

**Sediment, Waste Material, Surface Water and Fish
Community Study of
Pioneer Lake**

Williams County, Ohio

July 10, 1995

Prepared by

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Errata Sheet (dated 2/5/96)

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The revised fish tissue PCB data presented below are based on revised results provided by the Ohio EPA Division of Emergency and Remedial Response contract lab. The initial results presented in the original report were determined to be improperly produced by the lab and therefore are unacceptable data.

Table 8. Results of tissue analyses from fish collected in the south end of Pioneer Lake by Ohio EPA during April 1995. Fish were analyzed as whole body samples; common carp and largemouth bass as 3-4 fish composites and white sucker as one individual fish.

Parameter	FISH TISSUE		
	Common Carp	Largemouth Bass	White Sucker
PCB-1260	<16	47J	18J

INTRODUCTION

Pioneer Lake is a 75 acre lake that was a sand and gravel quarry excavated from the 1930's through the 1960's. Pioneer Lake is located in northwest Ohio in Williams County, in the Village of Pioneer. The quarrying operation began as two gravel pits in the southern and northern portions of the lake. An asphalt production facility began operations at Pioneer Lake in the 1940's. The facility was operated as an asphalt and ready mix concrete producer until 1975.

Specific objectives of this evaluation were to:

- 1) determine the areal extent of polycyclic aromatic hydrocarbons (PAHs), BTEX (benzene, toluene, ethyl benzene, and xylenes) compounds, metals and other potential contaminants in the sediments from Pioneer Lake;
- 2) determine and measure adverse impacts on fish condition and water quality in Pioneer Lake, and;
- 3) delineate the coal tar area in the southeast corner of Pioneer Lake.

METHODS

All chemical, physical, and biological field, laboratory, data processing, and data analysis methodologies and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio Environmental Protection Agency 1989a) and Biological Criteria for the Protection of Aquatic Life, Volumes I-III (Ohio Environmental Protection Agency 1987a, 1987b, 1989b, 1989c), and The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application (Rankin 1989) for aquatic habitat assessment. All surface water, sediment, and waste material sampling locations are listed in Table 1.

Surface Water/ Sediment/ Waste Material Assessment

Fine grain sediment samples were collected in the upper 6 inches of bottom material at the majority of locations using either a decontaminated stainless steel Ekman dredge or stainless steel core sampler. Core samples of sediment were also collected at several locations using plastic tubing attached to a vibrating core sampler. Waste material samples were collected using stainless steel spoons. Decontamination of sediment and waste material sampling equipment followed the procedures outlined in FSOP 10.01, DERR Sampling Guidance, Vol. III, Ohio EPA 1992). Collected sediment and waste material (grab samples) was homogenized in stainless steel pans, transferred into clear glass jars with teflon lined lids, placed on ice (to maintain 4^o C) in a cooler, and shipped to an Ohio EPA contract lab. Samples for volatile organic compound analysis were collected from the pans prior to the sample being homogenized. Surface water samples were collected directly into appropriate containers at two locations (the near bottom sample was collected using a stainless steel Kemmerer sampler), preserved and delivered to an Ohio EPA contract lab. Surface water samples were evaluated using comparisons to Ohio Water Quality Criteria and published literature. Sediment evaluations were conducted using guidelines established by the Ontario Ministry of the Environment (Persaud *et al.* 1993) and published literature.

Fish Community Assessment

Fish were sampled using boat mounted pulsed DC electrofishing gear. Each location (north side and south side of lake) was sampled once during April, 1995. Whole body fish samples were collected for tissue analysis. Fish tissue sampling procedures are detailed in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 1989a).

SUMMARY/ CONCLUSIONS

Sediment

Sediment samples were collected at 16 locations in Pioneer Lake and one location in the Pioneer Lake outlet channel to the East Branch St. Joseph River. All sampling locations are indicated by sample number in Figure 1 and Table 1. Sample depths varied between 0 and 85 centimeters of bottom material, with a majority of the locations sampled in the 0 - 15 centimeter range. Samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), target analyte list metals, total organic carbon (TOC), and grain size. Specific chemical parameters measured and their concentrations at each sample location are listed in Appendix Table 1.

- Seventeen polycyclic aromatic hydrocarbons (PAHs) were identified and quantified (Table 3) in sediment collected from Pioneer Lake. In addition, three tentatively identified compounds (TICs) of PAHs and numerous unknown PAHs were documented in sediments collected in the south end of Pioneer Lake. PAHs which were detected ranged between 4.8 ug/kg (ppb) and 742,000 ug/kg, with the highest concentrations occurring in the southeast corner of Pioneer Lake.
- Eight PAH compounds (phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene) from three sediment sampling locations (SED03, SED04, and SRCE03) were within or above the range of sediment values associated with areas of high incidence of abnormal tissue growth (e.g. tumors) in fish (Baumann 1989).
- Sediment samples were evaluated using guidelines established by the Ontario Ministry of the Environment (Persaud *et al.* 1993). The guidelines define two levels of ecotoxic effects and are based on the chronic, long term effects of contaminants on benthic organisms. A *Lowest Effect Level* is a level of sediment contamination that can be tolerated by the majority of benthic organisms, and a *Severe Effect Level* indicates a level at which pronounced disturbance of the sediment-dwelling community can be expected. The Severe Effect Level is the sediment concentration of a compound that would be detrimental to the majority of benthic species. When any parameters are at or above the Severe Effect Level guideline, the material tested is considered highly contaminated and will likely have a significant effect on benthic biological resources. Based on the guidelines noted above, three sediment samples (SED03, SED04, SRCE03) were considered highly contaminated based on numerous PAH compounds and total PAHs exceeding the Severe Effect Level (Table 2, Figure 2). In addition, one sediment sample (SED19) exceeded the Lowest Effect Level based on PAH contaminants. The guidelines detailed in Persaud *et al.* (1993) do not include evaluations of volatile organic compounds, several PAHs and metals, and most non-PAH semivolatile organic compounds.

- The concentrations of PAHs at the three most contaminated sediment sampling locations were comparable to levels documented in the Little Scioto River near Marion, Ohio (Ohio EPA 1994). The Ohio Department of Health has issued a fish advisory and primary contact advisory for the Little Scioto River as a result of the elevated levels of PAHs in the bottom sediments.
- Significant levels of BTEX (benzene, toluene, ethylbenzene, and xylene) compounds were measured in sediment samples with the highest PAH concentrations (SED03, SED04, SRCE03). Total BTEX levels ranged between 122,530 ug/kg and 1,873,000 ug/kg at the three most contaminated sample locations. The other 14 sediment samples had reported BTEX concentrations at or near laboratory detection limits.

Waste Material

Waste material samples were collected at two locations along Pioneer Lake during April 1995. These samples were collected to characterize conditions at the former asphalt production facility and at a shallow pond area on the west side of the lake. Both of these locations had tar-like material present. Both sampling locations are indicated by sample number in Figure 1 and Table 1. Sample depths varied between 0 and 45 centimeters. Samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and target analyte list metals. Specific chemical parameters measured and their concentrations at each sample location are listed in Appendix Table 2.

- Seventeen polycyclic aromatic hydrocarbons (PAHs) were identified and quantified (Tables 4 and 5) in waste material collected from the Pioneer Lake site. PAHs which were detected ranged between 174,000 ug/kg (ppb) and 24,500,000 ug/kg, with the highest concentrations occurring in waste material collected from near the southeast corner of Pioneer Lake. In addition, tentatively identified compounds (TICs) of PAHs and numerous unknown PAHs were documented in waste material collected in the southeast end near Pioneer Lake (45,350,000 ug/kg) and in the shallow pond (23,595,000 ug/kg).
- Total PAH compounds were measured at highly elevated levels at both waste material locations, with total PAHs from waste material sample SRCE01 measuring 86,320,000 ug/kg (8.6% of sample) and waste material sample SRCE02 measuring 34,045,000 ug/kg (3.4% of sample). Carcinogenic PAHs comprised 1.1% (11,480,000 ug/kg) and 0.8% (8,065,000 ug/kg) of samples SRCE01 and SRCE02, respectively.
- Significant levels of BTEX (benzene, toluene, ethylbenzene, and xylene) compounds were measured in waste material sample SRCE01. The BTEX level at SRCE01 measured 7,080,000 ug/kg, approximately 0.7% of the sample. A substantially lower BTEX level was observed in sample SRCE02 (12,500 ug/kg).
- Other significant parameter concentrations in waste material samples included dibenzofuran (1,100,000 - 1,540,000 ug/kg) and carbazole (995,000 ug/kg).

Surface Water

Surface water samples were collected at two locations in Pioneer Lake on April 18, 1995. One location was sampled in the north end of the lake (PLSW01) and one location was sampled in close proximity to the coal tar area (PLSW02, PLSW03). The two samples in the coal tar area were collected at two depths - one at the water surface and one near the lake bottom. Results of the surface water tests are presented in Table 7.

- Surface water samples collected in the north section of Pioneer Lake and in the south section of Pioneer Lake at the water surface were reflective of good water quality. Results for most metal parameters were low, with most values reported near or below laboratory detection limits. None of the measured chemical parameters exceeded Ohio Water Quality Criteria standards.
- A water sample collected in Pioneer Lake near the bottom of the lake, in close proximity to the coal tar area, revealed several exceedances of Ohio Water Quality Criteria standards (Table 6). Most notable were exceedances of the 30-day average water quality criteria for mercury and total PAHs. In addition, a visible oil sheen on the lake water surface associated with the coal tar area was in violation of the 'free from floating oil' criteria listed in the Ohio Water Quality Standards. The aquatic life 30-day average criterion for mercury is established to protect aquatic biological resources against unacceptable effects (e.g. adverse effects on organism growth or reproduction). The human health 30-day average criterion for total PAHs is established to protect the human population from adverse effects associated with the consumption of fish.

Fish Community

A total of 249 fish representing ten species were collected from Pioneer Lake during April 1995. The sampling effort included a cumulative distance electrofished of 1.01 km at two locations. Sampling locations were located along the northern shoreline and southern shoreline (coal tar area). Relative numbers and species collected per location is presented in Appendix Table 3.

- The physical condition of fish was monitored at each sampling site by recording the incidence of gross DELT (deformities, fin erosions lesions/ulcers and tumors) external anomalies. Biosurvey results collected by Ohio EPA from throughout the state show a high frequency of DELT anomalies to be an accurate indication of pollution stress usually caused by multiple sublethal stresses as the result of degraded water quality (*i.e.* often a combination of toxic impacts combined with marginal D.O. concentrations). Within Ohio, there also appears to be a positive relationship between sites containing chemically contaminated sediments (*e.g.* metals, PAHs) and very high percent occurrence of DELT anomalies in combination with very low Index of Biotic Integrity and Modified Index of Well-Being scores (Yoder 1991). Although standard Ohio EPA stream biological index scores could not be applied to the lake sampling data from Pioneer Lake, some important results of the fish community assessment were evident. A substantial increase in the percent occurrence of DELT anomalies was recorded in the fish community sampled in the southern section of Pioneer Lake (10.7 percent) in comparison to the northern sampling location (1.4 percent) and stream reference conditions. Common carp, a bottom dwelling fish species, was the only species with observable DELT anomalies reported in Pioneer Lake. One individual common carp from the northern sampling location was deformed, while 71 percent of the common carp from the southern sampling location were either deformed or had external tumors. These types of anomalies have been recorded by Ohio EPA at similar frequencies in common carp collected from other rivers and streams in Ohio where elevated

PAH compounds have been documented in bottom sediments.

- Populations of fish species listed as highly tolerant to environmental stress were compared between the two Pioneer Lake sampling locations. At the northern sampling zone, 20 percent of the population was composed of tolerant fish. The southern sampling zone had a higher percent of tolerant fish species numbers, with 28 percent of the fish considered pollution tolerant.

Fish Tissue

Fish tissue samples were collected from Pioneer Lake in the southern section of the lake within the area of coal tar deposition. Whole body composite samples of common carp and largemouth bass and an individual white sucker were analyzed for cadmium, lead, mercury, volatile organic compounds, semivolatile organic compounds, and PCBs. Fish tissue sampling results are listed in Table 8.

- Seven PCB congeners were tested in each fish tissue sample. All values were near or below lab detection limits (detection limits varied from between 16 ug/kg and 33 ug/kg). Two detected PCBs (PCB-1260), one in the largemouth bass sample (45 ug/kg) and one in the white sucker sample (19 ug/kg), were considered not elevated based on a comparison to Ohio Department of Health PCB consumption guidelines (Vandermeer 1994).
- PAH compounds were not detected in fish tissue samples collected from Pioneer Lake. However, lab detection limits for PAH compounds (and all other semivolatile organic compounds) were high, with detection limits varying between 6,600 ug/kg and 66,000 ug/kg. In addition, PAH compounds do not significantly bioaccumulate in fish because they are readily metabolized.
- Aside from typical organic chemical lab contaminants (acetone, methylene chloride, phthalates), the only organic chemical detected in the fish tissue samples was benzoic acid, with concentrations ranging between 2,400 ug/kg and 5,300 ug/kg.

Table 1. Sediment, waste material, and surface water sampling locations in the Pioneer Lake study area, April 1995.

Sample Number	Depth of Sample	Sampling Equipment	Latitude/ Longitude	Landmark
Sediment				
PLSED01	0-15 cm	SS corer	41°40'22"/84°32'23"	Pioneer Lake outlet
PLSED02	0-10 cm	SS corer	41°40'20"/84°32'24"	Sand Beach
PLSED03	0-75 cm	Plastic corer	41°39'58"/84°32'40"	20 meters from south shore
PLSED04	0-85 cm	Plastic corer	41°39'59"/84°32'40"	30 meters from south shore
PLSED16 (duplicate of PLSED04)				
PLSED05	0-12 cm	SS Ekman dredge	41°40'08"/84°32'34"	East central part of lake
PLSED06	0-12 cm	SS Ekman dredge	41°40'10"/84°32'38"	Central part of lake
PLSED07	0-12 cm	SS Ekman dredge	41°40'09"/84°32'41"	West central part of lake
PLSED08	0-12 cm	SS Ekman dredge	41°40'06"/84°32'43"	30 meters from west shore
PLSED09	0-12 cm	SS Ekman dredge	41°40'05"/84°32'43"	Near sand pit, west shore
PLSED10	0-12 cm	SS Ekman dredge	41°40'00"/84°32'39"	60 meters from south shore
PLSED11	0-12 cm	SS Ekman dredge	41°40'03"/84°32'39"	Near east shore, north coal tar
PLSED12	0-15 cm	SS Ekman dredge	41°40'01"/84°32'39"	North of coal tar
PLSED13	0-15 cm	SS Ekman dredge	41°40'00"/84°32'41"	Northwest of coal tar
PLSED14	0-15 cm	SS Ekman dredge	41°39'59"/84°32'42"	West of coal tar
PLSED15 (duplicate of PLSED14)				
PLSED18	0-80 cm	Plastic corer	41°39'57"/84°32'41"	West of coal tar
PLSED19	0-80 cm	Plastic corer	41°39'59"/84°32'41"	Northwest of coal tar
PLSRCE03	0-80 cm	Plastic corer	41°39'57"/84°32'39"	Coal tar area
Surface Water				
PLSW01	0-5 cm	Sample containers	41°40'12"/84°32'36"	North part of lake
PLSW02	Surface sheen	Sample containers	41°39'59"/84°32'40"	30 meters from south shore
PLSW03	Near bottom	SS Kemmerer	41°39'59"/84°32'40"	Same as PLSW02
Waste Material				
PLSRCE01	30-45 cm	SS spoon	41°39'57"/84°32'38"	Waste tar pit
PLSRCE02	0-30 cm	SS spoon	41°40'50"/84°32'44"	Shallow pond, west side of lake

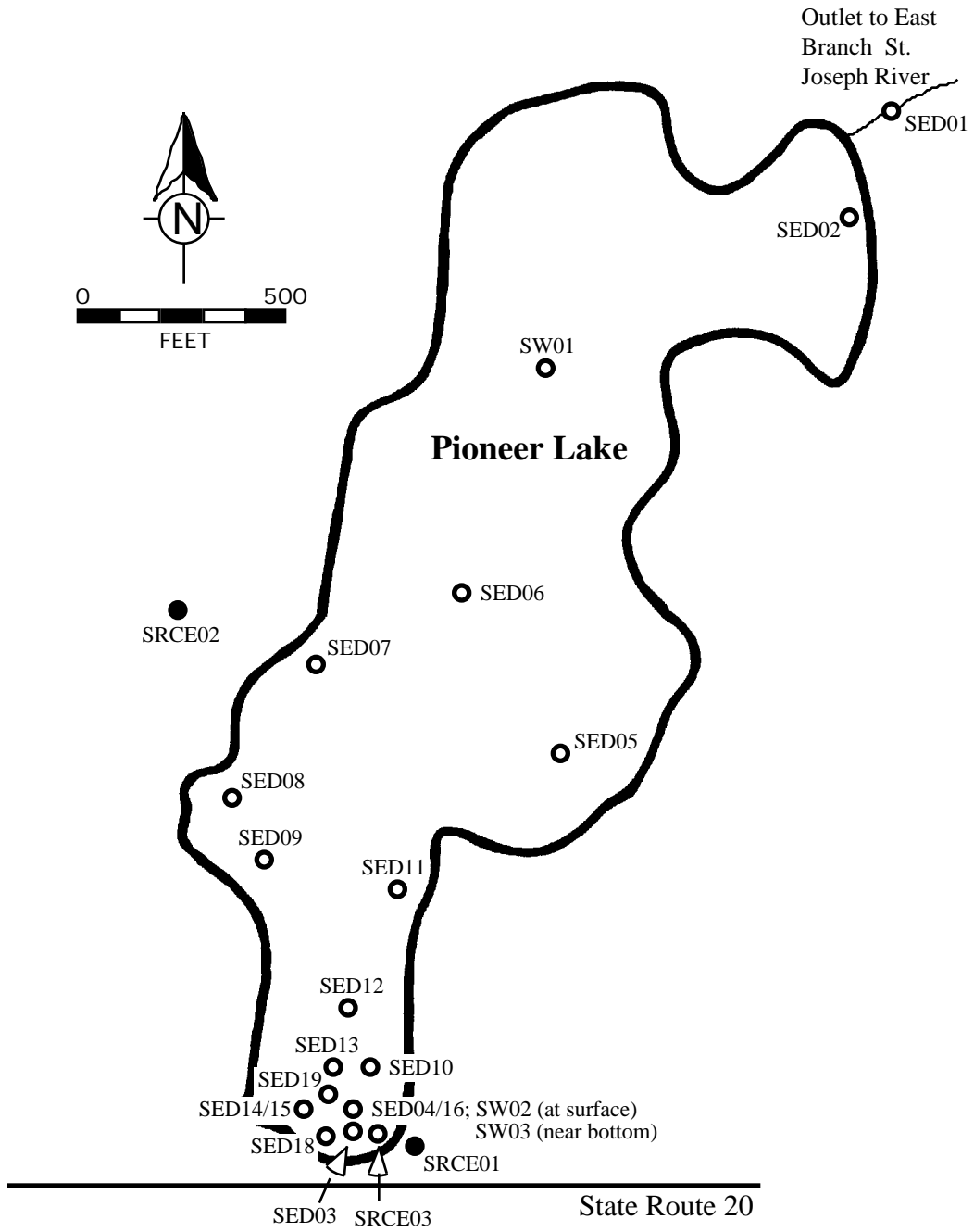


Figure 1. Map of the Pioneer Lake study area showing sediment, surface water, and waste material sampling locations, April 1995.

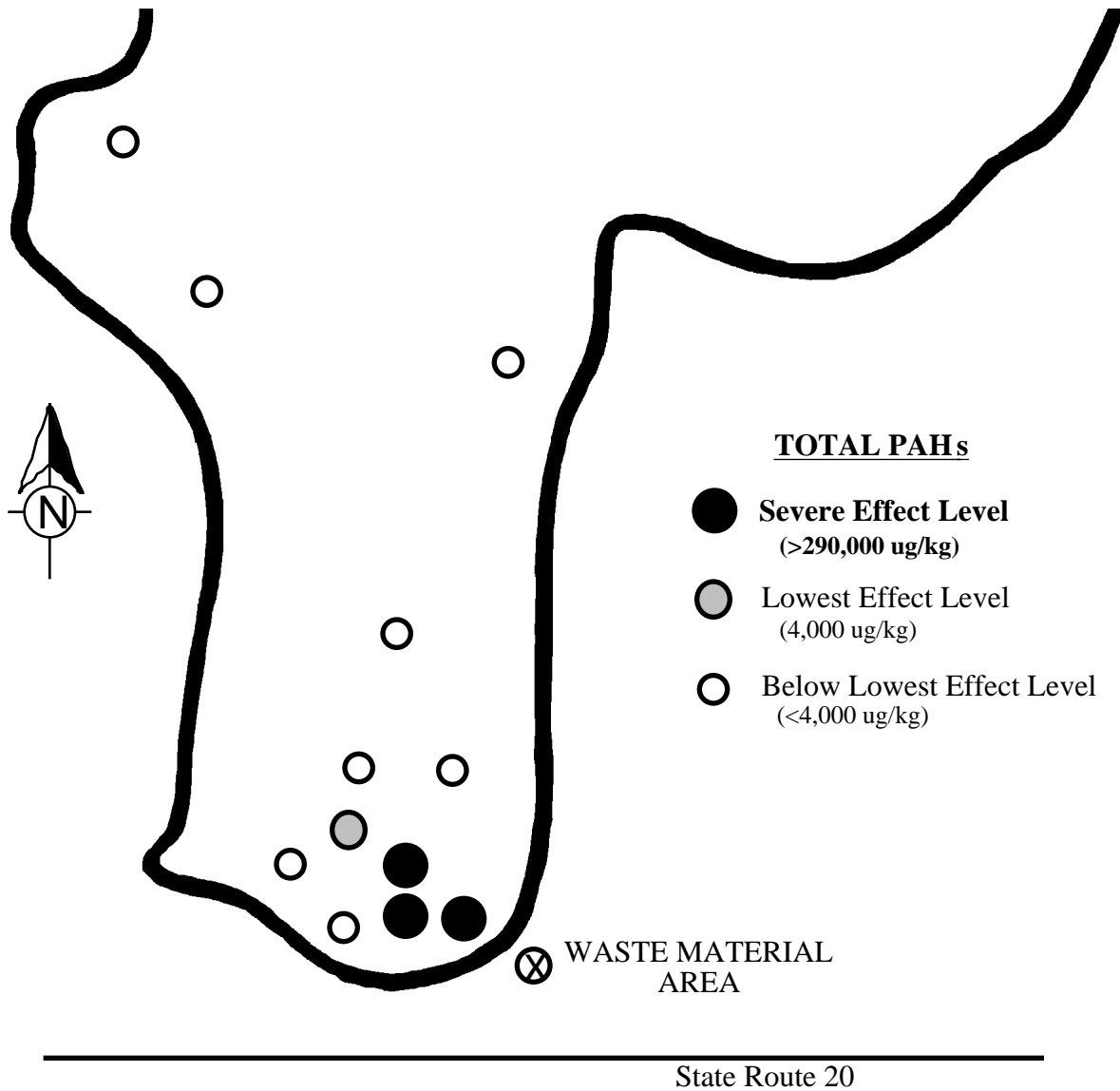


Figure 2. Map of the southern section of Pioneer Lake showing sediment and waste material sampling locations, and total PAH levels, April 1995. The PAH evaluations are based on guidelines established by the Ontario Ministry of the Environment (Persaud *et al.* 1993).

Table 2. Results of polycyclic aromatic hydrocarbon (PAH) and BTEX (benzene, toluene, ethylbenzene, and xylenes) testing in sediment from Pioneer Lake, April 1995. Values are presented in ug/kg (ppb) dry weight. Total PAH concentrations were evaluated based on Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Persaud *et al.* 1993). **Bold** numbers exceed the Severe Effect Level (a level at which pronounced disturbance of the sediment-dwelling community can be expected) and ***bold italic*** numbers exceed the Lowest Effect Level (a level of sediment contamination that can be tolerated by the majority of benthic organisms). nd = not detected.

Sample Location	SEDIMENT				
	Total PAHs	Carcinogenic PAHs ^a	TIC ^b PAHs	BTEX	TIC ^b Benzenes
PL-SED-01	569	357	nd	nd	nd
PL-SED-02	396	159	nd	nd	nd
PL-SED-03	2,086,980	239,080	965,800	118,000	145,000
PL-SED-04	655,360	83,660	437,700	435,700	618,800
PL-SED-16 (Dupl.04)	654,770	83,340	363,700	122,530	151,900
PL-SED-05	627	82	nd	nd	nd
PL-SED-06	395	57	nd	nd	nd
PL-SED-07	1239	223	nd	nd	nd
PL-SED-08	299	56	nd	nd	nd
PL-SED-09	332	67	nd	nd	nd
PL-SED-10	1293	384	nd	5	nd
PL-SED-11	2642	1155	nd	2	nd
PL-SED-12	2722	1160	nd	33	nd
PL-SED-13	2474	1030	nd	nd	nd
PL-SED-14	1341	490	nd	nd	nd
PL-SED-15 (Dupl.14)	1585	595	nd	2	nd
PL-SED-18	1015	504	nd	4	nd
PL-SED-19	6386	2296	nd	4	nd
PL-SRCE-03	2,662,200	338,700	1,754,200	1,873,000	1,247,121

^a Carcinogenic PAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene.

^b TIC = Tentatively Identified Compound.

Table 3. Summary of detected volatile and semivolatile organic compounds in sediment samples collected from Pioneer Lake during April 1995. Common lab contaminants (acetone, methylene chloride, 2-butanone, diethylphthalate, and bis(2-ethylhexyl) phthalate) were excluded from this analysis. PAH concentrations were evaluated based on Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (Persaud *et al.* 1993). **Bold** numbers exceed the Severe Effect Level (a level at which pronounced disturbance of the sediment-dwelling community can be expected) and ***bold italic*** numbers exceed the Lowest Effect Level (a level of sediment contamination that can be tolerated by the majority of benthic organisms).

SEDIMENT					
Parameter	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04	PL-SED-05
<i>Volatile Organic Compounds</i> <i>(ug/kg, ppb)</i>					
Benzene	<14	<15	11,000J	10,100	<27
Trichloroethene	<14	<15	<24,000	3,700J	<27
Toluene	<14	<15	25,000	49,600	<27
Ethylbenzene	<14	<15	50,000	227,000	<27
Xylene (total)	<14	<15	32,000	149,000	<27
Styrene	<14	<15	<24,000	<37,300	<27
<i>Semivolatile Organic Compounds</i> <i>(ug/kg, ppb)</i>					
Naphthalene	<330	46.4J	568,000D	186,000D	83.0J
2-Methylnaphthalene	<330	15.8J	288,000D	67,500D	38.8J
Acenaphthylene	<330	<330	122,000D	7,300DJ	24.2J
Acenaphthene	<330	<330	59,900D	49,100D	19.4J
Dibenzofuran	<330	<330	23,600DJ	7,410DJ	13.0J
Fluorene	<330	<330	91,000D	28,700D	36.1J
Pentachlorophenol	<800	<800	<100,000	<50,000	<800
Phenanthrene	54.1J	<330	335,000D	109,000D	110J
Anthracene	26.2J	<330	88,800D	29,700D	42.6J
Carbazole	<330	<330	6,520J	<10,000	<330
Di-n-butylphthalate	<330	113J	<40,000	<20,000	132J
Fluoranthene	66.5J	77.3J	99,500D	33,200D	91.8J
Pyrene	65.2J	97.8J	178,000D	61,200D	98.6J
Benzo(a)anthracene	28.6J	59.0J	71,600D	25,200D	<330
Chrysene	60.4J	100J	65,000D	22,600D	<330
Benzo(b)fluoranthene	32.5J	<330	38,400DJ	9,560DJ	29.7J
Benzo(k)fluoranthene	24.1J	<330	31,000DJ	10,800DJ	27.2J
Benzo(a)pyrene	211J	<330	9,960J	15,500DJ	<330
Indeno(1,2,3-cd)pyrene	<330	<330	18,400J	<20,000	25.6J
Dibenz(a,h)anthracene	<330	<330	4,720J	<20,000	<330
Benzo(g,h,i)perylene	<330	<330	17,700J	<20,000	<330

Table 3. Continued.

SEDIMENT					
Parameter	PL-SED-06	PL-SED-07	PL-SED-08	PL-SED-09	PL-SED-10
<i>Volatile Organic Compounds</i>					
<i>(ug/kg, ppb)</i>					
Benzene	<26	<31	<17	<27	<13
Trichloroethene	<26	<31	<17	<27	<13
Toluene	<26	<31	<17	<27	1J
Ethylbenzene	<26	<31	<17	<27	0.8J
Xylene (total)	<26	<31	<17	<27	3J
Styrene	<26	<31	<17	<27	<13
<i>Semivolatile Organic Compounds</i>					
<i>(ug/kg, ppb)</i>					
Naphthalene	59.7J	179J	33.5J	37.8J	51.4J
2-Methylnaphthalene	29.0J	87.0	12.3J	17.6J	37.2J
Acenaphthylene	15.1J	50.3J	8.6J	10.9J	26.5J
Acenaphthene	10.6J	30.2J	4.8J	7.9J	48.2J
Dibenzofuran	7.2J	<330	<330	<330	21.6J
Fluorene	22.6J	60.8J	14.9J	16.3J	59.5J
Pentachlorophenol	<800	<800	<800	<800	<800
Phenanthrene	63.6J	194J	47.0J	40.9J	187J
Anthracene	26.6J	50.3J	15.9J	17.9J	71.9J
Carbazole	<330	<330	<330	<330	<330
Di-n-butylphthalate	288J	366	273J	209J	248J
Fluoranthene	53.7J	187J	51.6J	60.2J	185J
Pyrene	56.9J	177J	54.9J	56.0J	203J
Benzo(a)anthracene	25.2J	95.1J	24.8J	26.7J	77.6J
Chrysene	32.0J	128J	30.8J	40.1J	105J
Benzo(b)fluoranthene	<330	<330	<330	<330	47.0J
Benzo(k)fluoranthene	<330	<330	<330	<330	42.6J
Benzo(a)pyrene	<330	<330	<330	<330	74.0J
Indeno(1,2,3-cd)pyrene	<330	<330	<330	<330	38.1J
Dibenz(a,h)anthracene	<330	<330	<330	<330	<330
Benzo(g,h,i)perylene	<330	<330	<330	<330	39.3J

Table 3. Continued.

SEDIMENT					
Parameter	PL-SED-11	PL-SED-12	PL-SED-13	PL-SED-14	PL-SED-15
<i>Volatile Organic Compounds</i>					
<i>(ug/kg, ppb)</i>					
Benzene	<22	19J	<36	<18	<20
Trichloroethene	<22	<150	<36	<18	<20
Toluene	<22	14J	<36	<18	<20
Ethylbenzene	<22	<150	<36	<18	<20
Xylene (total)	2J	<150	<36	<18	2J
Styrene	<22	<150	<36	<18	<20
<i>Semivolatile Organic Compounds</i>					
<i>(ug/kg, ppb)</i>					
Naphthalene	71.6J	112J	125J	68.5J	106J
2-Methylnaphthalene	28.7J	68.3J	58.3J	46.9J	56.9J
Acenaphthylene	71.8J	73.1J	61.8J	24.6J	33.5J
Acenaphthene	31.5J	72.8J	52.8J	65.1J	63.2J
Dibenzofuran	<330	<330	<330	<330	17.4J
Fluorene	52.8J	71.9J	75.9J	66.6J	57.8J
Pentachlorophenol	<800	<800	<800	<800	<800
Phenanthrene	206J	203J	215J	157J	174J
Anthracene	71.0J	72.5J	67.8J	53.8J	45.2J
Carbazole	<330	<330	<330	<330	<330
Di-n-butylphthalate	259J	269J	<330	197J	126J
Fluoranthene	359	331	293J	158J	192J
Pyrene	464	406	359	150J	194J
Benzo(a)anthracene	257J	204J	187J	88.6J	108J
Chrysene	322J	277J	265J	124J	152J
Benzo(b)fluoranthene	195J	184J	160J	65.9J	89.6J
Benzo(k)fluoranthene	160J	155J	137J	65.8J	81.3J
Benzo(a)pyrene	93.5J	198J	158J	80.9J	81.5J
Indeno(1,2,3-cd)pyrene	128J	142J	123J	65.1J	82.8J
Dibenz(a,h)anthracene	<330	<330	<330	<330	<330
Benzo(g,h,i)perylene	130J	151J	135J	60.6J	67.2J

Table 3. Continued.

SEDIMENT				
Parameter	PL-SED-16	PL-SED-18	PL-SED-19	PL-SRCE-03
<i>Volatile Organic Compounds</i> (ug/kg, ppb)				
Benzene	1,830J	<13	<24	63,000
Trichloroethene	<22,600	<13	<24	<37,000
Toluene	10,800J	<13	<24	370,000
Ethylbenzene	66,200	<13	<24	730,000
Xylene (total)	43,700	4J	4J	710,000
Styrene	<22,600	<13	<24	130,000
<i>Semivolatile Organic Compounds</i> (ug/kg, ppb)				
Naphthalene	186,000E	21.9J	200J	742,000
2-Methylnaphthalene	70,400	9.6J	349	294,000
Acenaphthylene	8,370J	13.5J	85.4J	132,000
Acenaphthene	50,800	<330	<330	106,000
Dibenzofuran	7,880J	<330	406	33,500J
Fluorene	30,300	23.5J	520	119,000
Pentachlorophenol	8,850J	<800	<800	<250,000
Phenanthrene	104,000	92.2J	1,000	421,000
Anthracene	28,500	17.1J	138J	118,000
Carbazole	<10,000	<330	134J	12,400J
Di-n-butylphthalate	<10,000	372	110J	<100,000
Fluoranthene	33,400	149J	819	143,000
Pyrene	51,400	132J	762	220,000
Benzo(a)anthracene	25,700	68.4J	449	92,500J
Chrysene	23,600	95.4J	532	81,200J
Benzo(b)fluoranthene	9,330J	87.4J	431	39,500J
Benzo(k)fluoranthene	9,980J	59.0J	347	27,400J
Benzo(a)pyrene	5,730J	134J	258J	58,400J
Indeno(1,2,3-cd)pyrene	9,000J	59.4J	279J	26,500J
Dibenz(a,h)anthracene	<10,000	<330	<330	13,200J
Benzo(g,h,i)perylene	8,260J	52.6J	217J	28,500J

D - Compound quantified when a sample has been diluted and reanalyzed.

E - Compound identified whose concentration exceeds the calibrated range of the instrument.

J - Indicates an estimated value (a value less than the contract required quantitation limit but greater than the method detection limit).

Table 4. Results of polycyclic aromatic hydrocarbon (PAH) and BTEX (benzene, toluene, ethylbenzene, and xylenes) testing in waste material from Pioneer Lake, April 1995. Values are presented in ug/kg (ppb) dry weight.

WASTE MATERIAL					
Sample Location	Total PAHs	Carcinogenic PAHs ^a	TIC ^b PAHs	BTEX	TIC ^b Benzenes
PL-SRCE-01	86,320,000	11,480,000	45,350,000	7,080,000	3,611,960
PL-SRCE-02	34,045,000	8,065,000	23,595,000	12,500	36,907

^a Carcinogenic PAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene.

^b TIC = Tentatively Identified Compound.

Table 5. Summary of detected volatile and semivolatile organic compounds in waste material samples collected from the Pioneer Lake site during April 1995. Common lab contaminants (acetone, methylene chloride, 2-butanone, phthalates) were excluded from this analysis.

WASTE MATERIAL		
Parameter	PL-SRCE-01	PL-SRCE-02
<i>Volatile Organic Compounds</i>		
<i>(ug/kg, ppb)</i>		
Benzene	1,700,000D	<16,000
1,2-Diichloroethane	30,000J	<16,000
Toluene	2,500,000D	1,200J
Ethylbenzene	380,000	4,700J
Xylene (total)	2,500,000D	6,600J
Styrene	2,100,000D	<16,000
1,1,2-Trichloroethane	18,000J	<16,000
trans-1,3-Dichloropropene	43,000J	<16,000
4-Methyl-2-pentanone	75,000	<16,000
1,1,2,2-Tetrachloroethane	17,000J	<16,000
<i>Semivolatile Organic Compounds</i>		
<i>(ug/kg, ppb)</i>		
4-Methylphenol	<1,000,000	142,000J
Naphthalene	24,500,000D	2,560,000
2-Methylnaphthalene	8,600,000	1,530,000
Acenaphthylene	6,370,000	174,000J
Dibenzofuran	1,100,000	1,540,000
Fluorene	4,180,000	1,970,000
Phenanthrene	16,000,000D	5,950,000
Anthracene	3,730,000	6,090,000
Carbazole	<1,000,000	995,000
Fluoranthene	4,350,000	3,900,000
Pyrene	7,110,000	3,350,000
Benzo(a)anthracene	3,350,000	1,700,000
Chrysene	3,140,000	1,860,000
Benzo(b)fluoranthene	1,520,000	1,420,000
Benzo(k)fluoranthene	1,250,000	1,200,000
Benzo(a)pyrene	2,220,000	1,640,000
Dibenz(a,h)anthracene	<1,000,000	245,000J
Benzo(g,h,i)perylene	<1,000,000	456,000J
<p>J- Indicates an estimated value (a value less than the contract required quantitation limit but greater than the method detection limit).</p> <p>D - Compound quantified when a sample has been diluted and reanalyzed.</p>		

Table 6. Exceedances of Ohio EPA Warmwater Habitat water quality criteria (OAC 3745-1) for chemical/physical parameters measured in surface water from Pioneer Lake on April 18, 1995.

SURFACE WATER

Sample Number	Location	Parameter (value)
PLSW01	North end of lake	No exceedances of water quality criteria
PLSW02	At surface, over coal tar	No exceedances of water quality criteria
PLSW03	Near bottom, over coal tar	Iron, total (1,430 ug/l)* Mercury, total (0.47 ug/l)* Naphthalene (4.494 ug/l)** Fluorene (0.3208 ug/l)** Phenanthrene (1.352 ug/l)** Anthracene (0.245 ug/l)**

* - Indicates an exceedance of the Warmwater Habitat outside mixing zone 30-day average criterion (iron = 1,000 ug/l, mercury = 0.2 ug/l).

** - Indicates an exceedance of the Warmwater Habitat outside mixing zone human health 30-day average criterion (PAHs = 0.31 ug/l). This criterion applies to the sum of 13 PAH compounds identified in the Ohio Water Quality Standards.

Table 7. Results of surface water samples collected from Pioneer Lake by Ohio EPA during April 1995. Surface water results are based on grab samples.

Parameter	SURFACE WATER		
	PL-SW-01 Near Surface	PL-SW-02 At Surface Over Coal Tar	PL-SW-03 Near Bottom Over Coal Tar
Oil & Grease (mg/l)	-	<5.0	-
Metals - Total (ug/l - ppb)			
Aluminum	402	-	1350
Antimony	<18.4	-	<18.4
Arsenic	1.4J	-	2.4J
Barium	55.7J	-	61.4J
Beryllium	<0.20	-	<0.20
Cadmium	<1.5	-	<1.5
Calcium	48500	-	52200
Chromium	8.3J	-	<4.0
Cobalt	<2.6	-	<2.6
Copper	13.9J	-	8.8J
Iron	417	-	1430
Lead	<1.6	-	1.7J
Magnesium	17600	-	18600
Manganese	20.6	-	60.3
Mercury	<0.05	-	0.47
Nickel	<4.4	-	<4.4
Potassium	2260J	-	2620J
Selenium	1.2J	-	<0.80
Silver	<4.3	-	<4.3
Sodium	10800	-	11300
Thallium	<2.4	-	<2.4
Vanadium	<2.0	-	2.8J
Zinc	13.6J	-	22.7
Volatile Organic Compounds (ug/l - ppb)			
Chloromethane	<10	<10	<10
Vinyl chloride	<10	<10	<10
Bromomethane	<10	<10	<10
Chloroethane	<10	<10	<10
1,1-Dichloroethene	<10	<10	<10
Carbon disulfide	<10	<10	<10
Acetone	<10	<10	<10
Methylene chloride	<10	1.24J	1.25J
1,1-Dichloroethane	<10	<10	<10
1,2-Dichloroethene (total)	<10	<10	<10

Table 7. Continued.

	SURFACE WATER		
	PL-SW-01	PL-SW-02	PL-SW-03
<i>Volatile Organic Compounds (ug/l - ppb)</i>			
2-Butanone	<10	<10	<10
Chloroform	<10	<10	<10
1,1,1-Trichloroethane	<10	<10	<10
Carbon tetrachloride	<10	<10	<10
Benzene	<10	<10	<10
1,2-Dichloroethane	<10	<10	<10
Trichloroethene	<10	<10	<10
1,2-Dichloropropane	<10	<10	<10
Bromodichloromethane	<10	<10	<10
cis-1,3-Dichloropropene	<10	<10	<10
4-Methyl-2-pentanone	<10	<10	<10
Toluene	<10	<10	<10
trans-1,3-Dichloropropene	<10	<10	<10
1,1,2-Trichloroethane	<10	<10	<10
Tetrachloroethene	<10	<10	<10
2-Hexanone	<10	<10	<10
Dibromochloromethane	<10	<10	<10
Chlorobenzene	<10	<10	<10
Ethyl benzene	<10	<10	<10
Xylene (total)	<10	<10	<10
Styrene	<10	<10	<10
Bromoform	<10	<10	<10
1,1,2,2-Tetrachloroethane	<10	<10	<10
<i>Semivolatile Organic Compounds (ug/l - ppb)</i>			
Phenol	<10	-	<10
bis(2-Chloroethyl) ether	<10	-	<10
2-Chlorophenol	<10	-	<10
1,3-Dichlorobenzene	<10	-	<10
1,4-Dichlorobenzene	<10	-	<10
2,2'-oxybis-(1-Chloropropane)	<10	-	<10
1,2-Dichlorobenzene	<10	-	<10
2-Methylphenol	<10	-	<10
4-Methylphenol	<10	-	<10
N-Nitroso-di-n-propylamine	<10	-	<10
Hexachloroethane	<10	-	<10
Nitrobenzene	<10	-	<10
Isophorone	<10	-	<10
2-Nitrophenol	<10	-	<10
2,4-Dimethylphenol	<10	-	<10
bis(2-Chloroethoxy) methane	<10	-	<10
2,4-Dichlorophenol	<10	-	<10

Table 7. Continued.

SURFACE WATER			
	PL-SW-01	PL-SW-02	PL-SW-03
<i>Semivolatile Organic Compounds (ug/l - ppb)</i>			
1,2,4-Trichlorobenzene	<10	-	<10
Naphthalene	<10	-	4.494J
4-Chloroaniline	<20	-	<20
Hexachlorobutadiene	<10	-	<10
4-Chloro-3-methylphenol	<20	-	<20
2-Methylnaphthalene	<10	-	1.455J
Hexachlorocyclopentadiene	<10	-	<10
2,4,6-Trichlorophenol	<10	-	<10
2,4,5-Trichlorophenol	<50	-	<50
2-Chloronaphthalene	<10	-	<10
2-Nitroaniline	<50	-	<50
Dimethyl phthalate	<10	-	<10
Acenaphthylene	<10	-	<10
3-Nitroaniline	<50	-	<50
Acenaphthene	<10	-	0.7046J
2,4-Dinitrophenol	<50	-	<50
4-Nitrophenol	<50	-	<50
Dibenzofuran	<10	-	<10
2,4-Dinitrotoluene	<10	-	<10
2,6-Dinitrotoluene	<10	-	<10
Diethylphthalate	<10	-	<10
4-Chlorophenyl phenyl ether	<10	-	<10
Fluorene	<10	-	0.3208J
4-Nitroaniline	<50	-	<50
4,6-Dinitro-2-methylphenol	<50	-	<50
N-Nitrosodiphenylamine*	<10	-	<10
4-Bromophenyl phenyl ether	<10	-	<10
Hexachlorobenzene	<10	-	<10
Pentachlorophenol	<50	-	<50
Phenanthrene	<10	-	1.352J
Anthracene	<10	-	0.2450J
Carbazole	<10	-	<10
Di-n-butylphthalate	<10	-	<10
Fluoranthene	<10	-	<10
Pyrene	<10	-	<10
Butyl benzyl phthalate	<10	-	<10
3,3'-Dichlorobenzidine	<20	-	<20
Benzo(a)anthracene	<10	-	<10
bis(2-Ethylhexyl) phthalate	<10	-	<10
Chrysene	<10	-	<10
di-n-Octyl phthalate	<10	-	<10
Benzo(b)fluoranthene	<10	-	<10
Benzo(k)fluoranthene	<10	-	<10

Table 7. Continued.

SURFACE WATER			
	PL-SW-01	PL-SW-02	PL-SW-03
<i>Semivolatile Organic Compounds (ug/l - ppb)</i>			
Benzo(a)pyrene	<10	-	<10
Indeno(1,2,3-cd)pyrene	<10	-	<10
Dibenz(a,h)anthracene	<10	-	<10
Benzo(g,h,i)perylene	<10	-	<10
<i>Tentatively Identified Compounds (TICs, ug/l - ppb)</i>			
1-Propene, 1,2,3-Trichloro-	4.502NJ	-	6.555NJ
2-Cyclohexen-1-ol	-	-	2.296NJ
<i>Polychlorinated Biphenyls (PCBs) (ug/l - ppb)</i>			
PCB-1016	<1.0	-	<1.0
PCB-1221	<2.0	-	<2.0
PCB-1232	<1.0	-	<1.0
PCB-1242	<1.0	-	<1.0
PCB-1248	<1.0	-	<1.0
PCB-1254	<1.0	-	<1.0
PCB-1260	<1.0	-	<1.0
<i>Organochlorine Pesticides (ug/l - ppb)</i>			
alpha-BHC	<0.05	-	<0.05
beta-BHC	<0.05	-	<0.05
delta-BHC	<0.05	-	<0.05
gamma-BHC (Lindane)	<0.05	-	<0.05
Heptachlor	<0.05	-	<0.05
Aldrin	<0.05	-	<0.05
Heptachlor epoxide	<0.05	-	<0.05
Endosulfan I	<0.05	-	<0.05
Dieldrin	<0.10	-	<0.10
4,4'-DDE	<0.10	-	<0.10
Endrin	<0.10	-	<0.10
Endosulfan II	<0.10	-	<0.10
4,4'-DDD	<0.10	-	<0.10
Endosulfan sulfate	<0.10	-	<0.10
4,4'-DDT	<0.10	-	<0.10
Methoxychlor	<0.50	-	<0.50
Endrin ketone	<0.10	-	<0.10
Endrin aldehyde	<0.10	-	<0.10
alpha-Chlordane	<0.05	-	<0.05
gamma-Chlordane	<0.05	-	<0.05
Toxaphene	<5.0	-	<5.0

* Cannot be distinguished from Diphenylamine.

J- Indicates an estimated value (a value less than the contract required quantitation limit but greater than the method detection limit).

N- Spiked sample recovery not within control limits.

Table 8. Results of tissue analyses from fish collected in the south end of Pioneer Lake by Ohio EPA during April 1995. Fish were analyzed as whole body samples; common carp and largemouth bass as 3-4 fish composites and white sucker as one individual fish.

Parameter	FISH TISSUE		
	Common Carp	Largemouth Bass	White Sucker
Metals (mg/kg - ppm)			
Cadmium	0.118	0.019	0.014
Lead	0.4	0.2	<0.1
Mercury	<0.08	<0.08	<0.08
Volatile Organic Compounds (ug/kg - ppb)			
Chloromethane	<1100	<1200	<1200
Bromomethane	<1100	<1200	<1200
Vinyl chloride	<1100	<1200	<1200
Chloroethane	<1100	<1200	<1200
Methylene chloride	<570	61JB	<600
Acetone	570J	2330J	787J
Carbon disulfide	<570	<580	<600
1,1-Dichloroethene	<570	<580	<600
1,1-Dichloroethane	<570	<580	<600
1,2-Dichloroethene (total)	<570	<580	<600
Chloroform	<570	<580	<600
1,2-Dichloroethane	<570	<580	<600
2-Butanone	<5700	<5800	<6000
1,1,1-Trichloroethane	<570	<580	<600
Carbon tetrachloride	<570	<580	<600
Vinyl acetate	<5700	<5800	<6000
Bromodichloromethane	<570	<580	<600
1,1,2,2-Tetrachloroethane	<570	<580	<600
1,2-Dichloropropane	<570	<580	<600
trans-1,3-Dichloropropene	<570	<580	<600
Trichloroethene	<570	<580	<600
Dibromochloromethane	<570	<580	<600
1,1,2-Trichloroethane	<570	<580	<600
Benzene	<570	<580	<600
cis-1,3-Dichloropropene	<570	<580	<600
Bromoform	<570	<580	<600
2-Hexanone	<5700	<5800	<6000
4-Methyl-2-pentanone	<5700	<5800	<6000
Tetrachloroethene	<570	<580	<600
Toluene	<570	<580	<600
Chlorobenzene	<570	<580	<600
Ethyl benzene	<570	<580	<600
Styrene	<570	<580	<600
Xylenes	<570	<580	<600

Table 8. Continued.

Parameter	FISH TISSUE		
	Common Carp	Largemouth Bass	White Sucker
<i>Semivolatile Organic Compounds (ug/kg)</i>			
Phenol	<6600	<6600	<13000
bis(2-Chloroethyl) ether	<6600	<6600	<13000
2-Chlorophenol	<6600	<6600	<13000
1,3-Dichlorobenzene	<6600	<6600	<13000
1,4-Dichlorobenzene	<6600	<6600	<13000
Benzyl alcohol	<13000	<13000	<27000
1,2-Dichlorobenzene	<6600	<6600	<13000
2-Methylphenol	<6600	<6600	<13000
bis(2-Chloroisopropyl) ether	<6600	<6600	<13000
3+4-Methylphenol	<6600	<6600	<13000
N-Nitroso-di-n-propylamine	<6600	<6600	<13000
Hexachloroethane	<6600	<6600	<13000
Nitrobenzene	<6600	<6600	<13000
Isophorone	<6600	<6600	<13000
2-Nitrophenol	<6600	<6600	<13000
2,4-Dimethylphenol	<6600	<6600	<13000
Benzoic acid	2400J	<33000	5300
bis(2-Chloroethoxy) methane	<6600	<6600	<13000
2,4-Dichlorophenol	<6600	<6600	<13000
1,2,4-Trichlorobenzene	<6600	<6600	<13000
Naphthalene	<6600	<6600	<13000
4-Chloroaniline	<13000	<13000	<27000
Hexachlorobutadiene	<6600	<6600	<13000
4-Chloro-3-methylphenol	<13000	<13000	<27000
2-Methylnaphthalene	<6600	<6600	<13000
Hexachlorocyclopentadiene	<6600	<6600	<13000
2,4,6-Trichlorophenol	<6600	<6600	<13000
2,4,5-Trichlorophenol	<6600	<6600	<13000
2-Chloronaphthalene	<6600	<6600	<13000
2-Nitroaniline	<33000	<33000	<66000
Dimethyl phthalate	<6600	<6600	<13000
Acenaphthylene	<6600	<6600	<13000
3-Nitroaniline	<33000	<33000	<66000
Acenaphthene	<6600	<6600	<13000
2,4-Dinitrophenol	<33000	<33000	<66000
4-Nitrophenol	<33000	<33000	<66000
Dibenzofuran	<6600	<6600	<13000
2,4-Dinitrotoluene	<6600	<6600	<13000
2,6-Dinitrotoluene	<6600	<6600	<13000
Diethylphthalate	<6600	<6600	<13000
4-Chlorophenyl phenyl ether	<6600	<6600	<13000
Fluorene	<6600	<6600	<13000
4-Nitroaniline	<6600	<6600	<13000

Table 8. Continued.

Parameter	FISH TISSUE		
	Common Carp	Largemouth Bass	White Sucker
<i>Semivolatile Organic Compounds (ug/kg)</i>			
4,6-Dinitro-2-methylphenol	<33000	<33000	<66000
N-Nitrosodiphenylamine*	<6600	<6600	<13000
4-Bromophenyl phenyl ether	<6600	<6600	<13000
Hexachlorobenzene	<6600	<6600	<13000
Pentachlorophenol	<33000	<33000	<66000
Phenanthrene	<6600	<6600	<13000
Anthracene	<6600	<6600	<13000
Di-n-butylphthalate	12000JB	<6600	<13000
Fluoranthene	<6600	<6600	<13000
Pyrene	<6600	<6600	<13000
Butyl benzyl phthalate	<6600	<6600	<13000
3,3'-Dichlorobenzidine	<13000	<13000	<27000
Benzo(a)anthracene	<6600	<6600	<13000
bis(2-Ethylhexyl) phthalate	<6600	<6600	<13000
Chrysene	<6600	<6600	<13000
di-n-Octyl phthalate	<6600	<6600	<13000
Benzo(b)fluoranthene	<6600	<6600	<13000
Benzo(k)fluoranthene	<6600	<6600	<13000
Benzo(a)pyrene	<6600	<6600	<13000
Indeno(1,2,3-cd)pyrene	<6600	<6600	<13000
Dibenz(a,h)anthracene	<6600	<6600	<13000
Benzo(g,h,i)perylene	<6600	<6600	<13000
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>			
PCB-1016	<16	<17	<17
PCB-1221	<33	<33	<33
PCB-1232	<16	<17	<17
PCB-1242	<16	<17	<17
PCB-1248	<16	<17	<17
PCB-1254	<16	<17	<17
PCB-1260	<16	45	19

* Cannot be distinguished from Diphenylamine.

J - Indicates an estimated value (a value less than the contract required quantitation limit but greater than the method detection limit).

B- Compound was found in the blank as well as the sample.

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Appendix Table 1. Results of sediment samples collected from Pioneer Lake by Ohio EPA during April 1995. Sediment results are based on grab samples. Results are reported as dry weight.

Parameter	SEDIMENT			
	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04
Grain Size Distribution				
% Gravel	10.9	12.8	-	-
% Sand	52.1	73.3	-	-
% Silt	30.0	10.3	-	-
% Clay	7.0	3.6	-	-
TOC (mg/kg - ppm)	29,000	47,500	-	-
Metals - Total (mg/kg - ppm)				
Aluminum	5040	1750	8780	22,400
Antimony	<5.3	<5.8	8.7J	<12.0
Arsenic	6.7	6.1	19.4	37.9
Barium	34.2J	14.5J	72.1J	176
Beryllium	0.38J	0.16J	0.43J	1.3J
Cadmium	<0.43	<0.47	<0.61	<0.98
Calcium	35,300	30,700	64,100	168,000
Chromium	8.2	4.2	14.4	38.1
Cobalt	5.7J	1.3J	9.9J	24.7J
Copper	20.9	42.0	30.8	75.8
Iron	12,300	7590	23,200	57,500
Lead	10.2	6.7	68.9	42.8
Magnesium	9510	4280	21,600	53,100
Manganese	380	132	620	1630
Mercury	0.04J	0.04J	0.09J	0.11J
Nickel	14.3	9.6J	26.2	65.6
Potassium	546J	334J	1300J	3140J
Selenium	0.33J	<0.25	0.80J	1.5J
Silver	<1.2	<1.4	<1.7	<2.8
Sodium	84.2J	64.2J	144J	289J
Thallium	1.2J	1.5J	2.2J	3.9J
Vanadium	12.3J	6.2J	23.4	58.1
Zinc	54.9	47.6	97.5	232
Volatile Organic Compounds (ug/kg - ppb)				
Chloromethane	<14	<15	<24,000	<37,300
Vinyl chloride	<14	<15	<24,000	<37,300
Bromomethane	<14	<15	<24,000	<37,300
Chloroethane	<14	<15	<24,000	<37,300
1,1-Dichloroethene	<14	<15	<24,000	2930J
Carbon disulfide	<14	<15	<24,000	<37,300

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04
<i>Volatile Organic Compounds (ug/kg - ppb)</i>				
Acetone	220	56	35,000	20,900J
Methylene chloride	<14	<15	4500J	<37,300
1,1-Dichloroethane	<14	<15	<24,000	<37,300
1,2-Dichloroethene (total)	<14	<15	<24,000	<37,300
2-Butanone	36	12J	<24,000	<37,300
Chloroform	<14	<15	<24,000	<37,300
1,1,1-Trichloroethane	<14	<15	<24,000	<37,300
Carbon tetrachloride	<14	<15	<24,000	<37,300
Benzene	<14	<15	11,000J	10,100J
1,2-Dichloroethane	<14	<15	<24,000	<37,300
Trichloroethene	<14	<15	<24,000	3700J
1,2-Dichloropropane	<14	<15	<24,000	<37,300
Bromodichloromethane	<14	<15	<24,000	<37,300
cis-1,3-Dichloropropene	<14	<15	<24,000	<37,300
4-Methyl-2-pentanone	<14	<15	<24,000	<37,300
Toluene	<14	<15	25,000	49,600
trans-1,3-Dichloropropene	<14	<15	<24,000	<37,300
1,1,2-Trichloroethane	<14	<15	<24,000	<37,300
Tetrachloroethene	<14	<15	<24,000	<37,300
2-Hexanone	<14	<15	<24,000	<37,300
Dibromochloromethane	<14	<15	<24,000	<37,300
Chlorobenzene	<14	<15	<24,000	<37,300
Ethyl benzene	<14	<15	50,000	227,000
Xylene (total)	<14	<15	32,000	149,000
Styrene	<14	<15	<24,000	<37,300
Bromoform	<14	<15	<24,000	<37,300
1,1,2,2-Tetrachloroethane	<14	<15	<24,000	<37,300
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
4-Octene, (E)-	-	-	61,000J	-
1-ethyl-2-methyl-benzene	-	-	34,000J	304,000J
1,2,4-Trimethylbenzene	-	-	30,000J	96,900J
1,2,3-Trimethylbenzene	-	-	31,000J	130,000J
1-Ethenyl-3-methyl-benzene	-	-	32,000J	-
1-Propenyl-benzene	-	-	18,000J	-
Indene	-	-	100,000J	272,000J
1-Methyl-1H-indene	-	-	21,000J	87,100J
Naphthalene	-	-	160,000J	-
Indane	-	-	-	303,000J
1-Ethenyl-3,5-Dimethyl-benzene	-	-	-	46,300J
2-Butenyl-benzene	-	-	-	41,600J
1-Methylene-1H-indene	-	-	-	822,000J

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
Phenol	<330	<330	<40,000	<20,000
bis(2-Chloroethyl) ether	<330	<330	<40,000	<20,000
2-Chlorophenol	<330	<330	<40,000	<20,000
1,3-Dichlorobenzene	<330	<330	<40,000	<20,000
1,4-Dichlorobenzene	<330	<330	<40,000	<20,000
1,2-Dichlorobenzene	<330	<330	<40,000	<20,000
2-Methylphenol	<330	<330	<40,000	<20,000
2,2'-oxybis-(1-Chloropropane)	<330	<330	<40,000	<20,000
4-Methylphenol	<330	<330	<40,000	<20,000
N-Nitroso-di-n-propylamine	<330	<330	<40,000	<20,000
Hexachloroethane	<330	<330	<40,000	<20,000
Nitrobenzene	<330	<330	<40,000	<20,000
Isophorone	<330	<330	<40,000	<20,000
2-Nitrophenol	<330	<330	<40,000	<20,000
2,4-Dimethylphenol	<330	<330	<40,000	<20,000
bis(2-Chloroethoxy) methane	<330	<330	<40,000	<20,000
2,4-Dichlorophenol	<330	<330	<40,000	<20,000
1,2,4-Trichlorobenzene	<330	<330	<40,000	<20,000
Naphthalene	<330	46.4J	568,000D	186,000D
4-Chloroaniline	<330	<330	<40,000	<20,000
Hexachlorobutadiene	<330	<330	<40,000	<20,000
4-Chloro-3-methylphenol	<330	<330	<40,000	<20,000
2-Methylnaphthalene	<330	15.8J	288,000D	67,500D
2,4,6-Trichlorophenol	<330	<330	<40,000	<20,000
2,4,5-Trichlorophenol	<800	<800	<100,000	<50,000
Hexachlorocyclopentadiene	<330	<330	<40,000	<20,000
2-Chloronaphthalene	<330	<330	<40,000	<20,000
2-Nitroaniline	<800	<800	<100,000	<50,000
Dimethyl phthalate	<330	<330	<40,000	<20,000
Acenaphthylene	<330	<330	122,000D	7300DJ
2,6-Dinitrotoluene	<330	<330	<40,000	<20,000
3-Nitroaniline	<800	<800	<100,000	<50,000
Acenaphthene	<330	<330	59,900D	49,100D
2,4-Dinitrophenol	<800	<800	<100,000	<50,000
4-Nitrophenol	<800	<800	<100,000	<50,000
Dibenzofuran	<330	<330	23,600DJ	7410DJ
2,4-Dinitrotoluene	<330	<330	<40,000	<20,000
Diethylphthalate	44.8JB	<330	<40,000	<20,000
4-Chlorophenyl phenyl ether	<330	<330	<40,000	<20,000
Fluorene	<330	<330	91,000D	28,700D
4-Nitroaniline	<800	<800	<100,000	<50,000

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
4,6-Dinitro-2-methylphenol	<800	<800	<100,000	<50,000
N-Nitrosodiphenylamine*	<330	<330	<40,000	<20,000
4-Bromophenyl phenyl ether	<330	<330	<100,000	<50,000
Hexachlorobenzene	<330	<330	<40,000	<20,000
Pentachlorophenol	<800	<800	<100,000	<50,000
Phenanthrene	54.1J	<330	335,000D	109,000D
Anthracene	26.2J	<330	88,800D	29,700D
Carbazole	<330	<330	6520J	<10,000
Di-n-butylphthalate	<330	113J	<40,000	<20,000
Fluoranthene	66.5J	77.3J	99,500D	33,200D
Pyrene	65.2J	97.8J	178,000D	61,200D
Butyl benzyl phthalate	<330	<330	<40,000	<20,000
Benzo(a)anthracene	28.6J	59.0J	71,600D	25,200D
3,3'-Dichlorobenzidine	<330	<330	<40,000	<20,000
Chrysene	60.4J	100J	65,000D	22,600D
bis(2-Ethylhexyl) phthalate	66.4J	<330	<40,000	<20,000
di-n-Octyl phthalate	<330	<330	<40,000	<20,000
Benzo(b)fluoranthene	32.5J	<330	38,400DJ	9560DJ
Benzo(k)fluoranthene	24.1J	<330	31,000DJ	10,800DJ
Benzo(a)pyrene	211J	<330	9960J	15,500DJ
Indeno(1,2,3-cd)pyrene	<330	<330	18,400J	<20,000
Dibenz(a,h)anthracene	<330	<330	4720J	<20,000
Benzo(g,h,i)perylene	<330	<330	17,700J	<20,000
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
2-Ethenyl-naphthalene	-	-	63,500JD	-
1,2-Dimethyl-naphthalene	-	-	44,600JD	-
Indene	-	-	-	23,700JD
Unknown PAHs	-	-	857,700JD	414,000JD
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>				
PCB-1016	-	<49	<600	<55
PCB-1221	-	<100	<1200	<110
PCB-1232	-	<49	<600	<55
PCB-1242	-	<49	<600	<55
PCB-1248	-	<49	<600	<55
PCB-1254	-	<49	<600	<55
PCB-1260	-	<49	<600	<55

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-01	PL-SED-02	PL-SED-03	PL-SED-04
<i>Organochlorine Pesticides (ug/kg - ppb)</i>				
alpha-BHC	-	<2.5	18J	4.2P
beta-BHC	-	<2.5	<31	<2.8
delta-BHC	-	<2.5	<31	2.9P
gamma-BHC (Lindane)	-	<2.5	<31	<2.8
Heptachlor	-	<2.5	10JBP	<2.8
Aldrin	-	0.70JBP	7.2JBP	<2.8
Heptachlor epoxide	-	0.87JBP	7.1JBP	1.0JBP
Endosulfan I	-	<2.5	<31	<2.8
Dieldrin	-	<4.9	<60	<5.5
4,4'-DDE	-	0.83JBP	8.6JBP	10B
Endrin	-	<4.9	9.3JBP	<5.5
Endosulfan II	-	<4.9	17JP	4.2JP
4,4'-DDD	-	0.63J	29JBP	7.4BP
Endosulfan sulfate	-	<4.9	43JB	31P
4,4'-DDT	-	<4.9	30JBP	23BP
Methoxychlor	-	<25	<310	<28
Endrin ketone	-	<4.9	<60	<5.5
Endrin aldehyde	-	<4.9	<60	35B
alpha-Chlordane	-	<2.5	20JP	<2.8
gamma-Chlordane	-	<2.5	19J	<2.8
Toxaphene	-	<250	<3100	<280

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-05	PL-SED-06	PL-SED-07	PL-SED-08
Grain Size Distribution				
% Gravel	-	0.5	0.0	0.0
% Sand	-	57.5	13.4	52.1
% Silt	-	33.4	74.5	41.7
% Clay	-	8.6	12.1	6.2
TOC (<i>mg/kg - ppm</i>)	-	51,000	77,000	39,000
Metals - Total (<i>mg/kg - ppm</i>)				
Aluminum	-	5580	5510	3340
Antimony	-	<9.3	<11.5	<6.4
Arsenic	-	7.1	11.0	4.7
Barium	-	42.7J	53.2J	25.0J
Beryllium	-	0.34J	0.50J	0.18J
Cadmium	-	<0.76	<0.93	<0.52
Calcium	-	38,700	45,400	55,000
Chromium	-	9.6	12.0	6.5
Cobalt	-	3.1J	4.7J	2.5J
Copper	-	17.3	23.0	9.2
Iron	-	11,100	12,600	7180
Lead	-	12.7	16.9	5.1
Magnesium	-	10,100	10,400	14,100
Manganese	-	305	376	231
Mercury	-	0.08J	0.10J	0.05J
Nickel	-	16.1J	17.7J	10.0J
Potassium	-	760J	759J	492J
Selenium	-	0.61J	0.68J	<0.29
Silver	-	<2.2	<2.7	<1.5
Sodium	-	128J	197J	104J
Thallium	-	1.9J	2.5J	<0.88
Vanadium	-	15.8J	15.7J	11.2J
Zinc	-	54.8	60.8	27.2
Volatile Organic Compounds (<i>ug/kg - ppb</i>)				
Chloromethane	<27	<26	<31	<17
Vinyl chloride	<27	<26	<31	<17
Bromomethane	<27	<26	<31	<17
Chloroethane	<27	<26	<31	<17
1,1-Dichloroethene	<27	<26	<31	<17
Carbon disulfide	<27	<26	<31	<17

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-05	PL-SED-06	PL-SED-07	PL-SED-08
<i>Volatile Organic Compounds (ug/kg - ppb)</i>				
Acetone	240	140	190	70
Methylene chloride	3J	<26	<31	<17
1,1-Dichloroethane	<27	<26	<31	<17
1,2-Dichloroethene (total)	<27	<26	<31	<17
2-Butanone	45	29	24J	10J
Chloroform	<27	<26	<31	<17
1,1,1-Trichloroethane	<27	<26	<31	<17
Carbon tetrachloride	<27	<26	<31	<17
Benzene	<27	<26	<31	<17
1,2-Dichloroethane	<27	<26	<31	<17
Trichloroethene	<27	<26	<31	<17
1,2-Dichloropropane	<27	<26	<31	<17
Bromodichloromethane	<27	<26	<31	<17
cis-1,3-Dichloropropene	<27	<26	<31	<17
4-Methyl-2-pentanone	<27	<26	<31	<17
Toluene	<27	<26	<31	<17
trans-1,3-Dichloropropene	<27	<26	<31	<17
1,1,2-Trichloroethane	<27	<26	<31	<17
Tetrachloroethene	<27	<26	<31	<17
2-Hexanone	<27	<26	<31	<17
Dibromochloromethane	<27	<26	<31	<17
Chlorobenzene	<27	<26	<31	<17
Ethyl benzene	<27	<26	<31	<17
Xylene (total)	<27	<26	<31	<17
Styrene	<27	<26	<31	<17
Bromoform	<27	<26	<31	<17
1,1,2,2-Tetrachloroethane	<27	<26	<31	<17
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
4-Octene, (E)-	-	-	-	-
1-ethyl-2-methyl-benzene	-	-	-	-
1,2,4-Trimethylbenzene	-	-	-	-
1,2,3-Trimethylbenzene	-	-	-	-
1-Ethenyl-3-methyl-benzene	-	-	-	-
1-Propenyl-benzene	-	-	-	-
Indene	-	-	-	-
1-Methyl-1H-indene	-	-	-	-
Naphthalene	-	-	-	-
Indane	-	-	-	-
1-Ethenyl-3,5-Dimethyl-benzene	-	-	-	-
2-Butenyl-benzene	-	-	-	-
1-Methylene-1H-indene	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-05	PL-SED-06	PL-SED-07	PL-SED-08
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
Phenol	<330	<330	<330	<330
bis(2-Chloroethyl) ether	<330	<330	<330	<330
2-Chlorophenol	<330	<330	<330	<330
1,3-Dichlorobenzene	<330	<330	<330	<330
1,4-Dichlorobenzene	<330	<330	<330	<330
1,2-Dichlorobenzene	<330	<330	<330	<330
2-Methylphenol	<330	<330	<330	<330
2,2'-oxybis-(1-Chloropropane)	<330	<330	<330	<330
4-Methylphenol	<330	<330	<330	<330
N-Nitroso-di-n-propylamine	<330	<330	<330	<330
Hexachloroethane	<330	<330	<330	<330
Nitrobenzene	<330	<330	<330	<330
Isophorone	<330	<330	<330	<330
2-Nitrophenol	<330	<330	<330	<330
2,4-Dimethylphenol	<330	<330	<330	<330
bis(2-Chloroethoxy) methane	<330	<330	<330	<330
2,4-Dichlorophenol	<330	<330	<330	<330
1,2,4-Trichlorobenzene	<330	<330	<330	<330
Naphthalene	83.0J	59.7J	179J	33.5J
4-Chloroaniline	<330	<330	<330	<330
Hexachlorobutadiene	<330	<330	<330	<330
4-Chloro-3-methylphenol	<330	<330	<330	<330
2-Methylnaphthalene	38.8J	29.0J	87.0J	12.3J
2,4,6-Trichlorophenol	<330	<330	<330	<330
2,4,5-Trichlorophenol	<800	<800	<800	<800
Hexachlorocyclopentadiene	<330	<330	<330	<330
2-Chloronaphthalene	<330	<330	<330	<330
2-Nitroaniline	<800	<800	<800	<800
Dimethyl phthalate	<330	<330	<330	<330
Acenaphthylene	24.2J	15.1J	50.3J	8.593J
2,6-Dinitrotoluene	<330	<330	<330	<330
3-Nitroaniline	<800	<800	<800	<800
Acenaphthene	19.4J	10.6J	30.2J	4.803J
2,4-Dinitrophenol	<800	<800	<800	<800
4-Nitrophenol	<800	<800	<800	<800
Dibenzofuran	13.0J	7.185J	<330	<330
2,4-Dinitrotoluene	<330	<330	<330	<330
Diethylphthalate	43.9JB	25.7JB	43.7JB	21.8JB
4-Chlorophenyl phenyl ether	<330	<330	<330	<330
Fluorene	36.1J	22.6J	60.8J	14.9J
4-Nitroaniline	<800	<800	<800	<800

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-05	PL-SED-06	PL-SED-07	PL-SED-08
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
4,6-Dinitro-2-methylphenol	<800	<800	<800	<800
N-Nitrosodiphenylamine*	<330	<330	<330	<330
4-Bromophenyl phenyl ether	<330	<330	<330	<330
Hexachlorobenzene	<330	<330	<330	<330
Pentachlorophenol	<800	<800	<800	<800
Phenanthrene	110J	63.6J	194J	47.0J
Anthracene	42.6J	26.6J	50.3J	15.9J
Carbazole	<330	<330	<330	<330
Di-n-butylphthalate	132J	288J	366	273J
Fluoranthene	91.8J	53.7J	187J	51.6J
Pyrene	98.6J	56.9J	177J	54.9J
Butyl benzyl phthalate	<330	<330	<330	<330
Benzo(a)anthracene	<330	25.2J	95.1J	24.8J
3,3'-Dichlorobenzidine	<330	<330	<330	<330
Chrysene	<330	32.0J	128J	30.8J
bis(2-Ethylhexyl) phthalate	36.6J	22.1J	50.2J	21.5J
di-n-Octyl phthalate	<330	<330	<330	<330
Benzo(b)fluoranthene	29.7J	<330	<330	<330
Benzo(k)fluoranthene	27.2J	<330	<330	<330
Benzo(a)pyrene	<330	<330	<330	<330
Indeno(1,2,3-cd)pyrene	25.6J	<330	<330	<330
Dibenz(a,h)anthracene	<330	<330	<330	<330
Benzo(g,h,i)perylene	<330	<330	<330	<330
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
2-Ethenyl-naphthalene	-	-	-	-
1,2-Dimethyl-naphthalene	-	-	-	-
Indene	-	-	-	-
Unknown PAHs	-	-	-	-
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>				
PCB-1016	-	<59	-	-
PCB-1221	-	<120	-	-
PCB-1232	-	<59	-	-
PCB-1242	-	<59	-	-
PCB-1248	-	<59	-	-
PCB-1254	-	<59	-	-
PCB-1260	-	<59	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-05	PL-SED-06	PL-SED-07	PL-SED-08
<i>Organochlorine Pesticides (ug/kg - ppb)</i>				
alpha-BHC	-	<3.0	-	-
beta-BHC	-	<3.0	-	-
delta-BHC	-	<3.0	-	-
gamma-BHC (Lindane)	-	<3.0	-	-
Heptachlor	-	<3.0	-	-
Aldrin	-	<3.0	-	-
Heptachlor epoxide	-	1.2J	-	-
Endosulfan I	-	<3.0	-	-
Dieldrin	-	<5.9	-	-
4,4'-DDE	-	<5.9	-	-
Endrin	-	<5.9	-	-
Endosulfan II	-	<5.9	-	-
4,4'-DDD	-	0.77JP	-	-
Endosulfan sulfate	-	<5.9	-	-
4,4'-DDT	-	<5.9	-	-
Methoxychlor	-	<30	-	-
Endrin ketone	-	0.57JBP	-	-
Endrin aldehyde	-	<5.9	-	-
alpha-Chlordane	-	0.64JP	-	-
gamma-Chlordane	-	<3.0	-	-
Toxaphene	-	<300	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-09	PL-SED-10	PL-SED-11	PL-SED-12
Grain Size Distribution				
% Gravel	2.8	10.0	1.8	0.0
% Sand	67.3	74.7	58.9	3.4
% Silt	25.3	10.3	31.4	74.8
% Clay	4.6	5.0	7.9	21.8
TOC (<i>mg/kg - ppm</i>)	54,000	36,000	68,200	72,200
Metals - Total (<i>mg/kg - ppm</i>)				
Aluminum	4380	4040	3900	9670
Antimony	<9.8	<5.0	<8.6	<11.7
Arsenic	8.1	10.9	6.9	8.7
Barium	51.8J	26.2J	41.1J	98.5J
Beryllium	0.21J	0.25J	0.30J	0.59J
Cadmium	<0.80	<0.41	<0.70	<0.95
Calcium	64,600	64,900	31,200	77,000
Chromium	8.2	8.1	7.9	18.5
Cobalt	2.9J	6.7J	3.5J	9.0J
Copper	14.6	17.7	14.9	36.0
Iron	9360	14,600	10,100	23,700
Lead	11.9	9.3	13.2	16.8
Magnesium	12,400	14,500	7220	26,100
Manganese	297	454	246	899
Mercury	0.08J	0.06J	0.06J	0.11J
Nickel	12.5J	16.9	11.8J	30.6
Potassium	561J	693J	484J	1060J
Selenium	0.52J	0.28J	1.3J	1.4J
Silver	<2.3	<1.2	<2.0	<2.7
Sodium	122J	127J	98.2J	170J
Thallium	<1.3	0.79J	<1.1	1.6J
Vanadium	11.5J	11.6J	12.0J	26.4J
Zinc	39.9	65.1	44.0	105
Volatile Organic Compounds (<i>ug/kg - ppb</i>)				
Chloromethane	<27	<13	<22	<150
Vinyl chloride	<27	<13	<22	<150
Bromomethane	<27	<13	<22	<150
Chloroethane	<27	<13	<22	<150
1,1-Dichloroethene	<27	<13	<22	<150
Carbon disulfide	<27	<13	<22	<150

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-09	PL-SED-10	PL-SED-11	PL-SED-12
<i>Volatile Organic Compounds (ug/kg - ppb)</i>				
Acetone	150	38	150	740
Methylene chloride	<27	4J	10J	42J
1,1-Dichloroethane	<27	<13	<22	<150
1,2-Dichloroethene (total)	<27	<13	<22	<150
2-Butanone	20J	6J	31	140J
Chloroform	<27	<13	<22	<150
1,1,1-Trichloroethane	<27	<13	<22	<150
Carbon tetrachloride	<27	<13	<22	<150
Benzene	<27	<13	<22	19J
1,2-Dichloroethane	<27	<13	<22	<150
Trichloroethene	<27	<13	<22	<150
1,2-Dichloropropane	<27	<13	<22	<150
Bromodichloromethane	<27	<13	<22	<150
cis-1,3-Dichloropropene	<27	<13	<22	<150
4-Methyl-2-pentanone	<27	<13	<22	<150
Toluene	<27	1J	<22	14J
trans-1,3-Dichloropropene	<27	<13	<22	<150
1,1,2-Trichloroethane	<27	<13	<22	<150
Tetrachloroethene	<27	<13	<22	<150
2-Hexanone	<27	<13	<22	<150
Dibromochloromethane	<27	<13	<22	<150
Chlorobenzene	<27	<13	<22	<150
Ethyl benzene	<27	0.8J	<22	<150
Xylene (total)	<27	3J	2J	<150
Styrene	<27	<13	<22	<150
Bromoform	<27	<13	<22	<150
1,1,2,2-Tetrachloroethane	<27	<13	<22	<150
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
4-Octene, (E)-	-	-	-	-
1-ethyl-2-methyl-benzene	-	-	-	-
1,2,4-Trimethylbenzene	-	-	-	-
1,2,3-Trimethylbenzene	-	-	-	-
1-Ethenyl-3-methyl-benzene	-	-	-	-
1-Propenyl-benzene	-	-	-	-
Indene	-	-	-	-
1-Methyl-1H-indene	-	-	-	-
Naphthalene	-	-	-	-
Indane	-	-	-	-
1-Ethenyl-3,5-Dimethyl-benzene	-	-	-	-
2-Butenyl-benzene	-	-	-	-
1-Methylene-1H-indene	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-09	PL-SED-10	PL-SED-11	PL-SED-12
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
Phenol	<330	<330	<330	<330
bis(2-Chloroethyl) ether	<330	<330	<330	<330
2-Chlorophenol	<330	<330	<330	<330
1,3-Dichlorobenzene	<330	<330	<330	<330
1,4-Dichlorobenzene	<330	<330	<330	<330
1,2-Dichlorobenzene	<330	<330	<330	<330
2-Methylphenol	<330	<330	<330	<330
2,2'-oxybis-(1-Chloropropane)	<330	<330	<330	<330
4-Methylphenol	<330	<330	<330	<330
N-Nitroso-di-n-propylamine	<330	<330	<330	<330
Hexachloroethane	<330	<330	<330	<330
Nitrobenzene	<330	<330	<330	<330
Isophorone	<330	<330	<330	<330
2-Nitrophenol	<330	<330	<330	<330
2,4-Dimethylphenol	<330	<330	<330	<330
bis(2-Chloroethoxy) methane	<330	<330	<330	<330
2,4-Dichlorophenol	<330	<330	<330	<330
1,2,4-Trichlorobenzene	<330	<330	<330	<330
Naphthalene	37.8J	51.4J	71.6J	112J
4-Chloroaniline	<330	<330	<330	<330
Hexachlorobutadiene	<330	<330	<330	<330
4-Chloro-3-methylphenol	<330	<330	<330	<330
2-Methylnaphthalene	17.6J	37.2J	28.7J	68.3J
2,4,6-Trichlorophenol	<330	<330	<330	<330
2,4,5-Trichlorophenol	<800	<800	<800	<800
Hexachlorocyclopentadiene	<330	<330	<330	<330
2-Chloronaphthalene	<330	<330	<330	<330
2-Nitroaniline	<800	<800	<800	<800
Dimethyl phthalate	<330	<330	<330	<330
Acenaphthylene	10.9J	26.5J	71.8J	73.1J
2,6-Dinitrotoluene	<330	<330	<330	<330
3-Nitroaniline	<800	<1700	<1700	<1700
Acenaphthene	7.869J	48.2J	31.5J	72.8J
2,4-Dinitrophenol	<800	<800	<800	<800
4-Nitrophenol	<800	<800	<800	<800
Dibenzofuran	<330	21.6J	<330	<330
2,4-Dinitrotoluene	<330	<330	<330	<330
Diethylphthalate	30.6JB	87.1JB	65.9JB	<330
4-Chlorophenyl phenyl ether	<330	<330	<330	<330
Fluorene	16.3J	59.5J	52.8J	71.9J
4-Nitroaniline	<800	<800	<800	<800

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-09	PL-SED-10	PL-SED-11	PL-SED-12
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
4,6-Dinitro-2-methylphenol	<800	<800	<800	<800
N-Nitrosodiphenylamine*	<330	<330	<330	<330
4-Bromophenyl phenyl ether	<330	<330	<330	<330
Hexachlorobenzene	<330	<330	<330	<330
Pentachlorophenol	<800	<800	<800	<800
Phenanthrene	40.9J	187J	206J	203J
Anthracene	17.9J	71.9J	71.0J	72.5J
Carbazole	<330	<330	<330	<330
Di-n-butylphthalate	209J	248J	259J	269J
Fluoranthene	60.2J	185J	359	331
Pyrene	56.0J	203J	464	406
Butyl benzyl phthalate	<330	19.4J	<330	290J
Benzo(a)anthracene	26.7J	77.6J	257J	204J
3,3'-Dichlorobenzidine	<330	<670	<670	<670
Chrysene	40.1J	105J	322J	277J
bis(2-Ethylhexyl) phthalate	38.6J	61.8J	67.6J	88.7J
di-n-Octyl phthalate	<330	<330	<330	<330
Benzo(b)fluoranthene	<330	47.0J	195J	184J
Benzo(k)fluoranthene	<330	42.6J	160J	155J
Benzo(a)pyrene	<330	74.0J	93.5J	198J
Indeno(1,2,3-cd)pyrene	<330	38.1J	128J	142J
Dibenz(a,h)anthracene	<330	<330	<330	<330
Benzo(g,h,i)perylene	<330	39.3J	130J	151J
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
2-Ethenyl-naphthalene	-	-	-	-
1,2-Dimethyl-naphthalene	-	-	-	-
Indene	-	-	-	-
Unknown PAHs	-	-	-	-
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>				
PCB-1016	-	-	-	-
PCB-1221	-	-	-	-
PCB-1232	-	-	-	-
PCB-1242	-	-	-	-
PCB-1248	-	-	-	-
PCB-1254	-	-	-	-
PCB-1260	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-09	PL-SED-10	PL-SED-11	PL-SED-12
<i>Organochlorine Pesticides (ug/kg - ppb)</i>				
alpha-BHC	-	-	-	-
beta-BHC	-	-	-	-
delta-BHC	-	-	-	-
gamma-BHC (Lindane)	-	-	-	-
Heptachlor	-	-	-	-
Aldrin	-	-	-	-
Heptachlor epoxide	-	-	-	-
Endosulfan I	-	-	-	-
Dieldrin	-	-	-	-
4,4'-DDE	-	-	-	-
Endrin	-	-	-	-
Endosulfan II	-	-	-	-
4,4'-DDD	-	-	-	-
Endosulfan sulfate	-	-	-	-
4,4'-DDT	-	-	-	-
Methoxychlor	-	-	-	-
Endrin ketone	-	-	-	-
Endrin aldehyde	-	-	-	-
alpha-Chlordane	-	-	-	-
gamma-Chlordane	-	-	-	-
Toxaphene	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-13	PL-SED-14	PL-SED-15 Dupl. of SED-14	PL-SED-16 Dupl. of SED-04
Grain Size Distribution				
% Gravel	0.0	0.0	0.0	2.9
% Sand	2.2	1.8	2.2	6.0
% Silt	73.5	72.3	72.8	58.5
% Clay	24.3	25.9	25.0	32.6
TOC (mg/kg - ppm)	-	66,000	68,000	54,300
Metals - Total (mg/kg - ppm)				
Aluminum	9490	6900	5740	11,200
Antimony	16.1J	<6.4	<7.4	8.8J
Arsenic	14.4	11.9	12.0	22.1
Barium	106J	61.9J	58.1J	103
Beryllium	0.56J	0.26J	0.32J	0.72J
Cadmium	<1.1	<0.52	<0.60	<0.58
Calcium	69,000	104,000	96,600	99,500
Chromium	18.7	15.0	11.8	20.7
Cobalt	8.4J	8.7J	6.6J	14.9J
Copper	39.7	28.7	27.1	46.6
Iron	22,400	20,300	18,800	35,000
Lead	24.6	14.5	17.6	25.2
Magnesium	23,000	36,800	33,900	32,800
Manganese	747	772	743	1000
Mercury	0.13J	0.07J	0.08J	0.09J
Nickel	27.9J	20.3	20.5	39.3
Potassium	1180J	1040J	783J	1380J
Selenium	1.6J	0.43J	0.51J	1.4J
Silver	<3.0	<1.5	<1.7	<1.7
Sodium	157J	166J	159J	166J
Thallium	<1.7	1.3J	<0.94	1.6J
Vanadium	26.5J	20.7	17.3J	30.0
Zinc	133	134	73.7	137
Volatile Organic Compounds (ug/kg - ppb)				
Chloromethane	<36	<18	<20	<22,600
Vinyl chloride	<36	<18	<20	<22,600
Bromomethane	<36	<18	<20	<22,600
Chloroethane	<36	<18	<20	<22,600
1,1-Dichloroethene	<36	<18	<20	<22,600
Carbon disulfide	<36	<18	<20	<22,600

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-13	PL-SED-14	PL-SED-15 Dupl. of SED-14	PL-SED-16 Dupl. of SED04
<i>Volatile Organic Compounds (ug/kg - ppb)</i>				
Acetone	480	140	130	15,000J
Methylene chloride	4J	2J	10J	1500J
1,1-Dichloroethane	<36	<18	<20	<22,600
1,2-Dichloroethene (total)	<36	<18	<20	<22,600
2-Butanone	26J	5J	24	<22,600
Chloroform	<36	<18	<20	<22,600
1,1,1-Trichloroethane	<36	<18	<20	<22,600
Carbon tetrachloride	<36	<18	<20	<22,600
Benzene	<36	<18	<20	1830J
1,2-Dichloroethane	<36	<18	<20	<22,600
Trichloroethene	<36	<18	<20	<22,600
1,2-Dichloropropane	<36	<18	<20	<22,600
Bromodichloromethane	<36	<18	<20	<22,600
cis-1,3-Dichloropropene	<36	<18	<20	<22,600
4-Methyl-2-pentanone	<36	<18	<20	<22,600
Toluene	<36	<18	<20	10,800J
trans-1,3-Dichloropropene	<36	<18	<20	<22,600
1,1,2-Trichloroethane	<36	<18	<20	<22,600
Tetrachloroethene	<36	<18	<20	<22,600
2-Hexanone	<36	<18	<20	<22,600
Dibromochloromethane	<36	<18	<20	<22,600
Chlorobenzene	<36	<18	<20	<22,600
Ethyl benzene	<36	<18	<20	66,200
Xylene (total)	<36	<18	2J	43,700
Styrene	<36	<18	<20	<22,600
Bromoform	<36	<18	<20	<22,600
1,1,2,2-Tetrachloroethane	<36	<18	<20	<22,600
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
4-Octene, (E)-	-	-	-	-
1-ethyl-2-methyl-benzene	-	-	-	85,900J
1,2,4-Trimethylbenzene	-	-	-	-
1,2,3-Trimethylbenzene	-	-	-	28,700J
1-Ethenyl-3-methyl-benzene	-	-	-	-
1-Propenyl-benzene	-	-	-	-
Indene	-	-	-	74,000J
1-Methyl-1H-indene	-	-	-	29,700J
Naphthalene	-	-	-	239,000J
Indane	-	-	-	97,200J
1-Ethenyl-3,5-Dimethyl-benzene	-	-	-	12,700J
1-Methyl-naphthalene	-	-	-	15,600J
Benzene (1-Methyl-2-cyclopr)	-	-	-	24,600J

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-13	PL-SED-14	PL-SED-15 Dupl. of SED-14	PL-SED-16 Dupl. of SED04
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
Phenol	<330	<330	<330	<10,000
bis(2-Chloroethyl) ether	<330	<330	<330	<10,000
2-Chlorophenol	<330	<330	<330	<10,000
1,3-Dichlorobenzene	<330	<330	<330	<10,000
1,4-Dichlorobenzene	<330	<330	<330	<10,000
1,2-Dichlorobenzene	<330	<330	<330	<10,000
2-Methylphenol	<330	<330	<330	<10,000
2,2'-oxybis-(1-Chloropropane)	<330	<330	<330	<10,000
4-Methylphenol	<330	<330	<330	<10,000
N-Nitroso-di-n-propylamine	<330	<330	<330	<10,000
Hexachloroethane	<330	<330	<330	<10,000
Nitrobenzene	<330	<330	<330	<10,000
Isophorone	<330	<330	<330	<10,000
2-Nitrophenol	<330	<330	<330	<10,000
2,4-Dimethylphenol	<330	<330	<330	<10,000
bis(2-Chloroethoxy) methane	<330	<330	<330	<10,000
2,4-Dichlorophenol	<330	<330	<330	<10,000
1,2,4-Trichlorobenzene	<330	<330	<330	<10,000
Naphthalene	125J	68.5J	106J	186,000E
4-Chloroaniline	<330	<330	<330	<10,000
Hexachlorobutadiene	<330	<330	<330	<10,000
4-Chloro-3-methylphenol	<330	<330	<330	<10,000
2-Methylnaphthalene	58.3J	46.9J	56.9J	70,400
2,4,6-Trichlorophenol	<330	<330	<330	<10,000
2,4,5-Trichlorophenol	<800	<800	<800	<25,000
Hexachlorocyclopentadiene	<330	<330	<330	<10,000
2-Chloronaphthalene	<330	<330	<330	<10,000
2-Nitroaniline	<800	<800	<800	<25,000
Dimethyl phthalate	<330	<330	<330	<10,000
Acenaphthylene	61.8J	24.6J	33.5J	8370J
2,6-Dinitrotoluene	<330	<330	<330	<10,000
3-Nitroaniline	<1700	<1700	<1700	<25,000
Acenaphthene	52.8J	65.1J	63.2J	50,800
2,4-Dinitrophenol	<800	<800	<800	<25,000
4-Nitrophenol	<800	<800	<800	<25,000
Dibenzofuran	<330	<330	17.4J	7880J
2,4-Dinitrotoluene	<330	<330	<330	<10,000
Diethylphthalate	76.0JB	101JB	75.4JB	<10,000
4-Chlorophenyl phenyl ether	<330	<330	<330	<10,000
Fluorene	75.9J	66.6J	57.8J	30,300
4-Nitroaniline	<800	<800	<800	<25,000

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-13	PL-SED-14	PL-SED-15 Dupl. of SED-14	PL-SED-16 Dupl. of SED04
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>				
4,6-Dinitro-2-methylphenol	<800	<800	<800	<25,000
N-Nitrosodiphenylamine*	<330	<330	<330	<10,000
4-Bromophenyl phenyl ether	<330	<330	<330	<10,000
Hexachlorobenzene	<330	<330	<330	<10,000
Pentachlorophenol	<800	<800	<800	8850J
Phenanthrene	215J	157J	174J	104,000
Anthracene	67.8J	53.8J	45.2J	28,500
Carbazole	<330	<330	<330	<10,000
Di-n-butylphthalate	<330	197J	126J	<10,000
Fluoranthene	293J	158J	192J	33,400
Pyrene	359	150J	194J	51,400
Butyl benzyl phthalate	<330	<330	<330	<10,000
Benzo(a)anthracene	187J	88.6J	108J	25,700
3,3'-Dichlorobenzidine	<670	<670	<670	<10,000
Chrysene	265J	124J	152J	23,600
bis(2-Ethylhexyl) phthalate	<330	58.4J	47.3J	<10,000
di-n-Octyl phthalate	<330	<330	<330	<10,000
Benzo(b)fluoranthene	160J	65.9J	89.6J	9330J
Benzo(k)fluoranthene	137J	65.8J	81.3J	9980J
Benzo(a)pyrene	158J	80.9J	81.5J	5730J
Indeno(1,2,3-cd)pyrene	123J	65.1J	82.8J	9000J
Dibenz(a,h)anthracene	<330	<330	<330	<10,000
Benzo(g,h,i)perylene	135J	60.6J	67.2J	8260J
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>				
2-Ethenyl-naphthalene	-	-	-	-
1,2-Dimethyl-naphthalene	-	-	-	-
Indene	-	-	-	27,300J
Unknown PAHs	-	-	-	336,400J
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>				
PCB-1016	-	-	-	-
PCB-1221	-	-	-	-
PCB-1232	-	-	-	-
PCB-1242	-	-	-	-
PCB-1248	-	-	-	-
PCB-1254	-	-	-	-
PCB-1260	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT			
	PL-SED-13	PL-SED-14	PL-SED-15 Dupl. of SED-14	PL-SED-16 Dupl. of SED04
<i>Organochlorine Pesticides (ug/kg - ppb)</i>				
alpha-BHC	-	-	-	-
beta-BHC	-	-	-	-
delta-BHC	-	-	-	-
gamma-BHC (Lindane)	-	-	-	-
Heptachlor	-	-	-	-
Aldrin	-	-	-	-
Heptachlor epoxide	-	-	-	-
Endosulfan I	-	-	-	-
Dieldrin	-	-	-	-
4,4'-DDE	-	-	-	-
Endrin	-	-	-	-
Endosulfan II	-	-	-	-
4,4'-DDD	-	-	-	-
Endosulfan sulfate	-	-	-	-
4,4'-DDT	-	-	-	-
Methoxychlor	-	-	-	-
Endrin ketone	-	-	-	-
Endrin aldehyde	-	-	-	-
alpha-Chlordane	-	-	-	-
gamma-Chlordane	-	-	-	-
Toxaphene	-	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT		
	PL-SED-18	PL-SED-19	PL-SRCE-03
Grain Size Distribution			
% Gravel	-	-	-
% Sand	-	-	-
% Silt	-	-	-
% Clay	-	-	-
TOC (<i>mg/kg - ppm</i>)	-	-	-
Metals - Total (<i>mg/kg - ppm</i>)			
Aluminum	-	-	4860
Antimony	-	-	<5.1
Arsenic	-	-	14.8
Barium	-	-	38.2J
Beryllium	-	-	0.19J
Cadmium	-	-	<0.42
Calcium	-	-	67,700
Chromium	-	-	8.8
Cobalt	-	-	7.7J
Copper	-	-	19.2
Iron	-	-	15,900
Lead	-	-	22.3
Magnesium	-	-	18,300
Manganese	-	-	437
Mercury	-	-	0.05J
Nickel	-	-	19.6
Potassium	-	-	807J
Selenium	-	-	0.84J
Silver	-	-	<1.2
Sodium	-	-	111J
Thallium	-	-	1.9J
Vanadium	-	-	13.4J
Zinc	-	-	75.8
Volatile Organic Compounds (<i>ug/kg - ppb</i>)			
Chloromethane	<13	<24	<37,000
Vinyl chloride	<13	<24	<37,000
Bromomethane	<13	<24	<37,000
Chloroethane	<13	<24	<37,000
1,1-Dichloroethene	<13	<24	<37,000
Carbon disulfide	<13	<24	<37,000

Appendix Table 1. Continued.

Parameter	SEDIMENT		
	PL-SED-18	PL-SED-19	PL-SRCE-03
<i>Volatile Organic Compounds (ug/kg - ppb)</i>			
Acetone	21	450	<37,000
Methylene chloride	7J	10J	<37,000
1,1-Dichloroethane	<13	<24	<37,000
1,2-Dichloroethene (total)	<13	<24	<37,000
2-Butanone	<13	92	<37,000
Chloroform	<13	<24	<37,000
1,1,1-Trichloroethane	<13	<24	<37,000
Carbon tetrachloride	<13	<24	<37,000
Benzene	<13	<24	63,000
1,2-Dichloroethane	<13	<24	<37,000
Trichloroethene	<13	<24	<37,000
1,2-Dichloropropane	<13	<24	<37,000
Bromodichloromethane	<13	<24	<37,000
cis-1,3-Dichloropropene	<13	<24	<37,000
4-Methyl-2-pentanone	<13	<24	<37,000
Toluene	<13	<24	370,000
trans-1,3-Dichloropropene	<13	<24	<37,000
1,1,2-Trichloroethane	<13	<24	<37,000
Tetrachloroethene	<13	<24	<37,000
2-Hexanone	<13	<24	<37,000
Dibromochloromethane	<13	<24	<37,000
Chlorobenzene	<13	<24	<37,000
Ethyl benzene	<13	<24	730,000
Xylene (total)	4J	4J	710,000
Styrene	<13	<24	130,000
Bromoform	<13	<24	<37,000
1,1,2,2-Tetrachloroethane	<13	<24	<37,000
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>			
1-Ethenyl-4-methyl-benzene	-	-	210,116J
1-ethyl-2-methyl-benzene	-	-	195,328J
1,2,4-Trimethylbenzene	-	-	-
1,2,3-Trimethylbenzene	-	-	316,172J
1-Ethenyl-3-methyl-benzene	-	-	525,505J
Azulene	-	-	2,767,725J
Indene	-	-	1,322,850J
1-Methyl-1H-indene	-	-	212,675J
Naphthalene	-	-	-
Indane	-	-	-
1-Ethenyl-3,5-Dimethyl-benzene	-	-	-
2-Methyl-naphthalene	-	-	156,824J
Benzene (1-Methyl-2-cyclopr)	-	-	-

Appendix Table 1. Continued.

Parameter	SEDIMENT		
	PL-SED-18	PL-SED-19	PL-SRCE-03
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>			
Phenol	<330	<330	<100,000
bis(2-Chloroethyl) ether	<330	<330	<100,000
2-Chlorophenol	<330	<330	<100,000
1,3-Dichlorobenzene	<330	<330	<100,000
1,4-Dichlorobenzene	<330	<330	<100,000
1,2-Dichlorobenzene	<330	<330	<100,000
2-Methylphenol	<330	<330	<100,000
2,2'-oxybis-(1-Chloropropane)	<330	<330	<100,000
4-Methylphenol	<330	<330	<100,000
N-Nitroso-di-n-propylamine	<330	<330	<100,000
Hexachloroethane	<330	<330	<100,000
Nitrobenzene	<330	<330	<100,000
Isophorone	<330	<330	<100,000
2-Nitrophenol	<330	<330	<100,000
2,4-Dimethylphenol	<330	<330	<100,000
bis(2-Chloroethoxy) methane	<330	<330	<100,000
2,4-Dichlorophenol	<330	<330	<100,000
1,2,4-Trichlorobenzene	<330	<330	<100,000
Naphthalene	21.9J	200J	742,000
4-Chloroaniline	<330	<330	<100,000
Hexachlorobutadiene	<330	<330	<100,000
4-Chloro-3-methylphenol	<330	<330	<100,000
2-Methylnaphthalene	9.656J	349	294,000
2,4,6-Trichlorophenol	<330	<330	<100,000
2,4,5-Trichlorophenol	<800	<800	<250,000
Hexachlorocyclopentadiene	<330	<330	<100,000
2-Chloronaphthalene	<330	<330	<100,000
2-Nitroaniline	<800	<800	<250,000
Dimethyl phthalate	<330	<330	<100,000
Acenaphthylene	13.5J	85.4J	132,000
2,6-Dinitrotoluene	<330	<330	<100,000
3-Nitroaniline	<1700	<1700	<250,000
Acenaphthene	<330	<330	106,000
2,4-Dinitrophenol	<800	<800	<250,000
4-Nitrophenol	<800	<800	<250,000
Dibenzofuran	<330	406	33,500J
2,4-Dinitrotoluene	<330	<330	<100,000
Diethylphthalate	59.6J	<330	<100,000
4-Chlorophenyl phenyl ether	<330	<330	<100,000
Fluorene	23.5J	520	119,000
4-Nitroaniline	<800	<800	<250,000

Appendix Table 1. Continued.

Parameter	SEDIMENT		
	PL-SED-18	PL-SED-19	PL-SRCE-03
<i>Semivolatile Organic Compounds (ug/kg - ppb)</i>			
4,6-Dinitro-2-methylphenol	<800	<800	<250,000
N-Nitrosodiphenylamine*	<330	<330	<100,000
4-Bromophenyl phenyl ether	<330	<330	<250,000
Hexachlorobenzene	<330	<330	<100,000
Pentachlorophenol	<800	<800	<250,000
Phenanthrene	92.2J	1,000	421,000
Anthracene	17.1J	138J	118,000
Carbazole	<330	134J	12,400J
Di-n-butylphthalate	372	110J	<100,000
Fluoranthene	149J	819	143,000
Pyrene	132J	762	220,000
Butyl benzyl phthalate	<330	<330	<100,000
Benzo(a)anthracene	68.4J	449	92,500J
3,3'-Dichlorobenzidine	<670	<670	<100,000
Chrysene	95.4J	532	81,200J
bis(2-Ethylhexyl) phthalate	41.6J	64.6J	<100,000
di-n-Octyl phthalate	<330	<330	<100,000
Benzo(b)fluoranthene	87.4J	431	39,500J
Benzo(k)fluoranthene	59.0J	347	27,400J
Benzo(a)pyrene	134J	258J	58,400J
Indeno(1,2,3-cd)pyrene	59.4J	279J	26,500J
Dibenz(a,h)anthracene	<330	<330	13,200J
Benzo(g,h,i)perylene	52.6J	217J	28,500J
<i>Tentatively Identified Compounds (TICs, ug/kg - ppb)</i>			
2-Ethenyl-naphthalene	-	-	-
1,2-Dimethyl-naphthalene	-	-	-
Indene	-	-	170,000J
Unknown PAHs	-	1449J	1,584,200J
<i>Polychlorinated Biphenyls (PCBs) (ug/kg - ppb)</i>			
PCB-1016	-	-	<930
PCB-1221	-	-	<1900
PCB-1232	-	-	<930
PCB-1242	-	-	<930
PCB-1248	-	-	<930
PCB-1254	-	-	<930
PCB-1260	-	-	<930

Appendix Table 1. Continued.

Parameter	SEDIMENT		
	PL-SED-18	PL-SED-19	PL-SRCE-03
<i>Organochlorine Pesticides (ug/kg - ppb)</i>			
alpha-BHC	-	-	24J
beta-BHC	-	-	<48
delta-BHC	-	-	<48
gamma-BHC (Lindane)	-	-	<48
Heptachlor	-	-	11JP
Aldrin	-	-	17JP
Heptachlor epoxide	-	-	<48
Endosulfan I	-	-	<48
Dieldrin	-	-	<93
4,4'-DDE	-	-	17JP
Endrin	-	-	15JP
Endosulfan II	-	-	22JP
4,4'-DDD	-	-	40J
Endosulfan sulfate	-	-	74J
4,4'-DDT	-	-	54JP
Methoxychlor	-	-	220JP
Endrin ketone	-	-	<93
Endrin aldehyde	-	-	<93
alpha-Chlordane	-	-	44J
gamma-Chlordane	-	-	<48
Toxaphene	-	-	<4800

* Cannot be distinguished from Diphenylamine.

B- Compound was found in the blank as well as the sample.

E - Compound identified whose concentration exceeds the calibrated range of the instrument.

J - Indicates an estimated value (a value less than the contract required quantitation limit but greater than the method detection limit).

D- Compound quantified when a sample has been diluted and reanalyzed.

P- Greater than 25% difference between the two GC columns; reported the lowest column reading.

Appendix Table 2. Waste material sample results, Pioneer Lake, 1995.

SAMPLE NUMBER		PLSRCE01	PLSRCE02
DATE SAMPLE COLLECTED		04/18/95	04/18/95
TIME SAMPLE COLLECTED		10:45	12:05
SAMPLE DEPTH		0-1.5'	0-1'
QA/QC DESCRIPTION (if applicable)			
COMPOUND DETECTED (ug/kg)			
VOLATILE ORGANIC COMPOUNDS	CRQL		
chloromethane	10 ug/kg	47,000U	16,000U
bromomethane	10 ug/kg	47,000U	16,000U
vinyl chloride	10 ug/kg	47,000U	16,000U
chloroethane	10 ug/kg	47,000U	16,000U
methylene chloride	10 ug/kg	4,000J	16,000U
acetone	10 ug/kg	32000J	9,600J
carbon disulfide	10 ug/kg	47,000U	16,000U
1,1-dichloroethene	10 ug/kg	47,000U	16,000U
1,1-dichloroethane	10 ug/kg	47,000U	16,000U
1,2-dichloroethene (total)	10 ug/kg	47,000U	16,000U
chloroform	10 ug/kg	47,000U	16,000U
1,2-dichloroethane	10 ug/kg	30,000J	16,000U
2-butanone	10 ug/kg	3,900J	16,000U
1,1,1-trichloroethane	10 ug/kg	47,000U	16,000U
carbon tetrachloride	10 ug/kg	47,000U	16,000U
bromodichloromethane	10 ug/kg	47,000U	16,000U
1,2-dichloropropane	10 ug/kg	47,000U	16,000U
cis-1,3-dichloropropene	10 ug/kg	47,000U	16,000U
trichloroethene	10 ug/kg	47,000U	16,000U
1,1,2-trichloroethane	10 ug/kg	18,000J	16,000U
benzene	10 ug/kg	1,700,000D	16,000U
trans-1,3-dichloropropene	10 ug/kg	43,000J	16,000U
bromoform	10 ug/kg	47,000U	16,000U
4-methyl-2-pentanone	10 ug/kg	75,000	16,000U
2-hexanone	10 ug/kg	47,000U	16,000U
tetrachloroethene	10 ug/kg	47,000U	16,000U
1,1,2,2-tetrachloroethane	10 ug/kg	17,000J	16,000U
toluene	10 ug/kg	2,500,000D	1,200J
Chlorodibromomethane	10 ug/kg	47,000U	16,000U
chlorobenzene	10 ug/kg	47,000U	16,000U
ethyl benzene	10 ug/kg	380,000	4,700J
styrene	10 ug/kg	2,100,000D	16,000U
xylene (total)	10 ug/kg	2,500,000D	6,600J
SEMI-VOLATILE ORGANIC COMPOUNDS	CRQL		
phenol	330 ug/kg	1,000,000U	1,000,000U
bis(2-chloroethyl)ether	330 ug/kg	1,000,000U	1,000,000U
2-chlorophenol	330 ug/kg	1,000,000U	1,000,000U
1,3-dichlorobenzene	330 ug/kg	1,000,000U	1,000,000U
1,4-dichlorobenzene	330 ug/kg	1,000,000U	1,000,000U
1,2-dichlorobenzene	330 ug/kg	1,000,000U	1,000,000U
2-methylphenol	330 ug/kg	1,000,000U	1,000,000U
2,2-oxybis(1-chloropropane)	330 ug/kg	1,000,000U	1,000,000U

Appendix Table 2. Waste material sample results, Pioneer Lake, 1995.

SAMPLE NUMBER		PLSRCE01	PLSRCE02
DATE SAMPLE COLLECTED		04/18/95	04/18/95
TIME SAMPLE COLLECTED		10:45	12:05
SAMPLE DEPTH		0-1.5'	0-1'
QA/QC DESCRIPTION (if applicable)			
COMPOUND DETECTED (ug/kg)			
SEMI-VOLATILE ORGANIC COMPOUNDS	CRQL		
4-methylphenol	330 ug/kg	1,000,000U	142,000J
n-nitroso-di-n-dipropylamine	330 ug/kg	1,000,000U	1,000,000U
hexachloroethane	330 ug/kg	1,000,000U	1,000,000U
nitrobenzene	330 ug/kg	1,000,000U	1,000,000U
isophorone	330 ug/kg	1,000,000U	1,000,000U
2-nitrophenol	330 ug/kg	1,000,000U	1,000,000U
2,4-dimethylphenol	330 ug/kg	1,000,000U	1,000,000U
bis(2-chloroethoxy)methane	330 ug/kg	1,000,000U	1,000,000U
2,4-dichlorophenol	330 ug/kg	1,000,000U	1,000,000U
1,2,4-trichlorobenzene	330 ug/kg	1,000,000U	1,000,000U
naphthalene	330 ug/kg	2450000D	2,560,000
4-chloroaniline	330 ug/kg	1,000,000U	1,000,000U
hexachlorobutadiene	330 ug/kg	1,000,000U	1,000,000U
4-chloro-3-methylphenol	330 ug/kg	1,000,000U	1,000,000U
2-methylnaphthalene	330 ug/kg	8,600,000	1,530,000
hexachlorocyclopentadiene	330 ug/kg	1,000,000U	1,000,000U
2,4,6-trichlorophenol	330 ug/kg	1,000,000U	1,000,000U
2,4,5-trichlorophenol	800 ug/kg	2,500,000U	2,500,000U
2-chloronaphthalene	330 ug/kg	1,000,000U	1,000,000U
2-nitroaniline	800 ug/kg	2,500,000U	2,500,000U
dimethylphthalate	330 ug/kg	1,000,000U	1,000,000U
acenaphthylene	330 ug/kg	6,370,000	174,000J
2,6-dinitrotoluene	330 ug/kg	1,000,000U	1,000,000U
3-nitroaniline	330 ug/kg	1,000,000U	1,000,000U
acenaphthene	330 ug/kg	862,000JB	1,580,000B
2,4-dinitrophenol	800 ug/kg	2,500,000U	2,500,000U
4-nitrophenol	800 ug/kg	2,500,000U	2500000U
dibenzofuran	330 ug/kg	1,100,000	1,540,000
2,4-dinitrotoluene	330 ug/kg	1,000,000U	1,000,000U
diethylphthalate	330 ug/kg	1,000,000U	1,000,000U
4-chlorophenyl-phenyl ether	330 ug/kg	1,000,000U	1,000,000U
fluorene	330 ug/kg	4,180,000	1,970,000
4-nitroaniline	800 ug/kg	2,500,000U	2,500,000U
4,6-dinitro-2-methylphenol	800 ug/kg	2,500,000U	2,500,000U
n-nitrosodiphenylamine	330 ug/kg	1,000,000U	1,000,000U
4-bromophenyl-phenyl ether	330 ug/kg	1,000,000U	1,000,000U
hexachlorobenzene	330 ug/kg	1,000,000U	1,000,000U
pentachlorophenol	800 ug/kg	2,500,000U	2500000U
phenanthrene	330 ug/kg	16,000,000D	5,950,000
anthracene	330 ug/kg	3,730,000	6,090,000
carbazole	330 ug/kg	1,000,000U	995,000
di-n-butylphthalate	330 ug/kg	1,000,000U	1,000,000U
fluoranthene	330 ug/kg	4,350,000	3,900,000
pyrene	330 ug/kg	7,110,000	3,350,000

Appendix Table 2. Waste material sample results, Pioneer Lake, 1995.

SAMPLE NUMBER		PLSRCE01	PLSRCE02
DATE SAMPLE COLLECTED		04/18/95	04/18/95
TIME SAMPLE COLLECTED		10:45	12:05
SAMPLE DEPTH		0-1.5'	0-1'
QA/QC DESCRIPTION (if applicable)			
COMPOUND DETECTED (ug/kg)			
SEMI-VOLATILE ORGANIC COMPOUNDS			
	CRQL		
butylbenzylphthalate	330 ug/kg	1,000,000U	1,000,000U
3,3-dichlorobenzidine	330 ug/kg	1,000,000U	1,000,000U
benzo(a)anthracene	330 ug/kg	3,350,000	1,700,000
chrysene	330 ug/kg	3,140,000	1,860,000
bis(2-ethylhexyl)phthalate	330 ug/kg	1,000,000U	1,000,000U
di-n-octylphthalate	330 ug/kg	1,000,000U	1,000,000U
benzo(b)fluoranthene	330 ug/kg	1,520,000	1,420,000
benzo(k)fluoranthene	330 ug/kg	1,250,000	1,200,000
benzo(a)pyrene	330 ug/kg	2,220,000	1,640,000
indeno(1,2,3-cd)pyrene	330 ug/kg	1,000,000U	1,000,000U
dibenzo(a,h)anthracene	330 ug/kg	1,000,000U	245,000J
benzo(g,h,i)perylene	330 ug/kg	1,000,000U	456,000J
PESTICIDES/PCBs			
	CRQL		
alpha-BHC	1.7 ug/kg	640	220U
beta-BHC	1.7 ug/kg	630U	220U
delta-BHC	1.7 ug/kg	440JP	220U
gamma-BHC (Lindane)	1.7 ug/kg	200JP	220U
heptachlor	1.7 ug/kg	630U	220U
aldrin	1.7 ug/kg	630U	77JP
heptachlor epoxide	1.7 ug/kg	520JP	66JP
endosulfan I	1.7 ug/kg	630U	220U
dieldrin	3.3 ug/kg	1,200U	430U
4,4-DDE	3.3 ug/kg	1,200U	190JP
Endrin	3.3 ug/kg	1,800P	430U
Endosulfan II	3.3 ug/kg	300JP	430U
4,4-DDD	3.3 ug/kg	130JP	69J
Endosulfan sulfate	3.3 ug/kg	1,200U	89JP
4,4-DDT	3.3 ug/kg	3,700P	430U
methoxychlor	17.0 ug/kg	13,000P	220U
endrin ketone	3.3 ug/kg	1,200U	200JP
endrin aldehyde	3.3 ug/kg	7,900	430U
alpha-chlordane	1.7 ug/kg	630U	220U
gamma-chlordane	1.7 ug/kg	630U	81JP
toxaphene	170 ug/kg	63,000U	22,000U
rochlor-1016	33 ug/kg	12,000U	4,300U
rochlor-1221	33 ug/kg	25,000U	8,700U
rochlor-1232	67 ug/kg	12,000U	4,300U
rochlor-1242	33 ug/kg	12,000U	4,300U
rochlor-1248	33 ug/kg	12,000U	4,300U
rochlor-1254	33 ug/kg	12,000U	4,300U
rochlor-1260	33 ug/kg	12,000U	4,300U

Appendix Table 2. Waste material sample results, Pioneer Lake, 1995.

SAMPLE NUMBER		PLSRCE01	PLSRCE02
DATE SAMPLE COLLECTED		04/18/95	04/18/95
TIME SAMPLE COLLECTED		10:45	12:05
SAMPLE DEPTH		0-1.5'	0-1'
QA/QC DESCRIPTION (if applicable)			
ANALYTE DETECTED (mg/kg)			
TAL METALS/CYANIDE	CRDL		
aluminum	40 mg/kg	293	8,580
antimony	12 mg/kg	6.7U	4.6U
arsenic	2 mg/kg	7	5
barium	40 mg/kg	32.7J	54
beryllium	1 mg/kg	0.11J	0.40J
cadmium	1 mg/kg	2	0.37U
calcium	1000 mg/kg	5,320	10,700
chromium	2 mg/kg	1.6J	15
cobalt	10 mg/kg	0.94U	6.3J
copper	5 mg/kg	23	22
iron	20 mg/kg	3,030	14,800
lead	0.6 mg/kg	880	15
magnesium	1000 mg/kg	925J	3,750
manganese	3 mg/kg	29	214
mercury	0.1 mg/kg	0	0.03U
nickel	8 mg/kg	2.8J	21
potassium	1000 mg/kg	104J	947J
selenium	1 mg/kg	2	0.22J
silver	2 mg/kg	1.6U	1.1U
sodium	1000 mg/kg	116J	115J
thallium	2 mg/kg	1.9J	1.0J
vanadium	10 mg/kg	1.1J	43
zinc	4 mg/kg	127	111

DATA QUALIFIERS

- U Indicates the compound was analyzed for but not detected.
- J Indicates an estimated value.
- P Indicates there is a greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported.
- B Compound is found in the associated blank as well as the sample.
- D This flag indicates all compounds identified in an analysis at a secondary dilution factor.

Appendix Table 3. Fish species collected from Pioneer Lake during April
1995.

RM 0.20 is located along the north shore

RM 0.10 is located along the south shore

Species List

River Code: 04-421	Stream: Pioneer Lake	Sample Date: 1995
River Mile: 0.20	Basin: Maumee River	Date Range: 04/19/95
Data Source: 01	Time Fished: 1842 sec Drain Area: 200.0 sq mi	
Purpose:	Dist Fished: 0.53 km No of Passes: 1	Sampler Type: A

Species Name / Stage / ODNR Status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
GIZZARD SHAD (C)		O	M		2	3.77	1.72	0.53	0.34	140.50
COMMON CARP (C)	G	O	M	T	22	41.51	18.97	120.90	77.47	2,912.50
SPOTFIN SHINER (C)	N	I	M		2	3.77	1.72	0.03	0.02	9.00
BLUNTNOSE MINNOW (C)	N	O	C	T	1	1.89	0.86	0.00	0.00	1.00
LARGEMOUTH BASS (A)	F	C	C		18	33.96	15.52	30.89	19.80	909.67
LARGEMOUTH BASS (B)	F	C	C		8	15.09	6.90	0.16	0.10	10.25
WARMOUTH SF (C)	S	C	C		2	3.77	1.72	0.11	0.07	29.00
BLUEGILL SUNFISH (C)	S	I	C	P	49	92.45	42.24	2.62	1.68	28.28
PUMPKINSEED SUNFISH (C)	S	I	C	P	6	11.32	5.17	0.69	0.44	60.67
YELLOW PERCH (C)			M		6	11.32	5.17	0.13	0.09	11.83
<i>Mile Total</i>					116	218.87		156.06		
<i>Number of Species</i>					9					
<i>Number of Hybrids</i>					0					

Species List

River Code: 04-421	Stream: Pioneer Lake	Sample Date: 1995
River Mile: 0.10	Basin: Maumee River	Date Range: 04/19/95
Data Source: 01	Time Fished: 2050 sec Drain Area: 200.0 sq mi	
Purpose:	Dist Fished: 0.48 km No of Passes: 1	Sampler Type: A

Species Name / Stage / ODNR Status	IBI	Feed	Breed		# of	Relative	% by	Relative	% by	Ave(gm)
	Grp	Grp	Grp	Tol	Fish	Number	Number	Weight	Weight	Weight
WHITE SUCKER (C)	W	O	S	T	1	2.08	0.75	2.81	2.04	1,350.00
COMMON CARP (C)	G	O	M	T	17	35.42	12.78	117.95	85.60	3,330.36
BLUNTNOSE MINNOW (C)	N	O	C	T	19	39.58	14.29	0.13	0.09	3.28
LARGEMOUTH BASS (A)	F	C	C		32	66.67	24.06	14.76	10.71	221.40
LARGEMOUTH BASS (B)	F	C	C		16	33.33	12.03	0.45	0.33	13.63
WARMOUTH SF (C)	S	C	C		1	2.08	0.75	0.02	0.02	10.00
BLUEGILL SUNFISH (C)	S	I	C	P	33	68.75	24.81	0.93	0.67	13.45
PUMPKINSEED SUNFISH (C)	S	I	C	P	6	12.50	4.51	0.26	0.19	20.67
YELLOW PERCH (C)			M		8	16.67	6.02	0.48	0.35	28.80
<i>Mile Total</i>					133	277.08		137.79		
<i>Number of Species</i>					8					
<i>Number of Hybrids</i>					0					