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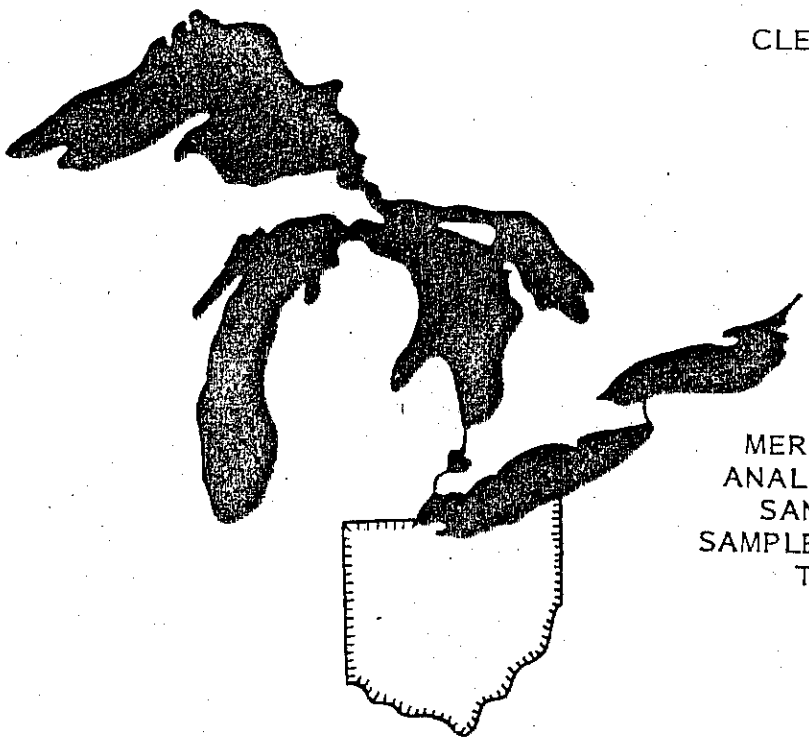

MERCURY, CHROMIUM, AND NICKEL ANALYSES OF SEDIMENT CORES FROM SANDUSKY BAY AND SEDIMENT SAMPLES FROM THE SANDUSKY RIVER, TYMOCHTEE CREEK, AND BROKEN SWORD CREEK

Prepared by

Lester J. Walters, Jr.

THE OHIO STATE UNIVERSITY

CENTER FOR LAKE ERIE AREA RESEARCH

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by

Lester J. Walters, Jr.
Associate Professor
Department of Geology
Bowling Green State University
Bowling Green, Ohio 43403

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Project Completion Report

Submitted to

Center for Lake Erie Area Research
The Ohio State University

PROJECT PERSONNEL

Name	Project Position	Department
Faculty		
Lester J. Walters Jr.	Principal Investigator	Geology
Graduate Students		
William Butcher	Research Assistant	Geology
Leo Schifferli	Research Assistant	Geology
Cooperators		
Bayliss Prater		Biology
Jan Stevenson		Biology
Peter Pryfogle		Biology
Gus Bankieris		Biology
Janet Barker		Biology

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ABSTRACT

Surface sediments in cores from Sandusky Bay are enriched in mercury by a factor of 10 to 20 times above background levels. The background levels were established using sediment samples from Tymochtee and Broken Sword Creeks. These control samples had an average level of 0.031 ppm Hg (dry weight) in the less than 60 mesh fraction. In contrast, the surface sediments in 35 cores from Sandusky Bay ranged from 0.10 to 0.80 ppm Hg (dry weight).

Average sedimentation rates, calculated for the Sandusky Bay cores, ranged from 0.3 to 2.0 cm/year. The western bay had the highest rates of sediment deposition (up to 2.0 cm/yr) while deposition in the eastern bay generally was less than 1.3 cm/yr. The sedimentation rates were calculated by setting the depth at which the mercury concentration departed from the background level equivalent to 1941. This date represents an estimate of the time pollutant mercury began to be introduced into the Sandusky River-Sandusky Bay system. Analyses of sediment samples from 13 stations on the Sandusky River show that the sediments are enriched in mercury down stream of Bucyrus, Ohio.

INTRODUCTION

Mercury, chromium, and nickel were determined in sediment cores from Sandusky Bay and the fine fraction of sediment samples from the Sandusky River, Broken Sword Creek and Tymochtee Creek. Walters et al. (1974) previously reported the results for mercury in one core from Sandusky Bay which was collected in 1971. Skoch and Sikes (1973) determined the mercury levels in Sandusky Bay sediments at two sites sampled monthly (February through November, 1972). These early studies suggested that the sediments of Sandusky Bay contained a low level of mercury pollution, averaging 0.6 ppm Hg dry weight.

The objective of the present study were to: 1) confirm the pollution nature of Sandusky Bay sediments, 2) define a possible source area for the mercury pollution, and 3) estimate recent average sedimentation rates using the mercury pollution method of Wolery and Walters (1974).

METHODS

Sediment core samples were collected at 34 stations in Sandusky Bay in cooperation with Larry Bradich and the Ohio Division of Geological Survey. The coring was done in late September 1972 using the R/V GS-1. These cores were sectioned and preserved frozen until they were analyzed for mercury, chromium, and nickel. Figure 1 is a sample location map for these cores. The sampling stations were located in both the west Bay (22) and east Bay (12).

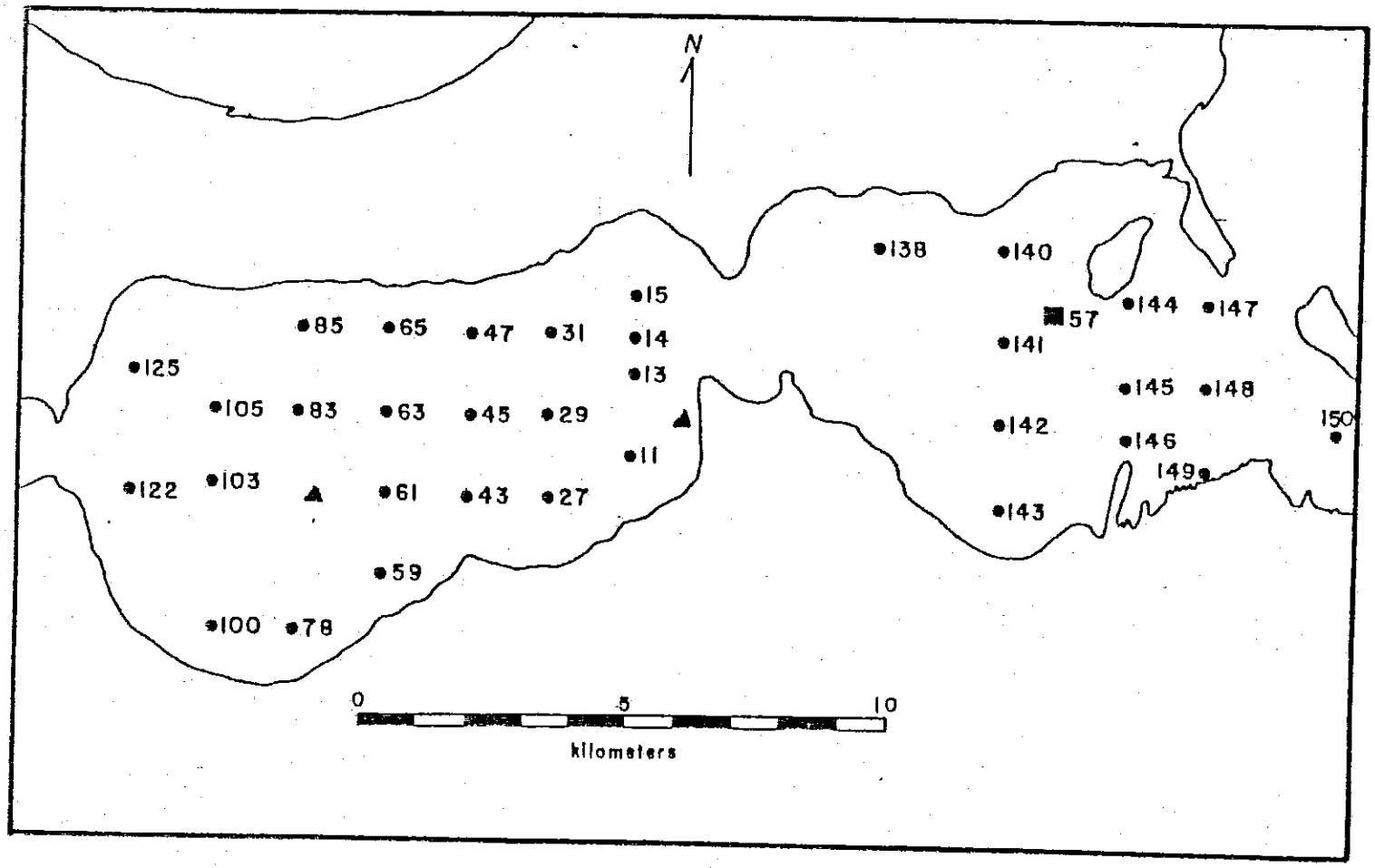

Figure 1. Sample location map showing cores, collected September 1972 (●) using the R/V GS-1 and those reported by Walters et. al. (1974) (■) and Skoch and Sikes (1973) (▲).

Stream sediments from 26 stations on the Sandusky River, Tymochtee Creek and Broken Sword Creek, shown in Figure 2, were collected in January and February 1975 by students of the Department of Biological Sciences at Bowling Green State University. Twenty-three of these samples were collected at the same locations used by Stevenson and Pryfogle (1975), Bankieris and Barker (1975), and Prater et al. (1975). Three additional samples were collected in or near Bucyrus, Ohio.

These bottom sediment grab samples were wet sieved using standard stainless steel sieves and double distilled water. The fraction less than 250 microns was allowed to settle so that the excess water could be poured off prior to heavy metal analyses.

Mercury, chromium and nickel were then determined by the standard atomic absorption methods of EPA (1974) and are reported as ppm dry weight. The cold vapor atomic absorption analysis procedure was used for mercury following digestion with sulfuric and nitric acids, potassium permanganate, and potassium persulfate. The chromium and nickel analyses were performed using standard flame atomic absorption procedures following extraction of a dried sample with hydrochloric acid and hydroxylamine hydrochloride according to the procedure of Wolery (1973).

RESULTS AND DISCUSSION

The results of the mercury, chromium, and nickel analyses of the sediment core intervals, from Sandusky Bay, are contained in Appendix 1. The results for the Sandusky River,

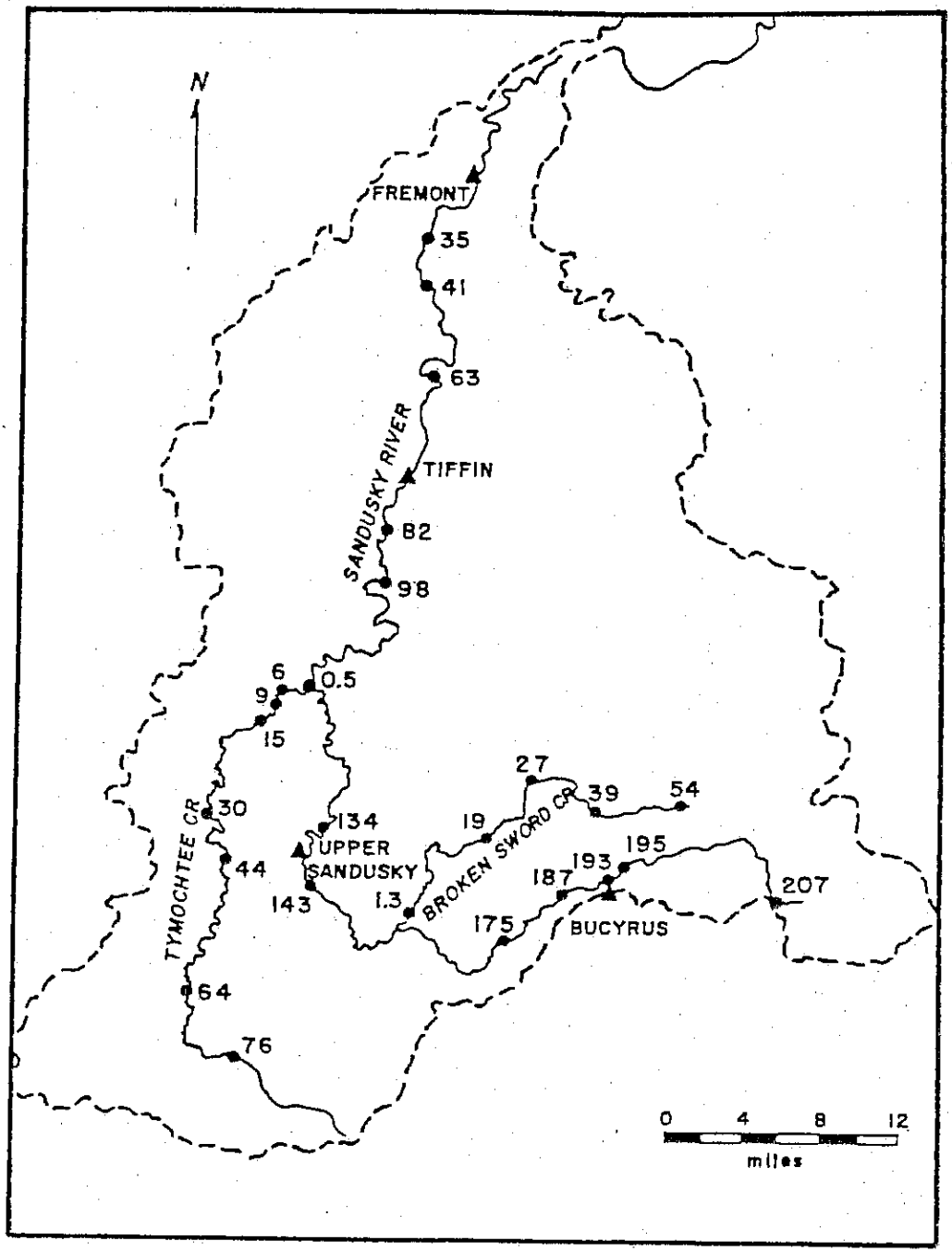

Figure 2. Sample location map for stream sediment samples from the Sandusky River, Tymochtee Creek, and Broken Sword Creek. The station numbers represent the distance in kilometers from the respective river or creek mouths.

Tymochtee Creek and Broken Sword Creek are contained in Appendix 2. Each of these values represents a single analysis.

The results of a few duplicate analyses indicated that the error associated with these mercury determinations is ± 15 percent and for the chromium and nickel ± 10 percent of the stated values.

The results of the chromium and nickel analyses of Sandusky Bay sediments (Appendix 1) do not show any significant enrichment above background levels reported by Wolery (1973) for Lake Erie sediments. The Sandusky Bay sediments averaged 24 ppm chromium and 40 ppm nickel as compared to the Lake Erie background levels of 18 ppm chromium and 45 ppm nickel.

The sediment samples from Tymochtee and Broken Sword Creeks were used as controls for this study. The drainage basins of these creeks are primarily agricultural areas and do not contain any large metropolitan centers.

The mercury level for Tymochtee Creek, shown in Figure 3, ranges between .02 and .04 ppm (dry weight). This level of mercury concentration is lower than the general background level reported by Walters et al. (1974) for western Lake Erie sediments but is in agreement with that of Wolery (1973) for central basin Lake Erie sediments. No significant variation was observed with distance from the mouth of the stream.

The mercury level in the Broken Sword Creek sediments

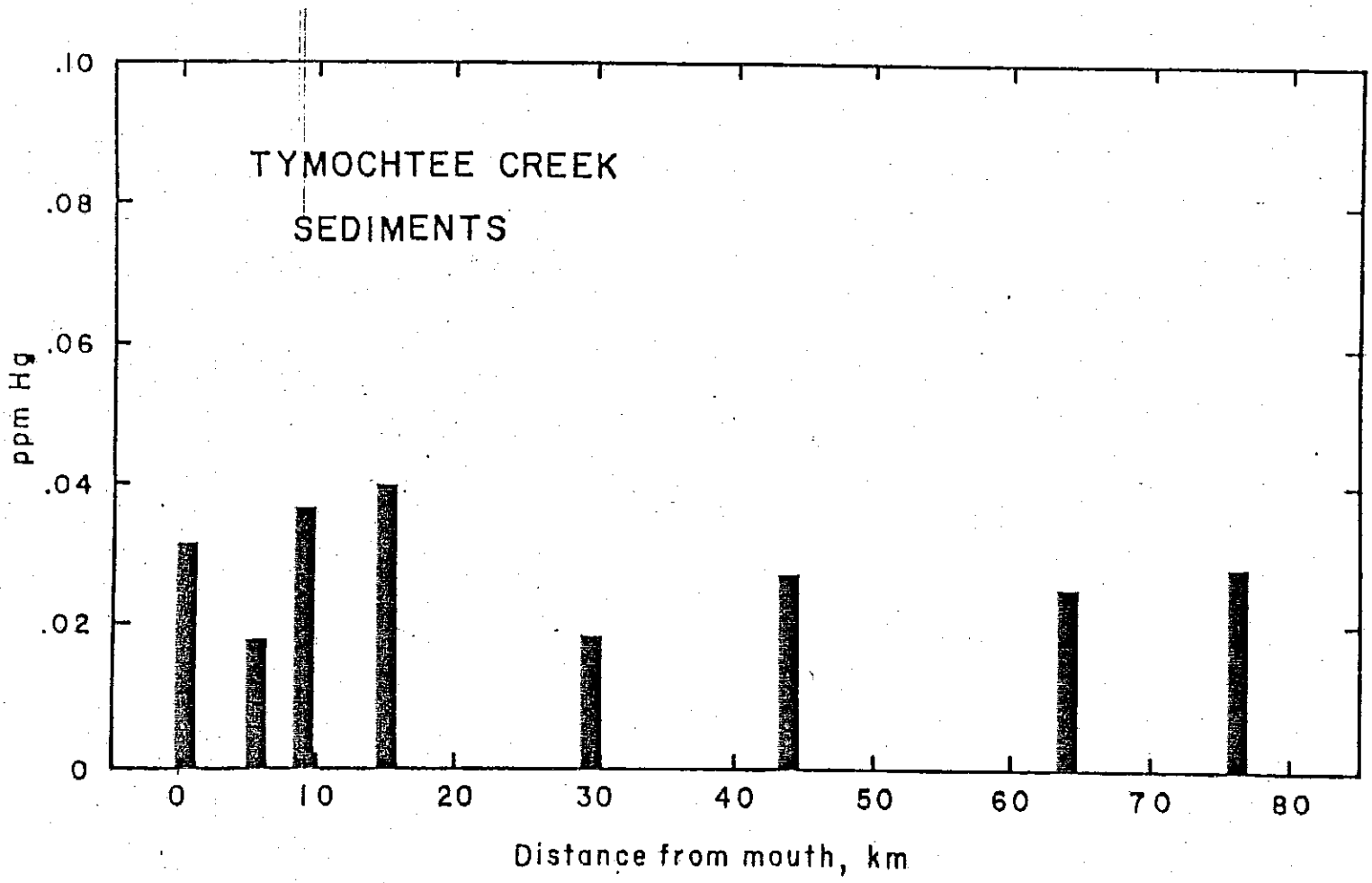

Figure 3. Mercury concentration in the less than 250 micron fraction of Tymochtee Creek sediment collected February 1975.

(Fig. 4) was slightly higher than that in Tymochtee Creek. The Broken Sword sediments ranged between 0.02 ppm Hg and 0.05 ppm Hg. Again no significant variation was observed in the mercury level as a function of distance from the mouth.

The average value for all of the Tymochtee and Broken Sword Creek samples was 0.031 ppm Hg (dry weight). This value represents the natural background level of mercury to be expected in the Sandusky Bay sediments. Similar values were observed at depth in sediment cores from Lake Erie (Walters et al., 1974; and Wolery, 1973). Kemp et al. (1975) found an average mercury concentration of 0.045 ppm for glacial till samples eroding from the bluffs along the north shore of the central basin of Lake Erie. These till samples should be similar to the surficial debris being transported into Sandusky Bay by the Sandusky River and its tributaries.

All 13 samples of Sandusky River sediment had mercury concentrations greater than the background value of 0.031 ppm established by the control samples. The highest levels (0.7 ppm) were observed down stream of the Bucyrus Sewage Treatment Plant. Moderately high levels of mercury were found in the sediments between Crestline and Bucyrus. Two significant features concerning the mercury concentration in the Sandusky River sediments can be seen in Figure 5. First the highly polluted sediments were only observed near Bucyrus and did not extend down stream. These samples were collected on January 18 and February 15. This was during a period of

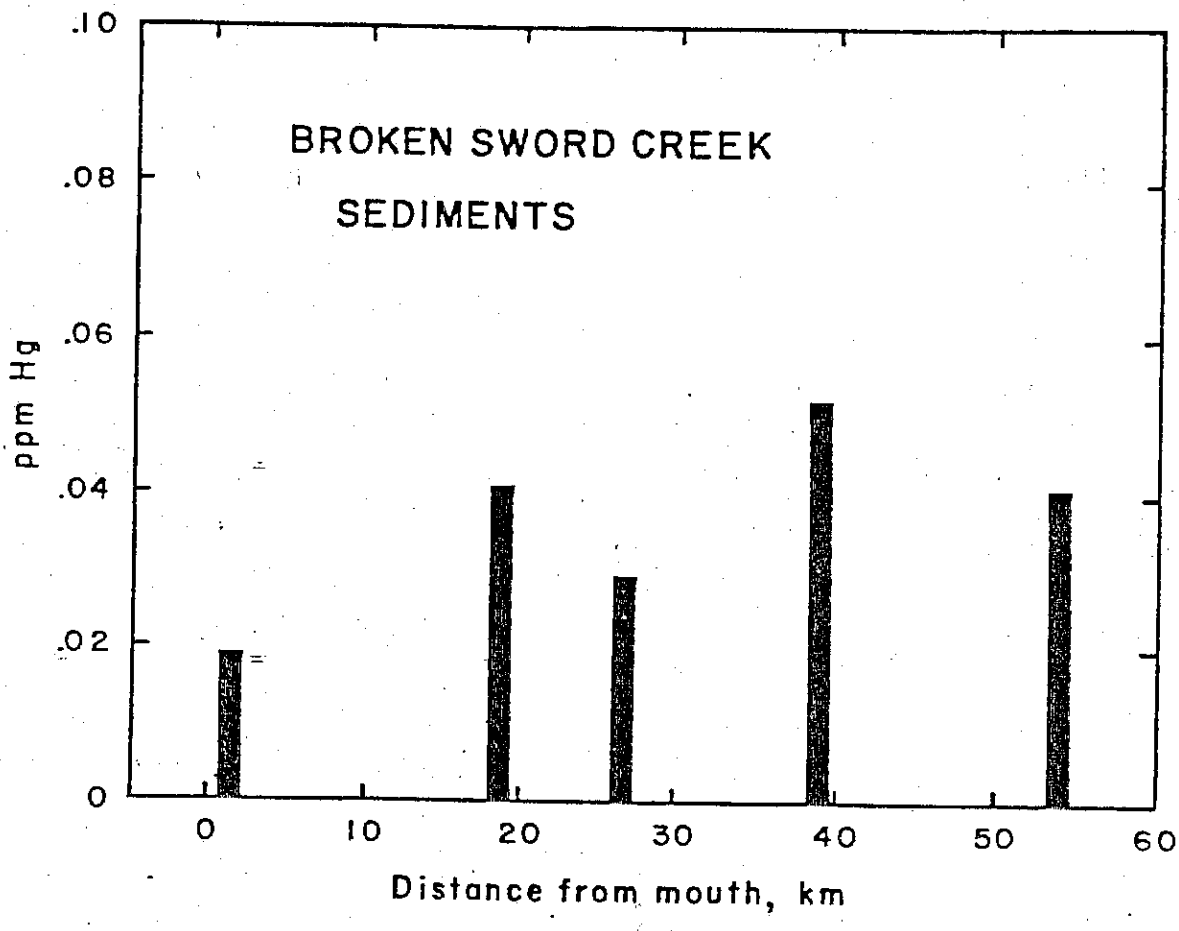

Figure 4. Mercury concentration in the less than 250 microns fraction of Broken Sword Creek sediments collected February 1975.

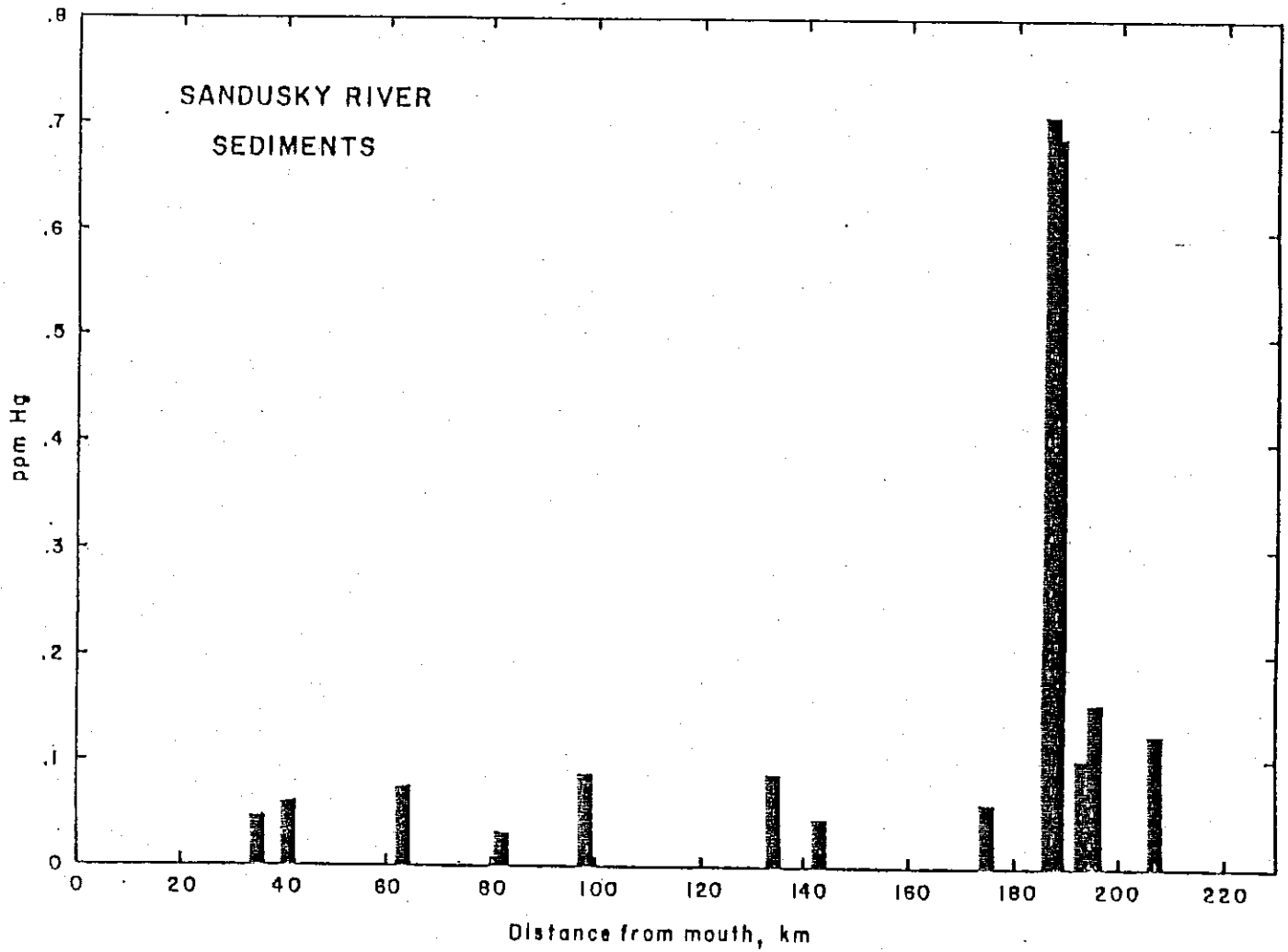

Figure 5. Mercury concentrations in the less than 250 micron fraction of Sandusky River sediments collected January and February 1975.

very high water flow which tends to place the bed load of the River in suspension and flush it down stream. Furthermore, a significant amount of additional sediment is input to the drainage system from the farmland. The second feature is pointed out by the two samples down stream of the Bucyrus Sewage Treatment Plant. Although these samples were collected almost 1 month a part, the mercury level observed was very constant, 0.69 ppm vs. 0.71 ppm mercury. Thus the major pollution source is one of persistent nature having a fairly constant output rate, and not what would be expected for a periodic dumping of mercury via an industrial outfall. Although the sediment samples down stream of Bucyrus show significant mercury levels, they are only one tenth the high levels observed near the mouth of the Detroit River in Lake Erie. Likewise, the total mass of mercury involved is small in comparison to the 228 metric tons of pollution mercury we have estimated for the western basin sediments (Walters et al. 1974).

Figure 6 shows the pollutant-mercury, concentration-depth profiles for two cores from Sandusky Bay. The mercury values have been corrected for background by subtracting the average control value (0.031 ppm) from the observed value. All of the Sandusky Bay cores had a concentration depth profile similar to these shown for station 63 from the West Bay and 142 from the East Bay. This profile shape is different than that reported by Walters et al. (1974) for the western basin of Lake Erie. The relatively constant value

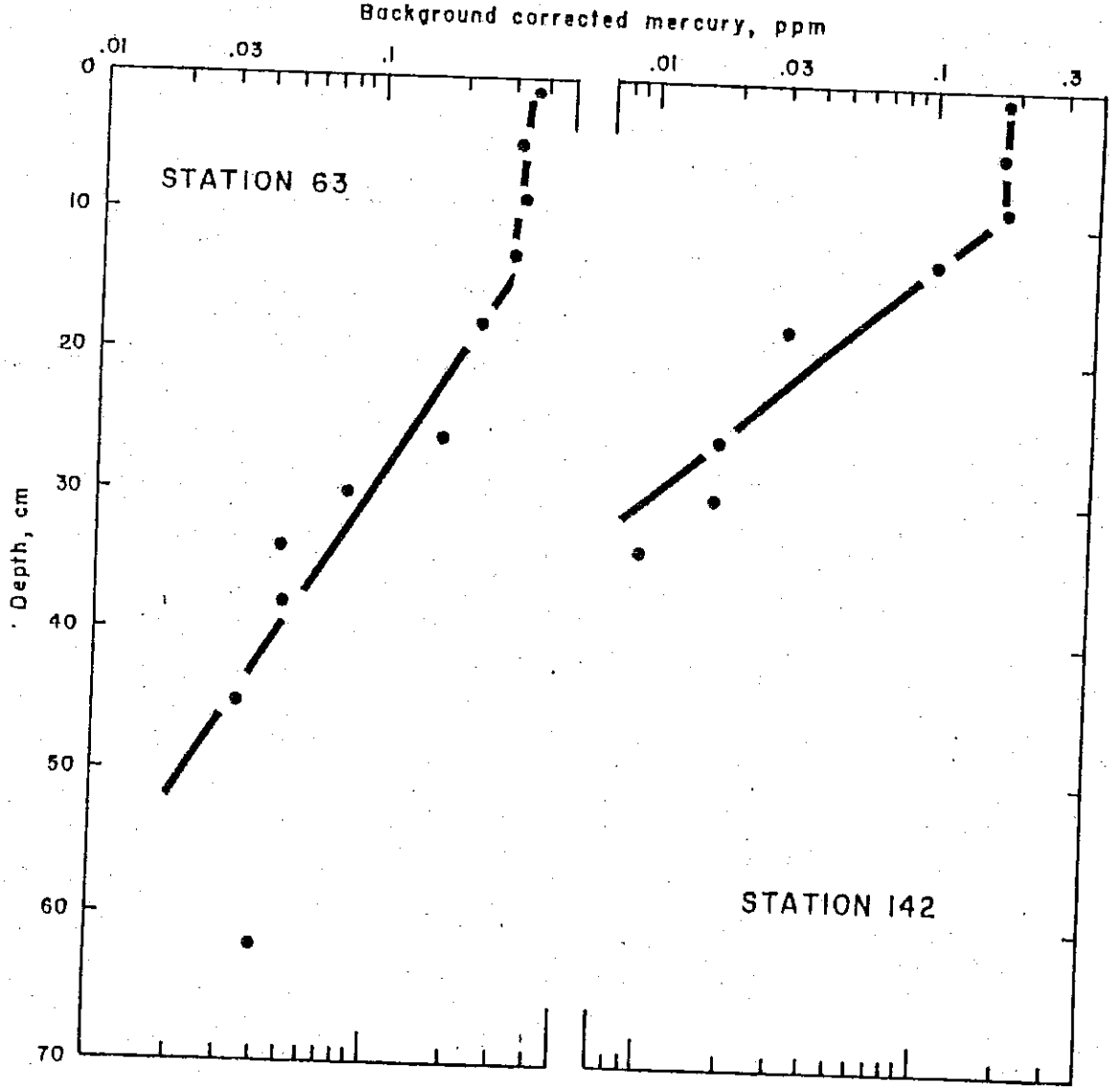

Figure 6. Pollutant-mercury concentration as a function of depth in sediment cores from Sandusky Bay.

near the surface that begins to decrease at an exponential rate is similar in form to the distribution of cesium in Lake Michigan cores just reported by Robbins and Edgington (1975). They attributed the constant zone at the surface to mixing of the sediments by organisms. Possibly some type of either mechanical or biological mixing process is operating in Sandusky Bay.

The surface concentration that was observed varied between 0.1 and 0.8 ppm which was up to 20 times the control value. Generally the surface concentration was between 0.2 and 0.4 ppm.

The effect of sedimentation rate on these concentration-depth profiles can be seen by the two different slopes for these profiles. The concentration in core 63 decreases at a much slower rate than that for core 142. The average sedimentation rate was estimated by dividing the depth corresponding to a corrected concentration of 0.02 ppm by 31 years. The value of 0.02 ppm was chosen because it represents the minimum difference between background values that we can realistically measure. The time period of 31 years corresponds to the time between 1941 which is our estimate of when mercury input began and 1972 when the cores were collected.

The variation of mercury concentration with depth going across Sandusky Bay is shown by Figure 7. Cross section 122-13 compares the mercury concentration depth profiles for cores going from west to east across the west bay. The mercury values on these profiles are not corrected for

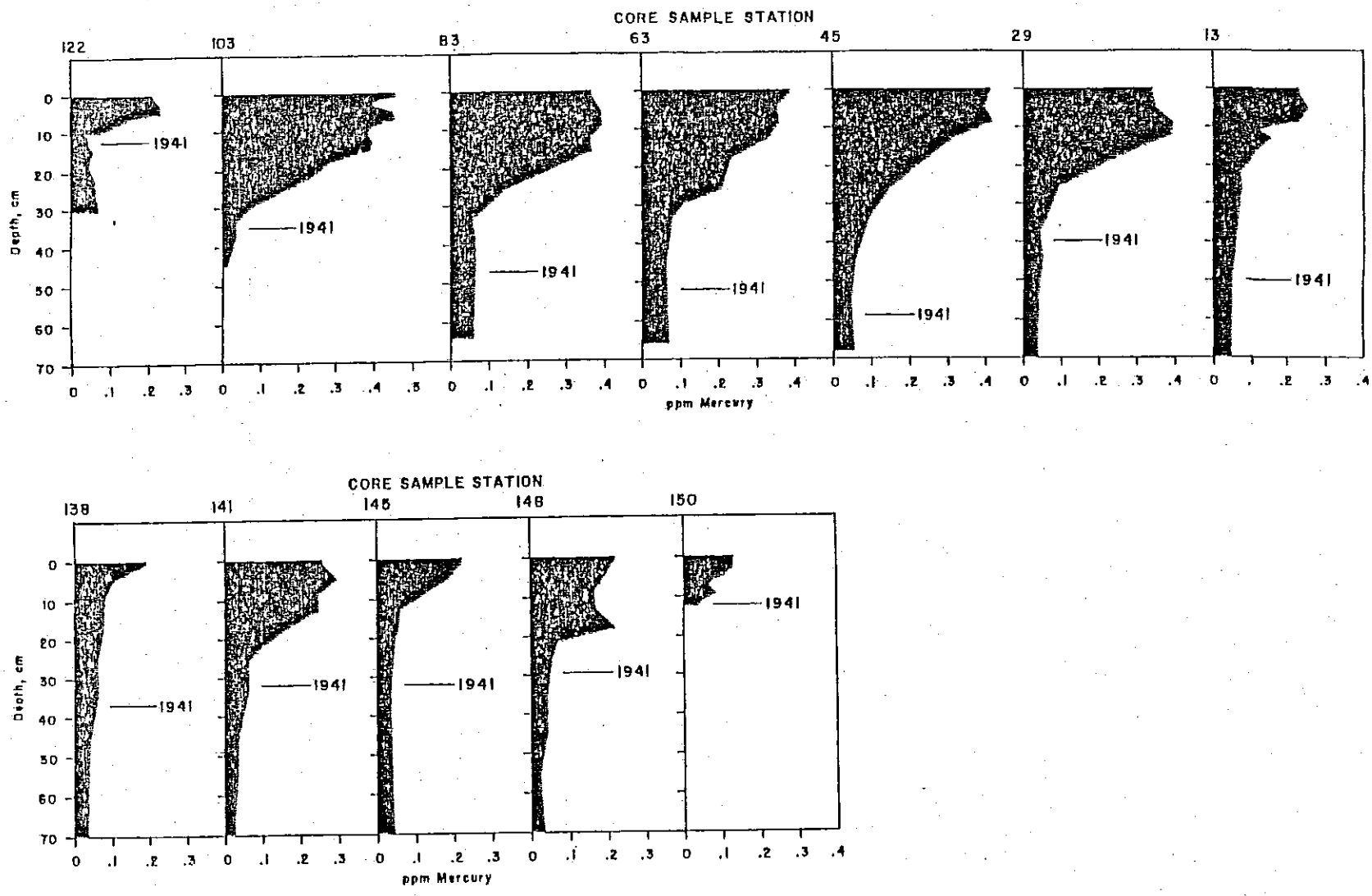

Figure 7. Cross sections of West Sandusky Bay (122-13) and East Sandusky Bay (138-150) showing the mercury concentration in the sediments as a function of depth.

background. These linear plots show that the initial increase in mercury concentration above the control or background value was very subtle. This point is best seen on semilog or log-log plots of mercury concentration and depth such as Figure 6. Thus the sedimentation rates to follow represent maximum values. The major increase in mercury concentration is generally much later than the point we estimate corresponds to the beginning of mercury input.

The second cross section 138-150 shows the mercury profile across the east bay. The pollution level in this area is much lower. Some cores such as 138 and 145 may show evidence of scour or dredging because they contain a disproportionate thickness of constant enriched zone at the surface. Both of these cross sections serve to illustrate that the west bay and the east bay act as separate depositional basins. They are separated by a narrow area where the Bass Island group outcrops. Very little deposition has occurred across this bedrock high.

The sedimentation rates calculated for the Sandusky Bay cores using the method of Wolery and Walters (1974) show a logical pattern (Figure 8) that is consistent with the bedrock geology described by Forsyth (1975). The values near shore were consistently less than those in the center portions of the west and east bays. The sedimentation rates reach a maximum of 2.0 cm/year in the west bay and 1.7 cm/year in the east bay. These sedimentation rates are higher

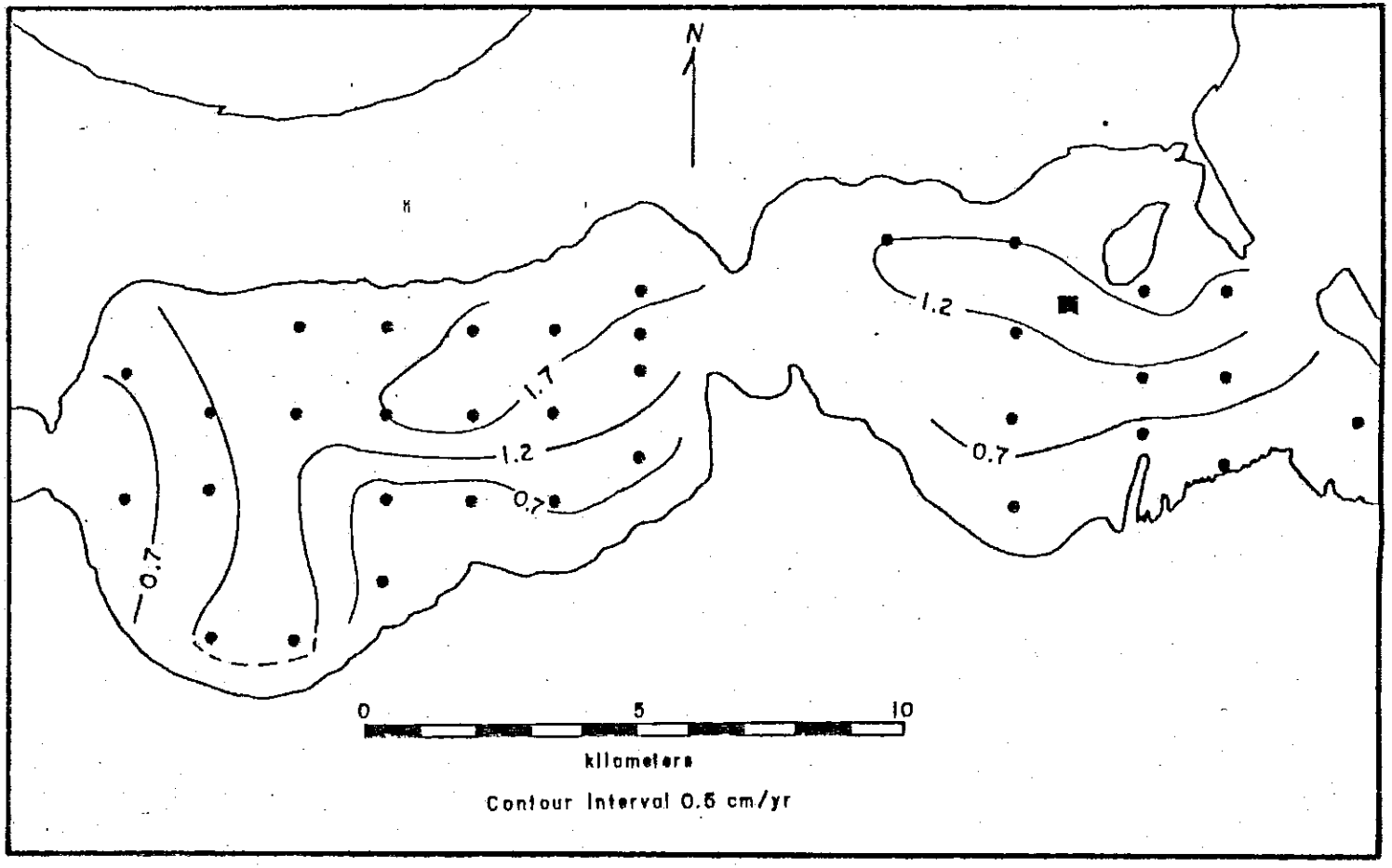

Figure 8. Average sedimentation rate map for Sandusky Bay. The sedimentation rates are given in cm/year.

than normally observed in Western Lake Erie (Wolery and Walters, 1974; Walters and Herdendorf, 1975) and comparable to those reported by Carter et al. (1975). The maximum sediment deposition was observed in a strip along the axis of the west bay. The sediment deposition also increased going away from the mouth of the Sandusky River.

The effects of sedimentation are summarized in Table 1 which shows the sediment and mercury loads of material deposited in Sandusky Bay since 1941. The total mercury load (3.5 metric tons is only 1.5 percent of the 228 metric tons reported for western Lake Erie by Walters et al. (1974). Therefore, Sandusky Bay and the apparent source on the Sandusky River in the vicinity of Bucyrus, Ohio (Figure 5) are of minor importance when considering the Lake Erie system. The distribution of mercury and sediment between the west and east bays suggest that a small amount of sediment having a mercury concentration of about 0.4 ppm has been lost through either 1) non-deposition, 2) resuspension by wave, current and ship activity, or 3) dredging of Sandusky Harbor.

Table 1. Mercury and Sediment loads in Sandusky Bay sediment deposited since 1941.

	West Bay	East Bay	Total
Mercury load (Kg Hg)	2500	1000	3500
Sediment load (10^9Kg)	16.	9.4	2.5
Area (Km^2)	63.0	44.5	107.5
Average Mercury Concentration (ppm)	0.16	0.11	.14
Mercury/Area ratio (Kg Hg/Km^2)	40	23	33
Sediment/Area ratio (10^8Kg/Km^2)	2.5	2.1	2.3

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APPENDIX 1. RESULTS OF ANALYSES OF SANDUSKY BAY SEDIMENT CORES FOR MERCURY, CHROMIUM, AND NICKEL

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
11	1	0.0	2.0	64	0.100	0.280	28.0	40.0
11	1	2.0	4.0	INTERVAL NOT ANALYZED				
11	1	4.0	6.0	66	0.110	0.310	28.0	44.0
11	1	6.0	8.0	INTERVAL NOT ANALYZED				
11	1	8.0	10.0	62	0.120	0.310	26.0	43.0
11	1	10.0	12.0	58	0.090	0.220	26.0	38.0
11	1	12.0	14.0	49	0.073	0.140	22.0	37.0
11	1	14.0	16.0	INTERVAL NOT ANALYZED				
11	1	16.0	20.0	49	0.039	0.076	23.0	40.0
11	1	20.0	24.0	54	0.014	0.032	24.0	37.0
11	1	24.0	28.0	50	0.022	0.043	22.0	40.0
11	1	28.0	32.0	50	0.019	0.038	19.0	35.0
13	1	0.0	2.0	50	0.120	0.230	25.0	41.0
13	1	2.0	4.0	INTERVAL NOT ANALYZED				
13	1	4.0	6.0	51	0.120	0.250	24.0	39.0
13	1	6.0	8.0	INTERVAL NOT ANALYZED				
13	1	8.0	10.0	48	0.120	0.230	25.0	38.0
13	1	10.0	12.0	50	0.064	0.130	23.0	39.0
13	1	12.0	14.0	51	0.080	0.160	27.0	39.0
13	1	14.0	16.0	INTERVAL NOT ANALYZED				
13	1	16.0	20.0	51	0.054	0.110	25.0	41.0
13	1	20.0	24.0	52	0.036	0.075	24.0	38.0
13	1	24.0	28.0	53	0.037	0.078	26.0	40.0
13	1	28.0	32.0	INTERVAL NOT ANALYZED				
13	1	32.0	36.0	55	0.030	0.067	23.0	42.0
13	1	36.0	40.0	INTERVAL NOT ANALYZED				
13	1	40.0	50.0	52	0.026	0.055	27.0	46.0
13	1	50.0	60.0	45	0.026	0.048	20.0	35.0
13	1	60.0	66.0	INTERVAL NOT ANALYZED				
13	1	66.0	72.0	39	0.027	0.043	17.0	31.0
14	1	0.0	2.0	43	0.110	0.180	19.0	32.0
14	1	2.0	4.0	INTERVAL NOT ANALYZED				
14	1	4.0	6.0	43	0.120	0.200	20.0	34.0
14	1	6.0	8.0	INTERVAL NOT ANALYZED				
14	1	8.0	10.0	45	0.140	0.260	23.0	39.0
14	1	10.0	12.0	INTERVAL NOT ANALYZED				
14	1	12.0	14.0	46	0.110	0.200	28.0	46.0
14	1	14.0	16.0	INTERVAL NOT ANALYZED				
14	1	16.0	20.0	50	0.072	0.140	27.0	43.0
14	1	20.0	24.0	52	0.053	0.110	28.0	47.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
14	1	24.0	28.0	INTERVAL NOT ANALYZED				
14	1	28.0	32.0	53	0.027	0.058	25.0	41.0
14	1	32.0	36.0	55	0.031	0.069	22.0	38.0
14	1	36.0	40.0	INTERVAL NOT ANALYZED				
14	1	40.0	50.0	56	0.021	0.048	24.0	39.0
14	1	50.0	60.0	45	0.026	0.046	19.0	38.0
14	1	60.0	68.0	INTERVAL NOT ANALYZED				
14	1	68.0	75.0	36	0.025	0.039	13.0	26.0
15	1	0.0	2.0	67	0.120	0.360	28.0	47.0
15	1	2.0	4.0	INTERVAL NOT ANALYZED				
15	1	4.0	6.0	78	0.087	0.390	28.0	45.0
15	1	6.0	8.0	INTERVAL NOT ANALYZED				
15	1	8.0	10.0	65	0.160	0.450	27.0	44.0
15	1	10.0	12.0	INTERVAL NOT ANALYZED				
15	1	12.0	14.0	63	0.150	0.390	26.0	46.0
15	1	14.0	16.0	INTERVAL NOT ANALYZED				
15	1	16.0	20.0	74	0.140	0.520	28.0	47.0
15	1	20.0	24.0	60	0.069	0.170	25.0	41.0
15	1	24.0	28.0	61	0.068	0.170	24.0	41.0
15	1	28.0	32.0	INTERVAL NOT ANALYZED				
15	1	32.0	36.0	45	0.046	0.084	22.0	39.0
15	1	36.0	40.0	62	0.020	0.054	24.0	40.0
15	1	40.0	50.0	53	0.027	0.059	20.0	43.0
15	1	50.0	58.0	INTERVAL NOT ANALYZED				
15	1	58.0	66.0	42	0.033	0.058	21.0	42.0
27	1	0.0	2.0	69	0.099	0.310	27.0	47.0
27	1	2.0	4.0	INTERVAL NOT ANALYZED				
27	1	4.0	6.0	67	0.100	0.300	27.0	43.0
27	1	6.0	8.0	INTERVAL NOT ANALYZED				
27	1	8.0	10.0	62	0.110	0.290	25.0	43.0
27	1	10.0	12.0	INTERVAL NOT ANALYZED				
27	1	12.0	14.0	53	0.100	0.220	21.0	37.0
27	1	14.0	16.0	INTERVAL NOT ANALYZED				
27	1	16.0	20.0	51	0.041	0.084	19.0	32.0
27	1	20.0	24.0	50	0.020	0.041	21.0	36.0
27	1	24.0	28.0	45	0.019	0.035	14.0	29.0
27	1	28.0	32.0	INTERVAL NOT ANALYZED				
27	1	32.0	35.0	INTERVAL NOT ANALYZED				
27	1	35.0	38.0	41	0.025	0.043	28.0	43.0
29	1	0.0	2.0	57	0.150	0.340	25.0	42.0
29	1	2.0	4.0	INTERVAL NOT ANALYZED				
29	1	4.0	6.0	56	0.150	0.350	28.0	42.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
29	1	6.0	8.0	INTERVAL NOT ANALYZED				
29	1	8.0	10.0	57	0.170	0.400	26.0	46.0
29	1	10.0	12.0	INTERVAL NOT ANALYZED				
29	1	12.0	14.0	57	0.170	0.390	25.0	44.0
29	1	14.0	16.0	INTERVAL NOT ANALYZED				
29	1	16.0	20.0	59	0.110	0.260	26.0	45.0
29	1	20.0	24.0	INTERVAL NOT ANALYZED				
29	1	24.0	28.0	54	0.044	0.094	23.0	42.0
29	1	28.0	32.0	INTERVAL NOT ANALYZED				
29	1	32.0	36.0	51	0.033	0.067	23.0	45.0
29	1	36.0	40.0	62	0.018	0.047	26.0	41.0
29	1	40.0	50.0	52	0.026	0.054	21.0	40.0
29	1	50.0	60.0	54	0.018	0.039	24.0	40.0
29	1	60.0	70.0	INTERVAL NOT ANALYZED				
29	1	70.0	77.0	38	0.025	0.040	15.0	29.0
31	1	0.0	2.0	53	0.170	0.360	25.0	40.0
31	1	2.0	4.0	INTERVAL NOT ANALYZED				
31	1	4.0	6.0	53	0.180	0.390	23.0	38.0
31	1	6.0	8.0	INTERVAL NOT ANALYZED				
31	1	8.0	10.0	54	0.170	0.370	24.0	43.0
31	1	10.0	12.0	INTERVAL NOT ANALYZED				
31	1	12.0	14.0	52	0.200	0.420	26.0	50.0
31	1	14.0	16.0	INTERVAL NOT ANALYZED				
31	1	16.0	20.0	57	0.130	0.290	25.0	44.0
31	1	20.0	24.0	INTERVAL NOT ANALYZED				
31	1	24.0	28.0	55	0.092	0.200	22.0	44.0
31	1	28.0	32.0	INTERVAL NOT ANALYZED				
31	1	32.0	36.0	56	0.062	0.140	24.0	49.0
31	1	36.0	40.0	INTERVAL NOT ANALYZED				
31	1	40.0	50.0	53	0.034	0.071	22.0	45.0
31	1	50.0	60.0	57	0.024	0.056	27.0	45.0
31	1	60.0	66.0	INTERVAL NOT ANALYZED				
31	1	66.0	71.0	44	0.029	0.052	19.0	42.0
43	1	0.0	2.0	60	0.140	0.360	26.0	47.0
43	1	2.0	4.0	INTERVAL NOT ANALYZED				
43	1	4.0	6.0	68	0.110	0.350	28.0	48.0
43	1	6.0	8.0	INTERVAL NOT ANALYZED				
43	1	8.0	10.0	61	0.140	0.370	24.0	43.0
43	1	10.0	12.0	INTERVAL NOT ANALYZED				
43	1	12.0	14.0	55	0.110	0.240	26.0	44.0
43	1	14.0	16.0	INTERVAL NOT ANALYZED				
43	1	16.0	20.0	56	0.076	0.170	24.0	44.0
43	1	20.0	24.0	40	0.022	0.037	26.0	39.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
43	1	24.0	28.0	34	0.0	0.0	29.0	43.0
43	1	24.0	28.0	35	0.023	0.036	26.0	40.0
43	1	28.0	32.0	35	0.019	0.032	0.0	0.0
43	1	32.0	35.0	37	0.029	0.046	32.0	47.0
45	1	0.0	2.0	59	0.170	0.410	28.0	44.0
45	1	2.0	4.0	INTERVAL NOT ANALYZED				
45	1	4.0	6.0	57	0.170	0.400	24.0	45.0
45	1	6.0	8.0	INTERVAL NOT ANALYZED				
45	1	8.0	10.0	57	0.180	0.420	25.0	44.0
45	1	10.0	12.0	INTERVAL NOT ANALYZED				
45	1	12.0	14.0	54	0.150	0.320	28.0	43.0
45	1	14.0	16.0	INTERVAL NOT ANALYZED				
45	1	16.0	20.0	59	0.100	0.250	27.0	45.0
45	1	20.0	24.0	INTERVAL NOT ANALYZED				
45	1	24.0	28.0	58	0.064	0.150	27.0	45.0
45	1	28.0	32.0	INTERVAL NOT ANALYZED				
45	1	32.0	36.0	60	0.038	0.094	27.0	43.0
45	1	36.0	40.0	INTERVAL NOT ANALYZED				
45	1	40.0	50.0	50	0.030	0.060	25.0	45.0
45	1	50.0	60.0	61	0.019	0.048	22.0	37.0
45	1	60.0	68.0	40	0.033	0.054	16.0	29.0
47	1	0.0	2.0	69	0.120	0.380	27.0	41.0
47	1	2.0	4.0	INTERVAL NOT ANALYZED				
47	1	4.0	6.0	48	0.180	0.340	25.0	38.0
47	1	6.0	8.0	INTERVAL NOT ANALYZED				
47	1	8.0	10.0	44	0.190	0.340	25.0	39.0
47	1	10.0	12.0	INTERVAL NOT ANALYZED				
47	1	12.0	14.0	41	0.120	0.210	24.0	39.0
47	1	14.0	16.0	INTERVAL NOT ANALYZED				
47	1	16.0	20.0	51	0.057	0.120	25.0	43.0
47	1	20.0	24.0	INTERVAL NOT ANALYZED				
47	1	24.0	28.0	53	0.046	0.097	26.0	43.0
47	1	28.0	32.0	INTERVAL NOT ANALYZED				
47	1	32.0	36.0	52	0.035	0.072	23.0	42.0
47	1	36.0	40.0	INTERVAL NOT ANALYZED				
47	1	40.0	46.0	45	0.035	0.063	21.0	39.0
59	1	0.0	2.0	46	0.150	0.270	25.0	44.0
59	1	2.0	4.0	INTERVAL NOT ANALYZED				
59	1	4.0	6.0	52	0.100	0.220	25.0	44.0
59	1	6.0	8.0	INTERVAL NOT ANALYZED				
59	1	8.0	10.0	41	0.042	0.070	26.0	44.0
59	1	10.0	12.0	34	0.046	0.069	25.0	42.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
59	1	12.0	14.0	32	0.022	0.032	24.0	42.0
61	1	0.0	2.0	52	0.069	0.140	29.0	46.0
61	1	2.0	4.0	INTERVAL NOT ANALYZED				
61	1	4.0	6.0	43	0.057	0.100	29.0	46.0
61	1	6.0	8.0	38	0.190	0.310	28.0	45.0
61	1	8.0	10.0	32	0.160	0.230	26.0	44.0
61	1	10.0	12.0	38	0.087	0.140	23.0	43.0
61	1	12.0	14.0	44	0.025	0.045	24.0	42.0
61	1	14.0	16.0	49	0.047	0.093	22.0	43.0
61	1	16.0	20.0	45	0.049	0.090	24.0	45.0
61	1	20.0	24.0	INTERVAL NOT ANALYZED				
61	1	24.0	28.0	46	0.042	0.079	26.0	46.0
61	1	28.0	32.0	INTERVAL NOT ANALYZED				
61	1	32.0	36.0	INTERVAL NOT ANALYZED				
61	1	36.0	40.0	51	0.034	0.068	25.0	46.0
61	1	40.0	46.0	INTERVAL NOT ANALYZED				
61	1	46.0	52.0	58	0.026	0.061	26.0	44.0
63	1	0.0	2.0	59	0.160	0.390	26.0	43.0
63	1	2.0	4.0	INTERVAL NOT ANALYZED				
63	1	4.0	6.0	60	0.140	0.350	25.0	43.0
63	1	6.0	8.0	INTERVAL NOT ANALYZED				
63	1	8.0	10.0	57	0.160	0.360	25.0	41.0
63	1	10.0	12.0	INTERVAL NOT ANALYZED				
63	1	12.0	14.0	55	0.150	0.340	19.0	42.0
63	1	14.0	16.0	INTERVAL NOT ANALYZED				
63	1	16.0	20.0	61	0.110	0.270	25.0	41.0
63	1	20.0	24.0	INTERVAL NOT ANALYZED				
63	1	24.0	28.0	61	0.082	0.210	25.0	42.0
63	1	28.0	32.0	59	0.046	0.110	22.0	41.0
63	1	32.0	36.0	58	0.033	0.078	24.0	45.0
63	1	36.0	40.0	65	0.028	0.079	22.0	40.0
63	1	40.0	50.0	59	0.027	0.064	25.0	44.0
63	1	50.0	58.0	INTERVAL NOT ANALYZED				
63	1	58.0	66.0	57	0.031	0.071	25.0	43.0
65	1	0.0	2.0	63	0.052	0.310	27.0	41.0
65	1	2.0	4.0	INTERVAL NOT ANALYZED				
65	1	4.0	6.0	68	0.110	0.340	26.0	41.0
65	1	6.0	8.0	INTERVAL NOT ANALYZED				
65	1	8.0	10.0	61	0.150	0.380	27.0	41.0
65	1	10.0	12.0	INTERVAL NOT ANALYZED				
65	1	12.0	14.0	59	0.130	0.310	25.0	40.0
65	1	14.0	16.0	INTERVAL NOT ANALYZED				

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
65	1	16.0	20.0	59	0.088	0.210	26.0	41.0
65	1	20.0	24.0	INTERVAL NOT ANALYZED				
65	1	24.0	26.5	52	0.053	0.110	27.0	42.0
78	1	0.0	2.0	66	0.110	0.330	24.0	41.0
78	1	2.0	4.0	64	0.140	0.390	25.0	41.0
78	1	4.0	6.0	63	0.130	0.350	24.0	37.0
78	1	6.0	8.0	63	0.150	0.420	24.0	39.0
78	1	8.0	10.0	59	0.130	0.320	22.0	39.0
78	1	10.0	12.0	55	0.130	0.290	20.0	36.0
78	1	12.0	14.0	52	0.089	0.190	20.0	40.0
78	1	14.0	16.0	53	0.062	0.130	22.0	37.0
78	1	16.0	20.0	56	0.068	0.160	23.0	41.0
78	1	20.0	24.0	55	0.042	0.092	25.0	41.0
78	1	24.0	28.0	56	0.034	0.079	22.0	44.0
78	1	28.0	32.0	48	0.036	0.070	20.0	41.0
78	1	32.0	37.0	52	0.032	0.066	21.0	43.0
83	1	0.0	2.0	57	0.160	0.370	26.0	41.0
83	1	2.0	4.0	INTERVAL NOT ANALYZED				
83	1	4.0	6.0	53	0.180	0.390	25.0	41.0
83	1	6.0	8.0	INTERVAL NOT ANALYZED				
83	1	8.0	10.0	55	0.180	0.390	27.0	41.0
83	1	10.0	12.0	INTERVAL NOT ANALYZED				
83	1	12.0	14.0	51	0.180	0.370	26.0	42.0
83	1	14.0	16.0	INTERVAL NOT ANALYZED				
83	1	16.0	20.0	63	0.140	0.370	25.0	40.0
83	1	20.0	24.0	58	0.100	0.240	24.0	41.0
83	1	24.0	28.0	60	0.056	0.140	24.0	41.0
83	1	28.0	32.0	INTERVAL NOT ANALYZED				
83	1	32.0	36.0	57	0.040	0.093	24.0	41.0
83	1	36.0	40.0	56	0.029	0.067	23.0	44.0
83	1	40.0	50.0	61	0.026	0.065	26.0	43.0
83	1	50.0	57.0	INTERVAL NOT ANALYZED				
83	1	57.0	64.0	47	0.031	0.060	21.0	35.0
85	1	0.0	2.0	49	0.240	0.460	25.0	41.0
85	1	2.0	4.0	48	0.240	0.460	23.0	39.0
85	1	4.0	6.0	45	0.200	0.370	22.0	38.0
85	1	6.0	8.0	41	0.260	0.440	23.0	41.0
85	1	8.0	10.0	48	0.230	0.430	20.0	38.0
85	1	10.0	12.0	49	0.160	0.310	20.0	41.0
85	1	12.0	14.0	51	0.150	0.320	24.0	35.0
85	1	14.0	16.0	53	0.110	0.230	21.0	38.0
85	1	16.0	20.0	57	0.090	0.210	21.0	38.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
85	1	20.0	24.0	56	0.056	0.130	19.0	35.0
85	1	24.0	28.0	57	0.052	0.120	20.0	37.0
85	1	28.0	32.0	63	0.054	0.150	21.0	37.0
85	1	32.0	36.0	55	0.033	0.073	0.0	37.0
85	1	36.0	40.0	57	0.024	0.057	22.0	41.0
85	1	40.0	44.0	51	0.050	0.100	0.0	38.0
100	1	0.0	2.0	49	0.190	0.380	23.0	42.0
100	1	2.0	4.0	48	0.200	0.380	24.0	41.0
100	1	4.0	6.0	48	0.200	0.400	22.0	36.0
100	1	6.0	8.0	43	0.230	0.400	23.0	37.0
100	1	8.0	10.0	41	0.160	0.270	16.0	27.0
100	1	10.0	12.0	45	0.120	0.210	23.0	37.0
100	1	12.0	14.0	43	0.120	0.220	22.0	35.0
100	1	14.0	16.0	44	0.100	0.190	22.0	38.0
100	1	16.0	20.0	45	0.058	0.110	26.0	42.0
100	1	20.0	24.0	46	0.070	0.130	24.0	40.0
100	1	24.0	28.0	46	0.081	0.150	27.0	44.0
100	1	28.0	32.0	43	0.024	0.043	22.0	33.0
100	1	32.0	35.0	46	0.069	0.130	20.0	40.0
103	1	0.0	2.0	58	0.200	0.460	21.0	28.0
103	1	2.0	4.0	56	0.170	0.390	21.0	39.0
103	1	4.0	6.0	58	0.190	0.450	22.0	31.0
103	1	6.0	8.0	57	0.220	0.520	24.0	37.0
103	1	8.0	10.0	57	0.170	0.400	23.0	35.0
103	1	10.0	12.0	51	0.190	0.380	19.0	31.0
103	1	12.0	14.0	52	0.190	0.400	17.0	30.0
103	1	14.0	16.0	51	0.190	0.390	22.0	38.0
103	1	16.0	20.0	49	0.150	0.290	15.0	28.0
103	1	20.0	24.0	48	0.120	0.240	18.0	31.0
103	1	24.0	28.0	48	0.085	0.160	17.0	33.0
103	1	28.0	32.0	46	0.044	0.081	18.0	32.0
103	1	32.0	36.0	45	0.022	0.039	16.0	31.0
103	1	36.0	40.0	39	0.023	0.038	13.0	24.0
103	1	40.0	50.0	49	0.006	0.011	9.2	27.0
103	1	50.0	60.0	57	0.068	0.160	9.3	31.0
105	1	0.0	2.0	59	0.140	0.340	25.0	36.0
105	1	2.0	4.0	INTERVAL NOT ANALYZED				
105	1	4.0	6.0	58	0.140	0.330	24.0	37.0
105	1	6.0	8.0	INTERVAL NOT ANALYZED				
105	1	8.0	10.0	51	0.160	0.330	20.0	31.0
105	1	10.0	12.0	INTERVAL NOT ANALYZED				
105	1	12.0	14.0	42	0.210	0.360	19.0	31.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
105	1	14.0	16.0	INTERVAL NOT ANALYZED				
105	1	16.0	20.0	39	0.110	0.180	23.0	37.0
122	1	0.0	2.0	38	0.140	0.220	11.0	19.0
122	1	2.0	4.0	34	0.160	0.240	10.0	18.0
122	1	4.0	6.0	30	0.160	0.230	9.3	15.0
122	1	6.0	8.0	29	0.110	0.160	8.2	16.0
122	1	8.0	10.0	26	0.079	0.110	7.3	13.0
122	1	10.0	12.0	27	0.036	0.049	7.2	14.0
122	1	12.0	14.0	27	0.035	0.047	7.9	15.0
122	1	14.0	16.0	27	0.046	0.064	7.6	16.0
122	1	16.0	20.0	33	0.035	0.052	7.0	15.0
122	1	20.0	24.0	31	0.045	0.065	7.8	18.0
122	1	24.0	28.0	29	0.048	0.068	8.8	18.0
122	1	28.0	30.5	25	0.056	0.075	9.9	19.0
125	1	0.0	2.0	62	0.110	0.300	22.0	32.0
125	1	2.0	4.0	INTERVAL NOT ANALYZED				
125	1	4.0	6.0	45	0.160	0.290	15.0	22.0
125	1	6.0	8.0	INTERVAL NOT ANALYZED				
125	1	8.0	10.0	39	0.150	0.240	14.0	21.0
125	1	10.0	12.0	INTERVAL NOT ANALYZED				
125	1	12.0	14.0	29	0.130	0.180	11.0	19.0
125	1	14.0	16.0	28	0.073	0.100	10.0	19.0
125	1	16.0	20.0	27	0.025	0.035	8.3	14.0
125	1	20.0	24.0	26	0.014	0.019	7.7	12.0
125	1	24.0	28.0	INTERVAL NOT ANALYZED				
125	1	28.0	31.0	33	0.025	0.037	23.0	33.0
138	1	0.0	2.0	45	0.100	0.190	24.0	44.0
138	1	2.0	4.0	INTERVAL NOT ANALYZED				
138	1	4.0	6.0	48	0.056	0.110	25.0	44.0
138	1	6.0	8.0	INTERVAL NOT ANALYZED				
138	1	8.0	10.0	58	0.036	0.085	28.0	45.0
138	1	10.0	12.0	INTERVAL NOT ANALYZED				
138	1	12.0	14.0	48	0.043	0.082	28.0	42.0
138	1	14.0	16.0	INTERVAL NOT ANALYZED				
138	1	16.0	20.0	53	0.038	0.080	28.0	45.0
138	1	20.0	24.0	INTERVAL NOT ANALYZED				
138	1	24.0	28.0	43	0.032	0.055	20.0	36.0
138	1	28.0	32.0	INTERVAL NOT ANALYZED				
138	1	32.0	36.0	42	0.040	0.069	20.0	36.0
138	1	36.0	40.0	INTERVAL NOT ANALYZED				
138	1	40.0	50.0	50	0.023	0.046	21.0	35.0
138	1	50.0	60.0	INTERVAL NOT ANALYZED				

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
138	1	60.0	70.0	42	0.020	0.035	27.0	33.0
138	1	70.0	80.0	INTERVAL NOT ANALYZED				
138	1	80.0	88.0	36	0.020	0.032	25.0	32.0
140	1	0.0	2.0	56	0.120	0.260	25.0	40.0
140	1	2.0	4.0	INTERVAL NOT ANALYZED				
140	1	4.0	6.0	55	0.120	0.280	23.0	39.0
140	1	6.0	8.0	INTERVAL NOT ANALYZED				
140	1	8.0	10.0	56	0.120	0.260	27.0	39.0
140	1	10.0	12.0	INTERVAL NOT ANALYZED				
140	1	12.0	14.0	56	0.110	0.240	26.0	39.0
140	1	14.0	16.0	60	0.071	0.180	21.0	40.0
140	1	16.0	20.0	58	0.051	0.120	22.0	39.0
140	1	20.0	24.0	INTERVAL NOT ANALYZED				
140	1	24.0	28.0	60	0.027	0.067	24.0	42.0
140	1	28.0	32.0	INTERVAL NOT ANALYZED				
140	1	32.0	36.0	59	0.026	0.064	23.0	39.0
140	1	36.0	40.0	55	0.021	0.048	19.0	36.0
140	1	40.0	50.0	54	0.025	0.054	20.0	35.0
140	1	50.0	60.0	INTERVAL NOT ANALYZED				
140	1	60.0	70.0	INTERVAL NOT ANALYZED				
140	1	70.0	77.0	39	0.030	0.049	15.0	28.0
141	1	0.0	2.0	54	0.120	0.260	23.0	39.0
141	1	2.0	4.0	INTERVAL NOT ANALYZED				
141	1	4.0	6.0	52	0.140	0.290	26.0	40.0
141	1	6.0	8.0	INTERVAL NOT ANALYZED				
141	1	8.0	10.0	52	0.120	0.250	40.0	47.0
141	1	10.0	12.0	INTERVAL NOT ANALYZED				
141	1	12.0	14.0	55	0.110	0.250	26.0	47.0
141	1	14.0	16.0	INTERVAL NOT ANALYZED				
141	1	16.0	20.0	61	0.063	0.160	24.0	41.0
141	1	20.0	24.0	59	0.042	0.100	21.0	38.0
141	1	24.0	28.0	49	0.035	0.068	21.0	37.0
141	1	28.0	32.0	INTERVAL NOT ANALYZED				
141	1	32.0	36.0	47	0.034	0.065	16.0	36.0
141	1	36.0	40.0	INTERVAL NOT ANALYZED				
141	1	40.0	50.0	49	0.019	0.037	17.0	36.0
141	1	50.0	60.0	41	0.021	0.036	16.0	29.0
141	1	60.0	66.0	INTERVAL NOT ANALYZED				
141	1	66.0	72.0	31	0.017	0.024	8.2	17.0
142	1	0.0	2.0	55	0.096	0.210	22.0	40.0
142	1	2.0	4.0	INTERVAL NOT ANALYZED				
142	1	4.0	6.0	50	0.100	0.210	23.0	39.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
142	1	6.0	8.0	INTERVAL NOT ANALYZED				
142	1	8.0	10.0	50	0.110	0.220	22.0	38.0
142	1	10.0	12.0	INTERVAL NOT ANALYZED				
142	1	12.0	14.0	48	0.071	0.140	18.0	34.0
142	1	14.0	16.0	INTERVAL NOT ANALYZED				
142	1	16.0	20.0	48	0.032	0.062	19.0	38.0
142	1	20.0	24.0	INTERVAL NOT ANALYZED				
142	1	24.0	28.0	55	0.022	0.049	21.0	38.0
142	1	28.0	32.0	56	0.021	0.049	17.0	36.0
142	1	32.0	36.0	50	0.020	0.041	19.0	36.0
142	1	36.0	40.0	INTERVAL NOT ANALYZED				
142	1	40.0	50.0	42	0.014	0.024	15.0	29.0
142	1	50.0	59.0	47	0.023	0.042	20.0	34.0
142	1	59.0	67.0	51	0.020	0.041	18.0	40.0
143	1	0.0	2.0	63	0.074	0.200	27.0	46.0
143	1	2.0	4.0	61	0.082	0.210	23.0	45.0
143	1	4.0	6.0	59	0.085	0.210	21.0	38.0
143	1	6.0	8.0	58	0.086	0.210	25.0	45.0
143	1	8.0	10.0	56	0.083	0.190	23.0	43.0
144	1	0.0	2.0	56	0.093	0.210	24.0	44.0
144	1	2.0	4.0	INTERVAL NOT ANALYZED				
144	1	4.0	6.0	56	0.130	0.290	24.0	41.0
144	1	6.0	8.0	INTERVAL NOT ANALYZED				
144	1	8.0	10.0	INTERVAL NOT ANALYZED				
144	1	10.0	12.0	INTERVAL NOT ANALYZED				
144	1	12.0	14.0	53	0.130	0.280	22.0	37.0
144	1	14.0	16.0	INTERVAL NOT ANALYZED				
144	1	16.0	20.0	46	0.096	0.180	18.0	34.0
144	1	20.0	24.0	41	0.064	0.110	16.0	30.0
144	1	24.0	28.0	42	0.041	0.071	16.0	31.0
144	1	28.0	32.0	37	0.027	0.043	14.0	26.0
144	1	32.0	36.0	37	0.028	0.045	14.0	28.0
144	1	36.0	40.0	INTERVAL NOT ANALYZED				
144	1	40.0	50.0	38	0.023	0.037	15.0	32.0
144	1	50.0	60.0	INTERVAL NOT ANALYZED				
144	1	60.0	71.0	44	0.020	0.035	15.0	33.0
145	1	0.0	2.0	51	0.110	0.220	22.0	41.0
145	1	2.0	4.0	INTERVAL NOT ANALYZED				
145	1	4.0	6.0	46	0.100	0.190	21.0	41.0
145	1	6.0	8.0	INTERVAL NOT ANALYZED				
145	1	8.0	10.0	46	0.062	0.110	18.0	36.0
145	1	10.0	12.0	INTERVAL NOT ANALYZED				

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
145	1	12.0	14.0	48	0.033	0.064	18.0	36.0
145	1	14.0	16.0	INTERVAL NOT ANALYZED				
145	1	16.0	20.0	49	0.028	0.055	17.0	36.0
145	1	20.0	24.0	INTERVAL NOT ANALYZED				
145	1	24.0	28.0	INTERVAL NOT ANALYZED				
145	1	28.0	32.0	53	0.024	0.050	16.0	35.0
145	1	32.0	36.0	49	0.022	0.044	16.0	35.0
145	1	36.0	40.0	INTERVAL NOT ANALYZED				
145	1	40.0	50.0	44	0.021	0.038	15.0	34.0
145	1	50.0	60.0	INTERVAL NOT ANALYZED				
145	1	60.0	66.0	INTERVAL NOT ANALYZED				
145	1	66.0	72.0	45	0.026	0.046	16.0	38.0
146	1	0.0	2.0	56	0.033	0.074	19.0	39.0
146	1	2.0	4.0	INTERVAL NOT ANALYZED				
146	1	4.0	6.0	34	0.046	0.069	18.0	40.0
146	1	6.0	8.0	INTERVAL NOT ANALYZED				
146	1	8.0	10.0	31	0.043	0.062	21.0	42.0
146	1	10.0	12.0	INTERVAL NOT ANALYZED				
146	1	12.0	14.0	36	0.035	0.054	19.0	40.0
146	1	14.0	16.0	INTERVAL NOT ANALYZED				
146	1	16.0	20.0	45	0.029	0.052	20.0	40.0
146	1	20.0	24.0	INTERVAL NOT ANALYZED				
146	1	24.0	28.0	41	0.028	0.047	16.0	33.0
146	1	28.0	32.0	INTERVAL NOT ANALYZED				
146	1	32.0	36.0	48	0.025	0.048	19.0	38.0
146	1	36.0	40.0	INTERVAL NOT ANALYZED				
146	1	40.0	46.0	47	0.026	0.049	19.0	40.0
147	1	0.0	2.0	32	0.077	0.110	10.0	19.0
147	1	2.0	4.0	INTERVAL NOT ANALYZED				
147	1	4.0	6.0	27	0.079	0.110	8.2	15.0
147	1	6.0	8.0	INTERVAL NOT ANALYZED				
147	1	8.0	10.0	27	0.069	0.094	8.5	15.0
147	1	10.0	12.0	INTERVAL NOT ANALYZED				
147	1	12.0	14.0	32	0.097	0.140	12.0	22.0
147	1	14.0	16.0	INTERVAL NOT ANALYZED				
147	1	16.0	20.0	34	0.100	0.150	13.0	21.0
147	1	20.0	24.0	INTERVAL NOT ANALYZED				
147	1	24.0	28.0	29	0.077	0.110	11.0	18.0
147	1	28.0	32.0	27	0.054	0.075	11.0	17.0
147	1	32.0	36.0	30	0.050	0.071	12.0	20.0
147	1	36.0	39.0	26	0.049	0.066	9.9	17.0
147	1	39.0	42.0	25	0.039	0.052	7.7	14.0

APPENDIX 1. (CONTINUED)

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
148	1	0.0	2.0	47	0.120	0.220	23.0	38.0
148	1	2.0	4.0	INTERVAL NOT ANALYZED				
148	1	4.0	6.0	44	0.110	0.190	24.0	38.0
148	1	6.0	8.0	INTERVAL NOT ANALYZED				
148	1	8.0	10.0	45	0.091	0.170	23.0	40.0
148	1	10.0	12.0	INTERVAL NOT ANALYZED				
148	1	12.0	14.0	47	0.090	0.170	21.0	37.0
148	1	14.0	16.0	INTERVAL NOT ANALYZED				
148	1	16.0	20.0	47	0.120	0.220	20.0	35.0
148	1	20.0	24.0	49	0.036	0.071	21.0	36.0
148	1	24.0	28.0	43	0.033	0.058	18.0	31.0
148	1	28.0	32.0	INTERVAL NOT ANALYZED				
148	1	32.0	36.0	38	0.028	0.046	12.0	22.0
148	1	36.0	40.0	34	0.029	0.043	11.0	22.0
148	1	40.0	50.0	38	0.027	0.044	14.0	26.0
148	1	50.0	60.0	31	0.018	0.027	11.0	21.0
148	1	60.0	70.0	INTERVAL NOT ANALYZED				
148	1	70.0	79.0	40	0.020	0.033	15.0	31.0
149	1	0.0	2.0	50	0.160	0.320	30.0	47.0
149	1	2.0	4.0	INTERVAL NOT ANALYZED				
149	1	4.0	6.0	48	0.160	0.320	30.0	45.0
149	1	6.0	8.0	INTERVAL NOT ANALYZED				
149	1	8.0	10.0	47	0.130	0.250	27.0	42.0
149	1	10.0	12.0	43	0.066	0.120	17.0	31.0
149	1	12.0	14.0	42	0.026	0.045	14.0	30.0
149	1	14.0	16.0	INTERVAL NOT ANALYZED				
149	1	16.0	20.0	40	0.023	0.038	12.0	27.0
149	1	20.0	24.0	33	0.014	0.021	14.0	23.0
149	1	20.0	24.0	INTERVAL NOT ANALYZED				
149	1	24.0	27.0	25	0.019	0.026	16.0	34.0
150	1	0.0	2.0	37	0.083	0.130	19.0	26.0
150	1	2.0	4.0	36	0.085	0.130	18.0	28.0
150	1	4.0	6.0	33	0.068	0.100	12.0	19.0
150	1	6.0	8.0	29	0.047	0.067	10.0	18.0
150	1	8.0	10.0	29	0.060	0.084	7.9	15.0
150	1	10.0	12.5	26	0.026	0.035	8.9	13.0

APPENDIX 2. RESULTS OF ANALYSES OF SANDUSKY RIVER, BROKEN SWORD CREEK, AND TYMOCHTEE CREEK SEDIMENTS FOR MERCURY, CHROMIUM, AND NICKEL

STATION	CORE	INTERVAL TOP	INTERVAL BOTTOM	WATER %	WET HG PPM	DRY HG PPM	CR PPM	NI PPM
				SANDUSKY RIVER				
35	2	0.0	0.0	39	0.028	0.046	7.1	10.0
41	2	0.0	0.0	74	0.015	0.059	15.0	21.0
63	2	0.0	0.0	74	0.018	0.071	15.0	23.0
82	2	0.0	0.0	66	0.010	0.031	16.0	27.0
98	2	0.0	0.0	97	0.003	0.086	14.0	24.0
134	2	0.0	0.0	57	0.036	0.084	13.0	23.0
143	2	0.0	0.0	50	0.021	0.042	11.0	17.0
175	2	0.0	0.0	80	0.011	0.057	8.1	12.0
187	1	0.0	0.0	48	0.360	0.700	17.0	22.0
187	2	0.0	0.0	75	0.170	0.710	17.0	12.0
193	1	0.0	0.0	43	0.087	0.150	14.0	28.0
195	1	0.0	0.0	73	0.027	0.099	22.0	36.0
207	2	0.0	0.0	85	0.021	0.140	18.0	27.0
				TYMOCHTEE CREEK				
0.5	2	0.0	0.0	66	0.010	0.031	13.0	24.0
5.6	2	0.0	0.0	56	0.008	0.018	15.0	23.0
9.2	2	0.0	0.0	48	0.019	0.036	9.4	14.0
15.0	2	0.0	0.0	76	0.009	0.039	16.0	27.0
29.7	2	0.0	0.0	50	0.009	0.018	12.0	19.0
43.9	2	0.0	0.0	50	0.013	0.027	12.0	22.0
64.1	2	0.0	0.0	51	0.012	0.025	15.0	29.0
76.3	2	0.0	0.0	66	0.009	0.028	12.0	29.0
				BROKEN SWORD CREEK				
1.3	2	0.0	0.0	73	0.005	0.019	8.9	17.0
18.7	2	0.0	0.0	74	0.010	0.040	15.0	31.0
26.7	2	0.0	0.0	72	0.008	0.029	14.0	22.0
39	2	0.0	0.0	80	0.011	0.052	14.0	33.0
54	2	0.0	0.0	55	0.019	0.041	18.0	29.0