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A SUMMARY OF PRIORITY POLLUTANT DATA FOR POINT SOURCES AND SEDIMENT IN INNER COMMENCEMENT BAY: A PRELIMINARY ASSESSMENT OF DATA AND CONSIDERATIONS FOR FUTURE WORK

PART 4. SITCUM WATERWAY

by

Art Johnson, Bill Yake, and Dale Norton

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Washington State Department of Ecology
Water Quality Investigations Section
Olympia WA 98504

INTRODUCTION

This document is part of a larger compilation and review of data on priority pollutant concentrations in point source discharges and surface sediments in Commencement Bay and adjacent waterways collected between 1979 and 1982 and reported by WDOE, EPA, and NOAA. Also presented here are hitherto unpublished data from WDOE point source sampling and a series of sediment collections made by EPA and WDOE. Water column data were also reviewed for this report; they were not, however, tabulated. Pollutant concentrations in biota and biological responses to water and sediment samples were not, in general, reviewed. Data on organic compounds not classified as priority pollutants also were not reviewed.

The report is arranged by waterway in the six parts listed below; each to be issued in separate installments as the data are compiled and reviewed. The fourth installment, Sitcum Waterway, is included with these introductory remarks.

	Subject	Anticipated Completion Date (1983)
Part 1.	Hylebos Waterway	Completed
Part 2.	City Waterway	Completed
Part 3.	Blair Waterway	Completed
Part 4.	Sitcum Waterway	Completed
Part 5.	Milwaukee, Puyallup, St. Paul, Middle Waterways and S.W. Shore Commencement Bay	August
Part 6.	Summary	August

This information was gathered with the aim of providing direction for the next phase of work in the Commencement Bay near-shore marine environment. In the interest of putting together a useful package in a timely fashion, an outline format is used.

SAMPLING AND ANALYTICAL METHODS

The results presented here are from studies conducted by a number of investigators and should be compared with caution because of the variable collection, extraction, and analytical methods employed. Even a casual review of the data will reveal that detection limits vary between laboratories and that certain compounds are regularly reported in some studies and rarely reported in others. The importance of consistent sampling techniques and analytical methods in future Commencement Bay investigations cannot be over-emphasized.

The methods employed in obtaining most of the data compiled here are described in the reports cited at the end of each data package. The WDOE point source data on discharges other than ASARCO, St. Regis, Tacoma Central STP, U.S. Oil, Reichhold, Pennwalt, Sound Refining, and Hooker (which are documented in WDOE "Class II" reports) and the data on sediment samples collected by EPA and WDOE on 5/13/81, 7/31/81, and 8/03-04/81 are being reported for the first time. The procedures used in obtaining these new data are briefly described below.

The WDOE point source samples were collected in one-gallon glass jars (base/neutrals, acid extractables, pesticides, and PCBs), 40 ml screw-top glass vials with teflon septums (volatiles), and 2-1/2 or 5-gallon polyethylene cubitainers (trace metals and conventional water quality parameters*). Sample bottles were cleaned according to EPA priority pollutant protocol. Laboratory and field blanks were included in conjunction with the point source samples as a check against sample contamination. All samples were composites, typically collected over a 2 - 6 hour period. Rising tides precluded long compositing periods at a number of discharges. Flows were measured with a magnetic flowmeter or bucket and stopwatch.

The analytical plan included sample analysis at several different laboratories. Organics analysis was done by EPA contract laboratories. Trace metals were analyzed at the WDOE Tumwater laboratory. Joe Blazevich, EPA Region X laboratory at Manchester, reviewed the organic priority pollutant data reported by the contract laboratories prior to inclusion in this report.

The intertidal sediment samples taken by WDOE on 7/30-31/81 were collected by hand using a stainless steel "cookie cutter" measuring 9 cm in diameter and 2.5 cm deep. Several samples were taken along a transect of the lower beach, usually below or near a point source discharge, and pooled. After mixing with a glass rod, subsamples were placed in glass (organics analysis) or plastic (trace metal analysis) containers and analyzed as described above. A third portion of the sample was sent to the EPA Newport laboratory for bioassay using amphipods as the test organism. (The results of bioassay tests were reported by R.C. Swartz in the Marine Pollution Bulletin Vol. 13, No. 10, pp. 359-364, 1982.)

The subtidal sediments collected by EPA and WDOE on 5/13/81 and 8/03-04/81 were taken with a Van Veen grab modified with rubber flaps to reduce loss of surface fines during retrieval. Subsamples of the top 2 cm were taken by core and analyzed as described above, except that a few samples were analyzed by the EPA Newport laboratory for a limited number of priority pollutants only.

*These data are available on request.

PART 4. SITCUM WATERWAY

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SITCUM WATERWAY

Refer to Data In:

General Observations

1. The major concern in Sitcum Waterway is high metals concentrations in the sediments. In spite of reported high concentrations, bioassays on Sitcum subtidal sediments by EPA, NOAA, and the University of Washington Fisheries Research Institute (references 1, 6, 7) have not shown acutely toxic effects. Some intertidal sediments elicited toxic responses in EPA's tests.

2. No Sitcum Waterway water column samples have been analyzed for organic priority pollutants. This is a rather substantial data gap.

3. Organic priority pollutants have not been measured in large concentrations in most samples of water and sediment. Limited data suggest further sampling for organics is warranted at four sites. These sites are identified below.

Metals - Observations

1. Only one sample from each of the two drains discharging to Sitcum Waterway has been analyzed for metals -- neither had high metals concentrations. As, Cu, Pb, and Zn were higher in the drain in the north corner of the waterway than in the south corner drain. Cu, Pb, and Zn in the north drain were above EPA chronic exposure criteria for protection of marine life. — Table 27

2. Metals loads for the north corner drain were two orders of magnitude higher than the south drain. The maximum load measured for an individual metal was only .70 lbs/day (Zn). — Table 28

3. Water column data on metals are limited to a sample collected by Dames and Moore (reference 2) in October, 1980. Cu and Zn were measured at 3 and 10 µg/L, respectively, while As, Cd, Cr, and Pb were below detection limits. None exceeded EPA criteria.

4. Sitcum sediments are higher in As, Cu, Pb, and Zn than sediments in other Commencement Bay waterways. With the exception of As, these same metals are roughly twice as high in sediments from the north side of the waterway than those from the south side. High Cu concentrations in sediment have also been reported in two samples off the south shoreline near the waterway entrance. — Table 30, Figure 18

5. The highest concentrations of Cu, Pb, and Zn reported for Sitcum sediments were in an intertidal sample from the mouth of the north corner drain. 7,000, 19,000, and 3,200 mg/Kg (dry) of Cu, Pb, and Zn, respectively, were measured. — Table 30

6. No core data are available to assess vertical stratification of metals in the sediments.

Refer to Data In:

7. The source(s) of the metals in Sitcum sediments has not been identified. ASARCO slag used as rip-rap along the south shore and alumina and lead concentrate unloaded on the Port of Tacoma docks on the north shore are possible sources. Except for Cu, as noted above, the areal distribution of metals in Sitcum sediments suggests that major source(s) are not on the south shore. No analytical data are yet available on the lead concentrates, known by WDOE to have been handled in the past. Two samples of alumina have been analyzed. Metals concentrations differed widely between samples. Sample #2 matches some of the Sitcum sediment data fairly well. Figure 18

Sample Collection Date	Alumina Sample #1 12/07/82	Alumina Sample #2 3/02/83
As		1,014 mg/Kg, dry
Cd	0.8 mg/Kg, dry	38 "
Cr	1.8 "	3.6 "
Cu	27 "	6,900 "
Hg		<.0002 "
Ni	3.7 "	12 "
Pb	190 "	6,300 "
Sb		2.0 "
Zn	63 "	7,300 "

Metals - Considerations for Future Work

1. The source(s) of metals in Sitcum sediments, whether historical or on-going, should be identified.

2. Sediment cores should be taken to determine metals stratification.

3. The materials handling procedures on the Sitcum Port of Tacoma docks should be reviewed with the aim of reducing the spillage to the waterway that has been observed by WDOE inspectors.

4. Water column samples should be taken.

Volatiles - Observations

1. Of the two point source discharges to Sitcum Waterway, only the north corner drain has had detectable concentrations of volatiles. Chloroform, 1,1,1-trichloroethane, and tetrachloroethylene were detected in each of the two samples collected. 1,1,1-trichloroethane was present in the largest concentrations, 34 and 42 µg/L. Trichloroethylene and 1,1,2,2-tetrachloroethylene were detected in the first of these two samples. Detection limits were an order of magnitude higher for the second sample. Table 27

		Refer to Data In:
2.	The higher of the two loads measured for 1,1,1-trichloroethane was .25 lbs/day.	Table 28
3.	Water column samples from Sitcum Waterway have not been analyzed for volatiles.	
4.	Volatiles have not been detected in intertidal or subtidal sediments collected within the waterway.	Table 30
5.	A sediment sample collected by the Port of Tacoma (unpublished data) just outside the waterway entrance on February 26, 1981, and analyzed by Laucks Testing Laboratories, had 87 mg/Kg chloroform, 1.2 mg/Kg xylene, 1.5 mg/Kg dichlorobromomethane, and 210 mg/Kg toluene (dry-weight basis). The sample was a composite of the top four feet of a sediment core. Coordinates for the sample site are approximately 47°16'20" x 122°25'14", based on the sketch accompanying the raw data. These high concentrations of volatiles are unique among the analyses done to date on Commencement Bay sediments.	

Volatiles - Considerations for Future Work

1. With the exception of the north corner drain, volatiles have not been shown to be a problem in Sitcum Waterway. Additional sediment samples (cores) should be collected outside the waterway entrance in the vicinity of the Port of Tacoma sample mentioned above to verify those measurements. The north corner drain should continue to be monitored for volatiles and efforts made to identify the source(s) of these compounds.

Base/Neutrals - Observations

1.	Base/neutral compounds have not been detected in either of the two drains to Sitcum Waterway.	Table 27
2.	No data are available on base/neutrals in the water column of Sitcum Waterway.	
3.	Concentrations of hexachlorobutadiene in Sitcum sediments are low relative to findings for Hylebos, Blair, and City waterways sediments.	Table 30
4.	One sediment sample near the mouth of Sitcum Waterway (station STS-9, Figure 17) had extremely high concentrations of PAH. Benzo(a)pyrene was measured in the highest concentrations, 230 mg/Kg, dry. These are the highest PAH concentrations so far reported for Commencement Bay sediments.	Table 30
5.	The remaining data on PAH in Sitcum sediments are not elevated relative to data from other Commencement Bay waterways.	Table 30

Refer to Data In:

Base/Neutrals - Considerations for Future Work

1. Sediments at station STS-9 should be sampled to verify this site as a PAH "hot spot" and determine the horizontal and vertical extent of contamination.

Acid Extractables - Observations

1. Phenol and pentachlorophenol are the only acid extractable compounds that have been detected in point source discharges to Sitcum Waterway. Less than 10 µg/L of each was measured in one of the two north corner drain samples. Table 27

2. Groundwater beneath phenolic waste ponds on Georgia Pacific property (formerly Pacific Resins and Chemicals) is contaminated with phenols. This materials has been removed through a WDOE enforcement action. A two-year groundwater monitoring program has been initiated. This site, Certain-Teed, and other small industries within the Sitcum drainage basin are possible sources of phenols to the waterway.

3. No water column data are available on acid extractables.

4. Acid extractables have not been commonly detected in Sitcum sediments. Phenol and pentachlorophenol have been found in small concentrations in two and three samples, respectively, of the 10 samples that have been analyzed for this fraction. One sample (station STS-3, Figure 17) contained 2-chlorophenol, p-chloro-m-cresol, and 4-nitrophenol. 4-nitrophenol was measured at a large concentration, 2.3 mg/Kg, dry, at this station. Table 30

Acid Extractables - Considerations for Future Work

1. Additional samples should be collected at station STS-3 and analyzed for acid extractables.

2. Because of the existence of sources of phenolic compounds within the Sitcum north corner drainage basin, this drain should continue to be monitored for these compounds.

Pesticides and PCBs - Observations

1. Neither pesticides nor PCBs have been detected in discharges from the two Sitcum Waterway drains. Table 27

2. No data are available on pesticides in the water column.

		Refer to Data In:
3.	The Dames and Moore water column sample, mentioned previously in this report, did not contain detectable concentrations of PCBs (.2 µg/L detection limit).	
4.	High concentrations of pesticides and PCBs have not been observed in Sitcum sediments.	Table 30

REFERENCES

1. Chapman, P.M., et al., 1982. Survey of Biological Effects of Toxicants upon Puget Sound Biota. I. Broad-scale Toxicity Survey. NOAA Technical Memorandum OMPA-25.

2. Dames and Moore, 1981. Commencement Bay Studies, Volume V, Water Quality. For U.S. Army Corps of Engineers, Seattle District.

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6. Pierson, K.B., et al., 1982. Biological Testing of Soild Phase and Suspended Phase Dredged Material from Commencement Bay, Tacoma, Washington. Fisheries Research Institute, Univ. Wash., Seattle.

7. Swartz, R.C., et al., 1982. Sediment Toxicity and the Distribution of Amphipods in Commencement Bay, Washington, USA. Marine Pollution Bulletin 13(10):359-364.

8. USEPAc, 1982. Unpubl. sediment data. Letter from D.W. Schults, USEPA Marine Science Center, Newport, Oregon, to Art Johnson, WDOE.

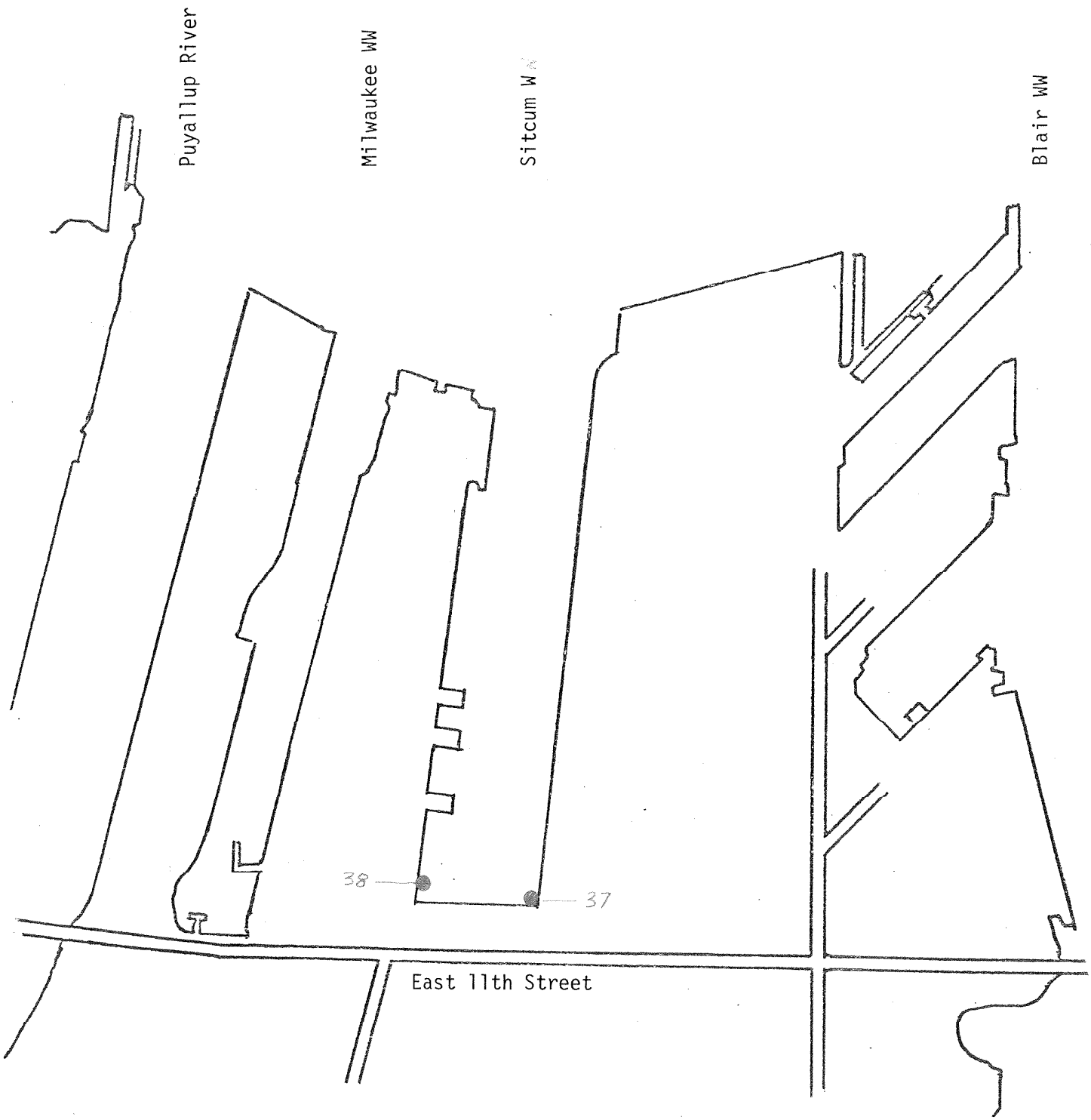

Figure 16. Sitcum Waterway: point source samples.

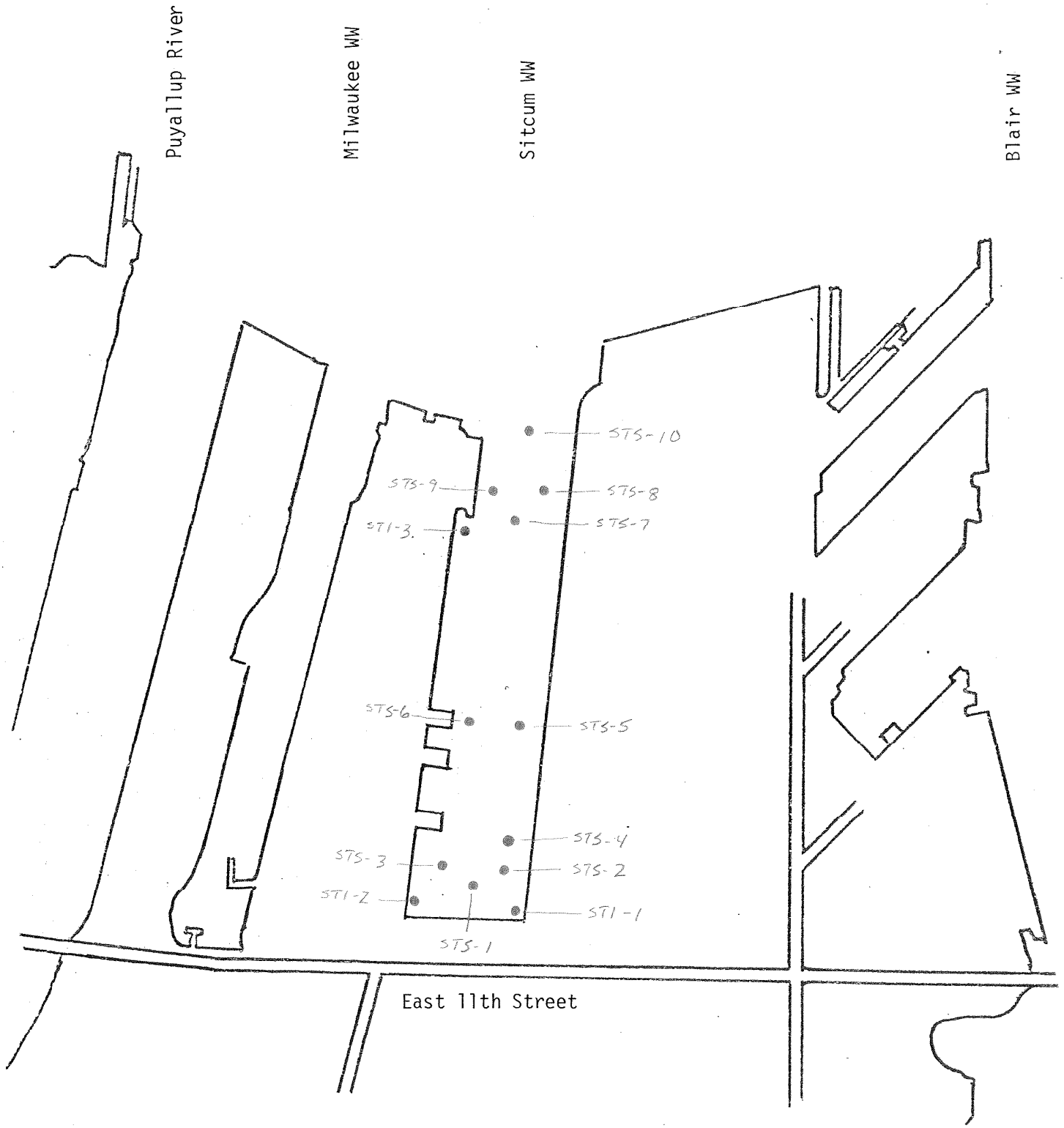

Figure 17. Sitcum Waterway: sediment samples.

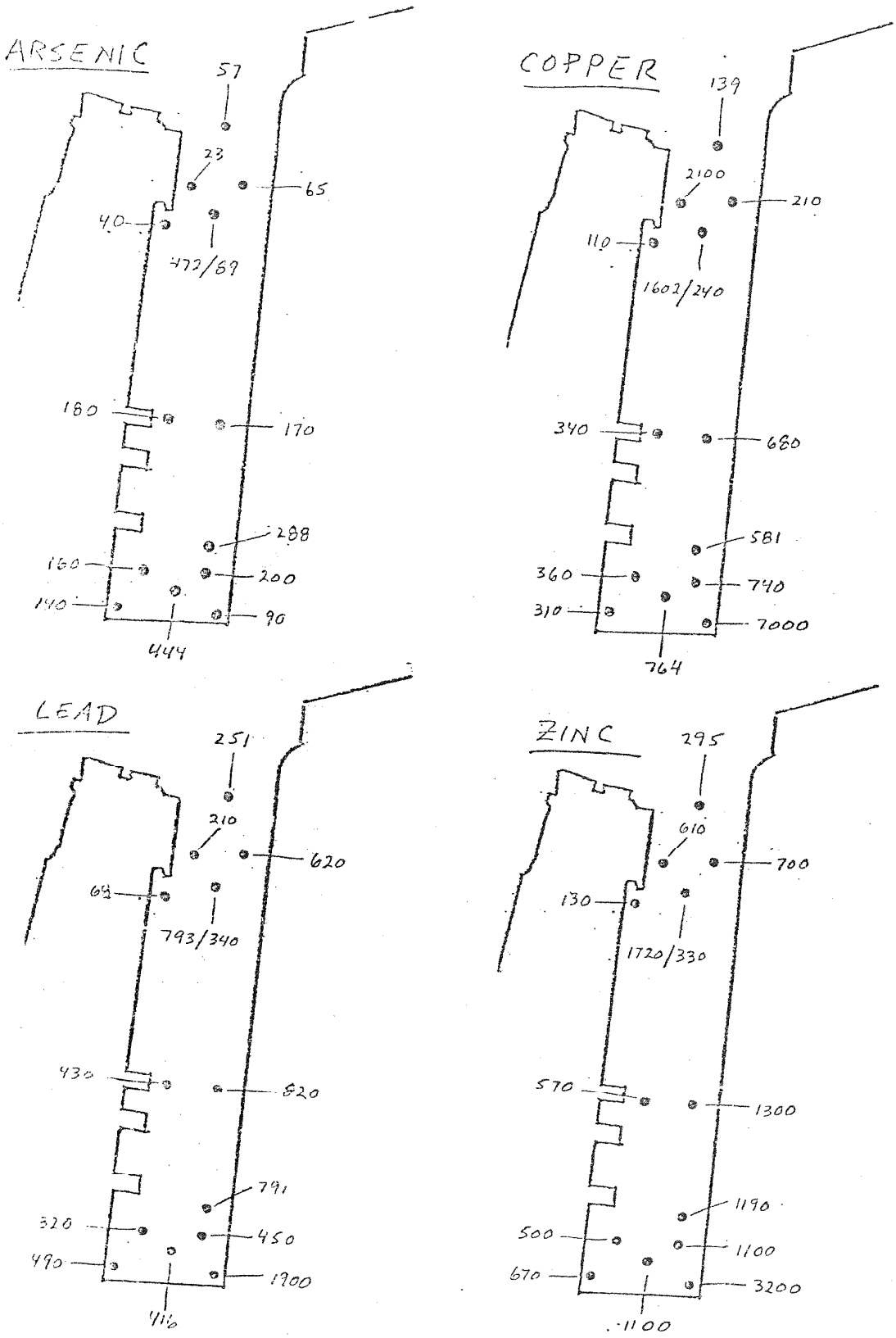

Figure 18. Sitcum Waterway: Concentrations of arsenic, copper, lead, and zinc in surface sediments (mg/Kg, dry).

Table 27. Sitcum Waterway: Metal and Organic Priority Pollutants in Point Source Discharges (µg/L).

Discharge	North Corner Drain		South Corner Drain	
Date Sampled	7/28/81	3/29/82	7/28/81	3/29/82
Time Sampled	0850-1040	1230-1600	0910-1100	1240-1600
Investigator	WDOE	WDOE	WDOE	WDOE
Sample Number	30108	J1344	30109	J1345
I.D. Number	37		38	
Flow (MGD)	(.15)	.72	(.020)	.086
Metals				
As		100		10
Cd		<2		<2
Cr		<10		<10
Cu		30		<10
Hg		<.20		<.20
Ni		<20		<20
Pb		70		20
Zn		180		39
Volatiles				
chloroform	3.8	<10	--	--
dichlorobromomethane	--	a	--	--
chlorodibromomethane	--	a	--	--
trichlorofluoromethane	--	a	--	--
1,1,1-trichloroethane	34	42	--	--
trichloroethylene	11	a	--	--
tetrachloroethylene	8.4	<10	--	--
1,1,2,2-tetrachloroethane	2.2	a	--	--
toluene	--	a	--	--
Base/Neutrals	--	--	--	--
Acid Extractables				
phenol	--	<10	--	--
pentachlorophenol	--	<10	--	--
Pesticides and PCBs	--	--	--	--
Miscellaneous				
cyanide		5		5

( ) = Estimated
-- = Not detected
a = Not detected, but detection limit high relative to other analyses

Table 28. Sitcum Waterway: Metal and Organic Priority Pollutant Loads Based on WDOE Data Collected July 1981 and March 1982 (pounds/day).

Discharge	North Corner Drain		South Corner Drain	
Date Sampled	7/28/81	3/29/82	7/28/81	3/29/82
Metals				
As		.60		.007
Cd		--		--
Cr		--		--
Cu		.18		--
Hg		--		--
Ni		--		--
Pb		.42		.014
Zn		1.1		.028
Volatiles				
chloroform	(.0048)	.030	--	--
dichlorobromomethane	--	--	--	--
chlorodibromomethane	--	--	--	--
trichlorofluoromethane	--	--	--	--
1,1,1-trichloroethane	(.043)	.25	--	--
trichloroethylene	(.014)	--	--	--
tetrachloroethylene	(.011)	.030*	--	--
1,1,2,2-tetrachloroethane	(.0028)	--	--	--
toluene	--	--	--	--
Base/Neutrals	--	--	--	--
Acid Extractables				
phenol	--	.030*	--	--
pentachlorophenol	--	.030*	--	--
Pesticides and PCBs	--	--	--	--
Miscellaneous				
cyanide		.030		.0036

( ) = Calculated using an estimated flow
-- = Not detected
* = Calculated using 1/2 quantification limit

Table 29. Sitcum Waterway: Sediment Sites.

Station Code	Original Agency Code	Collector	Analysis By	Location Name	Latitude (47°)	Longitude (122°)	Date Collected
STI-1	I-9	DOE	EPA/DOE	North Corner Sitcum Waterway	15' 58"	24' 38"	7/31/81
STI-2	I-10	DOE	"	South " " "	15' 54"	24' 45"	7/31/81
STI-3	I-11	DOE	"	South Side Sitcum Waterway Entrance	16' 14"	25' 07"	7/31/81
STS-1	15-09043	NOAA	NOAA	Head of Sitcum Waterway, Middle	15' 58"	24' 43"	1980
STS-2	8	EPA	EPA/DOE	" " " " , North Side	16' 00"	24' 42"	8/03/81
STS-3	7	"	"	" " " " , South Side	15' 58"	24' 46"	8/03/81
STS-4	SI	EPA	EPA-New	" " " " , North Side	15' 59"	24' 43"	5/12/81
STS-5	6	EPA	EPA/DOE	Middle of Sitcum Waterway, North Side	16' 06"	24' 50"	8/03/81
STS-6	5	EPA	EPA/DOE	" " " " , South Side	16' 04"	24' 55"	8/03/81
STS-7	4-09030	NOAA	NOAA	Inside Sitcum Waterway Entrance, Middle	16' 13"	25' 02"	1979;1981
STS-8	4	EPA	EPA/DOE	" " " " , North Side	16' 16"	25' 02"	8/03/81
STS-9	3	EPA	EPA/DOE	" " " " , South Side	16' 14"	25' 06"	8/03/81
STS-10	A-4	EPA	EPA-New	At Sitcum Waterway Entrance	16' 17"	25' 06"	5/13/81

Table 30. Sitcum Waterway: Sediment+ Priority Pollutant Concentrations (mg/Kg, dry weight).

	Intertidal			Subtidal										
Station Code	STI-1	STI-2	STI-3	STS-1	STS-2	STS-3	STS-4	STS-5	STS-6	STS-7		STS-8	STS-9	STS-10
Agency Responsible for Analysis	EPA/DOE	EPA/DOE	EPA/DOE	NOAA	EPA/DOE	EPA/DOE	EPA-New	EPA/DOE	EPA/DOE	NOAA		EPA/DOE	EPA/DOE	EPA-New
Original Agency Code	I-9	I-10	I-11	15-09043	8	7	SI	6	5	4-09030		4	3	A-4
Miles from Head of Waterway	.01	.02	.40	.04	.05	.05	.08	.20	.20	.41		.45	.45	.51
Year Collected	1981	1981	1981	1980	1981	1981	1981	1981	1981	1979	1981	1981	1981	1981
Percent Solids	61	74	73	49.5	54	52	54.0	58	70	56	56	55	72	61.0
Metals														
As	90	140	40	444	200	160	288	170	180	472	89	65	23	57
Cd	6.8	1.6	.37	6.5	6.7	4.4	6.9	7.0	1.8	(16.2)	1.8	3.3	1.0	1.6
Cr	41	13	13	32.7	22	35	27.4	15	8.8	58.7	37	16	14	17.5
Cu	7000	310	110	764	740	360	581	680	340	1602	240	210	2100	139
Hg	.17	.11	<.1	.10	.79	.34		.63	.34	.492	.26	.27	.23	
Ni	51	22	11		20	21		16	9.8	36.1		16	13	
Pb	1900	490	68	416	450	320	791	820	430	793	340	620	210	251
Sb	5.6	4.1	3.8		6.2	5.6		7.2	4.5	(338)		7.0	5.0	
Zn	3200	670	130	1100	1100	500	1190	1300	570	1720	330	700	610	295
Volatiles	--	--	--	--	--	--		--	--			--	--	
Base/Neutrals														
hexachlorobenzene	--	--	--	.0083	--	--	--	--	--	.002	.0029	--	--	--
hexachlorobutadiene	--	--	--	.004	--	--	--	--	--	.002	.0022	--	--	--
naphthalene	--	--	--	.48	--	T	.170	--	--	.17	.410	--	.23	T
acenaphthene	--	--	--	.150	--	--		T	--	.10	.059	--	3.0	
acenaphthylene	--	--	--	.074	--	--		--	--	.02		--	--	
anthracene/phenanthrene	--	--	T	.352	.24	.56	.963	.64	.24	.49	.64	T	19	.205
fluorene	--	--	--	.14	--	--	.071	T	--	.080	.093	--	6	.025
pyrene	1.1	T	.5	.94	T	.5	2.090*	1.5	T	.32	.99	T	38	1.041*
chrysene/benzo(a) anthracene	.99	T	--	1.1	T	.27	.475	--	.3	.39	.62	.30	77	.456
fluoranthene	1.1	T	T	1.1	.24	.56		1.6	.34	.38	.83	.28	27	
benzo(a)pyrene	1.1	.25	T	.20	.3	--		1.2	.3	.070	.19	.38	230	
benzo(k)fluoranthene/ 3,4-benzofluoranthene	1.2	T	T	.530**	T	T		1.3	14	.20**		.42	94	
benzo(g,h,i)perylene	--	--	--		--	--		T	--			T	15	
ideno(1,2,3-cd)pyrene	T	--	--	.11	--	--		T	--	.060		T	11	
dimethyl phthalate	--	--	--		--	--	.009	--	--			--	--	--
diethyl phthalate	--	--	--		--	--	--	--	--			--	--	.093
di-n-octyl phthalate	--	--	--		--	--	T	--	--			--	--	.411
di-n-butyl phthalate	--	--	--		--	--	--	--	--			--	--	.164
butylbenzyl phthalate	--	--	--		--	--	.079	--	--			--	--	.080
bis(2-ethylhexyl) phthalate	.62	--	T		.28	.28	1.07	.2	.26			.26	--	.620
Acid Extractables														
phenol	--	.27	T	--	--	.38		--	--			--	--	
2-chlorophenol	--	--	--	--	--	.33		--	--			--	--	
pentachlorophenol	--	T	--	--	--	T		--	--			--	--	
p-chloro-m-cresol	--	--	--	--	--	.4		--	--			--	--	
4-nitrophenol	--	--	--	--	--	2.3		--	--			--	--	
Pesticides and PCBs														
aldrin	--	--	--	--	--	--		--	--	.002	--	--	--	
γ-BHC (Lindane)	--	--	--	.00038	--	--		--	--	--	--	--	--	
4,4'-DDD	--	--	--	.0073	--	--	--	--	--	.0009	.0032	--	--	--
4,4'-DDE	--	--	--	.0038	--	--	--	--	--	.0006	--	--	--	--
4,4'-DDT	--	--	--	.0066	--	--	--	--	--	.0003	.0023	--	--	--
total DDT forms	--	--	--	.023	--	--		--	--	.016	.0059	--	--	--
PCB-1260	--		.04				--	--	--			--		--
total PCBs	.09	--	.04	.21	.06	.06	--	.03	--	--	.10	--	.12	--

+ = All data represent samples obtained from the top 2-5 cm of sediment
-- = Not detected
* = Pyrene + fluoranthene
** = Benzofluoranthenes
T = Trace; value is greater than the limit of detection but less than the limit of quantification
( ) = Value questionable -- included, but not used in calculations

Table 31. Summary of Sitcum Waterway Data (mg/Kg dry weight).

Constituent	Intertidal (including source-related) Sediments Minimum	Intertidal (including source-related) Sediments Maximum	Subtidal Sediments Minimum	Subtidal Sediments Maximum	Subtidal Sediments Median
Metals*					
As	40	140	23	472	170
Cd	.37	6.8	1.0	7.0	3.8
Cr	13	41	8.8	58.7	27.4
Cu	110	7,000	139	2,100	581
Hg	<0.1	.17	.10	.79	.34
Ni	11	51	9.8	36.1	16
Pb	68	1,900	210	793	450
Sb	3.8	5.6	4.5	7.2	5.8
Zn	130	3,200	295	1,720	700
Base/Neutrals					
hexachlorobenzene	--	--	--	.0083	(.003)
hexachlorobutadiene	--	--	--	.004	(.002)
naphthalene	--	--	--	.48	(.2)
acenaphthene	--	--	--	3.0	(.1)
acenaphthalene	--	--	--	.074	(.02)
anthracene/phenanthrene	--	T	T	19	.49
fluorene	--	--	--	6	.071
pyrene	T	1.1	T	38	1.0
chrysene/benzo(a)anthracene	--	.99	--	77	0.39
fluoranthene	T	1.1	.24	27	0.56
benzo(a)pyrene	T	1.1	--	230	0.30
benzo(k)fluoranthene/ 3,4-benzofluoranthene	T	1.2	T	94	0.85
benzo(g,h,i)perylene	--	--	--	15	--
ideno(1,2,3-cd)pyrene	--	T	--	11	(.08)
dimethyl phthalate	--	--	--	.009	--
diethyl phthalate	--	--	--	.093	--
di-n-octyl phthalate	--	--	--	.411	--
di-n-butyl phthalate	--	--	--	.164	--
butylbenzyl phthalate	--	--	--	.080	--
bis(2-ethylhexyl) phthalate	--	.62	--	1.07	.27
Acid Extractables					
phenol	--	.27	--	.38	--
2-chlorophenol	--	--	--	.33	--
pentachlorophenol	--	T	--	T	--
p-chloro-m-cresol	--	--	--	0.4	--
4-nitrophenol	--	--	--	2.3	--
Pesticides and PCBs					
aldrin	--	--	--	.002	--
γ-BHC (Lindane)	--	--	--	.00038	--
4,4'-DDD	--	--	--	.0073	(.003)
4,4'-DDE	--	--	--	.0038	(.001)
4,4'-DDT	--	--	--	.0066	(.002)
total DDT forms	--	--	--	.023	(.01)
PCB-1260	--	.04	--	--	--
total PCBs	--	.09	--	.21	.06

T = Trace amount
-- = None detected
( ) = Estimated median
* = Strong acid digestion data only