

Table ES-1. Contaminants of Concern Selected for Onondaga Lake Media

Chemical	Water	Sediment	Soil	Plants	Fish
Metals					
Antimony		•	•		•
Arsenic		•	•	•	•
Barium	•		•		
Cadmium		•	•	•	
Chromium		•	•	•	•
Copper	•	•	•	•	
Iron			•		
Lead	•	•	•	•	
Manganese	•	•	•		
Mercury/Methylmercury	•	•	•	•	•
Nickel		•	•	•	
Selenium		•	•	•	•
Silver		•	•	•	
Thallium			•	•	
Vanadium		•	•	•	•
Zinc	•	•	•	•	•
Cyanide	•		•		
Volatile Organic Compounds					
Benzene		•	•		
Chlorobenzene	•	•	•		
Dichlorobenzenes (Sum)	•	•	•		
Ethylbenzene		•			
Toluene		•			
Trichlorobenzenes (Sum)	•	•	•		
Xylene isomers		•			
Semivolatile Organic Compounds					
Bis(2-ethylhexyl)phthalate	•				
Dibenzofuran		•			
Hexachlorobenzene		•	•		
Phenol		•	•		
Polycyclic aromatic hydrocarbon (total)		•	•		
Pesticides/Polychlorinated Biphenyls					
Aldrin			•		
Chlordane isomers		•	•		
DDT and metabolites		•	•		•
Dieldrin		•	•		
Endrin					•
Hexachlorocyclohexanes			•		
Heptachlor and heptachlor epoxide		•			
Polychlorinated biphenyls (total)		•	•		•
Dioxins/Furans					
Total dioxins/furans		•			•

Note: • – Contaminants of concern assessed in the BERA for the specific media listed.
 DDT – dichlorodiphenyltrichloroethane

Table ES-2. Contaminants of Concern for Wildlife Species Evaluated in the Onondaga Lake BERA

Chemicals of Concern	Tree Swallow	Mallard	Belted Kingfisher	Great Blue Heron	Osprey	Red-Tailed Hawk	Little Brown Bat	Short-Tailed Shrew	Mink	River Otter
Metals										
Antimony							•	•		
Arsenic	•						•	•	•	•
Barium	•	•					•	•		
Cadmium	•	•					•	•		
Chromium	•	•	•	•	•	•	•	•	•	•
Cobalt	•	•					•			
Copper	•	•					•			
Lead	•		•			•	•	•		
Manganese							•			
Mercury/Methylmercury	•	•	•	•	•	•	•	•	•	•
Nickel	•	•					•			
Selenium	•		•	•	•		•	•	•	•
Thallium	•						•	•		
Vanadium	•	•					•	•	•	•
Zinc	•	•	•	•	•		•	•		
Volatile Organic Compounds										
Dichlorobenzenes (total)	•	•								
Trichlorobenzenes (total)	•	•					•	•		
Xylenes (total)	•	•					•			
Semivolatile Organic Compounds										
Bis(2-ethylhexyl)phthalate	•									
Hexachlorobenzene							•	•	•	
Polycyclic aromatic hydrocarbon (total)	•	•	•	•		•	•	•	•	•
Pesticides/Polychlorinated Biphenyls										
Chlordanes								•		
DDT and metabolites	•		•	•	•	•			•	
Dieldrin							•	•	•	•
Endrin			•							
Hexachlorocyclohexanes			•	•	•					
Polychlorinated biphenyls (total)	•	•	•	•	•		•	•	•	•
Dioxins/Furans										
Dioxins/furans (TEQ)	•	•	•		•	•	•	•	•	•

Notes • – Contaminants of concern (COC) assessed in the BERA for the specific receptor listed.

DDT – dichlorodiphenyltrichloroethane

TEQ – toxicity equivalent

Table ES-3. Comparison of Various Site-Specific Sediment Effect Concentrations and Probable Effect Concentrations for Onondaga Lake, 1992 Data^{ab}

	AET	ER-L	ER-M	TEL	PEL	PEC
Metals (mg/kg)						
Antimony	NC	3.1	3.1	4	4.3	3.6
Arsenic	4.3	0.9	4.4	1.3	3.6	2.4
Cadmium	8.6	0.9	2.1	1.4	3.1	2.4
Chromium	195	18	48	29	67	50
Copper	84	12	41	19	48	33
Lead	116	9.7	57	13	58	35
Manganese	445	197	280	231	295	278
Total mercury	13	0.5	2.8	1.0	2.8	2.2
Nickel	50	5.2	21	8.4	26	16
Selenium	0.9	0.4	0.6	0.4	0.7	0.6
Silver	2.7	0.8	1.2	0.9	1.4	1.3
Vanadium	12	2.7	6.0	3.4	8.3	5.6
Zinc	218	38	95	57	12	88
Organic Compounds						
BTEX Compounds (µg/kg)						
Benzene	5,300	27	42	42.4	299	150
Ethylbenzene	13	142	657	206	657	176
Toluene	443	13	28	16	50	42
Xylenes	606	153	1,640	367	997	561
Chlorinated Benzenes (µg/kg)						
Chlorobenzene	10,000	64	580	48	799	428
Dichlorobenzenes	1,373	21.5	773	44	765	239
Trichlorobenzenes	287	186	930	209	482	347
Hexachlorobenzene	28	7.2	28	8.9	24	16
Polychlorinated Biphenyls (µg/kg)						
Aroclor 1016	90	99	135	104	135	111
Aroclor 1248	470	82	300	99	307	204
Aroclor 1254	77	69	83	74	80	76
Aroclor 1260	240	80	240	115	221	164
Total PCBs	710	136	400	151	382	295
PAH Compounds (µg/kg)						
Naphthalene	2,100	340	1,400	471	1,380	917
Acenaphthene	1,700	469	1,200	478	1,030	861
Fluorene	3,500	55	305	66.9	327	264
Phenanthrene	16,000	92	480	135	491	543
Anthracene	4,400	33	210	49.6	249	207
Fluoranthene	26,000	140	1,400	483	2,482	1,436
Pyrene	NC	114	650	238	795	344
Benz[a]anthracene	NC	61	415	118	451	192
Chrysene	NC	100	440	172	541	253
Benzo[b]fluoranthene	1,100	63	240	81	253	908
Benzo[a]pyrene	NC	63	210	98	355	146
Indeno[1,2,3-cd]pyrene	NC	59	370	102	503	183
Dibenz[a,h]anthracene	730	49	180	67.7	218	157
Benzo[ghi]perylene	2,700	228	1,300	307	1,170	780
Acenaphthylene	3,000	507	1,850	673	1,970	1,301
Benzo[k]fluoranthene	1,100	63	240	81	253	203
Dibenzofuran	NC	340	340	295	561	372

Table ES-3. (cont.)

	AET	ER-L	ER-M	TEL	PEL	PEC
Other SVOCs (µg/kg)						
Phenol	45	45	45	45	45	45
Pesticides (µg/kg)						
DDT and Metabolites	16	47	47	24	27	30
Chlordane	NC	NC	NC	5.1	5.1	5.1

Notes:

^a All concentrations in dry weight

^b Maps of exceedances of ER-L, ER-M, TEL, PEL and PEC values are presented in Appendix F.

AET - apparent effects threshold

BTX - benzene, toluene, xylenes

DDT – dichlorodiphenyltrichloroethane

ER-L - effects-range low

ER-M - effects-range median

NC - value was not calculated because of an insufficient number of detected observations

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PEC - Probable Effect Concentration

PEL - probable effect level

TEL - threshold effect level

Table ES-4. Hazard Quotients for Measured Fish Concentrations

COC	Bluegill		Bluegill		Gizzard Shad		Gizzard Shad	
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Bluegill Mean HQ NOAEL	Bluegill Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Antimony	0**	0**	0**	0**	0*	0*	0*	0*
Arsenic	1.4	0.5	0.7	0.3	0*	0*	0*	0*
Chromium	61	18	16	4.6	0*	0*	0*	0*
Mercury	5.4	1.8	2.7	0.9	0*	0*	0*	0*
Methylmercury	3.5	1.2	2.8	0.9	2.3	0.8	2.1	0.7
Selenium	15	1.5	9.2	0.9	0*	0*	0*	0*
Vanadium	29	2.9	20	2.0	0*	0*	0*	0*
Zinc	3.2	2.7	2.1	1.8	0*	0*	0*	0*
Endrin	0.2	2.3E-02	0.1	1.5E-02	0*	0*	0*	0*
DDT and metabolites	4.7E-02	9.7E-03	3.9E-02	8.0E-03	0*	0*	0*	0*
Polychlorinated biphenyls	0.5	0.1	0.3	0.1	0*	0*	0*	0*
Dioxin/furan TEQ (Fish)	0.4	0.2	0.1	0.1	0*	0*	0*	0*

Table ES-4. (cont.)

CoC	Carp		Carp		Catfish		Catfish	
	95%UCL NOAEL	HQ 95%UCL LOAEL	Mean HQ NOAEL	Mean HQ LOAEL	95%UCL NOAEL	HQ 95%UCL LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Antimony	0**	0**	0**	0**	0.4	0.2	6.3E-02	3.5E-02
Arsenic	4.0	1.5	1.7	0.6	0**	0**	0**	0**
Chromium	21	6.2	7.2	2.1	5.7	1.7	3.1	0.9
Mercury	4.3	1.4	3.5	1.2	6.3	2.1	4.9	1.6
Methylmercury	4.8	1.6	3.9	1.3	7.8	2.6	7.1	2.4
Selenium	20	2.0	10	1.0	13	1.3	7.6	0.8
Vanadium	24	2.4	13	1.3	27	2.7	20	2.0
Zinc	13	11	6.1	5.2	2.2	1.8	1.2	1.0
Endrin	1.0	0.1	0.5	0.0	0.8	0.1	0.5	0.0
DDT and metabolites	0.4	0.1	0.3	0.1	0.6	0.1	0.3	0.1
Polychlorinated biphenyls	2.5	0.5	1.6	0.3	2.1	0.4	1.5	0.3
Dioxin/furan TEQ (Fish)	2.6	1.2	1.0	0.5	0.6	0.3	0.4	0.2

Table ES-4. (cont.)

CoC	White Perch	White Perch	White Perch	White Perch	SMB	SMB	SMB Mean HQ (NOAEL)	SMB Mean HQ (LOAEL)
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL		
Antimony	0.4	0.2	0.4	0.2	0**	0**	0**	0**
Arsenic	0**	0**	0**	0**	3.6	1.4	2.4	0.9
Chromium	2.5	0.7	2.5	0.7	3.2	0.9	2.3	0.7
Mercury	7.7	2.6	7.0	2.3	7.3	2.4	7.0	2.3
Methylmercury	12	4.1	11	3.6	8.2	2.7	7.2	2.4
Selenium	7.8	0.8	7.8	0.8	10	1.0	4.8	0.5
Vanadium	0**	0**	0**	0**	20	2.0	11	1.1
Zinc	0.5	0.4	0.5	0.4	1.6	1.4	1.1	0.9
Endrin	0.1	1.4E-02	0.1	1.2E-02	0.2	1.7E-02	0.2	1.6E-02
DDT and metabolites	0.2	3.5E-02	0.1	1.3E-02	0.1	2.1E-02	0.1	1.5E-02
Polychlorinated biphenyls	1.3	0.3	1.1	0.2	1.0	0.2	0.9	0.2
Dioxin/furan TEQ (Fish)	0.5	0.3	0.4	0.2	0.5	0.2	0.3	0.1

Table ES-4. (cont.)

CoC	LMB		LMB		Walleye		Walleye	
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	LMB Mean HQ NOAEL	LMB Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Walleye Mean HQ NOAEL	Walleye Mean HQ LOAEL
Antimony	NA	NA	NA	NA	0**	0**	0**	0**
Arsenic	0*	0*	0*	0*	0**	0**	0**	0**
Chromium	0*	0*	0*	0*	3.2	0.9	3.2	0.9
Mercury	6.9	2.3	6.6	2.2	15	5.2	14	4.6
Methylmercury	0*	0*	0*	0*	18	6.1	15	5.1
Selenium	0*	0*	0*	0*	0**	0**	0**	0**
Vanadium	0*	0*	0*	0*	0**	0**	0**	0**
Zinc	0*	0*	0*	0*	0**	0**	0**	0**
Endrin	0**	0**	0**	0**	0.3	2.7E-02	0.1	1.3E-02
DDT and metabolites	0.1	1.2E-02	2.9E-02	6.1E-03	0.2	3.6E-02	0.1	2.1E-02
Polychlorinated biphenyls	0.7	0.1	0.4	0.1	2.8	0.6	1.5	0.3
Dioxin/furan TEQ (Fish)	1.4	0.7	0.9	0.4	0*	0*	0*	0*

Notes:

* denotes not analyzed

** denotes all non-detects

Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

LMB – largemouth bass

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

SMB – smallmouth bass

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table ES-5. Hazard Quotients for Modeled Avian Exposure

COC	Tree Swallow				Mallard				Belted Kingfisher			
	95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ	
	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL
Metals												
Arsenic	0.1	4.4E-02	0.1	3.1E-02	NS	NS	NS	NS	NS	NS	NS	NS
Barium	10	5.1	8.3	4.1	2.4	1.2	1.8	0.9	NS	NS	NS	NS
Cadmium	7.0	0.5	4.6	0.3	1.0	0.1	0.7	4.7E-02	NS	NS	NS	NS
Chromium	53	11	57	11	10	2.1	9.7	1.9	0.2	3.8E-02	0.2	3.6E-02
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS	NS
Copper	0.8	0.6	0.6	0.5	0.2	0.1	0.1	0.1	NS	NS	NS	NS
Lead	1.8	0.2	1.3	0.1	NS	NS	NS	NS	0.1	1.4E-02	0.1	8.7E-03
Methylmercury	19	1.9	11	1.1	4.3	0.4	2.7	0.3	23	2.3	20	2.0
Mercury	6.5	3.3	3.1	1.5	0.9	0.4	0.7	0.3	0.7	0.3	0.6	0.3
Nickel	0.2	0.1	0.2	0.1	3.9E-02	2.8E-02	3.7E-02	2.7E-02	NS	NS	NS	NS
Selenium	6.8	3.4	5.4	2.7	NS	NS	NS	NS	3.9E-03	2.0E-03	3.1E-03	1.5E-03
Thallium	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.1	1.1E-02	0.1	7.9E-03	2.6E-02	2.6E-03	1.5E-02	1.5E-03	NS	NS	NS	NS
Zinc	6.4	0.7	5.6	0.6	1.2	0.1	1.0	0.1	1.0E-02	1.1E-03	8.6E-03	9.5E-04
Volatile Organic Compounds												
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS	NS
Dichlorobenzenes	3.0	0.3	1.4	0.1	2.1	0.2	0.3	3.3E-02	NS	NS	NS	NS
Trichlorobenzenes	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS	NS
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	0.7	0.1	0.6	0.1	NS	NS	NS	NS	NS	NS	NS	NS
Polycyclic aromatic hydrocarbons	287	29	292	29	393	39	118	12	12	1.2	3.7	0.4
Pesticides/Polychlorinated Biphenyls												
Endrin	NS	NS	NS	NS	NS	NS	NS	NS	2.9E-04	2.9E-05	2.4E-04	2.4E-05
Hexachlorocyclohexanes	NS	NS	NS	NS	NS	NS	NS	NS	2.2E-05	7.2E-06	2.0E-05	6.3E-06
DDT and metabolites	0.8	0.1	0.6	0.1	0.2	2.0E-02	0.1	1.4E-02	19	1.9	12	1.2
Polychlorinated biphenyls (PCBs)	1.9	0.2	1.8	0.2	0.4	3.9E-02	0.3	3.0E-02	11	1.1	3.1	0.3
Dioxins/Furans												
Dioxins/furans (TEQ) avian	5.6	0.6	1.3	0.1	1.4	0.1	0.3	3.1E-02	1.8	0.2	1.4	0.1

Table ES-5. (cont.)

COC	Great Blue Heron				Osprey				Red-tailed Hawk			
	95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ	
	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL
Metals												
Arsenic	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.1	2.7E-02	0.1	2.5E-02	0.1	2.1E-02	0.1	1.9E-02	0.2	4.7E-02	0.2	3.4E-02
Cobalt	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	NS	NS	NS	NS	NS	NS	NS	NS	0.4	4.2E-02	0.3	3.0E-02
Methylmercury	18	1.8	15	1.5	24	2.4	20	2.0	0.3	2.7E-02	0.1	7.2E-03
Mercury	0.3	0.1	0.3	0.1	0.3	0.2	0.3	0.2	0.1	7.1E-02	0.0	1.3E-02
Nickel	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.5	0.2	0.4	0.2	0.7	0.4	0.5	0.3	NS	NS	NS	NS
Thallium	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	1.1	0.1	0.8	0.1	1.6	0.2	1.2	0.1	NS	NS	NS	NS
Volatile Organic Compounds												
Xylenes	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dichlorobenzenes	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Trichlorobenzenes	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Polycyclic aromatic hydrocarbons	4.0	0.4	1.2	0.1	NA	NA	NA	NA	252	25	14	1.4
Pesticides/Polychlorinated Biphenyls												
Endrin	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Hexachlorocyclohexanes	1.0E-02	3.3E-03	0.2	0.1	1.5E-02	4.8E-03	0.3	0.1	NS	NS	NS	NS
DDT and metabolites	8.0	0.8	5.3	0.5	9.3	0.9	6.3	0.6	1.5	0.2	0.3	0.0
Polychlorinated biphenyls (PCBs)	2.7	0.3	1.4	0.1	2.5	0.3	0.2	2.5E-02	NS	NS	NS	NS
Dioxins/Furans												
Dioxins/furans (TEQ) avian	NS	NS	NS	NS	0.6	0.1	0.4	4.3E-02	9.9	0.99	1.0	0.1

Notes: NA = Not Available; NS = Not selected as a COC for this receptor.

Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table ES-6. Hazard Quotients for Modeled Mammalian Exposure

COC	Little Brown Bat				Mink				River Otter			
	95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ		95% UCL HQ		Mean HQ	
	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL	NOAEL/LOAEL
Metals												
Arsenic	1.1	0.1	0.8	0.1	0.2	1.7E-02	0.1	1.1E-02	0.8	0.1	0.5	0.1
Barium	2.1	1.3	1.7	1.0	NS							
Cadmium	4.5	0.5	3.0	0.3	NS							
Chromium	7.2	1.8	7.8	1.9	0.7	0.2	0.6	0.2	0.3	0.1	0.3	0.1
Cobalt	0.4	3.9E-02	0.3	3.4E-02	NS							
Copper	1.4	1.1	1.1	0.9	NS							
Lead	0.1	1.2E-02	0.1	8.8E-03	NS							
Manganese	3.8E-02	1.2E-02	3.5E-02	1.1E-02	NS							
Methylmercury	21	2.1	13	1.3	12	1.2	9.4	0.9	43	4.3	36	3.6
Mercury	1.3	0.1	0.6	0.1	0.1	1.4E-02	0.1	9.9E-03	0.1	1.5E-02	0.1	1.4E-02
Nickel	0.1	0.1	0.2	8.0E-02	NS							
Selenium	0.21	0.13	0.16	0.1	0.1	0.1	0.1	7.1E-02	0.9	0.5	0.7	0.4
Thallium	0.1	7.9E-03	0.1	7.1E-03	NS							
Vanadium	2.7	0.3	1.9	0.2	0.3	2.8E-02	0.7	6.7E-02	0.8	0.1	0.6	0.1
Zinc	0.26	0.13	0.22	0.11	NS							
Volatile Organic Compounds												
Trichlorobenzenes	2.8E-02	7.8E-03	0.1	1.7E-02	NS							
Xylenes	2.3	1.9	0.5	0.4	NS							
Semivolatile Organic Compounds												
Hexachlorobenzene	6.0	0.6	4.6	0.5	9.2	0.9	1.1	0.1	NS	NS	NS	NS
Polycyclic aromatic hydrocarbons	18	1.8	19	1.9	33	3.3	4.5	0.4	5.2	0.5	1.6	0.2
Pesticides/Polychlorinated Biphenyls												
DDT and metabolites	NS	NS	NS	NS	1.5E-02	2.9E-03	7.5E-03	1.5E-03	5.9	1.2	2.3	4.5E-01
Dieldrin	0.6	0.3	0.5	0.2	0.2	0.1	0.1	0.1	0.2	7.7E-02	0.1	4.4E-02
Polychlorinated biphenyls (PCBs)	0.4	0.1	0.4	0.1	109	11	34	3.4	130	13	69	6.9
Dioxins/Furans												
Dioxins/furans (TEQ) mammalian	11	1.1	2.9	0.3	42	4.2	4.9	0.5	2.8	0.3	1.5	0.2

Notes: NA = Not Available; NS = Not selected as a COC for this receptor. Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

LOAEL – lowest-observed-adverse-effect level

UCL – upper confidence limit

Table ES-7. Hazard Quotients for Modeled Short-Tailed Shrew Exposure in Wetlands and Dredge Spoils Area

COC	SYW-6		SYW-6		SYW-19		SYW-19	
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	SYW-6 Mean HQ NOAEL	SYW-6 Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL	SYW-19 Mean HQ NOAEL	SYW-19 Mean HQ LOAEL
Total Metals								
Antimony	0.4	3.6E-02	0.1	9.5E-03	0.2	1.8E-02	0.1	1.0E-02
Arsenic	2.0	0.2	1.1	0.1	2.8	0.3	2.3	0.2
Barium	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.1
Beryllium	1.9E-02	1.9E-03	1.5E-02	1.5E-03	2.6E-02	2.6E-03	2.2E-02	2.2E-03
Cadmium	11	1.1	3.5	0.4	2.5	0.3	1.6	0.2
Chromium	1.0	0.2	0.3	0.1	0.3	0.1	0.3	0.1
Lead	1.5	0.1	0.7	0.1	2.1	0.2	1.0	0.1
Methylmercury	22	2.2	19	1.9	29	2.9	27	2.7
Mercury	0.2	1.9E-02	0.1	1.1E-02	0.6	6.3E-02	0.4	4.1E-02
Nickel	3.3E-02	1.6E-02	1.5E-02	7.5E-03	2.2E-02	1.1E-02	1.6E-02	8.1E-03
Selenium	1.7	1.0	0.6	0.4	1.2	0.8	1.1	0.7
Thallium	2.6	0.3	1.4	0.1	ND	ND	ND	ND
Vanadium	2.9	0.3	1.8	0.2	1.7	0.2	1.6	0.2
Zinc	0.7	0.4	0.5	0.2	0.4	0.2	0.4	0.2
Volatile Organic Compounds								
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06	3.4	0.9	1.2	0.3
Semivolatile Organic Compounds								
Hexachlorobenzene	ND	ND	ND	ND	783	78	241	24
PAHs	213	21	47	4.7	2,565	256	794	79
Pesticides/Polychlorinated Biphenyls								
Chlordane	ND	ND	ND	ND	0.6	0.1	0.2	4.2E-02
Dieldrin	ND	ND	ND	ND	7.3	3.7	5.0	2.5
PCBs	3.9E-02	9.7E-03	2.8E-02	6.9E-03	1.8	0.5	1.4	0.4
Dioxins/Furans								
Dioxins/furans (TEQ)	15	1.5	5.9	0.6	1,706	171	681	68

Table ES-7. (cont.)

COC	SYW-12		SYW-12		SYW-10		SYW-10	
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	SYW-12 Mean HQ NOAEL	SYW-12 Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL	SYW-10 Mean HQ NOAEL	SYW-10 Mean HQ LOAEL
Total Metals								
Antimony	0.1	9.5E-03	4.7E-02	4.7E-03	8.3E-02	8.3E-03	4.5E-02	4.5E-03
Arsenic	1.4	0.1	0.99	9.9E-02	5.3	0.5	2.3	0.2
Barium	0.1	0.1	0.1	4.6E-02	0.1	7.3E-02	0.1	4.9E-02
Beryllium	1.8E-02	1.8E-03	1.2E-02	1.2E-03	5.0E-02	5.0E-03	2.4E-02	2.4E-03
Cadmium	7.5	0.8	5.0	0.5	1.2	0.1	0.7	0.1
Chromium	0.7	0.2	0.4	0.1	0.3	0.1	0.2	4.3E-02
Lead	1.0	0.1	0.7	0.1	1.0	0.1	0.6	0.1
Methylmercury	19	1.9	19	1.9	22	2.2	20	2.0
Mercury	0.1	1.2E-02	9.4E-02	9.4E-03	0.2	1.7E-02	0.1	1.3E-02
Nickel	1.6E-02	8.1E-03	9.9E-03	4.9E-03	1.7E-02	8.6E-03	1.0E-02	5.1E-03
Selenium	0.7	0.5	0.4	0.3	1.3	0.8	0.7	0.4
Thallium	ND	ND	ND	ND	4.3	0.4	2.8	0.3
Vanadium	2.0	0.2	1.1	0.1	3.9	0.4	2.0	0.2
Zinc	0.5	0.3	0.5	0.2	0.4	0.2	0.4	0.2
Volatile Organic Compounds								
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06	5.8E-06	1.6E-06	5.6E-06	1.6E-06
Semivolatile Organic Compounds								
Hexachlorobenzene	1.8	0.2	0.5	4.9E-02	2.0	0.2	1.5	0.1
PAHs	191	19	61	6.1	155	15.5	38	3.8
Pesticides/Polychlorinated Biphenyls								
Chlordane	0.1	2.6E-02	0.1	1.3E-02	ND	ND	ND	ND
Dieldrin	1.1	0.6	0.6	0.3	ND	ND	ND	ND
PCBs	0.4	0.1	0.2	0.1	0.1	3.5E-02	5.9E-02	1.5E-02
Dioxins/Furans								
Dioxins/furans (TEQ)	NA	NA	NA	NA	4.4	0.4	3.6	0.4

Table ES-7. (cont.)

COC	Dredge	Dredge	Dredge	Dredge
	Spoils 95% UCL HQ NOAEL	Spoils 95% UCL HQ LOAEL	Spoils Mean HQ NOAEL	Spoils Mean HQ LOAEL
Total Metals				
Antimony	0.1	6.5E-03	4.9E-02	4.9E-03
Arsenic	2.7	0.3	1.9	0.2
Barium	6.0E-02	3.6E-02	5.6E-02	3.3E-02
Beryllium	2.3E-02	2.3E-03	1.8E-02	1.8E-03
Cadmium	1.7E-04	1.7E-05	1.7E-04	1.7E-05
Chromium	0.2	4.6E-02	0.1	2.7E-02
Lead	0.2	1.7E-02	0.1	1.4E-02
Methylmercury	0.1	6.8E-03	5.E-02	5.E-03
Mercury	0.2	1.8E-02	9.E-02	9.E-03
Nickel	8.5E-03	4.3E-03	7.0E-03	3.5E-03
Selenium	1.1	0.7	0.8	0.5
Thallium	ND	ND	ND	ND
Vanadium	3.7	0.4	2.4	0.2
Zinc	0.3	0.2	0.3	0.1
Volatile Organic Compounds				
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06
Semivolatile Organic Compounds				
Hexachlorobenzene	38	3.8	4.6	0.5
PAHs	9.0	0.9	2.0	0.2
Pesticides/Polychlorinated Biphenyls				
Chlordane	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA
PCBs	3.4E-02	8.6E-03	1.7E-02	4.3E-03
Dioxins/Furans				
Dioxins/furans (TEQ)	0.7	0.1	0.4	4.2E-02

Notes:

NA = Not available, ND = Not detected

Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

PAH - polycyclic aromatic hydrocarbon

HQ – hazard quotient

PCB - polychlorinated biphenyl

LOAEL – lowest-observed-adverse-effect level

TEQ – toxicity equivalence quotient

NOAEL – no-observed-adverse-effect level

UCL – upper confidence limit

**Table 3-1. Minimum and Maximum Elevations of Onondaga Lake
for the 10-Year Period 1983 to 1992^a**

Year	Elevation		Difference in Elevation (ft)
	Minimum	Maximum	
1983	362.4	367.1	4.7
1984	362.4	365.8	3.4
1985	362.5	365.6	3.1
1986	362.0	365.7	3.7
1987	362.1	364.4	2.3
1988	362.4	363.9	1.5
1989	362.2	366.1	3.9
1990	362.5	365.8	3.3
1991	362.5	365.8	3.3
1992	362.6	365.8	3.2

Source: USGS unpublished data records.

^a Elevations are expressed in feet above sea level.

Table 3-2. Characteristics of NYSDEC-regulated Wetlands Within 2 miles (3.2 km) of Onondaga Lake

Wetland Identification Code	Class	Area (ha)	Predominant Vegetation
SYW-1	I	54.4	Deciduous trees and shrubs mixed with emergent vegetation
SYW-3	II	13.4	Deciduous trees and shrubs mixed with emergent vegetation; pockets of meadow vegetation present
SYW-4	III	5.3	Deciduous trees
SYW-6	I	40.6	Emergent vegetation and deciduous shrubs dominate; living and dead deciduous trees and floating vegetation also present
SYW-8	II	13.0	Deciduous trees and shrubs and emergent vegetation
SYW-10	I	11.0	Deciduous trees and shrubs and emergent vegetation
SYW-11	II	16.6	Reeds (<i>Phragmites</i>)
SYW-12	I	16.5	Reeds are dominant, some deciduous trees and shrubs also present
SYW-14	III	5.0	Emergent vegetation; herbaceous and shrubby successional vegetation
SYW-15	II	20.7	Emergent vegetation dominates with wet-meadow vegetation, dead trees, living deciduous shrubs, and a few living deciduous trees
SYW-18	II	11.0	Reeds are dominant ^a
SYW-19	II	8.0	Reeds are dominant ^a
BAL-29	II	68.9	Deciduous trees and shrubs and emergent vegetation dominate; wet meadow and upland vegetation also present

Table 3-2.(cont.)

Wetland Identification Code	Class	Area (ha)	Predominant Vegetation
BRE-19	II	144.76	Deciduous trees and shrubs; emergent and wet meadow vegetation
BRE-21	II	27.4	Emergent vegetation, deciduous trees and shrubs, and upland vegetation
BRE-22	I	12.6	Deciduous trees and shrubs, wet meadow vegetation, and emergent vegetation
BRE-23	II	16.8	Emergent vegetation dominates; deciduous trees, shrubs, and some dead trees also present
CAM-6	I	70.7	Deciduous trees and emergent vegetation, with some deciduous shrubs and wet meadow vegetation
CAM-7	II	5.6	Deciduous trees, emergent and floating vegetation
CAM-15	III	8.3	Deciduous shrubs are dominant; wet meadow vegetation, dead/living deciduous trees present
CAM-16	II	8.4	Wet meadow vegetation and deciduous trees and shrubs
CAM-21	II	126.7	Deciduous trees and shrubs, dead trees, emergent vegetation, and wet-meadow vegetation

Sources: Rhodes and Alexander (1980)

^a Monastory (1995, pers. comm.)

Table 3-3. Attributes of NWI Wetlands Within 2 Miles (3.2 km) of Onondaga Lake

Number in Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
1	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
2	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Excavated
3	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
4	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
5	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Excavated
6	PSS1F	Palustrine	Scrub-shrub	Broad-leaved deciduous	Semipermanently flooded	–
7	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
8	PSS1F	Palustrine	Scrub-shrub	Broad-leaved deciduous	Semipermanently flooded	–
11	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
13	PEM5F	Palustrine	Emergent	^a	Semipermanently flooded	–
18	PEM5C	Palustrine	Emergent	^a	Seasonally flooded	–
21	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
28	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
29	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
31	PFO1/SS1Cd	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded	Partly drained/ditched
32	PUBF	Palustrine	Unconsolidated bottom	–	Semipermanently flooded	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
33	PSS1/EM5A	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Temporarily flooded	–
34	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
35	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
36	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
37	PEM/UBF	Palustrine	Emergent/ unconsolidated bottom	–	Semipermanently flooded	–
42	L2UBKFhs	Lacustrine	Littoral/unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/ impounded, spoil
47	L2UBKFhs	Lacustrine	Littoral/unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/ impounded, spoil
48	L2UBKFhs	Lacustrine	Littoral/unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/ impounded, spoil
74	R2UBH	Riverine	Low perennial/ unconsolidated bottom	–	Permanently flooded	–
75	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
76	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
77	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
78	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
79	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
80	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
81	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
82	L2UBH	Lacustrine	Littoral/unconsolidated bottom	–	Permanently flooded	–
83	L1UBH	Lacustrine	Limnetic/unconsolidated bottom	–	Permanently flooded	–
84	L2UBG	Lacustrine	Littoral/Unconsolidated bottom	–	Intermittently exposed	–
85	L2UBH	Lacustrine	Littoral/Unconsolidated bottom	–	Permanently flooded	–
86	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
87	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
88	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
89	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
90	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Excavated
91	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
92	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
93	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
94	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
95	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
96	L2UBH	Lacustrine	Littoral	–	Permanently flooded	–
97	L2UBH	Lacustrine	Littoral	–	Permanently flooded	–
98	L2USCs	Lacustrine	Littoral	–	Seasonally flooded	Spoil

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
99	L2UBG	Lacustrine	Littoral	–	Intermittently exposed	–
100	PEM1E	Palustrine	Emergent	Persistent	Seasonally flooded/saturated	–
101	L2UBKFhs	Lacustrine	Littoral/unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/impounded, spoil
102	PUBKZh	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
103	L1UBKZh	Lacustrine	Limnetic	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
104	PUBKFhs	Palustrine	Unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/impounded, spoil
105	PUBKZhs	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded, spoil
106	L2UBKFhs	Lacustrine	Littoral	–	Artificially flooded, semipermanently flooded	Diked/impounded, spoil
107	PUBKFhs	Palustrine	Unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/impounded, spoil
108	L1UBZx	Lacustrine	Limnetic/unconsolidated bottom	–	Intermittently exposed/permanent	–
109	L2UBH	Lacustrine	Littoral/unconsolidated bottom	–	Permanently flooded	–
110	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Excavated
111	PUBKFhs	Palustrine	Unconsolidated bottom	–	Artificially flooded, semipermanently flooded	Diked/impounded, spoil

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
112	PEM1E	Palustrine	Emergent	Persistent	Seasonally flooded/saturated	–
113	PUBKZh	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
115	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
116	PUBKZh	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
117	PUBKZh	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
123	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
124	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
125	PFO1/SS1C	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded	–
126	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
127	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
129	PUBZh	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Diked/impounded
130	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
131	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
132	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
133	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
134	PEM5/UBFh	Palustrine	Emergent/ unconsolidated bottom	^a	Semipermanently flooded	Diked/ impounded
135	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
136	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
138	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
139	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
140	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
141	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
142	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
143	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
144	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
145	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
146	PSS1/EM5Cd	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded	Partially drained/ ditched
147	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
148	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
149	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
150	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
151	PSS1/EM5Cd	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded	Partially drained/ditched
152	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
153	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently flooded/permanent	Excavated
154	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
155	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
156	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
157	PFO5/1E	Palustrine	Forested	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
158	L2UBH	Lacustrine	Littoral/unconsolidated bottom	–	Permanently flooded	–
159	PEM1Cs	Palustrine	Emergent	Broad-leaved deciduous	Seasonally flooded	Spoil
160	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
161	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
162	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
163	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
164	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
166	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
167	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
168	PUBFx	Palustrine	Unconsolidated bottom	–	Semipermanently flooded	Excavated
169	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
170	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
171	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
172	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
173	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
174	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
175	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
176	PFO1A	Palustrine	Forested	Broad-leaved deciduous	Temporarily flooded	–
177	PSS1/EM5E	Palustrine	Scrub-shrub/emergent	Broad-leaved deciduous ^a	Seasonally flooded/saturated	–
178	PUBFx	Palustrine	Unconsolidated bottom	–	Semipermanently flooded	Excavated
179	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
180	L2BBAs	Lacustrine	Littoral	^b	Temporarily flooded	–
181	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
182	PEM1Cs	Palustrine	Emergent	Broad-leaved deciduous	Seasonally flooded	Spoil
183	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
184	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
185	PFO1Cd	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	Partially drained/ditched
186	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
187	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
188	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
189	PUBZx	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Excavated
190	PEM1Cs	Palustrine	Emergent	Broad-leaved deciduous	Seasonally flooded	Spoil
191	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
192	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
193	PUBKZh	Palustrine	Unconsolidated bottom	–	Artificially flooded, intermittently exposed/permanent	Diked/impounded
194	PUBZh	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Diked/impounded
195	PFO1E	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded/saturated	–
196	PSS1E	Palustrine	Scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
197	PEM5E	Palustrine	Emergent	^a	Seasonally flooded/saturated	–
198	PEM1Cs	Palustrine	Emergent	Broad-leaved deciduous	Seasonally flooded	Spoil
199	PEM1/UBFx	Palustrine	Emergent/ unconsolidated bottom	Broad-leaved deciduous	Semipermanently flooded	Excavated

Table 3-3. (cont.)

Number on Figure 3-3	Attribute	System	Class	Subclass	Water Regime	Special Modifiers
200	PFO1C	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	–
201	R2UBHx	Riverine	Lower perennial/ unconsolidated bottom	–	Permanently flooded	Excavated
202	PUBZh	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Diked/ impounded
203	PUBZh	Palustrine	Unconsolidated bottom	–	Intermittently exposed/permanent	Diked/ impounded
204	PFO1/SS1E	Palustrine	Forested/scrub-shrub	Broad-leaved deciduous	Seasonally flooded/saturated	–
205	PFO1Cd	Palustrine	Forested	Broad-leaved deciduous	Seasonally flooded	Partially drained/ ditched

Source: USFWS (1999)

Notes: ^a No definition is available for subclass "5"

^b No definition is available for subclass "BB"

Table 3-4. Phytoplankton Taxa Collected in Onondaga Lake in 1992

Species	Species
Green Algae	Diatoms
<i>Chlamydomonas</i> spp.	<i>Melosira granulata</i>
<i>Chlorogonium</i> sp.	<i>Coscinodiscus</i> sp.
<i>Heteromastix angulata</i>	<i>Cyclotella</i> spp.
<i>Platymonas elliptica</i>	<i>Stephanodiscus</i> spp.
<i>Schroederia setigera</i>	<i>Diatoma elongatum</i>
<i>Dictyosphaerium pulchellum</i>	<i>Diatoma tenue</i>
<i>Pediastrum duplex</i>	<i>Fragilaria crotonensis</i>
<i>Coelastrum microporum</i>	<i>Synedra</i> spp.
<i>Chlorella vulgaris</i>	<i>Asterionella formosa</i>
<i>Oocystis parva</i>	<i>Navicula</i> sp.
<i>Ankistrodesmus falcatus</i>	<i>Nitzschia palea</i>
<i>Scenedesmus obliquus</i>	Dinoflagellates
<i>Scenedesmus quadricauda</i>	<i>Ceratium hirundinella</i>
<i>Kirchneriella elongata</i>	Cryptomonads
<i>Quadrigula lacustris</i>	<i>Chroomonas</i> sp.
<i>Cruciginia tetrapedia</i>	<i>Cryptomonas erosa</i>
<i>Cosmarium</i> sp.	Blue-Green Algae
<i>Straurastrum</i> sp.	<i>Microcystis</i> sp.
	<i>Anabaena</i> spp.
	<i>Aphanizomenon flos-aquae</i>
	<i>Raphidiopsis</i> sp.

Sources: PTI (1993c); Stearns & Wheler (1994)

**Table 3-5. Zooplankton Taxa Collected in Onondaga Lake
Between 1986 and 1989**

Species	Relative Abundance
Cladocerans	
<i>Bosmina longirostris</i>	C
<i>Ceriodaphnia quadrangula</i>	C
<i>Daphnia galeata</i>	C
<i>Daphnia pulex</i>	C
<i>Diaphanosoma leuchtenbergianum</i>	C
<i>Eubosmina coregoni</i>	R
<i>Leptodora kindtii</i>	R
Copepods	
<i>Cyclops bicuspidatus</i>	R
<i>Cyclops vernalis</i>	C
<i>Diaptomus siciloides</i>	C
Rotifers	
<i>Brachionus angularis</i>	C
<i>Brachionus calyciflorus</i>	C
<i>Brachionus variabilis</i>	C
<i>Filinia longiseta</i>	C
<i>Filinia terminalis</i>	C
<i>Kellicottia bostoniensis</i>	C
<i>Kellicottia longispina</i>	C
<i>Keratella cochlearis</i>	R
<i>Keratella quadrata</i>	C
<i>Keratella robusta</i>	C
<i>Keratella testudo</i>	C
<i>Nothalca squamula</i>	R
<i>Ploesoma truncatum</i>	R
<i>Polyarthra</i> sp.	C
<i>Trichocerca multicrotinus</i>	R

Source: Siegfried et al. (1996)

Note: R - rare
C - common

Table 3-6. Benthic Macroinvertebrate Taxa Collected in Onondaga Lake in 1992 and 2000

Phylum	Class	Order	Family	Genus/Species
Nematoda				
Platyhelminthes	Turbellaria	Seriata	Planariidae	<i>Dugesia</i> <i>Dugesia tigrina</i>
Rhynchocoela				
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae	<i>Stylodrilus heringianus</i>
		Oligochaeta (Tubificida)	Naididae	<i>Dero</i> <i>Dero digitata</i> <i>Nais bretscheri</i> <i>Nais communis</i> <i>Ophidonais serpentina</i> <i>Stylaria lacustris</i> <i>Vejdovskyella intermedia</i>
			Tubificidae	<i>Aulodrilus pigueti</i> <i>Ilyodrilus templetoni</i> <i>Limnodrilus</i> <i>Limnodrilus cervix</i> <i>Limnodrilus cervix variant</i> <i>Limnodrilus claparedeianus</i> <i>Limnodrilus hoffmeisteri</i> <i>Limnodrilus profundicola</i> <i>Limnodrilus udekemianus</i> <i>Potamothrix bavaricus</i> <i>Potamothrix moldaviensis</i> <i>Quistadrilus multisetosus</i> <i>Tubifex tubifex</i>
Mollusca	Bivalvia	Heterodonta	Dreissenidae	<i>Dreissena polymorpha</i>
			Sphaeriidae	<i>Pisidium</i> <i>Pisidium casertanum</i>

Table 3-6. (cont.)

Phylum	Class	Order	Family	Genus/Species
	Gastropoda	Basommatophora	Physidae	<i>Physa</i> <i>Physa gyrina</i> <i>Physa heterostropha</i> <i>Physa</i> sp. B
			Planorbidae	<i>Gyraulus</i> <i>Gyraulus circumstriatus</i>
		Mesogastropoda	Valvatidae	<i>Valvata piscinalis</i> <i>Gyraulus parvus</i>
	Pelecypoda	Heterodonta	Dreissenidae	<i>Dreissina polymorpha</i>
			Sphaeriidae	<i>Pisidium compressum</i> <i>Pisidium dubium</i> <i>Pisidium walkeri</i> <i>Sphaerium</i> <i>Sphaerium corneum</i> <i>Sphaerium fabale</i> <i>Sphaerium nitidum</i> <i>Sphaerium patella</i> <i>Sphaerium rhomboideum</i>
Arthropoda	Arachnida	Acarina	Sperchontidae	<i>Sperchon</i> <i>Sperchon</i> sp. B
			Unionicolidae	<i>Neumania</i> <i>Neumania</i> sp. A
		Amphipoda	Gammaridae	<i>Gammarus</i>
		Hydrachnida		
		Trombidiformes	Limnesiidae	<i>Limnesia</i>

Table 3-6. (cont.)

Phylum	Class	Order	Family	Genus/Species		
Arthropoda	Crustacea			<i>Gammarus fasciatus</i>		
				<i>Gammarus pseudolimnaeus</i>		
				<i>Gammarus tigrinus</i>		
		Diplostraca	Macrothricidae	<i>Ilyocryptus</i>		
		Isopoda	Asellidae	<i>Caecidotea</i>		
				<i>Caecidotea racovitzai</i>		
		Podocopa	Cypridae			
		Arthropoda	Insecta	Coleoptera	Elmidae	<i>Dubiraphia</i>
						<i>Macronychus</i>
						<i>Stenelmis</i>
	Staphylinidae					
Collembola	Entomobryidae			<i>Entomobrya</i> sp. A		
Diptera						<i>Chironomini-tribe</i>
						<i>Chironomidae</i> genus AM
						<i>Chironomidae</i> genus BG
						<i>Chironomidae</i> genus S
						<i>Chironomidae</i> genus U
		<i>Chironomus</i>				
		<i>Chironomus</i> cf. <i>Riparius</i>				
		<i>Chironomus crassicaudaus</i>				
		<i>Chironomus decorus</i> grp				
		<i>Chironomus plumosus</i>				
<i>Chironomus species A</i>						
<i>Cladopelma</i>						
<i>Cladotanytarsus</i>						
<i>Cricotopus</i>						
<i>Cricotopus sylvestris</i>						
<i>Cryptochironomus</i>						

Table 3-6. (cont.)

Phylum	Class	Order	Family	Genus/Species
				<i>Dicrotendipes</i>
				<i>Dicrotendipes modestus</i>
				<i>Einfeldia</i>
				<i>Endochironomus</i>
				<i>Glyptotendipes</i>
				<i>Labrundinia</i>
				<i>Nanocladius distinctus</i>
				<i>Parachironomus</i>
				<i>Parachironomus carinatus</i>
				<i>Parachironomus directus</i>
				<i>Paratanytarsus</i>
				<i>Polypedilum</i>
				<i>Polypedilum halterale</i>
				<i>Polypedilum simulans</i> group
				<i>Procladius</i>
				<i>Procladius species A</i>
				<i>Procladius-Holotanypus</i>
				<i>Psectrocladius</i>
				<i>Pseudochironomus</i>
				<i>Rheotanytarsus</i>
				<i>Tanypus</i>
				<i>Tanypus stellatus</i>
				<i>Tanytarsus</i>
				<i>Tanytarsus</i> sp. I
			Psychodidae	<i>Tanytarsus</i> sp. IV
				<i>Pericoma</i>
				<i>Psychoda</i>
			Tipulidae	<i>Psychoda alternata</i>
		Lepidoptera	Pyralidae	
		Odonata	Coenagrionidae	<i>Acentria</i>

Sources: PTI (1993c); Exponent 2001 data files.

Table 3-7. Fish Species Collected in Onondaga Lake in Selected Years Between 1927 and 1994^a

Common Name	Species	Year Captured								
		1927	1946	1969	1980	1989	1990	1991	1993	1994
Sea lamprey	<i>Petromyzon marinus</i>							•		
Gar	<i>Lepistosteus</i> sp.				•	•	•	•	•	•
Bowfin	<i>Amia calva</i>				•	•	•	•	•	•
Alewife	<i>Alosa pseudoharengus</i>		•		•	•		•	•	•
Gizzard shad	<i>Dorosoma cepedianum</i>				•	•	•	•	•	•
Rainbow trout	<i>Oncorhynchus mykiss</i>							•	•	•
Atlantic salmon	<i>Salmo salar</i>								•	•
Brown trout	<i>Salmo trutta</i>					•	•	•	•	•
Lake trout	<i>Salvelinus namaycush</i>				•					
Brook trout	<i>Salvelinus fontinalis</i>							•		
Splake	<i>Salvelinus</i> (hybrid) ^b						•			
Trout-perch	<i>Percopsis omiscomaycus</i>									•
Rainbow smelt	<i>Osmerus mordax</i>							•		•
Central mudminnow	<i>Umbra limi</i>							•	•	•
Northern pike	<i>Esox lucius</i>		•		•	•	•	•	•	•
Grass pickerel	<i>Esox americanus</i>	•								
Chain pickerel	<i>Esox niger</i>							•		•
Muskellunge	<i>Esox masquinongy</i> ^c									
Tiger muskellunge	<i>Esox</i> (hybrid)					•	•	•	•	•
Carp	<i>Cyprinus carpio</i>	•	•	•	•	•	•	•	•	•
Golden shiner	<i>Notemigonus crysoleucas</i>	•	•		•	•	•	•	•	•
Emerald shiner	<i>Notropis atherinoides</i>		•	•		•		•	•	•
Spottail shiner	<i>Notropis hudsonius</i>								•	•
Spotfin shiner	<i>Notropis spilopterus</i>							•	•	
Redfin shiner	<i>Notropis umbratilus</i> ^c									
Bluntnose minnow	<i>Pimephales notatus</i>	•						•	•	•
Fathead minnow	<i>Pimephales promelas</i>							•	•	•
Rudd	<i>Scardinius erythrophthalmus</i>							•	•	•
Fallfish	<i>Semotilus corporalis</i>									•
Creek chub	<i>Semotilus atromaculatus</i>							•		•
White sucker	<i>Catostomus commersoni</i>	•		•	•	•	•	•	•	•

Table 3-7. (cont.)

Common Name	Species	Year Captured								
		1927	1946	1969	1980	1989	1990	1991	1993	1994
White sucker	<i>Catostomus commersoni</i>	•		•	•	•	•	•	•	•
Northern hog sucker	<i>Hypentelium nigricans</i>									•
Redhorse	<i>Moxostoma sp.</i>	•	•	•	•	•	•	•	•	•
Yellow bullhead	<i>Ameiurus natalis</i>						•	•	•	•
Brown bullhead	<i>Ameiurus nebulosus</i>			•	•	•	•	•	•	•
Channel catfish	<i>Ictalurus punctatus</i>		•	•	•	•	•	•	•	•
American eel	<i>Anguilla rostrata</i>							•	•	
Banded killifish	<i>Fundulus diaphanus</i>	•	•			•	•	•	•	•
Burbot	<i>Lota lota</i>						•			
Brook silverside	<i>Labidesthes sicculus</i>					•	•	•		•
Brook stickleback	<i>Culaea inconstans</i>			•			•	•		
White perch	<i>Morone americana</i>			•	•	•	•	•	•	•
White bass	<i>Morone chrysops</i>		•			•	•	•	•	
Rock bass	<i>Ambloplites rupestris</i>					•	•	•	•	•
Green sunfish	<i>Lepomis cyanellus</i>							•		
Pumpkinseed	<i>Lepomis gibbosus</i>	•		•	•	•	•	•	•	•
Bluegill	<i>Lepomis macrochirus</i>			•	•	•	•	•	•	•
Smallmouth bass	<i>Micropterus dolomieu</i>			•	•	•	•	•	•	•
Largemouth bass	<i>Micropterus salmoides</i>	•			•	•	•	•	•	•
White crappie	<i>Pomoxis annularis</i>				•	•	•	•		•
Black crappie	<i>Pomoxis nigromaculatus</i>				•	•	•	•	•	•
Yellow perch	<i>Perca flavescens</i>	•	•	•	•	•	•	•	•	•
Walleye	<i>Stizostedion vitreum</i>		•	•	•	•	•	•	•	•
Tessellated darter	<i>Etheostoma nigrum</i>							•	•	•
Logperch	<i>Percina caprodes</i>		•				•	•	•	•
Freshwater drum	<i>Aplodinotus grunniens</i>			•	•	•	•	•	•	•

Source: Tango and Ringler (1996)

Notes: ^a Species captured using different methods as described in Tango and Ringler (1996).

^b Splake is a hybrid of brook trout (*Salvelinus fontinalis*) and lake trout (*Salvelinus namaycush*).

^c Species reported as captured by PTI (1993c), time of capture unknown.

**Table 3-8. Levels of Natural Fish Reproduction in Onondaga Lake in 1991,
Based on Catches in Shoreline Seine Hauls**

High success (> 1,000 juveniles)		
White perch	Bluegill	Golden shiner
Gizzard shad	Brook silverside	
Banded killifish	Pumpkinseed	
Moderate success (100 - 1,000 fish)		
Largemouth bass	Yellow perch	
Carp	Emerald shiner	
Low success (1- 100 fish)		
Smallmouth bass	Northern pike	Brown bullhead
Black crappie	Spotfin shiner	
No success or unknown (0 fish)		
Bowfin	Alewife	Redhorse shiner
Rudd	Rainbow trout	Bluntnose minnow
Brook stickleback	Chain pickerel	Central mudminnow
Fathead minnow	White crappie	Common shiner
Spottail shiner	Rock bass	Tesselated darter
Channel catfish	Redfin shiner	White bass
Brown trout	Creek chub	Longnose gar
Burbot	Logperch	Rainbow smelt
Green sunfish	Walleye	Freshwater drum
Anadromous/Catadromous spawners		
White sucker	Sea lamprey	American eel
Hybrid (non-reproductive)		
Splake	Tiger muskellunge	

Source: Auer et al. (1996a)

Table 3-9. Species of Amphibians and Reptiles Expected to be Found in Covertypes Surrounding Onondaga Lake

Common Name	Scientific Name	Habitat
Amphibians - Frogs		
American toad	<i>Bufo americanus</i>	T/W
Gray treefrog	<i>Hyla chrysoscelis/versicolor</i>	T/W
Spring peeper	<i>Pseudacris crucifer</i>	T/W
Bullfrog	<i>Rana catesbiana</i>	W/A
Green frog	<i>Rana clamitans</i>	W/A
Wood frog	<i>Rana sylvatica</i>	T/W
Northern leopard frog	<i>Rana pipiens</i>	T/W/U
Pickerel frog	<i>Rana plaustris</i>	W
Salamanders		
Spotted salamander	<i>Ambystoma maculatum</i>	T/W
Jefferson complex ^a	<i>Ambystoma jeffersoni x laterale</i>	T/W
Red-spotted newt	<i>Notophthalmus viridescens</i>	T/W/A
Northern dusky	<i>Desmognathus fuscus</i>	T/A
Alleghany dusky	<i>Desmognathus ochrophaeus</i>	T/A
Northern redback	<i>Plethodon cinereus</i>	T
Northern slimy	<i>Plethodon glutinosus</i>	T
Northern spring	<i>Gyrinophilus porphyriticus</i>	A
Two-lined	<i>Eurycea bislineata</i>	T/A
Reptiles - Snakes		
Northern water snake	<i>Nerodia sipedon</i>	W/A
Northern brown snake	<i>Storeria dekayi</i>	T/U
Northern redbelly snake	<i>Storeria occipitomaculata</i>	T
Eastern garter snake	<i>Thamnophis sirtalis</i>	T/W/U
Northern ringneck snake	<i>Diadophis punctatus</i>	T
Black rat snake	<i>Elaphe obsoleta</i>	T
Eastern milk snake	<i>Lampropeltis triangulum</i>	T/U
Turtles		
Common snapping turtle	<i>Chelydra serpentina</i>	W/A
Painted turtle	<i>Chrysemys picta</i>	W/A
Wood turtle ^a	<i>Clemmys insculpta</i>	T/W/A
Musk turtle	<i>Sternotherus odoratus</i>	W/A

Sources: Conant and Collins (1998); NYSDEC (2001b)

Note: ^a NYS species of special concern

Habitat: Each species is assigned the habitat codes where they are most likely to be found. Species can potentially be found in other habitats. See Appendix A for covertypes included in each habitat code.

Habitat codes: T = Terrestrial, W = Wetland, A = Aquatic, U = Urban

**Table 3-10. Species of Amphibians and Reptiles Found Near Onondaga Lake
Between 1994 and 1997**

Common Name	Scientific Name	Life Stages Found
Amphibians		
American toad	<i>Bufo americanus</i>	Adults
Gray treefrog	<i>Hyla chrysoscelis/versicolor</i>	Adults
Spring peeper	<i>Pseudacris crucifer</i>	Juveniles, adults
Green frog	<i>Rana clamitans</i>	Larvae, juveniles, adults
Northern leopard frog	<i>Rana pipiens</i>	Larvae, juveniles, adults
Spotted salamander	<i>Ambystoma maculatum</i>	Larvae, adults
Red-spotted newt	<i>Notophthalmus viridescens</i>	Adults
Reptiles		
Northern water snake	<i>Nerodia sipedon</i>	Adults
Northern brown snake	<i>Storeria dekayi</i>	Neonates, adults
Eastern garter snake	<i>Thamnophis sirtalis</i>	Neonates, adults
Common snapping turtle	<i>Chelydra serpentina</i>	Eggs, adults
Painted turtle	<i>Chrysemys picta</i>	Eggs, adults
Musk turtle	<i>Sternotherus odoratus</i>	Adults

Source: Ducey et al. (1998); Ducey (1997); Ducey and Newman (1995)

Table 3-11. Bird Species Found in Covertypes Surrounding Onondaga Lake based on NYS Bird Breeding Atlas Data

Family	Common Name	Scientific Name	Breeding Status	Habitat
Ardeidae	Great blue heron	<i>Ardea herodias</i>	PO	W/A
	Green heron	<i>Butorides virescens</i>	C	W/A
Anatidae	American black duck	<i>Anas rubripes</i>	C	W/A
	Mallard	<i>Anas platyrhynchos</i>	C	W/A
	Wood duck	<i>Aix sponsa</i>	C	W/A
	Canada goose *	<i>Branta canadensis</i>	C	W/A
Cathartidae	Turkey vulture *	<i>Cathartes atratus</i>	PO	T
Accipitridae	Red-tailed hawk	<i>Buteo jamaicensis</i>	C	T/U
	Sharp-shinned hawk ^a	<i>Accipiter striatus</i>	PR	T
Falconidae	American kestrel	<i>Falco sparverius</i>	C	T/U
Tetraonidae	Ruffed grouse	<i>Bonasa umbellus</i>	PO	T
Meleagrididae	Wild turkey ¹	<i>Meleagris gallopavo</i>	C	T/U
Phasianidae	Ring-necked pheasant	<i>Phasianus colchicus</i>	C	T/W
Rallidae	Sora	<i>Porzana carolina</i>	C	W
	Virginia rail	<i>Rallus limicola</i>	C	W
Charadriidae	Killdeer	<i>Charadrius vociferus</i>	C	T/U
Scolopacidae	Spotted sandpiper	<i>Actitis macularia</i>	C	W
	American woodcock	<i>Scolopax minor</i>	PR	T
Columbidae	Mourning dove	<i>Zenaida macroura</i>	C	T/U
	Rock dove	<i>Columba livia</i>	C	T/U
Cuculidae	Black-billed cuckoo *	<i>Coccyzus erythrophthalmus</i>	PR	T
Strigidae	Great horned owl	<i>Bubo virginianus</i>	C	T
Caprimulgidae	Common nighthawk ^a	<i>Chordeiles minor</i>	PR	T/U
Apodidae	Chimney swift	<i>Chaetura pelagica</i>	PR	T/U
Trochilidae	Ruby-throated hummingbird	<i>Archilochus colubris</i>	PO	T
Alcedinidae	Belted kingfisher	<i>Ceryle alcyon</i>	C	W
Picidae	Red-headed woodpecker ^a	<i>Melanerpes erythrocephalus</i>	PO	T
	Red-bellied woodpecker	<i>Melanerpes carolinus</i>	PO	T
	Downy woodpecker	<i>Picoides pubescens</i>	C	T/U
	Hairy woodpecker	<i>Picoides villosus</i>	C	T/U
Tyrannidae	Eastern wood-pewee	<i>Contopus virens</i>	PR	T/U
	Common flicker	<i>Colaptes auratus</i>	C	T/U
	Pileated woodpecker *	<i>Dryocopus pileatus</i>	PO	T/W
	Alder flycatcher	<i>Empidonax alnorum</i>	PR	T

Table 3-11. (cont.)

Family	Common Name	Scientific Name	Breeding Status	Habitat
	Willow flycatcher	<i>Empidonax traillii</i>	C	T
	Least flycatcher	<i>Empidonax minimus</i>	PR	T
	Eastern phoebe	<i>Sayornis phoebe</i>	PR	T/U
	Great crested flycatcher	<i>Myiarchus crinitus</i>	PR	T
	Eastern kingbird	<i>Tyrannus tyrannus</i>	C	T/W
Alaudidae	Horned lark ^a	<i>Eremophila alpestris</i>	C	T/U
Hirundinidae	Purple martin	<i>Progne subis</i>	PO	W
	Tree swallow	<i>Tachycineta bicolor</i>	C	W
	Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	C	W
	Bank swallow	<i>Riparia riparia</i>	C	T/W
	Barn swallow	<i>Hirundo rustica</i>	C	T/U
Corvidae	Blue jay	<i>Cyanocitta cristata</i>	C	T/U
	American crow	<i>Corvus brachyrhynchos</i>	C	T/U
	Fish crow *	<i>Corvus ossifragus</i>	PR	W/A
Paridae	Black-capped chickadee	<i>Poecile atricapillus</i>	C	T/U
Sittidae	White-breasted nuthatch	<i>Sitta carolinensis</i>	C	T
	Red-breasted nuthatch *	<i>Sitta canadensis</i>	PR	T/U
Certhiidae	Brown creeper	<i>Certhia americana</i>	PR	T/W
Troglodytidae	House wren	<i>Troglodytes aedon</i>	C	T/U
	Marsh wren	<i>Cistothorus palustris</i>	C	W
Mimidae	Gray catbird	<i>Dumetella</i>	C	T/U
	Northern mockingbird	<i>Mimus polyglottos</i>	C	T/U
	Brown thrasher	<i>Toxostoma rufum</i>	PR	T
Turdidae	Veery	<i>Catharus fuscescens</i>	PO	T/U
	Wood thrush	<i>Hylocichla mustelina</i>	C	T/U
	American robin	<i>Turdus migratorius</i>	C	T/U
Sylviidae	Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	C	T/W
Bombycillidae	Cedar waxwing	<i>Bombycilla cedrorum</i>	C	T
Sturnidae	European starling	<i>Sturnus vulgaris</i>	C	T/U
Vireonidae	Yellow-throated vireo	<i>Vireo flavifrons</i>	PR	T/U
	Warbling vireo	<i>Vireo gilvus</i>	C	T/U
	Red-eyed vireo	<i>Vireo olivaceus</i>	C	T/U
Parulidae	Yellow warbler	<i>Dendroica petechia</i>	C	T/U
	American redstart	<i>Setophaga ruticilla</i>	C	T
	Mourning warbler *	<i>Oporornis agilis</i>	PO	T

Table 3-11. (cont.)

Family	Common Name	Scientific Name	Breeding Status	Habitat
	Common yellowthroat	<i>Geothlypis trichas</i>	C	T/W
Parylidae	House sparrow	<i>Passer domesticus</i>	C	U
Ploceidae	Baltimore oriole	<i>Icterus galbula</i>	C	T/U
Icteridae	Bobolink	<i>Dolichonyx oryzivorus</i>	PR	T
	Red-winged blackbird	<i>Agelaius phoeniceus</i>	C	T/W
	Eastern meadowlark	<i>Sturnella magna</i>	C	T
	Common grackle	<i>Quiscalus quiscula</i>	C	T/U
	Brown-headed cowbird	<i>Molothrus ater</i>	C	T/U
Thraupidae	Scarlet tanager	<i>Piranga olivacea</i>	PR	T
Fringillidae	Northern cardinal	<i>Cardinalis cardinalis</i>	C	T/U
	Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	C	T/U
	Indigo bunting	<i>Passerina cyanea</i>	PR	T
	Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>	C	T
	Chipping sparrow	<i>Spizella passerina</i>	C	T/U
	Field sparrow	<i>Spizella pusilla</i>	C	T
	Savannah sparrow	<i>Passerculus sandwichensis</i>	C	T
	Song sparrow	<i>Melospiza melodia</i>	C	T/U
	Swamp sparrow	<i>Melospiza georgiana</i>	C	W
	Purple finch	<i>Carpodacus purpureus</i>	PR	T
	House finch	<i>Carpodacus mexicanus</i>	C	U
	American goldfinch	<i>Carduelis tristis</i>	C	T

Sources: Andrie and Carroll (1988); * NYS Breeding Bird Atlas Interim Data (NYSDEC, 2001a); ¹ Stiles (2001)

Breeding Status: Breeding status categories are defined as in the Breeding Bird Atlas for NYS:

C = Confirmed breeding, PR = Probable breeding, PO = Possible breeding

Note: ^a NYS species of special concern

Habitat : Each species is assigned the habitat codes where they are most likely to be found. Species can potentially be found in other habitats. See Appendix A for coetypes included in each habitat code.

Habitat codes: T = Terrestrial, W = Wetland, A = Aquatic, U = Urban

Table 3-12. Additional Species of Birds Observed on Onondaga Lake and its Shoreline During the Summer of 1993, Not Listed in Table 3-11

Family (Subfamily)	Common Name	Scientific Name
Gaviidae	Common loon ^a	<i>Gavia immer</i>
Phalacrocoracidae	Double-crested cormorant	<i>Phalacrocorax auritus</i>
Anatidae		
(Anatinae)	Gadwall	<i>Anas strepera</i>
	Blue-winged teal	<i>Anas discors</i>
	American wigeon	<i>Anas americana</i>
	Northern shoveler	<i>Anas clypeata</i>
	Wood duck	<i>Aix sponsa</i>
(Anserinae)	Brant	<i>Branta bernicla</i>
(Aythyinae)	Greater scaup	<i>Aythya marila</i>
	Lesser scaup	<i>Aythya affinis</i>
(Cygninae)	Mute swan	<i>Cygnus olor</i>
(Merginae)	Common merganser	<i>Mergus merganser</i>
Pandionidae	Osprey ^a	<i>Pandion haliaetus</i>
Charadriidae	Semipalmated plover	<i>Charadrius semipalmatus</i>
Scolopacidae	Greater yellowlegs	<i>Tringa melanoleuca</i>
	Ruddy turnstone	<i>Arenaria interpres</i>
	Semipalmated sandpiper	<i>Calidris pusillus</i>
Laridae		
(Larinae)	Great black-backed gull	<i>Larus marinus</i>
	Ring-billed gull	<i>Larus delawarensis</i>
(Sterninae)	Common tern ^b	<i>Sterna hirundo</i>
	Caspian tern	<i>Sterna caspia</i>
Paridae	Tufted titmouse	<i>Parus bicolor</i>

Source: Tango (1993)

Notes: ^a New York State species of special concern.

^b New York State threatened species.

Table 3-13. Species of Waterfowl Observed Wintering on Onondaga Lake from 1990 to 1999

Common Name	Scientific Name	Recorded Observations									
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Horned grebe	<i>Podiceps auritus</i>	•	•		•			•		•	•
Mallard	<i>Anas platyrhynchos</i>	•	•	•	•	•	•	•	•	•	•
Black duck	<i>Anas rubripes</i>	•	•	•	•	•	•	•	•	•	•
Gadwall	<i>Anas strepera</i>	•	•	•	•	•	•	•	•	•	•
Green-winged teal	<i>Anas crecca</i>	•	•	•	•	•	•	•	•	•	
Ring-necked duck	<i>Aythya collaris</i>		•		•						•
Greater scaup	<i>Aythya marila</i>		•		•	•		•	•		•
Lesser scaup	<i>Aythya affinis</i>			•	•		•				
Common goldeneye	<i>Bucephala clangula</i>	•	•	•	•	•	•	•	•	•	•
Common merganser	<i>Mergus merganser</i>	•	•	•	•	•	•	•	•	•	•
Red-breasted merganser	<i>Mergus serrator</i>	•	•	•	•	•			•	•	•
Great blue heron	<i>Ardea herodias</i>	•	•	•	•	•	•	•	•	•	•
Belted kingfisher	<i>Megaceryle alcyon</i>	•	•	•	•	•	•	•	•	•	•
Red-tailed hawk	<i>Buteo jamaicensis</i>	•	•	•	•	•	•	•	•	•	•
Osprey	<i>Pandion haliaetus</i>										
American coot	<i>Fulica americana</i>		•	•		•	•		•		•
Mute swan	<i>Cygnus olor</i>				•						

Sources: Onondaga Audubon Society (1990, 1991, 1992, 1993); Rusk (1994)
 National Audubon Society; <http://birdsource.tc.cornell.edu/cbcddata/> (November 20, 2001)

**Table 3-14. Species of Mammals Expected to be Found in Covertypes
Surrounding Onondaga Lake**

Family	Common Name	Scientific Name	Habitat
Didelphidae	Virginia opossum	<i>Didelphis virginiana</i>	T/U
Soricidae	Shorttail shrew	<i>Blarina brevicauda</i>	T/U
	Masked shrew	<i>Sorex cinereus</i>	T/W/U
	Smoky shrew	<i>Sorex fumeus</i>	T/W
	Water shrew	<i>Sorex palustris</i>	W
Talpidae	Hairy-tailed mole	<i>Parascalops breweri</i>	T
	Star-nosed mole	<i>Condylura cristata</i>	W
Vespertilionidae	Little brown bat	<i>Myotis lucifugus</i>	T
	Small-footed bat ^a	<i>Myotis leibii</i>	T
	Northern long-eared bat	<i>Myotis septentrionalis</i>	T
	Indiana bat ^b	<i>Myotis sodalis</i>	T
	Big brown bat	<i>Eptesicus fuscus</i>	T
	Red bat	<i>Lasiurus borealis</i>	T
	Hoary bat	<i>Lasiurus cinereus</i>	T
	Silver-haired bat	<i>Lasionycteris noctivagans</i>	T
	Eastern pipistrelle	<i>Pipistrellus subflavus</i>	T
Leporidae	Eastern cottontail	<i>Sylvilagus floridanus</i>	T/U
Sciuridae	Eastern chipmunk	<i>Tamias striatus</i>	T
	Woodchuck	<i>Marmota monax</i>	T/U
	Gray squirrel	<i>Sciurus carolinensis</i>	T/U
	Southern flying squirrel	<i>Glaucomys volans</i>	T
	Northern flying squirrel	<i>Glaucomys sabrinus</i>	T
	Red squirrel	<i>Tamiasciurus hudsonicus</i>	T
Castoridae	Beaver	<i>Castor canadensis</i>	W
Muridae	Norway rat	<i>Rattus norvegicus</i>	U
	White-footed mouse	<i>Peromyscus leucopus</i>	T/U
	Deer mouse	<i>Peromyscus maniculatus</i>	T
	Red-backed vole	<i>Clethrionomys gapperi</i>	T/W
	Meadow vole	<i>Microtus pennsylvanicus</i>	T/W
	Woodland vole	<i>Microtus pinetorum</i>	T
	House mouse	<i>Mus musculus</i>	U

Table 3-14. (cont.)

Family	Common Name	Scientific Name	Habitat
	Muskrat	<i>Ondatra zibethicus</i>	A
	Southern bog lemming	<i>Synaptomys cooperi</i>	T/W
Dipodidae	Woodland jumping mouse	<i>Napaeozapus insignis</i>	T
	Meadow jumping mouse	<i>Zapus hudsonius</i>	T/W
Canidae	Coyote	<i>Canis latrans</i>	T
	Red fox	<i>Vulpes fulva</i>	T
	Gray fox	<i>Urocyon cinereoargenteus</i>	T
Procyonidae	Raccoon	<i>Procyon lotor</i>	T/U/W
Mustelidae	Mink	<i>Mustela vison</i>	W/A/T
	Ermine	<i>Mustela ermina</i>	T
	Long-tailed weasel	<i>Mustela frenata</i>	T
	River otter	<i>Lutra canadensis</i>	W/A
	Striped skunk	<i>Mephitis mephitis</i>	T/U
Cervidae	White-tailed deer	<i>Odocoileus virginianus</i>	T/U/W

Source: Kurta (1995)

Notes: ^a NYS species of special concern, ^b NYS endangered species

Habitat: Each species is assigned the habitat codes where they are most likely to be found. Species can potentially be found in other habitats. See Appendix A for covertypes included in each habitat code.

Habitat codes: T = Terrestrial, W = Wetland, A = Aquatic, U = Urban

Table 4-1. Preliminary List of Chemicals and Stressors of Potential Concern for the Onondaga Lake BERA

	Environmental Medium ^{a,b}							
	Water		Sediment		Soil	Tissue		
	Work Plan	New	Work Plan	New	New	Work Plan	New	
COPCs								
Metals								
Aluminum								•
Antimony				•	•			•
Arsenic					•			•
Barium		•			•			•
Beryllium					•			•
Cadmium	•		•		•			•
Chromium	•		•		•			•
Copper	•		•		•			
Iron					•			
Lead	•		•		•			•
Manganese		•			•			
Mercury/Methylmercury	•		•		•		•	
Nickel	•		•					
Selenium					•			•
Silver				•				•
Thallium					•			•
Vanadium					•			•
Zinc	•		•					•
Cyanide	•							
Volatile and Semivolatile Organic Compounds								
Benzene	•		•					
Toluene		•		•				
Xylenes		•		•				
Chlorobenzene	•		•		•			
Dichlorobenzenes	•		•		•			•
Trichlorobenzenes	•		•		•			•
Ethylbenzene				•				
PAH Compounds (total)				•	•			•
Bis(2-ethylhexyl)phthalate		•						
Hexachlorobenzene				•	•			•
2-Methylnaphthalene				•				
Phenol				•	•			

Table 4-1. (cont.)

	Environmental Medium ^{a,b}							
	Water		Sediment		Soil	Tissue		
	Work Plan	New	Work Plan	New	New	Work Plan	New	
Pesticides/Polychlorinated Biphenyls								
Total PCBs			•		•	•		
DDT and metabolites				•	•			•
Aldrin				•				•
Chlordane (total)				•	•			
alpha-endosulfan				•				
Endrin				•				•
Heptachlor/heptachlor epoxide				•	•			•
Hexachlorocyclohexanes (a,b,y, and sum)				•	•			
Dioxins/furans				•	•			•
SOPCs								
Calcium ^c			•					
Oncolites ^c				•				
Chloride ^c	•							
Salinity ^c		•						
Ammonia	•		•					
Nitrite		•						
Phosphorus		•						
Sulfide		•		•				
Dissolved oxygen		•						
Transparency ^c	•							

Notes: • – identified as a COPC/SOPC.

1. COPC - Chemical of Potential Concern
2. PAH - Polycyclic Aromatic Hydrocarbon
3. PCB - Polychlorinated Biphenyl
4. SOPC - Stressor of Potential Concern

^a Environmental medium in which chemical or stressor was evaluated.

^b Chemicals and stressors are denoted as having been identified in the RI/FS work plan (PTI, 1991) or as having been added after the work plan was finalized (i.e., new).

^c Stressors potentially related in part to ionic waste.

Table 4-2. Preliminary Assessment and Measurement Endpoints for the Onondaga Lake BERA

Receptors	Assessment Endpoints	Measurement Endpoints
Aquatic Macrophytes	Sustainability of community as source of food and shelter for local fauna	Field observations of community abundance and composition Measured concentrations of COCs/SOCs in surface water as compared to criteria/guidelines Onondaga Lake macrophyte tranplant and laboratory studies
Phytoplankton	Sustainability of community as source of food for local fauna	Field observations of community composition Measured concentrations of COCs/SOCs in surface water as compared to criteria/guidelines
Zooplankton	Sustainability of community as source of food for local fauna	Field observations of community composition Measured concentrations of COCs/SOCs in surface water and sediments as compared to criteria/guidelines Onondaga Lake literature studies
Terrestrial Plants	Sustainability of community as source of food and shelter for local fauna	Field observations Measured concentrations of COCs/SOCs in sediments/soil as compared to criteria/guidelines
Benthic Macroinvertebrates	Sustainability of community as source of food for local fish and wildlife	Field observations of community abundance and composition Sediment toxicity tests Measured concentrations of COCs/SOCs in surface water and sediment as compared to criteria/guidelines
Fishes	Protection/maintenance of local populations ^a	Field observations of community abundance and composition Measured COCs/SOCs in water, sediment, and tissue as compared to criteria, guidelines and TRVs Histopathology, frequency of disease and deformation
Amphibians/reptiles	Protection/maintenance of local populations ^a	Field observations of community abundance and composition Measured concentrations of COCs/SOCs in surface water and sediments/soil as compared to criteria/guidelines Onondaga Lake literature studies

Table 4-2. (cont.)

Receptors	Assessment Endpoints	Measurement Endpoints
Birds ^b	Protection/maintenance of local populations ^a	Measured COCs/SOCs in water, sediment, soil, and fish tissue as compared to criteria/guidelines Field observations of community abundance and composition COC body burdens based on food web models as compared to TRVs
Mammals ^c	Protection/maintenance of local populations ^a	Measured COCs/SOCs in water, sediment, soil, and fish tissue as compared to criteria/guidelines Field observations of community abundance and composition COC body burdens based on food web models as compared to TRVs

Notes:

1. COC/SOC = chemical/stressor of concern
2. SQV = sediment quality value
3. TRV = toxicity reference value
4. WQV = water quality value
5. Communities and populations are assumed to be those in the absence of widespread contamination.

^a Survival, growth, and reproduction.

^b Includes benthivorous, piscivorous, insectivorous, and carnivorous birds.

^c Includes piscivorous and insectivorous mammals.

Table 4-3. Ecological Screening Values Used for Organic Chemicals in Surface Water of Onondaga Lake^a

Chemical	Conc. Units	USEPA AWQC-FCV (Aquatic Life)	USEPA Chronic (Aquatic Life)	USEPA Acute (Aquatic Life)	USEPA CCC (Aquatic Life)	USEPA CMC (Aquatic Life)	NYSDEC Acute (Aquatic)	NYSDEC Chronic (Aquatic)	USEPA Tier II (Aquatic Life)
Conventional Parameters									
Total chloride	mg/L				230	860			
Volatile Organic Compounds									
Aromatic Hydrocarbons									
Benzene	μ g/L								46
Toluene	μ g/L								130
Ethylbenzene	μ g/L								290
Xylene isomers (total)	μ g/L								1.8
Chlorinated Aromatic Hydrocarbons									
Chlorobenzene	μ g/L							5	130
1,2-Dichlorobenzene	μ g/L								14
1,3-Dichlorobenzene	μ g/L								71
1,4-Dichlorobenzene	μ g/L								15
Dichlorobenzenes (sum)	μ g/L		763	1,120				5	
1,2,4-Trichlorobenzene	μ g/L								110
Trichlorobenzenes (sum)	μ g/L							5	
Halogenated Alkanes									
1,1-Dichloroethane	μ g/L								47
1,1,1-Trichloroethane	μ g/L		9,400	18,000					62
1,2-Dichloropropane	μ g/L		5,700	23,000					
1,1,2-Trichloroethane	μ g/L		9,400	18,000					
1,1,2,2-Tetrachloroethane	μ g/L		2,400	9,320					420
Halogenated Alkenes									
<i>cis</i> -1,3-Dichloropropene	μ g/L		244	6,060					
<i>trans</i> -1,3-Dichloropropene	μ g/L		244	6,060					
Trichloroethene	μ g/L		21,900	45,000					350
Tetrachloroethene	μ g/L		840	5,280					120

Table 4-3. (cont.)

Chemical	Concentration Units	USEPA AWQC-FCV (Aquatic Life)	USEPA Chronic (Aquatic Life)	USEPA Acute (Aquatic Life)	USEPA CCC (Aquatic Life)	USEPA CMC (Aquatic Life)	NYSDEC Acute (Aquatic)	NYSDEC Chronic (Aquatic)	USEPA Tier II (Aquatic Life)
Semivolatile Organic Compounds									
Chlorinated Aromatic Hydrocarbons									
Hexachlorobenzene	μ g/L		3.68	6					
Low Molecular Weight Polycyclic Aromatic Hydrocarbons									
Naphthalene	μ g/L		620	2,300					24
Acenaphthene	μ g/L	23	520	1,700					
Fluorene	μ g/L								3.9
Phenanthrene	μ g/L	6.3							
High Molecular Weight Polycyclic Aromatic Hydrocarbons									
Fluoranthene	μ g/L	8.1							
Benzo[a]pyrene	μ g/L								0.014
Phenols									
Phenol	μ g/L		2,560	10,200					
Substituted Phenols									
2-Chlorophenol	μ g/L			4,380					
2,4-Dichlorophenol	μ g/L		365	2,020					
2,4,6-Trichlorophenol	μ g/L		970						
2,4,5-Trichlorophenol	μ g/L		63	100					
Pentachlorophenol	μ g/L	13			15	19	19.5	15	
2-Nitrophenol	μ g/L		150	230					
4-Nitrophenol	μ g/L		150	230					
Chlorinated Aliphatic Hydrocarbons									
Hexachloroethane	μ g/L		540	980					12
Hexachlorobutadiene	μ g/L		9.3	90				1	
Hexachlorocyclopentadiene	μ g/L		5.2	7				0.45	
Halogenated Ethers									
4-Bromophenyl-phenyl ether	μ g/L								1.5
Phthalates									
Diethyl phthalate	μ g/L								220
Di- <i>n</i> -butyl phthalate	μ g/L								33
Butylbenzyl phthalate	μ g/L								19
bis[2-Ethylhexyl]phthalate	μ g/L							0.6	32

Table 4-3. (cont.)

Chemical	Conc. Units	USEPA AWQC-FCV (Aquatic Life)	USEPA Chronic (Aquatic Life)	USEPA Acute (Aquatic Life)	USEPA CCC (Aquatic Life)	USEPA CMC (Aquatic Life)	NYSDEC Acute (Aquatic)	NYSDEC Chronic (Aquatic)	Tier II (Aquatic Life)
Miscellaneous Oxygenated Compounds									
Dibenzofuran	μ g/L								20
Organonitrogen Compounds									
2,4-Dinitrotoluene	μ g/L		230	330					
Pesticides/Polychlorinated Biphenyls									
γ-Hexachlorocyclohexane	μ g/L	0.08	0.08			0.95	0.95		
Aldrin	μ g/L					3			
α-Chlordane	μ g/L				0.0043	2.4			
γ-Chlordane	μ g/L				0.0043	2.4			
Dieldrin	μ g/L	0.062			0.056	0.24			
α-Endosulfan	μ g/L							0.009	0.051
β-Endosulfan	μ g/L							0.009	0.051
Endosulfan (sum of α- and β-)	μ g/L				0.056	0.22			
Endosulfan sulfate	μ g/L								
Endrin	μ g/L	0.061			0.036	0.086	0.086	0.036	
Heptachlor	μ g/L				0.0038	0.52			0.0069
Heptachlor epoxide	μ g/L				0.0038	0.52			
Methoxychlor	μ g/L				0.03			0.03	0.019
4,4'-DDT	μ g/L				0.001	1.1			0.013
Toxaphene	μ g/L				0.0002	0.73		0.005	0.011
Polychlorinated biphenyls (sum)	μ g/L			2	0.014			0.00012	0.19
Dioxins/Furans									
Total dioxins	μ g/L		0.0056						

^a Guidelines are applied to both the dissolved and unfiltered forms.

NYSDEC Water Quality Standards (NYSDEC 1999a)

Dichlorobenzenes standard applied to the sum of 1,2-, 1,3-, and 1,4-dichlorobenzene.

Trichlorobenzenes standard applied to the sum of 1,2,3-, 1,2,4-, and 1,3,5-trichlorobenzene.

Pentachlorophenol standards calculated to reflect site-specific pH (average in 1998 = 7.8).

Standard for "sum of p,p'-DDT, p,p'-DDE, and p,p'-DDD" applied to DDT and metabolites (Sum).

Endosulfan standard applied separately to alpha-endosulfan and beta-endosulfan.

PCB standard is for wildlife protection (vs. specific acute or chronic effects) and applies to sum of these substances.

Table 4-3. (cont.)

USEPA Surface Water Benchmarks (USEPA, 1996a)

AWQC/FCV - EPA chronic ambient water quality criteria or EPA-derived final chronic values.

Tier II - Values calculated using Great Lakes Water Quality Initiative Tier II methodology (40 CFR 9, 122, 123, 131, and 132 [1995]).

All Tier II values as calculated in Suter and Mabrey (1994), except DDT and heptachlor (EPA support documents cited) and the following (calculated for USEPA [1996a]): 4-bromophenyl phenyl ether; butylbenzylphthalate; 1,2-, 1,3-, and 1,4-dichlorobenzene; alpha-endosulfan; beta-endosulfan; fluorene; hexachloroethane; methoxychlor; toxaphene; 1,2,4-trichlorobenzene; and m-xylene.

m-Xylene Tier II value applied to total xylene isomers.

Pentachlorophenol AWQC calculated to reflect site-specific pH (average in 1998 = 7.8) .

DDT Tier II value applied to 4,4'-DDT.

PCBs Tier II value applied to sum of Aroclors[®].

Trichloroethylene and tetrachloroethylene Tier II values applied to trichloroethene and tetrachloroethene.

USEPA Recommended Water Quality Criteria (USEPA, 1999c)

CCC - criteria continuous concentration

CMC - criteria maximum concentration

Pentachlorophenol criteria calculated to reflect site-specific pH (average in 1998 = 7.8).

Chlordane isomers not specified; criteria applied separately to each chlordane isomer.

Dieldrin CCC derivation did not consider dietary exposure.

Endosulfan criteria presented separately for alpha- and beta-endosulfan are more appropriately applied to the sum of these isomers.

Endrin CCC derivation did not consider dietary exposure .

Heptachlor epoxide CCC derived from data for heptachlor.

The CCC for PCBs applied to sum of Aroclors[®].

USEPA Water Quality Criteria (1986a)

USEPA (1986a) values used only when USEPA (1999c) values unavailable.

Dichlorobenzenes criteria applied to sum of dichlorobenzene isomers.

Dichloropropane isomer not specified; criteria applied to 1,2-dichloropropane.

Trichlorinated ethanes criteria applied separately to trichloroethane isomers.

Tetrachlorinated ethanes acute criterion (USEPA 1986a) applied to 1,1,2,2-tetrachloroethane.

Dichloropropene isomers not specified; criteria applied separately to 1,3-dichloropropene isomers.

Trichloroethylene and tetrachloroethylene criteria applied to trichloroethene and tetrachloroethene.

Nitrophenols isomers not specified; criteria applied separately to nitrophenol isomers.

PCBs acute criterion applied to sum of Aroclors[®].

Table 4-4. Ecological Screening Values Used for Metals in Onondaga Lake Surface Water^a

Chemical	Measurement Basis	Conc. Units	USEPA Acute (Aquatic Life)	USEPA Chronic (Aquatic Life)	USEPA AWQC-FCV (Aquatic Life)	USEPA CCC (Aquatic Life)	USEPA CMC (Aquatic Life)	NYSDEC Acute (Aquatic)	NYSDEC Chronic (Aquatic)	USEPA Tier II (Aquatic Life)	NYSDEC (Wildlife)
Aluminum	dissolved	$\mu\text{g/L}$				87	750		100		
Aluminum	unfiltered	$\mu\text{g/L}$				87			100		
Antimony	dissolved	$\mu\text{g/L}$	9000	1600							
Arsenic	dissolved	$\mu\text{g/L}$			190	150	340	340	150		
Barium	dissolved	$\mu\text{g/L}$								3.9	
Beryllium	dissolved	$\mu\text{g/L}$	130	5.3					1,100	5.1	
Beryllium	unfiltered	$\mu\text{g/L}$							1,100		
Cadmium	dissolved	$\mu\text{g/L}$			1.3	2.8	5.9	5.4	2.6		
Chromium	dissolved	$\mu\text{g/L}$			228	94.8	729	729	94.8		
Cobalt	dissolved	$\mu\text{g/L}$							5	3	
Cobalt	unfiltered	$\mu\text{g/L}$							5		
Copper	dissolved	$\mu\text{g/L}$			14.7	11.6	17.8	17.8	11.6		
Iron	dissolved	$\mu\text{g/L}$			1,000	1,000		300	300		
Iron	unfiltered	$\mu\text{g/L}$				1,000		300	300		
Lead	dissolved	$\mu\text{g/L}$			3.7	3.5	89	134	5.2		
Manganese	dissolved	$\mu\text{g/L}$								80	
Methylmercury	dissolved	$\mu\text{g/L}$								0.003	
Mercury	dissolved	$\mu\text{g/L}$			1.3	0.77	1.4	1.4	0.77		0.0026
Nickel	dissolved	$\mu\text{g/L}$			203	67	604	604	67		
Selenium	dissolved	$\mu\text{g/L}$			5	4.6			4.6		
Selenium	unfiltered	$\mu\text{g/L}$									
Silver	dissolved	$\mu\text{g/L}$					5.8	6.8	0.1		
Silver	unfiltered	$\mu\text{g/L}$							0.1		
Thallium	dissolved	$\mu\text{g/L}$	1,400	40				20	8		
Thallium	unfiltered	$\mu\text{g/L}$						20	8		
Vanadium	dissolved	$\mu\text{g/L}$						190	14	19	
Vanadium	unfiltered	$\mu\text{g/L}$						190	14		
Zinc	dissolved	$\mu\text{g/L}$			135	152	151	151	107		
Cyanide	dissolved	$\mu\text{g/L}$			5.2	5.2	22	22	5.2		
Cyanide	unfiltered	$\mu\text{g/L}$				5.2	22	22	5.2		

^a Cadmium, chromium, copper, lead, nickel, and zinc standards calculated using the lowest water hardness observed in 1992 (135 mg/L CaCO₃).

Table 4-4. (cont.)

Notes:

NYSDEC Water Quality Standards (NYSDEC, 1999a)

Arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc standards refer to dissolved fraction, and were compared only with dissolved concentrations. Standards for other metals were compared with both unfiltered and dissolved concentrations.

Ionic aluminum standard applied to aluminum.

Beryllium, cobalt, thallium, and vanadium standards refer to acid-soluble forms and were applied to both unfiltered and dissolved concentrations.

Mercury standard applied to total mercury.

Ionic silver standard applied to silver.

Free CN (sum of HCN and CN⁻) standard applied to cyanide.

USEPA Ecotox Surface Water Benchmarks (USEPA, 1996a)

AWQC/FCV - EPA chronic ambient water quality criteria or EPA-derived final chronic values (USEPA1986a, 1986b, 1987)

Tier II - Values calculated using Great Lakes Water Quality Initiative Tier II methodology (40 CFR 9, 122, 123, 131, and 132 [1995]).

AWQC/FCV and Tier II benchmarks for metals refer to total dissolved chemical (USEPA1996) and were compared only with dissolved concentrations.

Standards for metals were compared to both unfiltered and dissolved concentrations.

Inorganic mercury AWQC/FCV applied to total mercury.

USEPA Recommended Water Quality Criteria (USEPA, 1999c)

CCC - criteria continuous concentration

CMC - criteria maximum concentration

Criteria for metals (other than aluminum, iron, and cyanide) refer to dissolved fraction and were compared only with dissolved concentrations.

Standards for other metals were compared with both unfiltered and dissolved concentrations.

Total aluminum criteria applied to aluminum.

Total arsenic criteria applied to arsenic.

Total mercury criteria were derived for inorganic mercury, but applicable to total mercury. Mercury criteria will be underprotective

"if a substantial portion of the mercury in the water column is methylmercury."

Total selenium CCC applied to selenium. CCC for dissolved fraction calculated using 0.922 conversion factor (multiplied by standard for total recoverable selenium).

Free cyanide criteria applied to cyanide.

USEPA Water Quality Criteria (USEPA,1986a)

USEPA (1986a) values used only when USEPA(1999c) values unavailable.

Criteria for metals assumed to refer to dissolved fraction.

Table 4-5. Dry-weight Basis Ecological Screening Values Used for Sediments in Onondaga Lake

Chemical	Units dry weight	NYSDEC LEL (Benthos)	NYSDEC SEL (Benthos)	OME NOEL (Benthos)	OME LEL (Benthos)	OME SEL (Benthos)	USEPA TEC (Benthos)	USEPA PEC (Benthos)	USEPA NEC (Benthos)	NOAA ERL (Benthos)
Total Metals and Cyanide										
Aluminum	mg/kg							58,030	73,160	
Antimony	mg/kg	2	25							
Arsenic	mg/kg	6	33		6	33	12.1	57	92.9	8.2
Barium	mg/kg									
Beryllium	mg/kg									
Cadmium	mg/kg	0.6	9		0.6	10	0.592	11.7	41.1	1.2
Calcium	mg/kg									
Chromium	mg/kg	26	110		26	110	56	159	312	81
Cobalt	mg/kg									
Copper	mg/kg	16	110		16	110	28	77.7	54.8	34
Iron	mg/kg	20,000	40,000		20,000	40,000				
Lead	mg/kg	31	110		31	250	34.2	396	68.7	47
Magnesium	mg/kg									
Manganese	mg/kg	460	1,100		460	1,100	1,673	1,080	819	
Mercury	ng/g	150	1,300		200	2,000				150
Nickel	mg/kg	16	50		16	75	39.6	38.5	37.9	21
Potassium	mg/kg									
Selenium	mg/kg									
Silver	mg/kg	1	2.2							
Sodium	mg/kg									
Thallium	mg/kg									
Vanadium	mg/kg									
Zinc	mg/kg	120	270		120	820	159	1,532	541	150
Cyanide	mg/kg									
Semivolatile Organic Compounds										
Chlorinated Aromatic Hydrocarbons										
Hexachlorobenzene	μ g/kg			10	20					
Low Molecular Weight Polycyclic Aromatic Hydrocarbons										
Naphthalene	μ g/kg						32.8	688	290	160
Acenaphthylene	μ g/kg									
Acenaphthene	μ g/kg									16

Table 4-5. (cont.)

Chemical	Units	NYSDEC	NYSDEC	OME	OME	OME	USEPA	USEPA	USEPA	NOAA
		LEL (Benthos)	SEL (Benthos)	NOEL (Benthos)	LEL (Benthos)	SEL (Benthos)	TEC (Benthos)	PEC (Benthos)	NEC (Benthos)	ERL (Benthos)
Fluorene	μ g/kg						34.6	652	1,800	
Phenanthrene	μ g/kg				560					240
Anthracene	μ g/kg				220		31.6	548	1,700	
2-Methylnaphthalene	μ g/kg									
High Molecular Weight Polycyclic Aromatic Hydrocarbons										
Fluoranthene	μ g/kg				750		64.2	834	7,500	600
Pyrene	μ g/kg				490		570	3,225	6,100	665
Benz[a]anthracene	μ g/kg						260	4,200	3,500	
Chrysene	μ g/kg				340		500	5,200	4,000	
Benzo[b]fluoranthene	μ g/kg									
Benzo[k]fluoranthene	μ g/kg				240					
Benzo[a]pyrene	μ g/kg				370		350	394	440	430
Indeno[1,2,3-cd]pyrene	μ g/kg				200		78	837	3,800	
Dibenz[a,h]anthracene	μ g/kg							28.2	870	
Benzo[ghi]perylene	μ g/kg				170		290	6,300	3,800	
PAH (total)	μ g/kg									4,000
Pesticides/Polychlorinated Biphenyls										
α -Hexachlorocyclohexane	μ g/kg									
β -Hexachlorocyclohexane	μ g/kg									
δ -Hexachlorocyclohexane	μ g/kg									
γ -Hexachlorocyclohexane	μ g/kg			0.2	3					
Aldrin	μ g/kg									
Chlordane	μ g/kg				5					
Dieldrin	μ g/kg									
Endrin	μ g/kg									
Heptachlor	μ g/kg									
Heptachlor epoxide	μ g/kg									
4,4'-DDD	μ g/kg									
4,4'-DDE	μ g/kg									2.2
4,4'-DDT	μ g/kg									1.6
DDT and metabolites (sum)	μ g/kg									1.6
Toxaphene	μ g/kg									1.6

Table 4-5. (cont.)

Chemical	Units	NYSDEC	NYSDEC	OME	OME	OME	USEPA	USEPA	USEPA	NOAA
		LEL (Benthos)	SEL (Benthos)	NOEL (Benthos)	LEL (Benthos)	SEL (Benthos)	TEC (Benthos)	PEC (Benthos)	NEC (Benthos)	ERL (Benthos)
Aroclor [®] 1016	μ g/kg				7					
Aroclor [®] 1221	μ g/kg									
Aroclor [®] 1232	μ g/kg									
Aroclor [®] 1242	μ g/kg									
Aroclor [®] 1248	μ g/kg				30					
Aroclor [®] 1254	μ g/kg				60					
Aroclor [®] 1260	μ g/kg				5					
Polychlorinated biphenyls (sum)	μ g/kg			10	70		31.6	245	194	23

Notes:

Only groups of compounds with screening values are listed here. Organic-carbon normalized screening values are listed in Table4-6.

NYSDEC Sediment Criteria (NYSDEC, 1999b)

LEL - lowest effect level

SEL - severe effect level

OME Sediment Benchmarks (Persaud et al., 1993)

NOEL - no effect level

LEL - lowest effect level

SEL - severe effect level

USEPA Sediment Benchmarks (USEPA, 1996b)

TEC - threshold effect concentration

PEC - probable effect concentration

NEC - high no-effect concentration

Total PCB TEC/PEC/NEC applied to sum of Aroclors[®].

NOAA Sediment Benchmarks (Long et al., 1995)

ER-L - effects range-low

Arsenic-III ER-L applied to arsenic.

Chromium-III ER-L applied to chromium.

Inorganic mercury ER-L applied to total mercury.

DDT ER-L applied to 4,4'-DDT and total DDT and metabolites.

PCB ER-L applied to sum of Aroclors[®].

Table 4-6. Organic-carbon Normalized Ecological Screening Values Used for Sediments in Onondaga Lake

	Units	NYSDEC Chronic (Benthos)	NYSDEC Acute (Benthos)	NYSDEC Bioaccumulatio (Wildlife)	USEPA SQC* (Benthos)	USEPA SQB (Benthos)	OME LEL** (Benthos)	OME SEL (Benthos)	ORNL Secondary Chronic (Benthos)
Volatile Organic Compounds									
Aromatic Hydrocarbons									
Benzene	μg/gOC	28	103			5.7			16
Toluene	μg/gOC	49	235			67			5.0
Ethylbenzene	μg/gOC	24	212			360			8.9
Xylene isomers (total)	μg/gOC	92	833			2.5			16
Chlorinated Aromatic Hydrocarbons									
Chlorobenzene	μg/gOC	3.5	34.6			82			41
1,2-Dichlorobenzene	μg/gOC					34			33
1,3-Dichlorobenzene	μg/gOC					170			170
1,4-Dichlorobenzene	μg/gOC					35			34
Dichlorobenzenes (sum)	μg/gOC	12	120						
1,2,4-Trichlorobenzene	μg/gOC					920			960
Trichlorobenzenes (sum)	μg/gOC	91	910						
Halogenated Alkanes									
Methylene chloride	μg/gOC								37
1,1-Dichloroethane	μg/gOC								2.7
Chloroform	μg/gOC								2.2
1,2-Dichloroethane	μg/gOC								25
1,1,1-Trichloroethane	μg/gOC					17			3
Carbon tetrachloride	μg/gOC								4.7
1,1,2-Trichloroethane	μg/gOC								120
1,1,2,2-Tetrachloroethane	μg/gOC					94			140
Halogenated Alkenes									
1,1-Dichloroethene	μg/gOC								3.1
1,2-Dichloroethene isomers (total)	μg/gOC								40
<i>cis</i> -1,3-Dichloropropene	μg/gOC								0.0051
<i>trans</i> -1,3-Dichloropropene	μg/gOC								0.0051
Trichloroethene	μg/gOC					160			22
Tetrachloroethene	μg/gOC					53			41

Table 4-6. (cont.)

		NYSDEC	NYSDEC	NYSDEC	USEPA	USEPA	OME	OME	ORNL
	Units	Chronic	Acute	Bioaccumulatio	SQC	SQB	LEL	SEL	Secondary
		(Benthos)	(Benthos)	(Wildlife)	(Benthos)	(Benthos)	(Benthos)	(Benthos)	Chronic
									(Benthos)
Ketones									
Acetone	μ g/gOC								0.87
2-Butanone	μ g/gOC								27
2-Hexanone	μ g/gOC								2.2
4-Methyl-2-pentanone	μ g/gOC								3.3
Miscellaneous Volatile Compounds									
Carbon disulfide	μ g/gOC								0.085
Semivolatile Organic Compounds									
Chlorinated Aromatic Hydrocarbons									
Pentachlorobenzene	μ g/gOC					69			70.1
Hexachlorobenzene	μ g/gOC	5,570	9,081	12			2.0	24	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons									
Naphthalene	μ g/gOC	30	258			48			24
Acenaphthene	μ g/gOC	140			62				130
Fluorene	μ g/gOC	8	73			54	19	160	54
Phenanthrene	μ g/gOC	120			85		56	950	180
Anthracene	μ g/gOC	107	986				22	370	22
2-Methylnaphthalene	μ g/gOC	34	304						
High Molecular Weight Polycyclic Aromatic Hydrocarbons									
Fluoranthene	μ g/gOC	1,020			290		75	1,020	620
Pyrene	μ g/gOC	961	8775				49	850	
Benz[a]anthracene	μ g/gOC	12	94				32	1,480	11
Chrysene	μ g/gOC						34	460	
Benzo[k]fluoranthene	μ g/gOC						24	1,340	
Benzo[a]pyrene	μ g/gOC						37	1,440	14
Indeno[1,2,3-cd]pyrene	μ g/gOC						20	320	
Dibenz[a,h]anthracene	μ g/gOC						6.0	130	
Benzo[ghi]perylene	μ g/gOC						17	320	
Phenols									
Phenol	μ g/gOC	0.5							3.1
2-Methylphenol	μ g/gOC								1.2

Table 4-6. (cont.)

	Units	NYSDEC Chronic (Benthos)	NYSDEC Acute (Benthos)	NYSDEC Bioaccumulatio (Wildlife)	USEPA SQC (Benthos)	USEPA SQB (Benthos)	OME LEL (Benthos)	OME SEL (Benthos)	ORNL Secondary Chronic (Benthos)
Substituted Phenols									
Pentachlorophenol	μ g/gOC	40	100						
Chlorinated Aliphatic Hydrocarbons									
Hexachloroethane	μ g/gOC					100			100
Hexachlorobutadiene	μ g/gOC	5.5	55	4.0					
Hexachlorocyclopentadiene	μ g/gOC	4.4	44						
Halogenated Ethers									
4-Bromophenyl-phenyl ether	μ g/gOC					130			
Phthalates									
Diethyl phthalate	μ g/gOC					63			60
Di- <i>n</i> -butyl phthalate	μ g/gOC					1,100			1,100
Butylbenzyl phthalate	μ g/gOC					1,100			1,100
Bis[2-ethylhexyl]phthalate	μ g/gOC	199.5							89,000
Miscellaneous Oxygenated Compounds									
Dibenzofuran	μ g/gOC					200			42
Pesticides/Polychlorinated Biphenyls									
α -Hexachlorocyclohexane	μ g/gOC						0.6	10	12
β -Hexachlorocyclohexane	μ g/gOC						0.5	21	12
δ -Hexachlorocyclohexane	μ g/gOC								12
γ -Hexachlorocyclohexane	μ g/gOC					0.37	0.3	1.0	0.37
Hexachlorocyclohexanes (sum)	μ g/gOC	0.06	12.6	1.5					
Aldrin	μ g/gOC						0.2	8.0	
α -Chlordane	μ g/gOC	0.03	1.4	0.006			0.7	6.0	280
γ -Chlordane	μ g/gOC	0.03	1.4	0.006			0.7	6.0	280
Dieldrin	μ g/gOC	9.0			5.2		0.2	91	11
α -Endosulfan	μ g/gOC	0.03	0.78			0.29			0.55
β -Endosulfan	μ g/gOC	0.03	0.78			1.4			0.55
Endrin	μ g/gOC	4.0		0.8	2.0		0.3	130	4.2
Heptachlor	μ g/gOC								6.8
Heptachlor epoxide	μ g/gOC						0.5	5.0	
Heptachlor and Heptachlor epoxide (sum)	μ g/gOC	0.1	13.1	0.03					
Methoxychlor	μ g/gOC	0.6				1.9			1.9

Table 4-6. (cont.)

	Units	NYSDEC Chronic (Benthos)	NYSDEC Acute (Benthos)	NYSDEC Bioaccumulator (Wildlife)	USEPA SQC (Benthos)	USEPA SQB (Benthos)	OME LEL (Benthos)	OME SEL (Benthos)	ORNL Secondary Chronic (Benthos)
4,4'-DDD	μ g/gOC						0.8	6.0	11
4,4'-DDE	μ g/gOC						0.5	19.0	
4,4'-DDT	μ g/gOC	1.0	1,100				0.8	71	34
DDT and metabolites (sum)	μ g/gOC						0.7	12	
Toxaphene	μ g/gOC	0.01	3.2			2.8			
Aroclor [®] 1016	μ g/gOC						0.7	53	
Aroclor [®] 1221	μ g/gOC								12
Aroclor [®] 1232	μ g/gOC								60
Aroclor [®] 1242	μ g/gOC								17
Aroclor [®] 1248	μ g/gOC						3.0	150	100
Aroclor [®] 1254	μ g/gOC						6.0	34	81
Aroclor [®] 1260	μ g/gOC						0.5	24	450,000
Polychlorinated biphenyls (sum)	μ g/gOC	19.3	2,760	1.4			7.0	530	=
Dioxins/Furans									
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin				0.0002					

Notes:

NYSDEC Sediment Criteria (NYSDEC, 1999b)

- Xylene criteria applied to total xylene isomers.
- Dichlorobenzenes criteria applied to sum of dichlorobenzene isomers.
- Trichlorobenzenes criteria applied to sum of trichlorobenzene isomers.
- Chlordane isomers not specified; criteria applied separately to each chlordane isomer.
- Endosulfan isomers not specified; criteria applied separately to each endosulfan isomer.
- Heptachlor and heptachlor epoxide criteria applied to sum of heptachlor and heptachlor epoxide.
- Hexachlorocyclohexanes criteria applied to sum of hexachlorocyclohexane isomers.
- PCB criteria applied to sum of Aroclors[®].

Table 4-6. (cont.)

USEPA Sediment Benchmarks (USEPA, 1993a; 1995c)

- SQC - sediment quality criteria (USEPA, 1993a)
- SQB - sediment quality benchmarks (USEPA, 1995c)
- SQB values derived by equilibrium partitioning.
- m-Xylene SQB applied to total xylene isomers.
- Trichloroethylene and tetrachloroethylene SQB values applied to trichloroethene and tetrachloroethene.
- * Assumes 1% organic carbon.

OME Sediment Benchmarks (Persaud et al., 1993)

- OME - Ontario Ministry of the Environment
- LEL - lowest effect level (Persaud et al. 1993, except for PAHs [Persaud et al. 1991]) (assuming 1%TOC)
- SEL - severe effect level (Persaud et al. 1993, except for PAHs [Persaud et al. 1991])
- p,p'-DDD LEL/SEL and secondary chronic value applied to 4,4'-DDD.
- p,p'-DDE LEL/SEL applied to 4,4'-DDE.
- o,p'-DDT + p,p'-DDT LEL/SEL applied to 4,4'-DDT.
- Total DDT LEL/SEL applied to sum of DDT and metabolites.
- Chlordane isomers not specified for LEL/SEL or secondary chronic value; criteria applied separately to each chlordane isomer.
- α -BHC LEL/SEL applied to α -hexachlorocyclohexane.
- β -BHC LEL/SEL applied to β -hexachlorocyclohexane.
- γ -BHC (lindane) LEL/SEL applied to γ -hexachlorocyclohexane.
- Total PCB LEL/SEL applied to sum of Aroclors[®].
- ** Assumes 1% organic carbon.

ORNL Secondary Chronic Benchmarks (Jones et al., 1997)

- ORNL - Oak Ridge National Laboratory
 - NAWQC - national ambient water quality criterion
 - Secondary chronic benchmarks derived by equilibrium partitioning of aqueous benchmarks.
 - Xylene secondary chronic value applied to total xylene isomers.
 - 1,2-Dichloroethene secondary chronic value applied to 1,2-dichloroethene isomers (total).
 - 1,3-Dichloropropene isomers not specified for secondary chronic value; criterion applied separately to each 1,3-dichloropropene isomer.
 - Acenaphthene NAWQC chronic value used as secondary chronic benchmark.
 - Phenanthrene NAWQC chronic value used as secondary chronic benchmark.
 - Fluoranthene NAWQC chronic value used as secondary chronic benchmark.
 - Phenol NAWQC chronic value used as secondary chronic benchmark.
 - Chlordane NAWQC chronic value used as secondary chronic benchmark.
 - DDT secondary chronic value applied to 4,4'-DDT.
 - Dieldrin NAWQC chronic value used as secondary chronic benchmark.
 - Endosulfan, all isomers secondary chronic value applied separately to each endosulfan isomer.
 - Endrin NAWQC chronic value used as secondary chronic benchmark.
 - BHC (other) secondary chronic value applied separately to each hexachlorocyclohexane isomer (except lindane).
 - BHC (lindane) NAWQC chronic value used as secondary chronic benchmark for γ -hexachlorocyclohexane.
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**Table 4-7. Dry-weight Basis Ecological Screening Values Used for Soils
Collected Near Onondaga Lake**

Chemical	Units	Efroymsen et al. 1997b		Efroymsen et al. 1997b Earthworm Toxicity	USEPA Region 4 1999 Screening Value
		al. 1997a Phytotoxicity	Microbial Toxicity		
Total Metals/Cyanide					
Aluminum	mg/kg	50	600		50 ^a
Antimony	mg/kg	5			3.5
Arsenic	mg/kg	10	100	60	10 ^a
Barium	mg/kg	500	3,000		165
Beryllium	mg/kg	10			1.1
Boron	mg/kg	0.5	20		0.5 ^a
Cadmium	mg/kg	4	20	20	1.6
Calcium	mg/kg				
Chromium	mg/kg	1	10	0.4	0.4 ^a
Chromium VI	mg/kg				
Cobalt	mg/kg	20	1,000		20 ^a
Copper	mg/kg	100	100	50	40
Iron	mg/kg		200		200 ^a
Lead	mg/kg	50	900	500	50 ^a
Magnesium	mg/kg				
Manganese	mg/kg	500	100		100
				0.1 (combined inorganic and organic)	
Mercury	mg/kg	0.3 (inorganic)	30		0.1 (inorganic) ^a
Methylmercury	mg/kg				0.67
Molybdenum	mg/kg	2	200		2 ^a
Nickel	mg/kg	30	90	200	30 ^a
Potassium	mg/kg				
Selenium	mg/kg	1	100	70	0.81
Silver	mg/kg	2	50		2 ^a
Sodium	mg/kg				
Thallium	mg/kg	1			1 ^a
Vanadium	mg/kg	2	20		2 ^a
Zinc	mg/kg	50	100	200	50 ^a
Cyanide	mg/kg				0.9 (free total)
Total Cyanide	mg/kg				5.0 (total)

Table 4-7. (cont.)

Chemical	Units	Efroymsn et	Efroymsn et	USEPA Region 4 1999 Screening Value
		al. 1997a Phytotoxicity	al. 1997b Microbial Toxicity	
Volatile Organic Compounds				
1,1,1-Trichloroethane	mg/kg			
1,1,2,2-Tetrachloroethane	mg/kg			
1,1-Dichloroethane	mg/kg			
1,2-Dichloroethane	mg/kg			0.4
1,2-Dichloroethene (Total)	mg/kg			
1,2-Dichloropropane	mg/kg		700	700 ^a
2-Butanone (MEK)	mg/kg			
4-Methyl-2-pentanone	mg/kg			
Acetone	mg/kg			
Benzene	mg/kg			0.05
Benzoic Acid	mg/kg			
BTX	mg/kg			
Carbon disulfide	mg/kg			
Chlorobenzene	mg/kg		40	0.05 (each); 0.05 (total)
Chloroethane	mg/kg			
Chloroform	mg/kg			
cis-1,2-Dichloroethene	mg/kg			
Ethylbenzene	mg/kg			0.05
Dichloromethane)	mg/kg			2.0
Pentachlorobenzene	mg/kg		20	0.0025
Tetrachloroethene	mg/kg			0.01
Toluene	mg/kg	200		0.05
Trichloroethene	mg/kg			
Vinyl chloride	mg/kg			0.01
Xylene (Total)	mg/kg			0.05
Xylene (m,p)	mg/kg			
Xylene (o)	mg/kg			
Semivolatile Organic Compounds				
Dichlorobenzenes (Total)	mg/kg			0.01
1,2-Dichlorobenzene	mg/kg			
1,3-Dichlorobenzene	mg/kg			
1,4-Dichlorobenzene	mg/kg		20	
1,2,3,4-Tetrachlorobenzene	mg/kg		10	0.01 (total)
Trichlorobenzenes (Total)	mg/kg			0.01
1,2,3-Trichlorobenzene	mg/kg		20	
1,2,4-Trichlorobenzene	mg/kg		20	
1,3,5-Trichlorobenzene	mg/kg			
1,2,4-Trimethylbenzene	mg/kg			

Table 4-7. (cont.)

Chemical	Units	Efroymsen et al. 1997b		USEPA Region 4 1999 Screening Value
		al. 1997a Phytotoxicity	Microbial Toxicity	
Nitrobenzene	mg/kg			40
<i>N</i> -nitrosodiphenylamine	mg/kg			20
2-Methylnaphthalene	mg/kg			
2-Methylphenol	mg/kg			
4-Methylphenol	mg/kg			
2,4-Dichlorophenol	mg/kg			
2,4,5-Trichlorophenol	mg/kg	4		4
2,4,6-Trichlorophenol	mg/kg	10		10
4-Nitrophenol	mg/kg	7		7
2,4-Dinitrophenol	mg/kg	20		20
4-Chloroaniline	mg/kg			
Acenaphthene	mg/kg	20		20 ^a
Acenaphthylene	mg/kg	20		
Aniline	mg/kg			
Anthracene	mg/kg			0.1
Benz(a)anthracene	mg/kg			
Benzo(a)pyrene	mg/kg			0.1
Benzo(b)fluoranthene	mg/kg			
Benzo(g,h,i)perylene	mg/kg			
Benzo(k)fluoranthene	mg/kg			
Benzyl Alcohol	mg/kg			
Bis(2-ethylhexyl)phthalate	mg/kg			
sec-Butylbenzene	mg/kg			
Carbazole	mg/kg			
Chrysene	mg/kg			
Dibenz(a,h)anthracene	mg/kg			
Dibenzofuran	mg/kg			
Di- <i>n</i> -butyl phthalate	mg/kg	200		200 ^a
Diethylphthalate	mg/kg	100		100 ^a
Dimethylphthalate	mg/kg			200
Fluoranthene	mg/kg			0.1
Fluorene	mg/kg			30 (fluorine)
Hexachlorobenzene	mg/kg		1,000	0.0025
Hexachlorobutadiene	mg/kg			
Hexachloroethane	mg/kg			
Hexachlorocyclopentadiene	mg/kg	10		10
Indeno(1,2,3-cd)pyrene	mg/kg			
Isophorone	mg/kg			
Naphthalene	mg/kg			0.1
PAH Compounds	mg/kg			1.0 (total)
Pentachlorophenol	mg/kg	3	400	6
Phenanthrene	mg/kg			0.1
Phenol	mg/kg	70	100	30
Pyrene	mg/kg			0.1

Table 4-7. (cont.)

Chemical	Units	Efroymsen et al. 1997b		USEPA Region 4
		al. 1997a Phytotoxicity	Microbial Toxicity	1999 Earthworm Screening Value
Pesticides/PCBs				
α-Hexachlorocyclohexane	mg/kg			0.0025
β-Hexachlorocyclohexane	mg/kg			0.001
Chlordane	mg/kg			
Aldrin	mg/kg			0.0025
Dieldrin	mg/kg			0.0005
Dieldrin & Aldrin	mg/kg			
Endosulfan	mg/kg			
Endrin	mg/kg			0.001
Heptachlor	mg/kg			
Heptachlor epoxide	mg/kg			
Methoxychlor	mg/kg			
4,4'-DDD	mg/kg			
4,4'-DDE	mg/kg			
4,4'-DDT	mg/kg			
Total DDT (Total, DDD,DDT,DDE)	mg/kg			0.0025
Aroclor-1016	mg/kg			
Aroclor-1221	mg/kg			
Aroclor-1232	mg/kg			
Aroclor-1242	mg/kg			
Aroclor-1248	mg/kg			
Aroclor-1254	mg/kg			
Aroclor-1254 & Aroclor 1260	mg/kg			
Aroclor-1260	mg/kg			
Total PCB	mg/kg	40		0.02
Dioxins/Furans				
Total PCDD/Fs	mg/kg			
Ecological Stressors				
Non-native species	mg/kg			
Wave disturbance	mg/kg			
Transparency	mg/kg			
Salinity	mg/kg			
Oncolites	mg/kg			
Conventional Analytes				
Ammonia	mg/kg			
Chloride	mg/kg			
Nitrite	mg/kg			
DO (mg/L) ³	mg/kg			
pH (SU)	mg/kg			
Phosphorus	mg/kg			
Carbon tetrachloride	mg/kg		1,000	1,000
Sulfate	mg/kg			
Sulfides	mg/kg			

Note: ^a Based upon ORNL (Efroymsen et al., 1997a; 1997b).

Table 4-8. ORNL Plant Screening Benchmarks

Analyte	Concentration Units	Measurement Basis	ORNL Soil Benchmark
Total Metals and Cyanide			
Aluminum	mg/kg	dry	50
Antimony	mg/kg	dry	5
Arsenic	mg/kg	dry	10
Barium	mg/kg	dry	500
Beryllium	mg/kg	dry	10
Cadmium	mg/kg	dry	4
Chromium	mg/kg	dry	1
Cobalt	mg/kg	dry	20
Copper	mg/kg	dry	100
Lead	mg/kg	dry	50
Manganese	mg/kg	dry	500
Total mercury	mg/kg	dry	0.3
Nickel	mg/kg	dry	30
Selenium	mg/kg	dry	1
Silver	mg/kg	dry	2
Thallium	mg/kg	dry	1
Vanadium	mg/kg	dry	2
Zinc	mg/kg	dry	50
Volatile Organic Compounds			
Aromatic Hydrocarbons			
Styrene	μ g/kg	dry	300,000
Toluene	μ g/kg	dry	200,000
Semivolatile Organic Compounds			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons			
Acenaphthene	μ g/kg	dry	20,000
Phenols			
Phenol	μ g/kg	dry	70,000
Substituted Phenols			
2,4-Dinitrophenol	μ g/kg	dry	20,000
Pentachlorophenol	μ g/kg	dry	3,000
2,4,5-Trichlorophenol	μ g/kg	dry	4,000
Chlorinated Aliphatic Hydrocarbons			
Hexachlorocyclopentadiene	μ g/kg	dry	10,000
Phthalates			
Di- <i>n</i> -butyl phthalate	μ g/kg	dry	200,000
Di-ethyl phthalate	μ g/kg	dry	100,000
Pesticides/Polychlorinated Biphenyls			
Polychlorinated biphenyls	μ g/kg	dry	40,000

Note: ORNL - Oak Ridge National Laboratory

Source: Efrogmson et al. (1997a).

Table 4-9. Fish Values for Screening-Level Exposure Estimates

Analyte	Concentration Units	Measurement Basis	Minimum Screening Value	Source of Minimum Screening Value
Total Metals and Cyanide				
Aluminum	mg/kg	wet	5.86	F
Antimony ¹	mg/kg	wet	0.38	F
Arsenic	mg/kg	wet	0.38	F
Barium	mg/kg	wet	30.2	F
Beryllium	mg/kg	wet	3.71	F
Cadmium	mg/kg	wet	2.86	E
Chromium	mg/kg	wet	1.97	E
Copper	mg/kg	wet	85.4	F
Lead	mg/kg	wet	2.23	E
Manganese	mg/kg	wet	494	F
Mercury (total)	mg/kg	wet	0.013	E
Nickel	mg/kg	wet	153	E
Selenium	mg/kg	wet	0.79	E
Thallium	mg/kg	wet	0.042	F
Vanadium	mg/kg	wet	1.1	F
Zinc	mg/kg	wet	28.6	E
Cyanide	mg/kg	wet	363	F
Volatile Organic Compounds				
Aromatic Hydrocarbons				
Benzene	μ g/kg	wet	80,100	F
Toluene	μ g/kg	wet	79,000	F
Xylene Isomers	μ g/kg	wet	6,379	F
Halogenated Alkanes				
Methylene Chloride	μ g/kg	wet	32,800	F
Chloroform	μ g/kg	wet	84,000	F
1,2-Dichloroethane	μ g/kg	wet	33,900	E
1,1,1-Trichloroethane	μ g/kg	wet	3,157,000	F
Carbon tetrachloride	μ g/kg	wet	89,800	F
Halogenated Alkenes				
Vinyl chloride	μ g/kg	wet	954	F
Ketones				
Acetone	mg/kg	wet	56	F
2-Butanone	mg/kg	wet	9,943	F
4-Methyl-2-pentanone	mg/kg	wet	140	F
Semivolatile Organic Compounds				
Chlorinated Aromatic Hydrocarbons				
Hexachlorobenzene	μ g/kg	wet	330	B
High Molecular Weight Polycyclic Aromatic Hydrocarbons				
Benzo[a]pyrene	μ g/kg	wet	3,040	F
Phenols				
2-Methylphenol	μ g/kg	wet	1,600,000	F
Substituted Phenols				
Tetrachlorophenol	μ g/kg	wet	100	B
Pentachlorophenol	μ g/kg	wet	1,347	F

Table 4-9. (cont.)

Analyte	Concentration Units	Measurement Basis	Minimum Screening Value	Source of Minimum Screening Value
Pesticides/Polychlorinated Biphenyls				
γ -Hexachlorocyclohexane	μ g/kg	wet	3,950	E
Hexachlorocyclohexane isomers (Sum)	μ g/kg	wet	100	B,F
Aldrin	μ g/kg	wet	1,120	F
α -Chlordane	μ g/kg	wet	4,200	E
γ -Chlordane	μ g/kg	wet	4,200	E
Chlordane Isomers (Sum)	μ g/kg	wet	500	B
Dieldrin	μ g/kg	wet	110	F
Aldrin and Dieldrin (Sum)	μ g/kg	wet	120	B
Endosulfan sulfate	μ g/kg	wet	840	F
Endrin	μ g/kg	wet	20	E
DDT and Metabolites (Sum)	μ g/kg	wet	6	E
Aroclor [®] 1248	μ g/kg	wet	109	F
Polychlorinated biphenyls	μ g/kg	wet	100	A
Dioxins/Furans				
2,3,7,8-Tetrachlorodibenzofuran	ng/kg	wet	2	E
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin	ng/kg	wet	5.6	F
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	wet	900	F
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	wet	90	F
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	wet	900	F

Notes:

A - IJC criteria (birds) (IJC, 1988) D - ORNL LOAEL (mammals) (Sample et al., 1996)

B - NYSDEC criteria (piscivores) (Newell, 1987) E - ORNL NOAEL (birds) (Sample et al., 1996)

C - ORNL LOAEL (birds) (Sample et al., 1996) F - ORNL NOAEL (mammals) (Sample et al., 1996)

¹ Arsenic value used to screen antimony

Table 4-10. Avian Toxicity Reference Values for Screening-Level Exposure Estimates

Contaminant	Avian Toxicity Reference Value (mg/kg-day)	Reference
Total Metals and Cyanide		
Aluminum	110	Carriere et al. (1986)
Antimony	1,400	Damron and Wilson (1975)
Arsenic	2.46	USFWS (1969)
Barium	20.8	Johnson et al. (1960)
Beryllium	0.66	Schroeder and Mitchner (1975)*
Cadmium	1.45	White and Finley (1978)
Chromium	1	Haseltine et al. (unpublished data)
Cobalt	5	Nation et al. (1983)*
Copper	47	Mehring et al. (1960)
Lead	1.13	Edens et al. (1976)
Manganese	977	Laskey and Edens (1985)
Methylmercury	0.0064	Heinz (1979)
Mercury (total)	0.45	Hill and Schaffner (1976)
Nickel	77.4	Cain and Pafford (1981)
Selenium	0.4	Heinz et al. (1989)
Silver	18.1	Walker (1971)*
Thallium	0.237	Hudson et al. (1984)
Vanadium	11.4	White and Dieter (1978)
Zinc	14.5	Stahl et al. (1990)
Cyanide	68.7	Tewe and Maner (1981)*
Volatile Organic Compounds		
Aromatic Hydrocarbons		
Toluene	26	Nawrot and Staples (1979)*
Xylene (m,p)	2.1	Marks et al. (1982)*
Xylene (o)	2.1	Marks et al. (1982)*
Xylene isomers (total)	2.1	Marks et al. (1982)*
Chlorinated Aromatic Hydrocarbons		
1,2-Dichlorobenzene	6	Jori et al. (1982)
1,3-Dichlorobenzene	6	Jori et al. (1982)
1,4-Dichlorobenzene	6	Jori et al. (1982)
1,4-Dichlorobenzene	6	Jori et al. (1982)
Dichlorobenzenes (sum)	6	Jori et al. (1982)
1,2,4-Trichlorobenzene	8.0	Cote et al. (1988)*
1,2,3-Trichlorobenzene	8.0	Cote et al. (1988)*
1,3,5-Trichlorobenzene	8.0	Cote et al. (1988)*
Trichlorobenzenes (sum)	8.0	Cote et al. (1988)*
Halogenated Alkanes		
Methylene chloride	5.85	NCA (1982)*
Chloroform	15	Palmer et al. (1979)*
1,1-Dichloroethane	17.2	Alumut et al. (1976) ¹
1,2-Dichloroethane	17.2	Alumut et al. (1976)
1,1,1-Trichloroethane	1,000	Lane et al. (1982)*
1,1,2-Trichloroethane	1,000	Lane et al. (1982)*
Bromodichloromethane	N/A	
Carbon tetrachloride	16	Alumot et al. (1976)*

Table 4-10. (cont.)

Contaminant	Avian Toxicity Reference Value (mg/kg-day)	Reference
Halogenated Alkenes		
Vinyl chloride	0.17	Feron et al. (1981)*
1,1-Dichloroethene	2.5	Quast et al. (1983)*
<i>cis</i> -1,2-Dichloroethene	2.5	Quast et al. (1983)*
<i>trans</i> -1,2-Dichloroethene	2.5	Quast et al. (1983)*
1,2-Dichloroethene isomers (total)	2.5	Quast et al. (1983)*
Trichloroethene	0.7	Buben and O'Flaherty (1985)*
Tetrachloroethene	1.4	Buben and O'Flaherty (1985)*
Ketones		
Acetone	10	EPA (1986e)*
Semivolatile Organic Compounds		
Chlorinated Aromatic Hydrocarbons		
1,2,4,5-Tetrachlorobenzene	1.60	Grant et al. (1977)*
Tetrachlorobenzenes (mixed)	1.60	Grant et al. (1977)*
Pentachlorobenzene	6	Jori et al. (1982)
Hexachlorobenzene	0.2	Vos et al. (1971)
Low Molecular Weight Polycyclic Aromatic Hydrocarbons		
Naphthalene	1	Hough et al. (1993) ²
Acenaphthylene	1	Hough et al. (1993) ²
Acenaphthene	1	Hough et al. (1993) ²
Fluorene	1	Hough et al. (1993) ²
Phenanthrene	1	Hough et al. (1993) ²
Anthracene	1	Hough et al. (1993) ²
1-Methylnaphthalene	1	Hough et al. (1993) ²
2-Methylnaphthalene	1	Hough et al. (1993) ²
High Molecular Weight Polycyclic Aromatic Hydrocarbons		
Fluoranthene	1	Hough et al. (1993) ²
Pyrene	1	Hough et al. (1993) ²
Benz[a]anthracene	1	Hough et al. (1993) ²
Chrysene	1	Hough et al. (1993) ²
Benzo[b]fluoranthene	1	Hough et al. (1993) ²
Benzo[k]fluoranthene	1	Hough et al. (1993) ²
Benzo[a]pyrene	1	Hough et al. (1993)
Indeno[1,2,3-cd]pyrene	1	Hough et al. (1993) ²
Dibenz[a,h]anthracene	1	Hough et al. (1993) ²
Benzo[ghi]perylene	1	Hough et al. (1993) ²
Benzo[e]pyrene	1	Hough et al. (1993) ²
Phenols		
Phenol	6	Schafer et al. (1983)
2-Methylphenol	219	Hornshaw et al. (1986)*
4-Methylphenol	219	Hornshaw et al. (1986)*
Substituted Phenols		
Pentachlorophenol	0.24	Schwetz et al. (1978)*
2,3,4,6-Tetrachlorophenol	1	Hattula et al. (1981)*
Chlorinated Aliphatic Hydrocarbons		
Hexachloroethane	0.05	Tugarinova et al. (1960)*
Hexachlorobutadiene	0.2	Kociba et al. (1977)*

Table 4-10. (cont.)

Contaminant	Avian Toxicity Reference Value (mg/kg-day)	Reference
Phthalates		
Di- <i>n</i> -butyl phthalate	0.11	Peakall (1974)
bis[2-Ethylhexyl]phthalate	1.1	Peakall (1974)
Diethyl phthalate	4,580	Lamb et al. (1987)*
Pesticides/Polychlorinated Biphenyls		
α-Hexachlorocyclohexane	0.02	Sauter and Steele (1972) ³
β-Hexachlorocyclohexane	0.02	Sauter and Steele (1972) ³
δ-Hexachlorocyclohexane	0.02	Sauter and Steele (1972) ³
γ-Hexachlorocyclohexane	0.02	Sauter and Steele (1972) ³
Hexachlorocyclohexanes (sum)	0.02	Sauter and Steele (1972)
Aldrin	0.77	Mendenhall et al. (1983)
α-Chlordane	2.4	Stickel et al. (1983)
γ-Chlordane	2.4	Stickel et al. (1983)
Oxichlordane	2.4	Stickel et al. (1983)
Chlordane isomers (sum)	2.4	Stickel et al. (1983)
α-Endosulfan	50	Abiola (1992)
β-Endosulfan	50	Abiola (1992)
Endosulfan sulfate	11.1	Abiola (1992)
Dieldrin	0.077	Mendenhall et al. (1983)
Aldrin and dieldrin (sum)	0.77	Mendenhall et al. (1983)
Endrin	0.01	Fleming et al. (1982)
Endrin aldehyde	0.01	Fleming et al. (1982) ⁴
Heptachlor	0.05	Wagstaff et al. (1980)
Heptachlor epoxide	0.005	WHO (1984)
Heptachlor and heptachlor epoxide (sum)	0.005	WHO (1984)
Methoxychlor	2	Hudson et al. (1984)
Mirex	20	Newell et al. (1987)
Photomirex	20	Newell et al. (1987) ⁵
Mirex and photomirex	20	Newell et al. (1987) ⁵
Toxaphene	8	Kennedy et al. (1973)*
4,4'-DDD	0.0028	Anderson et al. (1975) ⁵
4,4'-DDE	0.038	Mendenhall et al. (1983)
4,4'-DDT	0.0028	Anderson et al. (1975) ⁶
o,p'-DDD	0.0028	Anderson et al. (1975) ⁶
o,p'-DDE	0.0028	Anderson et al. (1975) ⁶
DDT and metabolites (sum)	0.0028	Anderson et al. (1975)
Aroclor [®] 1016	0.18	Dahlgren et al. (1982)
Aroclor [®] 1221	0.18	Dahlgren et al. (1982)
Aroclor [®] 1232	0.18	Dahlgren et al. (1982)
Aroclor [®] 1242	0.41	McLane and Hughes (1980)
Aroclor [®] 1248	0.18	Dahlgren et al. (1982)
Aroclor [®] 1254	0.18	Dahlgren et al. (1982)
Aroclor [®] 1260	33.3	Call and Harrell (1974)
Aroclor [®] 1268	0.18	Dahlgren et al. (1982)
Aroclor [®] 1254 and 1260	0.18	Dahlgren et al. (1982)
Aroclors (sum)	0.18	Dahlgren et al. (1982)

Table 4-10. (cont.)

Contaminant	Avian Toxicity Reference Value (mg/kg-day)	Reference
Dioxins/Furans		
2,3,7,8-Tetrachloro Dibenzodioxin (TCDD)	0.000014	Nosek et al. (1992)

Notes: Only compounds with TRVs available are listed here; all compounds can be found in screening tables (Appendix D).

* Indicates that a mammalian value was used due to the lack of an avian value.

¹ Value for 1,2-dichloroethane used.

² Value for benzo(a)pyrene used.

³ Value for sum of hexachlorocyclohexane isomers used.

⁴ Value for endrin used.

⁵ Value for mirex used.

⁶ Value for DDT and metabolites used.

Table 4-11. Mammalian Toxicity Reference Values for Screening-Level Exposure Estima

Contaminant	Mammalian Toxicity Reference Value (mg/kg-day)	Reference
Total Metals and Cyanide		
Aluminum	1.93	Ondreicka et al. (1966)
Antimony	0.125	Schroeder et al. (1968)
Arsenic	0.126	Schroeder and Mitchner (1971)
Barium	5.1	Perry et al. (1983)
Beryllium	0.66	Schroeder and Mitchner (1975)
Cadmium	1	Sutou et al. (1980)
Chromium	3.28	Mackenzie et al. (1958)
Cobalt	5	Nation et al. (1983)
Copper	11.7	Aulerich et al. (1982)
Lead	8	Azar et al. (1973)
Manganese	88	Laskey et al. (1982)
Methylmercury	0.015	Wobeser et al. (1976)
Mercury (total)	1	Aulerich et al. (1974)
Nickel	40	Ambrose et al. (1976)
Selenium	0.2	Rosenfeld and Beath (1954)
Silver	18.1	Walker (1971)
Thallium	0.0074	Formigli et al. (1986)
Vanadium	0.21	Domingo et al. (1986)
Zinc	160	Schlicker and Cox (1968)
Cyanide	68.7	Tewe and Maner (1981)
Volatile Organic Compounds		
Aromatic Hydrocarbons		
Benzene	26	Nawrot and Staples (1979)
Toluene	26	Nawrot and Staples (1979)
Ethylbenzene	26	Nawrot and Staples (1979)
Xylene (m,p)	2.1	Marks et al. (1982)
Xylene (o)	2.1	Marks et al. (1982)
Xylene isomers (total)	2.1	Marks et al. (1982)
Chlorinated Aromatic Hydrocarbons		
1,2-Dichlorobenzene	250	Lake et al. (1997)
1,3-Dichlorobenzene	250	Lake et al. (1997)
1,4-Dichlorobenzene	250	Lake et al. (1997)
Dichlorobenzenes (sum)	250	Lake et al. (1997)
1,2,4-Trichlorobenzene	8.0	Cote et al. (1988)
1,2,3-Trichlorobenzene	8.0	Cote et al. (1988)
1,3,5-Trichlorobenzene	8.0	Cote et al. (1988)
Trichlorobenzenes (sum)	8.0	Cote et al. (1988)
Halogenated Alkanes		
Methylene chloride	5.85	NCA (1982)
Chloroform	15	Palmer et al. (1979)
1,1-Dichloroethane	50	Lane et al. (1982) ¹
1,2-Dichloroethane	50	Lane et al. (1982)
1,1,1-Trichloroethane	1,000	Lane et al. (1982)
1,1,2-Trichloroethane	1,000	Lane et al. (1982) ¹
Carbon tetrachloride	16	Alumot et al. (1976)

Table 4-11. (cont.)

Contaminant	Mammalian Toxicity Reference Value (mg/kg-day)	Reference
Halogenated Alkenes		
Vinyl chloride	0.17	Feron et al. (1981)
1,1-Dichloroethene	2.5	Quast et al. (1983)
<i>cis</i> -1,2-Dichloroethene	2.5	Quast et al. (1983) ²
<i>trans</i> -1,2-Dichloroethene	2.5	Quast et al. (1983) ²
1,2-Dichloroethene isomers (total)	2.5	Quast et al. (1983) ²
Trichloroethene	0.7	Buben and O'Flaherty (1985)
Tetrachloroethene	1.4	Buben and O'Flaherty (1985)
Ketones		
Acetone	10	USEPA (1986c)
Semivolatile Organic Compounds		
Chlorinated Aromatic Hydrocarbons		
1,2,4,5-Tetrachlorobenzene	1.6	Grant et al. (1977)
Tetrachlorobenzenes (mixed)	1.6	Grant et al. (1977)
Pentachlorobenzene	1.6	Grant et al. (1977)
Hexachlorobenzene	0.05	Fassbender et al. (1977)
Low Molecular Weight Polycyclic Aromatic Hydrocarbons		
Naphthalene	1	Mackenzie and Angevine (1981) ³
Acenaphthylene	1	Mackenzie and Angevine (1981) ³
Acenaphthene	1	Mackenzie and Angevine (1981) ³
Fluorene	1	Mackenzie and Angevine (1981) ³
Phenanthrene	1	Mackenzie and Angevine (1981) ³
Anthracene	1	Mackenzie and Angevine (1981) ³
1-Methylnaphthalene	1	Mackenzie and Angevine (1981) ³
2-Methylnaphthalene	1	Mackenzie and Angevine (1981) ³
High Molecular Weight Polycyclic Aromatic Hydrocarbons		
Fluoranthene	1	Mackenzie and Angevine (1981) ³
Pyrene	1	Mackenzie and Angevine (1981) ³
Benz[a]anthracene	1	Mackenzie and Angevine (1981) ³
Chrysene	1	Mackenzie and Angevine (1981) ³
Benzo[b]fluoranthene	1	Mackenzie and Angevine (1981) ³
Benzo[k]fluoranthene	1	Mackenzie and Angevine (1981) ³
Benzo[a]pyrene	1	Mackenzie and Angevine (1981) ³
Indeno[1,2,3-cd]pyrene	1	Mackenzie and Angevine (1981) ³
Dibenz[a,h]anthracene	1	Mackenzie and Angevine (1981) ³
Benzo[ghi]perylene	1	Mackenzie and Angevine (1981) ³
Benzo[e]pyrene	1	Mackenzie and Angevine (1981) ³
Phenols		
Phenol	523	NCI (1980)
2-Methylphenol	219	Hornshaw et al. (1986)
4-Methylphenol	219	Hornshaw et al. (1986)
Substituted Phenols		
Pentachlorophenol	0.24	Schwetz et al. (1978)
2,3,4,6-Tetrachlorophenol	1	Hattula et al. (1981)
Chlorinated Aliphatic Hydrocarbons		
Hexachloroethane	0.05	Tugarinova et al. (1960)
Hexachlorobutadiene	0.2	Kociba et al. (1977)

Table 4-11. (cont.)

Contaminant	Mammalian Toxicity Reference Value (mg/kg-day)	Reference
Phthalates		
Di-n-butyl phthalate	550	Lamb et al. (1987)
Bis[2-ethylhexyl]phthalate	18.3	Lamb et al. (1987)
Diethyl phthalate	4,580	Lamb et al. (1987)
Pesticides/Polychlorinated Biphenyls		
α-Hexachlorocyclohexane	8	Palmer et al. (1978)
δ-Hexachlorocyclohexane	8	Palmer et al. (1978)
γ-Hexachlorocyclohexane	8	Palmer et al. (1978)
Hexachlorocyclohexanes (sum)	1.6	Grant et al. (1977)
Aldrin	0.2	Treon and Cleveland (1955)
α-Chlordane	0.075	FAO/WHO (1983) ⁴
γ-Chlordane	0.075	FAO/WHO (1983) ⁴
Chlordane isomers (sum)	0.075	FAO/WHO (1983)
α-Endosulfan	0.15	Dikshith et al. (1984)
β-Endosulfan	0.15	Dikshith et al. (1984)
Endosulfan sulfate	0.15	Dikshith et al. (1984)
Dieldrin	0.018	Harr et al. (1970)
Aldrin and dieldrin (sum)	0.018	Harr et al. (1970)
Endrin	0.065	Treon et al. (1955)
Endrin aldehyde	0.065	Treon et al. (1955) ⁵
Endrin ketone	0.065	Treon et al. (1955) ⁵
Heptachlor	0.075	Kinoshita and Kempf (1970)
Heptachlor epoxide	0.075	Kinoshita and Kempf (1970)
Heptachlor and Heptachlor	0.075	Kinoshita and Kempf (1970) ⁶
Methoxychlor	4	Gray et al. (1988)
Toxaphene	8	Kennedy et al. (1973)
4,4'-DDD	85	NCI (1978)
4,4'-DDE	28	Gellert and Heinrich (1975)
4,4'-DDT	0.8	Fitzhugh (1948)
o,p'-DDD	0.8	Fitzhugh (1948) ⁷
o,p'-DDE	0.8	Fitzhugh (1948) ⁷
DDT and metabolites (sum)	0.8	Fitzhugh (1948) ⁷
Mirex	0.05	Chu et al. (1981)
Photomirex	0.05	Chu et al. (1981) ⁸
Mirex and photomirex	0.05	Chu et al. (1981) ⁸
Aroclor [®] 1016	1.37	Bleavins et al. (1980)
Aroclor [®] 1221	0.01	Barsotti et al. (1976)
Aroclor [®] 1232	0.01	Barsotti et al. (1976)
Aroclor [®] 1242	0.069	Bleavins et al. (1980)
Aroclor [®] 1248	0.01	Barsotti et al. (1976)
Aroclor [®] 1254	0.068	McCoy et al. (1995)
Aroclors [®] 1254 and 1260	0.068	McCoy et al. (1995)
Aroclor [®] 1260	6.9	Linder et al. (1974)
Aroclor [®] 1268	0.01	Barsotti et al. (1976)
Aroclors (sum)	0.068	McCoy et al. (1995)

Table 4-11. (cont.)

Contaminant	Mammalian Toxicity Reference Value (mg/kg-day)	Reference
Dioxins/Furans		
2,3,7,8-TCDD	1.0E-06	Murray et al. (1979)

Notes: Only compounds with TRVs available are listed here; all compounds can be found in screening 1

¹ Value for 1,2-dichloroethane used.

² Value for 1,2-dichloroethane used.

³ Value for benzo(a)pyrene used.

⁴ Value for chlordane used.

⁵ Value for endrin used.

⁶ Value for heptaclor/heptaclor epoxide used.

⁷ Value for DDT used.

⁸ Value for mirex used.

Table 5-1. Screening-Level Avian Receptor Life History Parameters

Factors	Units	Tree Swallow	Mallard Duck	Belted Kingfisher	Great Blue Heron	Osprey	Red-Tailed Hawk
		<i>Tachycineta bicolor</i>	<i>Anas platyrhynchos</i>	<i>Ceryle alcyon</i>	<i>Ardea herodias</i>	<i>Pandion haliaetus</i>	<i>Buteo jamaicensis</i>
Body weight	kg	0.017 ^a	1.01 ^b	0.136 ^c	1.905 ^d	1.25 ^e	1.154 ^f
FIR (dw basis)	kg/kg-day	0.241	0.058	0.117	0.046	0.054	0.055
Percent dietary composition:							
Fish				100%	100%	100%	
Aquatic Invertebrates		100%	100%				
Plants							
Small mammals							100%
WIR	L/kg-day	0.23	0.059	0.114	0.048	0.055	0.056
SIR (dw basis)	% of FIR	0	3.3	1	2	0	2

Notes: dw – dry weight

FIR – food ingestion rate

SIR – sediment ingestion rate

WIR – water ingestion rate

Temporal and area use are assumed to be 100%.

FIR based on Nagy (1987) – FI (g/day) = 0.648 Wt.^{0.651} (g).

WIR based on Calder and Braun (1983) – WI (L/day) = 0.059 Wt.^{0.67} (g).

SIR based on Beyer et al. (1994) and/or professional judgment.

^a Robertson et al. (1992).

^b Dunning (1993).

^c Brooks and Davis (1987).

^d Poole (1938), as cited in USEPA (1993b).

^e Brown and Amadon (1968).

^f Steenhof (1983), as cited in USEPA (1993).

Table 5-2. Screening-Level Mammalian Receptor Life History Parameters

Factors	Units	Little Brown Bat <i>Myotis lucifugus</i>	Short-Tailed Shrew <i>Blarina brevica</i>	Mink <i>Mustela vison</i>	River Otter <i>Lutra canadensis</i>
Body weight	kg	0.0045 ^a	0.015 ^b	0.55 ^c	4.74 ^d
FIR (dw basis)	kg/kg-day	0.180	0.145	0.076	0.052
Percent dietary composition –					
Fish				100%	100%
Aquatic invertebrates (emergent)		100%			
Terrestrial invertebrates			100%		
WIR	L/kg-day	0.170	0.151	0.105	0.085
SIR (dw basis)	% of FIR	0	13 ^e	1	1

Notes: dw – dry weight

FIR – food ingestion rate

SIR – sediment ingestion rate

WIR – water ingestion rate

Temporal and area use are assumed to be 100%.

FIR based on Nagy (1987) – FI (g/day) = 0.235 Wt.^{0.822} (g).

WIR based on Calder and Braun (1983) – WI (L/day) = 0.099 Wt.^{0.90} (g).

Professional judgment used to estimate SIR when no reference was available.

^a Douth et al. (1977).

^b Schlesinger and Potter (1974).

^c Mitchell (1961).

^d Lauhachinda (1974), as cited in USEPA (1993b).

^e Sample and Suter (1994).

Table 5-3. Summary of Screening Ratios that Exceeded 1.0 for Surface Water in Onondaga Lake in 1992 and 1999

Chemical	Screening Ratio ^a		
	1992	1999	1997-2001*
Conventional Analytes			
Chloride	2.4		
Dissolved Oxygen			O ₂ below 4.0 mg/L
Sulfide			11,000
Metals and Cyanide			
Aluminum	1.4		
Barium	20		
Cadmium	2.2		
Copper	4.4		
Iron	1.2	2.0	
Lead	5.2	<1.0	
Manganese	11	7.6	
Methylmercury	4.1	5.1	
Total Mercury	23	40	
Zinc	1.3		
Cyanide	33		
Volatile Organic Compounds			
Xylenes	2.8 ^b	<1.0	
Chlorobenzene	1.0 ^b	2.4	
Dichlorobenzenes (Sum)		1.3	
Trichlorobenzenes (Sum)	1.3		
Semivolatile Organic Compounds			
bis[2-Ethylhexyl]phthalate	17		
Hexachlorobenzene	1.4 ^b		
Fluorene	1.3 ^b		
Benzo[a]pyrene	357 ^b		
Pentachlorophenol	1.0 ^b		
Hexachlorobutadiene	5.0 ^b		
Hexachlorocyclopentadiene	11 ^b		
4-Bromophenyl-phenyl ether	3.3 ^b		
Pesticides/Polychlorinated Biphenyls			
α-Chlordane	6.0 ^b		
γ-Chlordane	6.0 ^b		
α-Endosulfan	2.9 ^b		
β-Endosulfan	5.6 ^b		
Endrin	1.4 ^b		
Heptachlor	6.8 ^b		
Heptachlor epoxide	6.8 ^b		
Methoxychlor	14 ^b		
4,4'-DDT	50 ^b		
Toxaphene	13,000 ^b		

Notes: ^a Ratios are maximum detected values divided by minimum screening values. When two values were available (e.g., dissolved and unfiltered), the higher value was used.

^b Ratio is halved maximum detection limit divided by the minimum screening value. Full TCL/TAL analyses were not performed in 1999.

* OCDWEP 1997 to 2001 Data

**Table 5-4. Summary of Screening Ratios that Exceeded 1.0 for
Onondaga Lake Tributary Water and Metro Discharge in 1992**

Chemical	Screening Ratio ^a		
	Base Flow	Intermediate Flow	High Flow
Conventional Analytes			
Chloride	4.8	4.5	4.3
Metals			
Cadmium	<1.0 ^b	1.8	13
Chromium	<1.0	1.3	5.9
Copper	1.3	2.6	11
Iron	1.9	N/A	N/A
Lead	3.1	8.1	27
Manganese	1.5	1.2	N/A
Methylmercury	1.0	1	3.1
Total Mercury	84	159	145
Nickel	1.7	1.4	4.9
Zinc	1.8	1.7	2.4
Volatile Organic Compounds			
Benzene	<1.0	<1.0 ^b	1.3
Xylenes	2.0	<1.0 ^b	1.3
Chlorobenzene	1.5	<1.0 ^b	<1.0 ^b
1,4-Dichlorobenzene	<1.0	<1.0	1.4
Dichlorobenzenes (Sum)	<1.0	<1.0	4.5

Notes: Tributaries sampled include: Bloody Brook, East Flume, Geddes Brook, Harbor Brook, Lake Outlet, Ley Creek, Ninemile Creek, Onondaga Creek, and Sawmill Creek.

Highest concentration detected in all tributaries is presented.

N/A – not available.

^a Ratios are maximum detected values (unfiltered) divided by minimum screening values.

^b Ratio is halved maximum detection limit divided by the minimum screening value.

Table 5-5. Summary of Screening Ratios that Exceeded 1.0 for Sediments in Onondaga Lake in 1992 and 2000^a

Chemical	Screening Ratio ^b	
	1992	2000
Metals		
Antimony	3.2	2.7
Arsenic	1.9	7.9
Cadmium	24	25
Chromium	77	161
Copper	11	23
Iron	1.7	2.5
Lead	8.1	24
Manganese	1.1	2.6
Mercury	459	518
Nickel	41	104
Silver	5.1	6.1
Zinc	2.3	3.5
Volatile Organic Compounds		
Benzene ^d	154	246
Toluene ^d	52	28
Ethylbenzene ^d	11	26
Xylenes ^d	400	825
Chlorobenzene ^d	657	4,571
Dichlorobenzenes (Sum) ^d	106	230
1,2-Dichlorobenzene ^d	15	24
1,3-Dichlorobenzene ^d	2.1	1.9
1,4-Dichlorobenzene ^d	29	59
Trichlorobenzenes (Sum) ^d	2.9	3.3
Methylene chloride ^d	<1.0	3.0
1,1-Dichloroethane ^d	44 ^c	43 ^c
Chloroform ^d	55 ^c	52 ^c
1,2-Dichloroethane ^d	4.8 ^c	<1.0
1,1,1-Trichloroethane ^d	40 ^c	<1.0
Carbon tetrachloride ^d	26 ^c	24 ^c
1,1,2-Trichloroethane ^d	1.0 ^c	<1.0 ^c
1,1,2,2-Tetrachloroethane ^d	1.3 ^c	1.2 ^c
1,1-Dichloroethene ^d	39 ^c	37 ^c
1,2-Dichloroethene isomers (total) ^d	3.0 ^c	N/A
<i>cis</i> -1,3-Dichloropropene ^d	23,529 ^c	22,549 ^c
<i>trans</i> -1,3-Dichloropropene ^d	23,529 ^c	22,549 ^c
Trichloroethene ^d	5.5 ^c	<1.0 ^c
Tetrachloroethene ^d	2.9 ^c	<1.0
Acetone ^d	44	7.0
2-Butanone ^d	8.1	<1.0
2-Hexanone ^d	55 ^c	108 ^c
4-Methyl-2-pentanone ^d	36 ^c	N/A
Carbon disulfide ^d	1,412 ^c	18

Table 5-5. (cont.)

Chemical	Screening Ratio ^b	
	1992	2000
Semivolatile Organic Compounds		
Hexachlorobenzene ^d	55	22
Naphthalene	915	792,683
Acenaphthene	938	5,313
Fluorene	208	4,046
Phenanthrene	92	2,625
Anthracene	282	3,006
2-Methylnaphthalene ^d	8.4	262
Fluoranthene	3,583	3,894
Pyrene ^d	41	306
Benz[a]anthracene ^d	83	385
Chrysene ^d	29	294
Benzo[k]fluoranthene ^d	22	18
Benzo[a]pyrene ^d	49	186
Indeno[1,2,3-cd]pyrene	25	487
Dibenz[a,h]anthracene	32	603
Benzo[g,h,i]perylene ^d	45	121
Phenol ^d	18	106
2-Methylphenol ^d	1,083 ^c	12
Pentachlorophenol ^d	78 ^c	239 ^c
4-Chloro-3-methylphenol ^d	N/A	579 ^c
Hexachloroethane ^d	13 ^c	3.7 ^c
Hexachlorobutadiene ^d	325 ^c	92 ^c
Hexachlorocyclopentadiene ^d	295 ^c	434 ^c
4-Bromophenyl-phenyl ether ^d	10 ^c	2.8 ^c
Diethyl phthalate ^d	22 ^c	6.1 ^c
Di- <i>n</i> -butyl phthalate ^d	1.2 ^c	<1.0
Butylbenzyl phthalate ^d	1.2 ^c	<1.0 ^c
Dibenzofuran ^d	2.2	14
Pesticides/Polychlorinated Biphenyls		
β-Hexachlorocyclohexane ^d	1.0 ^c	<1.0
γ-Hexachlorocyclohexane ^d	1.7 ^c	<1.0
Hexachlorocyclohexanes ^d	N/A	2.2
Aldrin ^d	2.5 ^c	<1.0
α-Chlordane ^d	67	28
γ-Chlordane ^d	83 ^c	73
Dieldrin ^d	4.8 ^c	1.8
α-Endosulfan ^d	17 ^c	3.3
β-Endosulfan ^d	32 ^c	1.6 ^c
Endrin ^d	3.2 ^c	<1.0
Toxaphene ^d	5,000 ^c	474 ^c
Heptachlor epoxide ^d	1.0 ^c	<1.0
Heptachlor and heptachlor epoxide (Sum) ^d	N/A	11
Methoxychlor ^d	8.3 ^c	<1.0

Table 5-5. (cont.)

Chemical	Screening Ratio ^b	
	1992	2000
DDT and metabolites ^d	5.1	1.4
4,4'-DDD ^d	4.5	<1.0
4,4'-DDE ^d	1.9 ^c	1.0
4,4'-DDT	9.1 ^c	55
PCBs (Sum)	210	2,096
Aroclor 1016 ^d	14	7.7 ^c
Aroclor 1221 ^d	1.6 ^c	1.7
Aroclor 1242 ^d	<1.0 ^c	6.8
Aroclor 1248 ^d	20	<1.0
Aroclor 1254 ^d	1.5	2.4
Aroclor 1260 ^d	98	15
Dioxins/Furans		
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin ^d	N/A	11

Notes: ^a Maps of exceedances of NYSDEC sediment screening criteria are presented in Appendix E.

^b Ratios are maximum detected values divided by minimum screening values.

^c Ratio is halved maximum detection limit divided by the minimum screening value.

^d Ratio is based on organic-carbon normalized values.

N/A = Not available.

Table 5-6. Summary of Screening Ratios that Exceeded 1.0 for Soil near Onondaga Lake in 2000 and 2002

Chemical	Screening Ratio ^a		
	Wetlands (Soil Benchmarks)	Wetlands (Sediment Benchmarks)*	Dredge Spoils Area (Soil Benchmarks)
Metals and Cyanide			
Aluminum	274	<1.0	466
Arsenic	1.8	3.1	1.3
Barium	2.4	*	1.4
Beryllium	1.1	*	<1.0
Cadmium	8.9	24	2.7
Chromium	385	5.9	154
Copper	4.2	10	1.5
Iron	162	1.6	148
Lead	5.2	8.4	3.1
Manganese	4.9	1.1	4.4
Mercury	251	167	988
Nickel	2.5	4.7	1.7
Selenium	3.1	*	2.6
Silver	1.4	2.7	<1.0
Thallium	2.5	*	<1.0
Vanadium	18	*	20
Zinc	10	4.3	3.7
Cyanide	6.0	*	1.4
Volatile Organic Compounds			
Benzene	1.2	*	NA
Chlorobenzene	12	*	NA
1,2-Dichlorobenzene	490	*	9.7
1,3-Dichlorobenzene	138	*	13
1,4-Dichlorobenzene	490	*	13 ^b
1,2,4-Trichlorobenzene	328	*	13 ^b
Semivolatile Organic Compounds			
Hexachlorobenzene	2,142	536	196
Naphthalene	76	232	90
Phenanthrene	630	263	95
Anthracene	180	570	19
Fluoranthene	860	1,340	320
Pyrene	830	169	250
Benzo[a]pyrene	480	137	230
Phenol	57	*	5 ^b
2-Chlorophenol	315 ^b	*	25 ^b
Pentachlorophenol	5,250 ^b	*	3,250 ^b
4-Nitrophenol	1.5 ^b	*	<1.0
Pesticides/Polychlorinated Biphenyls			
β-Hexachlorocyclohexane	5.6	1.1	3.2
DDT and metabolites (Sum)	22	35	<1.0
Chlordane (Sum)	NA	5.9	NA
Aldrin	18	23	<1.0
Dieldrin	48	40	7.6
Total PCBs	54	107	41

Notes: *Only sediment benchmarks measured on a dry-weight basis were applied (see Table 4-5).

NA - denotes not analyzed

^a Ratios are maximum detected values divided by minimum screening values.

^b Ratio is halved maximum detection limit divided by the minimum screening value.

Table 5-7. Summary of Screening Ratios that Exceeded 1.0 for Plants near Onondaga Lake in 2000

Chemical	Screening Ratio ^a	
	Wetlands	Dredge Spoils Area
Aluminum	274	466
Arsenic	1.8	1.3
Cadmium	3.6	1.1
Chromium	154	62
Copper	1.7	<1.0
Lead	5.2	3.1
Manganese	1.0	<1.0
Mercury (Inorganic)	84	329
Nickel	2.1	1.7
Selenium	2.5	2.1
Silver	1.4	<1.0
Thallium	2.5	<1.0
Vanadium	18	20
Zinc	10	3.7

Note: ^a Ratios are maximum detected values divided by minimum screening values.

Table 5-8. Summary of Screening Ratios that Exceeded 1.0 for Fish in Onondaga Lake from 1992 to 2000

Chemical	Fish	
	1992-1999	2000
Metals		
Aluminum	0.8	20
Antimony	5.5	0.07 ^a
Arsenic	0.3	5.3
Chromium	<1.0	7.2
Mercury/methylmercury	390/244	145/NA
Selenium	1.1	3
Thallium	2.5 ^a	<1.0
Vanadium	0.2	1.5
Zinc	<1.0	15
Organic Compounds		
Bis[2-ethylhexyl]phthalate	1.1	NA
Aroclor 1248	22	19
Aroclor 1254	31	0.1 ^a
Polychlorinated biphenyl (sum)	110	34
DDT and metabolites	100	83
Oxichlordane	10 ^a	2.4E-03
Mirex	3 ^a	0.03 ^a
Photomirex	7.6 ^a	7.6E-03 ^a
Endrin	1.6	2.3
γ-Hexachlorocyclohexane	2.3	2.5E-03 ^a
2,3,4,7,8-Pentachlorodibenzofuran	<1.0	1.3
2,3,7,8-Tetrachlorodibenzofuran	20	32

Notes: Higher ratio of adult and juvenile fish is presented.

^a Ratio is halved maximum detection limit divided by the minimum screening value.

NA= not analyzed

Table 5-9. Results of Screening Risk Assessment for Detected Chemicals of Potential Concern through Food Web Exposure for Wildlife Receptors Using Maximum Concentrations (Hazard Quotients Greater than 1.0)

Chemical	Tree Swallow		Mallard		Belted Kingfisher		Great Blue Heron		Osprey	
	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000
Metals										
Aluminum	7.2	19	2.6	4.7						
Antimony										
Arsenic		3.1								
Barium	95	222	23	54						
Cadmium	22	23	5.3	5.5						
Chromium	282	592	72	151	2.7	12	2.0	6.6		3.3
Cobalt	13	26	3.2	6.3						
Copper	5.0	7.3		1.8						
Lead	51	151	13	38		1.4				
Manganese										
Methylmercury	73	95	38	26	222	161	87	64	102	73
Mercury (total)	2.7	28		7.2	5.2	2.5	2.1	1.0	2.3	1.0
Nickel	6.4	16	1.6	4.0						
Selenium		2.1			1.0	3.4		1.4		1.6
Thallium		2.8								
Vanadium	1.4	4.6		1.1						
Zinc	39	59	9.4	14		10		4.1		4.7
Volatile Organic Compounds										
1,2-Dichlorobenzene	2.1	12		3.0						
1,3-Dichlorobenzene	1.8	10		2.4						
1,4-Dichlorobenzene	4.2	45	1.0	11						
Dichlorobenzene (sum)	6.0		1.5							
1,2,4-Trichlorobenzene		7.5		1.8						
Xylene (m,p)		17		4.1						
Xylene (o)		3.8								
Xylene Isomers		55		14						
Vinyl Chloride	3.5 ^a	15 ^a		3.8 ^a						

Table 5-9. (cont.)

Chemical	Tree Swallow		Mallard		Belted Kingfisher		Great Blue Heron		Osprey	
	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000
Semivolatile Organic Compounds										
Pentachlorophenol	73 ^a	4,368 ^a	18 ^a	1,075 ^a		15 ^a		12 ^a		
Di- <i>n</i> -butyl phthalate	67 ^a		16 ^a							
Bis[2-ethylhexyl]phthalate	1.0	1.6			1.0					
Acenaphthylene	1.7	5.1		1.3						
Acenaphthene		3.2								
Anthracene		3.6		1.0						
Benz[a]anthracene		12		3.0						
Benzo[a]pyrene		5.1		1.3						
Benzo[g,h,i]perylene										
Chrysene	1.1	15		3.9						
Dibenz[a,h]anthracene		2.2								
Fluoranthene	43	47	11	12						
Benzo[b]fluoranthene	4.2	8.3	1.1	2.1						
Benzo[k]fluoranthene		6.1		1.6						
Fluorene	2.4	47		12						
Hexachlorobenzene	8.7	49	2.1	12						
Indeno[1,2,3-cd]pyrene		3.7		1.0						
1-Methylnaphthalene	15		3.7							
2-Methylnaphthalene	1.3	978		241		3.3		2.6		
Naphthalene	28	23,959	6.7	5,816		30		24		
Phenanthrene	2.3	67		17						
Pyrene	3.1	27		6.8						
Hexachloroethane	147 ^a	804 ^a	36 ^a	198 ^a	1.3 ^a	2.7 ^a		2.1 ^b		
Hexachlorobutadiene	37 ^a	201 ^a	9 ^a	49 ^a						

Table 5-9. (cont.)

Chemical	Tree Swallow		Mallard		Belted Kingfisher		Great Blue Heron		Osprey	
	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000	1992-1998	1999-2000
Pesticides/PCBs										
γ-Hexachlorocyclohexane					201		79		93	
4,4'-DDD	2.4				19	15	7.6	6.0	8.9	7.1
4,4'-DDE					3.3	4.3	1.3	1.7	1.5	2.0
4,4'-DDT		4.5		1.1	12	7.4	4.6	2.9	5.3	3.4
DDT and metabolites	2.4				113	81	44	32	52	38
Chlordane isomers (sum)										
Heptachlor epoxide					1.1					
Heptachlor and heptachlor epoxide (sum)					1.1					
Dieldrin										
Endrin					1.7	2.1				1.0
Aroclor 1016		2.2 ^a			4.0		1.6		1.8	
Aroclor 1221		4.5		1.1						
Aroclor 1232		2.2 ^a								
Aroclor 1242		24		5.8	1.9					
Aroclor 1248	3.2				6.6	5.5	2.6	2.2	3.0	2.5
Aroclor 1254		3.6			30		12		14	
Aroclor 1254 and 1260					4.2	1.3	1.7		1.9	
Aroclor 1268										
PCBs (sum)	6.0	60	1.5	15	30	1.5	12	3.5	14	4.0
Dioxins/Furans										
Dioxins/furans (TEQ)		588		1.7	2.9	1.7			1.4	

Table 5-9. (cont.)

Chemical	Red-Tailed Hawk	Little Brown Bat		Short-Tailed Shrew	Mink		River Otter	
	1999–2000	1992–1998	1999–2000	1999–2000	1992–1998	1999–2000	1992–1998	1999–2000
Metals								
Aluminum	1.3	308	795	434	3.0	20	2.0	14
Antimony		6.3	5.3	1.7	5.3		3.6	
Arsenic		11	46	14		4.4		3.0
Barium		290	675	3.2				
Cadmium		24	25	57				
Chromium	2.3	64	135	22		2.4		1.6
Cobalt		10	19					
Copper		10	22	1.1				
Lead	2.0	5.3	16	7.8				
Manganese		1.0	2.3					
Methylmercury	180	23	30	138	61	45	42	30
Mercury (total)	2.6		9.6	2.1	1.5		1.0	
Nickel		9.2	24	1.1				
Selenium			3.1	3.4	1.3	4.5		3.1
Thallium		15	67	81	3.1	1.1	2.1	
Vanadium		58	185	6.1		3.6		2.5
Zinc		2.6	4.0	2.0				
Volatile Organic Compounds								
1,2-Dichlorobenzene								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
Dichlorobenzene (sum)								
1,2,4-Trichlorobenzene			5.6	2.7				
Xylene (m,p)			12					
Xylene (o)			2.9					
Xylene Isomers		1.6	41					
Vinyl Chloride		2.6 ^a	12 ^a					

Table 5-9. (cont.)

Chemical	Red-Tailed Hawk	Little Brown Bat		Short-Tailed Shrew	Mink		River Otter	
	1999–2000	1992–1998	1999–2000	1999–2000	1992–1998	1999–2000	1992–1998	1999–2000
Semivolatile Organic Compounds								
Pentachlorophenol	5.3 ^a	54 ^a	3,263 ^a	142 ^a		9.5 ^a		6.5 ^a
Di- <i>n</i> -butyl phthalate								
Bis[2-ethylhexyl]phthalate								
Acenaphthylene		1.6	3.8	24				
Acenaphthene			2.4	20				
Anthracene	2.2		2.7	58				
Benz[a]anthracene	6.0		8.8	159				
Benzo[a]pyrene	5.9		3.8	155				
Benzo[ghi]perylene	3.4			91				
Chrysene	5.9		11	155				
Dibenz[a,h]anthracene	1.0		1.7	26				
Fluoranthene	11	32	35	278		0.2		
Benzo[b]fluoranthene	7.2	3.1	6.2	191				
Benzo[k]fluoranthene	2.7		4.6	71				
Fluorene	1.5	1.8	35	39				
Hexachlorobenzene	3.3	26	147	347		1.2		
Indeno[1,2,3-cd]pyrene	3.4		2.8	91				
1-Methylnaphthalene		11						
2-Methylnaphthalene		1.0	731	18		2.1		1.5
Naphthalene	1.1	21	17,895	29		20		14
Phenanthrene	7.7	1.7	50	204				
Pyrene	10	2.3	20	269				
Hexachloroethane	1.0 ^a		600 ^a	27 ^a		1.7 ^a		1.2 ^a
Hexachlorobutadiene			150 ^a	6.7 ^a				

Table 5-9. (cont.)

Chemical	Red-Tailed Hawk	Little Brown Bat		Short-Tailed Shrew		Mink		River Otter	
	1999–2000	1992–1998	1999–2000	1999–2000	1992–1998	1999–2000	1992–1998	1999–2000	
Pesticides/PCBs									
g-Hexachlorocyclohexane									
4,4'-DDD									
4,4'-DDE									
4,4'-DDT	2.2								
DDT and metabolites					3.6				
Chlordane isomers (sum)				1.3					
Heptachlor epoxide									
Heptachlor and heptachlor epoxide (sum)									
Dieldrin		1.8 ^a	4.4	4.3		1.7		1.1	
Endrin									
Aroclor 1016									
Aroclor 1221		11 ^a	60	26 ^a	16 ^a	3.7	11 ^a	2.5	
Aroclor 1232		6.6 ^a	29 ^a	26 ^a		1.9 ^a		1.3 ^a	
Aroclor 1242			105	31	7.4	1.5	5.0	1.0	
Aroclor 1248		42	4.7	26 ^a	117	64	53	44	
Aroclor 1254		5.7	72	280	516	2.8	353	1.9	
Aroclor 1254 and 1260					99	23	50	16	
Aroclor 1268			6.6	192		1.8		1.2	
PCBs (sum)		119	1,190	721	516	151	353	103	
Dioxins/Furans									
Dioxins/furans (TEQ)	84		2,764	3,519	13	6.1	8.9	4.2	

Notes: TEQ – toxicity equivalent

^a Ratio is halved maximum detection limit divided by the minimum screening value.

Table 5-10. Summary of COC Screening Ratios that Exceeded 1.0 for Media and Receptors In and Around Onondaga Lake

Chemical	Water	Sediments	Soil	Plants	Fish	Aquatic Wildlife ^a	Terrestrial Wildlife ^b
Metals and Cyanide							
Aluminum	•		•	•	•	•	•
Antimony		•			•	•	•
Arsenic		•	•	•	•	•	•
Barium	•		•			•	•
Beryllium			•				
Cadmium	•	•	•	•		•	•
Chromium		•	•	•	•	•	•
Cobalt						•	
Copper	•	•	•	•		•	•
Iron	•	•	•				
Lead	•	•	•	•		•	•
Manganese	•	•	•	•		•	
Mercury	•	•	•	•		•	•
Methylmercury	•				•	•	•
Nickel		•	•	•		•	•
Selenium			•	•	•	•	•
Silver		•	•	•			
Thallium			•	•	◻	•	•
Vanadium			•	•	•	•	•
Zinc	•	•	•	•	•	•	•
Cyanide	•		•				
Volatile Organic Compounds							
1,1,1-Trichloroethane		◻					
1,1,2,2-Tetrachloroethane		◻					
1,1,2-Trichloroethane		◻					
1,1-Dichloroethane		◻					
1,1-Dichloroethene		◻					
1,2-Dichlorobenzene		•	•			•	
1,2-Dichloroethane		◻					
1,2-Dichloroethene isomers (total)		◻					
1,3-Dichlorobenzene		•	•			•	
1,4-Dichlorobenzene		•	•			•	
Dichlorobenzenes (sum)	•	•				•	
2-Butanone		•					
2-Hexanone		◻					
4-Methyl-2-pentanone		◻					
Acetone		•					
Benzene		•	•				
Carbon disulfide		•					
Carbon tetrachloride		◻					
Chlorobenzene	•	•	•				
Chloroform		◻					
<i>cis</i> -1,3-Dichloropropene		◻					
<i>trans</i> -1,3-Dichloropropene		◻					
Ethylbenzene		•					

Table 5-10. (cont.)

Chemical	Water	Sediments	Soil	Plants	Fish	Aquatic Wildlife^a	Terrestrial Wildlife^b
Methylene chloride		•					
Tetrachloroethene		▣					
Toluene		•					
1,2,4-Trichlorobenzenes			•			•	•
Trichlorobenzenes (Sum)	•	•					
Trichloroethene		•					
Xylene (m,p)						•	
Xylene (o)						•	
Xylene isomers	▣	•				•	
Vinyl chloride						▣	
Semivolatile Organic Compounds							
2-Chlorophenol			▣				
1-Methylnaphthalene						•	
2-Methylnaphthalene						•	•
2-Methylphenol		•					
4-Bromophenyl-phenyl ether	▣	▣					
4-Chloro-3-methylphenol		▣					
4-Nitrophenol			▣				
Acenaphthene		•				•	•
Acenaphthylene						•	•
Anthracene		•	•			•	•
Benz[a]anthracene		•				•	•
Benzo[a]pyrene	▣	•	•			•	•
Benzo[g,h,i]perylene		•					•
Benzo[b]fluoranthene						•	•
Benzo[k]fluoranthene		•				•	•
Bis(2-ethylhexyl)phthalate	•				•	•	
Butylbenzyl phthalate		▣					
Chrysene		•				•	•
Dibenz[a,h]anthracene		•				•	•
Dibenzofuran		•					
Diethyl phthalate		▣					
Di- <i>n</i> -butyl phthalate		▣				▣	
Fluoranthene		•	•			•	•
Fluorene	▣	•					•
Hexachlorobenzene	▣	•	•			•	•
Hexachlorobutadiene	▣	▣				▣	▣
Hexachlorocyclopentadiene	▣	▣					
Hexachloroethane		▣				▣	▣
Indeno[1,2,3-cd]pyrene		•				•	
Naphthalene		•	•			•	•
Pentachlorophenol	▣	▣	▣			▣	▣
Phenanthrene		•	•			•	•
Phenol		•	•				
Pyrene		•	•			•	•

Table 5-10. (cont.)

Chemical	Water	Sediments	Soil	Plants	Fish	Aquatic Wildlife^a	Terrestrial Wildlife^b
Pesticides/Polychlorinated Biphenyls							
4,4'-DDD		•				•	
4,4'-DDE		•				•	
4,4'-DDT	▣	•				•	•
DDT and metabolites		•			•	•	
α-Chlordane	▣	•					
γ-Chlordane	▣	•					
Oxichlordane					▣		
Chlordane isomers							•
α-Endosulfan	▣	•					
β-Endosulfan	▣	▣					
Aldrin		▣	•				
Aroclor 1016		•				•	
Aroclor 1221		•				•	▣
Aroclor 1232						▣	▣
Aroclor 1242		•				•	•
Aroclor 1248		•			•	•	▣
Aroclor 1254		•			•	•	•
Aroclor 1260		•					
Aroclor 1268						•	•
PCBs (Sum)		•	•		•	•	•
β-Hexachlorocyclohexane		▣	•				
γ-Hexachlorocyclohexane		▣			•	•	
Hexachlorocyclohexanes		•					
Dieldrin		•	•			•	•
Endrin	▣	▣			•	•	
Heptachlor	▣						
Heptachlor and heptachlor epoxide (sum)		•				•	
Heptachlor epoxide	▣	▣				•	
Methoxychlor	▣	▣					
Mirex					▣		
Photomirex					▣		
Toxaphene	▣	▣					
Dioxins/Furans							
2,3,4,7,8-Pentachlorodibenzofuran					•		
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -		•			•	•	•

Notes:

- Exceedance is based on maximum detected values divided by minimum screening values.
 - ▣ Exceedance is based on halved maximum detection limit divided by the minimum screening value.
- ^a Includes the belted kingfisher, great blue heron, osprey, mallard, tree swallow, mink, river otter, and little brown bat.
- ^b Includes the short-tailed shrew and red-tailed hawk.

Table 6-1. Contaminants of Concern Selected for Onondaga Lake Media

Chemical	Water	Sediment	Soil	Plants	Fish
Metals					
Antimony		•	•		•
Arsenic		•	•	•	•
Barium	•		•		
Cadmium		•	•	•	
Chromium		•	•	•	•
Copper	•	•	•	•	
Iron			•		
Lead	•	•	•	•	
Manganese	•	•	•		
Mercury/Methylmercury	•	•	•	•	•
Nickel		•	•	•	
Selenium		•	•	•	•
Silver		•	•	•	
Thallium			•	•	
Vanadium		•	•	•	•
Zinc	•	•	•	•	•
Cyanide	•		•		
Volatile Organic Compounds					
Benzene		•	•		
Chlorobenzene	•	•	•		
Dichlorobenzenes (Sum)	•	•	•		
Ethylbenzene		•			
Toluene		•			
Trichlorobenzenes (Sum)	•	•	•		
Xylene isomers		•			
Semivolatile Organic Compounds					
Bis(2-ethylhexyl)phthalate	•				
Dibenzofuran		•			
Hexachlorobenzene		•	•		
Phenol		•	•		
Polycyclic aromatic hydrocarbon (total)		•	•		
Pesticides/Polychlorinated Biphenyls					
Aldrin			•		
Chlordane isomers		•	•		
DDT and metabolites		•	•		•
Dieldrin		•	•		
Endrin					•
Hexachlorocyclohexanes			•		
Heptachlor and heptachlor epoxide		•			
Polychlorinated biphenyls (total)		•	•		•
Dioxins/Furans					
Total dioxins/furans		•			•

Note: • – Contaminants of concern assessed in the BERA for the specific media listed.
 DDT – dichlorodiphenyltrichloroethane

Table 6-2. Contaminants of Concern for Wildlife Species Evaluated for the Onondaga Lake BERA

Contaminants of Concern	Tree Swallow	Mallard	Belted Kingfisher	Great Blue Heron	Osprey	Red-Tailed Hawk	Little Brown Bat	Short-Tailed Shrew	Mink	River Otter
Metals										
Antimony							•	•		
Arsenic	•						•	•	•	•
Barium	•	•					•	•		
Cadmium	•	•					•	•		
Chromium	•	•	•	•	•	•	•	•	•	•
Cobalt	•	•					•			
Copper	•	•					•			
Lead	•		•			•	•	•		
Manganese							•			
Mercury/Methylmercury	•	•	•	•	•	•	•	•	•	•
Nickel	•	•					•			
Selenium	•		•	•	•		•	•	•	•
Thallium	•						•	•		
Vanadium	•	•					•	•	•	•
Zinc	•	•	•	•	•		•	•		
Volatile Organic Compounds										
Dichlorobenzenes (total)	•	•								
Trichlorobenzenes (total)	•	•					•	•		
Xylenes (total)	•	•					•			
Semivolatile Organic Compounds										
Bis(2-ethylhexyl)phthalate	•									
Hexachlorobenzene							•	•	•	
Polycyclic aromatic hydrocarbon (total)	•	•	•	•		•	•	•	•	•
Pesticides/Polychlorinated Biphenyls										
Chlordanes								•		
DDT and metabolites	•		•	•	•	•			•	
Dieldrin							•	•	•	•
Endrin			•							
Hexachlorocyclohexanes			•	•	•					
Polychlorinated biphenyls (total)	•	•	•	•	•		•	•	•	•
Dioxins/Furans										
Dioxins/furans (TEQ)	•	•	•		•	•	•	•	•	•

Notes:

• – Contaminants of concern assessed in the BERA for the specific receptor listed.

DDT – dichlorodiphenyltrichloroethane

TEQ – toxicity equivalent

Table 6-3. Mercury:Methylmercury Ratios in Samples Collected at the LCP Bridge Street Site

Depth (cm)	Sample Location	Log Notes (location characteristics)	Total Mercury (mg/kg dw)	Methyl- mercury (µg/kg dw)	MeHg/Hg Percent
0 - 6	West Flume to north of property boundary	marsh vegetated	23.0 J	11.0 J	0.05%
0 - 6	West Flume to east of property boundary	flume	0.6	1.2 J	0.21%
0 - 6	West Flume at Geddes Brook	marsh vegetated	28.6 J	7.8 J	0.03%
0 - 6	Mouth of west ditch at ponded area	veg. ditch approx 1 in. deep	35.8	13.3 J	0.04%
0 - 6	Mouth of east ditch at West Flume	veg. ditch approx 3-4 in deep	4.4	5.2	0.12%
0 - 6	East ditch	grassy ditch	24.2 J	15.9 J	0.07%
0 - 6	East ditch	ditch in marsh	1.8	3.8	0.21%
0 - 6	Ponded area	unvegetated ditch	51.5	13.2	0.03%
0 - 6	Ponded area	unvegetated ditch	131.0 J	14.6	0.01%
0 - 6	Ponded area	vegetated ditch	10.2 J	11.5 J	0.11%
0 - 6	On-site drainage ditch to east of west ditch	approx 4 - 6 in deep	57.7 J	26.3	0.05%
0 - 6	On-site drainage ditch to east of west ditch	approx 8 in deep	193.0 J	175.0 J	0.09%
0 - 6	West ditch	veg. ditch less than 1 in deep	29.8	15.8 J	0.05%
0 - 6	Ponded area at West Flume	veg. marsh approx 2 in deep	56.0	3.6 J	0.01%
0 - 6	Ditch by west plant wall	lined ditch	2.9	63.8	2.20%
0 - 15	Ponded area, by west property boundary	vegetated, approx 0.5 ft deep	56.3 J	14.0 J	0.02%
0 - 15	Ponded area, by west property boundary	center of area, approx 4 in deep	56.4 J	11.4 J	0.02%
0 - 15	Ponded area	vegetated 4 in deep	9.3 J	3.8	0.04%
0 - 15	East ditch	vegetated, approx 3 in deep	9.5 J	29.7	0.31%
0 - 15	Ponded area	vegetated, approx 4 in deep	21.5 J	19.4	0.09%
0 - 15	Ponded area	vegetated, approx 3 in deep	41.9 J	1.2	0.003%
0 - 15	Ponded area	vegetated, approx 4 in deep	7.5 J	2.4	0.03%
0 - 15	Ponded area	vegetated, very moist, no water	12.6 J	74.3	0.59%
0 - 15	Ponded area	vegetated moist area, no water	1.8 J	20.1	1.12%
0 - 15	Ponded area	vegetated moist area, no water	1.5 J	6.2	0.41%
0 - 15	Ponded area	vegetated moist area, no water	1.7 J	12.2	0.72%
0 - 15	West Flume west of property boundary	vegetated, approx 2 in deep	11.5 J	14.6 J	0.13%
0 - 15	West Flume west of property boundary	vegetated moist area, no water	18.5 J	31.7 J	0.17%
0 - 15	West Flume west of property boundary	vegetated moist area, no water	23.3 J	68.9 J	0.30%

Notes:

1. J indicates an estimated value.	Max. Conc./Ratio	193	74	2.20%
2. Sampling conducted by Parsons Engineering Science, Inc.	Min. Conc./Ratio	0.6	1.2	0.003%
	Ave. Conc./Ratio	32	25	0.25%

Table 7-1. Summary of 1992 Honeywell RI Data Used in the Onondaga Lake BERA

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Mercury and Calcite Mass Balance Investigations					
External Loading and Flushing Study					
<p>Primary tributaries (Onondaga Creek, Harbor Brook, Ley Creek, East Flume, Tributary 5A, Ninemile Creek, and the lake outlet) and Metro outfall</p> <p>After September, site VOCs were dropped from the analytical suite for low-flow samples, except at Harbor Brook, the East Flume, and Tributary 5A</p>	10	<p>1 – low flow</p> <p>2 – high flow</p>	<p>Twice per month</p> <p>April – Dec.</p>	195	<p>Field measurements</p> <p>pH</p> <p>Temperature</p> <p>Dissolved oxygen</p> <p>Ammonia</p> <p>Chloride</p> <p>Site metals ^a</p> <p>Methylmercury</p> <p>Site VOCs ^b</p> <p>Hexachlorobenzene</p>
<p>Secondary tributaries (Bloody Brook and Sawmill Creek)</p>	2	1	<p>Once per month</p> <p>May (low flow)</p> <p>Dec. (high flow)</p>	4	<p>Field measurements</p> <p>pH</p> <p>Temperature</p> <p>Dissolved oxygen</p> <p>Ammonia</p> <p>Chloride</p> <p>Site metals</p> <p>Methylmercury</p> <p>Site VOCs</p> <p>Hexachlorobenzene</p>

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Water Column Processes Study					
Onondaga Lake water Unfiltered water samples from depths of 0, 3, 6, 9, 12, 15, and 18 m during summer stratification (May – Sept.). Unfiltered water samples from depths of 3, 9, and 15 m during turnover and winter stratification (April, Oct., Nov.). After September, site VOCs were dropped from the analytical suite.	2 (plus duplicates at Station W1 through July)	7 for 5 months 3 for 3 months	Monthly April – Nov.	112	Field measurements pH Temperature Dissolved oxygen Site metals Site VOCs Methylmercury Sulfide Ammonia Chloride
Onondaga Lake water Filtered water samples from depths of 0, 3, 6, 9, 12, 15, and 18 m during summer stratification (May – Sept.). Filtered water samples from depths of 3, 9, and 15 m during turnover and winter stratification (April, Oct., Nov.).	2 (plus duplicates at Station W1 through July)	7 for 5 months 3 for 3 months	Monthly April – Nov.	112	Total mercury Methylmercury
Sediment Processes Study – Nutrients					
Sediment cores to 20 cm (porewater fraction analyzed)	6	4–6	Aug., Nov.	83	Ammonia Hydrogen sulfide
Substance Distribution Investigation					
Lake Water Chemistry Study					
Onondaga Lake Unfiltered water samples from epilimnion and hypolimnion	2	2	Sept.	4	TAL and TCL chemicals

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Sediment Chemistry Study					
Onondaga Lake Full characterization – surface sediments (0 to 2 cm)	19	1	July – Aug.	29	Conventional analytes AVS Calcium carbonate TOC Grain size TAL and TCL chemicals SEM ^c (selected stations)
Partial characterization – surface sediments (0 to 2 cm)	95	1	July – Aug.	95	Conventional analytes AVS Calcium carbonate TOC Grain size Site metals SEM (selected stations) Site VOCs Chlorinated benzenes ^d PAHs (selected stations) PCBs
Otisco Lake Full characterization – surface sediments (0 to 2 cm)	5	1	July – Aug.	5	Conventional analytes AVS Calcium carbonate TOC Grain size TAL and TCL chemicals SEM (selected stations)

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Ecological Effects Investigation					
Sediment Toxicity Study					
Onondaga Lake	79	1	July – Aug.	83	Amphipod test Survival Biomass Chironomid test Survival Biomass (At stations S1 and S17 two additional replicates were collected per location)
Otisco Lake	5	1	July – Aug.	5	Amphipod test Survival Biomass Chironomid test Survival Biomass
Benthic Macroinvertebrate Study					
Onondaga Lake	66	5 replicates	July – Aug.	330	Species abundance
Tributaries (1 pool per tributary)	8	5 replicates	Aug.	40	Species abundance
Otisco Lake	5	5 replicates	July – Aug.	25	Species abundance
Nearshore Fish Study					
Littoral zone	8	5 replicates	June/July, Aug./Sept., and Oct./Nov.	120	Species abundance Total length Abnormalities
Tributaries	8	1	June – Nov.	24	Species abundance Total length Abnormalities

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Macrophyte Distribution Study					
Aerial and visual surveys	Entire littoral zone	NA	July – Aug.	NA	Species distribution
Bioaccumulation Investigation					
Phytoplankton Study					
Composite samples at each station from 0, 3, 6, and 12 m	2	3	May, Aug. and Nov.	18	Species abundance Biomass
Zooplankton Study					
Composite samples of entire assemblage and most abundant large zooplankton taxon (cladocerans)	2	3 (assemblages)	May, Aug. and Nov.	18 (assemblages)	Species abundance Biomass (assemblages)
Benthic Macroinvertebrate Study					
Composite samples of amphipods and chironomids at each station	7 (amphipods)	1	Aug.	15	Biomass Methylmercury
	8 (chironomids)				
Fish Tissue Study					
Filletts from individual adults from the northern, southern, and western parts of Onondaga Lake					
Gizzard shad	2	10	Aug. – Sept.	20	Total length
Carp	2	10	Aug. – Sept.	20	Biomass
Channel catfish	2	10–11	Aug. – Sept.	21	Age
White perch	2	10	Aug. – Sept.	20	Sex
Bluegill	3	10	Aug. – Sept.	30	Abnormalities
Smallmouth bass	3	10	Aug. – Sept.	30	Methylmercury
Walleye	2	9–11	Aug. – Sept.	20	PCBs Percent lipids

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
Composite samples of fillets from four individual adults from the southern part of Onondaga Lake					
Channel catfish	1	1 composite	Sept. – Oct.	1	Total length
White perch	1	1 composite	Sept. – Oct.	1	Biomass
Smallmouth bass	1	1 composite	Sept. – Oct.	1	Age
Walleye	1	1 composite	Sept. – Oct.	1	Sex
					Abnormalities ^c
					TAL and TCL chemicals
					Percent lipids
Whole bodies of individual adults from the northern and southern parts of Onondaga Lake					
Gizzard shad	2	5	Aug.	10	Total length
White perch	2	5	Aug.	10	Biomass
Bluegill	2	5	Aug. – Sept.	10	Age
Smallmouth bass	2	5	Aug. – Sept.	10	Abnormalities
					Methylmercury
					Percent lipids
Composite samples of whole bodies of 5 to 12 individual juveniles					
Most abundant species in littoral zone	8	1–2 composites	Aug.	10	Total length
					Biomass
					Abnormalities
					Methylmercury
					PCBs
					Percent lipids
Most abundant species in tributaries	7	1–2 composites	Sept.	7	

Notes: AVS – acid-volatile sulfides
 BTEX – benzene, toluene, ethylbenzene, and xylenes
 NA – not applicable
 PAH – polycyclic aromatic hydrocarbon
 PCB – polychlorinated biphenyl
 RI – remedial investigation
 SEM – simultaneously extracted metals
 TAL – USEPA's Target Analyte List for inorganic chemicals

Table 7-1. (cont.)

Investigation/Study	No. Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples	Analyses
TCL	–	USEPA's Target Compound List for organic chemicals			
TOC	–	total organic carbon			
VOC	–	volatile organic compound			
^a Site metals: cadmium, chromium, copper, lead, mercury, nickel, and zinc.					
^b Site VOCs: BTEX compounds and mono-, di-, and trichlorobenzenes.					
^c SEM: cadmium, copper, lead, mercury, nickel, and zinc.					
^d Chlorinated benzenes: tetra-, penta-, and hexachlorobenzenes.					
^e No abnormalities were subsequently found in any of the fishes collected for the RI in 1992 (PTI, 1993c).					

Table 7-2. Summary of 1999 and 2000 Honeywell RI and 2002 NYSDEC Data Used in the Onondaga Lake BERA

Investigation/Study	No. of Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples ^a	Analyses
Sediment Investigation					
Surface Sediment (0–15 cm)					
Onondaga Lake	84	1–9	7/13–8/13/00	157	Chemical analysis
Otisco Lake	2	1	8/9 and 8/14/00	2	Chemical analysis
Porewater (0–8 cm)					
Onondaga Lake	7	6	July 2000	42	Mercury, Methylmercury, pH, TOC and Total Solids
Wetland Sediment (0–15 cm)					
Onondaga Lake	21	1	8/11–8/13/00 and 5/9/02 ^b	21	Chemical analysis
Dredged Material					
Onondaga Lake	8	5–6 ^c	8/16–8/17/00	41	Chemical analysis
Water Column Investigation					
Onondaga Lake	12	1–35	9/27/99–12/2/99	73	Chemical analysis
Aquatic Ecological Investigation					
Whole Fish, Fillets, Remainers, and Composites					
Onondaga Lake	9	1–22 ^d	9/19–9/22/00	55	Species abundance Total length Biomass Age Chemical analysis

Table 7-2. (cont.)

Investigation/Study	No. of Stations	No. Samples per Station	Sampling Period(s)	Total No. Samples ^a	Analyses
Benthic Macroinvertebrates (0–15 cm)					
Onondaga Lake	15	5 replicates	8/10–8/13/00	75	Species abundance
Otisco Lake	2	5 replicates	8/9 and 8/14/00	10	Species abundance
Onondaga Lake	15	2–4	7/28–8/2/00	41	Chemical analysis of major taxa ^e
Otisco Lake	2	2 or 3	8/3/00	5	Chemical analysis of major taxa ^f
Sediment Toxicity (0–15 cm)					
Onondaga Lake	15	1	8/10–8/13/00	15	Amphipod test: survival, biomass, reproduction
Otisco Lake	2	1	8/9 and 8/14/00	2	Amphipod test: survival, biomass, reproduction

Notes: ^a The number of samples does not include field quality control samples (i.e., field duplicate and field replicate samples).

^b The May 2002 wetland sampling was conducted by NYSDEC/TAMS and accounted for five samples in Wetland SYW-6.

^c The presence of distinct layers observed in dredged material occasionally increased the number of intervals collected in a core.

^d Whole adult fish were collected near and in the mouth of Ninemile Creek and near the shore of Onondaga Lake from Tributary 5A to Harbor Brook. Composite young-of-the-year fish were collected from the mouths of Ninemile Creek, East Flume, Ley Creek, Harbor Brook, Onondaga Creek, Sawmill Creek, and Bloody Brook.

^e Benthic macroinvertebrates utilized for chemical analysis were collected from 7/28/00 through 8/2/00 at 15 stations; however, as specified in the work plan (Exponent, 2000d), these were not the same 15 stations that were used for analysis of species abundance and toxicity testing.

^f Benthic macroinvertebrates utilized for chemical analysis were collected on 8/3/00 at the reference area.

Table 8-1. Summary of Concentrations of Metals Other than Mercury in Tributary and Onondaga Lake Water and Metro Discharge in 1992 and 1999

Station	Location	No. of Samples	Metals (µg/L)											
			Barium			Cadmium			Chromium			Copper		
			No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.
Tributaries/Metro Outfall–Base Flow, 1992														
W3	Metro Outfall	4	0	--	--	0	--	--	1	2.5	2.5	4	8.0	12
W4	Onondaga Creek	5	0	--	--	0	--	--	0	--	--	3	4.2	6.4
W5	Harbor Brook	7	0	--	--	0	--	--	1	4.5	4.5	1	1.6	1.6
W6	Ley Creek	4	0	--	--	0	--	--	3	3.2	4.3	3	3.4	4.1
W7	East Flume	10	0	--	--	0	--	--	3	6.2	11	9	7.5	15
W8	Tributary 5A	7	0	--	--	0	--	--	7	13	28	6	7.7	10
W9	Bloody Brook	1	0	--	--	0	--	--	0	--	--	1	1.9	1.9
W10	Ninemile Creek	3	0	--	--	0	--	--	0	--	--	0	--	--
W11	Sawmill Creek	1	0	--	--	0	--	--	0	--	--	0	--	--
W12	Lake Outlet	3	0	--	--	0	--	--	1	18	18	0	--	--
Tributaries/Metro Outfall–Intermediate Flow, 1992														
W3	Metro Outfall	1	0	--	--	0	--	--	0	--	--	1	4.2	4.2
W4	Onondaga Creek	9	0	--	--	0	--	--	1	2.2	2.2	6	6.2	11
W5	Harbor Brook	3	0	--	--	0	--	--	2	5.4	5.7	1	6.7	6.7
W6	Ley Creek	7	0	--	--	0	--	--	1	3.9	3.9	5	7.4	13
W7	East Flume	5	0	--	--	0	--	--	3	5.0	8.3	5	9.0	18
W8	Tributary 5A	3	0	--	--	1	2.4	2.4	3	69	119	3	20	30
W10	Ninemile Creek	9	0	--	--	0	--	--	2	9.9	12	6	6.4	16
W12	Lake Outlet	10	0	--	--	0	--	--	0	--	--	0	--	--
Tributaries/Metro Outfall–High Flow, 1992														
W3	Metro Outfall	7	0	--	--	0	--	--	3	3.4	4.3	7	8.7	13
W4	Onondaga Creek	5	0	--	--	0	--	--	0	--	--	3	4.8	9.5
W5	Harbor Brook	8	0	--	--	0	--	--	4	7.1	9.1	8	22	48
W6	Ley Creek	5	0	--	--	0	--	--	3	12	19	5	23	58
W7	East Flume	4	0	--	--	0	--	--	0	--	--	4	4.5	7.5
W8	Tributary 5A	9	0	--	--	1	3.2	3.2	9	200	560	9	49	125
W9	Bloody Brook	1	0	--	--	1	17	17	1	12	12	1	42	42
W10	Ninemile Creek	5	0	--	--	1	2.1	2.1	2	4.7	6.4	5	6.5	16
W11	Sawmill Creek	1	0	--	--	0	--	--	0	--	--	1	4.7	4.7
W12	Lake Outlet	17	0	--	--	0	--	--	0	--	--	7	2.7	4.9

Table 8-1. (cont.)

Station	Location	Metals (µg/L)												
		No. of Samples	Barium			Cadmium			Chromium			Copper		
			No. Det.	Mean Conc.	Max. Conc.									
Onondaga Lake, 1992														
W1	South Basin	66	2	73	77	1	2.9	2.9	11	2.8	5.3	18	6.6	51
W2	North Basin	44	2	71	76	2	2.7	2.7	5	2.7	4.2	12	1.9	3
Onondaga Lake, 1999														
W1	South Basin	1	0	--	--	0	--	--	1	3.5	3.5	0	--	--
W2	North Basin	1	0	--	--	0	--	--	1	3.7	3.7	0	--	--
W50	Willis Lakeshore Exposure Ar	1	0	--	--	0	--	--	1	3.9	3.9	0	--	--
W51	Observed Fish Area	1	0	--	--	0	--	--	1	3.7	3.7	0	--	--
W52	Access from Fairgrounds	1	0	--	--	0	--	--	1	3.5	3.5	0	--	--
W53	Beach Access	2	0	--	--	0	--	--	2	3.1	3.5	0	--	--
W54	Lake Park Lakeland	1	0	--	--	0	--	--	1	3.1	3.1	0	--	--
W55	Harbor Brook	1	0	--	--	0	--	--	1	3.8	3.8	0	--	--
W56	Park/Picnic Area/Playground	1	0	--	--	0	--	--	1	3.6	3.6	0	--	--
W57	Boat Ramp (Liverpool)	1	0	--	--	0	--	--	1	3.2	3.2	0	--	--
W58	Lake Park Galeville	1	0	--	--	0	--	--	1	3.2	3.2	0	--	--

Table 8-1. (cont.)

Station	Location	Metals (µg/L)												
		No. of Samples	Lead			Manganese			Nickel			Zinc		
			No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.
Tributaries/Metro Outfall–Base Flow, 1992														
W3	Metro Outfall	4	1	1.1	1.1	0	--	--	1	9.3	9.3	3	33	42
W4	Onondaga Creek	5	2	2.4	3.5	0	--	--	0	--	--	4	26	51
W5	Harbor Brook	7	1	1.7	1.7	0	--	--	1	9.1	9.1	4	5.0	6.4
W6	Ley Creek	4	3	4.6	7.4	0	--	--	3	9.0	9.5	3	17	22
W7	East Flume	10	5	5.7	11	0	--	--	0	--	--	9	89	196
W8	Tributary 5A	7	5	1.6	2.1	0	--	--	0	--	--	4	23	59
W9	Bloody Brook	1	0	--	--	0	--	--	0	--	--	0	--	--
W10	Ninemile Creek	3	0	--	--	0	--	--	3	7.0	7.7	2	4.5	5.6
W11	Sawmill Creek	1	0	--	--	0	--	--	1	17	17	0	--	--
W12	Lake Outlet	3	0	--	--	0	--	--	1	10	10	1	14	14
Tributaries/Metro Outfall–Intermediate Flow, 1992														
W3	Metro Outfall	1	1	4.8	4.8	0	--	--	0	--	--	1	40	40
W4	Onondaga Creek	9	6	7.3	17	0	--	--	0	--	--	8	27	85
W5	Harbor Brook	3	2	4.3	6.7	0	--	--	2	6.3	6.5	3	15	29
W6	Ley Creek	7	7	4.7	8.6	0	--	--	2	7.9	8.7	7	30	43
W7	East Flume	5	5	6.9	28	0	--	--	0	--	--	5	122	179
W8	Tributary 5A	3	3	9.2	14	0	--	--	9	140	327	3	76	117
W10	Ninemile Creek	9	6	7.2	22	0	--	--	3	61	93	6	33	88
W12	Lake Outlet	10	1	1.1	1.1	0	--	--	7	66	115	8	7.0	13
Tributaries/Metro Outfall–High Flow, 1992														
W3	Metro Outfall	7	5	1.7	2.2	0	--	--	7	9.3	15	7	43	71
W4	Onondaga Creek	5	3	6.8	16	0	--	--	0	--	--	5	13	38
W5	Harbor Brook	8	6	35	63	0	--	--	3	16	19	8	97	188
W6	Ley Creek	5	5	31	95	0	--	--	0	--	--	5	84	182
W7	East Flume	4	3	1.6	2.0	0	--	--	0	--	--	4	109	130
W8	Tributary 5A	9	7	33	55	0	--	--	0	--	--	8	119	259
W9	Bloody Brook	1	1	44	44	0	--	--	4	10	17	1	201	201
W10	Ninemile Creek	5	3	9.3	20	0	--	--	0	--	--	3	43	72
W11	Sawmill Creek	1	1	3.5	3.5	0	--	--	1	9.1	9.1	1	27	27
W12	Lake Outlet	17	2	4.2	5.8	0	--	--	1	11	11	9	18	47

Table 8-1. (cont.)

Station	Location	Metals (µg/L)												
		No. of Samples	Lead			Manganese			Nickel			Zinc		
			No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.	No. Det.	Mean Conc.	Max. Conc.
Onondaga Lake, 1992														
W1	South Basin	66	14	1.7	2.8	66	190	868	10	9.7	15	46	17	143
W2	North Basin	44	10	2.4	7.7	42	173	880	2	5.3	5.3	31	12	42
Onondaga Lake, 1999														
W1	South Basin	1	0	--	--	34	143	601	1	3.6	3.6	0	--	--
W2	North Basin	1	0	--	--	21	186	577	1	3.7	3.7	0	--	--
W50	Willis Lakeshore Exposure Area	1	1	3.1	3.1	1	21	21	1	4.6	4.6	0	--	--
W51	Observed Fish Area	1	0	--	--	1	27	27	1	4.7	4.7	0	--	--
W52	Access from Fairgrounds	1	0	--	--	2	51	87	1	4.2	4.2	0	--	--
W53	Beach Access	2	0	--	--	1	15	15	2	4.0	4.0	0	--	--
W54	Lake Park Lakeland	1	0	--	--	2	58	102	1	3.7	3.7	0	--	--
W55	Harbor Brook	1	0	--	--	1	31	31	1	4.2	4.2	0	--	--
W56	Park/Picnic Area/Playground	1	0	--	--	1	19	19	1	3.5	3.5	0	--	--
W57	Boat Ramp (Liverpool)	1	0	--	--	1	16	16	1	3.9	3.9	0	--	--
W58	Lake Park Galeville	1	0	--	--	2	63	110	1	4.0	4.0	0	--	--

Source: Onondaga Lake Database

Notes: -- not detected

1. Detailed information for each water sample is presented in Appendix B.
2. Mean concentration was calculated using only detected values.
3. Barium was only measured in two samples in 1992.
4. All manganese detections were in 1999.

Table 8-2. Summary of Concentrations of Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) in Tributary and Onondaga Lake Water and Metro Discharge in 1992 and 1999

Station	Location	No. of Samples	Benzene		Toluene		Xylenes		Ethylbenzene	
			No. of Detects	Max. Conc. (µg/L)						
Tributaries/Metro Outfall–Base Flow, 1992										
W3	Metro Outfall	3	0	--	1	3.1	0	--	0	--
W4	Onondaga Creek	4	0	--	0	--	0	--	0	--
W5	Harbor Brook	7	4	1.7	5	2.6	4	3.6	0	--
W6	Ley Creek	3	0	--	0	--	0	--	0	--
W7	East Flume	10	1	15	1	2.5	1	1.4	0	--
W8	Tributary 5A	7	3	34	3	4.2	4	2.2	0	--
W9	Bloody Brook	1	0	--	0	--	0	--	0	--
W10	Ninemile Creek	3	0	--	0	--	0	--	0	--
W11	Sawmill Creek	1	0	--	0	--	0	--	0	--
W12	Lake Outlet	2	0	--	0	--	0	--	0	--
Tributaries/Metro Outfall–Intermediate Flow, 1992										
W3	Metro Outfall									
W4	Onondaga Creek	7	0	--	0	--	0	--	0	--
W5	Harbor Brook	3	0	--	0	--	0	--	0	--
W6	Ley Creek	5	0	--	0	--	0	--	1	1.7
W7	East Flume	5	0	--	0	--	0	--	0	--
W8	Tributary 5A	3	0	--	0	--	0	--	0	--
W10	Ninemile Creek	6	0	--	0	--	0	--	0	--
W12	Lake Outlet	7	0	--	0	--	0	--	0	--
Tributaries/Metro Outfall–High Flow, 1992										
W3	Metro Outfall	8	0	--	0	--	0	--	0	--
W4	Onondaga Creek	5	0	--	0	--	0	--	0	--
W5	Harbor Brook	9	0	--	1	2.1	1	1.7	0	--
W6	Ley Creek	4	0	--	0	--	0	--	0	--
W7	East Flume	4	0	--	0	--	3	1.8	0	--
W8	Tributary 5A	9	1	60	1	5.1	2	2.4	0	--
W9	Bloody Brook	1	0	--	0	--	0	--	0	--
W10	Ninemile Creek	5	0	--	0	--	0	--	0	--
W11	Sawmill Creek	1	0	--	0	--	0	--	0	--
W12	Lake Outlet	16	0	--	0	--	0	--	0	--
Onondaga Lake, 1992										
W1	South Basin	60	0	--	0	--	0	--	0	--
W2	North Basin	38	0	--	0	--	0	--	0	--
Onondaga Lake, 1999										
W1	South Basin	1	0	--	0	--	0	--	0	--
W2	North Basin	1	0	--	0	--	0	--	0	--
W50	Willis Lakeshore Exposure Area	1	1	6.3	1	0.2	0	--	0	--
W51	Observed Fish Area	1	0	--	0	--	0	--	0	--
W52	Access from Fairgrounds	1	0	--	0	--	0	--	0	--
W53	Beach Access	2	0	--	0	--	1	0.5	0	--
W54	Lake Park Lakeland	1	0	--	0	--	0	--	0	--
W55	Harbor Brook	1	1	0.11	0	--	1	0.3	0	--
W56	Park/Picnic Area/Playground	1	0	--	0	--	0	--	0	--
W57	Boat Ramp (Liverpool)	1	0	--	0	--	0	--	0	--
W58	Lake Park Galeville	1	0	--	0	--	0	--	0	--

Source: Onondaga Lake Database

Notes: -- - not detected

Detailed information for each water sample is presented in Appendix B.

Table 8-3. Summary of Concentrations of Chlorinated Benzenes in Tributary and Onondaga Lake Water and Metro Discharge in 1992 and 1999

Station	Location	No. of Samples	Monochloro-benzene (µg/L)		Dichlorobenzenes (µg/L)						Trichlorobenzenes (µg/L)					
			benzene (µg/L)		1,2		1,3		1,4		1,2,3		1,2,4		1,3,5	
			No. Det.	Max. Conc.	No. Det.	Max. Conc.	No. Det.	Max. Conc.	No. Det.	Max. Conc.	No. Det.	Max. Conc.	No. Det.	Max. Conc.	No. Det.	Max. Conc.
Tributaries/Metro Outfall–Base Flow, 1992																
W3	Metro Outfall	3	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W4	Onondaga Creek	4	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W5	Harbor Brook	7	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W6	Ley Creek	3	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W7	East Flume	10	1	7.6	4.0	10	0	--	8	13	0	--	0	--	0	--
W8	Tributary 5A	7	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W9	Bloody Brook	1	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W10	Ninemile Creek	3	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W11	Sawmill Creek	1	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W12	Lake Outlet	2	0	--	0	--	0	--	0	--	0	--	0	--	0	--
Tributaries/Metro Outfall–Intermediate Flow, 1992																
W3	Metro Outfall															
W4	Onondaga Creek	7	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W5	Harbor Brook	3	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W6	Ley Creek	5	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W7	East Flume	5	0	--	0	--	0	--	2	2.3	0	--	2	1.1	0	--
W8	Tributary 5A	3	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W10	Ninemile Creek	6	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W12	Lake Outlet	7	0	--	0	--	0	--	0	--	0	--	0	--	0	--
Tributaries/Metro Outfall–High Flow, 1992																
W3	Metro Outfall	8	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W4	Onondaga Creek	5	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W5	Harbor Brook	9	0	--	1	1.0	0	--	2	7.2	0	--	0	--	0	--
W6	Ley Creek	4	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W7	East Flume	4	0	--	3	5.2	1	1.0	4	20	0	--	3	2.4	0	--
W8	Tributary 5A	9	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W9	Bloody Brook	1	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W10	Ninemile Creek	5	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W11	Sawmill Creek	1	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W12	Lake Outlet	16	0	--	0	--	0	--	0	--	0	--	0	--	0	--
Onondaga Lake, 1992																
W1	South Basin	60	0	--	1	1.7	1	1.2	1	1.7	1	2.7	1	2.4	1	1.6
W2	North Basin	38	0	--	0	--	0	--	0	--	0	--	0	--	0	--
Onondaga Lake, 1999																
W1	South Basin	1	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--
W2	North Basin	1	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--
W50	Willis Lakeshore Exposure A	1	1	12	1	3.2	0	--	1	3.4	0	--	0	--	0	--
W51	Observed Fish Area	1	0	--	1	0.1	0	--	1	0.3	0	--	0	--	0	--
W52	Access from Fairgrounds	1	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--
W53	Beach Access	2	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--
W54	Lake Park Lakeland	1	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--
W55	Harbor Brook	1	1	0.5	1	0.2	0	--	1	0.5	0	--	0	--	0	--
W56	Park/Picnic Area/Playground	1	0	--	0	--	0	--	1	0.1	0	--	0	--	0	--
W57	Boat Ramp (Liverpool)	1	0	--	0	--	0	--	0	--	0	--	0	--	0	--
W58	Lake Park Galeville	1	0	--	0	--	0	--	1	0.2	0	--	0	--	0	--

Source: Onondaga Lake Database

Notes: -- - not detected

Detailed information for each water sample is presented in Appendix B.

Table 8-4. Summary of Honeywell Whole Fish and Fillet Data

	Data	Fillet	Whole Fish	Composite (YOY)	Composite (Adults)	Remains (Adults)	Total No. Samples	Ratio of Fillet to Whole Fish
Mercury (µg/kg)	No. of Analyses	11	22	15	100	11	159	
	No. of Detects	11	22	15	100	11		
	Mean	531	571	108	882	344		1.1
	Minimum	230	175	48	296	129		
	Maximum	904	1,400	224	1,890	734		
Total PCBs (µg/kg)	No. of Analyses	11	17	15	---	11	54	
	No. of Detects	11	17	15	---	11		
	Mean	686	1,718	619	---	1,467		2.5
	Minimum	88	300	142	---	380		
	Maximum	1,840	3,400	2,370	---	2,700		
DDT and metabolites (Sum) (µg/kg)	No. of Analyses	11	17	15	---	11	54	
	Mean	81	185	27	---	199		2.3
	Minimum	9.3	25	12	---	21		
	Maximum	208	499	87	---	443		
TEQ (1/2 DL) Avian (ng/kg)	No. of Analyses	11	18	16	---	11	56	
	No. of Detects	11	18	16	---	11		
	Mean	16	26	3.9	---	31		1.7
	Minimum	0.5	1.9	1.0	---	0.9		
	Maximum	101	128	13	---	194		
TEQ (1/2 DL) Mammalian (ng/kg)	No. of Analyses	11	18	16	---	11	56	
	No. of Detects	11	18	16	---	11		
	Mean	6.8	12	1.4	---	13		1.8
	Minimum	0.3	0.6	0.3	---	0.4		
	Maximum	41	62	4.7	---	79		

Notes:

- 1) Statistics are from samples collected in 1992 and 2000.
- 2) The data collected by PTI are included with the Honeywell samples.
- 3) 1992 Honeywell PCB data were excluded based on QA/QC.

Table 8-5. Uptake Factors Used to Estimate Prey Concentrations of COCs in Wildlife Receptor Diets

Analyte	Benthic Invertebrate Uptake Factors ^a	Earthworm Uptake Factors ^b	Small Mammal Uptake Factors ^c
Metals			
Arsenic	0.127	Not applicable	$\ln(\text{mammal}) = -4.5796 + (0.7354 * \ln[\text{soil}])$
Barium	$\ln(\text{invert}) = 0.0395 + (0.6092 * \ln(\text{sed}))^d$	0.091	Not applicable
Beryllium	Not applicable	0.045	Not applicable
Cadmium	9.24	$\ln(\text{earthworm}) = 2.114 + (0.795 * \ln(\text{soil}))$	Not applicable
Chromium	$\log(\text{invert}) = 0.2092 + (0.365 * \log(\text{sed}))$	Not available	$\ln(\text{mammal}) = -1.4945 + (0.7326 * \ln(\text{soil}))$
Cobalt	$\log(\text{invert}) = 1.48 + (-0.425 * \log(\text{sed}))^p$	Not applicable	Not applicable
Copper	$\log(\text{invert}) = 1.037 + (3.59 * \log(\text{sed}))$	Not applicable	Not applicable
Lead	0.066	$\ln(\text{earthworm}) = -0.218 + (0.807 * \ln(\text{soil}))$	$\ln(\text{mammal}) = 0.0761 + (0.4422 * \ln(\text{soil}))$
Manganese	0.066 ^f	Not applicable	Not applicable
Mercury	e	$\ln(\text{earthworm}) = -0.684 + (0.118 * \ln[\text{soil}])$	0.0543
Methylmercury	e	$\ln(\text{earthworm}) = -0.684 + (0.118 * \ln[\text{soil}])$	0.192
Selenium	$\log(\text{invert}) = 0.2092 + (0.365 * \log(\text{sed}))^q$	$\ln(\text{earthworm}) = -0.075 + (0.733 * \ln[\text{soil}])$	Not applicable
Nickel	$\log(\text{invert}) = 1.48 + (-0.425 * \log(\text{sed}))$	Not available	Not applicable
Thallium	0.066 ^f	$\ln(\text{earthworm}) = -0.218 + (0.807 * \ln(\text{soil}))^f$	Not applicable
Vanadium	0.127 ^g	0.042	$\ln(\text{mammal}) = -4.5796 + (0.7354 * \ln(\text{soil}))^g$
Zinc	$\log(\text{invert}) = 1.77 + (2.42 * \log(\text{sed}))$	Not applicable	Not applicable
Volatile Organic Compounds			
Dichlorobenzenes	4.51 ^h	Not applicable	Not applicable
Trichlorobenzenes	4.9	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	Not applicable
Xylenes	1	Not applicable	Not applicable
Semivolatile Organic Compounds			
Bis(2-ethylhexyl)phthalate	1	Not applicable	Not applicable
Hexachlorobenzene	4.17	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^k$
Total PAHs	0.55 ^j	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^k$
Polychlorinated Biphenyls/Pesticides/Dioxins/Furans			
Chlordanes	Not applicable	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	Not applicable
DDT and metabolites	0.59 ^l	Not applicable	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^k$
Dieldrin	8.5	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^k$
Total polychlorinated biphenyls	1.48	$\ln(\text{earthworm}) = 1.410 + (1.361 * \ln[\text{soil}])$	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^k$
Dioxins	0.45 ^m	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	$(\ln[\text{mammal}] = 0.8113 + 1.0993(\ln[\text{soil}]))^n$
Furans	0.45 ^m	$\ln(\text{earthworm}) = 3.533 + (1.182 * \ln(\text{soil}))^i$	0.1251 ^o

Table 8-5. (cont.)

Notes:

Uptake factors are only provided for COCs in receptor prey (see footnotes a, b, and c below for receptors consuming each prey item).

^a Benthic invertebrate uptake factors were based on USDOE (1998) for metals and USACE BSAF database for organics, except for mercury for which data were available. Receptors feeding on aquatic invertebrate prey include: mallard, tree swallow, little brown bat, mink, and river otter.

^b Earthworm uptake factors were based on Sample et al. (1998a). When a UF was not available for a contaminant, professional judgment was used. The short-tailed shrew represents receptors feeding on terrestrial invertebrates.

^c Small mammal uptake factors were based on Sample et al. (1998b). When a UF was not available for a contaminant, professional judgment was used. Receptors feeding on small mammals include the red-tailed hawk and mink.

^d Cadmium regression equation applied for barium.

^e Measured concentrations of mercury in invertebrates were used.

^f Median lead uptake factors applied for manganese and thallium.

^g Arsenic uptake factor applied for vanadium.

^h Average of dichlorobenzene uptake factors used.

ⁱ 90th percentile earthworm UF for 2,3,7,8-TCDD (22.2) was applied to trichlorobenzenes, Hexachlorobenzene, PAHs, chlordanes, dieldrin, and all dioxins and

^j Average of PAH uptake factors used.

^k 90th percentile small mammal UF for 2,3,7,8-TCDD (2.2) was applied to hexachlorobenzene, PAHs, DDT and metabolites, Dieldrin and PCBs.

^l Average of DDT, DDE, and DDD uptake factors used.

^m Average of dioxin and furan uptake factors used (both equal to 0.45).

ⁿ The recommendation for general estimates for tetrachlorodibenzo-p-dioxin was applied to all dioxins.

^o The recommendation for general estimates for tetrachlorodibenzo-furan was applied to all furans.

^p Nickel benthic uptake factor applied for cobalt.

^q Chromium benthic uptake factor applied for selenium.

Table 8-6. Avian Receptor Life History Parameters

Factors	Units	Tree Swallow	Mallard Duck	Belted Kingfisher	Great Blue Heron	Osprey	Red-tailed Hawk
Body weight	grams	20.6 ^a	1,043 ^g	136 ^k	2,200 ^l	1,568 ^o	1,224 ^l
Food ingestion rate (dw basis)	kg/kg-day	0.264 ^b	0.101 ^b	0.137 ^b	0.045 ^b	0.048 ^b	0.052 ^b
Water ingestion rate	kg/kg-day	0.212 ^c	0.058 ^c	0.114 ^c	0.045 ^c	0.051 ^c	0.055 ^c
Percent Diet Composition							
Fish 3 to 18 cm				100%	33%	10%	
Fish greater than 18 cm					67%	90%	
Aquatic Invertebrates		100%	50%				
Aquatic Plants			50%				
Vertebrate prey (e.g., mammals, birds)							100%
Sediment ingestion rate (dw basis)	% of FIR	0% ^d	3.3% ^h	1% ^d	1% ^d	0% ^{dj}	1% ^{dj}
Foraging radius (mean/maximum)	km	0.1/0.2 ^e	111/540 ⁱ hectares	0.4 -1.0 ^k	3.1/24 ^m	1.7 to 10 ^p (mean)	233/1770 ^{p,q} hectares
Residence time (maximum)	days/yr	365 ^f	365 ^{fj}	365 ^f	365 ^{fn}	243 - 365 ^d	365 ^f

Notes: -- - assumed to forage onsite exclusively

FIR - food ingestion rate

NA - not available

SD - standard deviation

^a Secord and McCarty (1997).

^j Andrlle and Carroll (1988).

^b Based on Nagy (1987).

^k Brooks and Davis (1987). Non-breeding range.

^c Based on Calder and Braun (1983).

^l Dunning (1993).

^d Based on professional judgement.

^m Dowd and Flake (1985).

^e McCarty and Winkler (1999).

ⁿ Bull (1998)

^f Cornell University (2001).

^o Brown and Amadon (1968).

^g Nelson and Martin (1953).

^p USEPA (1993b).

^h Estimated from Beyer et al. (1994).

^q Janes (1984).

ⁱ Dywer et al. (19879), Kirby et al. (1985).

Table 8-7. Mammalian Receptor Life History Parameters

Factors	Units	Little Brown Bat	Short-tailed Shrew	Mink	River Otter
Body weight	grams	7.1 ^a	15 ^f	600 ^k	5,450 ⁿ
Food ingestion rate (dw basis)	kg/kg-day	0.102 ^b	0.157 ^{d,g}	0.0643 ^l	0.044 ^l
Percent Diet Composition					
Fish 3 to 18 cm				35%	30%
Fish greater than 18 cm					60%
Aquatic Invertebrates		100%		15%	10%
Vertebrate prey (e.g., mammals, birds)				50%	
Terrestrial Invertebrates			100%		
Water ingestion rate	kg/kg-day	0.162 ^c	0.151 ^c	0.104 ^c	0.084 ^c
Sediment ingestion rate (dw basis)	% of FIR	0% ^d	13% ^h	1% ^d	1% ^d
Foraging radius (mean/maximum)	km	0.1 ^e	0.05/0.22 ⁱ hectares	1.85/2.8 ^m	9/22.5 ^o
Assumed Residence time	days/yr	365 ^d	365 ^j	365 ⁿ	365 ^d

Notes: - assumed to forage onsite exclusively

FIR - food ingestion rate

NA - not available

SD - standard deviation

^a Bopp (1999).

^b Hoffman, (1999); Environment Canada (2000); Synder (2002).

^c Based on Calder and Braun (1983).

^d Based on professional judgement.

^e Buchler (1976).

^f Schlesinger and Potter (1974).

^g Schmidt (1994).

^h Talmage and Walton (1993).

ⁱ Platt (1976).

^j Nowak (1997).

^k Mitchell (1961).

^l Based on Nagy (1987).

^m Gerell (1970).

ⁿ Allen (1986).

^o Spinola et al. (undated).

Table 9-1. SEDQUAL Impacted/Non-impacted List for Stations Sampled in 1992

Station	Amphipod Biomass	Amphipod Survival	Chironomid Biomass	Chironomid Survival
S1	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S2	Impacted	Not Impacted	Not Impacted	Impacted
S3	Not Impacted	Not Impacted	Impacted	Impacted
S4	Not Impacted	Not Impacted	Impacted	Impacted
S5	Impacted	Not Impacted	Not Impacted	Impacted
S6	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S7	Not Impacted	Not Impacted	Not Impacted	Impacted
S8	Not Impacted	Not Impacted	Impacted	Impacted
S9	Impacted	Not Impacted	Impacted	Impacted
S10	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S11	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S12	Not Impacted	Not Impacted	Impacted	Impacted
S13	Not Impacted	Not Impacted	Not Impacted	Impacted
S14	Impacted	Not Impacted	Not Impacted	Impacted
S15	Impacted	Not Impacted	Impacted	Impacted
S16	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S17	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S18	Not Impacted	Not Impacted	Impacted	Impacted
S19	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S20	Impacted	Not Impacted	Impacted	Impacted
S21	Impacted	Not Impacted	Impacted	Impacted
S22	Impacted	Not Impacted	Not Impacted	Not Impacted
S24	Not Impacted	Not Impacted	Not Impacted	Impacted
S25	Not Impacted	Not Impacted	Not Impacted	Impacted
S26	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S27	Not Impacted	Not Impacted	Not Impacted	Impacted
S28	Impacted	Impacted	Impacted	Impacted
S29	Impacted	Not Impacted	Not Impacted	Not Impacted
S34	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S35	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S36	Impacted	Not Impacted	Impacted	Impacted
S37	Not Impacted	Not Impacted	Not Impacted	Impacted
S38	Impacted	Not Impacted	Impacted	Impacted
S39	Impacted	Not Impacted	Not Impacted	Not Impacted
S40	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S45	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S46	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S47	Impacted	Not Impacted	Not Impacted	Not Impacted
S48	Not Impacted	Not Impacted	Impacted	Impacted
S51	Not Impacted	Not Impacted	Impacted	Not Impacted
S53	Impacted	Not Impacted	Not Impacted	Impacted
S54	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S55	Impacted	Not Impacted	Not Impacted	Not Impacted
S56	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S61	Not Impacted	Not Impacted	Impacted	Not Impacted
S62	Impacted	Not Impacted	Not Impacted	Not Impacted
S66	Not Impacted	Not Impacted	Not Impacted	Impacted

Table 9-1. (cont.)

Station	Amphipod Biomass	Amphipod Survival	Chironomid Biomass	Chironomid Survival
S67	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S68	Impacted	Not Impacted	Not Impacted	Not Impacted
S70	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S71	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S72	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S73	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S74	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S75	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S76	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S77	Not Impacted	Not Impacted	Not Impacted	Impacted
S81	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S82	Not Impacted	Not Impacted	Not Impacted	Impacted
S83	Not Impacted	Not Impacted	Not Impacted	Impacted
S84	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S86	Not Impacted	Not Impacted	Not Impacted	Impacted
S87	Not Impacted	Not Impacted	Not Impacted	Impacted
S90	Not Impacted	Not Impacted	Not Impacted	Impacted
S92	Not Impacted	Not Impacted	Not Impacted	Impacted
S93	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S94	Not Impacted	Not Impacted	Not Impacted	Impacted
S95	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S100	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S103	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S104	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S105	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S108	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S109	Not Impacted	Not Impacted	Not Impacted	Impacted
S110	Not Impacted	Not Impacted	Not Impacted	Impacted
S111	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S112	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S113	Not Impacted	Not Impacted	Not Impacted	Not Impacted
S114	Not Impacted	Not Impacted	Not Impacted	Impacted

Notes: Impacted = the station is a hit for this parameter (impacted).
 Not Impacted = the station is not a hit for this parameter (non-impacted).

Table 9-2. SEDQUAL Impacted/Non-impacted List for Stations Sampled in 2000

Station	Amphipod Biomass	Amphipod Survival	Amphipod Reproduction	Chironomid Biomass	Chironomid Survival	Chironomid Emergence
S302	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Impacted	Non-Impacted
S303	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Impacted	Non-Impacted
S305	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted
S315	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted
S317	Impacted	Impacted	Non-Impacted	Impacted	Non-Impacted	Non-Impacted
S320	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Impacted	Non-Impacted
S323	Impacted	Non-Impacted	Non-Impacted	Impacted	Impacted	Non-Impacted
S332	Non-Impacted	Impacted	Non-Impacted	Impacted	Impacted	Impacted
S337	Non-Impacted	Impacted	Non-Impacted	Impacted	Impacted	Impacted
S342	Non-Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
S344	Non-Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
S354	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Impacted
S355	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted	Non-Impacted
S365	Non-Impacted	Impacted	Impacted	Impacted	Impacted	Non-Impacted
S372	Non-Impacted	Non-Impacted	Non-Impacted	Impacted	Non-Impacted	Non-Impacted

Notes: Impacted = the station is a hit for this parameter (impacted).
 Not Impacted = the station is not a hit for this parameter (non-impacted).

Table 9-3. Onondaga Lake Benthic Analysis Assessment Criteria - Ranges

Criterion	Non-Impaired	Slightly Impaired	Moderately Impaired	Severely Impaired
Total Species Richness at Station ⁽¹⁾	>32	25 - 32	14 - 24	0 - 13
Dominance Index ⁽¹⁾	<61	61 - 75	76 - 90	91 - 100
Total # of NCO ⁽¹⁾	>15	10 - 15	5 - 9	0 - 4
Community Composition (Percent Model Affinity) ⁽²⁾	>64	50 - 64	35 - 49	<35
Shannon-Wiener ⁽³⁾ (Diversity Index)	3.1 - 4.0+	2.1 - 3.0	1.5 - 2.0	<1.5

Notes: Cumulative review of the five metrics is used to make an overall impairment assessment of a station.

Sources:

(1) NYSDEC (letter dated May 27, 1999).

(2) Bode et al. (1991).

(3) Based on USEPA (1973).

Table 9-4. Onondaga Lake Benthic Community Analysis, 1992 Data

Station	Water Depth (m)	Total # of Taxa	Taxa Richness (avg of 5 Reps)	Dominance Index	Total # of NCO	NCO (avg. of 5 reps.)	Community Composition (PMA)	Shannon- Wiener (Diversity Index)
S2	1.5	9	7	82%	2	<1	40	2
S5	1.5	12	8	83%	0	0	40	<1
S7	1.5	10	6	93%	2	<1	30	1.5
S8	4.5	8	5	92%	0	0	36	1.3
S11	4.5	19	13	85%	6	2	29	1.7
S13	1.5	17	10	93%	6	2	26	1.6
S14	1.5	9	6	90%	1	<1	39	1.6
S17	1.5	21	12	90%	8	4	27	1.3
S18	4.5	17	9	89%	6	1	27	1.5
S21	1.5	16	8	92%	9	4	39	1.7
S22	4.5	7	4	96%	0	0	40	1.6
S26	1.5	25	16	71%	8	5	56	2.6
S28	1.5	13	6	97%	3	1	21	1.3
S29	4.5	11	7	84%	3	1	30	2
S34	1.5	23	17	80%	7	5	27	2.2
S35	1.5	29	13	91%	14	4	27	1.6
S37	1.5	28	14	92%	13	5	28	1.5
S38	4.5	20	11	93%	7	5	26	1.2
S45	4.5	27	15	82%	11	6	40	1.9
S46	1.5	23	14	78%	6	3	40	2.2
S47	1.5	30	15	90%	15	6	30	1.4
S48	1.5	28	17	59%	14	7	44	3.1
S53	1.5	25	16	63%	11	5	41	3
S54	4.5	35	15	79%	17	5	44	2.1
S61	1.5	24	16	80%	6	3	40	2.1
S62	1.5	27	16	80%	9	4	41	4.3
S67	1.5	23	13	76%	10	4	52	2.3
S68	4.5	16	9	88%	3	1	34	1.4
S72	4.5	15	10	91%	3	1	39	1.5
S73	1.5	30	22	72%	11	7	58	2.7
S74	1.5	18	11	81%	4	2	36	2
S75	1.5	22	16	69%	7	3	42	2
S76	1.5	22	13	61%	7	3	50	2.1
S77	4.5	16	12	85%	5	3	31	1.9

Table 9-4. (cont.)

Station	Water Depth (m)	Total # of Taxa	Taxa Richness (avg of 5 Reps)	Dominance Index	Total # of NCO	NCO (avg. of 5 reps.)	Community Composition (PMA)	Shannon-Wiener (Diversity Index)
S82	1.5	17	9	94%	5	2	41	1.4
S83	4.5	20	10	92%	6	2	39	1.5
S87	1.5	27	19	61%	11	6	54	3
S92	4.5	23	14	89%	6	4	29	1.6
S93	1.5	23	18	78%	5	5	50	2.1
S94	1.5	25	16	80%	8	4	39	2
S95	4.5	25	17	80%	7	4	42	2.4
S100	1.5	28	21	50%	8	7	60	3.6
S104	4.5	24	13	75%	8	6	48	2.3
S105	1.5	28	21	64%	11	7	59	3
S109	4.5	24	16	78%	8	4	39	2.2
S110	1.5	28	20	64%	10	5	47	3
S111	1.5	22	13	80%	6	2	38	2.1
S112	4.5	27	17	85%	10	5	34	1.8
OT1	1.5	28	14	88%	10	4	40	1.6
OT2	1.5	32	15	87%	15	5	37	1.5
OT3	4.5	33	19	81%	22	11	50	2.3
T1	0.5	25	10	94%	14	4	----	1.2
T3	4.5	11	6	94%	3	<1	----	1.5
T5	1	25	12	95%	11	4	----	1
T7	0.5	18	8	80%	3	2	----	2
T9	0.5	9	4	99%	4	1	----	1.1
T11	0.5	41	23	58%	20	9	----	3.4
T13	2	20	11	87%	9	4	----	1.9
T15	0.5	43	26	53%	27	13	----	3.5

Notes:

1. Other than “Total # of Taxa” and “Total # of NCO”, data presented are based on averaging the five replicates and not pooling the numbers of all replicates.
2. For Community Composition, each Tributary station is designated as “----” - cannot compare tributary stations to a model lake community.
3. Water depths obtained from PTI (1993). Stations deeper than 4.5 m not included (see text).
4. NCO = Non-Chironomid/Oligochaete
PMA = Percent Model Affinity

Table 9-5. Onondaga Lake and Otisco Lake Benthic Stations for Evaluation - Impairment Assessment, 1992 Data

Station	Total # of Taxa	Total # of NCO	Dominance Index	Community Composition (PMA)	Shannon- Wiener (Diversity Index)	Impairment Assessment
S2	9 = I	82% = M	2 = I	40 = M	2.0 = M	Moderately impaired
S5	12 = I	83% = M	0 = I	40 = M	<1 = I	Severely impaired
S7	10 = I	93% = I	2 = I	30 = I	1.5 = M	Severely impaired
S8	8 = I	92% = I	0 = I	36 = M	1.3 = I	Severely impaired
S11	19 = M	85% = M	6 = M	29 = I	1.7 = M	Moderately impaired
S13	17 = M	93% = I	6 = M	26 = I	1.6 = M	Moderately impaired
S14	9 = I	90% = M	1 = I	39 = M	1.6 = M	Moderately impaired
S17	21 = M	90% = M	8 = M	27 = I	1.3 = I	Moderately impaired
S18	17 = M	89% = M	6 = M	27 = I	1.5 = M	Moderately impaired
S21	16 = M	92% = I	9 = M	39 = M	1.7 = M	Moderately impaired
S22	7 = I	96% = I	0 = I	40 = M	1.6 = M	Severely impaired
S26	25 = S	71% = S	8 = M	56 = S	2.6 = S	Slightly impaired
S28	13 = I	97% = I	3 = I	21 = I	1.3 = I	Severely impaired
S29	11 = I	84% = M	3 = I	30 = I	2.0 = M	Severely impaired
S34	23 = M	80% = M	7 = M	27 = I	2.2 = S	Moderately impaired
S35	29 = S	91% = I	14 = S	27 = I	1.6 = M	Moderately impaired*
S37	28 = S	92% = I	13 = S	28 = I	1.5 = M	Moderately impaired*
S38	20 = M	93% = I	7 = M	26 = I	1.2 = I	Severely impaired
S45	27 = S	82% = M	11 = S	40 = M	1.9 = M	Moderately impaired
S46	23 = M	78% = M	6 = M	40 = M	2.2 = S	Moderately impaired
S47	30 = S	90% = M	15 = S	30 = I	1.4 = I	Moderately impaired*
S48	28 = S	59% = S	14 = S	44 = M	3.1 = N	Slightly impaired
S53	25 = S	63% = S	11 = S	41 = S	3.0 = S	Slightly impaired
S54	35 = N	79% = M	17 = N	44 = M	2.1 = S	Slightly impaired*
S61	24 = M	80% = M	6 = M	40 = M	2.1 = S	Moderately impaired
S62	27 = S	80% = M	9 = M	41 = M	4.3 = S	Moderately impaired
S67	23 = S	76% = M	10 = S	52 = S	2.3 = S	Slightly impaired
S68	16 = M	88% = M	3 = I	34 = I	1.4 = I	Severely impaired
S72	15 = M	91% = I	3 = I	39 = M	1.5 = M	Moderately impaired
S73	30 = S	72% = S	11 = S	58 = S	2.7 = S	Slightly impaired
S74	18 = M	81% = M	4 = I	36 = M	2.0 = M	Moderately impaired
S75	22 = M	69% = S	7 = M	42 = M	2.0 = M	Moderately impaired
S76	22 = M	61% = S	7 = M	50 = S	2.1 = S	Slightly impaired
S77	16 = M	85% = M	5 = M	31 = I	1.9 = M	Moderately impaired
S82	17 = M	94% = I	5 = M	41 = M	1.4 = I	Moderately impaired

Table 9-5. (cont.)

Station	Total # of Taxa	Total # of NCO	Dominance Index	Community Composition (PMA)	Shannon- Wiener (Diversity Index)	Impairment Assessment
S83	20 = M	92% = I	6 = M	39 = M	1.5 = M	Moderately impaired
S87	27 = S	61% = S	11 = S	54 = S	3.0 = S	Slightly impaired
S92	23 = M	89% = M	6 = M	29 = I	1.6 = M	Moderately impaired
S93	23 = M	78% = M	5 = M	50 = S	2.1 = S	Moderately impaired
S94	25 = S	80% = M	8 = M	39 = M	2.0 = M	Moderately impaired
S95	25 = S	80% = M	7 = M	42 = M	2.4 = S	Moderately impaired
S100	28 = S	50% = N	8 = M	60 = S	3.6 = N	Slightly impaired*
S104	24 = M	75% = S	8 = M	48 = M	2.3 = S	Moderately impaired
S105	28 = S	64% = S	11 = S	59 = S	3.0 = S	Slightly impaired
S109	24 = M	78% = M	8 = M	39 = M	2.2 = S	Moderately impaired
S110	28 = S	64% = S	10 = S	47 = M	3.0 = S	Slightly impaired
S111	22 = M	80% = M	6 = M	38 = M	2.1 = S	Moderately impaired
S112	27 = S	85% = M	10 = S	34 = I	1.8 = M	Moderately impaired*
OT1	28 = S	88% = M	10 = S	40 = M	1.6 = M	Moderately impaired
OT2	32 = S	87% = M	15 = S	37 = M	1.5 = M	Moderately impaired
OT3	33 = N	81% = M	22 = N	50 = S	2.3 = S	Slightly impaired*

Notes:

1. N = Non-impaired; S = Slightly impaired; M = Moderately impaired; I = Severely impaired
 2. Overall station assessment on the basis that three or more of the five metrics exhibited the same impairment category.
 3. Stations deeper than 4.5 m not included (see text).
 4. NCO = Non-Chironomid/Oligochaete
PMA = Percent Model Affinity
- * Three or more of the five metrics did not exhibit the same impairment category; professional judgment and the results of all five metrics used for impairment assessment.

Table 9-6. Onondaga Lake and Otisco Lake Benthic Stations Statistical Evaluation, 1992 Data

Station	Total # of Taxa	Total # of NCO	Dominance Index (Diversity Index)	Shannon-Wiener
S2	Impacted	Impacted	Not Impacted	Impacted
S5	Impacted	Impacted	Not Impacted	Impacted
S7	Impacted	Impacted	Not Impacted	Impacted
S8	Impacted	Impacted	Not Impacted	Impacted
S11	Impacted	Impacted	Not Impacted	Impacted
S13	Impacted	Impacted	Not Impacted	Impacted
S14	Impacted	Impacted	Not Impacted	Impacted
S17	Impacted	Impacted	Not Impacted	Impacted
S18	Impacted	Impacted	Not Impacted	Impacted
S21	Impacted	Impacted	Not Impacted	Impacted
S22	Impacted	Impacted	Not Impacted	Impacted
S26	Not Impacted	Impacted	Impacted	Not Impacted
S28	Impacted	Impacted	Not Impacted	Impacted
S29	Impacted	Impacted	Not Impacted	Impacted
S34	Not Impacted	Impacted	Not Impacted	Not Impacted
S35	Not Impacted	Impacted	Not Impacted	Impacted
S37	Impacted	Impacted	Not Impacted	Impacted
S38	Impacted	Impacted	Not Impacted	Impacted
S45	Not Impacted	Impacted	Not Impacted	Impacted
S46	Impacted	Impacted	Not Impacted	Not Impacted
S47	Not Impacted	Impacted	Not Impacted	Impacted
S48	Not Impacted	Impacted	Impacted	Not Impacted
S53	Not Impacted	Impacted	Impacted	Not Impacted
S54	Not Impacted	Impacted	Not Impacted	Impacted
S61	Not Impacted	Impacted	Not Impacted	Not Impacted
S62	Not Impacted	Impacted	Not Impacted	Not Impacted
S67	Not Impacted	Impacted	Not Impacted	Not Impacted
S68	Impacted	Impacted	Not Impacted	Impacted
S72	Impacted	Impacted	Not Impacted	Impacted
S73	Not Impacted	Impacted	Impacted	Not Impacted
S74	Impacted	Impacted	Not Impacted	Not Impacted
S75	Not Impacted	Impacted	Not Impacted	Impacted
S76	Impacted	Impacted	Not Impacted	Not Impacted
S77	Impacted	Impacted	Not Impacted	Impacted
S82	Impacted	Impacted	Not Impacted	Impacted
S83	Impacted	Impacted	Not Impacted	Impacted
S87	Not Impacted	Impacted	Impacted	Not Impacted
S92	Impacted	Impacted	Not Impacted	Impacted
S93	Not Impacted	Impacted	Not Impacted	Not Impacted
S94	Not Impacted	Impacted	Not Impacted	Not Impacted
S95	Not Impacted	Impacted	Not Impacted	Not Impacted
S100	Not Impacted	Impacted	Impacted	Impacted
S104	Not Impacted	Impacted	Not Impacted	Not Impacted
S105	Not Impacted	Impacted	Impacted	Not Impacted
S109	Not Impacted	Impacted	Not Impacted	Not Impacted
S110	Not Impacted	Impacted	Impacted	Not Impacted
S111	Impacted	Impacted	Not Impacted	Not Impacted
S112	Not Impacted	Impacted	Not Impacted	Impacted

Note:

1. NCO = Non-Chironomid/Oligochaete

Table 9-7. Onondaga Lake Benthic Community Analysis, 2000 Data

Station	Water Depth (m)	Total # of Taxa	Taxa Richness (avg. of 5 reps.)	Dominance Index	Total # of NCO	NCO (avg. of 5 reps.)	Community Composition (PMA)	Shannon- Wiener (Diversity Index)
S305	4	24	16	63%	5	3	28	1.8
S317	3.5	12	8	91%	2	<1	22	1.7
S323	3.5	15	9	86%	2	1	23	1.9
S332	4	19	10	88%	4	2	28	1.6
S337	5	15	9	83%	3	2	22	1.9
S342*	4	22	11	87%	10	4	42	2
S344	3.5	16	8	90%	6	2	33	1.8
S365*	4	26	14	71%	4	3	47	2.5
S372*	1.5	36	22	84%	6	4	54	3.1
OT-6*	5	33	19	77%	15	9	60	2.4

Notes:

1. Stations deeper than 5 m not included (see text).
 2. NCO = Non-Chironomid/Oligochaete
- * Zebra mussels comprised a percentage of the population.

Table 9-8. Onondaga Lake and Otisco Lake Benthic Stations for Evaluation - Impairment Assessment, 2000 Data

Station	Total # of Taxa	Dominance Index	Total # of NCO	Community Composition	Shannon- Wiener (Diversity Index)	Impairment Assessment
S305	24 = M	63% = S	5 = M	28 = I	1.8 = M	Moderately impaired
S317	12 = I	91% = I	2 = I	22 = I	1.7 = M	Severely impaired
S323	15 = M	86% = M	2 = I	23 = I	1.9 = M	Moderately impaired
S332	19 = M	88% = M	4 = I	28 = I	1.6 = M	Moderately impaired
S337	15 = M	83% = M	3 = I	22 = I	1.9 = M	Moderately impaired
S342	22 = M	87% = M	10 = S	42 = M	2.0 = M	Moderately impaired
S344	16 = M	90% = M	6 = M	33 = I	1.8 = M	Moderately impaired
S365	26 = S	71% = S	4 = I	47 = M	2.5 = S	Slightly impaired
S372	36 = N	84% = M	6 = M	54 = S	3.1 = N	Slightly impaired*
OT-6	33 = N	77% = M	15 = S	60 = S	2.4 = S	Slightly impaired

Notes:

1. N = Non-impaired; S = Slightly impaired; M = Moderately impaired; I = Severely impaired
 2. Stations deeper than 5 m not included (see text).
- * Three or more of the five metrics did not exhibit the same impairment category; professional judgement and the results of all five metrics used for impairment assessment.

**Table 9-9. Onondaga Lake and Otisco Lake Benthic Stations
Statistical Evaluation, 2000 Data**

Station	Total # of Taxa	Dominance Index	Total # of NCO	Shannon- Wiener (Diversity Index)
S305	Impacted	Not Impacted	Impacted	Not Impacted
S317	Impacted	Not Impacted	Impacted	Impacted
S323	Impacted	Not Impacted	Impacted	Impacted
S332	Impacted	Not Impacted	Impacted	Impacted
S337	Impacted	Not Impacted	Impacted	Impacted
S342	Impacted	Not Impacted	Impacted	Not Impacted
S344	Impacted	Not Impacted	Impacted	Impacted
S365	Impacted	Not Impacted	Impacted	Not Impacted
S372	Not Impacted	Not Impacted	Impacted	Not Impacted

Note:

1. NCO = Non-Chironomid/Oligochaete

**Table 9-10. Onondaga Lake Tributary Stations for Evaluation - Impairment Assessment, 1992
Data**

Station	Total # of Taxa	Dominance Index	Total # of NCO	Community Composition	Shannon- Wiener (Diversity Index)	Impairment Assessment
T1 (Harbor Brook)	25	94%	14	----	1.2	Severely Impaired
T3 (Onondaga Creek)	11	94%	3	----	1.5	Severely Impaired
T5 (Ley Creek)	25	95%	11	----	1	Severely Impaired
T7 (East Flume)	18	80%	3	----	2	Moderately Impaired
T9 (Tributary 5A)	9	99%	4	----	1.1	Severely Impaired
T11 (Bloody Brook)	41	58%	20	----	3.4	Non-impaired
T13 (Ninemile Creek)	20	87%	9	----	1.9	Moderately Impaired
T15 (Sawmill Creek)	43	53%	27	----	3.5	Non-impaired

Note:

1. For Community Composition, each tributary station is designated as “-----” - cannot compare tributary stations to a model lake community.

Table 9-11. Site-Specific Sediment Effect Concentrations for Onondaga Lake - 1992 Toxicity Data

Parameter	Units	Amphipod Biomass					Amphipod Survival				
		AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
Metals											
Arsenic	mg/kg-dw	5.4	5.1	3.2	2.2	4.4				2.8	5.2
Cadmium	mg/kg-dw	8.6	2.5	1.1	1.5	3.2		3.0	3.0	2.5	3.5
Chromium	mg/kg-dw	195	107.5	23	31.5	92.2	690	1,990	1,990	301	431
Lead	mg/kg-dw	121	96.4	11	23.3	86.7		238	238	78	147
Mercury	mg/kg-dw	20.4	6	0.6	1.2	4.3		5.2	5.2	3	5.7
Nickel	mg/kg-dw	50	31.1	18.6	14.9	27	215	650	650	101	144
Zinc	mg/kg-dw	218	160	61.1	73.3	159		185	185	123	184
VOCs											
Benzene	µg/kg-dw	5,300	221	13	21	395	5,300	5,700	5,700	434	2,104
Chlorobenzene	µg/kg-dw	10,005	1,100	49	83	961		30,000	30,000	1,817	9,950
Ethylbenzene	µg/kg-dw		657	142	206	657				657	1,107
Toluene	µg/kg-dw	443	100	18	20	99		810	810	133	426
Xylene (Total)	µg/kg-dw	606	2,800	570	679	1,282				606	6,880
SVOCs											
2-Methylnaphthalene	µg/kg-dw	1,063	3,700	3,700	1,201	1,788				620	2,118
Acenaphthene	µg/kg-dw		1,300	782	686	1,144		1,400	1,400	917	1,420
Anthracene	µg/kg-dw		100	42.8	62	248		630	630	237	633
Benzo(a)anthracene	µg/kg-dw		240	58.9	121	457		1,400	1,400	511	1,109
Benzo(a)pyrene	µg/kg-dw		155	56.6	111	343				180	691
Benzo(g,h,i)perylene	µg/kg-dw		550	202	341	1,011		3,000	3,000	1,149	2,510
Benzo(k)fluoranthene	µg/kg-dw		210	67.6	98	323		580	580	285	522
Chrysene	µg/kg-dw		365	82.9	207	640		2,200	2,200	799	1,468
Dibenz(a,h)anthracene	µg/kg-dw		130	58	74	248		530	530	221	463

Table 9-11. (cont.)

Parameter	Units	Amphipod Biomass					Amphipod Survival				
		AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
SVOCs (cont.)											
Dibenzofuran	µg/kg-dw				340	802				340	802
Dichlorobenzenes (Sum)	µg/kg-dw	1,373	2,735	75	82	1,415		1,300	1,300	466	3,695
Fluoranthene	µg/kg-dw		1,800	336	650	3,036		28,000	28,000	5,103	13,299
Fluorene	µg/kg-dw		520	166	128	536		520	520	228	676
Hexachlorobenzene	µg/kg-dw	290	120	11	13	86		16	16	18	46
Indeno(1,2,3-cd)pyrene	µg/kg-dw		150	58	122	283		630	630	327	630
Naphthalene	µg/kg-dw	11,000	1,800	385	579	1,754		2,300	2,300	1,322	3,485
PAH-high MW	µg/kg-dw		37,300	37,300	37,300	37,300				37,300	37,300
PAH-low MW	µg/kg-dw		45,400	45,400	45,400	45,400				45,400	45,400
Phenanthrene	µg/kg-dw		350	96	157	522		2,000	2,000	707	1,646
Phenol	µg/kg-dw	45	45	45	45	45				45	45
Pyrene	µg/kg-dw		460	69	173	842		3,300	3,300	1,149	2,312
Trichlorobenzenes (Sum)	µg/kg-dw	287	1,300	708	183	527				423	2,025
Pesticides and PCBs											
alpha-Chlordane/Chlordane (sum)	µg/kg-dw				5	5				5	5
Aroclor-1016	µg/kg-dw	90	180	180	127	127				135	167
Aroclor-1248	µg/kg-dw	750	320	95	153	382	750	1,100	1,100	503	769
Aroclor-1254	µg/kg-dw				77	93				77	93
Aroclor-1260	µg/kg-dw	900	240	120	147	392	900	1,000	1,000	469	736
DDT and metabolites	µg/kg-dw	16	30	16	14	21				14	33
PCBs (Sum)	µg/kg-dw	1,650	400	141	190	568	1,650	2,100	2,100	744	1,322

Table 9-11. (cont.)

Parameter	Chironimid Biomass						Chironimid Survival				
	Units	AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
Metals											
Arsenic	mg/kg-dw	5.4	4.9	3.9	2.4	4.2	4.3	4.4	0.9	1.3	3.6
Cadmium	mg/kg-dw		2.8	1.1	1.4	3.4		2.1	0.9	1.4	3.1
Chromium	mg/kg-dw	389	71.2	28.8	36.1	77.9	389	47.9	17.6	29.3	67.3
Lead	mg/kg-dw	167	83.5	31.0	32.5	81.1	116	56.9	9.7	13.3	57.6
Mercury	mg/kg-dw	30	5.2	0.8	1.3	4.1	13	2.8	0.5	1.0	2.8
Nickel	mg/kg-dw	76.4	25.4	16.2	14.1	27.8	72.1	20.9	5.2	8.4	25.8
Zinc	mg/kg-dw		153	64.9	76.6	169.4	270	94.6	37.9	56.7	120.3
VOCs											
Benzene	µg/kg-dw	5,300	400.5	28.5	30.4	535.8	5,300	42.0	27.3	42.4	299
Chlorobenzene	µg/kg-dw	10,005	840	25.8	67.8	1,717	10,005	580	64.4	48.3	799
Ethylbenzene	µg/kg-dw	13.3	1,300	1,300	131.2	131.2		657	142	206	657
Toluene	µg/kg-dw		29.0	16.7	19.3	78.2	443	27.5	13.1	15.9	50.3
Xylene (Total)	µg/kg-dw	2,800	13,000	13,000	2,656	4,854	606	1,640	153	367	997
SVOCs											
2-Methylnaphthalene	µg/kg-dw	1,063	3,700	3,700	1,201	1,788	1,063	1,930	514	655	1,340
Acenaphthene	µg/kg-dw		1,300	750	635	1,193	1,700	1,200	469	478	1,033
Anthracene	µg/kg-dw		210	61	71	359	4,400	210	33	50	249
Benzo(a)anthracene	µg/kg-dw		420	177	191	600		415	61	118	451
Benzo(a)pyrene	µg/kg-dw		255	121	143	440		210	63	98	355
Benzo(g,h,i)perylene	µg/kg-dw		1,600	480	424	1,697	2,700	1,300	228	307	1,172
Benzo(k)fluoranthene	µg/kg-dw		250	121	119	310	1,100	240	63	81	253
Chrysene	µg/kg-dw		515	252	256	707		440	100	172	541
Dibenz(a,h)anthracene	µg/kg-dw		200	82	90	283	730	180	49	68	218

Table 9-11. (cont.)

Parameter	Units	Chironimid Biomass					Chironimid Survival				
		AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
SVOCs (cont.)											
Dibenzofuran	µg/kg-dw				340	802		340	340	295	561
Dichlorobenzenes (Sum)	µg/kg-dw	18,400	1,300	155	129	1,307	1,373	773	22	44	765
Fluoranthene	µg/kg-dw		1,800	648	843	3,338	26,000	1,400	140	483	2,482
Fluorene	µg/kg-dw		375	118	110	476	3,500	305	55	67	327
Hexachlorobenzene	µg/kg-dw	170	47	15	13	75	28	28	7	9	24
Indeno(1,2,3-cd)pyrene	µg/kg-dw		360	111	137	509		370	59	102	503
Naphthalene	µg/kg-dw		1,450	494	599	1,826	2,100	1,400	340	471	1,380
PAH-high MW	µg/kg-dw		37,300	37,300	37,300	37,300		37,300	37,300	37,300	37,300
PAH-low MW	µg/kg-dw		45,400	45,400	45,400	45,400		45,400	45,400	45,400	45,400
Phenanthrene	µg/kg-dw		510	176	199	662	16,000	480	92	135	491
Phenol	µg/kg-dw				45	45	45	45	45	45	45
Pyrene	µg/kg-dw		805	201	347	1,069		650	114	238	795
Trichlorobenzenes (Sum)	µg/kg-dw		663	153	303	1,303	287	930	186	209	482
Pesticides and PCBs											
alpha-Chlordane/Chlordane (sum)	µg/kg-dw				5	5				5	5
Aroclor-1016	µg/kg-dw	90	180	180	127	127		135	99	104	135
Aroclor-1248	µg/kg-dw	670	410	182	194	417	470	300	82	99	307
Aroclor-1254	µg/kg-dw		77	77	80	85	77	83	69	74	80
Aroclor-1260	µg/kg-dw	380	260	113	155	267	240	240	80	115	221
DDT and metabolites	µg/kg-dw	16	47	47	24	27	16	47	47	24	27
PCBs (Sum)	µg/kg-dw	1,050	800	142	201	660	710	400	136	151	382

Notes:

^a All concentrations in dry weight

^b Maps of exceedances of ER-L, ER-M, TEL, and PEL values are presented in Appendix F.

1. Effects values could not be calculated for some parameters and are shown as blanks. See text for discussion.

AET - apparent effects threshold

BTX - benzene, toluene, xylenes

ER-L - effects-range low

ER-M - effects-range median

PCB - polychlorinated biphenyl

PAH - polycyclic aromatic hydrocarbon

PEL - probable effect level

TEL - threshold effect level

Table 9-12. Site-Specific Sediment Effect Concentrations for Onondaga Lake - 2000 Toxicity Data

Parameter	Units	Amphipod Survival					Amphipod Biomass					Amphipod Reproduction				
		AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
Metals																
Arsenic	mg/kg-dw	6	8.7	6.0	5.7	6.9		4.0	3.7	4.6	5.9	8.9	9.1	8.0	6.2	7.9
Cadmium	mg/kg-dw		2.3	1.2	2.0	3.1	4.2	7.8	4.1	3.5	5.4		1.4	1.1	1.9	2.4
Chromium	mg/kg-dw	148	114.3	51	69.2	111		115	89	87	136		66.2	41.9	61.1	107
Lead	mg/kg-dw	116	110.8	46.2	73.3	108		117	96	89	122	172	71.3	31.1	57.5	94.4
Mercury	mg/kg-dw	9.6	9.2	0.7	1.4	7.1		9.4	3.2	3.4	10.1	17.2	0.7	0.7	1.4	2.8
Nickel	mg/kg-dw	40.6	53.5	27.8	30.4	43.9		35.5	34.5	32.4	46.1		49.8	27.0	30.7	50.4
Zinc	mg/kg-dw	323	126.5	77	144.5	187		296	274	190	278		96.3	65.4	130	169
VOCs																
Benzene	µg/kg-dw	73	275	64	36	116		14	14	32	72		180	180	60	259
Chlorobenzene	µg/kg-dw	140	2,800	282	123	499		208	86	137	3,584	65,000	60,115	12,207	1,332	12,688
Ethylbenzene	µg/kg-dw	12	1,600	792	72	125				12	1,650	1,600	1,345	741	76	933
Toluene	µg/kg-dw	90	233	51	46	128		5	5	16	35	90	460	460	67	172
Xylene (Total)	µg/kg-dw	6	7,800	1,696	121	216				170	8,640	170	8,850	8,010	221	1,034
SVOCs																
Acenaphthene	µg/kg-dw		580	244	286	580		160	160	400	400				580	874
Anthracene	µg/kg-dw	270	660	308	272	408	270	1,100	1,100	486	522				220	602
Benzo(a)anthracene	µg/kg-dw	680	700	380	383	652	700	1,075	415	429	852				370	693
Benzo(a)pyrene	µg/kg-dw	810	1,215	507	518	912	810	1,175	435	487	896				450	782
Benzo(g,h,i)perylene	µg/kg-dw	700	1,100	1,100	620	782	700	665	317	373	621				385	692
Benzo(k)fluoranthene	µg/kg-dw	660	930	394	445	762	660	920	376	437	758				430	652
Chrysene	µg/kg-dw	940	750	510	493	794	940	1,270	526	559	1,024				505	902
Dibenz(a,h)anthracene	µg/kg-dw	270	430	430	308	331	270	430	430	308	331				245	358
Dibenzofuran	µg/kg-dw		1,400	1,400	1,400	1,400				1,400	1,400				1,400	1,400
Dichlorobenzenes (Sum)	µg/kg-dw	290	1,164	556	326	544		1,164	1,164	699	5,849	6,100	119,880	24,584	3,599	16,955
Fluoranthene	µg/kg-dw	1,400	1,800	968	822	1,536	1,800	2,240	832	895	1,768				795	1,660
Fluorene	µg/kg-dw		930	314	391	930		160	160	522	522				930	1,469
Hexachlorobenzene	µg/kg-dw	54	27	2	5	22		15	6	10	25		14.8	5.4	9.8	24.4
Indeno(1,2,3-cd)pyrene	µg/kg-dw	580	600	280	315	557	580	600	280	315	557				310	566
Naphthalene	µg/kg-dw	310	35,000	9,733	1,866	3,180				16,155	71,000	38,000	32,000	6,552	1,737	29,226
Phenanthrene	µg/kg-dw	550	1,100	582	437	739		660	308	389	1,138	2,500	2,880	1,344	733	1,617
Phenol	µg/kg-dw		1,900	1,900	1,900	1,900				1,900	1,900		1,900	1,900	1,900	1,900
Pyrene	µg/kg-dw	1,300	500	180	372	689	1,300	1,525	665	661	1,173		100	100	251	350
Trichlorobenzenes (Sum)	µg/kg-dw		35,000	35,000	35,000	35,000				35,000	35,000		35,000	35,000	35,000	35,000
Pesticides and PCBs																
Aroclor-1242	µg/kg-dw	1,210	181	164	141	315		689	272	229	455	1,210	5,331	1,195	536	1,266
Aroclor-1254	µg/kg-dw	445	98	34	52	129		272	133	98	216	445	345	108	101	244
Aroclor-1260	µg/kg-dw	129	56	12	21	66		82	45	41	84	129	93	29	35	85
Chlordane (Sum)	µg/kg-dw		1.5	1.2	1.8	3.3	6.2	5.6	2.3	2.4	4.7				2.1	6.1
DDT and metabolites (Sum)	µg/kg-dw		4.1	1.3	2.5	6.4	11.4	12.9	9.0	6.1	9.5		3.5	1.7	3.0	5.6
Hexachlorocyclohexanes (Sum)	µg/kg-dw	2.9	5.3	2.6	2.6	3.8		2.1	2.1	2.8	3.7	6.6	5.3	4.2	3.3	5.1
PCBs (Sum)	µg/kg-dw	1,784	265	158	177	388		1,043	450	316	709	1,784	174	148	186	296

Table 9-12. (cont.)

Parameter	Units	Chironimid Survival					Chironimid Biomass					Chironimid Emergence				
		AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL	AET	ER-M	ER-L	TEL	PEL
Metals																
Arsenic	mg/kg-dw	6	7.7	3.5	4.2	6.6	6.0	8.1	2.8	4.2	6.7	9.1	8.4	6.4	5.6	6.9
Cadmium	mg/kg-dw	3.7	1.9	0.7	1.6	2.5	4.2	3.0	1.3	2.0	3.2		1.9	1.2	1.9	2.8
Chromium	mg/kg-dw	113	85.5	31.1	52.3	88.2	113	114.3	57.1	73.2	100	148	113	48	66.6	118.8
Lead	mg/kg-dw	142	79.6	36.0	62.2	96.6	116	85.5	18.5	46.5	96.8	142.0	92.0	44.4	67.6	102.2
Mercury	mg/kg-dw	17.2	3.0	0.7	1.6	5.9	9.6	2.3	0.7	1.5	3.9	17.2	3.3	1.6	2.5	5.3
Nickel	mg/kg-dw	40.6	36.8	20.4	26.0	36.3	40.6	43.3	17.2	25.6	38.2	57.1	49.8	29.0	31.5	42.3
Zinc	mg/kg-dw	269	130	89	157	184	282	127	76	143	181	323	130	84	140	190
VOCs																
Benzene	µg/kg-dw	73	275	57	38	116	73	275	63.8	36.4	116.3	20	275	105	38	69
Chlorobenzene	µg/kg-dw	360	1,515	50	70	629	140	1,580	142.5	93.6	395.6	360	2,800	121	93	799
Ethylbenzene	µg/kg-dw	12	1,095	180	43	107	12	1,600	792	71.7	124.9	12	1,095	180	43	107
Toluene	µg/kg-dw	90	232	49	45	128	90	233	50.7	45.7	128.2	90	254	88	29	117
Xylene (Total)	µg/kg-dw	6	7,800	1,696	121	216	6	7,800	1,696	121.5	216.3	6	3,985	55	22	155
SVOCs																
Acenaphthene	µg/kg-dw	160	1,000	1,000	400	400		580	244	286	580	160	1,000	1,000	400	400
Anthracene	µg/kg-dw		180	148	203	391	270	660	308	272	408		215	211	239	428
Benzo(a)anthracene	µg/kg-dw		275	180	349	610	680	500	265	318	557		390	318	338	559
Benzo(a)pyrene	µg/kg-dw		250	226	416	616	810	330	266	351	482		390	342	396	605
Benzo(g,h,i)perylene	µg/kg-dw		240	202	359	470	700	665	317	373	621		420	420	383	557
Benzo(k)fluoranthene	µg/kg-dw		250	210	375	542	660	260	244	325	405		345	277	350	510
Chrysene	µg/kg-dw		395	280	507	803	940	600	373	444	717		560	472	466	773
Dibenz(a,h)anthracene	µg/kg-dw		130	130	187	223	270	430	430	308	331				245	358
Dibenzofuran	µg/kg-dw		1,400	1,400	1,400	1,400		1,400	1,400	1,400	1,400		1,400	1,400	1,400	1,400
Dichlorobenzenes (Sum)	µg/kg-dw	1,164	3,430	522	363	1,626	290	1,164	556	326	544	1,164	760	270	305	828
Fluoranthene	µg/kg-dw		555	415	773	1,253	1,400	1,280	564	665	1,302		830	774	701	1,174
Fluorene	µg/kg-dw	160	1,700	1,700	522	522		930	314	391	930	160	1,700	1,700	522	522
Hexachlorobenzene	µg/kg-dw	53.5	9.0	2.3	6.2	18.3	53.5	15.0	2.5	6.4	18.2	53.5	17.0	3.6	8.0	20.7
Indeno(1,2,3-cd)pyrene	µg/kg-dw		200	188	323	403	580	200	200	257	325		275	215	263	414
Naphthalene	µg/kg-dw	310	35,000	9,733	1,866	3,180	310	35,000	9,733	1,866	3,180	190	35,000	9,817	1,619	2,558
Phenanthrene	µg/kg-dw	1,100	300	174	308	506	550	1,030	275	311	721	1,100	960	346	309	762
Phenol	µg/kg-dw		1,900	1,900	1,900	1,900		1,900	1,900	1,900	1,900		1,900	1,900	1,900	1,900
Pyrene	µg/kg-dw		430	220	556	931	1,300	475	205	420	692		620	524	538	891
Trichlorobenzenes (Sum)	µg/kg-dw		35,000	35,000	35,000	35,000		35,000	35,000	35,000	35,000		35,000	35,000	35,000	35,000
Pesticides and PCBs																
Aroclor-1242	µg/kg-dw	168	192	103	133	173	328	187	165	129	201	1,210	181	150	143	315
Aroclor-1254	µg/kg-dw	108	110	25	43	106	173	135	36	52	124	445	140	49	63	149
Aroclor-1260	µg/kg-dw	39.6	75.2	12.5	23.8	53.0	80.9	75.2	12.5	20.5	57.3	129	39.6	12.4	20.5	59.9
Chlordane (Sum)	µg/kg-dw	2.6	3.2	1.4	1.5	2.7	6.2	2.3	1.2	1.7	3.3		2.6	1.4	1.6	4.4
DDT and metabolites (Sum)	µg/kg-dw	8.1	4.1	1.3	2.6	5.0	10.2	4.1	1.3	2.5	5.2		4.3	1.3	2.6	6.5
Hexachlorocyclohexanes (Sum)	µg/kg-dw	2.1	5.3	3.2	2.6	3.3	2.9	5.3	2.6	2.6	3.8		2.9	6.6	4.4	3.1
PCBs (Sum)	µg/kg-dw	302	229	72	136	260	582	302	161	169	310	1,784	290	196	187	390

Notes:

^a All concentrations in dry weight

^b Maps of exceedances of ER-L, ER-M, TEL, and PEL values are presented in Appendix F.

1. Effects values could not be calculated for some parameters and are shown as blanks. See text for discussion.

AET - apparent effects threshold

PCB - polychlorinated biphenyl

BTX - benzene, toluene, xylenes

PAH - polycyclic aromatic hydrocarbon

ER-L - effects-range low

PEL - probable effect level

ER-M - effects-range median

TEL - threshold effect level

Table 9-13. Comparison of Various Site-Specific Sediment Effect Concentrations and Probable Effect Concentrations for Onondaga Lake, 1992 Data^{a,b}

	AET	ER-L	ER-M	TEL	PEL	PEC
Metals (mg/kg)						
Antimony	NC	3.1	3.1	4	4.3	3.6
Arsenic	4.3	0.90	4.4	1.29	3.55	2.4
Cadmium	8.6	0.94	2.1	1.42	3.11	2.4
Chromium	195	17.6	47.9	29.3	67.3	50.3
Copper	83.7	12.3	40.7	19.1	48.3	32.9
Lead	116	9.68	56.9	13.3	57.6	34.5
Manganese	445	197	280	231	295	278
Total mercury	13	0.51	2.8	0.99	2.84	2.2
Nickel	50	5.22	20.9	8.37	25.8	16.4
Selenium	0.94	0.42	0.6	0.4	0.68	0.58
Silver	2.7	0.82	1.2	0.9	1.42	1.28
Vanadium	12.2	2.7	6	3.4	8.3	5.6
Zinc	218	37.9	94.6	56.7	12	88
Organic Compounds						
BTEX Compounds (µg/kg)						
Benzene	5,300	27.3	42	42.4	299	150
Ethylbenzene	13.3	142	657	206.0	657	176
Toluene	443	13.1	27.5	15.9	50.3	41.8
Xylenes	606	153	1,640	367	997	560.8
Chlorinated Benzenes (µg/kg)						
Chlorobenzene	10,000	64.4	580	48.3	799	428
Dichlorobenzenes	1,373	21.5	773	44.2	765	239
Trichlorobenzenes	287	186	930	209	482	347
Hexachlorobenzene	28	7.16	28	8.9	23.6	16.4
Polychlorinated Biphenyls (µg/kg)						
Aroclor 1016	90	99	135	104	135	111
Aroclor 1248	470	82	300	99	307	204
Aroclor 1254	77	68.5	82.5	74	79.7	76
Aroclor 1260	240	80	240	115	221	164
Total PCBs	710	136	400	151	382	295
PAH Compounds (µg/kg)						
Naphthalene	2,100	340	1,400	471	1,380	917
Acenaphthene	1,700	469	1,200	478	1,030	861
Fluorene	3,500	55.2	305	66.9	327	264
Phenanthrene	16,000	92.2	480	135	491	543
Anthracene	4,400	33	210	49.6	249	207
Fluoranthene	26,000	140	1,400	483	2,482	1,436
Pyrene	NC	114	650	238	795	344
Benz[a]anthracene	NC	60.7	415	118	451	192
Chrysene	NC	100	440	172	541	253
Benzo[b]fluoranthene	1,100	63.1	240	80.9	253	908
Benzo[a]pyrene	NC	62.8	210	98.2	355	146
Indeno[1,2,3-cd]pyrene	NC	58.8	370	102	503	183
Dibenz[a,h]anthracene	730	49.4	180	67.7	218	157
Benzo[ghi]perylene	2,700	228	1,300	307	1,170	780
Acenaphthylene	3,000	507	1,850	673	1,970	1,301
Benzo[k]fluoranthene	1,100	63.1	240	80.9	253	203
Dibenzofuran	NC	340	340	295	561	372

Table 9-13. (cont.)

	AET	ER-L	ER-M	TEL	PEL	PEC
Other SVOCs (µg/kg)						
Phenol	45	45	45	45	45	45
Pesticides (µg/kg)						
DDT and Metabolites	16.3	47	47	23.7	26.6	29.6
Chlordane	NC	NC	NC	5.08	5.08	5.1
Heptachlor and Heptachlor Epoxide	NC	NC	NC	NC	NC	NC
Dioxins/Furans						
Total Dioxins/Furans	NC	NC	NC	NC	NC	NC

Notes:

^a All concentrations in dry weight

^b Maps of exceedances of ER-L, ER-M, TEL, PEL and PEC values are presented in Appendix F.

AET - apparent effects threshold

BTX - benzene, toluene, xylenes

ER-L - effects-range low

ER-M - effects-range median

NC - value was not calculated because of an insufficient number of detected observations or data points

PCB - polychlorinated biphenyl

PAH - polycyclic aromatic hydrocarbon

PEL - probable effect level

TEL - threshold effect level

PEC - Probable Effect Concentration

Table 9-14. Comparison of Lowest AET Values for Toxicity Endpoints Found for Onondaga Lake in 1992 and 2000

Chemical	AET (mg/kg dry weight)		AET
	1992	2000	Ratios ^a
Arsenic	4.3	6	1.4
Cadmium	8.6	4.2	2.1
Chromium	195	113	1.7
Lead	116	116	1.0
Mercury	13	9.4	1.4
Nickel	50	40.6	1.2
Zinc	218	269	1.2

Notes:

AET - apparent effects threshold

^aThe ratio for each chemical was calculated as the higher AET (i.e., regardless of year) divided by the lower AET.

Table 9-15. Toxicity Reference Values for Fish

Chemical of Concern	NOAEL/LOAEL	Reference
Antimony	5.0/9.0 mg/kg ww tissue	Doe et al. (1987)
Arsenic	0.5/1.3 mg/kg ww tissue	NRCC (1978)/Walsh (1977)
Chromium	0.23/0.78 mg/kg ww tissue	Van Der Putte et al. (1981a)
Mercury/Methylmercury	0.1/ 0.3 mg/kg ww tissue	NOAA (2002)
Selenium	0.11/1.1 mg/kg ww tissue	Lemly (1997) and references cited therein
Vanadium	0.041/0.41mg/kg ww tissue	Hilton and Bettger (1988)
Zinc	34/40 mg/kg ww tissue	Spehar (1976)
Endrin	0.024/0.24 mg/kg ww tissue	Jarvinen and Tyo (1978)
DDT and metabolites	0.6/2.9 mg/kg ww tissue	Macek (1968)
Polychlorinated biphenyls	1.9/9.3 mg/kg ww tissue	Hansen et al. (1974)
Dioxins/furans	0.29/0.6 µg TEQs/kg lipid	Walker et al. (1994)

Notes:

NOAEL/LOAEL - no-observed-adverse-effect level/lowest-observed-adverse-effect level.

Table 9-16. Toxicity Reference Values for Avian Receptors

Chemical of Concern	NOAEL/LOAEL mg/kg-day	Exposure Period	Reference
Inorganic Analytes			
Arsenic	2.46/7.38	7 months	USFWS (1969)
Barium	20.8/41.7	4 weeks	Johnson et al. (1960)
Cadmium	1.45/20	90 days	White and Finley (1978)
Chromium	1.0/5.0	303 days	Haseltine et al. (unpublished)
Copper	47/61.7	10 weeks	Mehring et al. (1960)
Lead	1.18/11.8	12 weeks	Edens et al. (1976)
Mercury (inorganic)	0.45/0.90	up to 365 days	Hill and Schaffner (1976)
Nickel	77.4/107	90 days	Cain and Pafford (1981)
Selenium	0.4/0.8	100 days	Heinz et al. (1989)
Thallium	NA		
Vanadium	11.4/114	12 weeks	White and Dieter (1978)
Zinc	14.5/131	44 weeks	Stahl et al. (1990)
Organic Compounds			
Bis(2-ethylhexyl)phthalate	1.1/11	4 weeks	Peakall (1974)
DDT and metabolites	0.0028/0.028	>365 days	Anderson et al. (1975)
Dichlorobenzenes	6/60	35 days	Hollingsworth et al. (1956)
Endrin	0.01/0.1	>83 days	Fleming et al. (1982)
Hexachlorocyclohexanes	0.11/0.34	7 days	Jansen (1976)
Methylmercury	0.0064/0.064	3 generations of mallard ducks	Heinz (1974, 1976a,b, 1979)
Polychlorinated biphenyls (PCBs)	0.18/1.8	16 weeks	Dahlgren et al. (1972)
Polycyclic aromatic hydrocarbons	0.143/1.43	151 days	Hough et al. (1993)
Trichlorobenzenes	NA	NA	NA
Xylenes	NA	NA	NA
Dioxins/furans	0.000014/ 0.00014	70 days	Nosek et al. (1992)

Notes:

NOAEL/LOAEL - no-observed-adverse-effect level/lowest-observed-adverse-effect level.

NA - No appropriate avian study available.

Units are mg/kg-day (dietary dose for wildlife TRVs).

Table 9-17. Toxicity Reference Values for Mammalian Receptors

Chemical of Concern	NOAEL/LOAEL		Reference
	mg/kg-day	Exposure Period	
Inorganic Analytes			
Antimony	0.125/1.25	mouse lifetime (> 1 year)	Schroeder et al. (1968)
Arsenic	0.126/1.26	3 generations of mice	Schroeder and Mitchener (1971)
Barium	45/75	105 weeks	NTP (1994)
Cadmium	1/10	42 days	Sutou et al. (1980)
Chromium	3.28/13.14	365 days/90 days	Mackenzie et al. (1958)/ Steven et al. (1976)
Copper	11.7/15.14	357 days	Aulerich et al. (1982)
Lead	8/80	3 generations of rats	Azar et al. (1974)
Manganese	88/284	224 days	Laskey et al. (1982)
Mercury (inorganic)	1.0/10	155 days	Aulerich et al. (1974)
Nickel	40/80	3 generations of rat	Ambrose et al. (1976)
Selenium	0.20/0.33	2 generations of rat	Rosenfeld and Beath (1954)
Thallium	0.74/0.074	60 days	Formigli et al. (1986)
Vanadium	0.21/2.1	180 days	Domingo et al. (1986)
Zinc	160/320	16 days of gestation	Schlicker and Cox (1968)
Organic Compounds			
Chlordane	0.15/0.75	104 weeks	Khasawinah and Grutsch (1989)
DDT and metabolites	0.8/4	2 years	Fitzhugh (1948)
Dieldrin	0.009 /0.018	up to 336 days	Harr et al. (1970)
Methylmercury	0.0025/0.025	2 years	Wobeser et al. (1976) and Wren et al. (1987)
Hexachlorobenzene	0.014/0.14	331 days	Bleavins et al. (1984)
PCBs	0.0034/0.034	2 generations of mink	Restum et al. (1998)
bat, otter			
bat, shrew	0.4/1.6	2 generations of rats	Linder et al. (1974)
Polycyclic aromatic hydrocarbon	1/10	9 days	Mackenzie and Angevine (1981)
Trichlorobenzenes	14.8/53.6	3 generations of rat	Robinson et al. (1981)
Xylenes	2.1/2.6	days 6 to 15 of gestation	Marks et al. 1982
Dioxins/furans	0.000001/0.00001	3 generations of rat	Murray et al. (1979)

Notes:

NOAEL/LOAEL - no-observed-adverse-effect level/lowest-observed-adverse-effect level.

Units are mg/kg-day (dietary dose for wildlife TRVs).

Table 10-1. Ratios of COCs in Soils Near Onondaga Lake in 2000 to ORNL Soil Benchmarks for Plants

COC	Combined Wetlands		SYW-6		SYW-10		SYW-12		SYW-19		Dredge spoils	
	95%UCL HQ	Mean HQ	95%UCL HQ	Mean HQ	95%UCL HQ	Mean HQ	95%UCL HQ	Mean HQ	95%UCL HQ	Mean HQ	95%UCL HQ	Dredge spoils Mean HQ
Arsenic	0.6	0.5	0.6	0.3	1.8	0.7	0.4	0.3	0.9	0.7	0.8	0.5
Cadmium	3.6	0.5	3.6	0.9	0.2	0.1	2.2	1.3	0.6	0.3	0.0	0.0 *
Chromium	51	39	154	49	47	27	115	66	54.6	42.8	29	17
Copper	4.4E-02	4.0E-02	0.1	3.6E-02	0.1	0.0	4.7E-02	3.0E-02	0.1	0.0	4.8E-02	4.2E-02
Lead	2.1	1.2	3.5	1.4	2.3	1.2	2.3	1.5	5.2	2.4	0.3	0.2
Mercury	62	9.9	15	4.3	11	7.0	5.0	2.2	82.7	48.8	13	2.2
Nickel	0.9	0.8	2.1	1.0	1.1	0.7	1.1	0.6	1.5	1.1	0.6	0.5
Silver	0.4	0.2	0.7	0.3	0.0 *	0.0 *	1.4	0.6	0.6	0.2	0.0 *	0.0 *
Selenium	1.2	0.9	2.5	0.8	1.8	0.7	0.9	0.4	1.7	1.4	1.4	1.0
Thallium	0.8	0.6	1.4	0.6	2.5	1.5	0.0 *	0.0 *	0.0 *	0.0 *	0.0 *	0.0 *
Vanadium	8.2	7.2	11	6.5	15	7.8	7.8	4.3	6.5	6.2	14	9.5
Zinc	3.2	2.4	10	3.6	2.4	1.9	4.8	3.2	2.8	2.3	1.0	0.8

Notes:

Hazard quotients equal to or greater than one are outlined.

*- Denotes all ND samples

Table 10-2. Summary of Ratios to Consensus PECs for COC Concentrations in Surface Sediments in Onondaga Lake in 1992^{a,b}

Chemical	Consensus																
	PECs	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16
Metals		mg/kg															
Antimony	3.6										1.77					0.86	1.10
Arsenic	2.4	1.19					0.26				0.67					1.55	0.59
Cadmium	2.4	0.36	2.95	1.69	1.01	2.4	0.46	0.46	1.18	1.18	1.43	0.20	1.81	1.26	0.59	1.05	0.51
Chromium	50.3	0.59	2.76	1.67	1.31	1.69	0.39	0.37	1.65	1.41	0.95	0.12	1.07	0.66	0.59	0.95	0.66
Copper	32.9	1.54	4.34	1.91	1.83	2.55	1.74	1.53	2.54	2.54	1.56	0.26	1.92	2.51	0.89	1.49	1.07
Lead	34.5	2.27	4.61	3.51	2.58	4.8	1.62	2.0	2.9	2.1	1.72	0.45	2.42	3.10	2.89	4.20	0.78
Manganese	278.3	0.64					0.34					0.78				0.73	0.86
Mercury	2.2	2.25	8.21	8.35	9.25	5.06	0.50	1.45	3.58	2.95	0.77	0.24	1.27	0.50	13.58	31.25	0.11
Nickel	16.4	0.94	4.67	2.93	1.36	1.55	0.45	0.45	1.37	0.96	0.71	0.26	1.18	1.28	1.83	1.78	0.27
Selenium	0.6	0.63					0.43									0.74	0.45
Silver	1.3	0.49									0.74					1.79	0.66
Vanadium	5.6	1.00					0.21				0.46					0.45	0.09
Zinc	88.2	1.07	3.13	2.11	1.56	2.20	0.49	0.88	2.06	2.01	1.36	0.30	1.79	2.47	0.71	1.07	0.74
Volatile Organic Compounds		µg/kg															
Benzene	150.4	4.25	2.19	0.34	0.20						0.18						
Chlorobenzene	428.4	23.36	7.70	2.57	1.35	0.49			0.21	0.51	0.02		0.04		9.10	100	
Dichlorobenzenes (Sum)	238.6	5.76	17.48	3.81	2.67	0.73	0.57	0.02	0.44	0.70					77.1	95.6	
Ethylbenzene	175.7																
Toluene	41.8	10.60	18.90	0.41	0.69	0.53		0.65	0.33	0.48		5.50		3.11	100		
Trichlorobenzenes (Sum)	346.5	0.83	1.62	0.07			0.12									12.12	
Xylene (Total)	560.8	1.08												0.86		4.99	
Semivolatile Organic Compounds		µg/kg															
Dibenzofuran	372.0	3.49					0.12				1.26						
Hexachlorobenzene	16.4		7.94	17.70	5.07	7.33		0.67	3.97	1.28			1.71	0.28	10.38		
Phenol	45.0																
Naphthalene	917.4	2.29	3.16	1.20	1.96	4.58	0.09		0.93	0.58	0.75		6.54	12.0	32.7	25.1	
Acenaphthene	860.7	1.18	1.28			3.37	0.22	17.4	0.91		1.03		8.60				0.05
Fluorene	264.3	4.67	2.16	2.27	1.44	5.30	0.61	9.8	0.36	0.79	13.24		3.78	27.24			0.27
Phenanthrene	542.7	10.38	0.88	0.88	0.55	3.87	1.36	11.6	1.00	0.39	29.5		6.08	40.54	12.72	4.42	1.00
Anthracene	206.7	15.97	1.89	3.29	1.02	6.3	2.37	19.4	0.82	0.28	21.3	2.76	5.81	43.06	23.23		1.16
Pyrene	343.8	21.72	5.24	7.85	2.15	11.6	3.49	27.6	2.76	1.51	49.5	1.11	19.5	9.31			3.20
Benz(a)anthracene	191.5	21.59	4.02	4.81	1.78	10.4	4.07	22.5	2.56	1.25	40.2	1.78	19.3	13.58	5.22		3.29
Chrysene	253.2	18.17	3.36	3.44	1.66	11.8	3.12	18.2	3.79	1.07	29.6		28.4				2.65
Benzo(b)fluoranthene	908.4	6.90	2.20	2.97	2.42	4.6	1.43	4.6	0.83	0.64	10.7	1.43	5.83	31.93	1.54		1.21
Benzo(a)pyrene	146.4	25	3.2	3.3	2.3	10.9	5.9	9.6	1.4	0.9	53.3	4.8	17.1	18.4			0.51
Indeno(1,2,3-cd)pyrene	182.9	10.57	6.01	2.62	2.24	4.26	1.75		1.97	0.71	10.4						1.53
Dibenz(a,h)anthracene	157.2	4.24	2.61			4.07	0.76		1.27	0.37	4.64	2.35	4.52	5.66			0.64

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16
Benzo(g,h,i)perylene	779.7	2.18	2.69	3.98	2.05	5.64	0.37	4.62	1.67	0.71	2.44	2.82	6.28	11.9	3.85		0.33
Acenaphthylene	1,300.7	0.49				2.00	0.09			0.92	1.54		4.84				0.06
Benzo(k)fluoranthene	202.5			2.62		4.89		12.35	0.94	0.94		4.00	10.4	18.8			
Fluoranthene	1,436.3	4.62	6.68		1.53	3.41	0.63	59.88	0.91	1.25	6.96	18.1	10.4	160	27.85	1.60	0.65
Pesticides/Polychlorinated Bipher	µg/kg																
Chlordane (Sum)	5.1	1.0															
DDT and metabolites	29.6	0.55									0.25						
Aroclor-1016	110.9															1.62	
Aroclor-1248	203.7	0.82	3.29	3.68	2.01	2.16		0.29	1.47	1.03		1.42	1.42	1.18			0.83
Aroclor-1254	76.1																
Aroclor-1260	163.6		2.32	5.50	4.03	1.47		0.23	1.10	0.73		3.42	0.43			1.34	
PCBs (Sum)	294.8	0.84	3.56	5.60	3.63	2.31		0.33	1.63	1.12		2.88	1.22	0.95		1.36	0.67
Exceedances		25	29	24	24	27	10	15	18	13	20	10	26	20	17	16	8
Total Hazard Index		207	140	99	58	131	27	223	39	21	283	45	178	409	341	276	15

Table 10-2. (cont.)

Chemical	Consensus	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32
	PECs																
Benzo(g,h,i)perylene	779.7	0.60	2.82	1.80		2.44			1.54	1.92			3.85	1.18			
Acenaphthylene	1,300.7	0.33		1.77					1.92	0.85	0.28		2.69				
Benzo(k)fluoranthene	202.5	0.71		1.63		2.02			1.43	2.22	0.21		2.9	0.69			
Fluoranthene	1,436.3	0.43	3.62	3.06		0.91	0.51		0.77	0.97	0.45	0.8	19.5	0.38			
Pesticides/Polychlorinated Biphenyls																	
Chlordane (Sum)	5.1																
DDT and metabolites	29.6				1.59		0.41										
Aroclor-1016	110.9																
Aroclor-1248	203.7	0.27	3.14	2.31		3.34	1.13	0.32	0.39	0.42			5.40	0.49	0.29	0.46	0.24
Aroclor-1254	76.1											1.31					
Aroclor-1260	163.6		0.98	1.47		1.83		0.28					6.11				0.31
PCBs (Sum)	294.8	0.30	2.71	2.41		3.32	0.95	0.38	0.51	0.49		0.59	7.12	0.48	0.32	0.49	0.30
Exceedances		5	17	23	14	23	12	8	17	16	0	17	29	10	8	8	8
Total Hazard Index		7	42	49	155	228	27	15	34	36	0	37	326	26	12	14	13

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S33	S34	S35	S36	S37	S38	S39	S40	S41	S42	S43	S44	S45	S46	S47	S48
Metals	mg/kg																
Antimony	3.6																0.91
Arsenic	2.4				4.69												0.63
Cadmium	2.4	1.43	0.88	0.46	0.40	0.27	0.5	1.05	0.97	1.01	0.93	0.93	1.10	0.97	0.42	0.63	0.42
Chromium	50.3	1.26	1.62	3.60	13.71	3.87	4.19	3.97	1.57	1.29	1.30	1.26	1.36	1.03	0.44	2.22	0.68
Copper	32.9	2.05	1.07	1.44	4.22	0.60	0.79	1.77	1.63	1.55	1.65	1.71	2.01	0.63	0.29	0.77	0.30
Lead	34.5	2.21	0.36	1.79	7.27	1.12	1.6	1.22	0.4	1.6	1.7	1.58	2.14	0.39	0.32	0.32	0.43
Manganese	278.3				1.83												0.95
Mercury	2.2	1.13	0.07	0.45	0.59	0.22	0.32	0.77	1.27	1.18	1.27	1.09	1.13	0.30	0.18	0.22	0.21
Nickel	16.4	1.61	0.43	2.38	13.13	2.06	2.85	3.57	1.77	1.77	1.70	1.58	1.47	0.24	0.38	2.46	1.03
Selenium	0.6				0.72												0.62
Silver	1.3				0.73												0.53
Vanadium	5.6				18.02												
Zinc	88.2	2.04	0.62	1.06	1.89	0.48	0.66	1.73	1.80	1.59	1.76	1.71	2.02	0.49	0.35	0.90	0.42
Volatile Organic Compounds	µg/kg																
Benzene	150.4	0.05						0.06	0.73	0.06	0.11						5.59
Chlorobenzene	428.4	0.04		0.04				0.03			0.09	0.08	0.08				
Dichlorobenzenes (Sum)	238.6	0.07			44.03	0.02		0.03	0.08		0.08	0.10	0.15				
Ethylbenzene	175.7																
Toluene	41.8	0.22	5.02	0.22	0.43		0.69	2.39	0.60	0.26	0.24	0.36		0.98			2.13
Trichlorobenzenes (Sum)	346.5																
Xylene (Total)	560.8																
Semivolatile Organic Compour	µg/kg																
Dibenzofuran	372.0																
Hexachlorobenzene	16.4			0.31						0.21	0.29	0.22	0.30				
Phenol	45.0																
Naphthalene	917.4			1.74		0.19	0.53	0.53	0.76					0.83		0.93	0.35
Acenaphthene	860.7		0.36					1.51		2.0							0.66
Fluorene	264.3		0.16	1.44				1.40		0.6					0.16		0.37
Phenanthrene	542.7		0.41	1.64				0.31	0.18	0.6				0.57	0.66	0.57	0.17
Anthracene	206.7		0.22	1.98				1.0	0.20	0.6				0.10	0.53	0.43	0.14
Pyrene	343.8		1.08	5.24		0.16		1.2	0.18	1.9				0.3	1.69	1.92	0.52
Benz(a)anthracene	191.5		0.57	7.31		0.32		1.3	0.43	1.4				0.8	1.57	1.46	0.31
Chrysene	253.2		0.83	10.7		0.55		1.7	0.75	2.5				0.1	1.22	1.90	0.43
Benzo(b)fluoranthene	908.4		0.63	2.31		0.17		0.15	0.6					0.23	0.48	0.29	0.07
Benzo(a)pyrene	146.4		0.3	8.9		0.4		1.8	0.4	2.3					1.6	1.8	0.3
Indeno(1,2,3-cd)pyrene	182.9			4.21						3.44				0.44	0.55	0.82	0.45
Dibenz(a,h)anthracene	157.2			4.20			0.89			1.08				0.21	0.27	0.53	

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S33	S34	S35	S36	S37	S38	S39	S40	S41	S42	S43	S44	S45	S46	S47	S48
Benzo(g,h,i)perylene	779.7		0.53	3.46		0.97	0.62	0.22	1.41					1.27	0.13	0.45	0.17
Acenaphthylene	1,300.7		0.29	2.31			0.55	1.31						0.35	0.03	0.32	
Benzo(k)fluoranthene	202.5		0.24	5.43		0.39	0.69		1.14					0.9		1.14	0.23
Fluoranthene	1,436.3		1.32	11.14	6.20	0.97	1.04	1.95	1.46					4.2	0.42	0.97	0.39
Pesticides/Polychlorinated Biphenyls																	
Chlordane (Sum)	5.1																
DDT and metabolites	29.6																
Aroclor-1016	110.9																
Aroclor-1248	203.7	0.31							0.45	0.35	0.59	0.69	0.74				
Aroclor-1254	76.1					0.85											
Aroclor-1260	163.6									0.24	0.44	0.45	0.47				
PCBs (Sum)	294.8	0.35				0.33			0.57	0.38	0.65	0.72	0.77				
Exceedances		7	5	20	10	3	11	9	15	7	6	6	7	3	4	7	3
Total Hazard Index		12	10	82	115	7	20	19	27	10	9	9	11	6	6	13	9

Table 10-2. (cont.)

Chemical	Consensus																	
	PECs	S49	S50	S51	S52	S53	S54	S55	S56	S57	S58	S59	S60	S61	S62	S63	S64	
Metals	mg/kg																	
Antimony	3.6																	
Arsenic	2.4			1.80			2.14											
Cadmium	2.4	1.14	0.63	1.18	1.05	0.41	1.7	5.98	0.72	0.93	1.08	1.39	1.26	1.31	1.01	0.72	1.05	
Chromium	50.3	1.27	1.09	1.19	1.29	0.35	1.35	5.62	1.03	1.12	1.13	1.31	1.22	1.59	0.86	0.75	1.00	
Copper	32.9	1.64	1.43	1.77	1.84	0.36	0.69	2.86	1.33	1.49	1.57	1.68	1.72	1.08	0.41	1.26	1.48	
Lead	34.5	1.76	1.63	1.64	2.09	0.32	0.2	3.36	1.4	1.7	1.7	1.86	1.95	0.51	0.27	1.55	1.32	
Manganese	278.3	0.99				1.15												
Mercury	2.2	1.36	1.54	1.13	1.27	0.10	0.82	5.87	1.45	1.63	1.25	1.13	1.09	0.43	0.43	1.45	1.13	
Nickel	16.4	1.55	1.63	1.91	1.48	0.66	3.05	4.40	1.69	1.66	1.63	1.84	1.58	0.56	1.22	1.05	1.73	
Selenium	0.6	1.62																
Silver	1.3						0.94											
Vanadium	5.6	2.07																
Zinc	88.2	1.80	1.66	1.73	2.00	0.39	1.28	3.06	1.58	1.70	1.69	1.77	1.85	0.85	0.97	1.51	1.53	
Volatile Organic Compounds	µg/kg																	
Benzene	150.4	0.14				0.74	35.25	14.63	0.05	0.14	0.07	0.09						0.07
Chlorobenzene	428.4	0.07	0.06							0.04	0.05						0.05	
Dichlorobenzenes (Sum)	238.6							3.31			0.04						0.08	
Ethylbenzene	175.7					0.08												
Toluene	41.8	0.26	0.26	0.26		0.16				0.36	0.38	0.41				1	0.26	
Trichlorobenzenes (Sum)	346.5																	
Xylene (Total)	560.8						0.02											
Semivolatile Organic Compounds	µg/kg																	
Dibenzofuran	372.0																	
Hexachlorobenzene	16.4	0.37				0.24						0.23	0.23	0.29	0.73			
Phenol	45.0					1.00												
Naphthalene	917.4						0.37	1.42	0.45								0.65	
Acenaphthene	860.7											0.85						
Fluorene	264.3									0.3			0.45					
Phenanthrene	542.7	0.35						0.11	0.64	0.2						0.88	0.06	
Anthracene	206.7	0.42						0.1	0.48	0.3						0.63	0.08	
Pyrene	343.8	1.13						0.22	0.4	0.35	1.2				2.5	0.19		
Benz(a)anthracene	191.5	0.89						0.26	0.4	0.43	0.9				1.8	0.21		
Chrysene	253.2	0.99						0.23	0.4	1.3					2.1	0.28		
Benzo(b)fluoranthene	908.4							0.41		0.4						0.39	0.05	
Benzo(a)pyrene	146.4	1.5						0.6	1.2	1.2				1.9	0.3			
Indeno(1,2,3-cd)pyrene	182.9						0.32	1.26									0.18	
Dibenz(a,h)anthracene	157.2							0.19	0.58	0.63						0.62	0.13	

Table 10-2. (cont.)

Chemical	Consensus	S49	S50	S51	S52	S53	S54	S55	S56	S57	S58	S59	S60	S61	S62	S63	S64
	PECs																
Benzo(g,h,i)perylene	779.7						0.21	0.68	0.67					0.67	0.19		
Acenaphthylene	1,300.7							1.54	0.52					0.59			
Benzo(k)fluoranthene	202.5						0.33	1.33	0.69					1.2	0.14		
Fluoranthene	1,436.3			0.20		0.05	0.11	6.06	0.97					0.7	0.13		
Pesticides/Polychlorinated Bipher	µg/kg																
Chlordane (Sum)	5.1																
DDT and metabolites	29.6																
Aroclor-1016	110.9																
Aroclor-1248	203.7	0.54	0.30		0.39			1.96		0.64	0.35	0.74	0.59	0.34		0.23	0.21
Aroclor-1254	76.1			1.01													
Aroclor-1260	163.6	0.36						0.73		0.35	0.24	0.43	0.36	0.32			
PCBs (Sum)	294.8	0.57	0.33	0.48	0.40			1.76		0.63	0.37	0.75	0.61	0.41		0.28	0.25
Exceedances		7	6	13	7	2	5	16	10	6	7	7	7	8	2	5	6
Total Hazard Index		11	9	20	11	3	43	64	13	9	10	11	11	14	2	7	8

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S65	S66	S67	S68	S69	S70	S71	S72	S73	S74	S75	S76	S77	S78	S79	S80
Metals	mg/kg																
Antimony	3.6																
Arsenic	2.4		0.30														
Cadmium	2.4	1.18	0.55	0.38	3.29		1.7		1.18	0.10	0.33	0.37	0.59	0.72		0.46	1.18
Chromium	50.3	1.04	0.45	0.66	2.24	0.65	0.99	0.13	0.66	0.19	0.27	0.24	0.22	0.35	0.44	0.68	0.97
Copper	32.9	1.51	0.39	0.37	1.35	1.21	1.47	0.16	0.59	0.14	0.14	0.44	0.30	0.47	1.10	1.18	1.39
Lead	34.5	1.47	0.26	0.35	1.21	1.32	1.5	0.21	0.5	0.2	0.2	0.29	0.34	0.27	1.00	1.17	1.42
Manganese	278.3		0.65														
Mercury	2.2	1.00	0.10	0.42	2.49	1.36	0.86		0.36		0.38	1.13	0.86	1.18	1.09	1.32	0.95
Nickel	16.4	1.54	0.26	1.11	1.97	1.15	1.29	0.16	0.44	0.11	0.35	0.73	0.68	1.24	1.06	1.39	1.53
Selenium	0.6																
Silver	1.3		2.11														
Vanadium	5.6																
Zinc	88.2	1.69	0.44	0.57	2.05	1.44	1.68	0.27	0.90	0.19	0.25	0.74	0.53	0.86	1.28	1.30	1.49
Volatile Organic Compounds	µg/kg																
Benzene	150.4					0.09	0.09									0.05	0.04
Chlorobenzene	428.4															0.03	0.03
Dichlorobenzenes (Sum)	238.6	0.10					0.10									0.1	0.05
Ethylbenzene	175.7																
Toluene	41.8	0.45		0.29		0.45	0.50	0.33	0.55	0.14	0.22				0.60	0.43	0.41
Trichlorobenzenes (Sum)	346.5																
Xylene (Total)	560.8																
Semivolatile Organic Compounds	µg/kg																
Dibenzofuran	372.0		0.91														
Hexachlorobenzene	16.4										1.71	0.35	0.25	0.52			
Phenol	45.0																
Naphthalene	917.4		0.40				0.47		0.46								
Acenaphthene	860.7		0.53	0.51			0.36			0.20							
Fluorene	264.3		1.82	0.17					0.3			0.13		0.15			
Phenanthrene	542.7		4.24	0.17	0.17		0.24		0.4			0.17	0.059	0.18			
Anthracene	206.7		3.63	0.18	0.22		0.2		0.3			0.15	0.06	0.15			
Pyrene	343.8		6.40	0.67	0.64		0.8		1.4	0.14	0.11	0.7	0.29	0.7			
Benz(a)anthracene	191.5		7.83	0.57	0.63		0.5		0.9	0.08	0.21	0.5	0.19	0.5			
Chrysene	253.2		4.74	0.87	0.83		0.7	0.10	1.2	0.14		0.7	0.28	0.8			
Benzo(b)fluoranthene	908.4		1.76	0.29	0.19		0.3	0.07	0.6	0.09	0.21	0.14	0.07	0.13			
Benzo(a)pyrene	146.4		8.9	0.6	0.9		0.8	0.2	0.9	0.2		0.7	0.3	0.7			
Indeno(1,2,3-cd)pyrene	182.9		2.95	0.26	0.41							0.46	0.21	0.33			
Dibenz(a,h)anthracene	157.2		1.15		0.39		0.32		0.46			0.31	0.15	0.30			

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S65	S66	S67	S68	S69	S70	S71	S72	S73	S74	S75	S76	S77	S78	S79	S80
Benzo(g,h,i)perylene	779.7		0.59	0.50	0.42		0.29		0.46	0.15		0.24	0.12	0.31			
Acenaphthylene	1,300.7		0.03				2.15										
Benzo(k)fluoranthene	202.5				0.36		0.49	0.10	0.64	0.11	0.06	0.43	0.19	0.4			
Fluoranthene	1,436.3		1.60	0.26	0.31		0.61	0.06	0.65	0.08		0.38	0.1	0.3			
Pesticides/Polychlorinated Biphenyls	µg/kg																
Chlordane (Sum)	5.1																
DDT and metabolites	29.6																
Aroclor-1016	110.9																
Aroclor-1248	203.7	0.24			0.26	0.23			0.17						0.23	0.17	0.17
Aroclor-1254	76.1																
Aroclor-1260	163.6																
PCBs (Sum)	294.8	0.30			0.30	0.28			0.23						0.28	0.22	0.23
Exceedances		6	12	1	7	5	6	0	3	0	0	2	0	2	4	5	5
Total Hazard Index		8	47	1	15	6	10	0	4	0	0	3	0	2	5	6	7

Table 10-2. (cont.)

Chemical	Consensus																
	PECs	S81	S82	S83	S84	S85	S86	S87	S88	S89	S90	S91	S92	S93	S94	S95	S96
Metals	mg/kg																
Antimony	3.6	1.77															
Arsenic	2.4	1.17															
Cadmium	2.4		0.24		0.32	0.34	0.88	0.67		0.63	0.7	0.88	0.72	0.31	0.40	2.44	
Chromium	50.3	0.21	0.14	0.15	0.31	0.38	0.75	0.75	0.61	0.68	0.71	0.96	0.67	0.50	0.39	1.50	0.68
Copper	32.9	0.65	0.49	0.62	0.85	1.07	1.33	0.36	1.11	1.23	1.24	1.39	0.42	0.27	0.26	0.96	1.13
Lead	34.5	0.85	0.62	0.70	0.47	1.28	1.21	0.30	1.29	1.61	1.3	2.16	0.3	0.2	0.2	0.65	1.33
Manganese	278.3	1.21									0.86						0.93
Mercury	2.2	0.59	0.50	0.77	1.22	0.86	1.27	0.45	1.13	1.45	1.32	1.22	0.24	0.18	0.44	1.36	1.36
Nickel	16.4	0.71	0.67	0.83	0.90	0.97	1.37	0.33	1.36	1.44	1.33	1.56	0.24	0.24	0.24	0.38	1.23
Selenium	0.6	1.36									1.90						
Silver	1.3														0.94		
Vanadium	5.6	1.23									1.37						
Zinc	88.2	0.70	0.57	0.68	0.98	1.20	1.58	0.39	1.50	1.58	1.41	1.73	0.46	0.28	0.27	1.20	1.52
Volatile Organic Compounds	µg/kg																
Benzene	150.4					0.07	0.22			0.12		0.11					
Chlorobenzene	428.4																
Dichlorobenzenes (Sum)	238.6																
Ethylbenzene	175.7																
Toluene	41.8					0.98	0.67	0.31	0.60	1.32		0.53	5.74	0.29	0.19	0.62	1.51
Trichlorobenzenes (Sum)	346.5																
Xylene (Total)	560.8																
Semivolatile Organic Compounds	µg/kg																
Dibenzofuran	372.0																
Hexachlorobenzene	16.4		0.67	1.34	1.16	0.22				0.24							
Phenol	45.0																
Naphthalene	917.4							0.50									
Acenaphthene	860.7				0.76		1.98										
Fluorene	264.3		0.21	0.27	0.28										0.17	0.18	
Phenanthrene	542.7	0.33	0.33	0.39	0.44			0.12			0.17		0.04				0.03
Anthracene	206.7	0.17	0.19	0.28	0.31			0.19									0.09
Pyrene	343.8	1.11	1.16	1.63	2.18			0.73			0.5				0.09	0.7	
Benz(a)anthracene	191.5	0.89	0.73	1.04	1.20			0.46							0.11	0.5	
Chrysene	253.2	0.91	1.07	1.38	1.90			0.79			0.5				0.16	0.8	
Benzo(b)fluoranthene	908.4	0.36	0.39	0.25	0.39			0.47							0.05	0.44	
Benzo(a)pyrene	146.4	1.4	0.6	1.2	2.0			0.5			0.8				0.2	0.4	
Indeno(1,2,3-cd)pyrene	182.9	0.60	0.31	0.93	0.77			2.24							0.09	0.33	
Dibenz(a,h)anthracene	157.2			0.60	0.89			0.34							0.12	0.34	

Table 10-2. (cont.)

Chemical	Consensus	S81	S82	S83	S84	S85	S86	S87	S88	S89	S90	S91	S92	S93	S94	S95	S96
	PECs																
Benzo(g,h,i)perylene	779.7	0.14		0.69	0.45		0.56						0.28			0.50	
Acenaphthylene	1,300.7				0.48												
Benzo(k)fluoranthene	202.5			0.79	1.33		0.35								0.13	0.40	
Fluoranthene	1,436.3	0.28	0.44	0.97	0.91		0.54				0.10				0.07	0.54	
Pesticides/Polychlorinated Bipher	µg/kg																
Chlordane (Sum)	5.1																
DDT and metabolites	29.6																
Aroclor-1016	110.9										0.81						
Aroclor-1248	203.7								0.25	0.27		0.16					0.15
Aroclor-1254	76.1																
Aroclor-1260	163.6																
PCBs (Sum)	294.8								0.31	0.32	0.54	0.25					0.24
Exceedances		7	2	5	7	3	7	0	5	6	8	5	1	0	0	4	6
Total Hazard Index		9	2	7	11	4	11	0	6	9	11	8	6	0	0	7	8

Table 10-2. (cont.)

Chemical	Consensus																					
	PECs	S97	S98	S99	S100	S101	S102	S103	S104	S105	S106	S107	S108	S109	S110	S111	S112	S113	S114			
Metals	mg/kg																					
Antimony	3.6																					
Arsenic	2.4																					
Cadmium	2.4	0.8	0.76	0.88	0.42	0.8	0.72	0.67	2.11	1.9	0.63	0.97	2.19	1.10	1.69	0.3	0.84	0.15	0.27			
Chromium	50.3	0.84	0.95	0.89	0.54	0.54	0.87	0.84	1.67	1.53	0.75	0.83	1.37	1.11	1.47	0.24	0.71	0.33	0.49			
Copper	32.9	1.29	1.37	1.21				0.35	1.29	1.32	0.84	0.84	1.05	1.13	1.05	0.77	0.94	0.52		0.39		
Lead	34.5	1.5	1.50	1.4	0.1	0.3	1.45		1.3	0.5	0.6	1.26	1.46	0.66	0.32	0.20	0.6	0.29	0.5	0.9		
Manganese	278.3				1.60																1.02	1.24
Mercury	2.2	1.63	1.13	1.00	0.16	0.39	0.86	1.04	0.63	0.73	0.82	0.42	1.04	0.73	1.00	1.32	0.50	0.08	0.29			
Nickel	16.4				0.24	1.43		0.54	0.46	1.42	1.14	0.80	0.37	0.53	0.37	0.49	0.29	0.31				
Selenium	0.6				0.67																	
Silver	1.3				1.01																	
Vanadium	5.6																					
Zinc	88.2	1.55	1.55	1.47	0.36	0.52	1.51	1.62	0.95	0.87	1.33	1.49	1.26	0.59	0.84	0.43	0.57	0.44	0.55			
Volatile Organic Compounds	µg/kg																					
Benzene	150.4																					
Chlorobenzene	428.4																					
Dichlorobenzenes (Sum)	238.6																					
Ethylbenzene	175.7																					
Toluene	41.8							0.26	1.05				0.45	0.24				0.12	0.19			
Trichlorobenzenes (Sum)	346.5																					
Xylene (Total)	560.8																					
Semivolatile Organic Compounds	µg/kg																					
Dibenzofuran	372.0																					
Hexachlorobenzene	16.4																					
Phenol	45.0				1.00																	
Naphthalene	917.4																					
Acenaphthene	860.7							0.5	0.43	0.73				0.12			0.44	0.59	0.0			
Fluorene	264.3							0.2	0.18				1.63	0.22	0.31				0.7	0.16		
Phenanthrene	542.7							0.1	0.14				0.22	0.48	0.06				1.1	0.11		
Anthracene	206.7							0.2	0.26				1.40			0.37				2.2	0.44	
Pyrene	343.8							0.5	0.79				0.32			1.25	0.1				2.6	0.43
Benz(a)anthracene	191.5							0.3	0.63				0.21			0.63				2.0	0.34	
Chrysene	253.2							0.5	1.07				0.27			0.67				3.3	0.5	
Benzo(b)fluoranthene	908.4							0.3	0.24	0.0				0.10			0.22	0.1				0.6
Benzo(a)pyrene	146.4							0.4	0.9	0.1				0.3			0.9				3.3	0.5
Indeno(1,2,3-cd)pyrene	182.9										3.99						0.45			1.15	0.82	
Dibenz(a,h)anthracene	157.2										0.52						0.18			0.45	0.39	

Table 10-2. (cont.)

Chemical	Consensus	S97	S98	S99	S100	S101	S102	S103	S104	S105	S106	S107	S108	S109	S110	S111	S112	S113	S114
	PECs																		
Benzo(g,h,i)perylene	779.7							0.45	0.42	0.27			0.14		0.37	0.42	0.03	0.17	0.04
Acenaphthylene	1,300.7																	0.06	
Benzo(k)fluoranthene	202.5							0.25	0.40	0.18						0.29			
Fluoranthene	1,436.3							0.35	0.39	0.41			0.13	0.02	0.41	0.97	0.19	0.42	0.12
Pesticides/Polychlorinated Biphenyls	µg/kg																		
Chlordane (Sum)	5.1																		
DDT and metabolites	29.6																		
Aroclor-1016	110.9																		
Aroclor-1248	203.7		0.19	0.17							0.27	0.36							
Aroclor-1254	76.1																		
Aroclor-1260	163.6																		
PCBs (Sum)	294.8		0.25	0.24							0.30	0.39							
Exceedances		4	4	3	2	0	3	5	5	2	4	4	7	2	3	1	1	6	1
Total Hazard Index		6	6	4	3	0	4	7	10	3	5	5	10	2	4	1	1	12	1

Notes: COC - chemical of concern
 PEC - Probable effect concentration

^a Consensus PECs could not be determined for heptachlor and heptachlor epoxide because the concentrations of those COCs were not found over a sufficiently large range.

^b A ratio >1.0 indicates that the observed COC concentration exceeded the PEC for that chemical.

Table 10-3. Summary of Ratios to Consensus PECs for COC Concentrations in Surface Sediments in Onondaga Lake in 2000^{a,b,c}

Chemical	Consensus															
	PECs	S301	S302	S303	S304	S305	S306	S307	S308	S309	S310	S311	S312	S313	S314	S315
Metals	mg/kg															
Antimony	3.6			0.22					0.28	0.64	0.18		1.0		0.36	0.33
Arsenic	2.4	1.30	1.38	0.00	2.01	1.42	1.05	2.93	1.76	4.86	1.97	4.11	2.01	2.09	5.66	2.05
Cadmium	2.4	0.33	0.19	0.34	0.09	0.08	0.35	0.17	1.47	5.31	1.60	0.16	0.37	1.14	1.81	1.18
Chromium	50.3	0.58	0.49	0.65	0.37	0.48	0.35	7.93	9.93	14.62	3.04	0.53	0.93	1.62	2.80	1.66
Copper	32.9	1.14	1.25	1.43	1.16	1.09	0.36	2.07	3.49	5.92	2.57	1.16	1.18	2.02	3.22	3.80
Lead	34.5	2.05	1.15	1.43	1.32	0.83	0.22	3.65	3.22	13.6	2.87	0.70	3.10	6.46	10.5	3.16
Manganese	278.3	0.85	1.40	1.65	1.28	1.18	1.23	1.49	1.68	1.31	1.48	1.47	0.59	0.72	0.93	1.25
Mercury	2.2	1.72	1.36	1.45	1.00	1.13	0.31	0.19	1.90	11.61	5.44	7.26	15.06	3.99	18.9	4.35
Nickel	16.4	0.98	1.03	1.31	1.20	0.94	0.92	8.06	9.65	8.49	2.79	1.40	2.52	2.16	3.60	1.86
Selenium	0.6	1.10		3.62	2.07	1.90	2.07	2.76		2.07				2.07	1.55	
Silver	1.3	0.20		0.54					1.64	2.11	1.79		0.34	0.78	2.18	4.76
Vanadium	5.6	1.37	2.43	3.09	2.03	2.55	1.71	4.89	12.61	6.07	4.16	1.80	0.91	2.62	2.44	3.50
Zinc	88.2	1.46	1.38	1.88	1.01	1.27	0.78	0.65	2.72	3.00	2.13	0.76	0.90	2.15	2.11	2.73
Volatile Organic Compounds	µg/kg															
Benzene	150.4								20.6	0.43	5.32	61.19	0.53	17.3		0.07
Chlorobenzene	428.4							0.01	0.47	280	3.74	4.20	2334	44.4	257	0.33
Dichlorobenzenes (Sum)	238.6				0.34				0.54	260	3.81	1.93	704	41.1	65.8	1.22
Ethylbenzene	175.7									39.9	0.05	7.97	34.2	0.38	24.5	0.07
Toluene	41.8									114.8		88.5	136	2.39	13.6	0.23
Trichlorobenzenes (Sum)	346.5												15.6			
Xylene (Total)	560.8															
Semivolatile Organic Compound	µg/kg															
Dibenzofuran	372.0							0.26						217.7	7.26	
Hexachlorobenzene	16.4	1.17	1.13	0.15	46.09	3.27	1.68		0.10	0.87	1.35	1.31	20.63		412.08	0.93
Phenol	45.0											48.89				
Naphthalene	917.4							0.06		76.30	1.42	21.80	45.78	78.5	50.14	
Acenaphthene	860.7							0.19						98.8		
Fluorene	264.3							0.49		6.81		1.93		530	14.00	
Phenanthrene	542.7		0.33	0.29	0.29			3.32	0.24	10.14		2.95		700	17.69	0.90
Anthracene	206.7							2.81	0.48			4.55		460		
Pyrene	343.8	0.20	1.19	0.99	0.84			9.31	0.87	11.35	1.63	1.25		436		2.65
Benz(a)anthracene	191.5		1.04	0.84	0.68			11.49	0.84	8.88	1.57			522	13.58	3.13
Chrysene	253.2		1.18	1.03	0.63			9.08	0.83	6.32	1.34			395	12.64	3.28
Benzo(b)fluoranthene	908.4		0.28	0.23	0.14			1.65	0.22			0.39		62.8	2.20	0.81
Benzo(a)pyrene	146.4		1.71	1.43	0.89			12.98	1.43			2.46		443.89	12.29	4.58
Indeno(1,2,3-cd)pyrene	182.9		1.20	0.98	0.50			6.56	0.87			1.15		208		2.79
Dibenz(a,h)anthracene	157.2							3.18						108		1.72

Table 10-3. (cont.)

Chemical	Consensus															
	PECs	S301	S302	S303	S304	S305	S306	S307	S308	S309	S310	S311	S312	S313	S314	S315
Benzo(g,h,i)perylene	779.7		0.32	0.24	0.12			1.54	0.23		0.33			44.9		0.69
Acenaphthylene	1,300.7							0.05			0.18	0.29		14.61	1.38	0.15
Benzo(k)fluoranthene	202.5		1.23	0.94	0.59			6.91	0.89		1.38			296	8.89	3.06
Fluoranthene	1,436.3	0.06	0.33	0.25	0.19			2.65	0.22	2.99	0.38	0.52		174	5.57	0.91
Pesticides/Polychlorinated Biphe	µg/kg															
Chlordane (Sum)	5.1	0.29	0.33							0.80	1.43				9.91	0.23
DDT and metabolites	29.6	0.27	0.07		0.05	0.08		0.39	0.05	0.27	0.30	0.24	0.24	2.98	2.00	0.17
Aroclor-1248	203.7															
Aroclor-1254	76.1	1.16	0.32	0.33	0.14	0.25		1.63	0.64	4.47	2.25		0.92		13.3	0.84
Aroclor-1260	163.6	0.35	0.20	0.20		0.08			0.20	2.71			0.20	6.24	4.19	0.19
PCBs (Sum)	294.8	0.98	0.25	0.20	0.09	0.11		0.68	0.50	11.0	2.30		6.29	10.9	37.4	0.57
Exceedances		9	15	10	9	8	5	21	12	27	24	18	14	33	33	19
Total Hazard Index		12	20	18	58	14	8	107	52	936	56	208	3383	4925	1057	53

Table 10-3. (cont.)

Chemical	Consensus													
	PECs	S316	S317	S318	S319	S320	S321	S322	S323	S324	S325	S326	S327	S328
Metals	mg/kg													
Antimony	3.6		0.22		0.14		0.08	0.24			0.11		0.61	
Arsenic	2.4	0.50	1.80	0.46	1.68	1.97	0.39	3.60	1.51	0.75	1.15	1.30	9.05	1.34
Cadmium	2.4	0.03	1.35	0.93	1.73	1.77	0.67	6.28	5.18	0.22	0.15	0.80	2.65	0.46
Chromium	50.3	0.13	1.64	0.47	1.40	1.70	0.52	2.66	2.94	0.75	3.93	8.48	83.04	7.07
Copper	32.9	0.92	3.58	1.39	2.79	3.62	0.92	4.65	2.96	0.41	0.93	2.16	10.45	1.32
Lead	34.5	1.46	4.11	1.52	3.30	3.36	0.81	8.26	2.65	0.33	0.85	2.26	8.78	1.43
Manganese	278.3	0.38	1.04	0.42	1.00	1.49	0.65	1.55	1.26	1.17	2.39	1.89	4.28	1.03
Mercury	2.2	0.16	7.80	0.41	1.72	2.77	0.10	0.45	0.73	0.15	0.07	0.59	1.04	0.33
Nickel	16.4	0.28	2.09	0.54	1.61	1.82	0.38	3.11	2.25	0.71	6.02	10.63	102.00	6.78
Selenium	0.6		2.76		2.42					2.42	3.26	3.97	10.18	
Silver	1.3	0.09	3.82	0.28	1.87	3.12	0.16	4.06	1.87			0.59	1.79	
Vanadium	5.6	0.96	2.89	0.73	2.71	4.12	0.66	5.25	1.73	1.00	3.96	10.15	56.92	4.62
Zinc	88.2	0.60	3.05	0.95	2.79	3.20	1.00	4.34	3.66	0.61	1.38	1.93	3.95	1.12
Volatile Organic Compounds	µg/kg													
Benzene	150.4		0.09	0.01		0.03		0.17		4.85	0.03	0.01	0.59	
Chlorobenzene	428.4		0.84	0.03	0.13	0.11		0.54	0.13	0.01		0.01	0.93	
Dichlorobenzenes (Sum)	238.6	0.71	4.88	0.75	0.84			0.88						
Ethylbenzene	175.7					0.03		1.88		0.06	0.00		0.10	
Toluene	41.8		0.12			0.08				3.35			0.50	
Trichlorobenzenes (Sum)	346.5													
Xylene (Total)	560.8									0.12	0.02	0.01	0.16	
Semivolatile Organic Compound	µg/kg													
Dibenzofuran	372.0	0.46			0.19			1.37						
Hexachlorobenzene	16.4		1.65	0.49	1.29	0.89		0.21	0.21		0.13	0.11		0.07
Phenol	45.0													
Naphthalene	917.4	0.28		0.06	0.25			0.62			0.08	0.10		
Acenaphthene	860.7	0.51	0.19	0.08	0.20			2.56						
Fluorene	264.3		0.61	0.26	0.61									
Phenanthrene	542.7	2.76	2.03	0.81	2.40	0.50	0.44	14.37	0.41		0.16	0.29		0.14
Anthracene	206.7	4.84	5.32	1.02	3.00	0.68	0.53	12.10			0.03	0.29		
Pyrene	343.8	9.31	7.56	2.04	7.85	1.83	1.77	20.07	1.31	0.17	0.40	0.87		0.25
Benz(a)anthracene	191.5	9.40	9.92	1.83	8.36	1.83	1.88	13.06	1.31	0.21	0.40	0.94		0.30
Chrysene	253.2	7.11	8.69	1.50	6.71	1.78	1.46	12.24	1.34	0.18	0.39	0.87		0.21
Benzo(b)fluoranthene	908.4	1.32	1.87	0.28	1.32	0.40	0.35	1.87	0.31	0.04	0.10	0.21		0.05
Benzo(a)pyrene	146.4	13.66	14.34	2.53	11.61	3.07	2.94	15.71	1.71	0.33	1.02	1.37		0.33
Indeno(1,2,3-cd)pyrene	182.9	6.01	5.47	1.26	5.47	1.69	1.53	6.56	1.09		0.38	0.82		0.19
Dibenz(a,h)anthracene	157.2	2.86	2.74	0.59	2.23	0.83	0.61	3.31				0.27		

Table 10-3. (cont.)

Chemical	Consensus													
	PECs	S316	S317	S318	S319	S320	S321	S322	S323	S324	S325	S326	S327	S328
Benzo(g,h,i)perylene	779.7	1.67	1.41	0.32	1.41	0.45	0.36	1.80	0.29		0.10	0.12		
Acenaphthylene	1,300.7	0.24	0.40	0.06	0.27		0.06	0.43						
Benzo(k)fluoranthene	202.5	6.91	7.90	1.43	6.42	2.12	1.88	8.89	1.19	0.20	0.36	0.89		0.26
Fluoranthene	1,436.3	2.09	2.78	0.53	1.81	0.44	0.34	4.46	0.33	0.04	0.12	0.27	0.70	0.07
Pesticides/Polychlorinated Biphe	µg/kg													
Chlordane (Sum)	5.1		0.29			1.22		4.98	1.90			0.45	6.47	
DDT and metabolites	29.6	0.05	0.27		0.23	0.34		1.57	0.60		0.01	0.28	0.41	0.07
Aroclor-1248	203.7									0.09	0.31	0.60		0.20
Aroclor-1254	76.1		1.29	1.05	1.97	2.27	0.19	8.91	5.85	0.21	0.82	1.38	6.69	0.66
Aroclor-1260	163.6		0.22	0.24	0.47	0.49	0.11	1.38	0.79	0.07	0.16	0.26	0.90	0.14
PCBs (Sum)	294.8		1.02	0.85	1.59	1.97	0.17	6.17	6.05	0.16	0.52	0.92	5.72	0.39
Exceedances		13	28	10	26	20	6	30	19	4	8	11	15	8
Total Hazard Index		69	115	16	87	47	11	187	48	12	23	46	313	25

Table 10-3. (cont.)

Chemical	Consensus														
	PECs	S329	S330	S331	S332	S333	S334	S335	S336	S337	S338	S339	S340	S341	
Metals	mg/kg														
Antimony	3.6	0.11	0.09		0.12	0.94	0.97	0.80	0.14	0.25	0.64	0.41	0.13	0.22	
Arsenic	2.4		0.54		2.22	3.52	19.82	7.54	8.63	2.39	3.73	8.63	6.33	3.56	3.94
Cadmium	2.4	0.09	0.08		2.36	0.80	0.46	0.46	0.42	0.10	1.77	4.38	0.97	0.05	0.08
Chromium	50.3	0.93	1.66	6.40	4.41	4.29	16.15	10.69	3.77	20.66	62.18	47.08	0.25	0.20	
Copper	32.9	0.15	0.25		3.04	2.71	5.74	7.20	5.89	1.30	5.04	10.85	11.12	1.28	1.12
Lead	34.5	0.13	0.38		3.36	2.31	2.60	11.39	5.79	2.19	4.98	12.92	17.76	0.62	0.90
Manganese	278.3	0.99	0.78		1.19	1.63	0.79	1.17	1.05	1.07	2.06	2.71	2.82	0.57	0.90
Mercury	2.2	0.05	0.20	0.86	1.36	0.73	1.90	0.95	3.49	6.98	5.49	2.90	1.13	1.13	
Nickel	16.4	0.32	1.37	6.29	4.31	3.73	12.58	9.71	4.36	25.90	59.37	65.96	0.59	0.91	
Selenium	0.6				2.24	2.76	5.87	6.56	5.87	1.55	4.66	6.56	5.18	1.50	2.76
Silver	1.3				2.57	0.31	0.28	0.37	0.41		1.87	2.89	0.77	0.38	0.34
Vanadium	5.6	0.37	0.95		6.76	2.21	5.94	9.87	11.33	7.71	23.73	43.36	29.98	1.11	2.30
Zinc	88.2	0.25	0.35		3.58	1.39	1.32	2.12	2.10	1.55	3.72	4.77	2.65	0.45	0.53
Volatile Organic Compounds	µg/kg														
Benzene	150.4		0.07			2.73	28.60	31.26	279.32	1.66	2.46	1.93	27.93	16.63	14.63
Chlorobenzene	428.4		0.35	0.11		6.54	1.00	4.44	210.10	20.78	151.74	44.36	112.05	8.40	2.33
Dichlorobenzenes (Sum)	238.6			0.21		25.57		1.97	1.84	25.82	1.76	2.47	9.64	62.88	15.93
Ethylbenzene	175.7					9.11	6.83	3.53	1.88				2.05	4.44	3.93
Toluene	41.8						13.16	16.27						26.32	95.71
Trichlorobenzenes (Sum)	346.5													1.44	0.95
Xylene (Total)	560.8			0.02	0.30		6.24	11.06	1.02				3.21	41.02	23.18
Semivolatile Organic Compound	µg/kg														
Dibenzofuran	372.0					3.76	37.63	3.49	2.12			0.51	1.59	1.34	0.65
Hexachlorobenzene	16.4			0.12		4.27	0.24	0.30	2.62	0.07	0.12	0.66	0.16	8.73	1.47
Phenol	45.0														9.78
Naphthalene	917.4					41.42	141.7	6.00	16.35	0.39		0.36	8.39	19.62	17.44
Acenaphthene	860.7					1.16	8.71	1.16	0.52			0.26	0.57	0.48	0.20
Fluorene	264.3			0.22		6.43	68.1	9.46	5.30			1.25	3.33	3.40	1.59
Phenanthrene	542.7			0.18		4.61	77.4	18.43	7.37	1.33	0.61	2.40	8.48	8.29	3.69
Anthracene	206.7						77.4	19.35	8.71	0.68	1.06	3.15	7.74	4.02	2.52
Pyrene	343.8		0.09	0.73			43.6	27.93	9.89	2.56	1.45	3.49	11.1	6.40	3.20
Benz(a)anthracene	191.5			0.57		3.66	37.6	31.34	10.45	1.93	1.57	3.13	12.0	4.96	2.66
Chrysene	253.2			0.63		2.96	24.5	22.91	8.69	1.78	1.78	2.84	10.3	3.48	2.13
Benzo(b)fluoranthene	908.4			0.13			3.63	4.40	1.65	0.36	0.31	0.56	1.98	0.69	0.36
Benzo(a)pyrene	146.4			0.89			25.95	30.05	10.24	2.46	2.25	3.76	12.98	4.23	2.32
Indeno(1,2,3-cd)pyrene	182.9			0.48				15.31	5.19	1.31	1.09	1.80	6.56	1.97	1.15
Dibenz(a,h)anthracene	157.2							8.27	2.86			0.83	3.31		0.57

Table 10-3. (cont.)

Chemical	Consensus													
	PECs	S329	S330	S331	S332	S333	S334	S335	S336	S337	S338	S339	S340	S341
Benzo(g,h,i)perylene	779.7			0.12			3.33	1.26	0.37		0.50	1.67	0.47	0.28
Acenaphthylene	1,300.7				1.38	3.15	1.15	0.59		0.09	0.15	0.36	0.30	0.18
Benzo(k)fluoranthene	202.5			0.54		21.73	20.74	7.90	1.53	1.28	2.02	8.39	2.77	1.58
Fluoranthene	1,436.3			0.17	1.25	13.92	8.35	3.20	0.68	0.53	1.18	3.83	2.16	1.04
Pesticides/Polychlorinated Biphe	µg/kg													
Chlordane (Sum)	5.1			0.98	0.23				0.25	0.63	0.49			
DDT and metabolites	29.6			0.34	0.05		0.25	0.13	0.12	0.16	1.07	0.72	0.14	
Aroclor-1248	203.7													
Aroclor-1254	76.1		0.15	1.84	0.32	0.68	1.11	1.30	0.83	2.26	10.34	3.60	0.83	0.29
Aroclor-1260	163.6			0.32	0.08		0.23	0.21	0.14	0.46	1.61	0.82	0.12	
PCBs (Sum)	294.8		0.12	1.53	0.78	0.35	0.61	0.73	0.36	1.45	9.67	2.52	0.78	1.05
Exceedances		0	2	13	24	27	34	31	20	24	29	32	25	25
Total Hazard Index		0	3	43	141	690	378	660	91	275	321	454	241	219

Table 10-3. (cont.)

Chemical	Consensus PECs	S342	S343	S344	S345	S346	S347	S348	S349	S350	S351	S352	S353	S354
		mg/kg												
Metals														
Arsenic	2.4	0.22	0.16	1.49	0.19	0.13	0.15	0.16		0.16		0.33	0.13	0.33
		4.06	3.06	3.23	4.94	2.01	4.36	3.10	2.89	2.97	1.42	2.18	1.47	2.35
Cadmium	2.4	0.59	0.37	0.42	0.15	0.38	0.26	0.36	0.59	0.30	0.35	1.10	0.93	1.31
Chromium	50.3	0.71	0.41	1.32	0.38	0.36	0.37	0.39	0.88	0.72	0.94	1.73	1.21	2.24
Copper	32.9	0.79	4.01	2.70	1.54	1.77	0.84	0.84	1.52	1.25	0.96	2.63	2.16	2.83
Lead	34.5	0.61	1.00	8.89	0.58	1.05	0.61	2.66	1.46	2.26	2.57	21.73	2.93	2.67
Manganese	278.3	1.23	0.75	1.23	1.22	0.83	1.46	1.17	0.88	1.25	0.83	0.67	0.63	1.98
Mercury	2.2	0.31	1.27	35.24	0.27	0.82	0.63	1.41	0.91	4.58	2.77	8.25	5.31	1.50
Nickel	16.4	1.30	1.66	3.04	1.55	1.25	1.19	1.27	1.42	3.87	1.56	1.98	1.98	2.48
Selenium	0.6		2.07				2.59		1.90		2.07	1.35		
Silver	1.3		0.30	0.66		0.23	0.12	0.22	0.32		0.48	1.40	0.40	2.57
Vanadium	5.6	1.70	1.34	1.66	2.71	1.14	2.05	1.32	1.66	1.41	1.30	2.53	1.20	5.50
Zinc	88.2	0.65	0.54	1.47	0.35	0.61	0.72	0.61	1.13	0.74	1.00	2.47	1.84	2.81
Volatile Organic Compounds														
µg/kg														
Benzene	150.4	1.20	7.98		9.98	5.05	2.66		10.64	0.80	1.26	0.73	0.15	0.49
Chlorobenzene	428.4	0.54	21.01	280.14	8.64	11.67	23.34	8.40	0.51	5.60	4.67	23.11	0.49	0.11
Dichlorobenzenes (Sum)	238.6	3.19	47.79	1001.82	12.20	9.72	209.59	34.37	2.56	21.80	48.67	40.24	12.78	0.71
Ethylbenzene	175.7	3.36	7.97	11.96	34.73	12.52	2.73	6.83	3.59	6.26	0.07	3.99	0.02	0.02
Toluene	41.8	11.01	52.64		198.59	57.42	22.73	16.99	98.10	9.09	1.12	3.83		1.12
Trichlorobenzenes (Sum)	346.5			101.02			10.68			0.98	6.93			
Xylene (Total)	560.8	17.65	60.63	13.91	267.50	94.52	17.48	28.53	16.94	24.97	0.30	2.85	0.02	0.01
Semivolatile Organic Compound														
µg/kg														
Dibenzofuran	372.0									1.91	4.57	20.96	1.85	
Hexachlorobenzene	16.4	1.62	2.16			3.23	2.28		5.65	12.88	9.10	11.84	7.14	0.45
Phenol	45.0	42.2			20.89				57.78	4.22	5.56			
Naphthalene	917.4	34.9	78.48	185.3	61.04	18.53	11.99	53.41	25.07	37.06	4.47	27.25	1.53	0.34
Acenaphthene	860.7									0.27	3.02	13.94	1.39	
Fluorene	264.3		4.54			1.44			2.08	2.84	6.81	45.40	4.54	
Phenanthrene	542.7	1.77	4.24	8.85		1.42			4.42	4.05	12.35	70.03	18.43	0.68
Anthracene	206.7		10.64			1.84			4.11	3.44	27.58	77.42	19.35	1.02
Pyrene	343.8					1.80			4.36	2.73	28.22	75.63	37.82	2.15
Benz(a)anthracene	191.5								2.25	1.83	25.07	50.14	47.01	2.04
Chrysene	253.2								2.09	1.62	20.54	39.50	35.55	2.21
Benzo(b)fluoranthene	908.4									0.22	3.96	7.38	7.60	0.52
Benzo(a)pyrene	146.4									1.37	30.05	55.32	64.19	3.07
Indeno(1,2,3-cd)pyrene	182.9										12.57	22.96	29.52	1.91
Dibenz(a,h)anthracene	157.2										5.03	8.91	15.27	

Table 10-3. (cont.)

Chemical	Consensus													
	PECs	S342	S343	S344	S345	S346	S347	S348	S349	S350	S351	S352	S353	S354
Benzo(g,h,i)perylene	779.7										3.33	5.77	8.34	0.54
Acenaphthylene	1,300.7	0.68			0.67				0.37	0.38	0.58	1.69	0.85	
Benzo(k)fluoranthene	202.5									1.09	22.22	33.58	35.06	2.12
Fluoranthene	1,436.3					0.43			0.97	0.97	9.05	22.28	11.84	0.58
Pesticides/Polychlorinated Biphe	µg/kg													
Chlordane (Sum)	5.1						0.21		0.54	0.27	0.84	7.95		0.50
DDT and metabolites	29.6	0.04		0.38		0.05	0.05		0.24	0.48	0.12	0.90	1.32	0.15
Aroclor-1248	203.7													
Aroclor-1254	76.1		0.41	8.44			0.26			2.10	3.84	5.24	4.73	1.42
Aroclor-1260	163.6	0.08		3.40	0.12	0.10	0.11	0.08	1.46	0.59	2.30	1.01	1.27	0.24
PCBs (Sum)	294.8	0.59	0.62	39.7	0.69	0.73	0.51	0.50	1.42	1.71	4.13	3.49	3.21	0.98
Exceedances		13	17	20	13	17	14	12	23	26	32	38	30	20
Total Hazard Index		125	311	1715	626	226	315	159	255	164	318	729	388	45

Table 10-3. (cont.)

Chemical	Consensus															
	PECs	S355	S356	S357	S358	S360	S361	S362	S363	S364	S365	S366	S367	S368	S369	S370
Metals	mg/kg															
Antimony	3.6							0.09								
Arsenic	2.4	2.51		0.37		1.23	0.78	0.41	1.11	2.14	3.81	0.26	0.30	0.29	0.18	0.32
Cadmium	2.4	1.39	0.11	0.50		0.15	0.12		0.49	0.14	1.14	0.06	0.54	0.16	0.08	0.75
Chromium	50.3	1.59	0.18	0.38	0.06	0.38	0.22	0.08	0.73	0.41	2.90	0.21	0.83	0.47	0.15	1.09
Copper	32.9	3.10	0.18	0.35	0.05	0.74	0.36	0.12	0.60	0.55	1.33	0.18	0.62	0.36	0.13	0.56
Lead	34.5	2.72	0.12	0.16	0.02	0.81	0.75	0.08	0.46	0.39	2.07	0.1	0.28	0.21	0.09	0.36
Manganese	278.3	1.83	1.17	1.02	0.70	1.16	0.87	0.71	0.70	1.42	1.71	0.82	1.04	1.14	0.69	0.66
Mercury	2.2	1.36	0.07	0.27		2.09	0.16	0.04	0.12		0.29		0.17	0.10	0.02	0.25
Nickel	16.4	2.01	0.20	0.28	0.18	0.69	0.50	0.23	1.06	0.88	3.49	0.26	0.42	0.29	0.18	0.41
Selenium	0.6		1.26	1.30		0.15	0.89					1.61	1.32		1.61	
Silver	1.3	2.73		0.04					0.34		0.22		0.05			0.21
Vanadium	5.6	4.76	0.41	0.41	0.43	1.66	0.81	0.39	1.08	1.59	2.84	0.66	0.79	0.70	0.46	0.33
Zinc	88.2	2.91	0.38	0.45	0.12	1.00	0.60	0.20	1.16	0.44	1.09	0.31	0.69	0.38	0.25	0.63
Volatile Organic Compounds	µg/kg															
Benzene	150.4	0.13							6.35	0.05						
Chlorobenzene	428.4	0.10														
Dichlorobenzenes (Sum)	238.6	0.67														
Ethylbenzene	175.7	0.04							5.57							
Toluene	41.8	2.15							170							
Trichlorobenzenes (Sum)	346.5															
Xylene (Total)	560.8	0.01														
Semivolatile Organic Compound	µg/kg															
Dibenzofuran	372.0															
Hexachlorobenzene	16.4	0.48				2.86			0.04		0.19					
Phenol	45.0					11.27			1.5	26.67						
Naphthalene	917.4	0.19							10.9		0.21					
Acenaphthene	860.7															
Fluorene	264.3															
Phenanthrene	542.7	1.01		0.10		0.02							0.06			
Anthracene	206.7	1.31		0.00									0.05			
Pyrene	343.8	3.78		0.43		0.38	0.19			0.38	0.29		0.35			0.20
Benz(a)anthracene	191.5	3.55		0.54		0.32	0.23						0.18			
Chrysene	253.2	3.71		0.38		0.37	0.18						0.14			
Benzo(b)fluoranthene	908.4	0.90		0.08		0.07							0.03			
Benzo(a)pyrene	146.4	5.53											1.84			0.40
Indeno(1,2,3-cd)pyrene	182.9	3.17				0.06							0.10			
Dibenz(a,h)anthracene	157.2	1.40											0.05			

Table 10-3. (cont.)

Chemical	Consensus															
	PECs	S355	S356	S357	S358	S360	S361	S362	S363	S364	S365	S366	S367	S368	S369	S370
Benzo(g,h,i)perylene	779.7	0.90				0.07							0.03			
Acenaphthylene	1,300.7	0.12														
Benzo(k)fluoranthene	202.5	3.26		0.36		0.34							0.14			
Fluoranthene	1,436.3	0.97		0.11		0.11	0.04						0.08			0.05
Pesticides/Polychlorinated Biphe	µg/kg															
Chlordane (Sum)	5.1													0.35		
DDT and metabolites	29.6	0.18				0.07		0.06			0.12			0.10		0.04
Aroclor-1248	203.7															
Aroclor-1254	76.1	0.98				0.38			0.20		0.64		0.02			
Aroclor-1260	163.6	0.21				0.03		0.48	0.11		0.57		0.25	0.10		
PCBs (Sum)	294.8	0.71				0.70		0.36	0.17		0.48		0.23	0.13		
Exceedances		21	2	2	0	7	0	0	9	4	9	1	3	1	1	1
Total Hazard Index		56	2	2	0	21	0	0	199	32	20	2	4	1	2	1

Table 10-3. (cont.)

Chemical	Consensus															
	PECs	S371	S359	S372	S373	S374	S400	S401	S402	S403	S404	S405	S406	S407	S434	S435
Metals	mg/kg															
Antimony	3.6			0.11	0.10	0.17										
Arsenic	2.4	0.59	2.22	0.36	0.81	0.31									0.26	4.15
Cadmium	2.4	0.93	0.03	1.56	1.53	0.26										0.10
Chromium	50.3	0.71	0.23	1.62	1.05	0.38									0.53	3.16
Copper	32.9	0.83	0.45	1.04	0.86	0.30									0.14	1.72
Lead	34.5	0.53	0.50	0.37	0.94	0.13									0.11	1.12
Manganese	278.3	0.94	1.10	1.21	0.77	0.97									0.54	0.56
Mercury	2.2	0.22	0.86	0.73	0.37	0.15	0.12	2.74	0.74	0.44	11.28	5.44	27.92	4.24	0.03	0.08
Nickel	16.4	0.58	0.77	0.46	0.82	0.29									0.56	4.43
Selenium	0.6		1.28	1.66	2.20	2.76									2.07	9.32
Silver	1.3	0.27		0.45	0.84											1.33
Vanadium	5.6	1.59	2.19	0.32	1.30	0.54									0.77	4.07
Zinc	88.2	1.16	0.59	0.95	1.55	0.47									0.28	0.57
Volatile Organic Compounds	µg/kg															
Benzene	150.4														0.03	200
Chlorobenzene	428.4														0.01	6.77
Dichlorobenzenes (Sum)	238.6															
Ethylbenzene	175.7														0.01	404
Toluene	41.8															165
Trichlorobenzenes (Sum)	346.5															
Xylene (Total)	560.8															588
Semivolatile Organic Compound	µg/kg															
Dibenzofuran	372.0															
Hexachlorobenzene	16.4	0.24	0.61													
Phenol	45.0															
Naphthalene	917.4															28,340
Acenaphthene	860.7															
Fluorene	264.3															
Phenanthrene	542.7	0.55	0.83		0.14										0.13	1,161
Anthracene	206.7	0.43	0.45													
Pyrene	343.8	1.57	1.40		0.70										0.67	
Benz(a)anthracene	191.5	1.51	1.20		0.54										0.68	
Chrysene	253.2	1.26	1.07		0.51										0.59	
Benzo(b)fluoranthene	908.4	0.32	0.19		0.13										0.15	
Benzo(a)pyrene	146.4	2.32	1.37		0.46										0.75	
Indeno(1,2,3-cd)pyrene	182.9	1.09	0.55		0.45										0.53	
Dibenz(a,h)anthracene	157.2															

Table 10-3. (cont.)

Chemical	Consensus	S371	S359	S372	S373	S374	S400	S401	S402	S403	S404	S405	S406	S407	S434	S435
	PECs															
Benzo(g,h,i)perylene	779.7	0.28	0.14		0.11										0.14	
Acenaphthylene	1,300.7															
Benzo(k)fluoranthene	202.5	1.58	0.84		0.56										0.64	
Fluoranthene	1,436.3	0.44	0.42		0.17										0.12	
Pesticides/Polychlorinated Biphe	µg/kg															
Chlordane (Sum)	5.1															
DDT and metabolites	29.6		0.04	0.04												0.10
Aroclor-1248	203.7															
Aroclor-1254	76.1	0.26	0.49		0.31		0.16	5.19		2.24		6.03	2.17	2.07	0.17	
Aroclor-1260	163.6	0.12			0.10		0.02	1.00		0.08		1.03	0.79	0.71		0.10
PCBs (Sum)	294.8	0.13	0.22		0.22		0.08	4.33	1.14	3.86	8.73	4.28	9.91	1.61	0.12	0.45
Exceedances		8	8	5	5	1	0	4	1	2	2	4	3	3	1	15
Total Hazard Index		12	12	7	8	3	0	13	1	6	20	17	40	8	2	30,895

^a Consensus PECs could not be determined for heptachlor and heptachlor epoxide.

^b A ratio >1.0 indicates that the observed COC concentration exceeded the PEC for that chemical. Exceedances are bolded.

^c Sediments at Stations 400 to 407 (benthic chemistry locations) were analyzed for only mercury, methylmercury, and PCBs.

Table 10-4. Hazard Quotients for Measured Fish Concentrations

COC	Bluegill		Bluegill		Gizzard Shad		Gizzard Shad		Gizzard Shad	
	95%UCL HQ	95%UCL HQ	Bluegill Mean	Bluegill Mean	95%UCL HQ	95%UCL HQ	Mean HQ	Mean HQ	Mean HQ	Mean HQ
	NOAEL	LOAEL	HQ NOAEL	HQ LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Antimony	0**	0**	0**	0**	0*	0*	0*	0*	0*	0*
Arsenic	1.4	0.5	0.7	0.3	0*	0*	0*	0*	0*	0*
Chromium	61	18	16	4.6	0*	0*	0*	0*	0*	0*
Mercury	5.4	1.8	2.7	0.9	0*	0*	0*	0*	0*	0*
Methylmercury	3.5	1.2	2.8	0.9	2.3	0.8	2.1	0.7	0.7	0.7
Selenium	15	1.5	9.2	0.9	0*	0*	0*	0*	0*	0*
Vanadium	29	2.9	20	2.0	0*	0*	0*	0*	0*	0*
Zinc	3.2	2.7	2.1	1.8	0*	0*	0*	0*	0*	0*
Endrin	0.2	2.3E-02	0.1	1.5E-02	0*	0*	0*	0*	0*	0*
DDT and metabolites	4.7E-02	9.7E-03	3.9E-02	8.0E-03	0*	0*	0*	0*	0*	0*
Polychlorinated biphenyls	0.5	0.1	0.3	0.1	0*	0*	0*	0*	0*	0*
Dioxin/furan TEQ (Fish)	0.4	0.2	0.1	0.1	0*	0*	0*	0*	0*	0*

Table 10-4. (cont.)

CoC	Carp		Carp		Catfish		Catfish	
	95%UCL NOAEL	HQ LOAEL	95%UCL NOAEL	HQ LOAEL	95%UCL NOAEL	HQ LOAEL	Catfish Mean HQ NOAEL	Catfish Mean HQ LOAEL
Antimony	0**	0**	0**	0**	0.4	0.2	6.3E-02	3.5E-02
Arsenic	4.0	1.5	1.7	0.6	0**	0**	0**	0**
Chromium	21	6.2	7.2	2.1	5.7	1.7	3.1	0.9
Mercury	4.3	1.4	3.5	1.2	6.3	2.1	4.9	1.6
Methylmercury	4.8	1.6	3.9	1.3	7.8	2.6	7.1	2.4
Selenium	20	2.0	10	1.0	13	1.3	7.6	0.8
Vanadium	24	2.4	13	1.3	27	2.7	20	2.0
Zinc	13	11	6.1	5.2	2.2	1.8	1.2	1.0
Endrin	1.0	0.1	0.5	0.0	0.8	0.1	0.5	0.0
DDT and metabolites	0.4	0.1	0.3	0.1	0.6	0.1	0.3	0.1
Polychlorinated biphenyls	2.5	0.5	1.6	0.3	2.1	0.4	1.5	0.3
Dioxin/furan TEQ (Fish)	2.6	1.2	1.0	0.5	0.6	0.3	0.4	0.2

Table 10-4. (cont.)

CoC	White Perch	White Perch	White Perch	White Perch	SMB	SMB	SMB Mean HQ (NOAEL)	SMB Mean HQ (LOAEL)
	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL	95%UCL HQ NOAEL	95%UCL HQ LOAEL		
Antimony	0.4	0.2	0.4	0.2	0**	0**	0**	0**
Arsenic	0**	0**	0**	0**	3.6	1.4	2.4	0.9
Chromium	2.5	0.7	2.5	0.7	3.2	0.9	2.3	0.7
Mercury	7.7	2.6	7.0	2.3	7.3	2.4	7.0	2.3
Methylmercury	12	4.1	11	3.6	8.2	2.7	7.2	2.4
Selenium	7.8	0.8	7.8	0.8	10	1.0	4.8	0.5
Vanadium	0**	0**	0**	0**	20	2.0	11	1.1
Zinc	0.5	0.4	0.5	0.4	1.6	1.4	1.1	0.9
Endrin	0.1	1.4E-02	0.1	1.2E-02	0.2	1.7E-02	0.2	1.6E-02
DDT and metabolites	0.2	3.5E-02	0.1	1.3E-02	0.1	2.1E-02	0.1	1.5E-02
Polychlorinated biphenyls	1.3	0.3	1.1	0.2	1.0	0.2	0.9	0.2
Dioxin/furan TEQ (Fish)	0.5	0.3	0.4	0.2	0.5	0.2	0.3	0.1

Table 10-4. (cont.)

CoC	LMB	LMB	LMB Mean HQ	LMB Mean HQ	Walleye	Walleye	Walleye Mean HQ	Walleye Mean HQ
	95%UCL NOAEL	95%UCL LOAEL			95%UCL NOAEL	95%UCL LOAEL		
Antimony	NA	NA	NA	NA	0**	0**	0**	0**
Arsenic	0*	0*	0*	0*	0**	0**	0**	0**
Chromium	0*	0*	0*	0*	3.2	0.9	3.2	0.9
Mercury	6.9	2.3	6.6	2.2	15	5.2	14	4.6
Methylmercury	0*	0*	0*	0*	18	6.1	15	5.1
Selenium	0*	0*	0*	0*	0**	0**	0**	0**
Vanadium	0*	0*	0*	0*	0**	0**	0**	0**
Zinc	0*	0*	0*	0*	0**	0**	0**	0**
Endrin	0**	0**	0**	0**	0.3	2.7E-02	0.1	1.3E-02
DDT and metabolites	0.1	1.2E-02	2.9E-02	6.1E-03	0.2	3.6E-02	0.1	2.1E-02
Polychlorinated biphenyls	0.7	0.1	0.4	0.1	2.8	0.6	1.5	0.3
Dioxin/furan TEQ (Fish)	1.4	0.7	0.9	0.4	0*	0*	0*	0*

Notes:

- * denotes not analyzed
- ** denotes all non-detects
- Hazard quotients equal to or greater than one are outlined and bolded.
- DDT – dichlorodiphenyltrichloroethane
- LMB – largemouth bass
- LOAEL – lowest-observed-adverse-effect level
- NOAEL – no-observed-adverse-effect level
- HQ – hazard quotient
- SMB – smallmouth bass
- TEQ – toxicity equivalence quotient
- UCL – upper confidence limit

Table 10-5. Hazard Quotients for Modeled Tree Swallow Exposure

COC	95% UCL HQ NOAEL	95% UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Metals				
Arsenic	0.1	4.4E-02	0.1	3.1E-02
Barium	10	5.1	8.3	4.1
Cadmium	7.0	0.5	4.6	0.3
Chromium	53	11	57	11
Copper	0.8	0.6	0.6	0.5
Lead	1.8	0.2	1.3	0.1
Methylmercury	19	1.9	11	1.1
Mercury	6.5	3.3	3.1	1.5
Nickel	0.2	0.1	0.2	0.1
Selenium	6.8	3.4	5.4	2.7
Thallium	NA	NA	NA	NA
Vanadium	0.1	1.1E-02	0.1	7.9E-03
Zinc	6.4	0.7	5.6	0.6
Volatile Organic Compounds				
Xylenes	NA	NA	NA	NA
Dichlorobenzenes	3.0	0.3	1.4	0.1
Trichlorobenzenes	NA	NA	NA	NA
Semivolatile Organic Compounds				
Bis(2-ethylhexyl)phthalate	0.7	0.1	0.6	0.1
Total polycyclic aromatic hydrocarbons	287	29	292	29
Pesticides/Polychlorinated Biphenyls				
DDT and metabolites	0.8	0.1	0.6	0.1
Total polychlorinated biphenyls	1.9	0.2	1.8	0.2
Dioxins/Furans				
Dioxins/furans (TEQ) avian	5.6	0.6	1.3	0.1

Note: Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 10-6. Hazard Quotients for Modeled Mallard Exposure

COC	95% UCL HQ NOAEL	95% UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Metals				
Barium	2.4	1.2	1.8	0.9
Cadmium	1.0	0.1	0.7	4.7E-02
Chromium	10	2.1	9.7	1.9
Copper	0.2	0.1	0.1	0.1
Methylmercury	4.3	0.4	2.7	0.3
Mercury	0.9	0.4	0.7	0.3
Nickel	3.9E-02	2.8E-02	3.7E-02	2.7E-02
Vanadium	2.6E-02	2.6E-03	1.5E-02	1.5E-03
Zinc	1.2	0.1	1.0	0.1
Volatile Organic Compounds				
Xylenes	NA	NA	NA	NA
Dichlorobenzenes	2.1	0.2	0.3	3.3E-02
Trichlorobenzenes	NA	NA	NA	NA
Organic Compounds				
Total polycyclic aromatic hydrocarbons	393	39	118	12
Pesticides/Polychlorinated Biphenyls				
Total polychlorinated biphenyls	0.4	3.9E-02	0.3	3.0E-02
Dioxins/Furans				
Dioxins/furans (TEQ) avian	1.4	0.1	0.3	3.1E-02

Note:

Hazard quotients equal to or greater than one are outlined and bolded.

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 10-7. Hazard Quotients for Modeled Belted Kingfisher Exposure

COC	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Chromium	0.2	3.8E-02	0.2	3.6E-02
Lead	0.1	1.4E-02	0.1	8.7E-03
Methylmercury	23	2.3	20	2.0
Mercury	0.7	0.3	0.6	0.3
Selenium	3.9E-03	2.0E-03	3.1E-03	1.5E-03
Zinc	1.0E-02	1.1E-03	8.6E-03	9.5E-04
Organic Compounds				
Total polycyclic aromatic hydrocarbons	12	1.2	3.7	0.4
Pesticides/Polychlorinated Biphenyls				
Endrin	2.9E-04	2.9E-05	2.4E-04	2.4E-05
Hexachlorocyclohexanes	2.2E-05	7.2E-06	2.0E-05	6.3E-06
DDT and metabolites	19	1.9	12	1.2
Total polychlorinated biphenyls	11	1.1	3.1	0.3
Dioxins/Furans				
Dioxins/furans (TEQ) avian	1.8	0.2	1.4	0.1

Note:

Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 10-8. Hazard Quotients for Modeled Great Blue Heron Exposure

COC	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Chromium	0.1	2.7E-02	0.1	2.5E-02
Methylmercury	18	1.8	15	1.5
Mercury	0.3	0.1	0.3	0.1
Selenium	0.5	0.2	0.4	0.2
Zinc	1.1	0.1	0.8	0.1
Organic Compounds				
Total polycyclic aromatic hydrocarbons	4.0	0.4	1.2	0.1
Pesticides/Polychlorinated Biphenyls				
Hexachlorocyclohexanes	1.0E-02	3.3E-03	0.2	0.1
DDT and metabolites	8.0	0.8	5.3	0.5
Total polychlorinated biphenyls	2.7	0.3	1.4	0.1

Note:

Hazard quotients equal to or greater than one are outlined and bolded.

DDT – dichlorodiphenyltrichloroethane

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

UCL – upper confidence limit

Table 10-9. Hazard Quotients for Modeled Osprey Exposure

COC	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Chromium	0.1	2.1E-02	0.1	1.9E-02
Methylmercury	24	2.4	20	2.0
Mercury	0.3	0.2	0.3	0.2
Selenium	0.7	0.4	0.5	0.3
Zinc	1.6	0.2	1.2	0.1
Pesticides/Polychlorinated Biphenyls				
Hexachlorocyclohexanes	1.5E-02	4.8E-03	0.3	0.1
DDT and metabolites	9.3	0.9	6.3	0.6
Total polychlorinated biphenyls	2.5	0.3	0.2	2.5E-02
Dioxins/Furans				
Dioxins/furans (TEQ) avian	0.6	5.6E-02	0.4	4.3E-02

Note:

- Hazard quotients equal to or greater than one are outlined and bolded.
- DDT – dichlorodiphenyltrichloroethane
- LOAEL – lowest-observed-adverse-effect level
- NOAEL – no-observed-adverse-effect level
- HQ – hazard quotient
- TEQ – toxicity equivalence quotient
- UCL – upper confidence limit

Table 10-10. Hazard Quotients for Modeled Red-Tailed Hawk Exposure

COC	95% UCL HQ NOAEL	95% UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Chromium	0.2	4.7E-02	0.2	3.4E-02
Lead	0.4	4.2E-02	0.3	3.0E-02
Methylmercury	0.3	2.7E-02	7.2E-02	7.2E-03
Mercury	0.1	7.1E-02	2.6E-02	1.3E-02
Organic Compounds				
Total polycyclic aromatic hydrocarbons	252	25	14	1.4
Pesticides				
DDT and metabolites	1.5	0.2	0.3	3.3E-02
Dioxins/Furans				
Dioxins/furans (TEQ) avian	9.9	0.99	1.01	0.1

Notes:

1. All state wetlands (i.e., SYW- 6, 10, 12, and 19) surrounding Onondaga Lake and the dredge spoils area were included in soil pathway calculations.
 2. Hazard quotients equal to or greater than one are outlined and bolded.
- DDT – dichlorodiphenyltrichloroethane
 LOAEL – lowest-observed-adverse-effect level
 NOAEL – no-observed-adverse-effect level
 HQ – hazard quotient
 TEQ – toxicity equivalence quotient
 UCL – upper confidence limit

Table 10-11. Hazard Quotients for Modeled Little Brown Bat Exposure

COC	95% UCL HQ NOAEL	95% UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Antimony	0.2	2.0E-02	0.2	1.6E-02
Arsenic	1.1	0.1	0.8	0.1
Barium	2.1	1.3	1.7	1.0
Cadmium	4.5	0.5	3.0	0.3
Chromium	7.2	1.8	7.8	1.9
Cobalt	0.4	3.9E-02	0.3	3.4E-02
Copper	1.4	1.1	1.1	0.9
Lead	0.1	1.2E-02	0.1	8.8E-03
Manganese	3.8E-02	1.2E-02	3.5E-02	1.1E-02
Methylmercury	21	2.1	13	1.3
Mercury	1.3	0.1	0.6	0.1
Nickel	0.1	0.1	0.2	0.1
Selenium	0.2	0.1	0.2	0.1
Thallium	0.1	7.9E-03	0.1	7.1E-03
Vanadium	2.7	0.3	1.9	0.2
Zinc	0.3	0.1	0.2	0.1
Volatile Organic Compounds				
Trichlorobenzenes	2.8E-02	7.8E-03	0.1	1.7E-02
Xylenes	2.3	1.9	0.5	0.4
Semivolatile Organic Compounds				
Hexachlorobenzene	6.0	0.6	4.6	0.5
Total polycyclic aromatic hydrocarbons	18	1.8	19	1.9
Pesticides/Polychlorinated Biphenyls				
Dieldrin	0.6	0.3	0.5	0.2
Total polychlorinated biphenyls	0.4	0.1	0.4	0.1
Dioxins/Furans				
Dioxins/furans (TEQ) mammalian	11	1.1	2.9	0.3

Note:

Hazard quotients equal to or greater than one are outlined and bolded.

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 10-12. Hazard Quotients for Modeled Short-Tailed Shrew Exposure

COC	SYW-6	SYW-6	SYW-6	SYW-6	SYW-10	SYW-10	SYW-10	SYW-10
	95%UCL Hazard Quotient NOAEL	95%UCL Hazard Quotient LOAEL	Mean Hazard Quotient NOAEL	Mean Hazard Quotient LOAEL	95%UCL Hazard Quotient NOAEL	95%UCL Hazard Quotient LOAEL	Mean Hazard Quotient NOAEL	Mean Hazard Quotient LOAEL
Total Metals								
Antimony	0.4	3.6E-02	0.1	9.5E-03	8.3E-02	8.3E-03	4.5E-02	4.5E-03
Arsenic	2.0	0.2	1.1	0.1	5.3	0.5	2.3	0.2
Barium	0.1	0.1	0.1	0.1	0.1	7.3E-02	0.1	4.9E-02
Cadmium	11	1.1	3.5	0.4	1.2	0.1	0.7	0.1
Chromium	1.0	0.2	0.3	0.1	0.3	0.1	0.2	4.3E-02
Lead	1.5	0.1	0.7	0.1	1.0	0.1	0.6	0.1
Methylmercury	22	2.2	19	1.9	22	2.2	20	2.0
Mercury	0.2	1.9E-02	0.1	1.1E-02	0.2	1.7E-02	0.1	1.3E-02
Selenium	1.7	1.0	0.6	0.4	1.3	0.8	0.7	0.4
Thallium	2.6	0.3	1.4	0.1	4.3	0.4	2.8	0.3
Vanadium	2.9	0.3	1.8	0.2	3.9	0.4	2.0	0.2
Zinc	0.7	0.4	0.5	0.2	0.4	0.2	0.4	0.2
Volatile Organic Compounds								
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06	5.8E-06	1.6E-06	5.6E-06	1.6E-06
Semivolatile Organic Compounds								
Hexachlorobenzene	ND	ND	ND	ND	2.0	0.2	1.5	0.1
Total polycyclic aromatic hydrocarbon	213	21	47	4.7	155	15.5	38	3.8
Pesticides/Polychlorinated Biphenyls								
Chlordane	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND
Total polychlorinated biphenyls	3.9E-02	9.7E-03	2.8E-02	6.9E-03	0.1	3.5E-02	5.9E-02	1.5E-02
Dioxins/Furans								
Dioxins/furans (TEQ)	15	1.5	5.9	0.6	4.4	0.4	3.6	0.4

Table 10-12. (cont.)

	SYW-12 95%UCL Hazard Quotient NOAEL	SYW-12 95%UCL Hazard Quotient LOAEL	SYW-12 Mean Hazard Quotient NOAEL	SYW-12 Mean Hazard Quotient LOAEL	SYW-19 95%UCL Hazard Quotient NOAEL	SYW-19 95%UCL Hazard Quotient LOAEL	SYW-19 Mean Hazard Quotient NOAEL	SYW-19 Mean Hazard Quotient LOAEL
COC								
Total Metals								
Antimony	0.1	9.5E-03	4.7E-02	4.7E-03	0.2	1.8E-02	0.1	1.0E-02
Arsenic	1.4	0.1	0.99	9.9E-02	2.8	0.3	2.3	0.2
Barium	0.1	0.1	0.1	4.6E-02	0.3	0.2	0.2	0.1
Cadmium	7.5	0.8	5.0	0.5	2.5	0.3	1.6	0.2
Chromium	0.7	0.2	0.4	0.1	0.3	0.1	0.3	0.1
Lead	1.0	0.1	0.7	0.1	2.1	0.2	1.0	0.1
Methylmercury	19	1.9	19	1.9	29	2.9	27	2.7
Mercury	0.1	1.2E-02	9.4E-02	9.4E-03	0.6	6.3E-02	0.4	4.1E-02
Selenium	0.7	0.5	0.4	0.3	1.2	0.8	1.1	0.7
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	2.0	0.2	1.1	0.1	1.7	0.2	1.6	0.2
Zinc	0.5	0.3	0.5	0.2	0.4	0.2	0.4	0.2
Volatile Organic Compounds								
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06	3.4	0.9	1.2	0.3
Semivolatile Organic Compounds								
Hexachlorobenzene	1.8	0.2	0.5	4.9E-02	783	78	241	24
Total polycyclic aromatic hydrocarbon	191	19	61	6.1	2,565	256	794	79
Pesticides/Polychlorinated Biphenyls								
Chlordane	0.1	2.6E-02	0.1	1.3E-02	0.6	0.1	0.2	4.2E-02
Dieldrin	1.1	0.6	0.6	0.3	7.3	3.7	5.0	2.5
Total polychlorinated biphenyls	0.4	0.1	0.2	0.1	1.8	0.5	1.4	0.4
Dioxins/Furans								
Dioxins/furans (TEQ)	NA	NA	NA	NA	1,706	171	681	68

Table 10-12. (cont.)

COC	Dredge Spoils 95%UCL HQ NOAEL	Dredge Spoils 95%UCL HQ LOAEL	Dredge Spoils Mean HQ NOAEL	Dredge Spoils Mean HQ LOAEL
Total Metals				
Antimony	0.1	6.5E-03	4.9E-02	4.9E-03
Arsenic	2.7	0.3	1.9	0.2
Barium	6.0E-02	3.6E-02	5.6E-02	3.3E-02
Cadmium	1.7E-04	1.7E-05	1.7E-04	1.7E-05
Chromium	0.2	4.6E-02	0.1	2.7E-02
Lead	0.2	1.7E-02	0.1	1.4E-02
Methylmercury	0.1	6.8E-03	5.E-02	5.E-03
Mercury	0.2	1.8E-02	9.E-02	9.E-03
Selenium	1.1	0.7	0.8	0.5
Thallium	ND	ND	ND	ND
Vanadium	3.7	0.4	2.4	0.2
Zinc	0.3	0.2	0.3	0.1
Volatile Organic Compounds				
Trichlorobenzenes	5.8E-06	1.6E-06	5.6E-06	1.6E-06
Semivolatile Organic Compounds				
Hexachlorobenzene	38	3.8	4.6	0.5
Total polycyclic aromatic hydrocarbon	9.0	0.9	2.0	0.2
Pesticides/Polychlorinated Biphenyls				
Chlordane	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA
Total polychlorinated biphenyls	3.4E-02	8.6E-03	1.7E-02	4.3E-03
Dioxins/Furans				
Dioxins/furans (TEQ)	0.7	0.1	0.4	4.2E-02

Notes:

NA = Not available

ND = Not detected

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

Hazard quotients equal to or greater than one are outlined and b

HQ – hazard quotient

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 10-13. Hazard Quotients for Modeled Mink Exposure

COC	95%UCL HQ NOAEL	95%UCL HQ LOAEL	Mean HQ NOAEL	Mean HQ LOAEL
Total Metals				
Arsenic	0.2	1.7E-02	0.1	1.1E-02
Chromium	0.7	0.2	0.6	0.2
Methylmercury	12	1.2	9.4	0.9
Mercury	0.1	1.4E-02	0.1	9.9E-03
Selenium	0.1	8.2E-02	0.1	7.1E-02
Vanadium	0.3	2.8E-02	0.7	6.7E-02
Organic Compounds				
Hexachlorobenzene	9.2	0.9	1.1	0.1
Total polycyclic aromatic hydrocarbons	33	3.3	4.5	0.4
Pesticides/Polychlorinated Biphenyls				
DDT and metabolites	1.5E-02	2.9E-03	7.5E-03	1.5E-03
Dieldrin	0.2	0.1	0.1	0.1
Total polychlorinated biphenyls	109	11	34	3.4
Dioxins/Furans				
Dioxins/furans (TEQ) mammalian	42	4.2	4.9	0.5

Notes:

1. All State wetlands surrounding Onondaga Lake and the dredge spoils area were included in soil pathway calculations.
 2. Hazard quotients equal to or greater than one are outlined and bolded.
- DDT – dichlorodiphenyltrichloroethane
 HQ – hazard quotient
 LOAEL – lowest-observed-adverse-effect level
 NOAEL – no-observed-adverse-effect level
 TEQ – toxicity equivalence quotient
 UCL – upper confidence limit

Table 10-14. Hazard Quotients for Modeled River Otter Exposure

COC	95%UCL HQ	95%UCL HQ	Mean HQ	Mean HQ
	NOAEL	LOAEL	NOAEL	LOAEL
Total Metals				
Arsenic	0.8	0.1	0.5	0.1
Chromium	0.3	0.1	0.3	0.1
Methylmercury	43	4.3	36	3.6
Mercury	0.1	1.5E-02	0.1	1.4E-02
Selenium	0.9	0.5	0.7	0.4
Vanadium	0.8	0.1	0.6	0.1
Organic Compounds				
Total polycyclic aromatic hydrocarbons	5.2	0.5	1.6	0.2
Pesticides/Polychlorinated Biphenyls				
DDT and metabolites	5.9	1.2	2.3	4.5E-01
Total polychlorinated biphenyls	130	13	69	6.9
Dioxins/Furans				
Dioxins/furans (TEQ) mammalian	2.8	0.3	1.5	0.2

Notes:

- Hazard quotients equal to or greater than one are outlined and bolded.
- DDT – dichlorodiphenyltrichloroethane
- HQ – hazard quotient
- LOAEL – lowest-observed-adverse-effect level
- NOAEL – no-observed-adverse-effect level
- TEQ – toxicity equivalence quotient
- UCL – upper confidence limit

Table 11-1. Ratios of Onondaga Lake Surface Water COCs to Reference Location Concentrations

COC	Units	Reference UCL (max)	Reference Mean	Lake 95% UCL	Lake Mean	UCL Ratio Lake:Reference	Mean Ratio
Barium*	µg/L	73	56	68	67	0.9	1.2
Copper	µg/L	4.8	2.7	11	9.1	2.3	3.3
Lead	µg/L	1.5	1.0	6.9	6.4	4.6	6.6
Manganese	µg/L	50	36	112	65	2.3	1.8
Mercury-dissolved	ng/L-dis	ND	ND	2.7	2.3	ND BKGD	ND BKGD
Mercury-total	ng/L	6.4	3.4	36	29	5.7	8.7
Methylmercury-dissolved	ng/L-dis	3.8E-02	2.9E-02	0.6	0.4	17	14
Zinc	µg/L	ND	ND	65	45	ND BKGD	ND BKGD
Chlorobenzene	µg/L	ND	ND	0.6	0.6	ND BKGD	ND BKGD
Dichlorobenzene (Sum)	µg/L-dis	ND	ND	1.3	1.7	ND BKGD	ND BKGD
Trichlorobenzenes (Sum)	µg/L-dis	ND	ND	0.6	0.6	ND BKGD	ND BKGD
Bis(2-ethylhexyl)phthalate*	µg/L-dis	ND	ND	10	6.0	ND BKGD	ND BKGD

Notes:

ND - not detected

ND BKGD- not detected in background samples and therefore no ratio could be calculated.

Reference locations used as background samples consist of Stations NM2 and GB2 from 1998 Geddes Brook/Ninemile Creek RI sampling.

* Barium and BEHP samples are taken from 6 m depth since no 1 m depth samples were available.

All other COC concentrations are based on 1 m depth samples.

UCL – upper confidence limit

Table 11-2. Surface Sediment Concentrations in Onondaga Lake and Reference Locations

COC	Onon Lake 1-	Onon Lake 1-	Onon Lake 9-	Onon Lake 9-	Upper	Upper	Otisco Lake	Otisco Lake
	m contour 95%UCL	m contour Mean	m contour 95%UCL	m contour Mean	GB/NMC 95%UCL	GB/NMC Mean	95%UCL	Mean
Metals (mg/kg)								
Antimony	1.5	1.1	1.3	1.0	ND	ND	0.8	0.8
Arsenic	8.4	5.2	7.6	5.4	4.7	4.0	7.7	4.1
Barium	405	320	392	330	82	66	189	102
Cadmium	2.2	1.4	3.3	2.2	ND	ND	0.7	0.2
Chromium	139	130	158	169	32	23	24	11
Copper	66	48	66	53	34	28	158	73
Lead	116	74	98	72	50	40	32	16
Manganese	313	287	342	318	355	296	1180	686
Mercury	11	5.4	12	7.1	0.8	0.3	0.2	0.1
Methylmercury (µg/kg)	29	7.9	30	94	2.1	0.8	1.4	0.9
Nickel	52	49	53	60	19	17	23	15
Selenium	1.1	0.9	1.2	1.0	ND	ND	3.2	0.8
Silver	0.8	0.6	1.4	0.9	ND	ND	ND	ND
Vanadium	23	14	30	21	17	17	24	11
Zinc	102	87	123	107	103	89	84	52
Volatile Organic Compounds (µg/kg)								
Benzene	11,776	1,645	2,289	1,068	ND	ND	ND	ND
Chlorobenzene	476,553	18,775	67,689	13,473	ND	ND	ND	ND
Dichlorobenzenes (Sum)	37,046	5,879	11,919	5,562	ND	ND	ND	ND
Ethylbenzene	7,831	1,466	1,587	979	ND	ND	ND	ND
Toluene	8,300	893	2,174	645	ND	ND	NA	NA
Trichlorobenzenes (Sum)	1,147	1,721	578	1,277	ND	ND	ND	ND
Total Xylenes	330,000	11,814	32,989	6,825	ND	ND	ND	ND
Semivolatile Organic Compounds (µg/kg)								
Dibenzofuran	3,354	3,806	1,599	2,767	73	194	ND	ND
Hexachlorobenzene	1,768	505	484	374	ND	ND	ND	ND
Phenol	1,326	2,362	911	1,780	ND	ND	ND	ND
Total PAHs	1,293,496	387,587	224,725	227,949	30,039	16,965	1,026	367

Table 11-2. (cont.)

COC	Onon Lake 1-	Onon Lake 1-	Onon Lake 9-	Onon Lake 9-	Upper	Upper	Otisco Lake	Otisco Lake
	m contour 95%UCL	m contour Mean	m contour 95%UCL	m contour Mean	GB/NMC 95%UCL	GB/NMC Mean	95%UCL	Mean
Pesticides/Polychlorinated Biphenyls (µg/kg)								
Chlordane (Sum)	2.8	3.2	3.1	3.3	2.8	2.2	1.2	1.8
DDT and metabolites (Sum)	12	8.3	11	7.9	ND	ND	13	4.7
Dieldrin	3.2	2.6	4.1	3.3	ND	ND	ND	ND
Heptachlor /Hept. epoxide	3.3	3.3	3.4	3.2	2.3	2.0	1.4	1.8
PCBs (Sum)	629	490	704	646	ND	ND	124	51
Dioxins/Furans (ng/kg)								
TEQ (1/2 DL) Avian	524	119	524	117	3.3	2.6	NA	NA
TEQ (1/2 DL) Mammalian	165	43	165	44	2.7	1.7	NA	NA

Notes:

ND = not detected

NA= not analyzed

DDT – dichlorodiphenyltrichloroethane

PAHs –polycyclic aromatic hydrocarbons

PCBs –polychlorinated biphenyls

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 11-3. Ratios of Onondaga Lake Sediment (0-15 cm) COC Concentrations to Reference Locations

COC	Lake 1 m: GB/NMC 95%UCL	Lake 1m: GB/NMC Mean	Lake 1m: Otisco 95%UCL	Lake 1m: Otisco Mean	Lake 9 m: GB/NMC 95%UCL	Lake 9m: GB/NMC Mean	Lake 9m: Otisco 95%UCL	Lake 9m: Otisco Mean
Metals								
Antimony	BKGD ND	BKGD ND	1.8	1.3	BKGD ND	BKGD ND	1.6	1.3
Arsenic	1.8	1.3	1.1	1.3	1.6	1.3	1.0	1.3
Barium	4.9	4.8	2.1	3.2	4.8	5.0	2.1	3.2
Cadmium	BKGD ND	BKGD ND	3.0	6.2	BKGD ND	BKGD ND	4.5	9.7
Chromium	4.3	5.6	5.8	12	4.9	7.3	6.6	15
Copper	2.0	1.7	0.4	0.7	2.0	1.9	0.4	0.7
Lead	2.3	1.9	3.6	4.5	2.0	1.8	3.0	4.4
Manganese	0.9	1.0	0.3	0.4	1.0	1.1	0.3	0.5
Mercury	13	18	48	68	14	24	54	90
Methylmercury	14	10	21	9.2	15	126	22	110
Nickel	2.7	2.9	2.2	3.4	2.8	3.5	2.3	4.1
Selenium	BKGD ND	BKGD ND	0.4	1.1	BKGD ND	BKGD ND	0.4	1.2
Silver	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Vanadium	1.3	0.8	1.0	1.3	1.3	0.8	1.3	2.0
Zinc	1.0	1.0	1.2	1.7	1.2	1.2	1.5	2.1
Volatile Organic Compounds								
Benzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Chlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Dichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Ethylbenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Toluene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Trichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total Xylenes	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Semivolatile Organic Compounds								
Dibenzofuran	46	20	BKGD ND	BKGD ND	22	14	BKGD ND	BKGD ND
Hexachlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Phenol	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total PAHs	43	23	1261	1056	7.5	13	219	621

Table 11-3. (cont.)

COC	Lake 1 m:	Lake 1m:	Lake 1m:		Lake 9 m:	Lake 9m:	Lake 9m:	Lake 9m:
	GB/NMC 95%UCL	GB/NMC Mean	Otisco 95%UCL	Lake 1m: Otisco Mean	GB/NMC 95%UCL	GB/NMC Mean	Otisco 95%UCL	Otisco Mean
Pesticides/Polychlorinated Biphenyls								
Chlordane (Sum)	1.0	1.5	2.4	1.8	1.1	1.5	2.7	1.9
DDT and metabolites (Sum)	BKGD ND	BKGD ND	0.9	1.8	BKGD ND	BKGD ND	0.9	1.7
Dieldrin	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Heptachlor and Heptachlor epoxide	1.4	1.7	2.4	1.8	1.5	1.6	2.4	1.8
PCBs (Sum)	BKGD ND	BKGD ND	5.1	9.6	BKGD ND	BKGD ND	5.7	12.7
Dioxins/Furans								
TEQ (1/2 DL) Avian	157	46	BKGD NA	BKGD NA	157	46	BKGD NA	BKGD NA
TEQ (1/2 DL) Mammalian	61	25	BKGD NA	BKGD NA	61	26	BKGD NA	BKGD NA

Notes:

BKGD ND- Not detected in reference station samples.

BKGD NA- Not analyzed in reference station samples.

Reference stations serving as background sites are NM2, GB2, TN-17, and TN-18 from the Geddes Brook/Ninemile Creek 1998/2001 RI sampling and Otisco Lake 1992 and 2000 sampling.

DDT – dichlorodiphenyltrichloroethane

PAHs –polycyclic aromatic hydrocarbons

PCBs –polychlorinated biphenyls

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 11-4. Surface Soil Concentrations in Onondaga Lake, Reference Locations, and Background Literature

COC	Combined Soils 95%UCL	Combined Soils Mean	Dredge Spoils 95%UCL	Dredge Spoils Mean	SYW-6 95%UCL	SYW-6 Mean	SWY-10 95%UCL	SWY-10 Mean
Metals (mg/kg)								
Antimony	0.5	0.4	0.4	0.3	2.2	0.6	0.5	0.3
Arsenic	0.5	0.4	0.4	0.3	2.2	0.6	1	0.3
Barium	156	128	78	72	176	125	157	105
Cadmium	14	2.0	ND	ND	14	3	0.9	0.5
Chromium	51	39	29	17	154	49	47	27
Copper	57	42	24	17	120	46	49	35
Iron	12,973	11,443	17,100	13,808	24,000	10,170	21,600	13,223
Lead	106	60	14	11	175	72	115	59
Manganese	301	278	354	299	406	267	488	344
Mercury	18	3.0	4.0	0.6	4.5	1.3	3.4	2.1
Methylmercury (µg/kg)	0.2	4.0E-02	NA	NA	4.5E-02	1.3E-02	3.4E-02	2.1E-02
Nickel	28	23	17	14	64	29	34	20
Selenium	0.8	0.4	ND	ND	1.4	0.5	ND	ND
Silver	1.2	0.9	1.4	1.0	2.5	0.8	1.8	0.7
Vanadium	16	14	29	19	22	13	31	16
Thallium	0.8	0.6	ND	ND	1.4	0.6	2.5	1.5
Zinc	159	118	50	39	510	181	119	97
Cyanide	0.8	0.6	ND	ND	1.4	0.6	2.5	1.5
Volatile Organic Compounds (µg/kg)								
Benzene	13	8.7	NA	NA	NA	NA	ND	ND
Chlorobenzene	600	69	NA	NA	NA	NA	ND	ND
Dichlorobenzenes (Sum)	4,518	1,400	51	24	ND	ND	ND	ND
Trichlorobenzenes (Sum)	1,229	512	ND	ND	ND	ND	ND	ND
Semivolatile Organic Compounds (µg/kg)								
Hexachlorobenzene	4,255	395	410	69	ND	ND	35	26
PAHs (Sum)	184,400	13,289	1,541	425	22,450	6,245	17,202	5,227
Phenol	519	254	ND	ND	n/a	328	ND	ND
Pesticides/Polychlorinated Biphenyls (µg/kg)								
Chlordane (sum)	17	4.7	NA	NA	ND	ND	ND	ND
DDT and metabolites	50	12	NA	NA	2.3	1.5	3.5	1.6
Hexachlorocyclohexanes	4.3	2.1	NA	NA	ND	ND	ND	ND
Aldrin	31	6.8	NA	NA	ND	ND	ND	ND
Dieldrin	22	5.3	NA	NA	ND	ND	ND	ND
PCBs (Sum)	17	5	56	33	ND	ND	ND	ND
Dioxins/Furans (ng/kg)								
TEQ (1/2 DL) Avian	2,168	275	2.9	1.8	34	15	25	17
TEQ (1/2 DL) Mammalian	1,086	128	1.4	0.9	20	8.8	6.9	5.8

Table 11-4. (cont.)

COC	SYW-12 95%UCL	SYW-12 Mean	SYW-19 95%UCL	SYW-19 Mean	Upper GB/NMC 95%UCL	Upper GB/NMC Mean	Background Mean
Metals (mg/kg)							
Antimony	0.6	0.3	1.1	0.6	ND	ND	ND
Arsenic	0.6	0.3	1.1	0.6	6.4	4.7	5.0
Barium	152	98	390	302	93	70	290
Cadmium	8.8	5.3	2.3	1.3	ND	ND	0.2
Chromium	115	66	55	43	36	22	33
Copper	88	49	167	85	83	42	13
Iron	11,800	8,763	11,750	10,478	23,300	17,267	14000
Lead	116	77	259	118	56	44	17
Manganese	284	239	303	233	581	433	345
Mercury	1.5	0.7	25	15	0.52	0.24	0.8
Methylmercury (µg/kg)	1.5E-02	1.1E-02	0.3	0.1	3.31	1.75	ND
Nickel	32	19	44	32	26	19	20
Selenium	2.7	1.2	1.3	0.5	ND	ND	0.8
Silver	0.9	0.4	1.7	1.4	ND	ND	0.01-8
Vanadium	16	9	13	12	20	17	43
Thallium	ND	ND	ND	ND	ND	ND	ND
Zinc	241	160	138	114	179	136	64
Cyanide	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (µg/kg)							
Benzene	NA	NA	60	18	ND	ND	ND
Chlorobenzene	2.0	2.8	600	199	ND	ND	ND
Dichlorobenzenes (Sum)	54	75	14,700	9,258	ND	ND	ND
Trichlorobenzenes (Sum)	ND	ND	6,550	2,838	ND	ND	ND
Semivolatile Organic Compounds (µg/kg)							
Hexachlorobenzene	31	10	5,355	1,972	ND	ND	ND
PAHs (Sum)	20,480	7,830	184,400	68,387	37,324	27,878	ND
Phenol	ND	ND	2,825	965	ND	ND	ND
Pesticides/Polychlorinated Biphenyls (µg/kg)							
Chlordane (sum)	8.5	4.7	30	13	3.1	1.8	ND
DDT and metabolites	9.7	6.8	56	39	14	6.4	ND
Hexachlorocyclohexanes	1.7	0.8	10	7	ND	ND	ND
Aldrin	ND	ND	45	24	ND	ND	ND
Dieldrin	5.0	2.8	24	17	ND	ND	ND
PCBs (Sum)	9	5	30	13	80	20	ND
Dioxins/Furans (ng/kg)							
TEQ (1/2 DL) Avian	NA	NA	2,168	1,066	3.4	2.6	ND
TEQ (1/2 DL) Mammalian	NA	NA	1,086	498	3.2	1.9	ND

Notes: ND-denotes Not Detected; NA- denotes Not Analyzed. DDT – dichlorodiphenyltrichloroethane PCBs –polychlorinated biphenyls
 GB/NMC reference sites include Stations NM2 and GB2. PAHs –polycyclic aromatic hydrocarbons TEQ – toxicity equivalence quotient
 Background means based on McGovern (no date) and Kabata-Pendias and Pendias (1984). UCL – upper confidence limit

Table 11-5. Ratios of Onondaga Lake Soil Concentrations to Geddes Brook/Ninemile Creek Reference Stations

COC	Combined Soils	Combined Soils	Dredge Spoils	Dredge Spoils	SYW-6	SYW-6
	95%UCL	Soils Mean	95%UCL	Spoils Mean	95%UCL	Mean
Metals						
Antimony	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Arsenic	1.0	1.0	1.3	1.1	0.9	0.6
Barium	1.7	1.8	0.8	1.0	1.9	1.8
Cadmium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Chromium	1.4	1.8	0.8	0.8	4.3	2.2
Copper	0.7	1.0	0.3	0.4	1.5	1.1
Iron	0.6	0.7	0.7	0.8	1.0	0.6
Lead	1.9	1.4	0.2	0.3	3.1	1.6
Manganese	0.5	0.6	0.6	0.7	0.7	0.6
Mercury	35.4	12.6	7.7	2.7	8.5	5.5
Methylmercury	NA	NA	NA	NA	NA	NA
Nickel	1.1	1.2	0.6	0.7	2.5	1.5
Selenium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Silver	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Vanadium	0.8	0.9	1.4	1.1	1.1	0.8
Thallium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Zinc	0.9	0.9	0.3	0.3	2.8	1.3
Cyanide	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Volatile Organic Compounds						
Benzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Chlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Dichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Trichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Semivolatile Organic Compounds						
Hexachlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total PAHs	4.9	0.5	4.1E-02	1.5E-02	0.6	0.2
Phenol	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Pesticides/Polychlorinated Biphenyls						
Chlordane (Sum)	5.4	2.6	NA	NA	ND	ND
DDT and metabolites	3.6	1.9	NA	NA	0.2	0.2
Hexachlorocyclohexanes	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Aldrin	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Dieldrin	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total PCBs	5.7	11	0.7	1.7	0.8	2.4
Dioxins/Furans (ng/kg)						
TEQ (1/2 DL) Avian	630	105	0.8	0.7	9.9	5.7
TEQ (1/2 DL) Mammalian	338	66	0.5	0.5	6.2	4.5

Table 11-5. (cont.)

COC	SYW-19 95%UCL	SYW-19 Mean	SYW-12 95%UCL	SYW-12 Mean	SYW-10 95%UCL	SYW-10 Mean
Metals						
Antimony	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Arsenic	1.3	1.5	0.6	0.5	2.9	1.5
Barium	4.2	4.3	1.6	1.4	1.7	1.5
Cadmium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Chromium	1.5	1.9	3.2	3.0	1.3	1.2
Copper	2.0	2.0	1.1	1.2	0.6	0.8
Iron	0.5	0.6	0.5	0.5	0.9	0.8
Lead	4.6	2.7	2.1	1.7	2.1	1.3
Manganese	0.5	0.5	0.5	0.6	0.8	0.8
Mercury	48	62	2.8	2.8	6.4	8.9
Methylmercury	NA	NA	NA	NA	NA	NA
Nickel	1.7	1.7	1.2	1.0	1.3	1.1
Selenium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Silver	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Vanadium	0.6	0.7	0.8	0.5	1.5	0.9
Thallium	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Zinc	0.8	0.8	1.3	1.2	0.7	0.7
Cyanide	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Volatile Organic Compounds						
Benzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Chlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Dichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Trichlorobenzenes (Sum)	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Semivolatile Organic Compounds						
Hexachlorobenzene	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total PAHs	4.9	2.5	0.5	0.3	0.5	0.2
Phenol	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Pesticides/Polychlorinated Biphenyls						
Chlordane (Sum)	9.6	7.1	2.7	2.6	ND	ND
DDT and metabolites	4.0	6.1	0.7	1.1	0.2	0.3
Hexachlorocyclohexanes	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Aldrin	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Dieldrin	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND	BKGD ND
Total PCBs	13	45	4.2	12	2.0	4.2
Dioxins/Furans (ng/kg)						
TEQ (1/2 DL) Avian	630	406	NA	NA	7.3	6.6
TEQ (1/2 DL) Mammalian	338	256	NA	NA	2.1	3.0

Notes: BKGD ND- Not detected in reference station samples.
Reference stations serving as background sites are NM2 and GB2 from the Geddes Brook/Ninemile Creek 1998 RI sampling.
PCBs –polychlorinated biphenyls
DDT – dichlorodiphenyltrichloroethane
TEQ – toxicity equivalence quotient
PAHs –polycyclic aromatic hydrocarbons
UCL – upper confidence limit

Table 11-6. Hazard Quotients of Reference Location Fish

COC		White Sucker	White Sucker	White Sucker	White Sucker	Creek Chub	Creek Chub	Tessellated	Tessellated
		95% UCL	95% UCL	Mean HQ	Mean HQ	Max	Max	Darter Max	Darter Max
		HQ NOAEL	HQ LOAEL	NOAEL	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Antimony	mg/kg-ww	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	mg/kg-ww	1.1	0.4	0.6	0.2	NA	NA	NA	NA
Chromium	mg/kg-ww	2.2	0.7	0.9	0.3	NA	NA	NA	NA
Mercury	mg/kg-ww	1.5E-01	7.5E-02	9.6E-02	4.8E-02	4.1E-02	2.0E-02	3.7E-02	1.9E-02
Methylmercury	mg/kg-ww	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	mg/kg-dw	2.2	0.218	1.1	0.11	NA	NA	NA	NA
Vanadium	mg/kg-ww	7.6	0.761	2.9	0.29	NA	NA	NA	NA
Zinc	mg/kg-ww	1.2	0.116	0.954	0.10	NA	NA	NA	NA
Endrin	mg/kg-ww	6.0E-02	6.0E-03	6.0E-02	6.0E-03	ND	ND	NA	NA
DDT and metabolites	mg/kg-ww	7.2E-03	1.5E-03	6.2E-03	1.3E-03	NA	NA	NA	NA
PCBs	mg/kg-ww	0.9	0.2	0.6	0.1	ND	ND	NA	NA
TEQ (1/2 DL) Fish	µg/kg-lipid	0.7	0.4	0.3	0.1	NA	NA	0.2	7.4E-02

Notes:

ND - not detected

NA- not analyzed

All samples are from Station NM2 in Ninemile Creek.

Sample sizes of reference fish:

White sucker n= 6

Creek chub n=1

Tessellated darter n=1.

DDT – dichlorodiphenyltrichloroethane

HQ – hazard quotient

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

PCBs –polychlorinated biphenyls

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 11-7. Ratios of Onondaga Lake Fish COC Concentrations to Reference Locations

COC	95%UCL	95%UCL	Mean Lake	Mean Lake	95%UCL	95%UCL
	Lake Carp:Bkgd WS	Lake Cfish:Bkgd WS	Carp:Bkgd WS	Cfish:Bkgd WS	Lake Bgill:Bkgd CChub	Lake Bgill:Bkgd TDarter
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	3.6	NA	2.8	NA	NA	NA
Chromium	9.5	8.7	7.6	20	NA	NA
Mercury	5.7	17	7.4	26	27	29
Methylmercury	NA	NA	NA	NA	NA	NA
Selenium	9.2	59	7.4	111	NA	NA
Vanadium	3.2	35	4.5	91	NA	NA
Zinc	17	29	10	35	NA	NA
Endrin	80	612	37	612	NA	NA
DDT and metabolites	50	386	46	449	NA	NA
Total PCBs	3.0	12	2.6	17	NA	NA
TEQ (1/2 DL) Fish	3.5	0.8	3.9	1.4	NA	2.9

Notes:

NA - Not available

White sucker (WS) n=6

Creek chub n=1

Tesselated darter n=1.

DDT – dichlorodiphenyltrichloroethane

LOAEL – lowest-observed-adverse-effect level

NOAEL – no-observed-adverse-effect level

PCBs –polychlorinated biphenyls

TEQ – toxicity equivalence quotient

UCL – upper confidence limit

Table 11-8. Comparison of Various Site-Specific Sediment Effect Concentrations for Onondaga Lake, 1992 Data^{a,b}

	AET	ER-L	ER-M	TEL	PEL	Onondaga Lake Consensus PECs	Ingersoll et al., 2000 PECs
Metals (mg/kg)							
Arsenic	4.3	0.90	4.4	1.29	3.55	2.4	33
Cadmium	8.6	0.94	2.1	1.42	3.11	2.4	5.0
Chromium	195	17.6	47.9	29.3	67.3	50	111
Copper	83.7	12.3	40.7	19.1	48.3	33	149
Lead	116	9.68	56.9	13.3	57.6	35	128
Total mercury	13	0.51	2.8	0.99	2.84	2.2	1.1
Nickel	50	5.22	20.9	8.37	25.8	16	49
Zinc	218	37.9	94.6	56.7	120	88	459
Organic Compounds (µg/kg)							
Total PCBs	710	136	400	151	382	295	676
PAH Compounds (µg/kg)							
Naphthalene	2,100	340	1,400	471	1,380	917	561
Fluorene	3,500	55.2	305	66.9	327	264	536
Phenanthrene	16,000	92.2	480	135	491	542	1,170
Anthracene	4,400	33	210	49.6	249	207	845
Fluoranthene	26,000	140	1,400	483	2,482	1,436	2,230
Pyrene	NC	114	650	238	795	344	1,520
Benz[a]anthracene	NC	60.7	415	118	451	191	1,050
Chrysene	NC	100	440	172	541	253	1,290
Benzo[a]pyrene	NC	62.8	210	98.2	355	146	1,450
Pesticides (µg/kg)							
DDT and Metabolites	16.3	47	47	23.7	26.6	30	572
Chlordane	NC	NC	NC	5.08	5.08	5.1	18
Heptachlor and Heptachlor Epoxide	NC	NC	NC	NC	NC		16

Notes: ^a All concentrations are provided in dry weight.

^b Maps of exceedances of ER-L, ER-M, TEL, PEL and PEC values are presented in Appendix F.

AET - apparent effects threshold; ER-L - effects-range low; ER-M - effects-range median

TEL - threshold effect level; PEL - probable effect level; PEC - Probable Effect Concentration

BTX - benzene, toluene, xylenes; PCB - polychlorinated biphenyl; PAH - polycyclic aromatic hydrocarbon

DDT – dichlorodiphenyltrichloroethane

NC - value was not calculated because of an insufficient number of detected observations.