Assessment of Sediment Quality for the Peoria River Front Environmental Restoration Project

Addendum

to

Assessment of Sediment Quality in Peoria Lake: Results from the Chemical Analysis of Sediment Core Samples Collected in 1998, 1999, and 2000

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Purpose

There is considerable interest in the sediment quality near RM 165 in Peoria Lake. Dredging took place there in the summer of 2000 to maintain access to Spindler Marina. This is also an area in the lake where large-scale dredging projects are proposed. Sediment samples were collected in 1999 and 2000 to evaluate sediment quality. Samples of the sediment that was dredged in 2000 was sampled from the sediment storage area in 2001. The sediment samples were analyzed by a variety of techniques and laboratories.

The purpose of this report is to provide data on the concentrations of a large number of organic and inorganic analytes in sediments near River Mile 165 from Peoria Lake. The chemical analyses were conducted at ISGS, the IEPA, and two outside contract laboratories. The report contains new chemical results not discussed in Cahill 2001.

Sediment Quality Results

Results from Peoria Lake Sediment Vibra Core Collected near RM 165 in November 1998

The core identification, date collected, approximate river mile, latitude, longitude, and core length of vibracore collected in Peoria Lake is given below.

Core ID	Date Collected	Approximate River Mile	Latitude Deg., Min., Sec.	Longitude, Deg., Min., Sec.	Core Length (cm)
165.5	11/28/98	165.5	40 42 29.8 N	89 32 29.8 W	94

Sediment samples collected using the portable vibracoring system were collected in aluminum pipe to avoid organic contamination. A single composite was made from this core. Analytical splits of the sediment samples were analyzed by ISGS and also to an IEPA-approved contract laboratory (Lab A). Details of methods of analysis and the analytes determined by the Illinois State Geological Survey and laboratory A are found in Cahill, 2001.

The results for total metal analysis Peoria Lake are given in Appendix 1. The results for "Total Recoverable Metals" in the composite sample from Peoria Lake are given in Appendix 2.The results from laboratory A for the comprehensive list of parameters are presented in

Locations of Sediment Cores Collected in Lake Peoria near RM 165.
✚ = 4/1998 Gravity Core (ISGS and Lab A); ▲= 11/1998 Vibra-Core (ISGS and Lab A)
■ = 2/1998 Gravity Cores (Lab A); ● = 10/2000 Gravity Cores (Lab B)

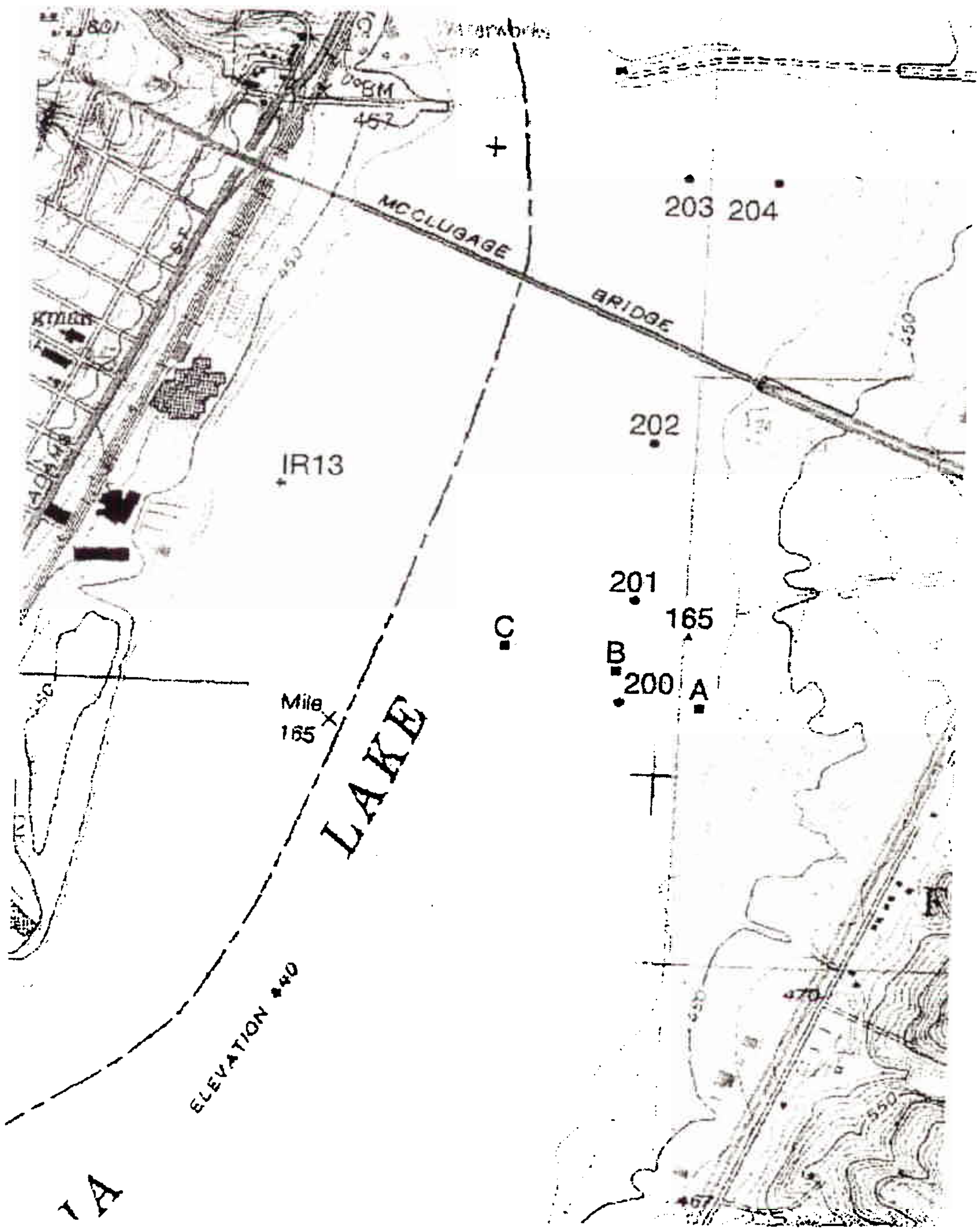

Figure 1 Locations where sediment cores were collected in Peoria Lake near River Mile 165 between 1998 and 2000.

Results from Peoria Lake Sediment Samples Dredged in May 2000 near RM 165 and collected from sediment storage area in January 2001 by IEPA

In January of 2001 the Illinois Environmental Protection Agency collected three samples of sediment that had been dredged from the Peoria Lake during the Spindler Marina channel project in May 2000. The sediment was from the channel transecting the site of the proposed Peoria River front Environmental Restoration Project. The well mixed sediment was stored at a gravel pit and had weathered outside for about nine months. The analysis for a comprehensive list of organic parameters and metals was done by the IEPA Laboratory. The results are given in appendix 7.

Discussion

Comparison of Metal Results for Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by ISGS, IEPA and Laboratories A and B

The concentrations of metals and major element in sediment samples collected near RM 165 in Peoria Lake between 1998 and 2001 are listed in table 2. Included in the table are concentration in sediment collected from the sediment storage area by the IEPA. The sediment samples were collected by various techniques and represent different depths and locations.

The concentrations of arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc are similar between laboratories. Elevated levels of arsenic and cadmium determined by laboratory A were not seen in the other data sets. Silver, selenium, thallium and antimony were not detected in any of the samples. The weathered, dredged sediment concentrations tested by the IEPA were in general lower than those obtained from fresh sediment cores.

Comparison of PAH (Method 8310), PCBs and chlorinated pesticides in Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by IEPA and Laboratories A and B

The concentrations of PAH, PCBs and detected chlorinated pesticides in sediment samples in cores collected near RM 165 in Peoria Lake and analyzed by laboratories A and B is provided in table 3. Included in the table are concentration in sediment collected from the sediment storage area by the IEPA.

Laboratory B found much lower levels of PAH compounds than laboratory A. The concentration of some PAH compounds determined by the IEPA on the dredged sediment were comparable to those determined by laboratory A and in a few cases higher. The high concentrations of benzo(a) pyrene and dibenz(a,h,)anthracene found by laboratory A were not found by laboratory B or the IEPA.

PCBs were not detected by either laboratory. The chlorinated pesticide MCPP detected by laboratory A was not observed by laboratory B.

Table 2 Concentrations of Major Constituents and Metals in Peoria Lake Sediment Collected near River Mile 165 determined by ISGS, Laboratories A and B and IEPA. ISGS (1) = Total Metal Concentrations, ISGS (2) = Total Recoverable Metal Concentrations. CL , core length, n, number of sub-samples used to calculate mean concentration. All values in milligram per kilogram unless noted otherwise

	ISGS (1) 11/98 CL 0.9 m n = 1	ISGS (2) 11/98 n = 1	Lab A 11/98 n = 1	Lab A 2/99 CL 1.0 m n = 3	ISGS (2) 4/00 CL 0.3 m n = 2	Lab B 10/00 CL 0.3 n = 5	IEPA 1/01 grabs n = 3
NH4-N			30	577		335	
TKN			533	614		2622	
Tot. P	1000		937			989	
Al (%)	6.40	3.43			3.35	1.07	0.89
Fe (%)	3.54	3.46			3.06	1.65	1.87
Ca (%)	3.28	3.14			3.44	2.14	4.1
Mg (%)	1.70	1.56			1.63	1.04	1.70
K (%)	2.34	0.74			0.71	0.15	0.13
Na	4900	210			<400	260	183
Mn	770	721			674	419	473
Ag			<2	<2		<2	<0.7
As		<50	26	7.7	<75	5.5	6.8
Be		1.1			1.3	0.4	0.6
Ba	470	190	106	128	189	82	113
Cd	<0.9	<5	1.7	4.4	<5	<2	<1.1
Co		14			14	7	8.5
Cr		43	32	48	51	32	22
Cu	36	31			56	27	23
Hg			0.12	0.33		0.22	0.10
Ni	<20	48			46	30	27
Pb	73	25	32	52	40	52	24
Sb		<25			<50	<10	<1
Se		<50		<1	<50	<1	<1.7
Tl		<100			<50	<1	<1.7
V		35			31	21	20
Zn	176	173			251	184	100

Table 3 Concentrations of PAH (Method 8310), PCB and Chlorinated Pesticides in Peoria Lake Sediment Collected near River Mile 165 determined by IEPA and Laboratories A and B. CL, core length, n, number of sub-samples used to calculate mean concentration same as in table 2. All values in mg/kg.

	Lab A 11/98	Lab A 2/99	Lab B 10/00	IEPA 1/01
Acenaphthene	<0.9	0.423	0.051	<0.08
Acenaphthylene	<0.9	<0.076	<0.18	<0.08
Anthracene	<0.09	0.053	<0.01	<0.07
Benzo(a) anthracene	0.31	0.195	<0.075	0.19
Benzo(a)pyrene	0.24	0.385	0.025	0.12
Benzo(b)fluoranthene	3.1	**2.05**	0.016	0.23
Benzo(g,h,i) perylene	<0.6	0.68	0.036	<0.12
Benzo(k)fluoranthene	0.13	0.21	0.024	0.25
Chrysene	0.12	0.25	0.018	0.26
Dibenz(a,h)anthracene	<0.094	**2.8**	0.006	<0.08
Fluoranthene	0.36	0.32	0.033	0.50
Fluorene	<0.94	0.093	<0.025	<0.08
Indeno(1,2,3-c,d) pyrene	<0.094	0.53	0.019	<0.14
Naphthalene	<0.093	0.26	<0.20	<0.08
Phenanthrene	0.12	0.195	0.011	0.36
Pyrene	<0.094	0.52	0.026	0.43
PCB's	<0.63	<0.074	<0.064	
2-4 D	<0.19	<0.23	<0.04	
Dalapon	<0.19	<0.23	<0.20	
Dicamba	<0.096	<0.12	<0.01	
MCPP	<3.8	1.4	<5	

Comparison of Peoria Lake Sediment Quality to Background Soils, and IEPA Classification of Lake Sediments

The ISGS has measured the background concentrations of 48 inorganic elements in 192 soil samples from 77 counties in Illinois (Frost, 1995). Included in that study were eighteen soil samples were collected in seven of the counties that border the Peoria Pool of the Illinois River. The soil samples were collected at depths of 10 to 20 cm and 70 to 80 cm.

The IEPA determined the background concentration of inorganic elements in 775 background soil samples from all 102 counties of Illinois (IEPA, 1994). The soils were collected at various depths, with different sampling techniques at sites judged by the field staff to be undisturbed by site-related activities. In the IEPA study, values reported as less than the detection limit were included in the statistics as one-half the detection limit. The analytical method used was not a total digestion procedure, so their results are not directly comparable to those of ISGS.

The IEPA has classified Illinois lake sediment quality based on the analysis of 1,876 sediment samples from 307 lakes in Illinois that have been collected since 1977. Lake sediments were considered to have "elevated" concentrations of an analyte if the concentration was between one standard deviation and two standard deviations above the mean for an analyte. Sediments were considered to have "highly elevated" concentrations if the concentration was greater than two standard deviations above the mean. In this statistical treatment of the data, all values below detection were converted to zero. This classification was not intended to be a standard, but as way to compare and classify lake sediments (Mitzelfetl, 1996).

The ranges of background concentrations of metals in undisturbed soils in the Peoria area, background concentrations of metals in Illinois soils determined by ISGS and IEPA and concentration classified as elevated and highly elevated for Illinois lake sediments by the IEPA are listed in table 4.

Table 4 Range in Background Concentrations of Metals in Undisturbed Soils in the Peoria area, Mean Concentration in Illinois Soils Determined by ISGS and IEPA, and Elevated and Highly Elevated IEPA Classification of Metals in Illinois Lake Sediments. All values in mg/kg.

	Bkg. for Soils in Peoria Area ISGS	Bkg. for Soils, Statewide ISGS	Bkg. for Soils Statewide IEPA	IEPA Elevated Sediment Concentrations	IEPA Highly Elevated Sediment Concentrations
TKN				5357 to11700	>11700
Phosphoru	200 - 1200	500		1125 to 2179	>2179
Antimony	0.8 - 1.7	1.1			
Arsenic	7 - 21	10	7	14 to 95	>95
Barium	210 - 810	545	130	271 to 397	> 397
Beryllium	0.5 - 1.9	1.4	0.7		
Boron	30 - 64	46			
Cadmium	<3	<1	1	5 to 14	>14
Chromium	40 - 91	57	17	27 to 49	>49
Cobalt	5 - 21	11	9		
Copper	15 - 51	30	20	100 to 590	>590
Lead	10 - 40	24	49	59 to 339	>339
Manganese	186 - 2170	600	767	1700 to 5500	>5500
Mercury			0.11	0.15 to 0.70	>0.70
Nickel	<16 - 53	24	17	31 to 43	>43
Selenium	<1 - 1.3	<1	0.5		
Silver	<1		0.8	0.1 to 1	>1
Thallium	< 1 - 3	1.4	0.6		
Vanadium	37 - 260	92	25		
Zinc	35 - 145	73	103	145 to 1100	>1100

Comparison of Peoria Lake Sediment Quality to various sediment quality guidelines for freshwater ecosystems

Sediment quality guidelines have been developed by a variety of agencies to classify and rank sites, and make decisions where more detailed studies are needed (Ingersoll et al., 2000). The U.S. EPA studied the severity of sediment contamination and identified watersheds that had probable concern for sediment contamination (U.S. EPA 1997). To make this assessment the U.S. EPA developed a series of screening values for 233 potential organic and metal sediment contaminants (U.S. EPA 1997). Based on available scientific studies, estimated sediment chemistry values were then developed for 111 sediment contaminants. In addition, values for estimated apparent effects threshold-low (AET-L)and apparent effects threshold-high (AET-H) were also included. These thresholds can be used to judge the degree of contamination of a sediment, Long et al. (1995).

It has been proposed that dredged sediment could be used as general use landscaping soil, or to rehabilitate strip mines, old industrial sites or brownfields. Specific standards do not exist for sediment in these applications. Illinois has regulations for cleanup of industrial sites known as TACO, an acronym for Tiered Approach to Corrective Action Objectives. This is a tool for deciding if an industrial site are clean enough for various purposes. The standards are for the protection of human health. While these standards are not directly applicable to sediment, they provide a useful reference for comparison. The levels of metals and organic compounds regulated at these locations are given in the TACO regulations, Illinois Statues (1997).

Tables 5 and 6 list the U.S. EPA sediment chemistry screening values, the apparent effects threshold high (Long et. al. 1995), consensus-based sediment quality guidelines for freshwater ecosystems recently developed for the U.S. EPA (Ingersol et al., 2000, MacDonald et al. 2000), and the TACO Tier 1 Soil Remediation Objectives for metals and organic compounds.

Most metal concentrations are well below the various sediment chemistry screening values. Nickel concentrations approach U.S. EPA sediment chemistry screening values and consensus-based sediment quality guidelines. Most PAH concentrations are well below the various sediment chemistry screening values. The highly elevated concentration observed by laboratory A for three compounds were not confirmed by subsequent analysis.

Table 5 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds High, Consensus-based Probable Effect Concentrations, and TACO Tier 1 Soil Remediation Objectives for Metals. All values are milligram per kilogram

	U.S. EPA * Estimated Sediment Screening Value	U.S. EPA* Apparent Effects Thresholds High	Consensus-based PEC&	TACO ** Tier 1 Soil ingestion
Ag	3.7	6		390
As	70	700	33	0.4 &
Be				0.1
Ba				5500
Cd	9.6	10	5	78
Co				4,700
Cr	370	270	111	390
Cu	270	1300	149	2,900
Hg	0.71	2.1	1.1	23
Mn				3,700
Ni	52		49	1,600
Pb	218	600	128	400
Se				390
Sb	200			31
Tl				6
V				550
Zn	410	1600	459	23,000

*National Sediment Quality Survey, Screening Values for Chemicals, U.S. EPA 1997. **Section 742 Tier 1 Soil Remediation Objectives, Exposure Route-Specific for Soil Ingestion.
& Listed value currently under review *From MacDonald et al. (2000).

Table 6 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds Low, Apparent Effects Thresholds High, and TACO Tier 1 Soil Remediation Objectives for selected organic compounds. Values in mg/kg

	U.S. EPA * Estimated Sediment Screening Value	U.S. EPA* Apparent Effects Thresholds High	Consensus-based PEC&	TACO ** Tier 1 Soil ingestion
Acenaphthene	1.3	2	0.84	4700
Acenaphthylene	0.6	1.3		
Anthracene	1.1	13		23000
Benzo(a) anthracene	0.17	5.1	1.05	0.9
Benzo(a)pyrene	0.017	3.6	1.45	0.09
Benzo(b)fluoranthene	0.17	9.9		0.9
Benzo(g,h,i) perylene	2.6	2.6		
Benzo(k)fluoranthene	1.7	9.9		9
Chrysene	2.8	9.2	1.29	88
Dibenz(a,h)anthracene	0.017	1.0		0.09
Fluoranthene	6.2	30	2.23	3100
Fluorene	0.54	3.6	0.54	3100
Indeno(1,2,3-c,d)	0.17	2.6		0.9
Naphthalene	0.47	2.7	0.56	3100
Phenanthrene	1.8	6.9	1.17	
Pyrene	2.6	16	1.52	2300
PCB's	0.0025	3.1		10
Aldrin	0.0012			0.04
Dieldrin	0.012		0.062	0.04
DDT	0.027	0.15	0.57	2
Chlordane	0.048		0.017	0.5
Endrin	0.042		0.21	23
Methoxychlor	0.019			390
alpha BHC	0.001			0.1
gamma-BHC	0.0037		0.005	0.5
Heptachlor	0.0044		0.016	0.1
Heptachlor-epoxide	0.0022			0.07

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Appendix 1 Total metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS

Analysis Number	Core ID	Depth interval (cm)	Total carbon (%)	Inorganic carbon (%)	Organic carbon (%)	SiO2 XRF (%)	Al2O3 XRF (%)	Fe2O3 XRF (%)	CaO XRF (%)	MgO XRF (%)	K2O XRF (%)	Na2O XRF (%)
R21543	165.5	0-94	3.36	1.19	2.17	59.40	12.10	5.06	4.59	2.82	2.82	0.66

Analysis Number	Core ID	Depth interval (cm)	TiO2 XRF (%)	P2O5 XRF (%)	MnO XRF (%)	SO3 XRF (%)	Ba XRF (ppm)	Ba EDX (ppm)	Cd AAS (ppm)	Cu AAS (ppm)	Mo EDX (ppm)	Ni AAS (ppm)
R21543	165.5	0-94	0.67	0.24	0.10	0.34	470	547	<0.9	36	25	<20

Analysis Number	Core ID	Depth interval (cm)	Pb AAS (ppm)	Sn EDX (ppm)	Sr XRF (ppm)	Sr EDX (ppm)	Zn AAS (ppm)	Zr XRF (ppm)	Zr EDX (ppm)
R21543	165.5	0-94	73	<5	127	103	176	162	250

Appendix 2 Total recoverable metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS

Analysis number	Core ID	Depth interval (cm)	Si (ppm)	Al (%)	Fe (%)	Ca (%)	Mg (%)	K (ppm)	Na (ppm)	Ti (ppm)	Mn (ppm)	S (ppm)
R21543	165.5	0-94	191	3.43	3.46	3.14	1.56	0.74	210	451	721	1,050

Analysis number	Core ID	Depth interval (cm)	As (ppm)	B (ppm)	Be (ppm)	Ba (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Li (ppm)
R21543	165.5	0-94	<50	62	1.13	190	<5	14	43	31	26	38

Analysis number	Core ID	Depth interval (cm)	Mo (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sr (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
R21543	165.5	0-94	<10	48	25	<25	7	<50	53	<100	35	173

Appendix 3 Results form a comprehensive analysis of a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by Laboratory A

Sample number	Core ID	Depth (cm)	Sand (%)	Silt (%)	Clay (%)	size (mm)	Moisture (%)	Density (g/cm3)	COD (mg/l)	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)
R21543	165.5	0-94	6	41	53	0.004	48	1.6	713	26	106	1.7

Sample number	Core ID	Depth (cm)	Chromium (mg/kg)	Lead (mg/kg)	Silver (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	NH4-N (mg/kg)	TKN (mg/kg)	Cyanide (mg/kg)	Phosphorus (mg/kg)	Sulfide (mg/kg)
R21543	165.5	0-94	31.8	33.4	<1.9	0.12	<1.0	30	533	<0.95	937	81

Sample number	Core ID	Depth (cm)	Acetone µg/kg	Benzene µg/kg	Bromodichloro-methane µg/kg	Bromoform µg/kg	2-Butanone µg/kg	Carbon Disulfide µg/kg	Carbon Tetrachloride µg/kg
R21543	165.5	0-94	500	<9.6	<9.6	<9.6	71	<9.6	<9.6

Sample number	Core ID	Depth (cm)	Chlorobenzene µg/kg	Chloroethane µg/kg	Chloroform µg/kg	Dibromochloro-methane µg/kg	1,1-Dichloroethane µg/kg	1,2-Dichloroethane µg/kg
R21543	165.5	0-94	<9.6	<19	<9.6	<9.6	<9.6	<9.6

Sample number	Core ID	Depth (cm)	1,1 Dichloroethene µg/kg	cis-1,2- Dichloroethene µg/kg	trans-1,2- Dichloroethene µg/kg	1,2- Dichloropropane µg/kg	cis-1,3-Dichloro propene µg/kg	trans-1,3-Dichloro propene µg/kg
R21543	165.5	0-94	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6

Sample number	Core ID	Depth (cm)	Ethyl benzene µg/kg	2-Hexanone µg/kg	Methyl Chloride (Chloromethane) µg/kg	Methyl bromide (Bromomethane) µg/kg	4-Methyl-2-pentanone µg/kg	Methylene Chloride µg/kg	Styrene µg/kg
R21543	165.5	0-94	<9.6	<19	<19	<19	<19	<19	<9.6

Appendix *3(continued)*

Sample number	Core ID	Depth (cm)	1,1,2,2-Tetra-chloroethane µg/kg	Tetrachloro-ethene µg/kg	Toluene µg/kg	1,1,1-Trichloro-ethane µg/kg	1,1,2-Trichloro-ethane µg/kg	Trichloroethene µg/kg	Vinyl Chloride µg/kg
R21543	165.5	0-94	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<19

Core ID	Depth (cm)	Xylenes Total µg/kg	Aroclor 1,016 µg/kg	Aroclor 1,221 µg/kg	Aroclor 1,232 µg/kg	Aroclor 1,242 µg/kg	Aroclor 1,248 µg/kg	Aroclor 1,254 µg/kg	Aroclor 1260 µg/kg	Aldrin µg/kg	gamma-BHC (Lindane) µg/kg
165.5	0-94	<9.6	<630	<630	<630	<630	<630	<630	<630	<76	<76

Sample number	Core ID	Depth (cm)	alpha-BHC µg/kg	beta-BHC µg/kg	delta-BHC µg/kg	Chlordane (Alpha) µg/kg	Chlordane (Gamma) µg/kg	4,4'-DDD µg/kg	4,4'-DDE µg/kg	4,4'-DDT µg/kg	Dieldrin µg/kg
R21543	165.5	0-94	<76	<76	<76	<76	<76	<150	<150	<150	<150

Sample number	Core ID	Depth (cm)	Endosulfan I µg/kg	Endosulfan II µg/kg	Endosulfan sulfate µg/kg	Endrin µg/kg	Endrin aldehyde µg/kg	Endrin ketone µg/kg	Heptachlor µg/kg	Heptachlor epoxide µg/kg	Methoxychlor µg/kg
R21543	165.5	0-94	<76	<76	<150	<150	<150	<150	<76	<76	<320

Sample number	Core ID	Depth (cm)	Toxaphene µg/kg	2,4-D µg/kg	2,4-DB µg/kg	Dalapon µg/kg	Dicamba µg/kg	Dichloro-prop µg/kg	Dinoseb µg/kg	MCPA µg/kg	MCPP µg/kg	Pentachloro-phenol µg/kg
R21543	165.5	0-94	<1,500	<190	<190	<190	<96	<190	<1,900	<38,000	<38,000	<19

Sample number	Core ID	Depth (cm)	Picloram µg/kg	2,4,5-T µg/kg	2,4,5-TP (Silvex) µg/kg	Acenaphthene µg/kg	Acenaphthylene µg/kg	Anthracene µg/kg	Benzo(a) anthracene µg/kg	Benzo(a) pyrene µg/kg
R21543	165.5	0-94	<190	<96	<96	<940	<940	<94	310	240

Appendix *3(continued)*

Sample number	Core ID	Depth (cm)	Benzo(b) fluoranthene µg/kg	Benzo(g,h,i) perylene µg/kg	Benzo(k)-fluoranthene µg/kg	Chrysene µg/kg	Dibenz(a,h) anthracene µg/kg	Fluoranthene µg/kg	Fluorene µg/kg	Indeno (1,2,3-cd) pyrene µg/kg
R21543	165.5	0-94	3,100	<6.3	130	120	<94	360	<940	<94

Sample number	Core ID	Depth (cm)	Naphthalene µg/kg	Phenanthrene µg/kg	Pyrene µg/kg	Acenaphthene µg/kg	Acenaphthylene µg/kg	Anthracene µg/kg	Benzo(a) anthracene µg/kg	Benzo(a) pyrene µg/kg
R21543	165.5	0-94	<63	120	<94	<320	<320	<320	<320	<320

Sample number	Core ID	Depth (cm)	Benzo(b) fluoranthene µg/kg	Benzo(g,h,i) perylene µg/kg	Benzo(k)-fluoranthene µg/kg	Chrysene µg/kg	Dibenz(a,h) anthracene µg/kg	Fluoranthene µg/kg	Fluorene µg/kg
R21543	165.5	0-94	<320	<320	<320	<320	<320	<320	<320

Sample number	Core ID	Depth (cm)	Indeno (1,2,3-cd)pyrene µg/kg	Naphthalene µg/kg	Phenanthrene µg/kg	Pyrene µg/kg
R21543	165.5	0-94	<320	<320	<320	<320

Appendix 4 Results from comprehensive analysis of sediment samples collected in Peoria Lake near RM 165 2/10/1999, analyzed by Laboratory A

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
Moisture (%)		56	52	57
Total Solids-Soil (%)		43.4	47	40.8
Volatile Solid (%)		0.91	1.5	1.2
TOC (%)		0.064	0.069	0.065
Bulk Density (g/cm3)		1.4	1.2	1.3
COD (mg/l)		18.7	18.7	7.5
pH		7.6	8	8
Inorganic parameters				
Arsenic (mg/kg)		8	7.9	7.3
Barium (mg/kg)		126	134	125
Cadmium (mg/kg)		4.7	4.9	3.5
Chromium (mg/kg)		49.6	56.3	38.5
Lead (mg/kg)		54.9	59.8	42.9
Silver (mg/kg)		<2	<2	<2
Mercury (mg/kg)		0.25	0.3	0.43
Selenium (mg/kg)		<1	<1	<1
Ammonia N (mg/kg)		322	516	894
TKN (mg/kg)		387	590	866
Cyanide (mg/kg)		<1	<1	<1
Reactive sulfide (mg/kg)		<10	<10	38
Volitile organic compounds				
Acetone	µg/kg	57	63	56
Benzene	µg/kg	<11	<10	<12
Bromodichloromethane	µg/kg	<11	<10	<12
Bromoform	µg/kg	<11	<10	<12
2-Butanone	µg/kg	<23	<21	<23
Carbon Disulfide	µg/kg	<11	<10	<12
Carbon Tetrachloride	µg/kg	<11	<10	<12
Chlorobenzene	µg/kg	<11	<10	<12
Chloroethane	µg/kg	<23	<21	<23
Chloroform	µg/kg	<11	<10	<12
Dibromochloromehtane	µg/kg	<11	<10	<12
1,1-Dichloroethane	µg/kg	<11	<10	<12
1,2-Dichloroethane	µg/kg	<11	<10	<12
1,1-Dichloroethene	µg/kg	<11	<10	<12
cis-1,2-Dichloroethene	µg/kg	<11	<10	<12

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
trans-1,2-Dichloroethene	µg/kg	<11	<10	<12
1,2-Dichloropropane	µg/kg	<11	<10	<12
cis-1,3-Dichloro propene	µg/kg	<11	<10	<12
trans-1,3-Dichloro propene	µg/kg	<11	<10	<12
Ethyl benzene	µg/kg	<11	<10	<12
2-Hexanone	µg/kg	<23	<21	<23
Methyl Chloride	µg/kg	<23	<21	<23
Methyl bromide	µg/kg	<23	<21	<23
4-Methyl-2-pentanone	µg/kg	<23	<21	<23
Methylene Chloride	µg/kg	<11	<10	<12
Styrene	µg/kg	<11	<10	<12
1,1,2,2-Tetrachloroethane	µg/kg	<11	<10	<12
Tetrachloroethene	µg/kg	<11	<10	<12
Toluene	µg/kg	<11	<10	<12
1,1,1-Trichloroethane	µg/kg	<11	<10	<12
1,1,2-Trichloroethane	µg/kg	<11	<10	<12
Trichloroethene	µg/kg	<11	<10	<12
Vinyl Chloride	µg/kg	<23	<21	<23
Xylenes (Total)	µg/kg	<11	<10	<12
PCB's				
Aroclor-1016	µg/kg	<74	<68	<76
Aroclor-1221	µg/kg	<74	<68	<76
Aroclor-1232	µg/kg	<74	<68	<76
Aroclor-1242	µg/kg	<74	<68	<76
Aroclor-1248	µg/kg	<74	<68	<76
Aroclor-1254	µg/kg	<74	<68	<76
Aroclor-1260	µg/kg	<74	<68	<76
Pesticides				
Aldrin	µg/kg	<90	<83	<93
gamma-BHC	µg/kg	<90	<83	<93
alpha-BHC	µg/kg	<90	<83	<93
beta-BHC	µg/kg	<90	<83	<93
delta-BHC	µg/kg	<90	<83	<93
Chlordane (Alpha)	µg/kg	<90	<83	<93
Chlordane (Gamma)	µg/kg	<90	<83	<93
4,4'-DDD	µg/kg	<180	<160	<180

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
4,4'-DDE	µg/kg	<180	<160	<180
4,4'-DDT	µg/kg	<180	<160	<180
Dieldrin	µg/kg	<180	<160	<160
Endosulfan I	µg/kg	<90	<83	<93
Endosulfan II	µg/kg	<90	<83	<93
Endosulfan sulfate	µg/kg	<180	<160	<180
Endrin	µg/kg	<180	<160	<180
Endrin aldehyde	µg/kg	<180	<160	<180
Endrin ketone	µg/kg	<180	<160	<180
Heptachlor	µg/kg	<90	<83	<93
Heptachlor epoxide	µg/kg	<90	<83	<93
Methoxychlor	µg/kg	<380	<350	<390
Toxaphene	µg/kg	<1,800	<1,600	<1,800
Chlorinated Pesticide				
2,4-D	µg/kg	<230	<210	<230
2,4-DB	µg/kg	<230	<210	<230
Dalapon	µg/kg	<230	<210	<230
Dicamba	µg/kg	<110	<100	<120
Dichloroprop	µg/kg	<230	<210	<230
Dinoseb	µg/kg	<2,300	<2,100	<2,300
MCPA	µg/kg	<45,000	<42,000	<46,000
MCPP	µg/kg	140,000	120,000	<46,000
Pentachlorophenol	µg/kg	<23	<21	<23
Picloram	µg/kg	<230	<210	<230
2,4,5-T	µg/kg	<110	<100	<120
2,4,5-TP (Silvex)	µg/kg	<110	<100	<120
PAH 8310				
Acenaphthene	µg/kg	500	660	110
Acenaphthylene	µg/kg	<75	<68	<76
Anthracene	µg/kg	47	60	<76
Benzo(a) anthracene	µg/kg	160	230	<76
Benzo(a)pyrene	µg/kg	310	460	<76
Benzo(b)fluoranthene	µg/kg	2,300	1,800	<76
Benzo(g,h,i) perylene	µg/kg	260	1,100	<76
Benzo(k)-fluoranthene	µg/kg	180	240	<76
Chrysene	µg/kg	200	300	<76

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
Dibenz(a,h)anthracene	µg/kg	2,800	2,800	<76
Fluoranthene	µg/kg	350	300	<76
Fluorene	µg/kg	<75	93	<76
Indeno(1,2,3-cd) pyrene	µg/kg	560	700	320
Naphthalene	µg/kg	320	210	240
Phenanthrene	µg/kg	160	230	<76
Pyrene	µg/kg	560	480	<76
PAH SW8270				
Acenaphthene	µg/kg	<370	<340	<380
Acenaphthylene	µg/kg	<370	<340	<380
Anthracene	µg/kg	<370	<340	<380
Benzo(a) anthracene	µg/kg	<370	<340	<380
Benzo(a)pyrene	µg/kg	<370	<340	<380
Benzo(b)fluoranthene	µg/kg	<370	<340	<380
Benzo(g,h,i) perylene	µg/kg	<370	<340	<380
Benzo(k)-fluoranthene	µg/kg	<370	370	<380
Chrysene	µg/kg	<370	<340	<380
Dibenz(a,h)anthracene	µg/kg	<370	<340	<380
Fluoranthene	µg/kg	<370	<340	<380
Fluorene	µg/kg	<370	<340	<380
Indeno(1,2,3-cd) pyrene	µg/kg	<370	<340	<380
Naphthalene	µg/kg	<370	<340	<380
Phenanthrene	µg/kg	<370	<340	<380
Pyrene	µg/kg	<370	450	<380

Appendix 5 Total recoverable metal concentrations and Total Carbon, Inorganic Carbon and Organic Carbon in a sediment samples from a core collected near RM 165 in Lake Peoria 4/25/2000 by ISWS, analyzed by ISGS

Analysis number	Core ID	Depth interval (cm)	Si (ppm)	Al (%)	Fe (%)	Ca (%)	Mg (%)	K (ppm)	Na (ppm)	Ti (ppm)	Mn (ppm)	S (ppm)
R21969	165.5	0-6	251	3.15	2.96	3.81	1.67	0.69	<400	398	715	860
R21970		24-30	248	3.55	3.15	3.06	1.60	0.72	<400	451	634	1170

Analysis number	Core ID	Depth interval (cm)	As (ppm)	B (ppm)	Be (ppm)	Ba (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Li (ppm)
R21969	165.5	0-6	<75	33	1.2	179	<5	13	43	42	24	32
R21970		24-30	<75	35	1.3	198	<5	14	58	69	24	37

Analysis number	Core ID	Depth interval (cm)	Mo (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sr (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
R21969	165.5	0-6	<5	38	40	<50	6	<50	68	<50	27	221
R21970		24-30	<5	54	40	<50	7	<50	60	<50	35	281

Analysis number	Core ID	Depth interval (cm)	Total C (%)	Inorganic C (%)	Organic C (%)
R21969	165.5	0-6	3.78	1.25	2.53
R21970		24-30	3.49	1.23	2.26

Appendix 6 Results from comprehensive analysis of five sediment samples collected in Peoria Lake Near RM 165 10/11/2000, analyzed by Laboratory B

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Al	%	1.00	1.31	1.30	0.89	0.85
Fe	%	1.63	1.85	1.87	1.49	1.40
Ca	%	2.06	1.85	2.07	2.60	2.12
Mg	%	0.81	0.90	1.05	1.35	1.08
K	%	0.14	0.17	0.17	0.13	0.13
Na	mg/kg	167	322	316	257	238
Mn	mg/kg	405	438	479	406	368
Ag	mg/kg	<1.9	<1.9	<1.9	<1.9	<1.9
As	mg/kg	5.8	5.8	6.6	5.48	4
Be	mg/kg	0	0	0	0	0
Ba	mg/kg	81	96.1	91.4	74.2	68.6
Cd	mg/kg	<1.9	<1.9	<1.9	<1.9	<1.9
Co	mg/kg	6.7	7.7	7.77	6.5	5.93
Cr	mg/kg	29.6	39.1	33.5	30.3	26.7
Cu	mg/kg	28.5	32.7	29.7	21.7	20.8
Hg	mg/kg	0.19	0	0	0	0
Mo	mg/kg	<4	<4	<4	<4	<4
Ni	mg/kg	25.8	36.4	32.8	27.2	25.6
Pb	mg/kg	45.2	62.5	58.4	45.5	48
Sb	mg/kg	<10	<10	<10	<10	<10
Se	mg/kg	<1	<1	<1	<1	<1
Tl	mg/kg	<1	<1	<1	<1	<1
V	mg/kg	17.6	21.1	21.2	17.4	16.4
Zn	mg/kg	160	184	159	133	120
Ammonia N	mg/kg	412	394	235	393	239
Total Kjeldahl N	mg/kg	1,090	4,060	2,250	3,010	2,700
Total cyanide	mg/kg	<2	<2	<1.9	<1.7	<1.6
Total P	mg/kg	947	1,100	1,200	904	794
pH		7.3	7.4	7.1	7.4	7.6
Total organic carbon	mg/kg	430	4,600	310	670	1,100
Moisture	%	48.5	51.8	50.3	44.2	37.8
PCBs						
Aroclor-1016	µg/kg	<64	<68	<66	<59	<53
Aroclor-1221	µg/kg	<64	<68	<66	<59	<53
Aroclor-1232	µg/kg	<64	<68	<66	<59	<53
Aroclor-1242	µg/kg	<64	<68	<66	<59	<53

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Aroclor-1248	µg/kg	<64	<68	<66	<59	<53
Aroclor-1254	µg/kg	<64	<68	<66	<59	<53
Aroclor-1260	µg/kg	<64	<68	<66	<59	<53
Volitile Organic Compounds						
Acetone	µg/kg	<25	<25	<25	<25	<25
Benzene	µg/kg	<10	<10	<10	<10	<10
Bromodichloromethane	µg/kg	<10	<10	<10	<10	<10
Bromoform	µg/kg	<10	<10	<10	<10	<10
2-Butanone	µg/kg	<19	<19	<19	<19	<19
Carbon Disulfide	µg/kg	<19	<19	<19	<19	<19
Carbon Tetrachloride	µg/kg	<10	<10	<10	<10	<10
Chlorobenzene	µg/kg	<10	<10	<10	<10	<10
Chloroethane	µg/kg	<10	<10	<10	<10	<10
Chloroform	µg/kg	<10	<10	<10	<10	<10
Dibromochloromehtane	µg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethane	µg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
cis-1,2-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
trans-1,2-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
1,2-Dichloropropane	µg/kg	<10	<10	<10	<10	<10
cis-1,3-Dichloro propene	µg/kg	<10	<10	<10	<10	<10
trans-1,3-Dichloro propene	µg/kg	<10	<10	<10	<10	<10
Ethyl benzene	µg/kg	<10	<10	<10	<10	<10
2-Hexanone	µg/kg	<25	<25	<25	<25	<25
Methyl Chloride	µg/kg	<10	<10	<10	<10	<10
4-Methyl-2-pentanone	µg/kg	<19	<19	<19	<19	<19
Methylene Chloride	µg/kg	<10	<10	<10	<10	<10
Styrene	µg/kg	<10	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/kg	<10	<10	<10	<10	<10
Tetrachloroethene	µg/kg	<10	<10	<10	<10	<10
Toluene	µg/kg	<10	<10	<10	<10	<10
1,1,2-Trichloroethane	µg/kg	<10	<10	<10	<10	<10
Trichloroethene	µg/kg	<10	<10	<10	<10	<10
Vinyl Chloride	µg/kg	<4	<4	<4	<4	<4
Xylenes (Total)	µg/kg	<10	<10	<10	<10	<10

Appendix 6 (continued)

	Depth(cm)	PL 200 20-30	PL 210 25-35	PL 202 25-35	PL203 37-47	PL204 47-57
GC/MS Semivolatiles						
Phenol	µg/kg	<640	<680	<660	<590	<530
bis(2-Chloroethyl)ether	µg/kg	<640	<680	<660	<590	<530
2-Chlorophenol	µg/kg	<640	<680	<660	<590	<530
1,3-Dichlorobenzene	µg/kg	<640	<680	<660	<590	<530
1,4-Dichlorobenzene	µg/kg	<640	<680	<660	<590	<530
Benzyl Alcohol	µg/kg	<1,300	<1,400	<1,300	<1,200	<1,100
1,2-Dichlorobenzene	µg/kg	<640	<680	660	<590	<530
2-Methylphenol	µg/kg	<640	<680	660	590	<530
bis(2-Chloroisopropyl)ether	µg/kg	<640	<680	660	590	<530
3&4-Methylphenol	µg/kg	<1,300	1,400	1,300	1,200	<1,100
N-Nitroso-di-n-propylamine	µg/kg	<640	680	660	590	<530
Hexachloroethane	µg/kg	<640	680	660	590	<530
Nitrobenzene	µg/kg	<640	680	660	590	<530
Isophorone	µg/kg	<640	680	660	590	<530
2-Nitrophenol	µg/kg	<640	680	660	590	<530
2,4-Dimethylphenol	µg/kg	<640	680	660	590	<530
Benzoic Acid	µg/kg	<3,100	3,300	3,200	2,900	<2,600
bis(2-Chloroethoxy)methane	µg/kg	<640	680	660	590	<530
2,4-Dichlorophenol	µg/kg	<640	680	660	590	<530
1,2,4-Trichlorobenzene	µg/kg	<640	680	660	590	<530
4-Chloroaniline	µg/kg	<1,300	1,400	1,300	1,200	<1,100
Hexachlorobutadiene	µg/kg	<640	680	660	590	<530
4-Chloro-3-methylphenol	µg/kg	<1,300	1,400	1,300	1,200	<1,100
Hexachlorocyclopentadiene	µg/kg	<640	680	660	590	<530
2,4,6-Trichlorophenol	µg/kg	<640	680	660	590	<530
2,4,5-Trichlorophenol	µg/kg	<640	680	660	590	<530
2-Chloronaphthalene	µg/kg	<640	680	660	590	<530
2-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	<2,600
Dimethylphthalate	µg/kg	<640	680	660	590	<530
2,6-Dinitrotoluene	µg/kg	<640	680	660	590	<530
3-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	<2,600
2,4-Dinitrophenol	µg/kg	<3,100	3,300	3,200	2,900	<2,600
4-Nitrophenol	µg/kg	<3,100	3,300	3,200	2,900	<2,600
Dibenzofuran	µg/kg	<640	680	660	590	530
2,4-Dinitrotoluene	µg/kg	<640	680	660	590	530

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Diethylphthalate	µg/kg	<640	680	660	590	530
4-Chlorophenyl-phenylether	µg/kg	<640	680	660	590	530
4-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	2,600
4,6-Dinitro-2-methylphenol	µg/kg	<3,100	3,300	3,200	2,900	2,600
N-Nitrosodiphenylamine	µg/kg	<640	680	660	590	530
4-Bromophenyl-phenylether	µg/kg	<640	680	660	590	530
Hexachlorobenzene	µg/kg	<640	680	660	590	530
Pentachlorophenol	µg/kg	<3,100	3,300	3,200	2,900	2,600
Di-n-butylphthalate	µg/kg	<640	680	660	590	530
Butylbenzylphthalate	µg/kg	<640	680	660	590	530
3,3'-Dichlorobenzidine	µg/kg	<1,300	1,400	1,300	1,200	1,100
bis(2-Ethylhexyl)phthalate	µg/kg	<640	680	660	590	530
Di-n-octylphthalate	µg/kg	<640	680	660	590	530
PAH'S by 8310						
Acenaphthene	µg/kg	76	47	<22	30	<18
Acenaphthylene	µg/kg	<170	<180	<180	<160	<140
Anthracene	µg/kg	10	<9	<9	<8	<7
Benzo(a) anthracene	µg/kg	<70	<75	<72	<7	<6
Benzo(a)pyrene	µg/kg	34	37	18	<3	11
Benzo(b)fluoranthene	µg/kg	18	20	11	<3	<3
Benzo(g,h,i) perylene	µg/kg	<5	63	29	<4	18
Benzo(k)-fluoranthene	µg/kg	<2	24	<22	<2	<2
Chrysene	µg/kg	30	27	10	5	<2
Dibenz(a,h)anthracene	µg/kg	<1	5	8	5	<1
Fluoranthene	µg/kg	52	45	22	<8	14
Fluorene	µg/kg	<25	<27	<26	<23	<21
Indeno(1,2,3-cd) pyrene	µg/kg	<2	34	14	<2	9
Naphthalene	µg/kg	<210	<230	<220	<200	<180
Phenanthrene	µg/kg	15	12	<5	5	<4
Pyrene	µg/kg	<230	<250	30	<220	22
Pesticides						
Aldrin	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
alpha-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
beta-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
gamma-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
delta-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlordane	µg/kg	<17	<17	<17	<17	<17
Chlordane (Alpha)	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlordane (Gamma)	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlorobenzilate	µg/kg	<33	<33	<33	<33	<33

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
4,4'-DDD	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
4,4'-DDE	µg/kg	<3.3	<3.3	<3.3	4.2	9.3
4,4'-DDT	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Diallate	µg/kg	<33	<33	<33	<33	<33
Dieldrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan I	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Endosulfan II	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan sulfate	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin aldehyde	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin ketone	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Heptachlor	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Heptachlor epoxide	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Isodrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Methoxychlor	µg/kg	<17	<17	<17	<17	<17
Toxaphene	µg/kg	<79	<79	<79	<79	<79
Clorinated Herbicides						
Dicamba	µg/kg	<10	<10	<10	<10	<10
2,4-D	µg/kg	<40	<40	<40	<40	<40
2,4,5-TP Silvex	µg/kg	<10	<10	<10	<10	<10
2,4,5-T	µg/kg	<10	<10	<10	<10	<10
2,4 DB	µg/kg	<100	<100	<100	<100	<100
Dalapon	µg/kg	<200	<200	<200	<200	<200
MCPP	µg/kg	<5,000	<5,000	<5,000	<5,000	<5,000
MCPA	µg/kg	<5,000	<5,000	<5,000	<5,000	<5,000
Dichloroprop	µg/kg	<40	<40	<40	<40	<40
Dinoseb	µg/kg	<40	<40	<40	<40	<40

Appendix 7 Results from comprehensive analysis of sediment samples that had been dredged from Peoria Lake in May 2000 and sampled from a dredge sediment storage area in January 2001, analyzed by the IEPA Laboratory. All valued in mg/kg unless noted.

Sample ID	X201	X202	X203
Al (%)	0.93	0.92	0.83
Fe (%)	2.00	1.90	1.70
Ca (%)	5.10	3.50	3.70
Mg (%)	2.10	1.70	1.30
K(%)	0.14	0.12	0.13
Na	210	180	160
Mn	550	380	490
Ag	<0.7	<0.6	<0.8
As	7.2	7.0	6.2
B	9.8	12.0	11.0
Ba	110	120	110
Be	0.60	0.60	0.58
Cd	1.1	<0.6	<1.1
Co	9.4	8.9	7.3
Cr	24	18	23
Cu	26	21	21
Hg	<0.1	0.1	0.1
Ni	30	24	26
Pb	27	19	27
Se	<1.3	<1.3	<1.7
Sb	<0.8	<1	<1
Sr	47	34	43
Tl	<1.3	<1.3	<1.7
V	21	21	18
Zn	110	76	110

Table 7 continued. All values in ug/g unless noted

Sample ID	X201	X202	X203
Hexachlorobenze (ug/kg)	<5	<5	<5
Trifluralin (ug/kg)	<10	<10	<10
Alpha-BHC (ug/kg)	<5	<5	<5
Gamma-BHC (ug/kg)	<5	<5	<5
Atrazine (ug/kg)	<50	<50	<50
Heptachlor (ug/kg)	<5	<5	<5
Aldrin (ug/kg)	<5	<5	<5
Acetochlor (ug/kg)	<10	<25	<25
Alachlor (ug/kg)	<10	<10	<10
Metribuzin (ug/kg)	<10	<10	<10
Metolachlor (ug/kg)	<25	<25	<25
Heptachlor Epoxide (ug/kg)	<5	<5	<5
Pendimethalin (ug/kg)	<10	<10	<10
gamma-Chlordane (ug/kg)	<10	<10	<10
Alpha-chlordane (ug/kg)	<10	<10	<10
p,p'-DDE (ug/kg)	<5	<5	<5
Dieldrin (ug/kg)	<5	<5	<5
Captan (ug/kg)	<10	<11	<10
Cyanazine (ug/kg)	<25	<25	<25
Endrin (ug/kg)	<5	<5	<5
p,p'-DDD (ug/kg)	<5	<5	<5
p,p'-DDT (ug/kg)	<5	<5	<5
Methoxychlor (ug/kg)	<0.06	<25	<25
Phenol	<0.06	<0.07	<0.08
Bis(2chlorophenol) ether	<0.06	<0.07	<0.08
2-chlorophenol	<0.06	<0.07	<0.08
1,3-dichlorobenze	<0.06	<0.07	<0.08
1,4-dichlorobenzene	<0.06	<0.07	<0.08
1,2-dichlorobenzene	<0.06	<0.07	<0.08
2-methylpehnol	<0.06	<0.07	<0.08
4-methylphenol	<0.06	<0.07	0.19
n-nitroso-di-n-propylamine	<0.06	<0.07	<0.08
Hexachloroethane	<0.06	<0.07	<0.08
Nitrobenzene	<0.06	<0.07	<0.08
Isophorone	<0.06	<0.07	<0.08
2-nitrophenol	<0.06	<0.07	<0.08
2,4 dimethylphenol	<0.06	<0.07	<0.08

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
bis(2-chloroethoxy) methane	<0.06	<0.07	<0.08
2,4-dichlorophenol	<0.06	<0.07	<0.08
1,2,4-trichlorobenzene	<0.06	<0.07	<0.08
Naphthalene	<0.06	<0.07	<0.08
4-chloroaniline	<0.06	<0.07	<0.08
Hexachlorobutadiene	<0.06	<0.07	<0.08
4-chloro-3methylphenol	<0.06	<0.07	<0.08
2-methylnaphthalene	0.07	<0.07	0.11
Hexachlorocyclopentadiene	<0.06	<0.07	<0.08
2,4,6-trichlorophenol	<0.06	<0.07	<0.08
2,4,5-trichlorophenol	<0.06	<0.07	<0.08
2-chloronaphtlalene	<0.06	<0.07	<0.08
2-nitroaniline	<0.06	<0.07	<0.08
dimethylphthalate	<0.06	<0.07	<0.08
acenaphthylene	<0.06	<0.07	<0.08
2,6-dinitrotoluene	<0.06	<0.07	<0.08
3-nitroaniline	<0.06	<0.07	<0.08
acenaphthene	<0.06	<0.07	<0.08
2,4-dinitrophenol	<0.7	<0.7	<0.8
4-nitrophenol	<0.06	<0.07	<0.08
Dibenzofuran	<0.06	<0.07	<0.08
2,4-dinitrotoluene	<0.06	<0.07	<0.08
diethylphthalate	<0.06	<0.07	<0.08
4-chlorophenyl phenyl ether	<0.06	<0.07	<0.08
Fluorene	<0.06	<0.07	<0.08
4-nitroaniline	<0.06	<0.07	<0.08
4,6-dinitro-2-methylphenol	<0.4	<0.5	<0.5
4-bromophenyl phenyl ether	<0.06	<0.07	<0.08
hexachlorobenzene	<0.06	<0.07	<0.08
pentachlorophenol	<0.2	<0.2	<0.3
Phenanthrene	0.61	0.11	0.36
Anthracene	0.07	<0.07	<0.08
di-n-butylphthalate	<0.06	<0.07	<0.08
Fluoranthene	0.78	0.24	0.48
Pyrene	0.62	0.24	0.44
Butyl benzyl phthalate	<0.06	<0.07	<0.08
3,3'-dichlorobenzidine	<0.06	<0.07	<0.08
Benzo(a)anthracene	0.28	0.12	0.20
Chrysene	0.36	0.15	0.26

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
Bis(2-ethylhexyl)phthalate	<0.08	<0.08	<0.13
di-n-octylphthalate	<0.06	<0.07	<0.08
Benzo(b)fluoranthene	0.30	0.14	0.26
Benzo(k)fluoranthene	0.32	0.16	0.26
Benzo(a)pyrene	0.30	0.13	0.22
Indeno(1,2,3-cd)pyrene	<0.14	<0.07	<0.09
Dibenzo(a,h)anthracene	<0.06	<0.07	<0.08
Benzo(g,h,i)perylene	<0.12	<0.07	<0.08
Chloromethane (ug/kg)	<2.8	<2.7	<3.4
Bromomethane (ug/kg)	<7	<6.8	<8.5
Vinyl chloride (ug/kg)	<2.8	<2.7	<3.4
Chloroethane (ug/kg)	<2.8	<2.7	<3.4
Methylene chloride (ug/kg)	<7	<6.8	<8.5
Acetone (ug/kg)	28	30	28
Trichlorofluoromethane (ug/kg)	<2.8	<2.7	<3.4
Bromochloromethane (ug/kg)	<2.8	<2.7	<3.4
Carbon Disulfide (ug/kg)	<2.8	<2.7	<3.4
1,1-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
1,1-dichloroethane (ug/kg)	<2.8	<2.7	<3.4
trans 1,2-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
cis 1,2-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
Chloroform (ug/kg)	<2.8	<2.7	<3.4
1,2-dichloroethane (ug/kg)	<2.8	<2.7	<3.4
2-butanone (ug/kg)	<2.8	<2.7	<3.4
1,1,1-trichloroethane (ug/kg)	<2.8	<2.7	<3.4
Carbon tetrachloride (ug/kg)	<2.8	<2.7	<3.4
Methyl tert butyl ethere (ug/kg)	<2.8	<2.7	<3.4
Dichlorobromomethane (ug/kg)	<2.8	<2.7	<3.4
1,2-dichloropropane (ug/kg)	<2.8	<2.7	<3.4
cis 1,2-dichloropropene (ug/kg)	<2.8	<2.7	<3.4
trichloroethylene (ug/kg)	<2.8	<2.7	<3.4
Chlorodibromomethane (ug/kg)	<2.8	<2.7	<3.4
1,1,2 trichloroethane (ug/kg)	<2.8	<2.7	<3.4
Benzene (ug/kg)	5.8	6.1	5.6
trans 1,3-dichloropropene (ug/kg)	<2.8	<2.7	<3.4
2-chloroethylvinyl ether (ug/kg)	<2.8	<2.7	<3.4
Bromform (ug/kg)	<2.8	<2.7	<3.4
4-methyl-2-pentanone (ug/kg)	<2.8	<2.7	<3.4
2-hexanone (ug/kg)	<2.8	<2.7	<3.4
Tetrachloroethylene (ug/kg)	<2.8	<2.7	<3.4
1,1,2,2-tetrachlorethane (ug/kg)	<2.8	<2.7	<3.4

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
Toluene (ug/kg)	11	10	11
chlorobenzene (ug/kg)	<2.8	<2.7	<3.4
ethylbenzene (ug/kg)	<2.8	3.3	<3.4
Styrene (ug/kg)	<2.8	<2.7	<3.4
Xylene (ug/kg)	3.5	4.6	4.2
Approximate Quantifications			
Misc. PNAS	0.71	0.46	0.85
Aliphatic Hydrocarbons	2.7	2.6	2.3
Solid (%)	75.7	77.4	60.1
pH (SW846)	9.0	8.9	9.1
NO3 soil extract	25	7.7	<2