

THE COMPOSITION OF THE INTERSTITIAL  
WATER OF SEDIMENTS IN THE CENTRAL  
BASIN OF LAKE ERIE

R. R. Weiler,  
Applied Research Division

Introduction:

This brief report summarizes the data obtained on the composition of the interstitial water in the sediments of the central basin of Lake Erie in 1970 and 1971. The methodology is described briefly. A discussion of the findings will be published elsewhere.

### Sampling locations and times

During 1971, cores were collected during cruises A,B, C,D,F, (Table 1) at stations 2, 3 and 5, (Table 2 and Fig. 1). In addition, a single core was collected at station 3 on August 24-25, 1970. At the same time, a core was taken at station F-14.

### Coring and sample presentation

Cores about 30cm long were collected by a triple Benthos corer, by a diver collecting a core manually using an appropriate length of core tubing or by pushing a suitable length of liner into the sediment in a large volume interface sample. The core liner was immediately sealed with Cap plugs and kept refrigerated at around +40C in the dark until processed. The overlying water was always kept on top of the sediment. On a few occasions, longer cores (around 2m) were taken with a Benthos corer.

### Sample processing

The cores were generally processed in the laboratory and exposed to air. After the water was syphoned off, the core was extruded and placed in gas-pressurized squeezers. The following segments were used for the shorter core:- 0-2cm, 2-4, 4-6, 9-11, 14-16 and 19-21. To obtain sufficient water, the sediment from two cores collected at the same station was used and the extruded water combined for analysis. For the longer core, sections were also removed from the 30-35, 50-55, 80-85, 110-115 and 140-145cm levels.

Because of the very fluid nature of the top 5cm, the sediment-water mixture had to be spooned out into the squeezer.

Before the sediment was placed in the squeezer, the pH was measured with a combination glass electrode and the Eh with a gold electrode and a calomel reference electrode by inserting them directly into the sediment. The Eh values measured by a gold electrode appear to be doubtful (Bohn, 1968).

Analyses were done, using atomic absorption, flame photometry, Auto-Analyser or manual colourimetric methods. The following were determined on the interstitial water; Ca, Mg, Na, K, Cl, SO<sub>4</sub>, ammonia, alkalinity, and total manganese and iron on acidified samples. In addition, on two cruises the total inorganic carbon was determined by acidifying the sample and measuring the amount of evolved CO<sub>2</sub> in a gas chromatograph. A few determinations of the  $\delta^{13}\text{C}$  of the dissolved inorganic carbon in interstitial water were also made. The carbon for the analysis was precipitated as SrCO<sub>3</sub> using the method of Friedman (1970). The  $\delta^{13}\text{C}$  was determined by Dr. H.P. Schwarcz of the Geology Department, McMaster University.

A few determinations of dissolved gases on the interstitial water were done using an adaption of the method of Swinnerton, Linnenbom and Cheek (1962). A Fisher-Hamilton Model 29 Gas Partitioner was used with a 32" column filled with 50-60 mesh molecular sieve 5A. The column was placed in a dry ice-methanol bath until the argon and oxygen peaks had appeared; then an ice water bath was substituted to elute the nitrogen and methane. Helium was used as the carrier gas. The sediment was transferred to the squeezer inside a glove bag filled with helium, which was also used as the pressurizing gas for the squeezers.

The cation exchange capacity (C.E.C.) and the exchangeable cation status (E.C.S.) were determined by using the method of Toth and Ott (1970) with cores which had been frozen immediately after collection and kept frozen until used. On the 1970 cores the organic and inorganic carbon content of the sediments were also determined. The water content of the sediment were also done on occasion by drying the sediments at 105°C.

### Results

The results are shown in five tables. These have been edited to the extent of removing what appeared to be clearly anomalous results. In table 3, the pH and Eh values are the average of the two determinations on separate cores. Table 4 gives the results obtained in 1970. Table 5 lists the cation exchange capacity and exchangeable cation status for cores collected in 1971. The dissolved gas concentrations are given in table 6 and the  $\delta^{13}\text{C}$  values in table 7.

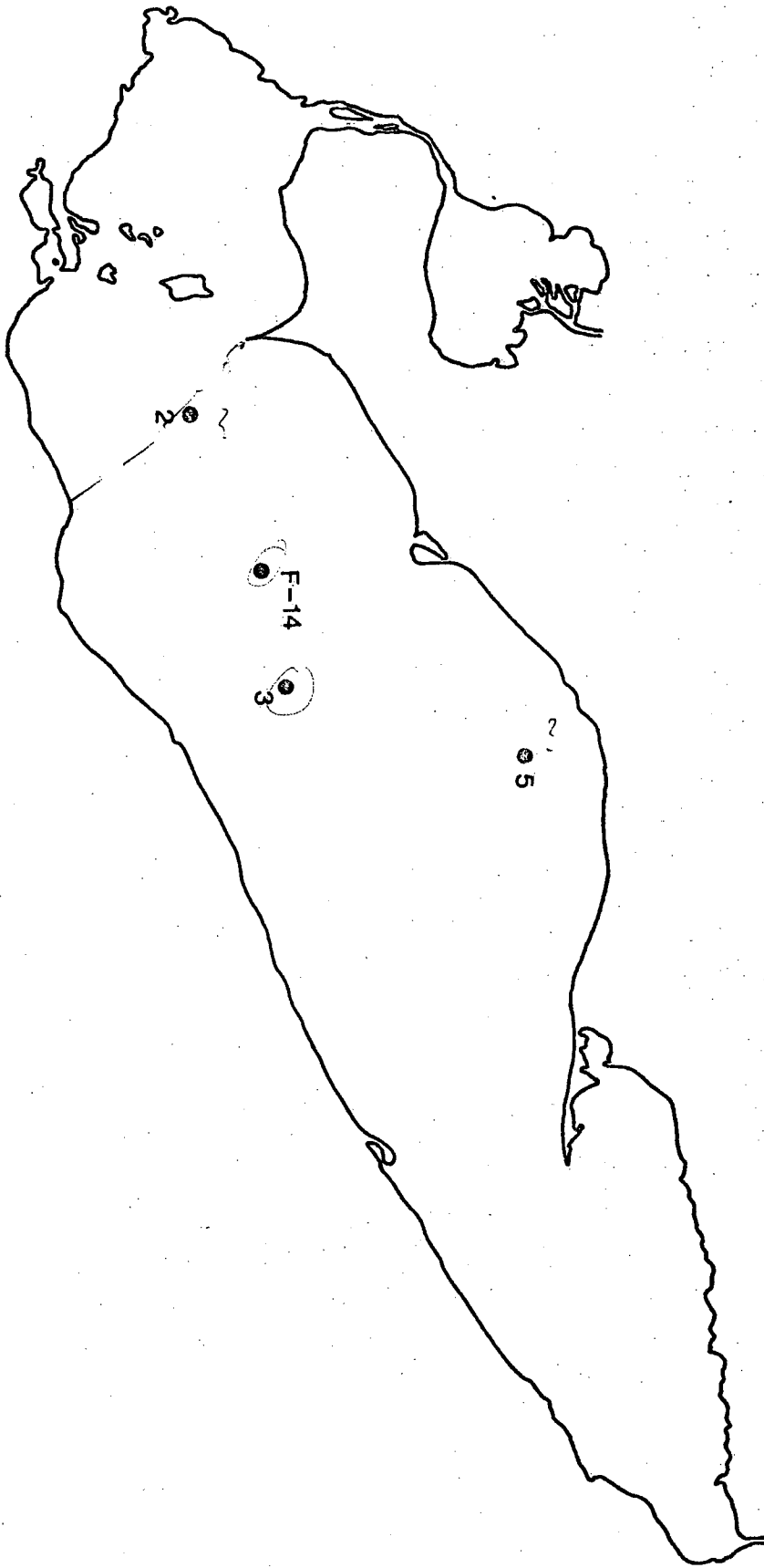
References

- Bohn, H.L. 1968. Electromotive force of inert electrodes in soil suspension. *Soil. Sci. Soc. Amer. Proc.* 32: 211-215.
- Friedman, I. 1970. Some investigations of the deposition of travertine from Hot Springs - 1. The isotopic chemistry of a travertine - depositing spring. *Geochim. Cosmochim. Acta* 34: 1303-1315.
- Swinnerton, J.W. Linnenbom, V.J. and Cheek, C.H. 1962. Determination of dissolved gases in aqueous solutions by gas chromatography. *Anal. Chem.* 34: 483-485.
- Toth, S.J. and Ott, A.N. 1970. Characterization of bottom sediments: Cation exchange capacity and exchangeable cation status. *Environ. Sci. Technol.* 4: 935-939.

List of Figure

Figure 1

Station locations in 1970 and 1971





TABLES

### List of Tables

Table 1	Cruise dates in 1971
Table 2	Station locations in 1970 and 1971
Table 3	Interstitial water concentrations on sediments of central basin of Lake Erie in 1971 (Stations 2, 3 and 5)
Table 4	Interstitial water concentrations at stations 3 and F-14 in central basin of Lake Erie on August 24-25, 1970
Table 5	Cation exchange capacity and exchangeable cation status at stations 2, 3 and 5 in 1970
Table 6	Dissolved gases in interstitial waters in 1971
Table 7	$\delta^{13}\text{C}$ in interstitial water in 1971

Table 1

<u>Identification</u>	<u>Date</u>
A	May 25-29
B	June 21-25
C	July 6-31
D	August 30 - September 3
F	October 25-28

Table 2

<u>Station</u>	<u>Latitude N.</u>	<u>Longitude W.</u>
2	41 <sup>0</sup> 49' 03"	82 <sup>0</sup> 12' 14"
3	42 <sup>0</sup> 00' 00"	81 <sup>0</sup> 36' 00"
5	42 <sup>0</sup> 27' 14"	81 <sup>0</sup> 14' 36"
F-14	41 <sup>0</sup> 54' 39"	81 <sup>0</sup> 50' 38"

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

pH

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		6.9	7.12	6.9	7.04
0- 2	7.08	7.25	7.25	6.71	7.05
2- 4	7.05	7.1	6.95	6.63	7.08
4- 6	6.98	7.05	6.95	6.48	6.96
9- 11	7.08	6.85	6.90	6.57	6.96
14- 16	7.05	6.85	6.90	6.65	6.91
19- 21	7.08	6.8	6.86	6.50	6.90
30- 35				6.08	6.75
50- 55				6.29	6.78
80- 85				6.60	6.58
85- 90					
110-115					
112-117				6.35	6.72
140-145					

Eh (mV)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		+265	+300	+140	
0- 2	+350	+135	+180	+ 60	
2- 4	+285	+ 90	+160	+ 90	
4- 6	+225	+125	+175	+ 30	
9- 11	+190	+110	+130	+ 20	
14- 16	+190	+ 90	+130	+ 55	
19- 21	+190	+110	+125	+ 75	
30- 35				+135	
50- 55				+130	
80- 85				+120	
85- 90					
110-115					
112-117				+115	
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Calcium (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	34.8	51.2	36.2	45.6	35.6
0- 2	34.3	50.8	44.5	35.0	32.5
2- 4	25.5	45.8	30.7	39.7	28.1
4- 6	30.8	42.8	31.0	38.0	28.5
9- 11	28.5	44.8	30.5	46.7	29.9
14- 16	32.5	39.5	35.0	46.7	32.9
19- 21	32.3	38.0	38.7	52.7	32.9
30- 35			31.2	43.0	38.8
50- 55			29.2	41.3	40.1
80- 85				36.7	40.6
85- 90					
110-115			26.0		41.8
112-117				36.0	
140-145			30.0		

Magnesium (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	7.87	10.2	8.3	9.20	7.19
0- 2	8.13	10.5	9.0	8.25	7.08
2- 4	6.63	9.85	8.5	9.62	6.73
4- 6	6.87	9.88	8.5	9.04	6.73
9- 11	7.92	10.3	8.5	10.7	7.45
14- 16	8.75	9.45	9.7	11.4	7.68
19- 21	10.3	9.30	9.7	12.0	8.05
30- 35			11.6	11.1	10.5
50- 55			12.1	11.5	11.5
80- 85				10.7	11.6
85- 90					
110-115			10.0		12.4
112-117				11.3	
140-145			10.4		

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Sodium (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		11.6	12.4	11.4	13.1
0- 2		15.2	13.1		14.1
2- 4		16.2	12.4		11.1
4- 6		17.6	12.8		11.7
9- 11		17.2	12.2	12.0	11.7
14- 16		16.6	12.6	11.8	11.2
19- 21		13.2	11.7	11.6	11.2
30- 35				9.7	8.1
50- 55				11.6	8.9
80- 85				11.4	7.5
85- 90					
110-115					7.8
112-117				12.6	
140-145					

Potassium (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		1.8	1.46	1.35	1.28
0- 2		2.7			1.95
2- 4		2.6	2.50		1.84
4- 6		2.4	2.22		2.05
9- 11		2.4	2.48	2.40	2.07
14- 16		2.5	2.50	3.31	2.18
19- 21		2.3	2.66	2.85	2.09
30- 35				2.13	1.90
50- 55				2.12	3.60
80- 85				2.22	2.18
85- 90					
110-115					1.78
112-117				2.94	
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Chloride (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	25.0	24.4	25.3	24.5	22.1
0- 2		26.6	27.6	26.8	23.7
2- 4	27.9	26.6	29.0	29.5	24.1
4- 6	28.0	24.4	27.6	28.1	25.4
9- 11	27.7	25.0	27.8	29.5	24.7
14- 16	27.6	26.6	27.7	28.9	24.1
19- 21	27.3	24.0	26.3	28.8	23.9
30- 35				22.3	18.4
50- 55				18.7	14.1
80- 85				14.6	11.8
85- 90					
110-115					9.0
112-117				<14	
140-145					

Sulphate (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	26.5	17.5	26.0	23.9	25.6
0- 2	21.0	6.1	12.0		17.3
2- 4	12.0	4.2	3.7		10.9
4- 6	3.8	3.4	3.5		10.9
9- 11	2.8	3.0	3.4	2.1	5.3
14- 16	1.9	4.3	2.2	2.3	5.0
19- 21	2.2	4.6	2.0	2.5	6.1
30- 35					1.5
50- 55					1.8
80- 85					1.2
85- 90					
110-115					1.1
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Ammonium (mg NH<sub>3</sub>/ℓ)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	.04	1.76	.27	.35	.11
0- 2	.94	2.64	1.59	1.74	1.31
2- 4	1.62	3.21	2.10	2.34	1.52
4- 6	2.03	3.48	1.64	2.97	2.34
9- 11	3.16	3.54	3.07	4.03	3.06
14- 16		3.95	4.30	4.44	3.70
19- 21		4.13	3.93	4.77	4.05
30- 35			4.53	5.60	5.00
50- 55			4.77	6.20	5.57
80- 85				7.40	6.66
85- 90					
110-115			6.63		8.00
112-117				8.60	
140-145			7.80		

Alkalinity (mg CaCO<sub>3</sub>/ℓ)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	90	162	93	94	92
0- 2	91	160	124	95	94
2- 4	95	138	122	123	94
4- 6	123	157	115	126	92
9- 11	137	145	121	142	109
14- 16	88	133	132	149	120
19- 21	134	147	139	165	118
30- 35			121	144	141
50- 55			125	144	138
80- 85				137	117
85- 90					
110-115			129		98
112-117				151	
140-145			142		



SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Manganese (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		10.0	.50	0.17	0.40
0- 2	0.60	8.82	3.10	1.09	1.25
2- 4	1.60	3.95	1.94	1.71	1.46
4- 6	1.68	3.02	1.74	2.01	1.42
9- 11	1.94	2.30	2.00	2.45	1.50
14- 16	2.22	1.90	2.12	2.50	1.60
19- 21	2.66	2.02	2.35	2.85	1.90
30- 35			2.70	2.96	3.86
50- 55			3.00	3.22	4.54
80- 85				3.06	4.17
85- 90					
110-115			2.8		4.50
112-117				3.06	
140-145			2.8		

Iron (mg/l)

Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		0.15	0.30	0.05	0.29
0- 2		8.1	1.66	2.08	0.26
2- 4	1.80	9.2	1.64	1.95	1.56
4- 6	4.40	10.1	3.13	3.15	2.86
9- 11	7.32	5.8	4.24	5.45	2.20
14- 16	5.96	6.2	4.98	4.85	0.86
19- 21	8.20	7.1	6.48	8.95	2.08
30- 35			1.20	6.30	15.1
50- 55			0.85	8.10	26.1
80- 85				7.80	22.3
85- 90					
110-115			0.51		17.8
112-117				5.20	
140-145			0.37		

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Total Inorganic Carbon (mM/l)  
Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface				2.04, 2.17	
0- 2				2.47	
2- 4				2.59	
4- 6				2.72	
9- 11				3.70	
14- 16				3.72	
19- 21				4.60	
30- 35				3.66	
50- 55				3.79	
80- 85				3.86	
85- 90					
110-115					
112-117				3.82	
140-145					

Percent Moisture  
Station 3

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface					
0- 2		88.1	91		
2- 4		85.0	85		
4- 6		84.9	83		
9- 11		77.3	77		
14- 16		75.2	81		
19- 21		73.3	75		
30- 35					
50- 55			64		
80- 85					
85- 90					
110-115			61		
112-117					
140-145			58		

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

pH

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	7.47	6.70	7.13	7.00	7.05
0- 2	7.11	7.05	7.14	6.81	6.90
2- 4	7.00	6.88	7.10	6.71	6.85
4- 6	7.02	6.85	7.08	6.78	7.00
9- 11	7.12	6.85	7.07	6.71	6.98
14- 16	7.17	7.15	7.16	6.80	7.13
19- 21	7.22	7.20	7.24	6.81	7.22
30- 35				7.39	
50- 55				6.95	
80- 85					
85- 90				7.39	
110-115					
112-117					
140-145					

Eh (mV)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	280	280	255	40	90
0- 2	200	130	210	50	45
2- 4	80	105	60	- 65	- 50
4- 6		100	155	10	10
9- 11	20	170	136	-130	80
14- 16	100	115	150	- 50	115
19- 21	125	135	145	- 40	0
30- 35				165	
50- 55				130	
80- 85					
85- 90				130	
110-115					
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Calcium (mg/ℓ)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	37.8	43.2	37.5	43.4	35.9
0- 2	37.8	46.5	44.0	42.0	35.3
2- 4	34.5	41.8	32.0	35.2	35.8
4- 6	34.0	40.8	35.0	43.5	37.3
9- 11	29.5	38.0	29.7	36.7	31.3
14- 16	30.3	36.8	41.6	38.7	35.5
19- 21	37.0	38.5	38.2	53.3	47.0
30- 35			33.7	48.0	
50- 55			35.2	42.7	
80- 85					
85- 90				38.5	
110-115			29.5		
112-117					
140-145			29.5		

Magnesium (mg/ℓ)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	8.30	8.78	8.3	7.70	7.78
0- 2	8.37	8.90	9.0	7.23	7.78
2- 4	7.05	8.28	7.5	6.60	7.33
4- 6	7.37	8.53	7.7	7.25	6.70
9- 11	7.42	8.63	8.0	8.00	7.40
14- 16	8.30	9.95	9.0	8.37	8.15
19- 21	9.87	10.8	9.5	9.73	9.12
30- 35			11.5	11.2	
50- 55			11.0	10.3	
80- 85					
85- 90				9.27	
110-115			9.0		
112-117					
140-145			9.0		

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Sodium (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		11.4	12.3	11.3	11.8
0- 2		12.0	12.3	11.0	13.1
2- 4		13.4	12.5	11.1	12.3
4- 6		14.6	12.8	10.6	12.7
9- 11		13.8	12.9	10.5	13.1
14- 16		12.2	12.6	11.5	12.9
19- 21		13.0	12.5	11.6	13.5
30- 35				13.5	
50- 55				14.1	
80- 85					
85- 90				17.4	
110-115					
112-117					
140-145					

Potassium (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		1.5	1.51	1.33	1.41
0- 2		2.2	2.88	2.19	2.56
2- 4		2.5	2.66	2.03	2.00
4- 6		2.2	2.47	2.19	2.24
9- 11		2.3		2.25	2.07
14- 16		2.3	2.19	2.22	2.22
19- 21		2.5	2.12	2.25	2.57
30- 35				1.74	
50- 55				1.54	
80- 85					
85- 90				1.68	
110-115					
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Chloride (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		24.4	24.6	24.4	24.0
0- 2		27.0	28.0	26.2	25.1
2- 4		27.5	26.4	26.8	25.6
4- 6		26.5	27.3	27.1	25.6
9- 11		26.6	28.0	28.8	25.8
14- 16		27.0	26.9	28.9	25.8
19- 21		29.5	27.2	28.9	27.6
30- 35				27.9	
50- 55				27.4	
80- 85				30.5	
85- 90					
110-115					
112-117					
140-145					

Sulphate (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		23.0	23.6	22.9	24.1
0- 2		9.5	11.0	20.5	20.6
2- 4		3.0	5.0	12.6	20.0
4- 6		3.4	5.7	7.3	22.4
9- 11		5.7	4.9	4.8	20.0
14- 16		4.8	2.3	2.7	11.0
19- 21		3.8	2.1	2.4	21.2
30- 35					
50- 55					
80- 85					
85- 90					
110-115					
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Ammonium (mg NH<sub>3</sub>/ℓ)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	0.12	0.55	0.30	0.13	0.06
0- 2	1.45	0.99	1.19	0.53	0.29
2- 4	1.10	1.17	2.38	0.74	0.60
4- 6	1.50	1.21	1.23	0.92	0.69
9- 11	2.30	1.36	1.90	1.23	0.95
14- 16	2.05	1.16	1.29	1.41	1.35
19- 21	1.80	1.01	1.27	1.63	1.20
30- 35			1.05	1.17	
50- 55			0.91	1.09	
80- 85					
85- 90				1.05	
110-115			0.93		
112-117					
140-145			1.08		

Alkalinity (mg CaCO<sub>3</sub>/ℓ)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	94	110	96	99	94
0- 2	125	135	114	101	96
2- 4	109	133	109	90	90
4- 6	111	133	113	91	80
9- 11	116	124	122	100	93
14- 16	119	125	133	121	110
19- 21	139	135		133	125
30- 35			137	144	
50- 55			131	134	
80- 85					
85- 90				125	
110-115			129		
112-117					
140-145			133		

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Manganese (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	0.1	0.80	0.69	0.10	0.28
0- 2	2.22	5.00	3.40	0.70	0.65
2- 4	1.32	1.95	2.00	1.20	0.92
4- 6	.98	1.90	1.64	1.20	0.70
9- 11	1.52	1.61	1.68	1.55	1.10
14- 16	1.65	1.35	1.46	1.50	1.27
19- 21	1.86	1.10	1.20	1.30	1.16
30- 35			0.68	0.60	
50- 55			0.55	0.40	
80- 85					
85- 90				0.08	
110-115			0.32		
112-117					
140-145			0.11		

Iron (mg/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		0.01	0.11	0.09	0.25
0- 2		0.30	1.32	0.20	<0.25
2- 4	1.02	0.82	1.60	0.70	<0.25
4- 6	1.08	1.02	0.59	1.40	0.25
9- 11	0.8	0.50	0.59	1.55	0.46
14- 16	0.6	0.30	0.48	0.40	<0.25
19- 21	1.4	0.10	0.44	0.30	<0.25
30- 35			0.11	0.10	
50- 55			0.08	0.05	
80- 85					
85- 90				0.05	
110-115			0.05		
112-117					
140-145			0.07		



SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Total Inorganic Carbon (mM/l)

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		-		2.09, 2.46, 2.36	
0- 2		2.64		2.57	
2- 4		2.66		2.24	
4- 6		2.62		2.07	
9- 11		2.81		2.45	
14- 16		2.94		2.77	
19- 21		3.05		3.02	
30- 35				3.66	
50- 55				3.19	
80- 85					
85- 90				2.95	
110-115					
112-117					
140-145					

Percent Moisture

Station 5

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface					
0- 2		72.7	82		
2- 4		73.5	79		
4- 6		52.0	61		
9- 11		49.0	53		
14- 16		55.3	60		
19- 21		49.6	52		
30- 35					
50- 55					
80- 85					
85- 90					
110-115					
112-117					
140-145					

TABLE 4

Depth (cm)	Ca3)	Mg	Na	K	Cl	SO <sub>4</sub>	ALK <sup>1)</sup>	Fe	Mn	SILICA	pH	Eh (mV)	MOISTURE (%)	CARBON <sup>2)</sup> Inorg Org (%) (%)	Station
Interface															
0-5	36.0	7.2	12.2	2.84	27.4	1.7	144	4.3	1.0	7.5	-	-	79.9	0.1	3.04
6-10	39.2	8.0	11.7	2.50	28.0	2.0	153	6.1	2.1	21.8	6.4	+195	75.9	0.09	2.60
11-15	42.0	8.7	11.4	2.72	28.5	2.8	150	5.3	2.2	42.2	6.6	+190	74.6	0.07	2.47
16-20	38.0	8.0	10.8	2.86	26.5	18.5	140	1.8	1.5		6.5	+295	73.5	NIL	2.27
21-25	38.0	8.1	10.4	2.86	25.9	14.0	142	2.7	1.5		6.6	+190	73.6	0.07	2.10
26-30	41.0	9.0	10.2	2.68	25.8	16.5	156	4.4	2.2		6.6	+170	69.2	0.07	1.86
Interface															
0-5	38.8	7.8	13.0	2.64	26.9	1.3	167	8.9	1.4	5.5	6.2	+285	83.3	NIL	3.57
6-10	36.0	7.3	12.2	2.20	27.8	1.4	148	6.5	1.8	28.8	6.3	+255	78.4	0.32	2.87
11-15	36.0	7.4	11.6	2.65	28.1	2.2	145	3.6	2.1	44.0	6.4	+235	76.7	0.03	2.47
16-20	32.6	7.5	11.5	2.92	27.8	2.3	149	1.3	1.7		6.45	+215	74.0	0.05	2.32
21-25	36.0	7.8	10.8	2.46	26.4	2.4	152	6.0	2.3		6.35	+135	73.7	NIL	1.73
26-30	37.6	8.8	10.8	2.68	26.2	4.8	151	4.4	2.6		6.6	+170	70.7	NIL	2.04
31-35	32.5	7.4	10.2	2.60	23.6	7.4	140	1.0	1.4		6.6	+165	67.5	0.09	1.57
36-40	35.2	8.2	10.0	2.68	23.2	7.7	157	2.5	2.2		6.6	+145	68.2	NIL	1.50
41-45	34.4	8.1	9.7	2.92	22.4	5.7	155	1.2	2.2		6.9	+140	67.9	0.04	1.35

1) As CaCO<sub>3</sub>

2) As Carbon

3) mg/l

TABLE 5

Station	Cruise	Sediment Depth (cm)	C.E.C. (meq/100g)	E.C.S. <sup>1)</sup> (meq/100g)			K	Fe	Mn
				Ca	Mg	Na			
2	D	0-10	20.4 <sup>2)</sup>	13.6	2.7		2.6	0.58	
		10-20	18.0	9.5	2.9		3.9	0.59	
3	C	0-10	20.8	14.2	1.7		6.8	0.79	
		10-20	20.7	12.1	1.4		5.5	0.72	
5	D	0-10	10.4	7	2.5		2.6	0.51	
		10-20	7.8	-	1.6		1.7	0.69	

1) CEC - cation exchange capacity; ECS - exchangeable cation status.

2) Averages of 2 to 4 determinations.

TABLE 6

Station <sup>1)</sup>	Sediment Depth (cm)	Temp. (°C)	Oxygen (ml/l)	Nitrogen	Methane
2	Interface	5.6, 19.4 <sup>2)</sup>	0.93	---	0.39
	0-2		0.87, 0.63 <sup>3)</sup>	21.0, 20.1	1.84
	7.5-10		NIL	12.1	1.39
3	Interface	5.6, 18.6	1.05	26.8, 25.9	Trace
	0-2		0.44, 0.32	19.6, 18.0	10.3, 9.1
	7-10		0.27, 0.28	17.9, 20.6	5.3, 8.2
5	Interface 0-2	5.6, 17.8	0.67, 0.88 0.47	13.1, 23.7 20.4, 18.2	NIL Trace

1) Cores collected on Cruise F.

2) The first figure gives the temperature of the cold room where the cores were stored; the second the temperature of the core at the end of processing.

3) Two figures signify two independent determinations on the same core.

TABLE 7

 $\delta C^{13}$ <sup>1)</sup>

Station	Sediment Depth (cm)	A <sup>2)</sup>	Cruise Designation			
			B	C	D	F
2	Interface <sup>3)</sup>		-1.17	+1.22	-3.78	--0.73
	0-20		-	+3.52	-	-
	60-80		-	+1.03	-	-
3	Interface		-0.42	-2.68	-	- 0.80
	0-20		-	+2.31	+5.85	+6.23
	60-80		-	+2.34	+7.36 {+6.62	+11.08
5	Interface		-1.16	-2.84	-3.45	- 0.76
	0-20		-	-	-3.84, -4.19	-
	60-80		-	-4.44	-2.30	-

1) 0/00 relative to PDB.

2) No samples available.

3) Water just above interface.

TABLE 3

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

pH						
Station 2						
Sediment Depth (cm)	Sample Dates					
	May 25	June 21	July 27	August 30	October 25	
Interface		7.0	7.20	6.8		
0- 2	7.10	7.05	7.12	6.62	6.89	
2- 4	7.00	6.9	6.80	6.45	6.73	
4- 6	7.18	6.65	6.83	6.35	6.72	
9- 11	7.13	6.88	6.91	6.79	6.85	
14- 16	7.30	6.9	6.96	6.73	6.96	
19- 21	7.10	7.0	7.07	6.78	6.94	
30- 35					6.93	
50- 55					6.98	
80- 85					7.15	
85- 90						
110-115					7.20	
112-117						
140-145						

Eh (mV)						
Station 2						
Sediment Depth (cm)	Sample Dates					
	May 25	June 21	July 27	August 30	October 25	
Interface		+155	+290	+170	+ 95	
0- 2	+150	+ 75	+142	+ 10	+105	
2- 4	0	+ 90	+130	- 50	+ 85	
4- 6	- 50	+ 65	+130	- 65	+120	
9- 11	- 65	+ 55	+106	+ 45	+115	
14- 16	- 70	+ 75	+120	+ 40	+115	
19- 21	- 40	+ 55	+118	+ 15	+105	
30- 35					+150	
50- 55					+135	
80- 85					+110	
85- 90						
110-115					+115	
112-117						
140-145						

X

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Calcium (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	39.0	41.2	37.5	42.7	36.5
0- 2	30.8	39.2	37.2	38.0	41.6
2- 4	28.0	31.8	28.7	36.0	36.1
4- 6	27.5	26.8	27.5	32.5	31.8
9- 11	31.2	29.8	30.7	38.5	28.5
14- 16	31.5	35.8	31.5	40.0	27.5
19- 21	30.2	32.0	32.2	40.7	30.1
30- 35			30.0		30.6
50- 55			32.5		31.3
80- 85			33.2		32.5
85- 90					
110-115			35.0		35.5
112-117					
140-145					

Magnesium (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	8.37	8.20	8.1	8.25	7.55
0- 2	6.87	8.30	8.7	7.35	8.13
2- 4	6.87	7.05	7.0	7.13	7.63
4- 6	7.13	6.42	7.5	6.77	7.30
9- 11	8.00	7.55	8.5	7.95	7.22
14- 16	8.80	8.70	8.6	8.57	6.92
19- 21	9.16	8.75	9.7	8.42	8.08
30- 35			10.5		9.20
50- 55			10.2		9.65
80- 85			10.3		10.00
85- 90					
110-115			11.7		10.35
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Sodium (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		12.0	12.0	11.3	11.1
0- 2		15.2	12.3	11.7	12.3
2- 4		13.8	11.6	11.3	11.5
4- 6		12.3	11.6	11.0	11.4
9- 11		11.6	12.1	10.5	12.4
14- 16		11.5	12.3	10.8	11.7
19- 21		12.2	12.3	11.4	11.9
30- 35					11.7
50- 55					11.2
80- 85					10.9
85- 90					
110-115					11.5
112-117					
140-145					

Potassium (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		1.4	1.38	1.35	1.15
0- 2		2.0	2.22	2.19	1.90
2- 4		2.0	2.12	2.03	1.48
4- 6		1.9	2.04	2.19	1.57
9- 11		2.1	1.80	2.25	1.88
14- 16		2.1	2.42	2.22	2.05
19- 21		2.0	2.40	2.25	2.30
30- 35					1.76
50- 55					1.65
80- 85					1.71
85- 90					
110-115					1.67
112-117					
140-145					



SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Chloride (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	25.0	23.4	24.6	25.9	17.6
0- 2		25.5	28.8	27.6	27.0
2- 4	30.8	25.4	30.3	27.7	25.8
4- 6	28.6	26.5	28.3	27.5	26.0
9- 11	27.9	26.7	28.0	29.8	26.4
14- 16	26.6	26.4	29.2	25.7	25.5
19- 21	27.7	26.6	28.5	25.4	25.2
30- 35					22.1
50- 55					20.0
80- 85					17.0
85- 90					
110-115					
112-117					14.3
140-145					

Sulphate (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	26.1	23.5	23.5	18.9	19.4
0- 2	9.8	9.3	3.4	4.5	24.5
2- 4	3.5	3.1	2.8	2.3	24.7
4- 6	3.0	2.5	2.1	2.0	30.2
9- 11	1.8	2.8	2.5	2.0	28.4
14- 16	1.9	3.0	2.0	2.0	13.4
19- 21	1.8	2.8	3.3	1.5	5.9
30- 35					2.4
50- 55					2.5
80- 85					2.0
85- 90					
110-115					
112-117					2.0
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Ammonium (mg NH<sub>3</sub>/ℓ)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	.055	0.460	0.180	0.43	0.14
0- 2	1.32	1.12	1.50	1.10	0.83
2- 4	2.0	1.31	1.75	1.57	0.74
4- 6	2.39	1.55	1.50	2.00	0.70
9- 11	2.90	2.07	2.57	1.68	0.86
14- 16	2.73	2.19	2.44	1.61	2.86
19- 21	2.87	1.99	2.48	2.26	1.92
30- 35			1.90		1.56
50- 55			1.78		1.92
80- 85			1.95		1.98
85- 90					
110-115			2.01		1.92
112-117					
140-145					

Alkalinity (mg CaCO<sub>3</sub>/ℓ)

Station-2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	94	100	93	100	94
0- 2	91	122	102	99	107
2- 4	87	101	93	105	92
4- 6	99	91	96	100	72
9- 11	121	105	114	108	77
14- 16	137	107	105	127	91
19- 21	130	117	122	136	108
30- 35			136		127
50- 55			129		133
80- 85			132		145
85- 90					
110-115			152		156
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Manganese (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface	0.1	0.6	0.53	0.54	0.65
0- 2	0.96	3.35	2.44	0.79	1.28
2- 4	1.68	1.53	1.50	1.05	1.15
4- 6	2.08	1.42	1.98	1.21	1.05
9- 11	1.92	1.61	1.68	1.70	0.88
14- 16	1.86	1.75	1.72	1.70	1.23
19- 21	1.58	1.82	1.76	1.85	1.20
30- 35			1.6		1.55
50- 55			1.4		1.20
80- 85			0.92		0.97
85- 90					
110-115			0.93		0.68
112-117					
140-145					

Iron (mg/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		0.1		1.05	0.40
0- 2	2.80	0.90	3.64	1.90	0.76
2- 4	3.90	1.4	2.04	1.75	1.82
4- 6	3.00	2.9	1.84	2.25	0.89
9- 11	1.92	1.6	1.89	3.40	0.74
14- 16	1.82	3.7	2.72	1.50	0.66
19- 21	1.40	2.0	1.95	1.60	0.66
30- 35			0.07		1.23
50- 55			0.40		0.68
80- 85			0.13		0.52
85- 90					0.45
110-115			0.15		
112-117					
140-145					

SEDIMENT INTERSTITIAL WATER STUDY  
LAKE ERIE

Total Inorganic Carbon (mM/l)

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface		2.78		2.31, 2.40	
0- 2		2.94		2.25	
2- 4		2.89		2.12	
4- 6		2.94		2.26	
9- 11		2.91		2.70	
14- 16		3.28		2.57	
19- 21		3.10		3.07	
30- 35					
50- 55					
80- 85					
85- 90					
110-115					
112-117					
140-145					

Percent Moisture

Station 2

Sediment Depth (cm)	Sample Dates				
	May 25	June 21	July 27	August 30	October 25
Interface					
0- 2		88.8	89		
2- 4		-	83		
4- 6		81.4	82		
9- 11		74.1	75		
14- 16		71.1	78		
19- 21		62.2	68		
30- 35					
50- 55			53		
80- 85			54		
85- 90					
110-115			51		
112-117					
140-145					