

NOAA Technical Memorandum ERL GLERL-3
(GLERL Contribution No. 32)

LAKE SUPERIOR BATHY THERMOGRAPH DATA

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Ann Arbor, Michigan
June 1975

UNITED STATES
DEPARTMENT OF COMMERCE
Rogers C.B. Morton, Secretary

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
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Environmental Research
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George A. Leshkevich

Water temperature profiles for a longitudinal cross section of Lake Superior were collected aboard vessels operated by the United States Steel Corporation during the 1972-73 and 1973-74 winter seasons. Seven cruises were made during this period, four during the first winter season and three during the second. This information was collected as part of the Great Lakes Environmental Research Laboratory's participation in the program to examine the feasibility of an extended navigation season on the Great Lakes and the St. Lawrence Seaway.

The temperature profiles were made with a portable expendable bathythermograph system and were taken at 30-minute to 1-hour intervals, resulting in 24 to 45 measurements per cruise. Temperature profile data from the surface to a maximum depth of 200 m (656.16 ft) is presented in tabular form for each cast.

1. INTRODUCTION

This report presents water temperature profile data collected across Lake Superior as part of the Great Lakes Environmental Research Laboratory's¹ participation in the multi-year demonstration program to extend the navigation season on the Great Lakes and the St. Lawrence Seaway. Water temperature profiles were taken in the months of December, January, and February during the 1972-73 and 1973-74 winter seasons.

Temperature measurements were made using an expendable bathythermograph (XBT) system and were taken from ore carriers of the United States Steel Corporation's Great Lakes Fleet. This report describes the instrumentation and methods used in collecting the temperature profiles and presents an edited version of this data in tabular form.

¹ In April 1974, the Limnology Division, Lake Survey Center, National Ocean Survey, was transferred to the Great Lakes Environmental Research Laboratory of the Environmental Research Laboratories. Reference is made to Lake Survey Center since this work was initiated and conducted under that organization.

2. DATA COLLECTION

2.1 Sampling Program

It was the express purpose of this program to collect water temperature data across Lake Superior beginning during the time of fall overturn and continuing for as long as possible thereafter. To reach this objective, a sampling program was initiated to take water temperature profile measurements across the lake at periodic intervals. These intervals were affected by weather conditions as well as ice conditions and ship schedules but in general were approximately 2 weeks in length.

Seven cruises were made during the two winter seasons (see table 1). A cruise, usually taking 2 or 3 days, is defined as the time period required for a vessel to transit the lake either in an eastward (downbound) direction from Duluth or Two Harbors, Minn., to the locks at Sault Ste. Marie, Mich., or westward (upbound) from the Soo locks to Two Harbors. The sequence of the XBT casts varied depending on whether one or two persons made the cruise (see table 2 for dates and locations of XBT casts). During the four cruises of the 1972-73 winter season, the casts were made consecutively on a 24-hour basis, while those of the 1973-74 winter season were made in two segments, half of them being taken upbound and half taken downbound, with an area of overlap abeam of the Keweenaw Peninsula. The cruises were made aboard commercial vessels following the Lake Carriers' Association's recommended shipping route (see figure 1). It should be noted, however, that the courses and subsequently the station sites are not the same for all cruises.

2.2 Equipment

The water temperature profiles were taken by means of a portable XBT system and were continuously recorded in degrees Celsius from the surface to the bottom or to a maximum depth of 200 m (656.16 ft) for each station. A Sippican Expendable Bathythermograph Recorder, model MK 2A-1, with a KOR 12 shallow water modification kit was used, coupled with a model LM 3-1 hand held launcher and Sippican T-10 XBT probes (see figure 2). Model MK 2A-1 has a temperature sensing range of -1.7°C to $+35.5^{\circ}\text{C}$ (28°F to 96°F), a temperature recording accuracy of $\pm 0.2^{\circ}\text{C}$ ($\pm 0.4^{\circ}\text{F}$), and a depth recording accuracy of $\pm 2\%$ or 4.57 m (15 ft), whichever is greater.

2.3 Methods

The recorder was set up at a 120 volt a.c. power supply near the stern of the ship in an area that would be maintained at temperatures above 0°C (32°F). A 15.24 m (50 ft) electrical cord connected the recorder to the hand held launcher and thus provided some flexibility of recorder location. The procedure for making a temperature profile

Table 1. Bathythermograph Cruises, 1972-73 Winter Season

Cruise No.	Date	Vessel	Number of Stations
1	20, 21 Dec. 1972	C. J. Callaway	44*
2	27, 28 Dec. 1972	P. R. Clarke	45*
3	15, 16 Jan. 1973	A. M. Anderson	30
4	31 Jan., 1 Feb. 1973	C. J. Callaway	28

1973-74 Winter Season			
Cruise No.	Date	Vessel	Number of Stations
1	19, 20, 21 Dec. 1973	A. M. Anderson	31*
2	10, 11, 12 Jan. 1974	A. H. Ferbert	32*
3	22, 23 Jan. 1974	P. R. Clarke	24

* Due to malfunctioning probes, ice interference, or other factors, the actual number of stations with valid data differs slightly.

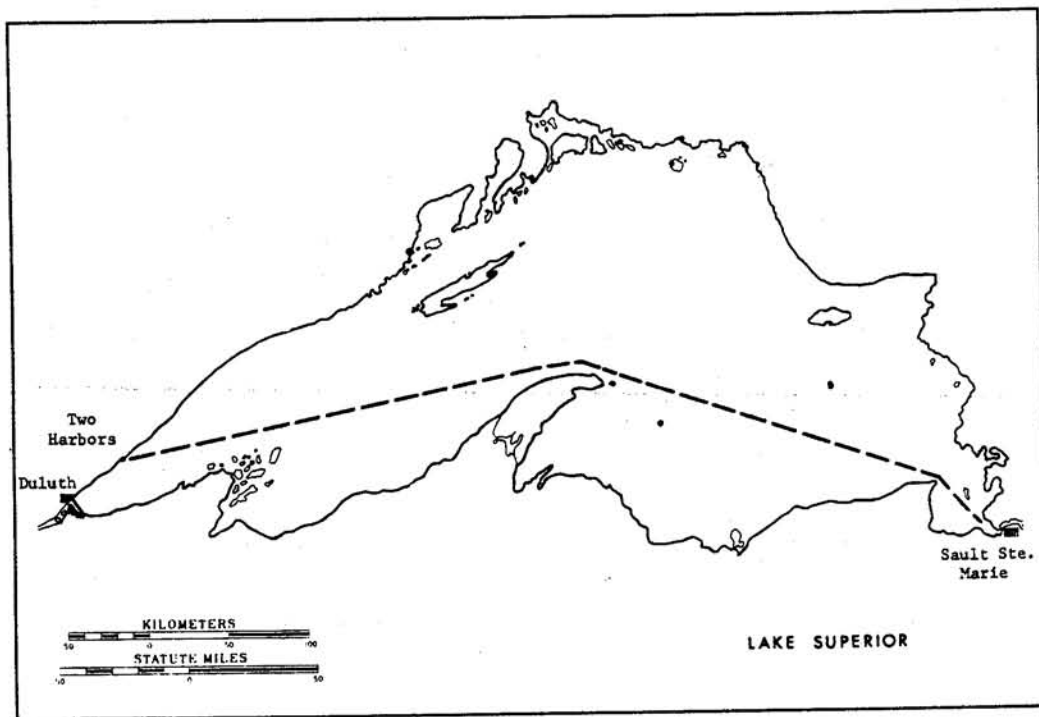


Figure 1. Lake Carriers' Association's recommended shipping route.

measurement consisted of loading an XBT canister into the hand held launcher, checking to see that the recorder calibrated at 16.7°C (62°F), taking the launcher to a convenient location on deck, and releasing the probe clear of the ship. When the release pin holding the probe in the canister is withdrawn, the probe falls from the canister and descends through the water unwinding a thin wire from the probe spool. The canister remains in the launcher with wire also unwinding from its spool. The two spools of wire, unwinding simultaneously, allow the wire to lie free in the water from the point of entry without being affected by the moving ship or the descending probe. The weighted nose of the XBT probe contains a temperature-sensitive thermistor, and the probe is spin-stabilized to assure a known velocity profile. A record of temperature in degrees Celsius and of depth in meters to a maximum depth of 200 m (656.16 ft) was continuously recorded as a graph on a calibrated paper chart for each cast (see figure 3).

Casts were made at 30-minute to 1-hour intervals, depending upon the detail desired for each cruise or portion of a cruise.

3. DATA REDUCTION AND PRESENTATION

3.1 Data Reduction

After each cruise the ship's course and the station sites were plotted on a lake chart using information recorded from the ship's log. The temperature-depth profile for each station was abstracted from the graph to a coding form along with the cruise number, station number, latitude and longitude to the nearest hundredth of a degree, maximum depth at the station to the nearest meter, and the date. The temperatures were recorded to the nearest tenth of a degree for each meter to a depth of 100 m (328.08 ft) and thereafter for each 10 m (32.81 ft) of depth to a maximum of 200 m (656.16 ft). The information on the coding forms was subsequently punched on computer cards.

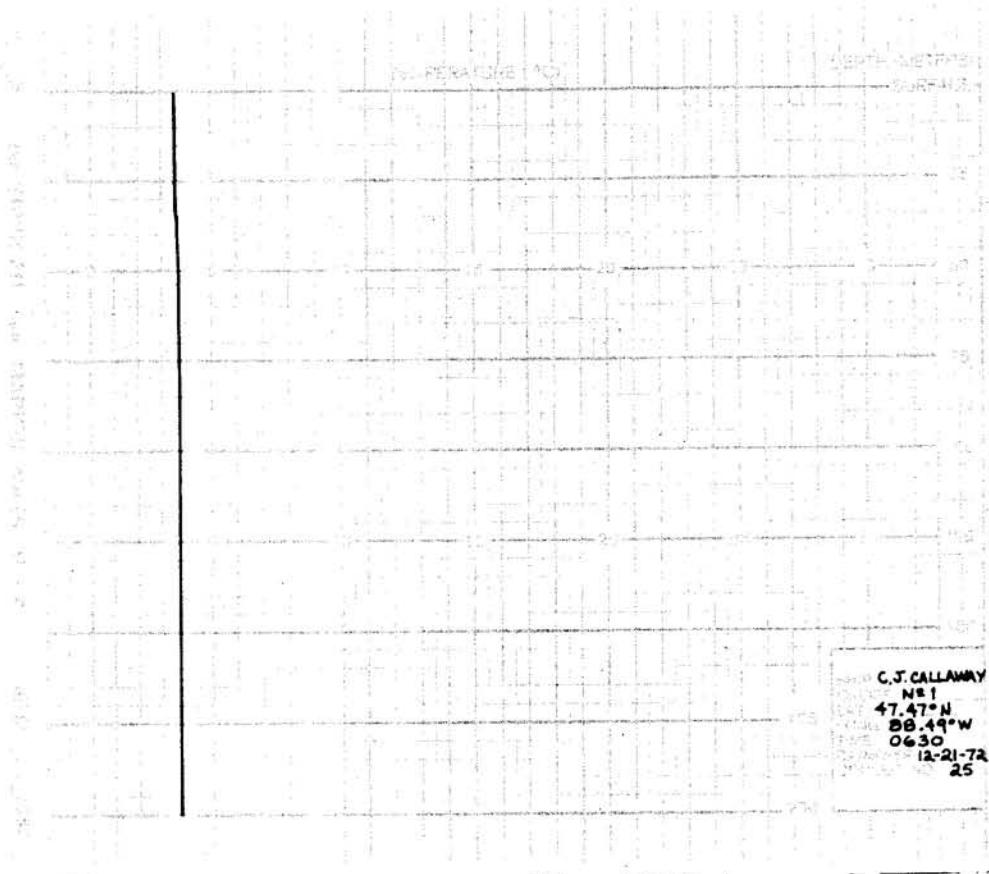
3.2 Data Presentation

Because the data gathered during the seven cruises is too voluminous to reproduce in its entirety, only an edited version is presented in this report. A computer program was written to print temperature and depth only when the temperature changes by 0.1°C (\approx 0.2°F) or more in a 1-m depth increment for the first 100 m and in a 10-m depth increment for depths from 100 to 200 m. Table 2 presents this data in tabular form. At station 25 of Cruise 1, 1972, for example, the temperature at the surface was 3.5°C, (38.3°F), changed to 3.6°C, (38.5°F) at 41 m (134.51 ft) and remained at that temperature (see figure 3). In table 2 this data is presented as follows: surface temperature 3.5°C, change in temperature to 3.6°C at 41 m, temperature at the deepest reading, which at this station is 200 m, 3.6°C.



Figure 2. Bathythermograph recording equipment (photograph used with permission of the Sippican Corp., Marion, Massachusetts).

Figure 3. XBT chart for station 25, cruise 1, 1972 (chart used with permission of the Sippican Corp., Marion, Massachusetts).



4. ACKNOWLEDGMENTS

This work was carried out under the general guidance of Dr. Frank H. Quinn, Head of the Lake Hydrology Group, and Charles Adams, formerly of the Lake Hydrology Group, Great Lakes Environmental Research Laboratory. Funding was provided under the Great Lakes-St. Lawrence Seaway Navigation Season Extension Demonstration Program.

The cooperation and hospitality of the captains and crews of the ore carriers of the United States Steel Corporation's Great Lakes Fleet is gratefully acknowledged. A special note of thanks goes to Captain Rankin and his associates at United States Steel who often on short notice granted permission and made arrangements for members of our staff to ride vessels of the fleet across Lake Superior.

Table 2. Changes in Temperature at Bathythermograph Casts

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	3	46.57N	84.71W	40M	12/20/72

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.50	3
2.60	5
2.80	7
3.00	8
3.50	9
3.60	10
3.80	11
4.00	12
4.20	13
4.50	14
4.60	16
4.80	17
5.00	18
5.10	22
5.20	24
5.30	28
5.40	32
5.50	35
5.50	40

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	1	46.45N	84.53W	18M	12/20/72

TEMPERATURE (C)	DEPTH (M)
.80	0
.90	6
.90	18

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	2	46.52N	84.62W	6M	12/20/72

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.80	6

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	4	46.75N 84.85W	33M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	5	46.76N 84.92W	62M
=====			
TEMPERATURE (C)			DEPTH (M)
2.10			0
2.20			4
2.30			9
2.40			10
2.50			11
2.60			12
2.70			13
2.80			15
2.90			18
3.00			20
3.10			26
3.20			29
3.40			32
3.60			33

TEMPERATURE (C)			DEPTH (M)
.80			0
.90			1
1.00			2
1.10			4
1.30			6
1.40			7
1.50			8
1.60			9
1.70			10
1.90			11
2.00			12
2.10			16
2.20			18
2.30			19
2.40			22
2.50			25
2.60			27
2.80			28
2.90			29
3.00			30
3.00			62

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 6	46.83N	85.10W	40M 12/20/72
=====			
TEMPERATURE (C)		DEPTH (M)	
2.00		0	
2.10		16	
2.20		17	
2.30		18	
2.40		19	
2.50		20	
2.60		22	
2.70		24	
2.80		31	
2.80		40	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 7	46.87N	85.25W	45M 12/20/72
=====			
TEMPERATURE (C)		DEPTH (M)	
No data for station.			
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 8	46.92N	85.43W	97M 12/20/72
=====			
TEMPERATURE (C)		DEPTH (M)	
3.40		0	
3.50		11	
3.50		97	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 9	46.97N	85.61W	150M 12/20/72
=====			
TEMPERATURE (C)		DEPTH (M)	
4.00		0	
4.00		150	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 10	47.02N	85.79W	178M 12/20/72
=====			
TEMPERATURE (C)		DEPTH (M)	
4.00		0	
4.10		33	
4.20		34	
4.30		36	
4.40		37	
4.50		38	
4.60		39	
4.70		40	
4.80		43	
4.90		44	
5.00		45	
5.30		46	
5.50		47	
5.60		48	
5.50		62	
5.30		70	
5.20		79	
5.10		86	
5.00		91	
4.90		120	
4.80		130	
4.70		150	
4.60		160	
4.60		178	
=====			

Table 2. Changes in Temperature at Bathymograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1	11	47.06N 85.96W	200M 12/20/72
=====			
TEMPERATURE (C)			DEPTH (M)
4.00			0
4.00			200
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1	12	47.10N 86.13W	200M 12/20/72
=====			
TEMPERATURE (C)			DEPTH (M)
4.10			0
4.20			28
4.30			36
4.20			96
4.20			200
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1	13	47.15N 86.32W	144M 12/21/72
=====			
TEMPERATURE (C)			DEPTH (M)
4.10			0
4.20			43
4.30			46
4.40			47
4.50			48
4.60			49
4.70			50
4.80			52
4.90			54
5.00			55
4.90			92
4.80			110
4.70			130
4.70			138
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1	14	47.20N 86.49W	218M 12/21/72
=====			
TEMPERATURE (C)			DEPTH (M)
4.10			0
4.20			50
4.20			200
=====			

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
15	47.24N	86.66W	233M
1			12/21/72
=====			
TEMPERATURE (C)		DEPTH (M)	
4.00		0	
4.10		16	
4.20		45	
4.30		78	
4.30		200	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
18	47.38N	87.19W	273M
1			12/21/72
=====			
TEMPERATURE (C)		DEPTH (M)	
3.60		0	
3.70		75	
3.70		200	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
19	47.42N	87.38W	204M
1			12/21/72
=====			
TEMPERATURE (C)		DEPTH (M)	
3.50		0	
3.60		95	
3.70		160	
3.70		200	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
16	47.28N	86.84W	237M
1			12/21/72
=====			
TEMPERATURE (C)		DEPTH (M)	
3.70		0	
3.80		190	
3.90		200	
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
17	47.33N	87.01W	252M
1			12/21/72
=====			
TEMPERATURE (C)		DEPTH (M)	
3.70		0	
3.80		60	
3.90		180	
3.90		200	
=====			

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
=====			
1	20	47.46N 87.55W	120M
=====			
CRUISE STA.NO. LAT. LONG. MAX. DEPTH			
=====			
1	21	47.50N 87.73W	100M
=====			

TEMPERATURE (C)	DEPTH (M)
1.70	0
1.80	8
2.00	9
2.30	13
2.50	14
2.60	15
2.80	16
3.00	17
3.20	18
3.30	19
3.40	20
3.50	24
3.50	120

TEMPERATURE (C)	DEPTH (M)
1.20	0
1.30	5
1.40	8
1.50	12
1.60	15
1.70	17
1.80	20
1.90	24
2.00	29
2.10	48
2.20	49
2.30	52
2.40	53
2.50	55
2.60	62
2.70	68
2.80	77
2.90	82
3.00	85
3.00	100

Table 2. Changes in Temperature at Bathymograph Casts (continued)

=====			
CRUISE	STA.NO.	LAT.	LONG.
1	22	47.52N	87.90W
			110M
			12/21/72
=====			
CRUISE	STA.NO.	LAT.	LONG.
1	23	47.51N	88.09W
			170M
			12/21/72
=====			

TEMPERATURE (C)	DEPTH (M)
.60	0
.70	7
.80	11
.80	12
.90	13
1.00	14
1.20	15
1.30	16
1.50	17
1.60	18
1.70	19
1.80	20
2.00	22
2.10	23
2.20	25
2.30	26
2.40	27
2.50	30
2.60	33
2.70	34
2.90	35
3.00	46
3.10	47
3.20	50
3.30	54
3.40	60
3.50	67
3.60	69
3.70	70
3.80	76
3.90	91
4.00	110

TEMPERATURE (C)	DEPTH (M)
.60	0
.70	9
.80	13
.90	17
1.00	18
1.30	19
1.40	20
1.50	22
1.60	23
1.70	24
1.80	25
1.90	26
2.00	27
2.10	30
2.20	32
2.30	33
2.40	34
2.50	38
2.60	41
2.70	43
2.80	44
3.00	48
3.10	51
3.20	53
3.30	57
3.40	65
3.50	89
3.50	170

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

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=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 26 47.44N 88.68W 210M 12/21/72
=====

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=====
TEMPERATURE (C) DEPTH (M)
3.60 0
3.70 51
3.80 180
3.90 190
4.10 200
=====

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=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 27 47.43N 88.87W 150M 12/21/72
=====

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=====
TEMPERATURE (C) DEPTH (M)
3.60 0
3.70 73
3.70 150
=====

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=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 24 47.49N 88.30W 236M 12/21/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
2.80 0
2.90 8
3.00 9
3.10 18
3.20 22
3.30 23
3.40 24
3.50 25
3.60 32
3.70 34
3.80 35
3.90 38
4.00 40
3.90 77
3.80 86
3.70 110
3.70 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 25 47.47N 88.49W 229M 12/21/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
3.50 0
3.60 41
3.60 200
=====

```


Table 3. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	28	47.41N	89.08W	140M	12/21/72
=====					
CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
1	30	47.39N	89.48W	160M	12/21/72
=====					
TEMPERATURE (C)				DEPTH (M)	
3.50				0	
3.60				31	
3.70				32	
3.80				46	
3.90				51	
4.00				54	
4.10				59	
4.20				61	
4.30				63	
4.40				65	
4.50				76	
4.60				81	
4.70				84	
4.80				85	
4.90				89	
5.00				95	
5.10				120	
5.20				130	
5.30				140	
=====					
CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
1	31	47.37N	89.67W	175M	12/21/72
=====					
TEMPERATURE (C)				DEPTH (M)	
3.60				0	
3.70				110	
3.80				160	
4.00				170	
4.00				175	
=====					
CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
1	29	47.41N	89.26W	185M	12/21/72
=====					
TEMPERATURE (C)				DEPTH (M)	
3.50				0	
3.60				51	
3.70				88	
3.80				150	
3.90				170	
4.10				180	
4.20				185	
=====					
CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
1	32	47.35N	89.75W	160M	12/21/72
=====					
TEMPERATURE (C)				DEPTH (M)	
3.50				0	
3.60				36	
3.70				71	
3.70				160	

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 33	47.33N	89.50W	127M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 36	47.21N	90.41W	85M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 37	47.17N	90.58W	50M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 38	47.13N	90.75W	38M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 33	47.33N	89.50W	127M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 34	47.31N	90.08W	125M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1 35	47.27N	90.25W	107M
=====			

TEMPERATURE (C)	DEPTH (M)
3.20	0
3.30	11
3.40	96
3.50	127

TEMPERATURE (C)	DEPTH (M)
2.60	0
2.70	57
2.70	85

TEMPERATURE (C)	DEPTH (M)
3.10	0
3.20	68
3.30	110
3.30	125

TEMPERATURE (C)	DEPTH (M)
2.40	0
2.40	50

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	29
2.00	31
2.10	33
2.20	34
2.20	38

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	39	47.08N	90.92W	43M	12/21/72
TEMPERATURE (C)					
				DEPTH (M)	
				0	1.00
				21	1.10
				22	1.20
				23	1.30
				24	1.40
				25	1.50
				26	1.60
				27	1.70
				29	1.80
				31	1.90
				34	2.00
				38	2.10
				39	2.30
				43	2.30

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	41	47.00N	91.22W	102M	12/21/72
TEMPERATURE (C)					
				DEPTH (M)	
				0	2.70
				33	2.80
				37	2.90
				41	3.00
				51	3.10
				65	3.20
				68	3.30
				75	3.40
				78	3.50
				83	3.60
				84	3.80
				85	4.00
				102	4.00

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	40	47.05N	91.07W	86M	12/21/72
TEMPERATURE (C)					
				DEPTH (M)	
				0	2.60
				44	2.70
				65	2.80
				76	2.90
				84	3.00
				86	3.00

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	42	46.96N 91.38W	102M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	43	46.91N 91.55W	102M
=====			
TEMPERATURE (C)	DEPTH (M)	TEMPERATURE (C)	DEPTH (M)
2.50	0	2.20	0
2.60	31	2.30	18
2.70	34	2.40	28
2.80	46	2.50	34
2.90	48	2.60	36
3.00	50	2.70	45
3.10	52	2.80	48
3.20	54	2.90	53 ⁿ
3.30	66	3.00	55
3.40	67	3.10	58
3.50	68	3.20	59
3.60	69	3.30	60
3.70	73	3.40	63
3.80	99	3.50	70
3.80	102	3.60	74
		3.70	76
		3.80	78
		4.00	84
		4.00	102

Table 1. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE	STA. NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	44	46.88N	91.70W	102M	12/21/72

TEMPERATURE (C)	DEPTH (M)
2.25	0
2.30	33
2.40	39
2.50	42
2.60	49
2.70	52
2.80	58
2.90	59
3.00	64
3.10	68
3.20	70
3.30	72
3.40	73
3.50	75
3.60	78
3.70	94
3.70	102

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.11N	91.20W	168M	12/27/72

TEMPERATURE (C)	DEPTH (M)
2.50	0
2.60	42
2.70	44
2.80	48
2.90	69
3.00	75
3.10	88
3.20	92
3.30	110
3.50	120
3.60	130
3.70	150
3.70	168

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	47.03N	91.62W	130M	12/27/72

TEMPERATURE (C)	DEPTH (M)
3.00	0
3.10	59
3.20	68
3.30	83
3.40	95
3.50	110
3.60	130

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.08N	91.37W	201M	12/27/72

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.15N	91.03W	150M	12/27/72

TEMPERATURE (C)	DEPTH (M)
No data for station.	

TEMPERATURE (C)	DEPTH (M)
2.80	0
2.90	50
3.00	54
3.10	59
3.20	62
3.30	63
3.40	94
3.50	98
3.60	110
3.70	130
3.80	140
3.80	200

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.23N	90.61W	65M	12/27/72

TEMPERATURE (C)	DEPTH (M)
2.00	0
2.10	26
2.20	33
2.30	37
2.40	45
2.50	55
2.50	65

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.24N	90.53W	77M	12/27/72

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	32
2.30	36
2.40	47
2.50	57
2.60	67
2.70	71
2.70	77

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.16N	90.99W	147M	12/27/72

TEMPERATURE (C)	DEPTH (M)
2.50	0
2.60	55
2.70	62
2.80	66
2.90	90
3.00	94
3.30	110
3.40	120
3.50	130
3.50	147

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.19N	90.83W	104M	12/27/72

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.40	41
2.50	49
2.60	81
2.70	83
2.80	87
2.80	104

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.28N	90.32W	110M	12/27/72
TEMPERATURE (C)				
2.50			0	
2.60			53	
2.70			61	
2.80			63	
2.90			71	
3.00			91	
3.00			110	
DEPTH (M)				
2	47.32N	90.01W	137M	12/27/72
TEMPERATURE (C)				
3.00			0	
3.10			81	
3.20			90	
3.30			100	
3.40			110	
3.60			130	
3.70			137	
DEPTH (M)				
2	47.30N	90.17W	125M	12/27/72
TEMPERATURE (C)				
2.70			0	
2.80			36	
2.90			66	
3.00			75	
3.10			91	
3.20			96	
3.30			110	
3.40			120	
3.40			125	
DEPTH (M)				
2	47.35N	89.85W	166M	12/27/72
TEMPERATURE (C)				
3.10			0	
3.20			31	
3.30			51	
3.40			76	
3.50			130	
3.60			160	
3.60			166	
DEPTH (M)				

Table 3. Changes in Temperature at bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	13	47.37N 89.68W	201M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	
			79	
			98	
			130	
			140	
			170	
			180	
			190	
			200	
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	15	47.42N 89.35W	167M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	
			36	
			100	
			130	
			167	
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	16	47.44N 89.13W	177M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	
			26	
			32	
			37	
			39	
			45	
			85	
			88	
			110	
			177	
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	14	47.39N 89.51W	190M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	
			39	
			100	
			160	
			170	
			180	
			190	

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	17	47.47N 88.98W	166M	12/27/72

TEMPERATURE (C)	DEPTH (M)
3.30	0
3.40	16
3.50	18
3.60	20
3.70	22
3.80	24
3.90	26
4.00	27
4.10	28
4.20	29
4.30	32
4.40	34
4.50	35
4.60	37
4.70	38
4.80	39
4.90	42
5.00	45
5.10	63
5.00	86
4.90	120
4.80	130
4.80	166

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	19	47.52N 88.66W	223M	12/27/72

TEMPERATURE (C)	DEPTH (M)
3.50	0
3.60	31
3.70	32
3.80	38
3.90	51
3.80	110
3.90	180
3.90	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	18	47.50N 88.83W	223M	12/27/72

TEMPERATURE (C)	DEPTH (M)
3.30	0
3.40	67
3.50	68
3.70	170
3.70	200

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 24 47.60N 87.78W 223M 12/27/72
=====

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```

=====
TEMPERATURE (C) DEPTH (M)
3.30 0
3.40 130
3.50 160
3.50 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 25 47.60N 87.63W 175M 12/27/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
3.30 0
3.40 41
3.50 120
3.60 140
3.70 150
3.80 170
3.80 175
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 21 47.57N 88.33W 190M 12/27/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
3.40 0
3.50 110
3.50 190
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 22 47.58N 88.11W 160M 12/27/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
3.40 0
3.50 110
3.60 140
3.60 160
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 23 47.59N 87.93W 189M 12/27/72
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
3.30 0
3.40 87
3.50 110
3.60 130
3.70 160
3.80 189
=====

```

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.56N	87.48W	138M	12/27/72	311M	12/27/72

TEMPERATURE (C)						DEPTH (M)
3.20						0
3.30						110
3.40						130
3.40						138

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.52N	87.33W	215M	12/27/72	316M	12/27/72

TEMPERATURE (C)						DEPTH (M)
No data for station.						

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.51N	87.30W	293M	12/27/72	307M	12/27/72

TEMPERATURE (C)						DEPTH (M)
3.50						0
3.60						51
3.70						200

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.47N	87.18W	311M	12/27/72	311M	12/27/72

TEMPERATURE (C)						DEPTH (M)
3.50						0
3.60						110
3.70						140
3.80						170
4.00						180
4.00						200

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.43N	87.00W	316M	12/27/72	316M	12/27/72

TEMPERATURE (C)						DEPTH (M)
3.60						0
3.70						33
3.80						170
4.00						200

=====						
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	MAX. DEPTH	DATE
2	47.39N	86.85W	307M	12/27/72	307M	12/27/72

TEMPERATURE (C)						DEPTH (M)
3.80						0
3.80						200

Table 2. Changes in Temperature at Bathy Thermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 34 47.23N 86.24W 193M 12/27/72
=====
TEMPERATURE (C) DEPTH (M)
3.90 0
4.00 110
4.20 180
4.30 190
4.40 193
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 35 47.18N 86.09W 201M 12/27/72
=====
TEMPERATURE (C) DEPTH (M)
3.90 0
4.00 75
4.00 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 36 47.13N 85.93W 184M 12/27/72
=====
TEMPERATURE (C) DEPTH (M)
3.50 0
3.60 35
3.70 110
3.80 180
3.80 184
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 32 47.36N 86.72W 245M 12/27/72
=====
TEMPERATURE (C) DEPTH (M)
3.90 0
4.00 30
4.10 50
4.20 65
4.20 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 33 47.27N 86.39W 115M 12/27/72
=====
TEMPERATURE (C) DEPTH (M)
3.30 0
3.40 34
3.50 35
3.60 38
3.70 41
3.80 47
3.90 49
3.60 53
3.60 115
=====

```

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.09N	85.78W	173M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	3.80
			70	3.90
			120	4.00
			160	4.40
			170	4.50
			173	4.50
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
2	40	46.95N 85.34W	207M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	3.80
			150	3.90
			160	4.00
			200	4.00
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
2	41	46.91N 85.18W	82M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	2.90
			23	2.80
			82	2.80
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
2	47.04N	85.63W	167M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	3.80
			120	4.00
			160	4.10
			167	4.10
=====				
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH <td>DATE</td>	DATE
2	39	46.99N 85.49W	200M	12/27/72
TEMPERATURE (C)				
			DEPTH (M)	
			0	3.60
			11	3.70
			38	3.80
			91	4.00
			200	4.00

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 42 46.88N 85.03W 67M 12/27/72
=====

```

```

TEMPERATURE (C) DEPTH (M)
2.10 0
2.20 31
2.30 32
2.40 34
2.50 35
2.40 42
2.30 43
2.40 47
2.50 59
2.60 63
2.70 66
2.70 67
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 44 46.68N 84.79W 46M 12/27/72
=====

```

```

TEMPERATURE (C) DEPTH (M)
2.10 0
2.20 33
2.30 41
2.30 46
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 45 46.58N 84.68W 48M 12/27/72
=====

```

```

TEMPERATURE (C) DEPTH (M)
1.90 0
1.90 48
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
2 43 46.79N 84.89W 63M 12/27/72
=====

```

```

TEMPERATURE (C) DEPTH (M)
1.70 0
1.80 21
1.90 36
2.00 43
2.10 48
2.20 53
2.30 54
2.40 56
2.50 57
2.60 59
2.70 60
2.70 63
=====

```

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.57N	84.68W	38M	01/15/73

TEMPERATURE (C)	DEPTH (M)
.10	0
.30	23
.40	24
.50	28
.60	33
.80	34
1.00	35
1.10	36
1.20	37
1.20	38

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.67N	84.79W	138M	01/15/73

TEMPERATURE (C)	DEPTH (M)
.10	0
.20	26
.30	64
.40	68
.50	76
.60	78
.70	80
.80	82
.90	89
1.00	95
1.30	110
1.50	120
1.70	138

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.72N	84.87W	87M	01/15/73

TEMPERATURE (C)	DEPTH (M)
.10	0
.20	25
.30	51
.40	59
.50	66
.60	71
.70	73
.80	74
.90	77
1.00	78
1.00	87

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.82N	85.08W	200M	01/15/73
4	46.82N	85.08W	200M	01/15/73
3	47.03N	85.75W	190M	01/15/73
6	47.03N	85.75W	190M	01/15/73

TEMPERATURE (C)	DEPTH (M)
.40	0
.50	21
.60	38
.70	56
.80	91
.90	160
.90	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.11N	86.06W	200M	01/15/73
7	47.11N	86.06W	200M	01/15/73

TEMPERATURE (C)	DEPTH (M)
2.70	0
2.80	21
2.90	89
3.00	150
3.00	190

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.92N	85.41W	120M	01/15/73
5	46.92N	85.41W	120M	01/15/73

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	64
2.00	65
2.10	110
2.10	120

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.92N	85.41W	120M	01/15/73
5	46.92N	85.41W	120M	01/15/73

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.40	76
2.50	110
2.60	140
2.70	150
2.80	160
2.90	170
3.00	200

Table 2. Changes in Temperature at Bathymograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
3	8	47.20N 86.42W	244M 01/15/73
=====			
TEMPERATURE (C)	DEPTH (M)		
2.80	0		
2.90	91		
3.00	110		
3.00	200		
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
3	9	47.28N 86.75W	219M 01/15/73
=====			
TEMPERATURE (C)	DEPTH (M)		
2.90	0		
3.00	110		
3.10	130		
3.20	200		
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
3	10	47.41N 87.04W	245M 01/16/73
=====			
TEMPERATURE (C)	DEPTH (M)		
2.80	0		
2.90	76		
3.00	93		
3.10	130		
3.20	150		
3.30	170		
3.40	200		
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
3	11	47.49N 87.36W	185M 01/16/73
=====			
TEMPERATURE (C)	DEPTH (M)		
2.20	0		
2.30	39		
2.40	49		
2.50	53		
2.60	76		
2.70	110		
2.80	130		
3.00	150		
3.00	185		
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
3	12	47.53N 87.55W	147M 01/16/73
=====			
TEMPERATURE (C)	DEPTH (M)		
1.70	0		
1.80	21		
1.90	31		
2.00	37		
2.10	71		
2.20	86		
2.30	110		
2.40	120		
2.40	147		
=====			

Table 2. Changes in Temperature at Babythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE		
3	13	47.55N	87.72W	163M	01/16/73	3	16	47.52N	88.20W	255M	01/16/73
=====											
TEMPERATURE (C)					DEPTH (M)						
1.70					0						
1.80					23						
1.90					79						
2.00					110						
2.00					163						

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE		
3	14	47.56N	87.87W	200M	01/16/73	3	17	47.49N	88.36W	246M	01/16/73
=====											
TEMPERATURE (C)					DEPTH (M)						
1.90					0						
2.00					70						
2.10					160						
2.20					190						
2.20					200						

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE		
3	15	47.54N	88.04W	201M	01/16/73	3	15	47.54N	88.04W	201M	01/16/73
=====											
TEMPERATURE (C)					DEPTH (M)						
2.30					0						
2.40					76						
2.50					190						
2.50					200						

Table 7. Changes in Temperature at Bathylthermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	18	47.45N 88.72W	190M	01/16/73
3	20	47.36N 89.37W	190M	01/16/73

TEMPERATURE (C)	DEPTH (M)
2.40	0
2.50	86
2.60	98
2.70	110
2.80	120
2.90	130
3.00	140
3.10	150
3.20	170
3.30	190

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	71
2.30	78
2.40	84
2.50	86
2.60	91
2.70	92
2.80	93
2.90	99
3.00	100
3.20	110
3.30	140
3.30	190

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	19	47.41N 89.04W	180M	01/16/73

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.40	96
2.50	97
2.60	110
2.70	130
2.90	140
3.10	150
3.20	160
3.30	180

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
=====			
3	21	47.33N 89.55W	180M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
=====			
3	22	47.31N 89.72W	180M
=====			

TEMPERATURE (C)	DEPTH (M)
2.00	0
2.10	61
2.20	63
2.30	68
2.40	72
2.50	74
2.60	82
2.70	85
2.80	88
2.90	89
3.00	90
3.20	91
3.30	92
3.40	93
3.50	99
3.50	180

TEMPERATURE (C)	DEPTH (M)
1.90	0
2.00	51
2.10	69
2.20	70
2.30	74
2.50	75
2.60	77
2.70	79
2.80	81
2.90	87
3.00	89
3.10	110
3.20	140
3.20	180

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	23	47.29N 89.87W	160M	01/16/73
3	24	47.27N 90.05W	140M	01/16/73

TEMPERATURE (C)	DEPTH (M)
1.60	0
1.70	50
1.80	54
1.90	57
2.00	60
2.10	62
2.20	63
2.30	64
2.50	65
2.70	67
2.80	68
2.90	81
3.00	96
3.00	160

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	48
2.00	55
2.10	57
2.20	58
2.30	60
2.40	64
2.50	67
2.60	74
2.70	75
2.80	77
2.90	80
3.00	81
3.10	88
3.20	89
3.30	96
3.30	140

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 26 47.23N 90.37W 82M 01/16/73
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.30 0
1.40 53
1.50 54
1.60 56
1.70 58
1.80 59
1.90 60
2.00 61
2.20 64
2.30 65
2.40 67
2.50 76
2.50 82
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 27 47.21N 90.55W 62M 01/16/73
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.90 0
1.90 62
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 28 47.16N 90.71W 200M 01/16/73
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.00 0
1.00 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 25 47.25N 90.21W 110M 01/16/73
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.40 0
1.50 24
1.60 25
1.70 32
1.80 34
1.90 39
2.00 47
2.10 51
2.20 52
2.30 53
2.40 63
2.50 70
2.60 72
2.70 74
2.80 76
2.90 85
3.00 96
3.00 110
=====

```

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
=====			
3	29	47.13N 91.03W	140M
			01/16/73

TEMPERATURE (C)	DEPTH (M)		
1.20	0		
1.30	56		
1.50	57		
1.80	58		
1.90	59		
2.00	61		
2.20	66		
2.30	68		
2.40	70		
2.50	74		
2.60	85		
2.70	86		
2.80	96		
3.00	120		
3.10	130		
3.20	140		

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
=====			
3	30	47.07N 91.34W	268M
			01/16/73

TEMPERATURE (C)	DEPTH (M)		
2.00	0		
2.10	37		
2.20	38		
2.30	43		
2.40	51		
2.50	53		
2.60	54		
2.70	56		
2.80	58		
2.90	60		
3.00	66		
3.10	76		
3.20	120		
3.30	180		
3.40	200		

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	DATE
=====			
4	47.04N	91.46W	01/31/73
		238M	
=====			
CRUISE STA.NO.	LAT.	LONG.	DATE
=====			
4	47.09N	91.12W	01/31/73
		140M	
=====			

TEMPERATURE (C)	DEPTH (M)
.90	0
1.00	30
1.10	37
1.20	38
1.30	46
1.40	51
1.50	53
1.60	54
1.70	57
1.80	58
1.90	64
2.00	65
2.10	70
2.20	71
2.40	72
2.50	75
2.60	76
2.70	78
2.80	82
2.90	120
3.00	130
3.10	150
3.20	180
3.40	200

TEMPERATURE (C)	DEPTH (M)
.20	0
.30	28
.40	38
.50	42
.60	47
.70	47
.80	54
.90	56
1.00	62
1.20	64
1.40	71
1.50	72
1.60	73
1.80	75
1.90	77
2.00	78
2.10	79
2.20	81
2.30	82
2.40	86
2.50	87
2.60	96
2.70	110
3.00	120
3.00	130
3.00	140

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	47.15N	90.77W	46M	01/31/73
4	47.17N	90.60W	55M	01/31/73

TEMPERATURE (C)	DEPTH (M)
.20	0
.50	24
1.10	25
1.20	26
1.30	27
1.50	28
2.00	29
2.30	30
2.60	31
2.80	32
3.00	33
3.30	34
3.40	35
3.60	36
3.80	37
3.90	38
4.00	39
4.00	46

TEMPERATURE (C)	DEPTH (M)
.20	0
.30	13
.40	16
.50	26
.60	27
.70	28
.80	29
.90	33
1.00	34
1.10	39
1.30	40
1.60	41
1.90	42
2.00	43
2.00	55

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	47.20N	90.43W	76M	01/31/73

TEMPERATURE (C)	DEPTH (M)
1.00	0
1.10	52
1.20	54
1.50	56
1.60	57
1.80	58
1.90	59
2.00	61
2.00	77

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	47.30N	89.73W	200M	01/31/73

TEMPERATURE (C)	DEPTH (M)			
1.40	0			
1.50	24			
1.60	51			
1.70	58			
1.80	59			
1.90	71			
2.00	78			
2.20	93			
2.30	96			
2.40	97			
2.60	110			
2.80	120			
3.00	130			
3.10	180			
3.10	200			

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	47.35N	89.38W	195M	01/31/73

TEMPERATURE (C)	DEPTH (M)			
1.60	0			
1.70	53			
1.80	63			
1.90	79			
2.00	84			
2.10	89			
2.20	91			
2.40	94			
2.50	95			
2.60	96			
2.70	97			
2.80	98			
3.00	110			
3.10	150			
3.20	170			
3.20	195			

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	11	47.45N 88.75W	160M	01/31/73
4	12	47.49N 88.46W	228M	02/01/73

TEMPERATURE (C)	DEPTH (M)
1.20	0
1.30	12
1.40	14
1.50	20
1.60	28
1.70	33
1.80	37
1.90	49
2.00	56
2.10	86
2.20	87
2.30	97
2.40	98
2.80	110
3.00	120
3.10	130
3.20	140
3.20	180

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	57
2.00	63
2.10	73
2.20	74
2.30	86
2.40	89
2.50	100
2.80	110
3.00	120
3.20	150
3.20	160

TEMPERATURE (C)	DEPTH (M)
1.60	0
1.70	47
1.80	49
1.90	66
2.00	84
2.50	120
2.80	130
3.00	150
3.00	200

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
4	14	47.52N 88.13W	200M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
4	13	47.51N 88.30W	238M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
4	13	47.51N 88.30W	238M
=====			
TEMPERATURE (C)			DEPTH (M)
1.00			0
1.10			6
1.20			16
1.30			34
1.40			35
1.50			38
1.60			39
1.70			53
1.80			56
1.90			81
2.00			96
2.10			110
2.30			120
2.40			130
2.60			140
2.70			150
2.80			160
2.90			180
3.00			190
3.00			200

TEMPERATURE (C)			DEPTH (M)
1.20			0
1.30			57
1.40			59
1.50			61
1.60			62
1.70			64
1.80			67
1.90			83
2.00			85
2.20			120
2.30			140
2.40			150
2.50			170
2.60			190
2.80			200

Table 2. Changes in Temperature at Bathymograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	18	47.36N 87.13W	258M	02/01/73
4	20	47.18N 86.46W	201M	02/01/73

TEMPERATURE (C)	DEPTH (M)
2.40	0
2.50	51
2.60	79
2.70	89
2.80	90
2.90	110
3.00	120
3.20	150
3.30	160
3.30	200

TEMPERATURE (C)	DEPTH (M)
2.00	0
2.10	71
2.20	89
2.10	93
2.20	98
2.40	120
2.50	130
2.60	140
2.80	160
2.90	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	19	47.27N 86.80W	261M	02/01/73
4	21	47.18N 86.13W	120M	02/01/73

TEMPERATURE (C)	DEPTH (M)
2.50	0
2.40	110
2.40	200

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	35
2.20	120

Table 2. Changes in Temperature at Bathymograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	22	47.02N 86.83W	100M	02/01/73

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	76
2.00	78
2.00	100

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	24	46.86N 85.20W	26M	02/01/73

TEMPERATURE (C)	DEPTH (M)
.20	0
.30	7
.40	13
.50	16
.60	21
.80	23
.80	26

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	23	46.95N 86.52W	93M	02/01/73

TEMPERATURE (C)	DEPTH (M)
1.60	0
1.70	3
1.60	7
1.70	10
1.60	14
1.70	17
1.60	21
1.70	24
1.60	28
1.70	30
1.70	66
1.80	82
1.90	86
2.00	93

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
4	25	46.80N 84.95W	55M	02/01/73

TEMPERATURE (C)	DEPTH (M)
0.00	0
.10	29
.20	34
.30	35
.40	37
.50	40
.60	45
.60	55

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
4 26 46.75N 84.91W 69M 02/01/73
=====
TEMPERATURE (C) DEPTH (M)
0.00 0
0.00 69
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
4 27 46.65N 84.80W 54M 02/01/73
=====
TEMPERATURE (C) DEPTH (M)
0.00 0
.10 33
.20 34
.30 44
.40 46
.50 51
.50 54
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
4 28 46.59N 84.74W 87M 02/01/73
=====
TEMPERATURE (C) DEPTH (M)
0.00 0
.10 59
.20 62
.30 74
.40 76
.50 79
.50 87
=====

```

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====					
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE	
1	46.58N	84.75W	74M	12/19/73	
=====					
TEMPERATURE (C)	DEPTH (M)				
4.90	0				
5.00	1				
5.10	2				
5.00	40				
4.80	57				
4.70	61				
4.60	62				
4.50	63				
4.40	66				
4.30	67				
4.20	69				
4.20	74				
=====					
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE					
1	2	46.75N	84.90W	98M	12/19/73
=====					
TEMPERATURE (C)	DEPTH (M)				
4.80	0				
4.90	2				
4.90	98				
=====					
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE					
1	3	46.83N	85.12W	28M	12/19/73
=====					
TEMPERATURE (C)	DEPTH (M)				
4.10	0				
4.10	28				
=====					
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE					
1	4	46.90N	85.38W	72M	12/19/73
=====					
TEMPERATURE (C)	DEPTH (M)				
4.40	0				
4.50	16				
4.50	72				
=====					
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE					
1	5	46.97N	85.63W	177M	12/19/73
=====					
TEMPERATURE (C)	DEPTH (M)				
4.40	0				
4.50	71				
4.50	177				
=====					

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 6	47.05M	85.92W	129M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
4.40			0
4.30			7
4.40			34
4.50			40
4.40			110
4.40			129
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 7	47.10N	86.15W	130M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
4.40			0
4.30			12
4.40			38
4.40			130
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 8	47.17N	86.40W	000M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
No data for station.			
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 9	47.22N	86.63W	233M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
4.30			0
4.30			200
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 10	47.28N	86.88W	258M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
3.90			0
4.00			43
4.00			200
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
1 11	47.35N	87.12W	282M 12/19/73
=====			
TEMPERATURE (C)			DEPTH (M)
3.90			0
4.00			1
4.00			200
=====			

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	15	47.48N 88.17W	225M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.60	0
3.70	20
3.80	140
3.80	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	12	47.40N 87.38W	175M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.80	0
3.80	175

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	16	47.47N 88.40W	240M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.50	0
3.60	35
3.70	57
3.80	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	13	47.45N 87.58W	135M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.80	0
3.70	6
3.80	18
3.80	135

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	17	47.42N 88.65W	87M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.80	0
3.90	47
4.00	87

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	14	47.52N 87.85W	138M	12/19/73

TEMPERATURE (C)	DEPTH (M)
3.70	0
3.80	18
3.80	138

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
18	47.02N	91.63W	72M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	20	47.13N 91.15W	170M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	21	47.17N 90.92W	156M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	22	47.22N 90.65W	000M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	19	47.07N 91.40W	271M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	20	47.13N 91.15W	170M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	21	47.17N 90.92W	156M
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH
1	22	47.22N 90.65W	000M
=====			

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	13
2.30	16
2.40	17
2.60	18
2.80	19
2.90	20
3.00	21
3.10	35
3.20	36
3.30	37
3.40	42
3.50	50
3.60	56
3.50	72

TEMPERATURE (C)	DEPTH (M)
3.40	0
3.50	60
3.60	80
3.70	99
3.70	156

TEMPERATURE (C)	DEPTH (M)
3.40	0
3.50	1
3.60	58
3.70	60
3.80	98
3.90	150
3.90	200

TEMPERATURE (C)	DEPTH (M)
No data for station.	

Table 2. Changes in Temperature at Bathymograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	23	47.25N	90.42W	108M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.20	0				
3.30	65				
3.30	108				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	24	47.28N	90.15W	150M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.50	0				
3.60	17				
3.80	18				
3.70	130				
3.70	150				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	25	47.32N	89.90W	174M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.50	0				
3.60	10				
3.60	174				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	26	47.35N	89.65W	200M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.50	0				
3.60	1				
3.70	83				
3.70	200				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	27	47.38N	89.40W	170M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.70	0				
3.80	50				
3.90	160				
3.90	170				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
1	28	47.42N	89.15W	180M	12/20/73
=====					
TEMPERATURE (C)	DEPTH (M)				
3.60	0				
3.70	38				
3.70	180				

Table 2. Changes in Temperature at Bathymograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 29 47.45N 88.90W 130M 12/20/73
=====

```

```

TEMPERATURE (C) DEPTH (M)
3.60 0
3.50 21
3.60 26
3.70 27
3.70 130
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 30 47.48N 88.65W 203M 12/20/73
=====

```

```

TEMPERATURE (C) DEPTH (M)
3.80 0
3.90 7
4.00 130
4.00 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
1 31 47.52N 88.40W 240M 12/20/73
=====

```

```

TEMPERATURE (C) DEPTH (M)
4.00 0
4.00 200
=====

```


Table 2. Changes in Temperature at Bathymograph Casts (continued)

=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
2 1	47.48N	87.67W	81M 01/10/74
=====			
TEMPERATURE (C)			DEPTH (M)
1.10			0
1.10			81
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
2 2	47.53N	87.90W	129M 01/10/74
=====			
TEMPERATURE (C)			DEPTH (M)
2.00			0
2.10			67
2.20			93
2.30			100
2.30			129
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
2 3	47.52N	88.13W	186M 01/10/74
=====			
TEMPERATURE (C)			DEPTH (M)
2.30			0
2.40			20
2.50			65
2.50			186
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
2 4	47.47N	88.35W	251M 01/10/74
=====			
TEMPERATURE (C)			DEPTH (M)
2.80			0
2.90			29
3.00			69
3.10			110
3.20			160
3.30			180
3.40			190
3.50			200
=====			
=====			
CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH DATE
2 5	47.45N	88.58W	210M 01/10/74
=====			
TEMPERATURE (C)			DEPTH (M)
2.70			0
2.80			34
2.90			44
3.00			55
3.10			94
3.30			140
3.40			150
3.50			160
3.60			170
3.60			200
=====			

Table 2. Changes in Temperature at Bathymograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.35N	89.27W	182M	01/10/74

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.40	29
2.50	36
2.60	42
2.70	44
2.80	49
2.90	76
3.00	97
3.10	130
3.20	140
3.50	150
3.60	160
3.60	182

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
6	47.40N	88.80W	158M	01/10/74

TEMPERATURE (C)	DEPTH (M)
2.50	0
2.60	40
2.70	44
2.80	54
2.90	69
3.00	78
3.10	120
3.20	130
3.30	150
3.30	158

56

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.32N	89.50W	000M	01/10/74

TEMPERATURE (C)	DEPTH (M)
No data for station.	

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
7	47.38N	89.05W	179M	01/10/74

TEMPERATURE (C)	DEPTH (M)
2.20	0
2.30	24
2.40	29
2.50	46
2.60	52
2.70	54
2.80	91
2.90	92
3.00	120
3.10	140
3.40	150
3.50	160
3.50	179

Table 2. Changes in Temperature at Bathylthermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	10	47.28N	89.73W	190M	01/10/74
2	11	47.25N	89.95W	160M	01/10/74

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	9
2.30	24
2.40	34
2.50	42
2.60	46
2.70	60
2.80	76
2.90	90
3.00	100
3.10	110
3.20	120
3.40	130
3.60	140
3.60	190

TEMPERATURE (C)	DEPTH (M)
1.80	0
1.90	40
2.00	52
2.10	56
2.20	58
2.30	62
2.40	66
2.50	70
2.60	76
2.70	78
2.80	80
2.90	86
3.00	90
3.10	96
3.20	99
3.40	110
3.50	120
3.60	130
3.60	160

Table 2. Changes in Temperature at Bathymograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.22N	90.18W	120M	01/10/74
2	47.18N	90.45W	72M	01/10/74

TEMPERATURE (C)	DEPTH (M)
1.50	0
1.60	10
1.70	32
1.80	36
1.90	42
2.00	45
2.10	51
2.20	53
2.30	57
2.40	59
2.50	61
2.60	64
2.70	66
2.80	68
2.90	69
3.00	71
3.10	79
3.20	81
3.30	82
3.40	83
3.40	120

TEMPERATURE (C)	DEPTH (M)
.60	0
.70	3
.80	7
.90	9
1.00	11
1.10	21
1.20	22
1.30	24
1.40	25
1.50	31
1.60	33
1.70	39
1.80	44
1.80	72

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.15N	90.63W	51M	01/10/74

TEMPERATURE (C)	DEPTH (M)
.70	0
.80	2
.90	3
1.00	6
1.10	12
1.20	25
1.30	26
1.40	27
1.50	28
1.60	41
1.70	42
1.80	44
1.80	51

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	17	47.03N 91.47W	254M	01/10/74
2	18	47.53N 87.57W	152M	01/11/74

TEMPERATURE (C)	DEPTH (M)
2.20	0
2.30	14
2.40	18
2.50	24
2.60	28
2.70	29
2.80	32
2.90	34
3.00	36
3.10	42
3.20	46
3.30	60
3.40	72
3.50	90
3.60	110
3.70	120
3.60	180
3.70	190
3.60	200

TEMPERATURE (C)	DEPTH (M)
2.10	0
2.20	17
2.30	18
2.40	19
2.50	20
2.60	21
2.70	23
2.80	25
2.90	30
3.00	65
3.00	152

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	19	47.48N 87.37W	182M	01/11/74

TEMPERATURE (C)	DEPTH (M)
2.30	0
2.40	32
2.50	40
2.60	47
2.70	62
2.80	75
2.90	88
3.00	99
3.10	110
3.30	130
3.50	140
3.60	150
3.60	182

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.43N	87.17W	185M	01/11/74

TEMPERATURE (C)	DEPTH (M)
2.90	0
3.00	57
3.10	65
3.20	72
3.30	80
3.40	94
3.50	150
3.60	170
3.60	185

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.32N	86.75W	240M	01/11/74

TEMPERATURE (C)	DEPTH (M)
2.90	0
3.00	40
3.10	75
3.20	110
3.30	150
3.40	190
3.40	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.27N	86.53W	258M	01/12/74

TEMPERATURE (C)	DEPTH (M)
2.70	0
2.80	58
2.90	61
3.00	65
3.10	71
3.20	72
3.30	120
3.40	140
3.50	170
3.50	200

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.37N	86.95W	315M	01/11/74

TEMPERATURE (C)	DEPTH (M)
2.90	0
3.00	50
3.10	57
3.20	58
3.30	86
3.40	110
3.40	200

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.03N	85.73W	193M	01/12/74

TEMPERATURE (C)	DEPTH (M)
3.40	0
3.50	89
3.60	120
3.60	193

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	46.97N	85.52W	115M	01/12/74

TEMPERATURE (C)	DEPTH (M)
2.80	0
2.90	21
3.00	23
3.10	31
3.20	32
3.30	33
3.40	40
3.50	55
3.60	71
3.60	115

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.20N	86.33W	178M	01/12/74

TEMPERATURE (C)	DEPTH (M)
3.40	0
3.50	140
3.60	160
3.60	178

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.15N	86.15W	126M	01/12/74

TEMPERATURE (C)	DEPTH (M)
3.10	0
3.20	62
3.30	78
3.40	86
3.50	126

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	47.08N	85.93W	90M	01/12/74

TEMPERATURE (C)	DEPTH (M)
3.20	0
3.30	69
3.40	80
3.40	90

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	31	46.77N	64M	01/12/74

TEMPERATURE (C)	DEPTH (M)
.60	0
.70	5
.80	20
.90	52
1.10	57
1.20	58
1.50	59
1.60	60
1.90	61
2.00	62
2.10	63
2.10	64

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	32	46.67N	44M	01/12/74

TEMPERATURE (C)	DEPTH (M)
.50	0
.60	20
.70	21
.80	28
.90	31
1.00	33
1.10	34
1.20	35
1.30	36
1.50	37
1.60	38
1.70	39
1.80	41
2.00	42
2.10	43
2.10	44

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	29	46.92N	73M	01/12/74

TEMPERATURE (C)	DEPTH (M)
2.20	0
2.30	44
2.40	57
2.40	73

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	30	46.85N	58M	01/12/74

TEMPERATURE (C)	DEPTH (M)
1.20	0
1.30	5
1.40	7
1.50	9
1.60	10
1.70	29
1.80	37
1.90	38
2.00	40
2.10	41
2.20	42
2.30	43
2.40	44
2.50	46
2.40	48
2.30	51
2.40	58

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.83N	85.00W	69M	01/22/74

TEMPERATURE (C)	DEPTH (M)
.20	0
.30	36
.40	40
.50	42
.60	43
.70	46
.80	48
.90	49
1.00	50
1.10	51
1.50	52
1.80	53
2.20	54
2.30	55

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	46.63N	84.77W	55M	01/22/74

TEMPERATURE (C)	DEPTH (M)
.20	0
.30	36
.40	40
.50	42
.60	43
.70	46
.80	48
.90	49
1.00	50
1.10	51
1.50	52
1.80	53
2.20	54
2.30	55

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.02N	85.69W	154M	01/22/74

TEMPERATURE (C)	DEPTH (M)
2.70	0
2.80	24
2.90	29
3.00	54
3.00	154

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
2	46.78N	84.90W	39M	01/22/74

TEMPERATURE (C)	DEPTH (M)
.30	0
.40	17
.50	20
.70	21
.60	22
.70	24
.80	29
.90	33
1.00	36
1.30	38
1.40	39

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.30N	86.78W	223M	01/22/74
TEMPERATURE (C)			DEPTH (M)	
2.50			0	
2.60			3	
2.70			51	
2.80			105	
2.90			108	
3.00			110	
3.10			117	
3.20			125	
3.30			134	
3.40			150	
3.50			153	
3.60			166	
3.60			200	

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.48N	87.48W	154M	01/22/74
TEMPERATURE (C)			DEPTH (M)	
2.20			0	
2.30			57	
2.40			73	
2.50			80	
2.60			83	
2.70			85	
2.80			87	
2.90			88	
3.00			105	
3.00			154	

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.53N	87.81W	147M	01/22/74
TEMPERATURE (C)			DEPTH (M)	
.80			0	
.90			53	
1.00			59	
1.10			61	
1.20			62	
1.30			65	
1.40			68	
1.50			70	
1.60			71	
1.70			83	
1.80			88	
1.90			102	
2.00			103	
2.10			143	
2.20			147	

CRUISE STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	47.38N	87.13W	197M	01/22/74
TEMPERATURE (C)			DEPTH (M)	
3.00			0	
3.10			116	
3.20			131	
3.30			169	
3.40			179	
3.50			189	
3.60			190	
3.70			192	
3.80			194	
3.90			196	
4.00			197	

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

=====			
CRUISE	STA.NO.	LAT.	LONG.
3	10	47.47N	88.57W
			MAX. DEPTH 216M
			DATE 01/22/74
=====			
TEMPERATURE (C)	DEPTH (M)	TEMPERATURE (C)	DEPTH (M)
1.30	0	1.40	0
1.40	33	1.50	36
1.50	34	1.60	45
1.60	35	1.70	60
1.70	36	1.80	62
1.80	40	1.90	66
1.90	54	2.00	67
2.00	65	2.10	72
2.10	87	2.20	75
2.20	89	2.30	78
2.30	91	2.40	87
2.40	93	2.50	89
2.50	95	2.60	90
2.60	97	2.70	92
2.70	98	2.80	94
2.80	99	2.90	95
3.00	105	3.00	104
3.10	107	3.10	115
3.20	111	3.20	128
3.30	118	3.30	129
3.40	122	3.40	136
3.50	123	3.50	146
3.60	126	3.60	155
3.70	129	3.70	156
3.70	168	3.70	200
=====			

Table 3. Changes in Temperature at Bathithermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	11	46.98N	91.65W	65M	01/23/74
3	12	47.07N	91.33W	192M	01/23/74

TEMPERATURE (C)	DEPTH (M)
1.10	0
1.20	6
1.30	12
1.40	15
1.50	30
1.60	32
1.70	37
1.80	40
1.90	45
2.00	65

TEMPERATURE (C)	DEPTH (M)
.40	0
.50	20
.60	21
.80	22
.90	23
1.00	24
1.20	25
1.30	26
1.40	28
1.50	29
1.60	30
1.70	32
1.80	34
1.90	35
2.00	37
2.10	43
2.30	62
2.40	65
2.50	66
2.60	67
2.70	69
2.80	72
2.90	74
3.00	80
3.10	84
3.20	88
3.30	95
3.40	98
3.50	110
3.60	120
3.70	130
3.80	160
4.10	180
4.20	190
4.20	192

Table 2. Changes in Temperature at Bathylthermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	13	47.15N	91.02W	145M	01/23/74

TEMPERATURE (C)	DEPTH (M)				
.40	0				
.50	23				
.60	24				
.70	25				
.80	30				
.90	31				
1.00	32				
1.10	33				
1.20	34				
1.30	35				
1.40	37				
1.50	40				
1.60	42				
1.70	43				
1.80	44				
1.90	46				
2.00	47				
2.10	48				
2.20	53				
2.30	55				
2.40	57				
2.50	58				
2.60	59				
2.70	73				
2.80	74				
2.90	80				
3.00	81				
3.10	82				
3.20	92				
3.30	96				
3.40	100				
3.50	110				
3.50	120				
3.50	145				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	14	47.23N	90.65W	55M	01/23/74

TEMPERATURE (C)	DEPTH (M)				
.30	0				
.40	15				
.50	50				
.80	51				
1.00	52				
1.20	53				
1.50	54				
1.60	55				

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	15	47.27N	90.32W	108M	01/23/74

TEMPERATURE (C)	DEPTH (M)				
.40	0				
.50	26				
.60	36				
.70	40				
.80	45				
.90	52				
1.00	56				
2.00	64				
3.00	75				
3.50	77				
3.50	108				

Table 3. Changes in Temperature at Bathythermograph Casts (continued)

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	16	47.32N	89.98W	141M	01/23/74
TEMPERATURE (C)					
				DEPTH (M)	
.50				0	
.60				13	
.70				44	
.80				47	
.90				52	
1.00				53	
1.10				57	
1.20				60	
1.50				63	
1.80				65	
2.00				67	
2.50				69	
2.70				70	
3.00				75	
3.30				80	
3.50				84	
3.60				85	
3.70				90	
3.80				93	
3.80				141	

CRUISE	STA.NO.	LAT.	LONG.	MAX. DEPTH	DATE
3	17	47.37N	89.63W	196M	01/23/74
TEMPERATURE (C)					
				DEPTH (M)	
.90				0	
1.00				55	
1.30				60	
2.00				64	
2.50				67	
2.70				70	
2.80				75	
2.90				85	
3.00				94	
3.10				112	
3.20				120	
3.30				130	
3.40				132	
3.50				134	
3.60				138	
3.60				196	

Table 2. Changes in Temperature at Bathythermograph Casts (continued)

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=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 20 47.50N 88.60W 210M 01/23/74
=====

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=====
TEMPERATURE (C) TEMPERATURE (C) DEPTH (M)
1.60 1.60 0
1.70 1.70 23
1.80 1.80 58
1.90 1.90 76
2.00 2.00 91
2.40 2.40 97
2.70 2.70 102
2.90 2.90 104
3.40 3.40 112
3.60 3.60 117
3.80 3.80 122
3.80 3.80 132
3.80 3.80 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 18 47.42N 89.25W 158M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.60 0
1.70 51
1.80 55
2.00 58
2.40 65
3.00 68
3.10 70
3.20 75
3.30 80
3.40 85
3.50 126
3.60 131
3.60 158
=====

```

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=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 19 47.45N 88.95W 131M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.90 0
2.00 80
2.50 88
2.70 90
3.00 96
3.40 100
3.50 105
3.60 109
3.60 131
=====

```


Table 2. Changes in Temperature at Bathythermograph Casts (continued)

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 23 47.12N 86.07W 193M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
2.70 0
2.80 47
2.90 70
3.00 160
3.00 193
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 24 46.92N 85.35W 67M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.00 0
1.10 10
1.20 20
1.30 21
1.50 22
1.60 23
1.70 25
1.80 34
1.90 35
2.00 37
2.10 45
2.20 57
2.20 67
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 21 47.55N 88.27W 246M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
1.80 0
1.90 62
2.00 73
2.10 80
2.20 81
2.30 88
2.40 91
2.50 96
2.60 100
3.00 110
3.20 120
3.50 140
3.60 150
3.70 160
3.70 200
=====

```

```

=====
CRUISE STA.NO. LAT. LONG. MAX. DEPTH DATE
3 22 47.22N 86.42W 153M 01/23/74
=====

```

```

=====
TEMPERATURE (C) DEPTH (M)
2.50 0
2.60 33
2.70 52
2.80 74
2.90 90
3.00 93
3.10 100
3.20 120
3.30 140
3.40 150
3.40 153
=====

```