

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION
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STAFF REPORT

A SEDIMENT SAMPLING SURVEY OF THE SAGINAW RIVER
BAY COUNTY, MICHIGAN
SEPTEMBER 2-3, 2003

Introduction

As part of the Michigan Department of Environmental Quality (MDEQ)-Water Division's (WD) environmental assessment program, staff of the Surface Water Quality Assessment Section and USEPA's Region 5 National Program Office (GLNPO) conducted a sediment sampling survey of the lower Saginaw River (SR) in Bay City, Michigan. The goal of this sediment sampling was to measure polychlorinated biphenyl (PCB) concentrations within the five areas that were remediated in 2000 and 2001 because of PCB contamination. This remediation was conducted as an environmental dredging project which removed 345,000 cubic yards of PCB contaminated sediments that were placed in the Saginaw Bay Confined Disposal Facility. Elimination of PCB laden sediments in the lower SR basin is important as they have been identified as contributing to elevated PCB tissue levels of the fish population within the SR watershed and Saginaw Bay.

Currently, the entire SR watershed is on Michigan's list of waterbodies that are not meeting Water Quality Standards for PCB based upon fish tissue concentrations (Creal and Wuycheck, 2002). This investigation is intended to complement caged fish tissue studies and water sampling conducted in 2003 in the lower SR. The velocity of the SR during the sampling period was very slow. This river section (Figure 1) has been used by various commercial, industrial, and landfill activities for over a century including car and chemical manufacturing, aggregate storage, and historical saw mill operations.

All PCB chemical analyses on sediment collected were performed at TriMatrix Laboratories in Grand Rapids, Michigan. A map of the SR and the specific sediment sampling locations is provided in Figure 1. The latitude and longitude coordinates and sediment chemistry data for these sediment sampling locations are presented in Table 1.

The objectives of the study were to:

- Document whether PCB's were present in the five SR areas environmentally dredged in 2000/2001.
- Document the concentrations of PCB's (if present) within these five locations.
- Provide information (if necessary) for development of future course of action regarding PCB concentration within the lower SR.

Summary

1. PCB concentrations of all surficial (0-6 inches) sediments sampled within the dredged areas were below the PCB remediation target concentration of 1 ppm.

2. Low levels of PCB-1242 were detected (above the reporting limit) for all surficial SR stations except Stations 31 and 34 which were below the reporting limit.
3. Slightly elevated levels of PCB-1242 and PCB-1260 were reported in the deeper core sections at Stations 25, 37 and 39.

Methods

Coring sites were selected by MDEQ – WD Staff with the assistance of the Department of the Army - Corps of Engineers (Saginaw Field Office) using aerial photographs and GPS coordinates from past dredging projects. The 12 SR sampling sites were chosen to represent the five areas that were previously dredged and that could contain PCB's due to the proximity of past and present municipal or industrial sites (Figure 1). Coring was conducted at the pre-selected sites by the EPA RV Mudpuppy with the use of a vibracoring device. Four inch diameter lexan tubes were driven into the sediments to the point of refusal. Samples were brought to the surface and sectioned on board the vessel in predetermined intervals. The intervals of interest were the top 6 inches of SR sediment (Section A), the next underlying 36 inches (Section B) and the next underlying 36 inches (Section C). The materials from each A, B, and C sections were emptied into a stainless steel bowl, mixed, and sub-samples were transferred into 8 oz. sediment jars for analysis. These sediment jars were stored on ice in coolers and delivered to the MDEQ Environmental Laboratory. The samples were then transferred to TriMatrix Laboratories in Grand Rapids, Michigan for PCB aroclors and % total solids analysis.

Discussion & Conclusion

In general, the surface material (section A) contained very low levels of PCB – 1242 at all 12 sampling sites (Table 1). These concentrations were well below the 1 part per million (ppm) PCB remediation target level that was used during previous dredging operations. At 3 stations (25, 37, and 39), aroclor 1260 was identified in the B and C layers; but, the levels were only slightly elevated. Elevated PCB concentrations were encountered in deeper sediment layers (sections B & C) of several stations (Table 1). The highest PCB concentrations encountered were in the B layer of Station 39 which contained 5.1 ppm of PCB-1242. Overall, results from this survey suggest the following: areas sampled achieved the remediation goal of 1 ppm PCB's, they have remained relatively “clean”, and have not been recontaminated by incoming sediments from upstream sources. This also indicates that ongoing upstream sources of PCB's are relatively minor.

Acknowledgements

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References

Creal, W. and J. Wuycheck. 2002. Federal CWA Section 303(d) List – Michigan's Submittal for Year 2002. MDEQ, Surface Water Quality Division, Report # MI/DEQ/SWQ-02/013.

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Table 1. Saginaw River sediment coring data for PCB's (Sept-2003)

Site No.	PCB-1242 (µg/kg)	PCB-1260 (µg/kg)	% Solids	LAT.	LONG.
24A	180	-	44	43.61184	-83.86075
24B	540	-	63		
25A	140	-	41	43.61335	-83.85908
25B	1700	120	72		
25C	14	-	77		
37A	80	-	42	43.61667	-83.84852
37B	2100	82	54		
37C	2800	200	56		
38A	100	-	40	43.61802	-83.84511
38B	230	-	54		
34A	51J	-	38	43.61163	-83.87522
34B	19J	-	67		
34C	8.1J	-	82		
22A	280	-	45	43.61252	-83.87149
22B	16J	-	78		
29A	28J	-	48	43.61257	-83.86896
29B	210	-	76		
29C	96	-	77		
31A	ND	-	45	43.61235	-83.86494
31B	94J	-	65		
36A	100	-	41	43.61965	-83.84316
36B	50J	-	56		
36C	ND	-	63		
39A	71J	-	36	43.62379	-83.84151
39B	5100	190J	53		
39C	4300	280	57		
40A	74J	-	38	43.62554	-83.84143
40B	9.2J	-	73		
40C	85J	-	73		
42A	190	-	41	43.6275	-83.84164
42B	82J	-	61		
42C	ND	-	80		

J - value was between the MDL and the reporting limit

ND-value is not detected at or above a given value, i.e., a substance, if present, is below detection limit

A = top 6" of sediment core

B = ≤ of the next 36 " of sediment core

C = ≤ of the next 36" of sediment core

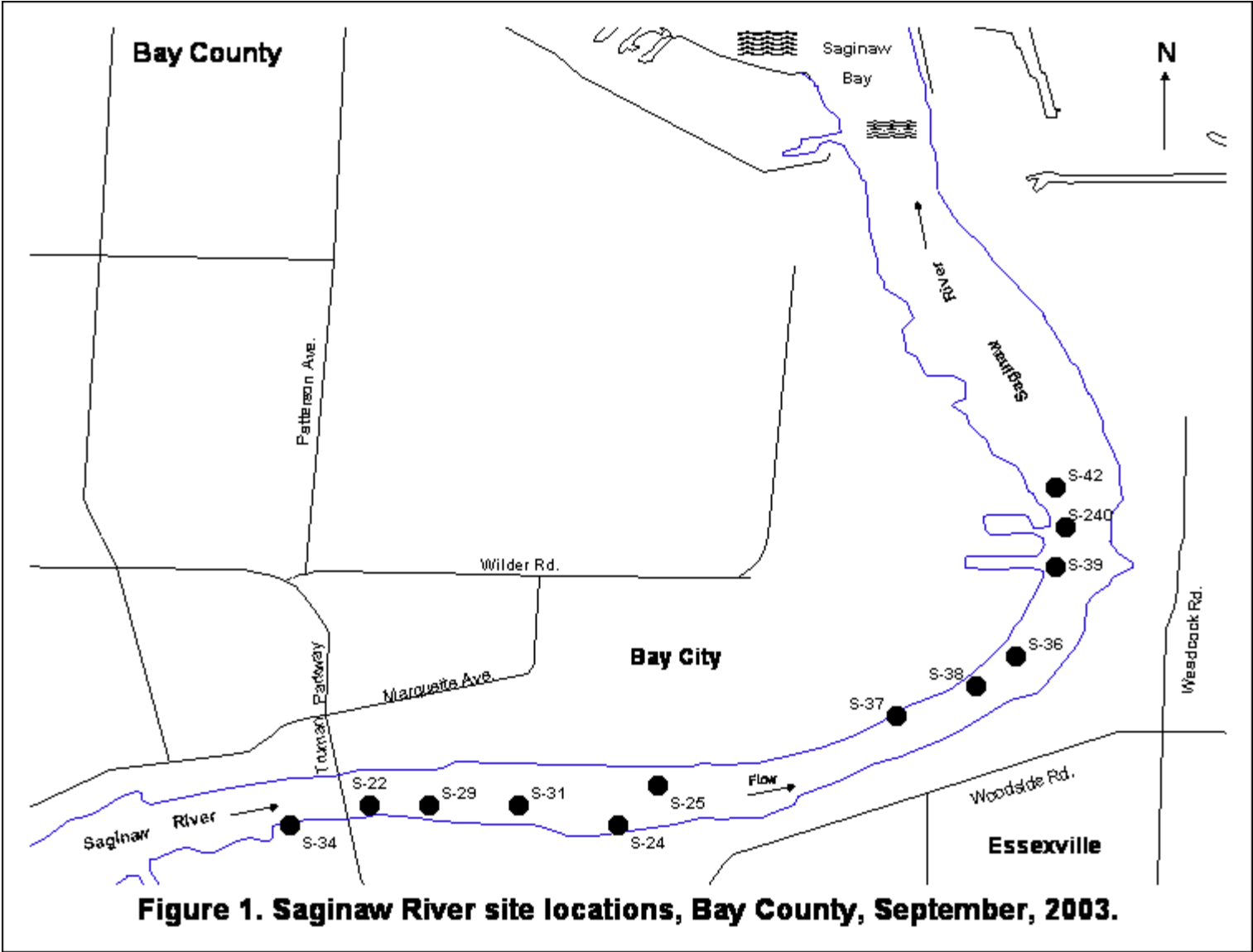


Figure 1. Saginaw River site locations, Bay County, September, 2003.