HYDRAULICS DIVISION

Technical Note

DATE: July 1980 **REPORT NO:** 80-25

TITLE: "Data on Lake Erie Nearshore Bottom Fauna, Mohawk Point to Port Burwell, collected during 1971-1973 nearshore sediment surveys"

AUTHOR: N. A. Rukavina

REASONS FOR REPORT:

Requested by the Department of Biology, University of Waterloo

CORRESPONDENCE FILE NO:

1374

1.0 INTRODUCTION

This report has been prepared in response to a request from the Department of Biology, University of Waterloo (Appendix 1) for unpublished data on bottom fauna collected during the 1971-1973 nearshore sediment surveys of Lake Erie. Data apply to the reach extending from Mohawk Point in the eastern basin to Port Glasgow in the central basin. This information will be used to supplement data already obtained from the biology samples by the Waterloo Biology Department as part of a contract study for the Great Lakes Biolimnology Laboratory (Hynes and Barton, undated; Barton and Hynes, 1978; Barton, 1980).

In general, nearshore survey procedures do not include the collection of biologic data beyond the recording of fauna observed during description of sample geology. In this case, advantage was taken of biologic expertise within the survey crew and the availability of laboratory facilities in the field to improve data quality by separating the fauna from the sediment, preserving them for further study, and making a preliminary identification to the level of order or family. For this report the faunal lists prepared in the field have been edited, computer coded and compiled as listings of the biologic data alone and in combination with other site and sample data.

2.0 BACKGROUND

The samples on which these data are based were collected during field surveys in the summers of 1971 to 1973. Field procedures and subsequent analysis are documented in reports by St. Jacques and Rukavina (1973) and Rukavina and St. Jacques (1978) and summarized below.

Survey coverage in 1971 was from Mohawk Point to Peacock Point, in 1972 from Peacock Point to Port Burwell, and in 1973 from Port Burwell to Port Glasgow. Samples were collected with a double-Shipek sampler (Sly, 1969) on a 2-km grid within the depth range 4-20 m. Positioning was by Motorola Range Positioning System with an accuracy of 5-10 m and depths were recorded with an Atlas Deso 10 echo sounder.

One sample bucket was reserved for geologic use, the other for biologic analysis. Both samples were photographed. The geologic sample was described in terms of physical properties (texture, colour, etc.) and sub-sampled for particle size analysis. The biologic sample was processed with the procedure described in the next section.

3.0 BIOLOGY PROCEDURES

1. Measure the temperature of the biology sample immediately upon recovery.
2. Pour the sediment from the Shipek bucket into a 40-mesh funnel net with a screened end vial and wash till clean.
3. Transfer the contents of the vial to a plastic sample bottle and store in a refrigerator at 4°C until analysis. Time between collection and analysis should not exceed four days.
4. Examine the sample and note the presence of:
   a) algae
   b) macrophytes
   c) organic detritus
5. Pour the water from the sample vial into a white porcelain sorting dish and pick out all visible (macroscopic) organisms. Identify as one of the following 11 types:
   a) AMPHIPODA
   b) ISOPODA
   c) CHIRONOMIDA
   d) OLIGOCHAETA
   e) BIVALVIA
   f) GASTROPODA
   g) HIRUDINEA
   h) TRICHOPTERA
   i) EPHEMEROPTERA
   j) TURBELLARIA
   k) OTHER (unidentified)

   and record the counts for each type. Note the presence of HYDRACARINA and COPEPODA but do not segregate or count.
6. Pour the sediment from the sample vial into a large beaker of water and transfer small amounts of the sediment-water mixture to the sorting dish and proceed as in step 5 until all the sediment has been analysed.
7. Store types a) to f) separately in labelled vials of alcohol and the remaining types in a common vial and preserve for further analysis as required.

4.0 DATA PROVIDED

1. A computer listing of the faunal counts for each sample station (Appendix 2).
2. A computer listing (DECODE format) of faunal data in combination with data on site, depth, time of collection, other survey parameters and sample geology (Appendix 3).
3. A Calcomp plot of the location of biology samples (Appendix 4).

5.0 REFERENCES CITED

Barton, D. R., 1980. "Some Nearshore Benthic Macroinvertebrates from Humber Bay and Toronto Harbour, Lake Ontario and Long Point Bay, Lake Erie". Unpublished Contract Report to Supply and Services Canada, Contract No. 05SU, FP714-9-0106, 27 p.

Barton, D. R. and Hynes, H.B.N., 1978. "Seasonal Variations in Densities of Macrobenthic Populations in the Wave Zone of North-Central Lake Erie". J. Great Lakes Res., IAGLR, 4 (1):50-56.

Hynes, H.B.N. and Barton, D. R., undated. "Comparative Study of the Temporal and Spatial Distribution of Invertebrate Species in the Shallow Littoral Zone of the Great Lakes". Unpublished Contract Report, Environment Canada, Contract No. OSU5-0044, 149 p.

Rukavina, N. A. and St. Jacques, D. A., 1978. "Lake Erie Nearshore Sediments, Point Pelee to Port Burwell, Ontario". Inland Waters Directorate, Scientific Series No. 99, 44 p.

St. Jacques, D. A. and Rukavina, N. A., 1973. "Lake Erie Nearshore Sediments-Mohawk Point to Port Burwell, Ontario". Proc. 16th Conf. Great Lakes Research, IAGLR, p. 454-467.

Sly, P.G., 1969. "Bottom Sediment Sampling". Proc. 12th Conf. Great Lakes Research, IAGLR, p. 883-898.

ACKNOWLEDGMENTS

Biologic procedures were devised by W. Cowan and refined by L. Culp. W. Cowan was responsible for biologic analysis of the 1971 samples. L. Culp, assisted by D. Wilson, D. St. Jacques and R. Dolling analysed the 1972 and 1973 samples. G. LaHaie prepared the site maps and assisted with the editing of the DECODE sample descriptions.

APPENDIX 1

University of Waterloo

Waterloo, Ontario, Canada
N2L 3G1

Faculty of Science
Department of Biology
519/885-1211

14 January 1980

FILE 1374		
No.		
DATE: Jan 15, 1980		
To	Initials	Date
T.M.D.	[illegible]	22/1/80
N.H.P.	[illegible]	5/2/80
Cn		

Dr. T. Milne Dick, Chief
Hydraulics Research Division
National Water Research Institute
Canada Centre for Inland Waters
867 Lakeshore Road, P.O.Box 5050
Burlington, Ontario
L7R 4A6

Dear Dr. Dick:

Several years ago I obtained the benthic invertebrates collected by Dr. Rukavina in his 1971-1973 nearshore surveys of Lake Erie. My primary interest in the material at the time was to supplement my own studies of the wave-zone fauna of the central basin and this work has long been completed. Since the entire series of samples cover an area which has been very little studied and are complete with very good sediment analyses, it seemed worthwhile to examine all of the material in hopes of preparing a joint publication with Dr. Rukavina. The press of other obligations has made this a slow process but the identifications are now completed. One major problem remains: when I received the samples, they had been sorted by group (e.g. Oligochaeta, Amphipoda, etc.) and groups, not samples, were stored together. This means that it is impossible for me to tell whether a missing group at any particular station was actually not collected, or the vial has been misplaced. My tabulated list of stations by group suggests that some of the vials are indeed missing.

In order to complete this study, would it be possible to check my list against the original records made when the samples were sorted? This would eliminate the need for much speculation about the distribution of several species. If you could spare someone for the task, I could send the list for comparison. If not, I would be willing to come down and spend a day or so myself on the job. There are about 600 stations involved, of which perhaps one-third may be missing some groups. If total counts from the original sorting are available, those would be even more useful than simple presence/absence.

As my other commitments are fairly light just now, I should like to complete this study by April and thus would appreciate this information by early February.

Thanks for your help,

JAN 15 1980

Sincerely,

David R. Barton

David R. Barton

APPENDIX 2
BIOLOGY DATA

Note: Field data were not recorded for sample numbers 345-387 and 417-524. Entries for these samples are data obtained from later analysis of selected faunal types (Barton, Pers. Comm.). In this case Bivalvia and Gastropoda have been grouped as Mollusca, and Trichoptera, Ephemeroptera and Turbellaria grouped with unidentified fauna as "OTHER".

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E200														
E201	4			2		7	5							+
E202	11	4	20		3	19	4							
E203	7	1	6		2	8	1							
E204	1	4	4		3	9								
E205			1											+
E206	5		2		1	4	2							
E207	1					2								
E208	1	7	8			80	1							
E209	4	8	16		1	17	1							
E210		3	33	5		27	7							+
E211	8	5	11	5		2								
E212	4	8	10											
E213	11	3	32	9		30	4							
E214	3	6	25	1	7	47								
E215	25	22	36	30	3	3								
E217	5		12	1		14	1							
E218	1					8								
E219		3		8										+
E220	6	1	32	4	4	36	1							
E221	3	3	34	37	16	9								
E222	30	7	11	18	5	4								
E223	19	4	28	3	1	16	1						1	
E224	8	6	20		12	1			2					
E225	13	5	40	3	6	22							1	
E226	11		52	7	1	35	1							
E227	18	4	135	20	4	42	1							
E228	7	3	36	16		45	2							
E229	7	31	11	33	7	37	1							
E230	9	2	1			4	9							
E231	8	3	12			9								
E232	11	1	46		5	54								
E233	9		113	8	11	106	3							
E234	6		9		4	8								
E235	6	10	69	13	3	34								
E236	7	4	9	8	5	47								
E237	2	13	84	49	3	26								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E238	3	8	2	1		8								
E239	9		26	15		6								
E240	1		12	22		14		1						
E241	14		7	72	2	17								+
E242			3											+
E243	10	4	13		1	4								
E244	31	13	25		4	50	8							
E245	18		6	8	8	30	1							
E246			13	10		5								
E247	6	9	43	5	4	54	3							
E248	1	9	105	5	17	29								
E249	26	33	49	12	24	114	3							
E250	4	3	23	13	9	20								
E251	11	0	10	7	2	8								
E252	6	0	9	33	2	16	2							
E253	2	2	3	2	2	8								
E254	2													
E255	15	3	32		3	41	10							
E256	3	2	13		1	2								
E257	11	1	23	9		24	2							
E258	28	16	29	10	7	31	1							
E259	2	2	15	6	4	25		1						
E260	3	3	39	44	29	30	1						3	
E261	2	3	48	39	9	31	1						1	
E262	3	1	27	28	1	6							10	
E263	17		8	111		25	2						3	
E264	8		59	4		9								
E265	1		3				5						1	
E266	5		16			15	2							
E267	7	1	26	1	3	24	10	2			+			
E268	8	5	28	10	2	37	5						2	
E269	14	2	11	7	5	32	3							
E270	4	4	45	7	6	60	2			1			1	
E271	8	7	32	2	13	25	1							
E272	2	1	26	15	19	25							2	
E273	7		51	10	2	22	2						1	
E274	4	6	19	15	4	9							2	

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E275	2	3	14	4		11	1	1						
E276	17		28	9	1	8		1						
E277	2		45	5		10	1						8	+
E278			46	4		17	3						6	+
E279	1		31	3	1	28	1	4					1	
E280	7		14	2	1	27	21	2					1	
E281	12	3	10	2	7	26	14						2	
E282	13		20	6	3	53	1	1						
E283	14	1	16	11	11	28		3					1	
E284	10	8	29	30	6	32	4						8	
E285	13	2	14	4	8	16	1						2	
E286	2	1	21	4		5							1	
E287	5		22		1	10	3							+
E288	13	1	67	7		8	3						1	+
E289	2				1		4							
E290	10		16	4	1	40	9	3					7	
E291	4		22			24	7	6						
E292	12		7	2	1	26	7	1					1	
E293	18	1	13	3	6	25	9	1					1	
E294	5	5	13	8	5	8	8						2	
E295	6	9	21	17	3	13	2						3	
E296	9	1	17	5	3	11	2						1	
E297	11		10		2	15							1	
E298	2		26	2	1	30	3							
E299	11		38	22		31	3							
E300	2						4							
E320	111		33	8	3	22	10	1					15	
E302	3		14	6		16	4	1						
E303	3		12	2	2	9	4						1	
E304	8		21	6	1	14	9						1	
E305	15	1	22	7	1	15	6						1	
E306	4		11			6								
E307	14	1	25	1	3	5	3							+
E308	2		22	1	5	6	6							+
E309	3		8	13	3	12	4	1		1	+		2	
E310	15	1	101	2	1	10	1	2					3	
E311	1		32	1	1	1	1							

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E312	4		25		2	2							1	
E313	15		17	3	2	5	3	2						
E314	2		2	2										
E315	7		9	1		20	10							
E316	4		60	5		7	10							
E317	10		31	1	5								1	+
E318	1													
E319														
E320		1	23			4								
E321	1	3	32	23	11	35	2						26	
E322	1	2	26	56	11	13								
E323	1		13	27	1	7					+			
E324		7	30	12	20	22	6						3	
E325	5	10	3	95	6	3								
E326	2	4	24	38	35	30							1	
E327	1		5	146		6					+	+		
E328			2	26		2						+		
E329		7	30	100		27								
E330													1	
E331	2	23	6	66		5						+	1	
E332	5				1	1						+	1	
E333			18	291	11	17								
E334														
E335			18	344	2	7					+	+		
E336		1	7	296		6								
E337			3								+			
E338			8	6	5	21								
E339				370										
E340	27		3	2								+		
E341	2		13	341	7	6								
E342		26	2	131										
E343	72		3	14		5								
E344	11		9	8	1	15								
E388	17		10	1								+		
E389	4		40	46	6	73	2							
E390	42	2	4	24	3	8	2							
E391	2		29	52	7	67								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E392	44		5	4	2	13								
E393	39		4	57	2	4					+			
E394	3			5								+		
E395	66		12		3									
E396	103			23	12	3						+		
E397	97		1	3	9	1						+		
E398	78	2		9		1								
E399	51	2		55	3	12	2					+		
E401	17		8	1		1								
E402			65	70	7	34								
E403	1		34	47	17	56								
E404	76		9	15		5	1							
E405	4	2	40	26	2	24								
E406	2			5										
E407	2			5										
E408	2			2	1	4					+	+		
E409	33		2	28	6	34						+		
E410	40		3	20	2	4	2							+
E411	41		5	15		4								
E412			28	35	9	25	1							
E413	4				6	4	1							
E413	4				6	4	1							
E414				3	2	6								
E415					3									
E416	2	1	1			6								
E525			71	255	11	34	3					+		+
E526			7	1	2	2								+
E527		2	10	36		4						+		+
E528				4	2							+		+
E529		20	87	76	7	33						+		+
E530		25	18	12	6	26	1							
E531		6	29	32		62	3					+		
E532	1	5	25	36		36	3							
E533		22	25	126		91								
E534		4	1	5		4						+		
E535	9													
E536		1	94	35	15	30								+

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E537			25	11	1	2								
E538			2	36		1								+
E539		6	4	3			1							+
E540		7	3	11	2		1					+		+
E541	14		1											
E542		1	78	76		13								
E543			17	11		3								
E544			7	72	1	11								+
E545		1	1	1	4		1					+		
E546		1												
E547												+		
E548				2	1	1						+		
E549		15	18	48		58	1					+		
E550				2		3						+		
E551		19	14	23		53								
E552			2	4										
E553		1										+		
E554		1	41	16	3	13								
E555			8	2	1	7								
E556		1	7	4		1								
E557		2	18	78	11	3	1							
E558		2	1									+		
E559			1									+		
E560		13	4	1	1		1					+		
E561			18	3	3	5								
E562		4	3	13	2	1								
E563			4	23	1									
E564		18	43	42		37	4							
E565		1					6				+	+		
E566		2		25		7						+		
E567		3	4	9		1								
E568		1	3			37	1							
E569			4		1									
E570			26	6										
E571			18	7										
E572		1	21	34		4								
E573		1	35	125		21								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E574		1	2	88		5								
E575	2		2	2										
E576		1	5	1		1						+		
E577			1	4		1						+		
E578		2	6	9										
E579			8	13										
E580		1	5	39		1				+				
E581		4	59	48		14								
E582		12	29	71		27	1							
E583			16	8		2								
E584		25	18	30		100	2							
E585		14	3	26		53	12							
E586			1											
E587			1	8		2					+	+		
E588			67	9		2								
E589		1	1	9										
E590		1	5	22										
E591		6	23	204		4								
E592	6		2	9		1								+
E593			13	128	2	3						+		+
E594		1	19	12		2								+
E595		3	14	24		1								+
E596			60	11	1	1								+
E597		9	39	2		1								+
E598		2	51	31		2						+		+
E599			2	78								+		
E600		4	5	56		42						+		+
E601			6	63		21						+		+
E602			63	68	1							+		+
E603			13											
E604		8	32	28		8								+
E605		9	61	18		2						+		+
E606		1	34	7		1								+
E607		7	106	270		13						+		+
E608	2		30	72	2	27	2							+
E609		4	15	4										+
E610		17	23								+	+		+

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E611		2	103	43										
E612			45	38		2	1				+			+
E613			36		33	1								+
E614		4	65	1		1								+
E615		1	6	47										+
E616		6	5	80		29								+
E617	1		9	23	1									+
E618														+
E619		16	15	19		2					+			
E620		38	113	21			1				+			
E621		2	58	51		1	1							
E622			48	65		3								
E623			51	36	2	65	2							+
E624		2	6	3										+
E625		1	31	13										
E626		9	148	36		2					+			
E627			115	53		18								
E628		24	104	8										
E629			59	17		2						+		
E630		1		14								+		
E631			10	12	54		46							
E632			20	9		29								+
E633		1	45		11									+
E634		20	39	12	3						+	+		
E635		8	52	83		3	2							
E636		5	114	22		16								
E637		2	269	55										
E638	1		13											+
E639		2	12											+
E640		34	2	3	1		1				+	+		
E641			48	18							+			
E642			20	93										
E643		3	132	252		16								
E644		20	201	37		15								
E645			37	61		23								
E646		1	5	77		33								
E647			43	14		2	1							

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E648		8	12	6							+	+		
E649		9	39	41	1	2					+			
E650			168	126										
E651		1	65	16										
E652		15	90	80		12						+		
E653			30	33	2	86	3							+
E654	1		20	2										
E655		25	21	14	1									
E656		24	34	12		2								
E657		5	31	9							+			
E658		5	90	33		6								
E659		25	22	21			1				+			
E660		3	37	85		13								
E661			42	41		14								
E662	1		9	15		2	2							
E663			62	53	1	6								
E664		2	51	10										
E665		13	96	28		3					+			
E666			105	48	2									
E667		2	156	113		2	1							
E668		37	159	17							+			
E669		17	11	5			1							
E670			26	44		9								
E671			33	60		17	2							
E672			36	43		14	5							
E673		6					8				+	+		
E674			172	9		10								
E675		5	89	45		1								
E676		38	91	16		1					+			
E677			75	149										
E678		3	42	21										
E679		25	152	76		7								
E680			31	119		19								
E681		3	43	34		26								
E682		8	16	46		28								
E683		5	24	86		13								
E684			23	57		5	1							

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E685			68	18		4								
E686		1	56	63		4								
E687			105	29		8								
E688		4	297	123		6					+			
E689			98	115										
E690		2	13	3										
E691		25	20	3		7								
E692		1	47	8										
E693			25	29		28								
E694		12	26	101		62								
E695		36	17	61		47	1							
E696			21	17	1	91	1							
E697			40	6		10								
E698		7	104	48										
E699			184	83		12								
E700			128	14		4								
E701		36	116	10		8								
E702			118	80		1								
E703			132	102		3								
E704			59	52		15								
E705			27	45		13								
E706			23	8		26								
E707			14	24		23								
E708		23	27	93		47								
E709		2		8		1					+		+	
E710			128	22	1	7								
E711		21	83	23		3								
E712		2	173	56		8								
E713				47		3	1							
E714		1	108	113		24								
E715		1	100	80		18								
E716			22	2		14								
E717			41	35		22								
E718		1		2										
E719			33	65	2	43								
E720		2	121	19		7	1				+			
E721		20	62	25		11								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E722		2	80	80		2								
E723		1	50	100		20								
E724			55	200		45								
E725			30	40		4	1							
E726		1	24	69		70								
E727			40	20		17								
E728														
E729		2	5	10										+
E730		3	72	26	1	2								
E731		8	35	140		5								
E732		4	100	50		5								
E733			65	300		25								
E734			75	200										
E735			87	200		12								
E736			15	30		19								
E737			3	45	150		40							
E738 - Data unreliable because of mislabelling.														
E739 - Data unreliable because of mislabelling.														
E740			200	40		6								
E741		1	72	64		4								
E742			106	26		11								
E743	3	6	43	50		8								
E744			35	20		2								
E745			22	16		15								+
E746			85	113		29	3					+		
E747		3	1	15		1								
E748		15	84	43		36								
E749		4	165	41		6								
E750		44	30	13		4								+
E751		1	60	17										
E752		1	28	10		1								
E753			23	50		5								
E754	1		3				+							+
E755			16	12		15	8							
E756		30	14	2		2	1				+	+		
E757		1	150	50			3							
E758		37	31	41	1	1								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURE	HYDR	COPE	OTH	PLANTS
E759			37	80		6							1	
E760			40	100		25								
E761			44	55		27								
E762			2	6										
E763	1	12	11	11		1	5				+	+		
E764		2	27	75		15	3							
E765 - Data unreliable because of mislabelling.														
E766			4	30		3								
E767			18	35		17								
E768			43	50		34								
E769			44	20		50								
E770			29	24		6								
E771			22	8	2	17	2							
E772			21	55		34								
E773			28	75		27								
E774			22	65		20								
E775 - Data unreliable because of mislabelling.														
E776				6		7								
E777			5	12		18								
E778			12	19		10	3							
E779		3	8	2		2	4				+	+		+
E780			6	59		13								
E781			1	30		6								
E782			2	70		13						+		
E783			27	326	1	22	1							
E784				172		6								
E785			41	25		24								+
E786			35	50		23								+
E787			16	27		4	1							
E788			18	38	1	34	6							
E789			2	36		9	1							
E790			1	37		2								
E791		3	6	25		24								
E792			1	179		14								
E793			21	95		20								
E794			30	20		13								
E795			6	7		3								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	BIVL	GAST	TRIC	EPHE	TURB	HYDR	COPE	OTH	PLANTS
E796		2	2	1		6								
E797		1	2	4	1	1								
E798			3	57		1								
E799		1	4	136		5								
E800			7	69		8								
E801			12	52		34								
E802			32	23	1	12								
E803														
E804														
E805														
E806				5										
E807			1	31		14								
E808			14	306		13								
E809				90		15								
E816			2	60		7								
E823			13	15		7								

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	MOLLUSCA	OTHER (TRIC,EPHE,TURB,UNIDENT)
E345		15	8	405	1	2	
E346	85		6	45		10	
E347	15		7	15		16	
E348		38	5	22	6	9	
E349	75		5	12		8	
E350	1		35	10	2	6	
E351		13	34	54	10	17	
E352	35		4	17		12	4
E353							
E354		3	11	35	30	16	
E355	16		3			1	
E356	13		30	45	5	52	
E357			14	5	13	7	
E358	5			2		2	
E359		5	5	28		3	
E360	36		3	23		2	
E361			1				
E362			8	16		2	
E363	13		1	12		6	
E364	4	1		39		5	
E365	1		4	31		3	
E366	7	2	1	77		9	
E367	55		2				
E368	3		32	15	4	31	
E369	1	9	27	56	14	64	
E370	36			7	3	1	
E371	3		1	32		1	
E372	3	1		50		5	
E373	3	3		59		14	
E374	19		1	12		3	
E375	2		1				
E376		1	22	5			
E377	52		38	10		13	
E378	1		1	4			
E379	29		1	15			
E380	3			47	1		
E381	95	1	1	26		3	

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	MOLLUSCA	OTHER	(TRIC,EPHE,TURB,UNIDENT)
E382	14			4		4		
E383	63					1		
E384	71			16		5		
E385		3	532				9	
E386	53		1	31				
E387	61		40	43	6	74		
E417	13			19		5		5
E418	32		2	7				
E419	9		71	7	7	33		1
E420			32	7		1		
E421		2		2				
E422								
E423	2	4	3	5		1		
E424	1		5	11	1			
E425	46		2	11		5		3
E426	2		4	4		1		
E427	7		35	12				
E428	2	2	13	10	2	26		
E429			2		2			
E430				4				
E431	2		1	36				
E432	1			4				
E433			18		1	2		
E434			65	10		1		
E435	11		100		4			
E436	3	1	24	1				
E437	4	4	5	5				
E438	1	2	15	5		1		
E439		1	2	18	2			
E440			46	246	9	11		
E441			29	1	3	10		
E442	4	1	17	3				
E443	5	2	5	19	3	1		
E444	10	2	13	6	2			1
E445	2	2		2				1
E446	5			3	2	1		
E447			131	13	3	1		

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	MOLLUSCA	OTHER (TRIC,EPHE,TURB,UNIDENT)
E448		2	12			4	
E449	9		25	4			
E450	4	1	7	21	1		
E451		4	4	8			
E452	1	5	20	7	4	3	
E453		4	20	50	7	26	
E454		3	18	67	3	38	
E455	17	1	22	79		13	
E456			41	13		6	
E457		6	5	1	2	1	
E458		1	47	20			
E459	1	9	16	7		4	
E460				20			
E461	6		43	10			
E462			37	15		1	
E463				11			
E464			9	13	5		
E465		11	10	6	1	5	
E466		2	28	38	9	7	
E467			23	24	1	2	
E468			52	170	21	12	
E469			27	38	1	3	
E470		19	7				
E471		1	28	42	1		
E472		1	42	2	4		
E473		6	22	18	1	17	
E474		5	13	11	4	19	1
E475	6		4				
E476		2	24	37	6	62	
E477		1	26	40		23	
E478			18	2			
E479			21	16	6	13	
E480			40	14		1	
E481		6	24	25	3	22	
E482			78	161	3	18	
E483		2	45	11		39	
E484			21	16	2		

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	MOLLUSCA	OTHER (TRIC,EPHE,TURB,UNIDENT)
E485			20	13	8	16	
E486		1	48	18		28	
E487		5	16	35	3	13	
E488		38	19	8	1	20	
E489			2	1			
E490			16	89	32	12	
E491		1	12	5			
E492		3	33	15	3	24	
E493		1	52	15	1	7	
E494			19	6	7	9	
E495			49	13	3		
E496		1	34	2	1	10	
E497		2	31	7		20	
E498			1				
E499		8			3		
E500			8	4	2	4	
E501		1	96	40	7	8	
E502		1	6	4	3	15	
E503			61	6	2	7	
E504		8	43	21	1	24	
E505		8	43			3	2
E506			9	2			
E507			41	96	5	38	
E508		3	17	6		5	
E509			9	8		5	
E510			18		6	9	
E511		1	26	14	1	6	
E512		7	51	18	6	19	
E513		11	20	13		11	
E514		2	10	2			1
E515		1	13	21		15	
E516			3				
E517			31	195	17	65	
E518		5	2	3	1		
E519		3	13	5	1	1	
E520		1	39	9		1	
E521		7	123	30		6	1

LAKE ERIE - BIOLOGY DATA

SAMPLE	AMPH	ISOP	CHIR	OLIG	HIRU	MOLLUSCA	OTHER (TRIC,EPHE,TURB,UNIDENT)
E521		7	123	30		6	1
E522		6	55	38	9	30	
E523			29	21		28	
E524		32	35	3	1		1

APPENDIX 3
BIOLOGY AND SITE DATA

(On File in Hydraulics Division)

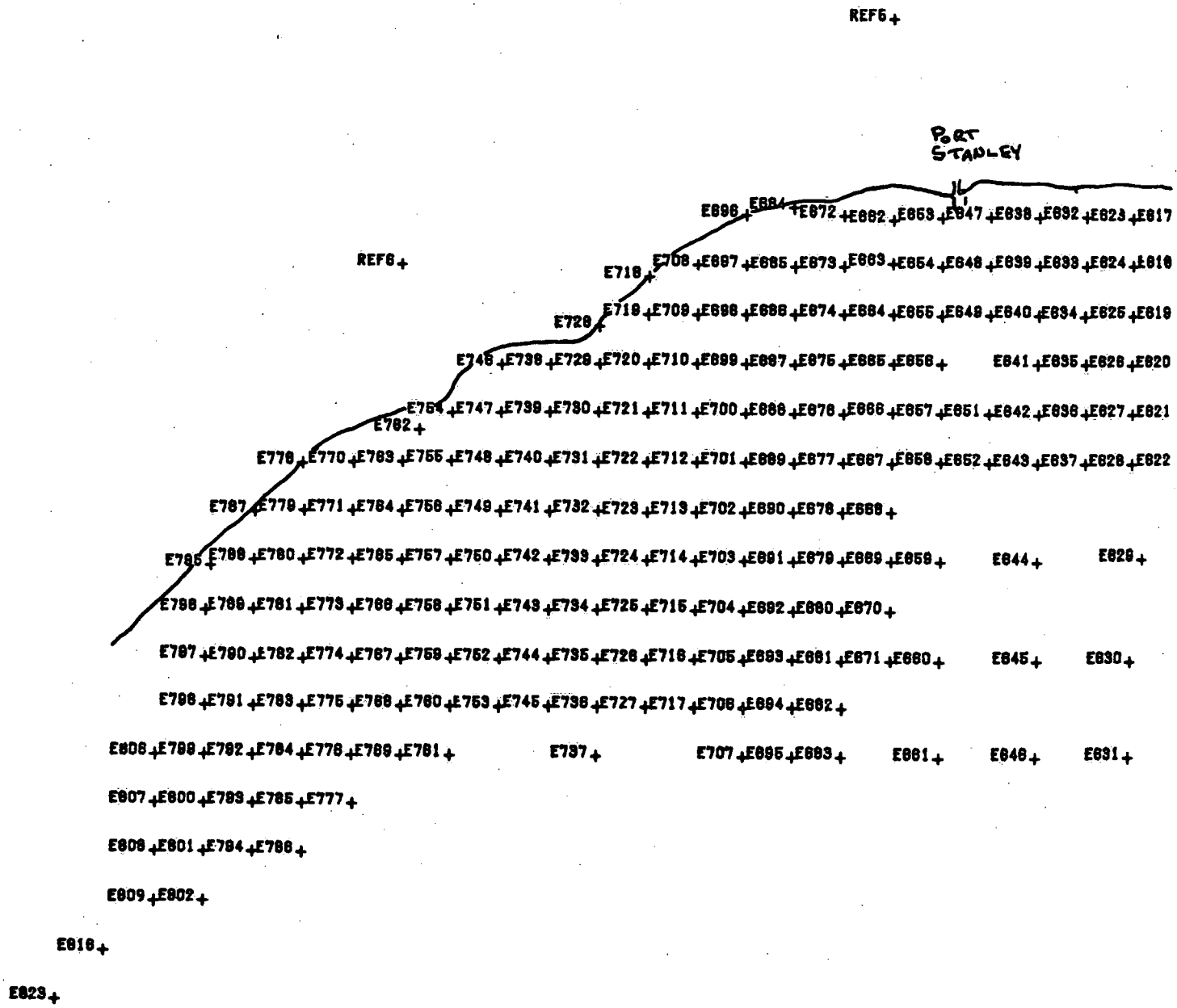
APPENDIX 4
MAP OF SAMPLE SITES

SAMPLE SITES

Scale- 1:250 000

Base Map- NTS Erie 40-I

Map References	UTM Northing	Easting
REF 1	4740000	570000
REF 2	4730000	550000
REF 3	4720000	530000
REF 4	4730000	510000
REF 5	4730000	480000
REF 6	4720000	460000



REF4 +

PORT BRUCE

PORT BURWELL

+E608 +E602 +E592 +E586 +E575 +E569 +E558 +E552 +E541 +E535 +

+E609 +E603 +E593 +E587 +E576 +E570 +E559 +E553 +E542 +E536 +E525 +E518 +E506 +

REF3 +

+E610 +E604 +E594 +E588 +E577 +E571 +E560 +E554 +E543 +E537 +E526 +E517 +E507 +E498 +E489 +

+E611 +E605 +E595 +E589 +E578 +E572 +E561 +E555 +E544 +E538 +E527 +E518 +E508 +E499 +E490 +E482 + E475 +

+E612 +E606 +E596 +E590 +E579 +E573 +E562 +E556 +E545 +E539 +E528 +E519 +E509 +E500 +E481 +E483 +E476 +E468 +E461 +

+E613 +E607 +E597 +E591 +E580 +E574 +E563 +E557 +E546 +E540 +E529 + E510 + E492 + E477 +E469 +E462 +E454 +E447 +E440 +E433 +E425 +

E520 + E501 + E484 + E470 +E463 +E455 +E448 +E441 + E434 +E426 +

E614 + E598 + E581 + E564 + E547 + E530 + E511 + E493 + E478 + E456 +E449 +E442 + E435 +E427 +

E521 + E502 + E485 + E471 +E464 +E457 +E450 +E443 + E436 +E428 +

E615 + E599 + E582 + E565 + E548 + E531 + E512 + E494 + E479 +

E522 + E503 + E486 + E472 +E465 +E458 +E451 +E444 + E437 +E429 +

E616 + E600 + E583 + E566 + E549 + E532 + E513 + E495 + E480 +

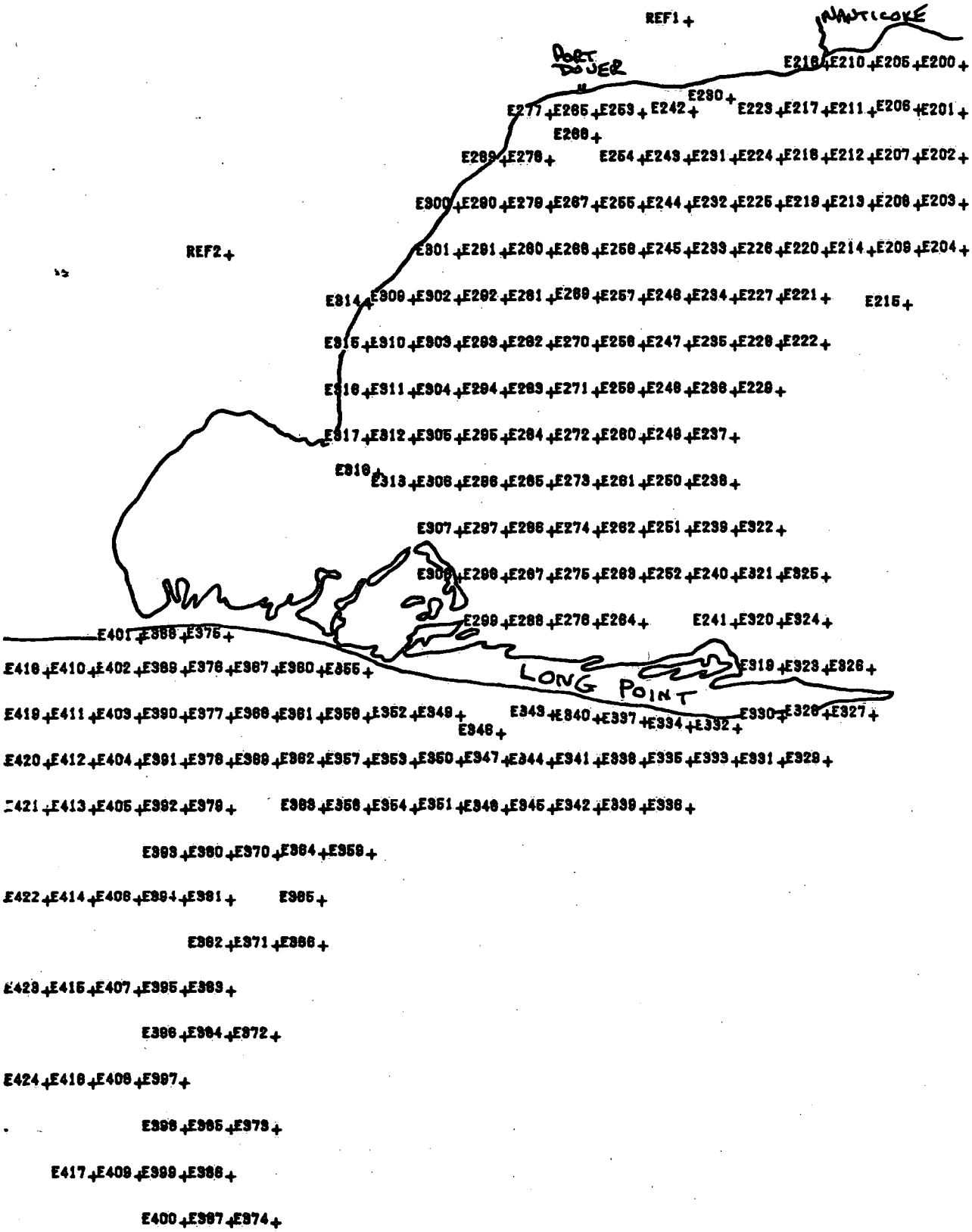
E523 + E504 + E487 + E473 +E466 +E459 +E452 +E445 + E438 +E430 +

E601 + E584 + E567 + E550 + E533 + E514 + E496 + E481 +

E524 + E505 + E488 + E474 +E467 +E460 +E453 +E446 + E439 +E431 +

E585 + E568 + E551 + E534 + E515 + E497 + E432 +

23671


REF1
NANTICOKE
PORT DOVER
E218 E210 E205 E200
E280
E277 E265 E253 E242 E223 E217 E211 E206 E201
E260
E289 E278 E254 E243 E231 E224 E218 E212 E207 E202
E300 E290 E279 E267 E255 E244 E232 E225 E219 E213 E208 E203
REF2
E301 E291 E280 E268 E256 E245 E233 E226 E220 E214 E209 E204
E314 E309 E302 E292 E281 E269 E257 E246 E234 E227 E221 E215
E315 E310 E303 E293 E282 E270 E258 E247 E235 E228 E222
E316 E311 E304 E294 E283 E271 E259 E248 E236 E229
E317 E312 E305 E295 E284 E272 E260 E249 E237
E318 E313 E306 E296 E285 E273 E261 E250 E238
E307 E297 E286 E274 E262 E251 E239 E322
E308 E298 E287 E275 E263 E252 E240 E321 E325
E299 E288 E276 E264 E241 E320 E324
E401 E388 E376
E416 E410 E402 E389 E378 E367 E360 E355
E319 E323 E326
LONG POINT
E419 E411 E403 E390 E377 E366 E361 E356 E352 E349
E343 E340 E337 E334 E332 E330 E328 E327
E346
E420 E412 E404 E391 E378 E369 E362 E357 E353 E350 E347 E344 E341 E338 E335 E333 E331 E329
E421 E413 E405 E392 E379 E363 E358 E354 E351 E348 E345 E342 E339 E336
E393 E380 E370 E364 E359
E422 E414 E406 E394 E381 E365
E382 E371 E366
E423 E415 E407 E395 E383
E396 E384 E372
E424 E416 E408 E397
E398 E385 E373
E417 E409 E399 E386
E400 E387 E374

National Water Research Institute.
Hydraulics Research Division.
Technical Note.