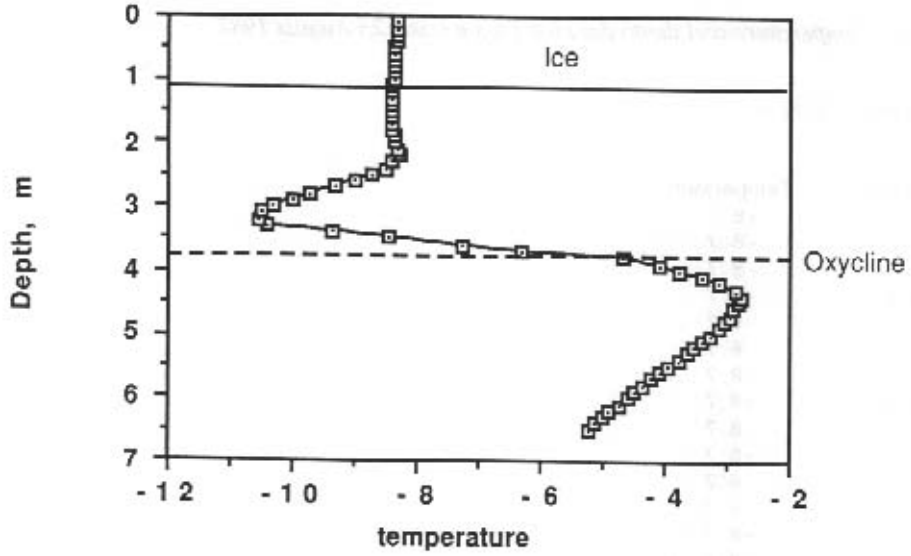


Figure 25. Thermal profile for Organic Lake, 17 August 1987

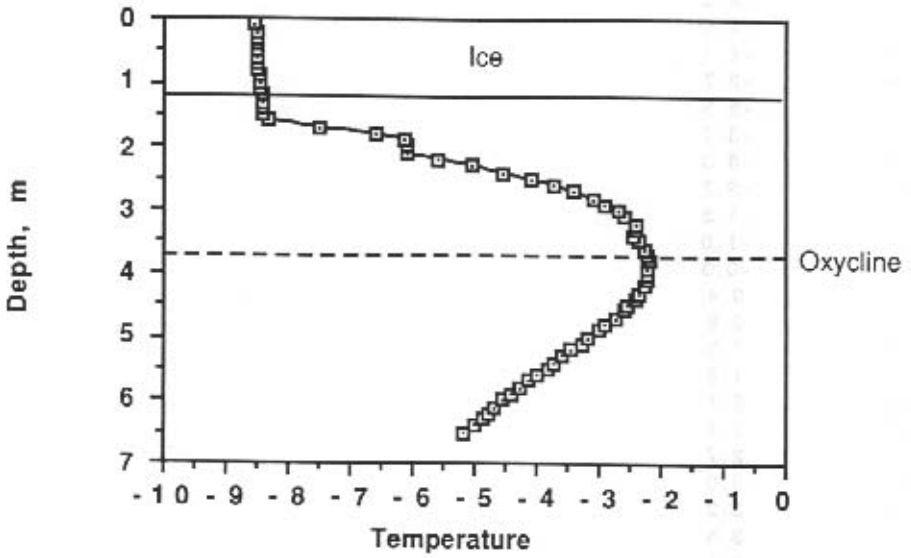


Figure 26. Thermal profile for Organic Lake, 23 August 1987

Table 24. Temperature and depth data for Organic Lake, 17 August 1987

Ice Thickness: 1.10 m

Depth, m	Site #1
0.1	-8.3
0.2	-8.3
0.3	-8.3
0.4	-8.3
0.5	-8.4
0.6	-8.4
0.7	-8.4
0.8	-8.4
0.9	-8.4
1.0	-8.4
1.1	-8.4
1.2	-8.4
1.3	-8.4
1.4	-8.4
1.5	-8.4
1.6	-8.4
1.7	-8.4
1.8	-8.4
1.9	-8.4
2.0	-8.4
2.1	-8.3
2.2	-8.3
2.3	-8.4
2.4	-8.5
2.5	-8.8
2.6	-9.0
2.7	-9.3
2.8	-9.7
2.9	-10.0
3.0	-10.3
3.1	-10.5
3.2	-10.6
3.3	-10.4
3.4	-9.4
3.5	-8.4
3.6	-7.3
3.7	-6.3
3.8	-4.7
3.9	-4.1
4.0	-3.8

Depth, m	Site #1
4.1	-3.4
4.2	-3.1
4.3	-2.9
4.4	-2.8
4.5	-2.8
4.6	-2.9
4.7	-2.9
4.8	-3.0
4.9	-3.1
5.0	-3.3
5.1	-3.4
5.2	-3.5
5.3	-3.7
5.4	-3.8
5.5	-4.0
5.6	-4.1
5.7	-4.2
5.8	-4.4
5.9	-4.5
6.0	-4.6
6.1	-4.7
6.2	-4.9
6.3	-5.0
6.4	-5.1
6.5	-5.2

Table 25. Temperature and depth data for Organic Lake, 23 August 1987

Ice Thickness: 1.15 m

Depth, m	Site #1
0.1	-8.5
0.2	-8.5
0.3	-8.5
0.4	-8.5
0.5	-8.5
0.6	-8.5
0.7	-8.5
0.8	-8.5
0.9	-8.5
1.0	-8.5
1.1	-8.5
1.2	-8.4
1.3	-8.4
1.4	-8.4
1.5	-8.4
1.6	-8.3
1.7	-7.5
1.8	-6.6
1.9	-6.1
2.0	-6.1
2.1	-6.1
2.2	-5.6
2.3	-5.0
2.4	-4.6
2.5	-4.1
2.6	-3.7
2.7	-3.4
2.8	-3.1
2.9	-2.9
3.0	-2.7
3.1	-2.6
3.2	-2.4
3.3	-2.4
3.4	-2.5
3.5	-2.4
3.6	-2.3
3.7	-2.2
3.8	-2.2
3.9	-2.2
4.0	-2.2

Depth, m	Site #1
4.1	-2.2
4.2	-2.3
4.3	-2.4
4.4	-2.4
4.5	-2.6
4.6	-2.6
4.7	-2.8
4.8	-2.9
4.9	-3.0
5.0	-3.2
5.1	-3.3
5.2	-3.4
5.3	-3.6
5.4	-3.7
5.5	-3.8
5.6	-4.0
5.7	-4.1
5.8	-4.3
5.9	-4.4
6.0	-4.5
6.1	-4.7
6.2	-4.8
6.3	-4.9
6.4	-5.0
6.5	-5.2

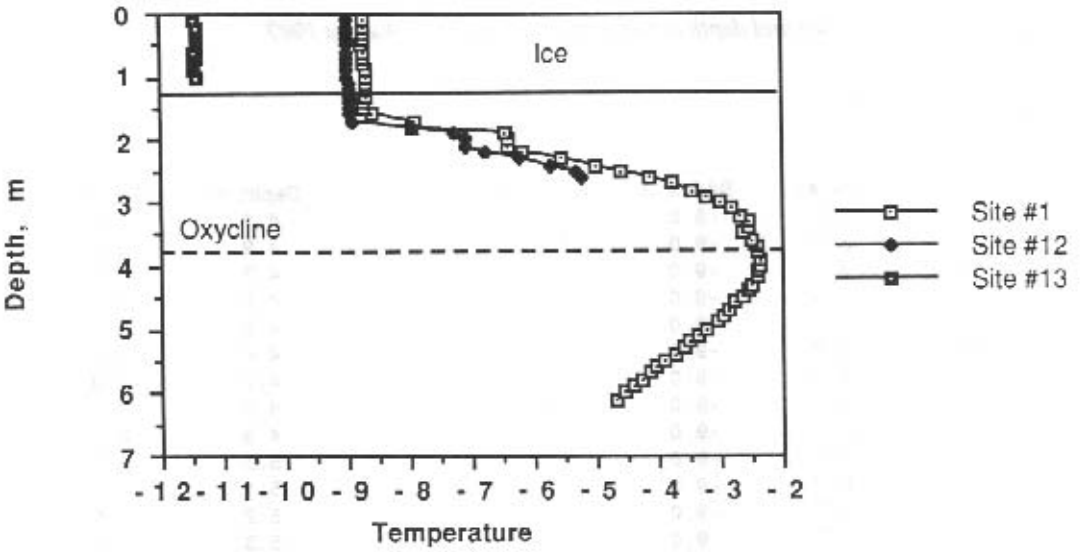


Figure 27. Thermal profiles for Organic Lake, 31 August 1987

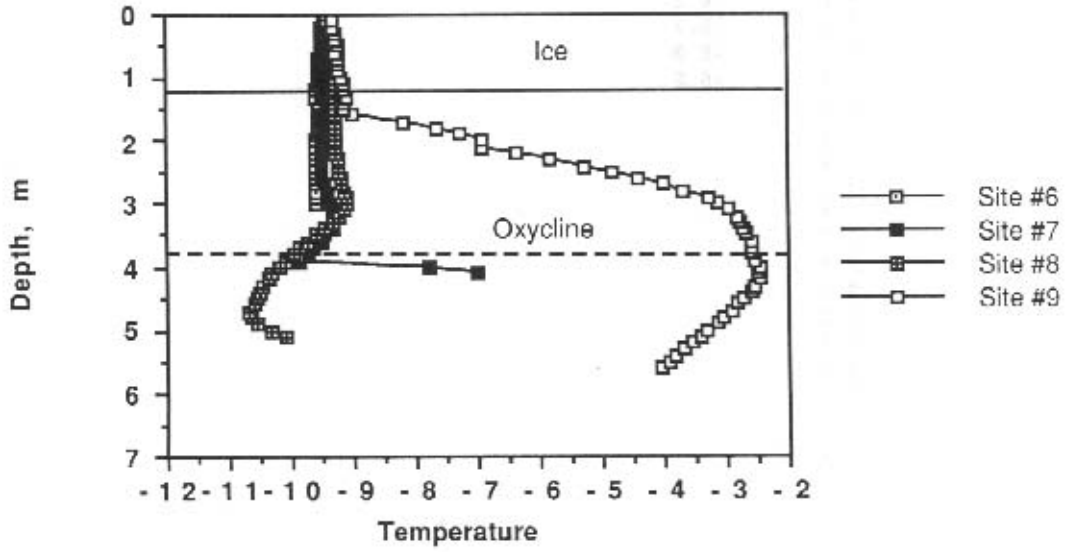


Figure 28. Thermal profiles for Organic Lake, 6 September 1987

Table 26. Temperature and depth data for Organic Lake, 31 August 1987

Ice Thickness: 1.20 m

Depth, m	Site #1	Site #12	Site #13
0.1	-8.8	-9.0	-11.5
0.2	-8.7	-9.0	-11.4
0.3	-8.7	-9.0	-11.4
0.4	-8.8	-9.0	-11.4
0.5	-8.8	-9.0	-11.4
0.6	-8.7	-9.0	-11.4
0.7	-8.7	-9.0	-11.4
0.8	-8.7	-9.0	-11.4
0.9	-8.7	-9.0	-11.4
1.0	-8.7	-9.0	-11.4
1.1	-8.7	-9.0	
1.2	-8.7	-9.0	
1.3	-8.7	-9.0	
1.4	-8.7	-9.0	
1.5	-8.8	-9.0	
1.6	-8.6	-9.0	
1.7	-7.9	-8.9	
1.8	-8.0	-7.9	
1.9	-6.4	-7.3	
2.0	-6.4	-7.1	
2.1	-6.4	-7.1	
2.2	-6.2	-6.8	
2.3	-5.6	-6.2	
2.4	-5.0	-5.7	
2.5	-4.6	-5.3	
2.6	-4.1	-5.2	
2.7	-3.8		
2.8	-3.5		
2.9	-3.2		
3.0	-3.0		
3.1	-2.8		
3.2	-2.7		
3.3	-2.6		
3.4	-2.5		
3.5	-2.6		
3.6	-2.5		
3.7	-2.4		
3.8	-2.4		
3.9	-2.4		
4.0	-2.4		

Depth, m	Site #1
4.1	-2.4
4.2	-2.4
4.3	-2.5
4.4	-2.6
4.5	-2.7
4.6	-2.8
4.7	-2.9
4.8	-3.0
4.9	-3.1
5.0	-3.2
5.1	-3.4
5.2	-3.5
5.3	-3.6
5.4	-3.7
5.5	-3.9
5.6	-4.0
5.7	-4.1
5.8	-4.3
5.9	-4.4
6.0	-4.5
6.1	-4.7

Table 27. Temperature and depth data for Organic Lake, 6 September 1987

Ice Thickness: 1.25 m

Depth, m	Site #6	Site #7	Site #8	Site #9	Depth, m	Site #7	Site #8	Site #9
0.1	-9.5	-9.5	-9.4	-9.3	4.1	-7.0	-10.3	-2.5
0.2	-9.5	-9.5	-9.3	-9.3	4.2		-10.4	-2.5
0.3	-9.5	-9.4	-9.3	-9.3	4.3		-10.5	-2.6
0.4	-9.5	-9.5	-9.3	-9.3	4.4		-10.5	-2.6
0.5	-9.5	-9.5	-9.3	-9.2	4.5		-10.5	-2.7
0.6	-9.5	-9.5	-9.3	-9.3	4.6		-10.6	-2.8
0.7	-9.5	-9.5	-9.3	-9.2	4.7		-10.7	-2.9
0.8	-9.5	-9.5	-9.3	-9.2	4.8		-10.7	-3.0
0.9	-9.6	-9.5	-9.3	-9.2	4.9		-10.6	-3.1
1.0	-9.6	-9.5	-9.3	-9.2	5.0		-10.3	-3.3
1.1	-9.6	-9.5	-9.3	-9.1	5.1		-10.1	-3.4
1.2	-9.6	-9.5	-9.3	-9.1	5.2			-3.6
1.3	-9.6	-9.5	-9.3	-9.1	5.3			-3.7
1.4	-9.6	-9.4	-9.3	-9.2	5.4			-3.8
1.5	-9.6	-9.4	-9.3	-9.1	5.5			-3.9
1.6	-9.6	-9.5	-9.3	-9.0	5.6			-4.0
1.7	-9.6	-9.5	-9.3	-8.2				
1.8	-9.6	-9.5	-9.3	-7.6				
1.9	-9.5	-9.5	-9.3	-7.3				
2.0	-9.6	-9.5	-9.3	-6.9				
2.1	-9.6	-9.5	-9.3	-6.9				
2.2	-9.6	-9.5	-9.3	-6.4				
2.3	-9.6	-9.5	-9.2	-5.8				
2.4	-9.6	-9.5	-9.2	-5.3				
2.5	-9.6	-9.5	-9.2	-4.8				
2.6	-9.6	-9.5	-9.2	-4.4				
2.7	-9.6	-9.5	-9.2	-4.0				
2.8	-9.6	-9.4	-9.1	-3.7				
2.9	-9.6	-9.4	-9.1	-3.3				
3.0	-9.6	-9.4	-9.1	-3.1				
3.1		-9.3	-9.1	-3.0				
3.2		-9.3	-9.2	-2.8				
3.3		-9.3	-9.3	-2.8				
3.4		-9.3	-9.4	-2.7				
3.5		-9.5	-9.6	-2.7				
3.6		-9.5	-9.7	-2.6				
3.7		-9.6	-9.9	-2.6				
3.8		-9.7	-10.0	-2.6				
3.9		-9.9	-10.1	-2.5				
4.0		-7.8	-10.2	-2.5				

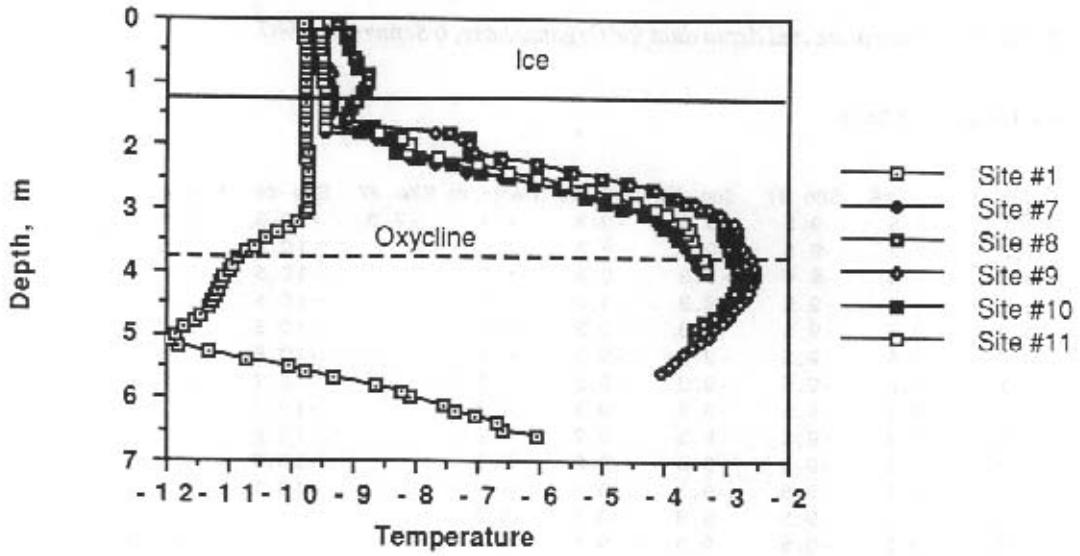


Figure 29. Thermal profiles for Organic Lake, 15 September 1987

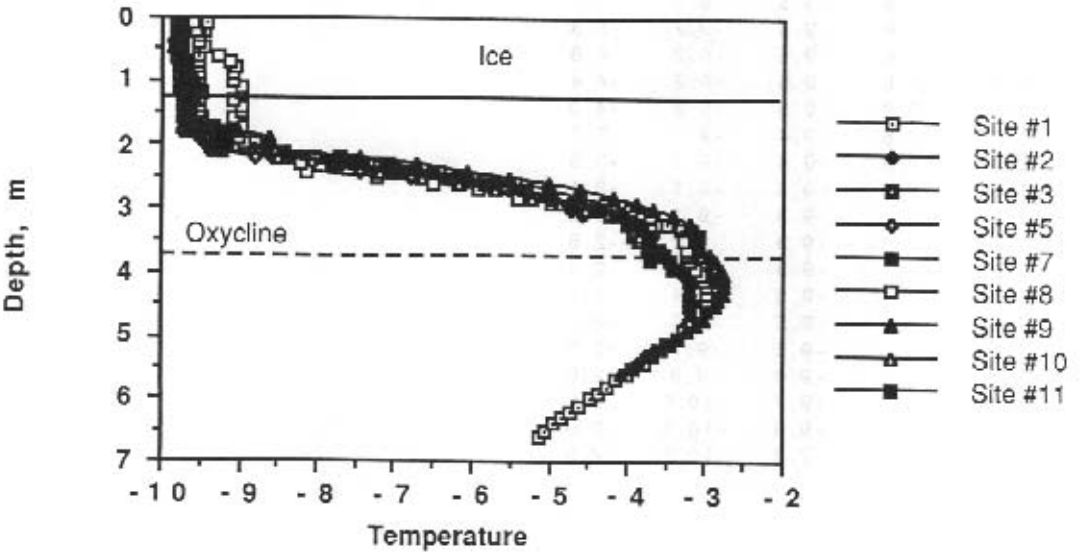


Figure 30. Thermal profiles for Organic Lake, 23 September 1987

Table 28. Temperature and depth data for Organic Lake, 15 September 1987

Ice Thickness: 1.25 m

Depth, m	Site #1	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-9.8	-9.6	-9.3	-9.6	-9.6	-9.6
0.2	-9.8	-9.6	-9.1	-9.5	-9.6	-9.6
0.3	-9.8	-9.5	-9.1	-9.5	-9.6	-9.6
0.4	-9.8	-9.5	-9.1	-9.5	-9.6	-9.5
0.5	-9.8	-9.5	-9.1	-9.5	-9.6	-9.5
0.6	-9.8	-9.5	-9.0	-9.5	-9.6	-9.5
0.7	-9.8	-9.5	-8.9	-9.5	-9.5	-9.5
0.8	-9.8	-9.5	-8.9	-9.4	-9.5	-9.5
0.9	-9.8	-9.5	-8.8	-9.4	-9.5	-9.5
1.0	-9.8	-9.5	-8.8	-9.4	-9.5	-9.5
1.1	-9.8	-9.5	-8.8	-9.4	-9.5	-9.5
1.2	-9.8	-9.5	-8.9	-9.4	-9.5	-9.5
1.3	-9.8	-9.5	-8.9	-9.4	-9.5	-9.5
1.4	-9.8	-9.5	-9.0	-9.4	-9.5	-9.5
1.5	-9.8	-9.5	-9.1	-9.4	-9.5	-9.5
1.6	-9.8	-9.0	-9.1	-9.1	-9.5	-9.5
1.7	-9.8	-7.8	-8.7	-8.8	-9.5	-9.5
1.8	-9.8	-9.4	-7.5	-7.7	-8.9	-8.6
1.9	-9.8	-8.6	-7.1	-7.3	-8.4	-8.2
2.0	-9.8	-8.3	-7.1	-7.1	-8.3	-8.1
2.1	-9.8	-8.1	-7.1	-7.0	-8.3	-8.1
2.2	-9.8	-8.1	-6.8	-6.6	-8.0	-7.6
2.3	-9.8	-7.7	-6.1	-6.0	-7.4	-7.0
2.4	-9.8	-7.2	-5.5	-5.5	-7.0	-6.5
2.5	-9.8	-6.6	-5.0	-5.0	-6.5	-6.0
2.6	-9.8	-6.1	-4.6	-4.5	-6.1	-5.6
2.7	-9.8	-5.6	-4.2	-4.1	-5.7	-5.2
2.8	-9.8	-5.2	-3.9	-3.8	-5.3	-4.8
2.9	-9.7	-4.9	-3.6	-3.5	-5.0	-4.5
3.0	-9.7	-4.6	-3.4	-3.3	-4.7	-4.1
3.1	-9.8	-4.2	-3.2	-3.1	-4.3	-4.0
3.2	-9.9	-4.1	-3.0	-2.9	-4.0	-3.7
3.3	-10.1	-3.8	-3.0	-2.8	-4.0	-3.6
3.4	-10.2	-3.7	-3.0	-2.8	-3.8	-3.6
3.5	-10.4	-3.7	-3.0	-2.8	-3.8	-3.6
3.6	-10.6	-3.7	-2.9	-2.7		-3.5
3.7	-10.7	-3.5	-2.9	-2.7		-3.5
3.8	-10.9	-3.5	-2.9	-2.6		-3.4
3.9	-11.0	-3.5	-2.8	-2.6		-3.3
4.0	-11.0		-2.8	-2.5		-3.3
4.1	-11.1	-2.8	-2.8			
4.2	-11.1	-2.8	-2.8			
4.3	-11.2	-2.9	-2.6			
4.4	-11.2	-2.9	-2.7			
4.5	-11.3	-3.0	-2.8			
4.6	-11.3	-3.1	-2.9			
4.7	-11.4	-3.2	-3.0			
4.8	-11.6	-3.4	-3.1			
4.9	-11.7	-3.5	-3.2			

Depth, m	Site #1	Site #8	Site #9
5.0	-11.9	-3.5	-3.3
5.1	-12.0		-3.4
5.2	-11.8		-3.5
5.3	-11.3		-3.7
5.4	-10.7		-3.8
5.5	-10.0		-3.9
5.6	-9.8		-4.0
5.7	-9.3		
5.8	-8.6		
5.9	-8.2		
6.0	-8.1		
6.1	-7.5		
6.2	-7.4		
6.3	-7.0		
6.4	-6.7		
6.5	-6.6		
6.6	-6.0		

Table 29. Temperature and depth data for Organic Lake, 23 September 1987

Ice Thickness: 1.25 m

Depth, m	Site #1	Site #2	Site #3	Site #5	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-9.4	-9.8	-9.8	-9.8	-9.7	-9.6	-9.8	-9.8	-9.8
0.2	-9.4	-9.8	-9.8	-9.8	-9.8	-9.6	-9.8	-9.8	-9.8
0.3	-9.5	-9.8	-9.8	-9.8	-9.8	-9.5	-9.8	-9.8	-9.8
0.4	-9.5	-9.8	-9.8	-9.8	-9.8	-9.5	-9.8	-9.8	-9.8
0.5	-9.5	-9.8	-9.8	-9.8	-9.8	-9.4	-9.8	-9.8	-9.8
0.6	-9.5	-9.7	-9.7	-9.8	-9.8	-9.3	-9.7	-9.8	-9.8
0.7	-9.5	-9.7	-9.7	-9.8	-9.7	-9.1	-9.7	-9.8	-9.7
0.8	-9.5	-9.7	-9.7	-9.8	-9.7	-9.1	-9.7	-9.8	-9.7
0.9	-9.5	-9.7	-9.7	-9.8	-9.7	-9.1	-9.7	-9.8	-9.7
1.0	-9.5	-9.7	-9.7	-9.8	-9.7	-9.1	-9.6	-9.8	-9.7
1.1	-9.5	-9.7	-9.7	-9.8	-9.7	-9.0	-9.5	-9.7	-9.7
1.2	-9.5	-9.7	-9.6	-9.8	-9.7	-9.0	-9.5	-9.7	-9.7
1.3	-9.5	-9.7	-9.6	-9.7	-9.7	-9.1	-9.6	-9.7	-9.7
1.4	-9.5	-9.7	-9.6	-9.7	-9.7	-9.0	-9.6	-9.8	-9.7
1.5	-9.5	-9.7	-9.7	-9.7	-9.7	-9.0	-9.6	-9.7	-9.7
1.6	-9.5	-9.7		-9.7	-9.7	-9.1	-9.6	-9.7	-9.7
1.7	-9.5	-9.7		-9.7	-9.4	-9.0	-9.5	-9.7	-9.7
1.8	-9.2	-9.7		-9.7	-9.2	-9.0	-9.0	-9.5	-9.6
1.9	-8.9	-9.3		-9.5	-9.2	-9.0	-8.6	-9.3	-9.5
2.0	-8.8	-9.3		-9.5	-9.2	-8.9	-8.6	-9.3	-9.3
2.1	-8.8	-9.3		-9.4	-8.4	-8.5	-8.4	-9.2	-9.3
2.2	-8.1	-8.6		-8.8	-7.7	-8.4	-7.5	-8.5	-8.4
2.3	-7.3	-7.7		-8.1	-7.1	-8.2	-6.7	-7.8	-7.7
2.4	-6.4	-7.0		-7.5	-6.5	-8.2	-6.1	-7.2	-6.9
2.5	-6.0	-6.5		-6.8	-6.1	-7.2	-5.5	-6.6	-6.3
2.6	-5.5	-5.9		-6.1	-5.7	-6.5	-5.0	-6.2	-5.8
2.7	-5.0	-5.4		-5.8	-5.3	-5.9	-4.6	-5.7	-5.4
2.8	-4.6	-5.0		-5.3	-5.0	-5.4	-4.2	-5.2	-5.0
2.9	-4.3	-4.6		-5.0	-4.7	-5.0	-3.9	-4.9	-4.7
3.0	-4.0	-4.3		-4.7	-4.5	-4.6	-3.7	-4.5	-4.3
3.1	-3.7	-4.1		-4.6	-4.1	-4.2	-3.4	-4.2	-4.1
3.2	-3.5	-3.8			-4.0	-4.0	-3.2	-3.9	-3.9
3.3	-3.3	-3.7			-3.9	-3.7	-3.1	-3.9	-3.8
3.4	-3.3	-3.7			-3.9	-3.1	-3.1	-3.9	-3.7
3.5	-3.3	-3.7			-3.8	-3.3	-3.1	-3.8	-3.7
3.6	-3.2	-3.6			-3.7	-3.2	-3.0		-3.6
3.7	-3.2	-3.6			-3.7	-3.2	-2.9		-3.5
3.8	-3.1	-3.5			-3.7	-3.2	-2.9		-3.5
3.9	-3.0	-3.3				-3.1	-2.8		-3.4
4.0	-3.8	-3.3				-3.1	-2.8		
4.1	-4.1	-3.2				-3.0	-2.7		
4.2	-2.9	-3.2				-3.0	-2.7		
4.3	-2.9	-3.2				-3.0	-2.8		
4.4	-3.0	-3.2				-3.0	-2.8		
4.5	-3.0	-3.2				-3.0	-2.9		
4.6	-3.1	-3.2				3.0	-3.0		
4.7	-3.2	-3.2				-3.1	3.0		
4.8	-3.2	-3.2				-3.2	-3.1		
4.9	-3.3	-3.3				-3.3	-3.2		

Depth, m	Site #1	Site #2	Site #8	Site #9
5.0	-3.4	-3.4	-3.4	-3.4
5.1	-3.5	-3.4	-3.4	-3.5
5.2	-3.6	-3.6	-3.6	-3.6
5.3	-3.7	-3.7		-3.7
5.4	-3.8	-3.8		-3.8
5.5	-3.9			-4.0
5.6	-4.0			-4.1
5.7	-4.1			
5.8	-4.3			
5.9	-4.4			
6.0	-4.5			
6.1	-4.6			
6.2	-4.7			
6.3	-4.8			
6.4	-4.9			
6.5	-5.1			
6.6	-5.1			

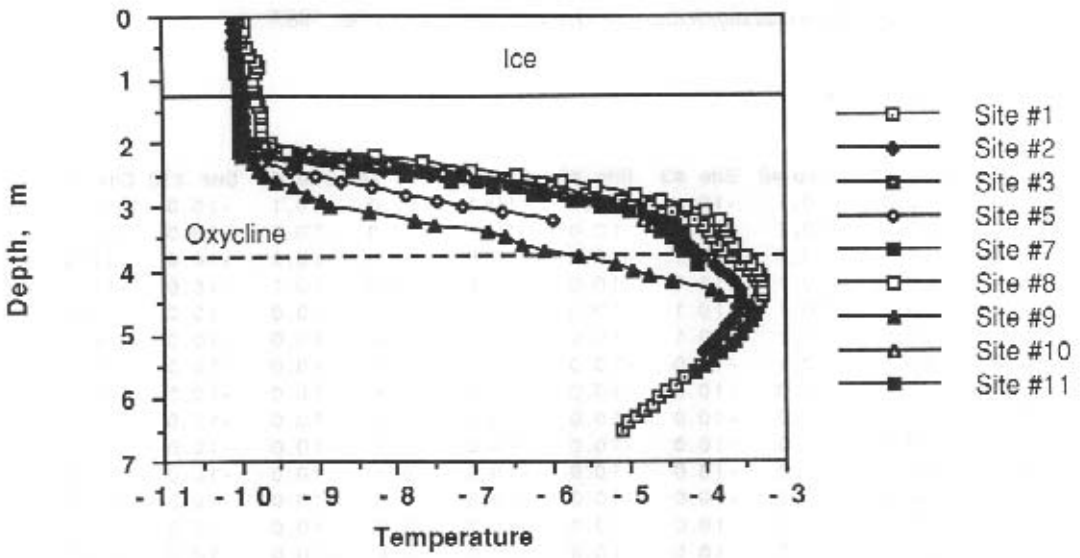


Figure 31. Thermal profiles for Organic Lake, 8 October 1987

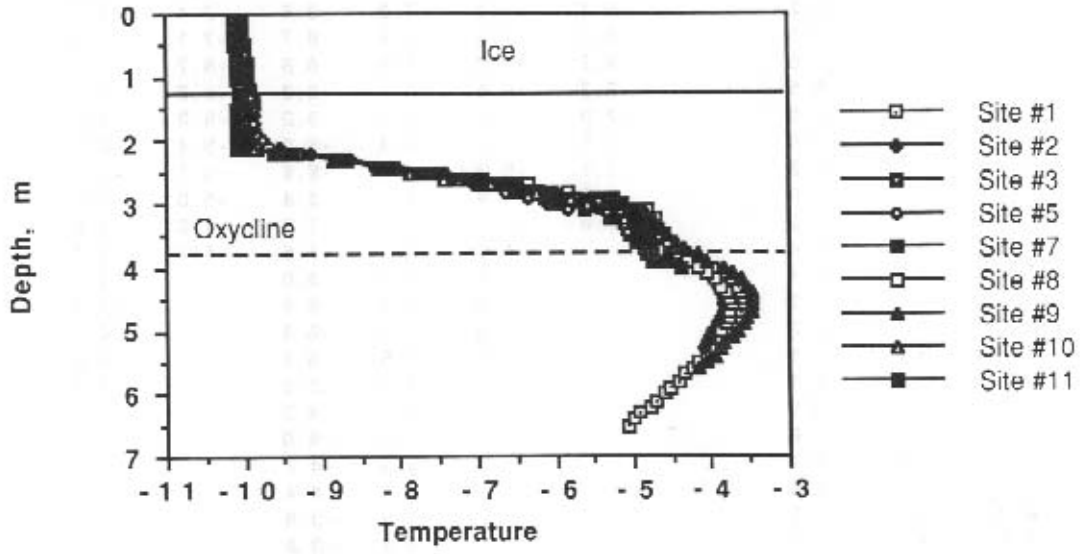


Figure 32. Thermal profiles for Organic Lake, 25 October 1987

Table 30. Temperature and depth data for Organic Lake, 8 October 1987

Ice Thickness: 1.25 m

Depth, m	Site #1	Site #2	Site #3	Site #5	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-10.0	-10.1	-10.1	-10.0	-10.1	-10.0	-10.1	-10.0	-10.0
0.2	-10.1	-10.1	-10.1	-10.0	-10.1	-10.0	-10.1	-10.0	-10.0
0.3	-10.1	-10.1	-10.1	-10.0	-10.0	-10.0	-10.1	-10.0	-10.0
0.4	-10.1	-10.1	-10.1	-10.0	-10.0	-10.0	-10.1	-10.0	-10.1
0.5	-10.1	-10.1	-10.1	-10.0	-10.0	-9.9	-10.0	-10.0	-10.1
0.6	-10.1	-10.1	-10.1	-10.0	-10.0	-9.9	-10.0	-10.0	-10.1
0.7	-10.1	-10.1	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.1
0.8	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
0.9	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.1
1.0	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
1.1	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
1.2	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
1.3	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
1.4	-10.0	-10.0	-10.0	-10.0	-10.0	-9.8	-10.0	-10.0	-10.0
1.5	-10.0	-10.0	-10.0	-10.0	-10.0	-9.7	-10.0	-10.0	-10.0
1.6	-10.0	-10.0		-10.0	-10.0	-9.7	-10.0	-10.0	-10.0
1.7	-10.0	-10.0		-10.0	-10.0	-9.7	-10.0	-10.0	-10.0
1.8	-10.0	-10.0		-10.0	-10.0	-9.7	-10.0	-10.0	-10.0
1.9	-10.0	-10.0		-10.0	-10.0	-9.7	-10.0	-10.0	-10.0
2.0	-9.9	-10.0		-10.0	-9.9	-9.6	-9.9	-9.7	-10.0
2.1	-9.7	-10.0		-10.0	-9.6	-9.4	-9.9	-9.1	-10.0
2.2	-9.2	-9.6		-10.0	-9.0	-8.3	-9.9	-8.6	-10.0
2.3	-8.4	-8.8		-9.7	-8.4	-7.7	-9.8	-8.1	-9.3
2.4	-7.7	-8.2		-9.4	-7.9	-7.0	-9.8	-7.4	-8.6
2.5	-7.1	-7.5		-9.0	-7.4	-6.5	-9.7	-7.1	-7.9
2.6	-6.5	-7.0		-8.7	-7.0	-5.9	-9.5	-6.7	-7.3
2.7	-6.0	-6.5		-8.3	-6.5	-5.4	-9.3	-6.2	-6.7
2.8	-5.5	-6.0		-7.9	-6.1	-4.9	-9.2	-5.8	-6.2
2.9	-5.1	-5.6		-7.5	-5.7	-4.6	-8.9	-5.4	-5.7
3.0	-4.7	-5.3		-7.1	-5.3	-4.3	-8.8	-5.1	-5.4
3.1	-4.5	-4.9		-6.6	-4.9	-4.0	-8.4	-5.0	-5.0
3.2	-4.2	-4.6		-6.0	-4.8	-3.8	-7.8	-4.8	-4.6
3.3	-4.0	-4.4			-4.6	-3.7	-7.5	-4.7	-4.4
3.4	-4.0	-4.4			-4.6	-3.8	-6.8		-4.3
3.5	-3.9	-4.3			-4.5	-3.7	-6.6		-4.3
3.6	-3.9	-4.2			-4.3	-3.7	-6.4		-4.3
3.7	-3.8	-4.1			-4.3	-3.6	-6.1		-4.2
3.8	-3.7	-4.1				-3.5	-5.6		-4.1
3.9	-3.6	-3.9				-3.4	-5.2		-4.1
4.0	-3.5	-3.8				-3.4	-5.0		
4.1	-3.4	-3.7				-3.3	-4.7		
4.2	-3.4	-3.6				-3.3	-4.4		
4.3	-3.3	-3.6				-3.3	-3.9		
4.4	-3.3	-3.6				-3.3	-3.8		
4.5	-3.3	-3.6				-3.4	-3.5		
4.6	-3.4	-3.6				-3.4	-3.4		
4.7	-3.4	-3.6				-3.4	-3.5		
4.8	-3.5	-3.7				-3.5	-3.4		
4.9	-3.5	-3.8				-3.6	-3.5		

Depth, m	Site #1	Site #2	Site #8	Site #9
5.0	-3.6	-3.8	-3.7	-3.6
5.1	-3.7	-3.9	-3.7	-3.6
5.2	-3.8	-4.0		-3.7
5.3	-3.9	-4.0		-3.8
5.4	-4.0			-3.9
5.5	-4.1			-4.1
5.6	-4.2			-4.2
5.7	-4.3			
5.8	-4.4			
5.9	-4.5			
6.0	-4.6			
6.1	-4.7			
6.2	-4.8			
6.3	-4.9			
6.4	-5.0			
6.5	-5.1			

Table 31. Temperature and depth data for Organic Lake, 25 October 1987

Ice Thickness: 1.25 m

Depth, m	Site #1	Site #2	Site #3	Site #5	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-10.1	-10.1	-10.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
0.2	-10.1	-10.1	-10.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
0.3	-10.0	-10.0	-10.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
0.4	-10.0	-10.0	-10.0	-10.1	-10.1	-10.0	-10.1	-10.1	-10.1
0.5	-10.0	-10.0	-10.0	-10.0	-10.1	-10.0	-10.1	-10.1	-10.1
0.6	-10.0	-10.0	-10.0	-10.0	-10.1	-10.0	-10.1	-10.1	-10.1
0.7	-10.0	-10.0	-10.0	-10.0	-10.1	-10.0	-10.1	-10.1	-10.1
0.8	-10.0	-10.0	-10.0	-9.9	-10.1	-10.0	-10.1	-10.1	-10.1
0.9	-10.0	-10.0	-10.0	-9.9	-10.1	-10.0	-10.0	-10.1	-10.1
1.0	-10.0	-10.0	-10.0	-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.1	-10.0	-10.0	-10.0	-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.2	-10.0	-10.0	-9.9	-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.3	-10.0	-10.0	-9.9	-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.4	-10.0	-10.0	-9.9	-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.5	-10.0	-10.0		-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.6	-10.0	-10.0		-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.7	-10.0	-10.0		-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.8	-10.0	-10.0		-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
1.9	-10.0	-10.0		-9.9	-10.1	-10.0	-10.0	-10.0	-10.0
2.0	-10.0	-10.0		-9.8	-10.1	-10.0	-10.0	-10.0	-10.0
2.1	-9.8	-9.9		-9.6	-10.1	-10.0	-10.0	-9.9	-10.0
2.2	-9.5	-9.2		-9.1	-9.6	-9.4	-9.4	-9.5	-9.4
2.3	-8.8	-8.8		-8.6	-8.8	-8.7	-8.7	-8.8	-8.8
2.4	-8.3	-8.3		-8.2	-8.2	-8.1	-8.0	-8.3	-8.2
2.5	-7.8	-7.8		-7.8	-7.8	-7.5	-7.4	-7.9	-7.7
2.6	-7.2	-7.3		-7.4	-7.4	-6.9	-6.9	-7.4	-7.1
2.7	-6.7	-6.8		-7.0	-7.0	-6.3	-6.4	-6.8	-6.6
2.8	-6.2	-6.3		-6.6	-6.5	-5.8	-6.0	-6.2	-6.1
2.9	-5.8	-5.9		-6.3	-6.1	-5.4	-5.5	-5.8	-5.3
3.0	-5.4	-5.4		-6.1	-6.0	-5.1	-5.2	-5.6	-5.3
3.1	-5.0	-5.0		-5.8	-5.6	-4.8	-4.9	-5.3	-5.0
3.2	-4.8	-4.9			-5.3	-4.7	-4.7	-5.1	-5.0
3.3	-4.8	-4.8			-5.1	-4.7	-4.7	-5.1	-4.9
3.4	-4.7	-4.8			-5.0	-4.7	-4.7	-5.1	-4.9
3.5	-4.6	-4.8			-5.0	-4.7	-4.5	-5.0	-4.9
3.6	-4.5	-4.6			-5.0	-4.5	-4.4		-4.8
3.7	-4.4	-4.5			-4.9	-4.5	-4.3		-4.8
3.8	-4.4	-4.4			-4.8	-4.4	-4.2		-4.7
3.9	-4.2	-4.3			-4.8	-4.3	-4.1		-4.6
4.0	-4.0	-4.2				-4.2	-3.9		-4.4
4.1	-3.9	-4.0				-4.0	-3.7		
4.2	-3.8	-4.0				-3.9	-3.6		
4.3	-3.7	-3.9				-3.9	-3.6		
4.4	-3.6	-3.9				-3.8	-3.5		
4.5	-3.6	-3.9				-3.8	-3.5		
4.6	-3.6	-3.8				-3.7	-3.5		
4.7	-3.6	-3.9				-3.8	-3.5		
4.8	-3.6	-3.9				-3.8	-3.5		
4.9	-3.7	-3.9				-3.8	-3.6		

Depth, m	Site #1	Site #2	Site #8	Site #9
5.0	-3.7	-4.0	-3.9	-3.7
5.1	-3.8	-4.0	-3.9	-3.7
5.2	-3.9	-4.1		-3.8
5.3	-4.0	-4.1		-3.9
5.4	-4.1			-4.0
5.5	-4.2			-4.1
5.6	-4.2			-4.2
5.7	-4.3			
5.8	-4.4			
5.9	-4.5			
6.0	-4.6			
6.1	-4.7			
6.2	-4.8			
6.3	-4.9			
6.4	-5.0			
6.5	-5.1			

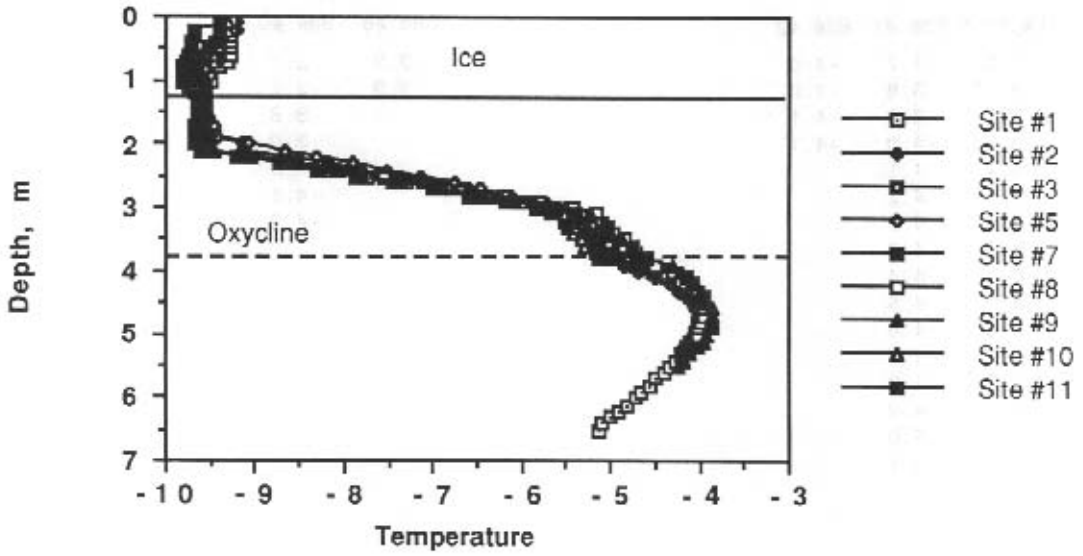


Figure 33. Thermal profiles for Organic Lake, 7 November 1987

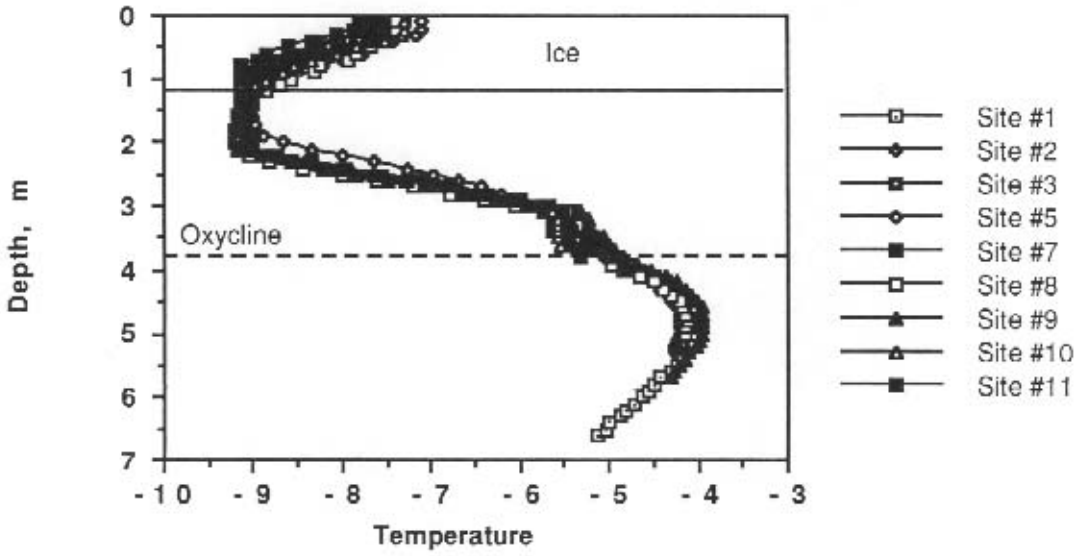


Figure 34. Thermal profiles for Organic Lake, 15 November 1987

Table 32. Temperature and depth data for Organic Lake, 7 November 1987

Ice Thickness: 1.25 m

Depth, m	Site #1	Site #2	Site #3	Site #5	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-9.3	-9.2	-9.4	-9.2	-9.2	-9.3	-9.4	-9.3	-9.4
0.2	-9.3	-9.3	-9.4	-9.2	-9.7	-9.3	-9.4	-9.3	-9.4
0.3	-9.4	-9.3	-9.4	-9.3	-9.7	-9.3	-9.4	-9.3	-9.4
0.4	-9.4	-9.4	-9.4	-9.3	-9.7	-9.3	-9.5	-9.4	-9.4
0.5	-9.4	-9.5	-9.5	-9.4	-9.7	-9.3	-9.5	-9.4	-9.5
0.6	-9.5	-9.6	-9.5	-9.5	-9.7	-9.3	-9.6	-9.5	-9.6
0.7	-9.5	-9.6	-9.5	-9.5	-9.8	-9.3	-9.6	-9.5	-9.6
0.8	-9.5	-9.7	-9.6	-9.6	-9.8	-9.4	-9.6	-9.6	-9.7
0.9	-9.5	-9.7	-9.6	-9.6	-9.8	-9.5	-9.6	-9.6	-9.7
1.0	-9.5	-9.6	-9.6	-9.6	-9.8	-9.6	-9.6	-9.6	-9.7
1.1	-9.5	-9.6	-9.6	-9.6	-9.7	-9.6	-9.6	-9.6	-9.6
1.2	-9.6	-9.6	-9.6	-9.6	-9.7	-9.6	-9.6	-9.6	-9.6
1.3	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6
1.4	-9.6	-9.6	-9.6	-9.5	-9.6	-9.6	-9.6	-9.6	-9.6
1.5	-9.6	-9.6		-9.5	-9.7	-9.6	-9.6	-9.6	-9.6
1.6	-9.6	-9.6		-9.5	-9.7	-9.6	-9.6	-9.6	-9.6
1.7	-9.6	-9.6		-9.5	-9.7	-9.6	-9.6	-9.6	-9.6
1.8	-9.6	-9.6		-9.5	-9.7	-9.6	-9.6	-9.6	-9.6
1.9	-9.6	-9.6		-9.4	-9.7	-9.6	-9.6	-9.6	-9.6
2.0	-9.6	-9.1		-9.1	-9.7	-9.5	-9.5	-9.5	-9.6
2.1	-9.6	-9.1		-8.7	-9.6	-9.5	-9.5	-9.5	-9.5
2.2	-9.2	-8.7		-8.3	-9.2	-9.0	-9.0	-9.1	-9.2
2.3	-8.7	-8.2		-7.9	-8.7	-8.5	-8.5	-8.7	-8.7
2.4	-8.2	-7.8		-7.5	-8.3	-8.1	-8.0	-8.3	-8.3
2.5	-7.7	-7.4		-7.2	-7.9	-7.5	-7.1	-7.8	-7.8
2.6	-7.3	-7.0		-6.8	-7.4	-7.1	-7.1	-7.4	-7.4
2.7	-6.8	-6.6		-6.5	-7.0	-6.6	-6.6	-6.9	-6.9
2.8	-6.4	-6.1		-6.2	-6.6	-6.2	-6.3	-6.5	-6.5
2.9	-5.9	-5.7		-6.1	-6.2	-5.8	-5.9	-6.0	-6.1
3.0	-5.6	-5.5			-5.8	-5.4	-5.5	-5.8	-5.7
3.1	-5.4	-5.4			-5.7	-5.2	-5.2	-5.5	-5.4
3.2	-5.3	-5.3			-5.5	-5.1	-5.1	-5.4	-5.3
3.3	-5.2	-5.3			-5.5	-5.0	-5.1	-5.4	-5.3
3.4	-5.2	-5.3			-5.4	-5.0	-5.0	-5.4	-5.2
3.5	-5.2	-5.3			-5.3	-4.9	-4.9	-5.3	-5.2
3.6	-5.0	-5.1			-5.2	-4.8	-4.7	-5.3	-5.1
3.7	-5.0	-5.2			-5.2	-4.7	-4.7		-5.0
3.8	-4.9	-5.0			-5.1	-4.6	-4.7		-5.0
3.9	-4.7	-4.8				-4.5	-4.3		-4.7
4.0	-4.5	-4.7				-4.3	-4.2		
4.1	-4.4	-4.5				-4.2	-4.1		
4.2	-4.2	-4.3				-4.1	-4.1		
4.3	-4.1	-4.2				-4.0	-4.0		
4.4	-4.0	-4.1				-4.0	-3.9		
4.5	-3.9	-4.1				-4.0	-3.9		
4.6	-3.9	-4.0				-3.9	-3.9		
4.7	-3.9	-4.0				-4.0	-3.9		
4.8	-3.9	-4.0				-4.0	-3.9		
4.9	-4.0	-4.0				-4.0	-3.9		

Depth, m	Site #1	Site #2	Site #8	Site #9
5.0	-4.0	-4.1	-4.0	-3.9
5.1	-4.1	-4.1		-4.0
5.2	-4.2	-4.2		-4.0
5.3	-4.2	-4.2		-4.1
5.4	-4.3			-4.2
5.5	-4.3			-4.2
5.6	-4.4			
5.7	-4.5			
5.8	-4.6			
5.9	-4.7			
6.0	-4.7			
6.1	-4.8			
6.2	-4.9			
6.3	-5.0			
6.4	-5.1			
6.5	-5.1			

Table 33. Temperature and depth data for Organic Lake, 15 November 1987

Ice Thickness: 1.20 m

Depth, m	Site #1	Site #2	Site #3	Site #5	Site #7	Site #8	Site #9	Site #10	Site #11
0.1	-7.4	-7.4	-7.3	-7.1	-7.8	-7.4	-7.7	-7.3	-7.6
0.2	-7.4	-7.4	-7.4	-7.1	-7.9	-7.4	-7.6	-7.3	-7.6
0.3	-7.6	-7.7	-7.7	-7.2	-8.1	-7.4	-7.6	-7.3	-7.7
0.4	-8.0	-8.0	-7.9	-7.4	-8.3	-7.5	-7.6	-7.5	-8.0
0.5	-8.2	-8.0	-8.2	-7.7	-8.6	-7.7	-7.9	-7.8	-8.3
0.6	-8.4	-8.3	-8.4	-7.8	-8.8	-7.8	-8.1	-8.1	-8.6
0.7	-8.6	-8.3	-8.6	-8.0	-9.0	-7.9	-8.4	-8.3	-8.7
0.8	-8.6	-8.5	-8.8	-8.2	-9.1	-8.3	-8.6	-8.5	-8.9
0.9	-8.6	-8.7	-8.8	-8.5	-9.1	-8.3	-8.7	-8.7	-9.1
1.0	-8.7	-8.9	-8.9	-8.7	-9.1	-8.6	-8.9	-8.9	-9.1
1.1	-8.9	-9.0	-9.0	-8.9	-9.1	-8.7	-9.0	-9.0	-9.1
1.2	-9.0	-9.0	-9.0	-9.0	-9.1	-8.9	-8.9	-9.0	-9.1
1.3	-9.0	-9.0	-9.0	-9.0	-9.1	-9.0	-9.0	-9.0	-9.1
1.4	-9.0	-9.1	-9.0	-9.0	-9.1	-9.1	-9.1	-9.1	-9.1
1.5	-9.0	-9.1		-9.0	-9.2	-9.1	-9.1	-9.1	-9.1
1.6	-9.1	-9.1		-9.0	-9.2	-9.1	-9.1	-9.1	-9.1
1.7	-9.1	-9.1		-9.0	-9.2	-9.1	-9.1	-9.1	-9.1
1.8	-9.1	-9.1		-9.0	-9.2	-9.1	-9.1	-9.1	-9.1
1.9	-9.1	-9.1		-8.9	-9.2	-9.1	-9.1	-9.1	-9.1
2.0	-9.0	-9.1		-8.6	-9.2	-9.1	-9.1	-9.0	-9.1
2.1	-9.0	-9.0		-8.3	-9.2	-9.1	-9.0	-9.0	-9.1
2.2	-8.7	-8.8		-8.0	-8.9	-9.1	-8.7	-8.8	-8.8
2.3	-8.4	-8.4		-7.7	-8.6	-8.8	-8.3	-8.4	-8.4
2.4	-7.9	-8.0		-7.3	-8.2	-8.4	-7.9	-8.0	-8.0
2.5	-7.5	-7.6		-7.0	-7.9	-8.0	-7.5	-7.7	-7.6
2.6	-7.2	-7.2		-6.7	-7.5	-7.6	-7.1	-7.3	-7.3
2.7	-6.7	-6.8		-6.4	-7.1	-7.2	-6.7	-6.9	-6.8
2.8	-6.4	-6.5		-6.2	-6.7	-6.8	-6.3	-6.5	-6.5
2.9	-6.0	-6.1		-6.1	-6.3	-6.4	-5.9	-6.2	-6.1
3.0	-5.7	-5.7			-6.0	-6.1	-5.6	-5.9	-5.8
3.1	-5.4	-5.5			-5.7	-5.7	-5.3	-5.6	-5.5
3.2	-5.3	-5.4			-5.6	-5.4	-5.2	-5.6	-5.5
3.3	-5.3	-5.4			-5.6	-5.4	-5.2	-5.6	-5.5
3.4	-5.3	-5.4			-5.6	-5.3	-5.2	-5.6	-5.4
3.5	-5.2	-5.3			-5.5	-5.3	-5.1	-5.6	-5.3
3.6	-5.1	-5.2			-5.5	-5.2	-5.0	-5.5	-5.2
3.7	-5.0	-5.2			-5.3	-5.1	-4.9		-5.2
3.8	-4.9	-5.1			-5.3	-5.0	-4.9		-5.0
3.9	-4.8	-4.9				-5.0	-4.7		4.9
4.0	-4.7	-4.7				-4.8	-4.5		-4.9
4.1	-4.5	-4.6				-4.7	-4.4		
4.2	-4.4	-4.5				-4.5	-4.3		
4.3	-4.3	-4.4				-4.4	-4.2		
4.4	-4.2	-4.3				-4.3	4.1		
4.5	-4.1	-4.3				-4.2	4.0		
4.6	-4.1	-4.3				-4.2	4.0		
4.7	-4.0	-4.2				-4.1	4.0		
4.8	-4.0	-4.2				-4.1	-4.0		
4.9	-4.0	-4.2				-4.1	4.0		

Depth, m	Site #1	Site #2	Site #8	Site #9
5.0	-4.0	-4.2	-4.2	-4.0
5.1	-4.0	-4.2		-4.0
5.2	-4.1	-4.3		-4.0
5.3	-4.1	-4.3		-4.1
5.4	-4.2			-4.2
5.5	-4.2			-4.2
5.6	-4.3			-4.3
5.7	-4.4			-4.3
5.8	-4.5			
5.9	-4.5			
6.0	-4.6			
6.1	-4.7			
6.2	-4.8			
6.3	-4.9			
6.4	-5.0			
6.5	-5.0			
6.6	-5.1			

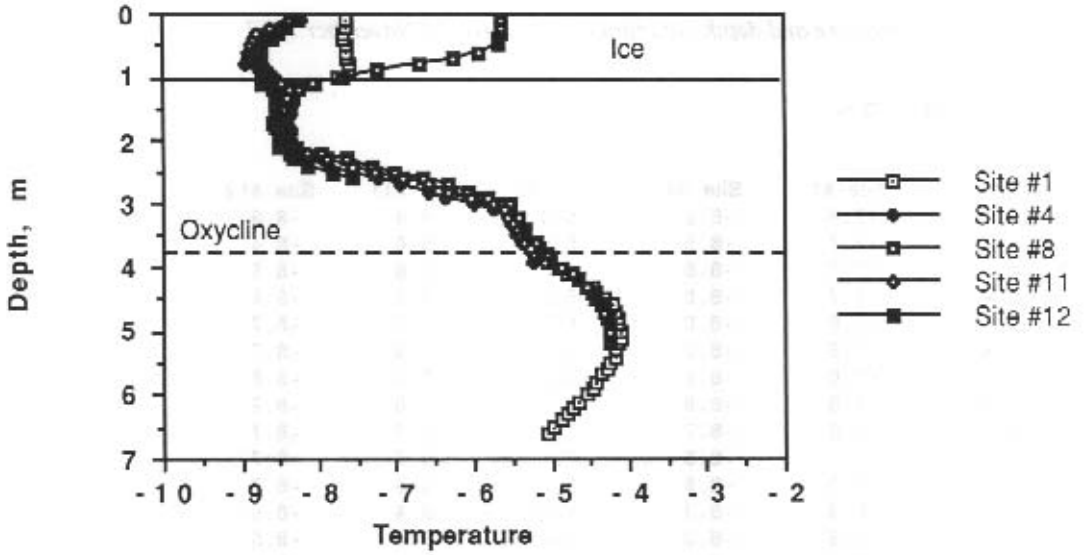


Figure 35. Thermal profiles for Organic Lake, 23 November 1987

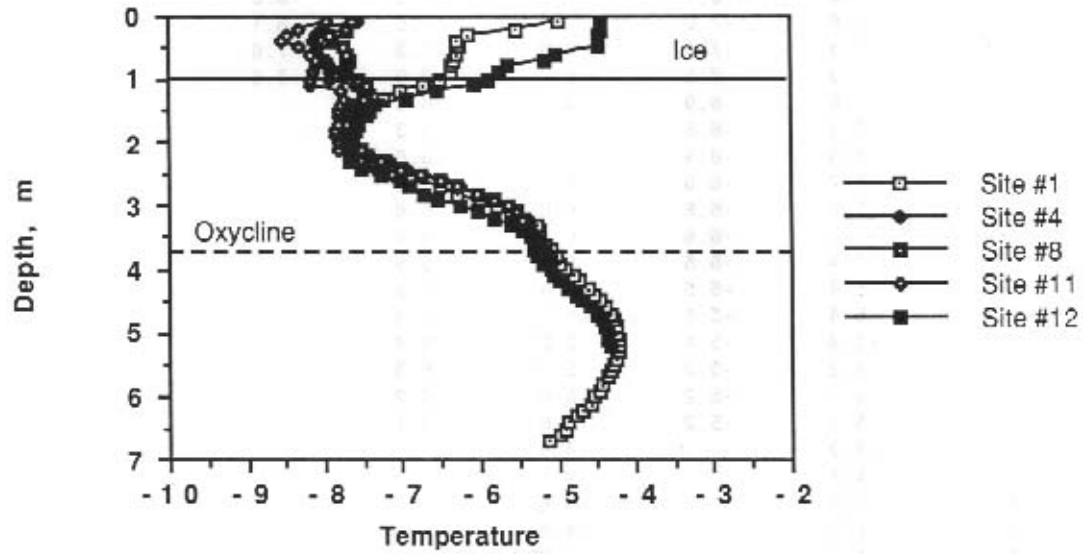


Figure 36. Thermal profiles for Organic Lake, 30 November 1987

Table 34. Temperature and depth data for Organic Lake, 23 November 1987

Ice Thickness: 1.10 m

Depth, m	Site #1	Site #4	Site #8	Site #11	Site #12
0.1	-7.6	-8.2	-5.6	-8.4	-8.3
0.2	-7.7	-8.5	-5.6	-8.6	-8.4
0.3	-7.7	-8.6	-5.6	-8.8	-8.5
0.4	-7.7	-8.8	-5.7	-8.8	-8.6
0.5	-7.6	-8.8	-5.7	-8.9	-8.7
0.6	-7.6	-8.9	-5.9	-8.9	-8.7
0.7	-7.6	-8.9	-6.3	-8.9	-8.8
0.8	-7.6	-8.9	-6.7	-8.8	-8.7
0.9	-7.6	-8.7	-7.2	-8.8	-8.7
1.0	-7.7	-8.5	-7.7	-8.7	-8.7
1.1	-8.0	-8.5	-8.1	-8.5	-8.7
1.2	-8.3	-8.3	-8.3	-8.4	-8.6
1.3	-8.3	-8.3	-8.4	-8.4	-8.5
1.4	-8.4	-8.3	-8.4	-8.4	-8.6
1.5	-8.4	-8.4	-8.5	-8.4	-8.6
1.6	-8.4	-8.4	-8.5	-8.5	-8.6
1.7	-8.4	-8.4	-8.5	-8.5	-8.6
1.8	-8.5	-8.4	-8.5	-8.5	-8.6
1.9	-8.5	-8.4	-8.5	-8.4	-8.5
2.0	-8.4	-8.4	-8.5	-8.4	-8.5
2.1	-8.4	-8.3	-8.3	-8.4	-8.5
2.2	-8.3	-8.3	-8.0	-8.2	-8.4
2.3	-7.9	-8.1	-7.6	-7.9	-8.3
2.4	-7.6	-7.9	-7.3	-7.6	-8.1
2.5	-7.3	-7.5	-7.0	-7.3	-7.8
2.6	-6.9	-7.2	-6.7	-6.9	-7.5
2.7	-6.6	-6.9	-6.3	-6.6	
2.8	-6.3	-6.6	-6.1	-6.3	
2.9	-6.0	-6.4	-5.8	-6.0	
3.0	-5.7	-6.0	-5.5	-5.8	
3.1	-5.5	-5.8	-5.5	-5.6	
3.2	-5.4	-5.6	-5.4	-5.6	
3.3	-5.4	-5.5	-5.4	-5.5	
3.4	-5.4	-5.5	-5.4	-5.5	
3.5	-5.4	-5.5	-5.3	-5.4	
3.6	-5.3	-5.4	-5.2	-5.4	
3.7	-5.2	-5.3	-5.2	-5.3	
3.8	-5.1	-5.2	-5.0	-5.2	
3.9	-5.1	-5.2	-5.0	-5.1	
4.0	-4.9		-4.9		
4.1	-4.8		-4.7		
4.2	-4.6		-4.6		
4.3	-4.5		-4.5		
4.4	-4.4		-4.5		
4.5	-4.3		-4.4		
4.6	-4.2		-4.4		
4.7	-4.2		-4.3		
4.8	-4.2		-4.3		
4.9	-4.1		-4.3		

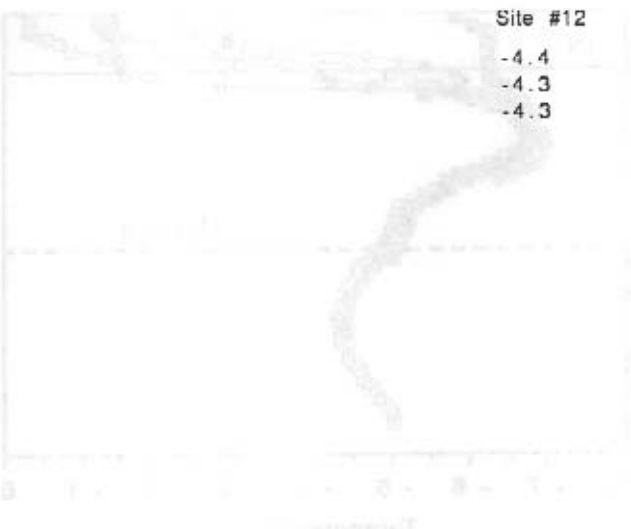
Depth, m	Site #1	Site #8
5.0	-4.1	-4.2
5.1	-4.1	-4.3
5.2	-4.1	-4.3
5.3	-4.2	
5.4	-4.2	
5.5	-4.3	
5.6	-4.3	
5.7	-4.4	
5.8	-4.4	
5.9	-4.5	
6.0	-4.6	
6.1	-4.7	
6.2	-4.7	
6.3	-4.8	
6.4	-4.9	
6.5	-5.0	
6.6	-5.1	

Table 35. Temperature and depth data for Organic Lake, 30 November 1987

Ice Thickness: 1.05 m

Depth, m	Site #1	Site #4	Site #8	Site #11	Site #12
0.1	-5.0	-7.6	-7.8	-8.0	-4.4
0.2	-5.5	-8.0	-7.7	-8.3	-4.5
0.3	-6.1	-8.1	-7.9	-8.5	-4.5
0.4	-6.3	-8.1	-7.9	-8.5	-4.5
0.5	-6.3	-8.1	-7.7	-8.3	-4.5
0.6	-6.3	-8.1	-7.7	-8.2	-5.0
0.7	-6.3	-8.0	-7.7	-8.1	-5.2
0.8	-6.4	-7.9	-7.7	-8.1	-5.6
0.9	-6.4	-7.9	-7.7	-8.1	-5.7
1.0	-6.5	-7.9	-7.6	-8.2	-5.9
1.1	-6.7	-7.6	-7.4	-8.2	-6.1
1.2	-7.0	-7.4	-7.5	-7.8	-6.5
1.3	-7.2	-7.5	-7.5	-7.7	-6.9
1.4	-7.4	-7.5	-7.6	-7.8	-7.4
1.5	-7.5	-7.5	-7.6	-7.8	-7.4
1.6	-7.6	-7.5	-7.7	-7.8	-7.5
1.7	-7.6	-7.6	-7.7	-7.8	-7.6
1.8	-7.6	-7.6	-7.7	-7.9	-7.6
1.9	-7.6	-7.6	-7.7	-7.9	-7.6
2.0	-7.6	-7.6	-7.7	-7.8	-7.7
2.1	-7.6	-7.6	-7.5	-7.8	-7.7
2.2	-7.5	-7.4	-7.5	-7.7	-7.7
2.3	-7.5	-7.2	-7.3	-7.5	-7.7
2.4	-7.3	-7.0	-7.0	-7.3	-7.5
2.5	-7.0	-6.7	-6.8	-7.1	-7.3
2.6	-6.9	-6.5	-6.5		-7.0
2.7	-6.5	-6.2	-6.3		-6.9
2.8	-6.3	-6.0	-6.1		-6.7
2.9	-6.0	-5.9	-5.8		-6.6
3.0	-5.8	-5.6	-5.6		-6.2
3.1	-5.6	-5.5	-5.5		-6.0
3.2	-5.4	-5.4	-5.5		-5.8
3.3	-5.3	-5.4	-5.4		-5.6
3.4	-5.2	-5.4	-5.4		-5.4
3.5	-5.2	-5.3	-5.3		-5.3
3.6	-5.2	-5.3	-5.3		-5.3
3.7	-5.1	-5.2	-5.2		-5.3
3.8	-5.0		-5.2		-5.3
3.9	-5.0		-5.1		-5.2
4.0	-4.9				-5.1
4.1	-4.8				-5.1
4.2	-4.7				-5.0
4.3	-4.6				-4.9
4.4	-4.6				-4.8
4.5	-4.5				-4.7
4.6	-4.4				-4.6
4.7	-4.3				-4.5
4.8	-4.3				-4.4
4.9	-4.3				-4.4

Depth, m	Site #1	Site #12
5.0	-4.2	-4.4
5.1	-4.2	-4.3
5.2	-4.2	-4.3
5.3	-4.2	
5.4	-4.3	
5.5	-4.3	
5.6	-4.3	
5.7	-4.4	
5.8	-4.4	
5.9	-4.5	
6.0	-4.6	
6.1	-4.6	
6.2	-4.7	
6.3	-4.8	
6.4	-4.9	
6.5	-4.9	
6.6	-5.0	
6.7	-5.1	



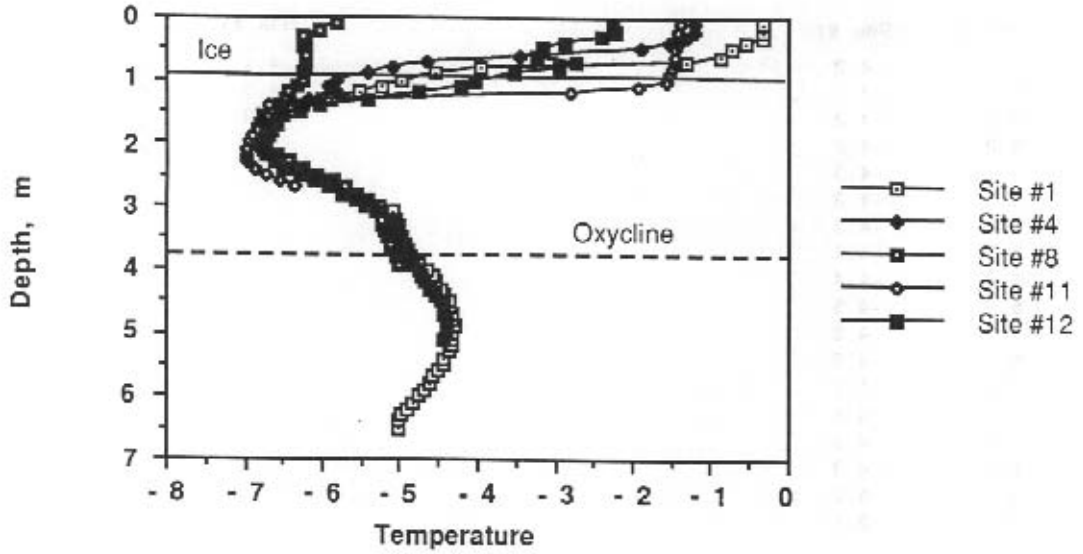


Figure 37. Thermal profiles for Organic Lake, 7 December 1987

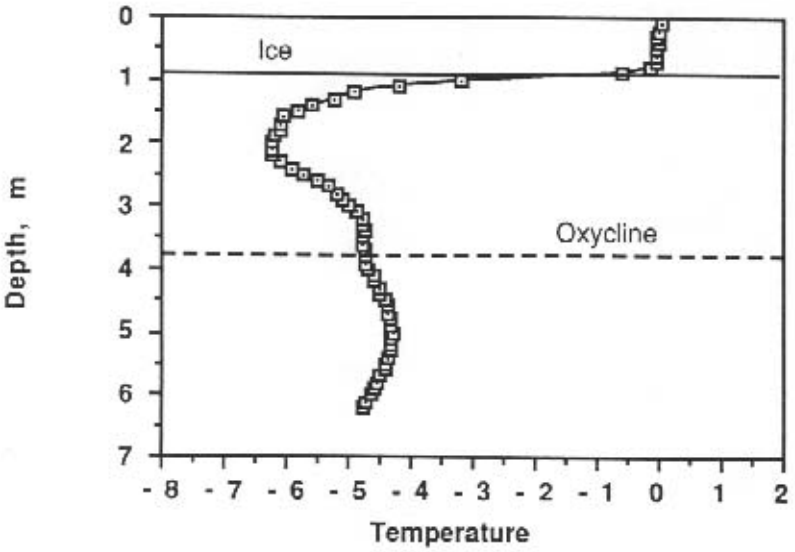


Figure 38. Thermal profile for Organic Lake, 11 December 1987

Table 36. Temperature and depth data for Organic Lake, 7 December 1987

Ice Thickness: 1.00 m

Depth, m	Site #1	Site #4	Site #8	Site #11	Site #12
0.1	-0.3	-1.2	-5.8	-1.4	-2.3
0.2	-0.3	-1.2	-6.0	-1.4	-2.2
0.3	-0.3	-1.3	-6.2	-1.4	-2.4
0.4	-0.5	-1.5	-6.2	-1.4	-2.9
0.5	-0.7	-1.9	-6.2	-1.4	-3.2
0.6	-0.9	-3.4	-6.2	-1.4	-3.2
0.7	-1.3	-4.6	-6.2	-1.5	-2.7
0.8	-4.0	-5.1	-6.2	-1.5	-2.9
0.9	-4.6	-5.4	-6.3	-1.5	-3.5
1.0	-5.0	-5.8	-6.3	-1.6	-4.0
1.1	-5.2	-5.9	-6.3	-1.9	-4.2
1.2	-5.5	-5.8	-6.4	-2.8	-4.8
1.3	-5.9	-6.2	-6.5	-6.1	-5.4
1.4	-6.2	-6.3	-6.5	-6.7	-6.0
1.5	-6.4	-6.5	-6.6	-6.7	-6.3
1.6	-6.5	-6.7	-6.7	-6.7	-6.5
1.7	-6.6	-6.8	-6.8	-6.7	-6.6
1.8	-6.7	-6.8	-6.8	-6.8	-6.7
1.9	-6.7	-6.8	-6.8	-6.9	-6.7
2.0	-6.8	-6.8	-6.8	-7.0	-6.7
2.1	-6.8	-6.8	-6.7	-7.0	-6.7
2.2	-6.7	-6.7	-6.6	-7.0	-6.7
2.3	-6.6	-6.6	-6.4	-7.0	-6.6
2.4	-6.5	-6.4	-6.2	-6.9	-6.5
2.5	-6.2	-6.2	-6.1	-6.7	-6.3
2.6	-6.0	-6.1	-5.9	-6.5	-6.1
2.7	-5.8	-5.9	-5.7	-6.4	-5.9
2.8	-5.6	-5.7	-5.6		-5.7
2.9	-5.4	-5.6	-5.4		-5.6
3.0	-5.3	-5.4	-5.3		-5.4
3.1	-5.1	-5.3	-5.3		-5.3
3.2	-5.1	-5.2	-5.2		-5.1
3.3	-5.0	-5.2	-5.2		-5.1
3.4	-5.0	-5.2	-5.2		-5.1
3.5	-5.0	-5.2	-5.2		-5.0
3.6	-5.0	-5.1	-5.1		-5.0
3.7	-4.9	-5.0	-5.1		-4.9
3.8	-4.9	-5.0	-5.1		-4.9
3.9	-4.8		-5.0		-4.9
4.0	-4.7				-4.8
4.1	-4.6				-4.7
4.2	-4.5				-4.7
4.3	-4.5				-4.6
4.4	-4.4				-4.6
4.5	-4.4				-4.5
4.6	-4.3				-4.5
4.7	-4.3				-4.4
4.8	-4.3				-4.4
4.9	-4.3				-4.4

Depth, m	Site #1	Site #12
5.0	-4.3	-4.4
5.1	-4.3	-4.4
5.2	-4.3	
5.3	-4.4	
5.4	-4.4	
5.5	-4.4	
5.6	-4.5	
5.7	-4.6	
5.8	-4.6	
5.9	-4.7	
6.0	-4.8	
6.1	-4.8	
6.2	-4.9	
6.3	-5.0	
6.4	-5.0	
6.5	-5.0	

Table 37. Temperature and depth data for Organic Lake, 11 December 1987

Ice Thickness: 0.95 m

Depth, m	Site #1	Depth, m	Site #1
0.1	0.0	4.1	-4.6
0.2	0.0	4.2	-4.6
0.3	0.0	4.3	-4.5
0.4	0.0	4.4	-4.5
0.5	0.0	4.5	-4.4
0.6	0.0	4.6	-4.4
0.7	-0.1	4.7	-4.3
0.8	-0.1	4.8	-4.3
0.9	-0.6	4.9	-4.3
1.0	-3.2	5.0	-4.3
1.1	-4.2	5.1	-4.3
1.2	-4.9	5.2	-4.3
1.3	-5.2	5.3	-4.3
1.4	-5.6	5.4	-4.3
1.5	-5.8	5.5	-4.4
1.6	-6.0	5.6	-4.4
1.7	-6.1	5.7	-4.5
1.8	-6.1	5.8	-4.6
1.9	-6.2	5.9	-4.6
2.0	-6.2	6.0	-4.7
2.1	-6.2	6.1	-4.7
2.2	-6.2	6.2	-4.8
2.3	-6.1		
2.4	-5.9		
2.5	-5.7		
2.6	-5.5		
2.7	-5.3		
2.8	-5.2		
2.9	-5.1		
3.0	-5.0		
3.1	-4.9		
3.2	-4.8		
3.3	-4.8		
3.4	-4.8		
3.5	-4.8		
3.6	-4.8		
3.7	-4.7		
3.8	-4.7		
3.9	-4.7		
4.0	-4.7		

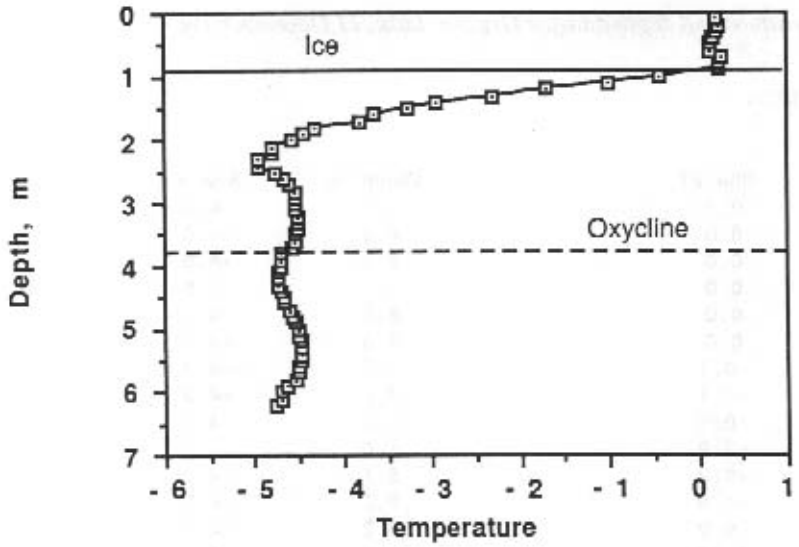


Figure 39. Thermal profile for Organic Lake, 20 December 1987

Table 38. Temperature and depth data for Organic Lake, 20 December 1987

Ice Thickness: 0.90 m

Depth, m	Site #1	Depth, m	Site #1
0.1	0.2	4.1	-4.7
0.2	0.3	4.2	-4.7
0.3	0.2	4.3	-4.7
0.4	0.2	4.4	-4.7
0.5	0.1	4.5	-4.7
0.6	0.1	4.6	-4.6
0.7	0.3	4.7	-4.6
0.8	0.2	4.8	-4.6
0.9	0.2	4.9	-4.5
1.0	-0.4	5.0	-4.5
1.1	-1.0	5.1	-4.5
1.2	-1.7	5.2	-4.5
1.3	-2.3	5.3	-4.5
1.4	-3.0	5.4	-4.5
1.5	-3.3	5.5	-4.5
1.6	-3.7	5.6	-4.5
1.7	-3.8	5.7	-4.5
1.8	-4.3	5.8	-4.5
1.9	-4.4	5.9	-4.6
2.0	-4.6	6.0	-4.7
2.1	-4.8	6.1	-4.7
2.2	-4.8	6.2	-4.8
2.3	-4.9		
2.4	-5.0		
2.5	-4.8		
2.6	-4.6		
2.7	-4.6		
2.8	-4.6		
2.9	-4.5		
3.0	-4.5		
3.1	-4.5		
3.2	-4.5		
3.3	-4.5		
3.4	-4.5		
3.5	-4.5		
3.6	-4.5		
3.7	-4.6		
3.8	-4.7		
3.9	-4.7		
4.0	-4.7		

ACKNOWLEDGMENTS

The authors wish to thank the 1985-86 summer personnel and the 1987 wintering expeditioners at Davis, especially Russell Garrick and Terry Newton, for their assistance in the field. Daniel Eslake supplied the profile of Pendant Lake.

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