APPENDIX A

Descriptive Data for Fish Samples

Table A-1. Fork length (mm), field wet weight (g), collection segment, and collection date of individual fish composited for analysis

Composite Number	Species	Sample Type	No. Fish per Composite	Specimen Number	Fork Length (mm)	Weight (g)	Collection Segment
1	Largescale sucker	F	8	11	388	635	1
				16	380	590	1
				21	380	544	1
				22	375	590	1
				24	370	726	1
				39	375	544	1
				42	390	680	1
				48	380	680	1
2	Largescale sucker	WB - F	8	11	388	635	1
				16	380	590	1
				21	380	544	1
				22	375	590	1
				24	370	726	1
				39	375	544	1
				42	390	680	1
				48	380	680	1
3	Carp	WB	5	72	570	3719	2
				73	540	3221	2
				74	490	2631	2
				275	530	2495	2
				278	525	2585	2
4	Carp	WB	5	71	610	4128	2
				109	615	5670	2
				271	590	3856	2
				276	605	5352	2
				279	575	3765	2
5	Carp	WB	5	272	625	3266	2
				273	635	4944	2
				274	715	6713	2
				277	660	6713	2
				280	655	4717	2
6	Smallmouth bass	F	5	57	210	181	2
				58	320	499	2
				70	300	544	2
				94	160	91	2
				108	160	136	2
7	Smallmouth bass	F	5	12	202	136	1
				237	260	272	5
				268	260	227	3
				269	160	91	3
				270	320	408	3
8	Carp	F	5	142	565	3765	3
				144	540	2722	3
				159	540	3447	3
				161	570	3901	3
				162	570	4309	3
9	Carp	WB - F	5	142	565	3765	3
				144	540	2722	3
				159	540	3447	3
				161	570	3901	3
				162	570	4309	3

Table A-1. Fork length (mm), field wet weight (g), collection segment, and collection date of individual fish composited for analysis

Composite Number	Species	Sample Type	No. Fish per Composite	Specimen Number	Fork Length (mm)	Weight (g)	Collection Segment
10	Northern pikeminnow	F	8	113	360	590	3
				136	340	363	3
				138	290	318	3
				139	260	227	3
				153	315	408	3
				154	335	454	3
				156	340	544	3
				157	290	227	3
11	Northern pikeminnow	WB - F	8	113	360	590	3
				136	340	363	3
				138	290	318	3
				139	260	227	3
				153	315	408	3
				154	335	454	3
				156	340	544	3
				157	290	227	3
12	Largescale sucker	WB	8	177	385	680	4
				178	380	771	4
				180	400	726	4
				183	390	680	4
				184	330	318	4
				185	330	454	4
				211	375	544	4
				214	365	635	4
13	Northern pikeminnow	WB	8	163	280	227	4
				168	335	454	4
				171	280	227	4
				193	325	408	4
				197	305	272	4
				199	275	227	4
				200	300	181	4
				220	335	544	4
14	Carp	WB	5	238	550	2812	5
				244	600	4218	5
				245	570	3538	5
				263	455	1724	5
				264	590	4309	5
15	Northern pikeminnow	WB	8	232	190	45	5
				233	190	45	5
				241	190	91	5
				246	200	45	5
				256	185	91	5
				259	190	136	5
				260	185	91	5
				261	180	91	5

NOTE: F - fillet without skin
WB - whole body
WB - F - whole body minus fillets from both sides of the fish

APPENDIX B

Chemistry Data for Fish Composite Samples

Table B-1. Trace metal concentrations (mg/kg wet weight) in composite fish samples collected from the Willamette River

		Composite 1		Composite 2		Composite 3		Composite 4		Composite 5		Composite 6	
		Species	Sucker	Species	Sucker	Species	Carp	Species	Carp	Species	Carp	Species	Bass
		Sample Type	Fillet	Sample Type	WB-fillet	Sample Type	WB	Sample Type	WB	Sample Type	WB	Sample Type	Fillet
Analyte (mg/kg)	CAS #	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier
Ag	7440-22-4	0.02		0.05		0.03		0.02		0.01		0.01	U
As	7440-38-2	0.08		0.17		0.16		0.13		0.15		0.11	
As - Tl	N/A	0.004		0.036		0.007		0.009		0.005		0.003	U
Be	7440-41-7	0.001	U	0.006		0.003		0.002		0.001	U	0.001	U
Cd	7440-43-9	0.01	U	0.01		0.01		0.01		0.01		0.01	U
Cr	7440-47-3	0.14		0.62		0.34		0.54		0.64		0.19	
Cu	7440-50-8	0.39		2.86		2.77		1.50		1.29		0.68	
Hg	7439-97-6	0.163		0.075		0.096		0.104		0.162		0.334	
Ni	7440-02-0	0.02		0.51		0.31		0.07		0.13		0.10	
Pb	7439-92-1	0.005	U	0.141		0.035		0.049		0.031		0.005	U
Sb	7440-36-0	0.001	U	0.001		0.001		0.001		0.001	U	0.001	U
Tl	7440-28-0	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Zn	7440-66-6	8.31		17.5		74.9		98.8		102		6.22	

		Composite 7		Composite 8		Composite 9		Composite 10		Composite 11		Composite 12	
		Species	Bass	Species	Carp	Species	Carp	Species	Pikeminnow	Species	Pikeminnow	Species	Sucker
		Sample Type	Fillet	Sample Type	Fillet	Sample Type	WB-fillet	Sample Type	Fillet	Sample Type	WB-fillet	Sample Type	WB
Analyte (mg/kg)	CAS #	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier	Concentration	Qualifier
Ag	7440-22-4	0.01	U	0.01	U	0.03		0.01	U	0.01	U	0.01	U
As	7440-38-2	0.08		0.12		0.17		0.05	U	0.05	U	0.12	
As - Tl	N/A	0.005		0.003	U	0.006		0.003	U	0.003	U	0.016	
Be	7440-41-7	0.001	U	0.001	U	0.001	U	0.002		0.001	U	0.010	
Cd	7440-43-9	0.01	U	0.01	U	0.02		0.01	U	0.01	U	0.01	
Cr	7440-47-3	0.19		0.23		0.51		0.18		0.17		0.32	
Cu	7440-50-8	0.95		0.67		1.81		0.49		0.61		1.78	
Hg	7439-97-6	0.416		0.247		0.075		0.717		0.337		0.121	
Ni	7440-02-0	0.13		0.01	U	0.01	U	0.04		0.01	U	0.31	
Pb	7439-92-1	0.005	U	0.005	U	0.033		0.005	U	0.005	U	0.037	
Sb	7440-36-0	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
Tl	7440-28-0	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Zn	7440-66-6	8.99		29.7		114		6.88		12.7		11.3	

Table B-1. Trace metal concentrations (mg/kg wet weight) in composite fish samples collected from the Willamette River

Analyte (mg/kg)	CAS #	Composite 13 Species: Pikeminnow Sample Type: WB Concentration	Qualifier	Composite 14 Species: Carp Sample Type: WB Concentration	Qualifier	Composite 15 Species: Pikeminnow Sample Type: WB Concentration	Qualifier
Ag	7440-22-4	0.01	U	0.02		0.01	U
As	7440-38-2	0.05	U	0.15		0.05	U
As - TI	N/A	0.003	U	0.003		0.003	U
Be	7440-41-7	0.001	U	0.002		0.001	U
Cd	7440-43-9	0.01	U	0.04		0.02	
Cr	7440-47-3	0.18		0.49		0.18	
Cu	7440-50-8	0.74		1.55		1.10	
Hg	7439-97-6	0.483		0.149		0.057	
Ni	7440-02-0	0.01	U	0.01	U	0.01	U
Pb	7439-92-1	0.006		0.014		0.007	
Sb	7440-36-0	0.001	U	0.001	U	0.001	U
Tl	7440-28-0	0.002	U	0.002	U	0.002	U
Zn	7440-66-6	12.1		74.9		18.2	

NOTE: As - TI - total inorganic arsenic
U - non-detected

Table B-2. Pesticide concentrations (ng/g) in composite fish samples collected from the Willamette River

					Hexachlorobenzene CAS 118-74-1			alpha HCH CAS 319-84-6			beta HCH CAS 319-85-7			gamma HCH CAS 58-89-9			Heptachlor CAS 76-44-8		
					Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)		
Species	Sample Type	Composite Sample	Collection Location[a]	Percent Lipid	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.67	47.86		0.11	7.86	U	0.15	10.71	U	0.82	58.57		0.23	16.43	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.9	69.23		0.13	10.00	U	0.19	14.62	U	0.79	60.77	J	0.31	23.85	U
Carp	WB	3	43.0 - 71.9	7.2	5.3	73.61		0.16	2.22	U	0.23	3.19	U	1.1	15.28	J	0.14	1.94	U
Carp	WB	3	43.0 - 71.9	7.2	5.9	81.94		0.41	5.69	U	0.57	7.92	U	1.6	22.22	J	0.2	2.78	U
Carp	WB	4	34.4 - 43.0	5.1	4.1	80.39		0.13	2.55	U	0.18	3.53	U	0.85	16.67		0.17	3.33	U
Carp	WB	5	34.4 - 43.0	8.5	7.6	89.41		0.19	2.24		0.16	1.88	J	1.2	14.12	J	0.25	2.94	U
Carp	Fillet	8	43.0 - 50.0	3.5	2.6	74.29		0.11	3.14	U	0.15	4.29	U	0.89	25.43	J	0.26	7.43	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	5.1	67.11		0.75	9.87	J	0.38	5.00	J	1.6	21.05	J	0.22	2.89	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	5.6	73.68		0.31	4.08	J	0.22	2.89	J	1.8	23.68		0.10	1.32	U
Carp	WB	14	56.5 - 71.9	6.1	4.1	67.21		0.12	1.97	J	0.13	2.13	U	0.82	13.44		0.14	2.30	U
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	1.0	55.56		0.54	30.00	U	0.69	38.33	U	1.1	61.11	J	0.24	13.33	U
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	4.7	58.02		0.54	6.67	J	0.13	1.60	J	1.0	12.35	J	0.09	1.11	U
Pikeminnow	WB	13	50.0 - 56.5	5.8	3.2	55.17		0.32	5.52	U	0.44	7.59	U	1.1	18.97	J	0.27	4.66	U
Pikeminnow	WB	15	56.5 - 71.9	3.6	2.3	63.89		0.04	1.11	U	0.06	1.67	U	0.64	17.78	J	0.17	4.72	U
Sucker	Fillet	1	26.5 - 34.4	2.0	2.0	100.00	U	6.2	310.00	U	8.7	435.00	U	5.0	250.00	U	17	850.00	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	4.9	49.49		1.4	14.14	J	0.58	5.86	U	1.9	19.19	J	0.37	3.74	U
Sucker	WB	12	50.0 - 56.5	7.9	4.4	55.70		0.83	10.51	J	0.27	3.42	J	0.98	12.41	J	0.16	2.03	U

					Aldrin CAS 309-00-2			Oxychlordane CAS 27304-13-8*			trans-Chlordane CAS 57-74-9+ 5103-74-2*			cis-Chlordane CAS 57-74-9+ 5103-71-9*			o,p'-DDE CAS 3424-82-6		
					Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)		
Species	Sample Type	Composite Sample	Collection Location[a]	Percent Lipid	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier	Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.08	5.71	U	0.79	56.43	U	0.09	6.43		0.22	15.71		0.09	6.43	
Bass	Fillet	7	43.0 - 71.9	1.3	0.09	6.92	U	0.59	45.38	U	0.13	10.00		0.21	16.15		0.08	6.15	
Carp	WB	3	43.0 - 71.9	7.2	0.3	4.17	U	1.8	25.00	U	1.9	26.39		4.0	55.56		0.58	8.06	
Carp	WB	3	43.0 - 71.9	7.2	0.31	4.31	U	1.4	19.44	U	2.2	30.56		4.6	63.89		0.67	9.31	
Carp	WB	4	34.4 - 43.0	5.1	0.11	2.16	J	1.3	25.49	J	2.3	45.10		5.5	107.84		0.48	9.41	
Carp	WB	5	34.4 - 43.0	8.5	1.9	22.35	J	4.3	50.59	J	2.3	27.06		4.5	52.94		0.66	7.76	
Carp	Fillet	8	43.0 - 50.0	3.5	0.08	2.29	J	0.86	24.57	J	0.88	25.14		2.2	62.86		0.18	5.14	
Carp	WB-fillet	9	43.0 - 50.0	7.6	5.2	68.42	J	2.2	28.95	J	1.8	23.68		4.2	55.26		0.50	6.58	
Carp	WB-fillet	9	43.0 - 50.0	7.6	2.4	31.58	J	3.2	42.11	J	2.0	26.32		4.9	64.47		0.54	7.11	
Carp	WB	14	56.5 - 71.9	6.1	1.9	31.15	J	2.2	36.07	J	2.4	39.34		5.7	93.44		0.34	5.57	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	6.5	361.11	J	2.9	161.11	U	0.22	12.22		0.45	25.00		0.16	8.89	
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	2.4	29.63	J	4.0	49.38	J	1.1	13.58		2.5	30.86		0.72	8.89	
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.23	3.97	U	1.8	31.03	J	0.91	15.69		2.1	36.21		0.63	10.86	
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.03	0.83	U	0.89	24.72	J	0.43	11.94		0.89	24.72		0.22	6.11	
Sucker	Fillet	1	26.5 - 34.4	2.0	3.6	180.00	U	27	1350.00	U	2.7	135.00	U	2.3	115.00	U	3.2	160.00	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.26	2.63	U	3.0	30.30	J	2.2	22.22		4.4	44.44		0.79	7.98	
Sucker	WB	12	50.0 - 56.5	7.9	1.1	13.92	J	1.3	16.46		1.1	13.92		2.5	31.65		0.40	5.06	

Table B-2. Pesticide concentrations (ng/g) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	Collection Location[a]	Percent Lipid	p,p'-DDE CAS 72-55-9 Concentration (ng/g) Wet Weight	p,p'-DDE CAS 72-55-9 Concentration (ng/g) Lipid Normalize	p,p'-DDE CAS 72-55-9 Data Qualifier	trans-Nonachlor CAS 3734-49-4+ 39765-80-5* Concentration (ng/g) Wet Weight	trans-Nonachlor CAS 3734-49-4+ 39765-80-5* Concentration (ng/g) Lipid Normalize	trans-Nonachlor CAS 3734-49-4+ 39765-80-5* Data Qualifier	cis-Nonachlor CAS 5103-73-1+ Concentration (ng/g) Wet Weight	cis-Nonachlor CAS 5103-73-1+ Concentration (ng/g) Lipid Normalize	cis-Nonachlor CAS 5103-73-1+ Data Qualifier	o,p'-DDD CAS 53-19-0 Concentration (ng/g) Wet Weight	o,p'-DDD CAS 53-19-0 Concentration (ng/g) Lipid Normalize	o,p'-DDD CAS 53-19-0 Data Qualifier	p,p'-DDD CAS 72-54-8 Concentration (ng/g) Wet Weight	p,p'-DDD CAS 72-54-8 Concentration (ng/g) Lipid Normalize	p,p'-DDD CAS 72-54-8 Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	18	1285.71		1.1	78.57		0.36	25.71		0.14	10.00		1.3	92.86	
Bass	Fillet	7	43.0 - 71.9	1.3	14	1076.92		1.1	84.62		0.3	23.08		0.12	9.23		1.0	76.92	
Carp	WB	3	43.0 - 71.9	7.2	210	2916.67		6.1	84.72		2.5	34.72		2.2	30.56		16	222.22	
Carp	WB	3	43.0 - 71.9	7.2	230	3194.44		7.9	109.72		3.2	44.44		2.5	34.72		17	236.11	
Carp	WB	4	34.4 - 43.0	5.1	140	2745.10		8.8	172.55		3.0	58.82		1.8	35.29		15	294.12	
Carp	WB	5	34.4 - 43.0	8.5	160	1882.35	EJ	8.6	101.18		3.4	40.00		2.4	28.24		18	211.76	
Carp	Fillet	8	43.0 - 50.0	3.5	170	4857.14	EJ	3.8	108.57		1.7	48.57		0.81	23.14		9.7	277.14	
Carp	WB-fillet	9	43.0 - 50.0	7.6	380	5000.00	EJ	9.7	127.63		3.7	48.68		1.8	23.68		17	223.68	
Carp	WB-fillet	9	43.0 - 50.0	7.6	380	5000.00	EJ	11	144.74		4.3	56.58		2.0	26.32		20	263.16	
Carp	WB	14	56.5 - 71.9	6.1	120	1967.21		11	180.33		4.2	68.85		2.0	32.79		19	311.48	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	22	1222.22		1.5	83.33		0.45	25.00		0.24	13.33	J	2.5	138.89	
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	140	1728.40		10	123.46		2.8	34.57		1.2	14.81		13	160.49	
Pikeminnow	WB	13	50.0 - 56.5	5.8	120	2068.97		8.0	137.93		2.2	37.93		0.81	13.97		9.0	155.17	
Pikeminnow	WB	15	56.5 - 71.9	3.6	45	1250.00		3.4	94.44		0.87	24.17		0.29	8.06		2.8	77.78	
Sucker	Fillet	1	26.5 - 34.4	2.0	21	1050.00		3.0	150.00	U	2.1	105.00	U	1.2	60.00	U	3.8	190.00	
Sucker	WB-fillet	2	26.5 - 34.4	9.9	130	1313.13		7.2	72.73		2.8	28.28		3.7	37.37		31	313.13	
Sucker	WB	12	50.0 - 56.5	7.9	66	835.44		5.1	64.56		1.8	22.78		1.1	13.92		7.6	96.20	

Species	Sample Type	Composite Sample	Collection Location[a]	Percent Lipid	Chemical CAS# o,p'-DDT 789-02-6* Concentration (ng/g) Wet Weight	o,p'-DDT 789-02-6* Concentration (ng/g) Lipid Normalize	o,p'-DDT 789-02-6* Data Qualifier	p,p'-DDT 50-29-3+ Concentration (ng/g) Wet Weight	p,p'-DDT 50-29-3+ Concentration (ng/g) Lipid Normalize	p,p'-DDT 50-29-3+ Data Qualifier	Mirex 2385-85-5 Concentration (ng/g) Wet Weight	Mirex 2385-85-5 Concentration (ng/g) Lipid Normalize	Mirex 2385-85-5 Data Qualifier	Heptachlor Epoxide 1024-57-3 Concentration (ng/g) Wet Weight	Heptachlor Epoxide 1024-57-3 Concentration (ng/g) Lipid Normalize	Heptachlor Epoxide 1024-57-3 Data Qualifier	alpha-Endosulfan (I) 959-98-8 Concentration (ng/g) Wet Weight	alpha-Endosulfan (I) 959-98-8 Concentration (ng/g) Lipid Normalize	alpha-Endosulfan (I) 959-98-8 Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.21	15.00		1.4	100.00		0.04	2.86		0.01	0.71	U	0.01	0.71	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.22	16.92	J	1.5	115.38		0.05	3.85		0.007	0.54	U	0.01	0.77	U
Carp	WB	3	43.0 - 71.9	7.2	1.6	22.22	J	1.6	22.22		0.13	1.81	J	0.20	2.78		0.008	0.11	U
Carp	WB	3	43.0 - 71.9	7.2	2.0	27.78		1.5	20.83		0.12	1.67	J	0.26	3.61		0.007	0.10	U
Carp	WB	4	34.4 - 43.0	5.1	1.8	35.29	J	1.7	33.33		0.18	3.53	J	0.18	3.53		0.01	0.20	U
Carp	WB	5	34.4 - 43.0	8.5	1.7	20.00	J	2.2	25.88	J	0.33	3.88	J	0.39	4.59		0.74	8.71	
Carp	Fillet	8	43.0 - 50.0	3.5	0.92	26.29	J	0.92	26.29		0.10	2.86	J	0.17	4.86		0.03	0.86	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	2.2	28.95	J	2.8	36.84	J	0.21	2.76	J	0.40	5.26		0.66	8.68	
Carp	WB-fillet	9	43.0 - 50.0	7.6	2.2	28.95	J	2.1	27.63		0.25	3.29	J	0.34	4.47		0.67	8.82	
Carp	WB	14	56.5 - 71.9	6.1	2.0	32.79	J	3.5	57.38		0.14	2.30		0.44	7.21		0.01	0.16	U
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.32	17.78		0.28	15.56	J	0.09	5.00	J	0.01	0.56	U	0.02	1.11	U
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	1.9	23.46	J	0.53	6.54		0.29	3.58	J	0.27	3.33		0.01	0.12	U
Pikeminnow	WB	13	50.0 - 56.5	5.8	2.1	36.21	J	0.35	6.03		0.25	4.31		0.15	2.59		0.01	0.17	U
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.85	23.61	J	0.12	3.33		0.07	1.94		0.03	0.83	U	0.04	1.11	U
Sucker	Fillet	1	26.5 - 34.4	2.0	2.5	125.00	U	3.1	155.00	U	1.6	80.00	U	0.03	1.50		0.02	1.00	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	3.5	35.35	J	21	212.12		0.18	1.82	J	0.28	2.83		0.02	0.20	U
Sucker	WB	12	50.0 - 56.5	7.9	1.7	21.52		15	189.87		0.11	1.39	J	0.38	4.81		0.01	0.13	U

Table B-2. Pesticide concentrations (ng/g) in composite fish samples collected from the Willamette River

					Dieldrin CAS 60-57-1			Endrin CAS 72-20-8			Methoxychlor CAS 72-43-5		
					Concentration (ng/g)			Concentration (ng/g)			Concentration (ng/g)		
Species	Sample Type	Composite Sample	Collection Location[a] (RM)	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifier	Wet Weight	Lipid Normalized	Data Qualifier	Wet Weight	Lipid Normalized	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.23	16.43		0.02	1.43	U	0.03	2.14	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.24	18.46		0.01	0.77	U	0.02	1.54	U
Carp	WB	3	43.0 - 71.9	7.2	3.0	41.67		0.02	0.28		0.02	0.28	U
Carp	WB	3	43.0 - 71.9	7.2	3.5	48.61		0.03	0.42		0.02	0.28	U
Carp	WB	4	34.4 - 43.0	5.1	1.9	37.25		0.02	0.39	U	0.03	0.59	U
Carp	WB	5	34.4 - 43.0	8.5	5.6	65.88		0.06	0.71	U	0.14	1.65	U
Carp	Fillet	8	43.0 - 50.0	3.5	1.8	51.43		0.05	1.43	U	0.13	3.71	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	4.4	57.89		0.05	0.66	U	0.12	1.58	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	4.2	55.26		0.03	0.39	U	0.07	0.92	U
Carp	WB	14	56.5 - 71.9	6.1	4.4	72.13		0.03	0.49	U	0.64	10.49	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.52	28.89		0.03	1.67	U	0.06	3.33	U
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	3.2	39.51		0.03	0.37	U	0.27	3.33	
Pikeminnow	WB	13	50.0 - 56.5	5.8	1.9	32.76		0.02	0.34	U	0.03	0.52	U
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.86	23.89		0.07	1.94	U	0.15	4.17	U
Sucker	Fillet	1	26.5 - 34.4	2.0	0.42	21.00		0.02	1.00	U	0.02	1.00	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	2.8	28.28		0.03	0.30	U	0.05	0.51	U
Sucker	WB	12	50.0 - 56.5	7.9	5.0	63.29		0.03	0.38	U	0.06	0.76	U

NOTE: CAS # - Chemical Abstracts Services
U - undetected
WB - whole body
***** - USEPA Environmental Monitoring Methods Index (EMMI) EPA#821-B-92-001
+'- http://webbook.nist.gov/chemistry/cas-ser.htm
a - average of two percent lipid duplicates
J - Value should be considered an estimate
E - concentration exceeds linear calibration range

[a] Segment 4 terminated at mouth of Yamhill River prior to RM 50 due to dredging activities in main channel

Table B-3. PAH concentrations (ng/g) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	Collection Location	Chemical CAS# / Percent Lipid	Naphthalene 91-20-3 Concentration (ng/g) Wet Weight	Naphthalene Lipid Normalize	Naphthalene Qualifier	Acenaphthylene 208-96-8 Concentration (ng/g) Wet Weight	Acenaphthylene Lipid Normalize	Acenaphthylene Qualifier	Acenaphthene 83-32-9 Concentration (ng/g) Wet Weight	Acenaphthene Lipid Normalize	Acenaphthene Qualifier	Fluorene 86-73-7 Concentration (ng/g) Wet Weight	Fluorene Lipid Normalize	Fluorene Qualifier	Phenanthrene 85-01-8 Concentration (ng/g) Wet Weight	Phenanthrene Lipid Normalize	Phenanthrene Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	NQ	NQ		0.76	54.3	J	0.22	15.7		0.62	44.3	U	1.1	78.6	
Bass	Fillet	7	43.0 - 71.9	1.3	11	846.2	J	1.4	107.7	UJ	1.5	115.4	UJ	1.5	115.4	UJ	2.2	169.2	J
Carp	WB	3	43.0 - 71.9	7.2	9.6	133.3		1.1	15.3		1.1	15.3		1.2	16.7		2.3	31.9	J
Carp	WB	4	34.4 - 43.0	5.1	9.2	180.4	J	0.94	18.4		1.1	21.6		1.0	19.6		1.9	37.3	J
Carp	WB	5	34.4 - 43.0	8.5	17	200.0	J	0.87	10.2	J	2.6	30.6	J	1.4	16.5	J	3.4	40.0	J
Carp	Fillet	8	43.0 - 50.0	3.5	13	371.4	J	1.8	51.4	UJ	1.9	54.3	UJ	1.9	54.3	UJ	1.9	54.3	J
Carp	Fillet	8	43.0 - 50.0	3.5	12	342.9	J	1.4	40.0	UJ	1.5	42.9	UJ	1.5	42.9	UJ	1.7	48.6	J
Carp	WB-fillet	9	43.0 - 50.0	7.6 [a]	12	157.9	J	0.70	9.2	UJ	1.2	15.8	J	0.72	9.5	UJ	1.7	22.4	J
Carp	WB	14	56.5 - 71.9	6.1	7.4	121.3	J	1.0	16.4	J	3.6	59.0	J	1.5	24.6	J	1.7	27.9	J
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	9.9	550.0	J	0.98	54.4	UJ	1.0	55.6	UJ	1.0	55.6	UJ	1.6	88.9	J
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	5.1	63.0	J	0.82	10.1		1.6	19.8	J	2.3	28.4		2.3	28.4	
Pikeminnow	WB	13	50.0 - 56.5	5.8	3.9	67.2	J	0.46	7.9	J	1.7	29.3	J	1.8	31.0	J	1.8	31.0	J
Pikeminnow	WB	15	56.5 - 71.9	3.6	4.1	113.9	J	0.52	14.4	J	2.2	61.1	J	1.2	33.3	J	1.2	33.3	J
Pikeminnow	WB	15	56.5 - 71.9	3.6	4.0	111.1	J	0.56	15.6	J	2.4	66.7	J	1.3	36.1	J	1.4	38.9	J
Sucker	Fillet	1	26.5 - 34.4	2.0	5.2	260.0		0.64	32.0		0.21	10.5		0.51	25.5		0.33	16.5	J
Sucker	Fillet	1	26.5 - 34.4	2.0	NQ	NQ		0.53	26.5		0.67	33.5	U	0.62	31.0		0.38	19.0	J
Sucker	WB-fillet	2	26.5 - 34.4	9.9	10	101.0		1.8	18.2		0.75	7.6		2.4	24.2		6.3	63.6	
Sucker	WB	12	50.0 - 56.5	7.9	4.4	55.7	J	0.60	7.6	J	9.7	122.8	J	2.5	31.6	J	2.6	32.9	J

Species	Sample Type	Composite Sample	Collection Location	Chemical CAS# / Percent Lipid	Anthracene 120-12-7 Concentration (ng/g) Wet Weight	Anthracene Lipid Normalize	Anthracene Qualifier	Fluoranthene 206-44-0 Concentration (ng/g) Wet Weight	Fluoranthene Lipid Normalize	Fluoranthene Qualifier	Pyrene 129-00-0 Concentration (ng/g) Wet Weight	Pyrene Lipid Normalize	Pyrene Qualifier	Benz[a]anthracene 56-55-3 Concentration (ng/g) Wet Weight	Benz[a]anthracene Lipid Normalize	Benz[a]anthracene Qualifier	Chrysene[b] 218-01-9 Concentration (ng/g) Wet Weight	Chrysene Lipid Normalize	Chrysene Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.23	16.4	U	0.31	22.1		0.20	14.3		0.17	12.1	U	0.15	10.7	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.71	54.6	UJ	0.54	41.5	J	0.33	25.4	J	0.20	15.4	UJ	0.21	16.2	UJ
Carp	WB	3	43.0 - 71.9	7.2	0.83	11.5	J	3.8	52.8		5.6	77.8		2.7	37.5		3.0	41.7	
Carp	WB	4	34.4 - 43.0	5.1	0.41	8.0	U	0.81	15.9	J	0.87	17.1	J	0.36	7.1	U	0.35	6.9	J
Carp	WB	5	34.4 - 43.0	8.5	0.72	8.5	UJ	0.89	10.5	UJ	1.4	16.5	J	0.59	6.9	UJ	0.61	7.2	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.86	24.6	UJ	0.56	16.0	UJ	0.62	17.7	J	0.57	16.3	UJ	0.59	16.9	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.92	26.3	UJ	0.74	21.1	UJ	0.73	20.9	UJ	0.66	18.9	UJ	0.69	19.7	UJ
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.39	5.1	J	0.65	8.6	UJ	0.68	8.9	J	0.81	10.7	UJ	0.84	11.1	UJ
Carp	WB	14	56.5 - 71.9	6.1	0.18	3.0	J	0.57	9.3	J	0.70	11.5	J	0.078	1.3	UJ	0.22	3.6	J
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.68	37.8	UJ	0.46	25.6	J	1.1	61.1	J	0.31	17.2	UJ	0.32	17.8	UJ
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	0.30	3.7	U	0.78	9.6		0.42	5.2		0.049	0.6	U	0.078	1.0	U
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.68	11.7	UJ	0.66	11.4	J	0.62	10.7	J	0.20	3.4	UJ	0.19	3.3	UJ
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.14	3.9	J	0.28	7.8	J	0.16	4.4	J	0.03	0.8	UJ	0.031	0.9	UJ
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.17	4.7	J	0.26	7.2	J	0.15	4.2	J	0.035	1.0	UJ	0.098	2.7	UJ
Sucker	Fillet	1	26.5 - 34.4	2.0	1.2	60.0	J	0.39	19.5		0.89	44.5		0.16	8.0	U	0.15	7.5	U
Sucker	Fillet	1	26.5 - 34.4	2.0	4.5	225.0	J	0.52	26.0	J	2.9	145.0		0.24	12.0	U	0.35	17.5	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	14	141.4	J	1.5	15.2		1.6	16.2	J	0.52	5.3	U	0.43	4.3	
Sucker	WB	12	50.0 - 56.5	7.9	0.52	6.6	J	0.8	10.1	J	0.44	5.6	J	0.14	1.8	J	0.22	2.8	J

Table B-3. PAH concentrations (ng/g) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	Collection Location	Chemical CAS# / Percent Lipid	Benz[b/j/k]fluoranthenes[c] 205-99-2/207-08-9 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier	Benzo[e]pyrene 192-97-2 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier	Benzo[a]pyrene 50-32-8 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier	Perylene 198-55-0 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier	Dibenz[ah]anthracene[d] 53-70-3 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	1.1	78.6	U	1.1	78.6	U	1.4	100.0	U	1.1	78.6	U	0.28	20.0	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.27	20.8	UJ	0.28	21.5	UJ	0.30	23.1	UJ	0.33	25.4	UJ	0.72	55.4	UJ
Carp	WB	3	43.0 - 71.9	7.2	6.0	83.3		3.4	47.2	J	4.3	59.7		1.9	26.4		0.97	13.5	U
Carp	WB	4	34.4 - 43.0	5.1	0.73	14.3	U	0.72	14.1	U	1.1	21.6	U	0.81	15.9	U	0.40	7.8	U
Carp	WB	5	34.4 - 43.0	8.5	0.56	6.6	UJ	0.58	6.8	UJ	0.61	7.2	UJ	0.69	8.1	UJ	0.75	8.8	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.54	15.4	UJ	0.56	16.0	UJ	0.59	16.9	UJ	0.67	19.1	UJ	0.70	20.0	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.78	22.3	UJ	0.82	23.4	UJ	0.85	24.3	UJ	0.92	26.3	UJ	1.1	31.4	UJ
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.47	6.2	UJ	0.49	6.4	UJ	0.51	6.7	UJ	0.54	7.1	UJ	0.43	5.7	UJ
Carp	WB	14	56.5 - 71.9	6.1	0.063	1.0	UJ	0.18	3.0	UJ	0.17	2.8	UJ	0.22	3.6	UJ	0.091	1.5	UJ
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.56	31.1	UJ	0.58	32.2	UJ	0.60	33.3	UJ	0.61	33.9	UJ	1.1	61.1	UJ
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	1.3	16.0	U	1.3	16.0	U	1.4	17.3	U	2.0	24.7	U	0.80	9.9	
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.89	15.3	UJ	3.6	62.1	UJ	0.88	15.2	UJ	0.76	13.1	UJ	0.064	1.1	UJ
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.048	1.3	UJ	0.095	2.6	UJ	0.11	3.1	UJ	0.22	6.1	UJ	0.098	2.7	UJ
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.15	4.2	UJ	0.11	3.1	UJ	0.13	3.6	UJ	0.17	4.7	UJ	0.15	4.2	UJ
Sucker	Fillet	1	26.5 - 34.4	2.0	0.38	19.0	U	0.32	16.0	U	0.47	23.5	U	0.75	37.5	U	0.50	25.0	U
Sucker	Fillet	1	26.5 - 34.4	2.0	0.50	25.0	U	0.48	24.0	U	0.70	35.0	U	0.98	49.0	U	1.2	60.0	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.85	8.6	U	0.81	8.2	U	1.2	12.1	U	1.3	13.1	J	0.47	4.7	U
Sucker	WB	12	50.0 - 56.5	7.9	0.078	1.0	J	0.099	1.3	J	0.14	1.8	J	0.48	6.1	J	0.089	1.1	UJ

Species	Sample Type	Composite Sample	Collection Location	Chemical CAS# / Percent Lipid	Indeno[1,2,3-cd]pyrene 193-39-5 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier	Benzo[ghi]perylene 191-24-2 Concentration (ng/g) Wet Weight	Lipid Normalize	Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.31	22.1	U	0.22	15.7	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.63	48.5	UJ	0.56	43.1	UJ
Carp	WB	3	43.0 - 71.9	7.2	3.4	47.2		4.9	68.1	
Carp	WB	4	34.4 - 43.0	5.1	0.34	6.7	U	0.25	4.9	U
Carp	WB	5	34.4 - 43.0	8.5	0.48	5.6	UJ	0.42	4.9	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.67	19.1	UJ	0.33	9.4	UJ
Carp	Fillet	8	43.0 - 50.0	3.5	0.93	26.6	UJ	0.82	23.4	UJ
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.45	5.9	UJ	0.40	5.3	UJ
Carp	WB	14	56.5 - 71.9	6.1	0.059	1.0	J	0.087	1.4	J
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.97	53.9	UJ	0.86	47.8	UJ
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	0.55	6.8		0.68	8.4	
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.043	0.7	UJ	0.052	0.9	J
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.027	0.8	UJ	0.037	1.0	UJ
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.09	2.5	UJ	0.073	2.0	UJ
Sucker	Fillet	1	26.5 - 34.4	2.0	0.28	14.0	U	0.30	15.0	U
Sucker	Fillet	1	26.5 - 34.4	2.0	0.54	27.0	U	0.63	31.5	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.46	4.6	J	1.1	11.1	
Sucker	WB	12	50.0 - 56.5	7.9	0.13	1.6	J	0.17	2.2	J

NOTE: CAS # - Chemical Abstracts Services
E - concentration is outside the linear calibration range
J - value should be considered an estimate
NQ - not quantifiable
U - not detected
WB - whole body

[a] Average of two percent lipid duplicates
[b] May co-elute with triphenylene
[c] May co-elute with benzo[j]fluoranthene
[d] May co-elute with dibenz[ac]anthracene

Table B-4. PCB Aroclor concentrations (ng/g) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	River Segment	Collection Location[a]	Chemical CAS# / Percent Lipid	Aroclor 1242 53469-21-9* Concentration (ng/g) Wet Weight	Aroclor 1242 Lipid Normalized	Aroclor 1242 Data Qualifier	Aroclor 1254 11097-69-1* Concentration (ng/g) Wet Weight	Aroclor 1254 Lipid Normalize	Aroclor 1254 Data Qualifier	Aroclor 1260 11096-82-5* Concentration (ng/g) Wet Weight	Aroclor 1260 Lipid Normalize	Aroclor 1260 Data Qualifier
Bass	Fillet	6	2	34.4 - 43.0	1.4	1.2	85.7		15	1071.4		11	785.7	
Bass	Fillet	7	3,4,5	43.0 - 71.9	1.3	1.3	100.0		13	1000.0		11	846.2	
Carp	WB	3	3,4,5	43.0 - 71.9	7.2	6.9	95.8		71	986.1		39	541.7	J
Carp	WB	3	3,4,5	43.0 - 71.9	7.2	7.7	106.9		87	1208.3		40	555.6	J
Carp	WB	4	2	34.4 - 43.0	5.1	3.9	76.5		60	1176.5		65	1274.5	J
Carp	WB	5	2	34.4 - 43.0	8.5	7.6	89.4		110	1294.1		120	1411.8	J
Carp	Fillet	8	3	43.0 - 50.0	3.5	3.0	85.7		36	1028.6		32	914.3	J
Carp	WB-fillet	9	3	43.0 - 50.0	7.6	6.6	86.8		82	1078.9		65	855.3	J
Carp	WB-fillet	9	3	43.0 - 50.0	7.6	6.5	85.5		91	1197.4		69	907.9	J
Carp	WB	14	5	56.5 - 71.9	6.1	4.1	67.2		59	967.2		49	803.3	J
Pikeminnow	Fillet	10	3	43.0 - 50.0	1.8	3.4	188.9	U	16	888.9		17	944.4	
Pikeminnow	WB-fillet	11	3	43.0 - 50.0	8.1	6.8	84.0		100	1234.6		92	1135.8	J
Pikeminnow	WB	13	4	50.0 - 56.5	5.8	3.7	63.8		58	1000.0		62	1069.0	J
Pikeminnow	WB	15	5	56.5 - 71.9	3.6	2.4	66.7		28	777.8		17	472.2	J
Sucker	Fillet	1	1	26.5 - 34.4	2.0	30	1500.0	U	63	3150.0	U	46	2300.0	U
Sucker	WB-fillet	2	1	26.5 - 34.4	9.9	9.6	97.0		88	888.9		58	585.9	J
Sucker	WB	12	4	50.0 - 56.5	7.9	6.7	84.8		53	670.9		36	455.7	J

NOTE: CAS # - Chemical Abstracts Services
DL - detection limit
nd - non-detects
U - undetected
WB - whole body

* - USEPA Environmental Monitoring Methods Index (EMMI) EPA#821-B-92-001

[a] Segment 4 terminated at mouth of Yamhill River prior to RM 50 due to dredging activities in main channel

Table B-5. PCB congener concentrations (ng/g) in composite fish samples collected from the Willamette River

			Composite 1				Composite 2				Composite 3				Composite 4			
			Species Sucker				Species Sucker				Species Carp				Species Carp			
			Sample Type Fillet				Sample Type WB-fillet				Sample Type WB				Sample Type WB			
				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)		
Chemical	IUPAC NO.	CAS#	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie
33'44'-TeCB	77	32598-13-3	2.0	12	600		9.9	82	828		7.2	84	1167		5.1	52	1020	
233'44'-PeCB	105	32598-14-4	2.0	360	18000		9.9	2500	25253		7.2	2100	29167		5.1	1800	35294	
2344'5-PeCB	114	74472-37-0	2.0	31	1550		9.9	190	1919		7.2	160	2222		5.1	160	3137	
23'44'5-PeCB	118	31508-00-6	2.0	1200	60000		9.9	7800	78788		7.2	7600	105556		5.1	6400	125490	
2'344'5-PeCB	123	65510-44-3	2.0	45	2250		9.9	280	2828		7.2	210	2917	J	5.1	220	4314	
33'44'5-PeCB	126	57465-28-8	2.0	2.9	145	U	9.9	16	162		7.2	17	236		5.1	14	275	
233'44'5-HxCB	156/157	38380-08-4 / 69782-90-7	2.0	170	8500		9.9	1100	11111		7.2	780	10833	C	5.1	1100	21569	
23'44'55'-HxCB	167	52663-72-6	2.0	74	3700		9.9	470	4747		7.2	370	5139		5.1	510	10000	
33'44'55'-HxCB	169	32774-16-6	2.0	3.2	160	J	9.9	18	182	J	7.2	19	264		5.1	20	392	J
22'33'44'5-HpCB	170	35065-30-6	2.0	320	16000		9.9	2000	20202		7.2	1400	19444		5.1	2400	47059	
22'344'55'-HpCB	180/193	8	2.0	850	42500		9.9	5900	59596		7.2	4500	62500	C	5.1	7200	141176	
233'44'55'-HpCB	189	39635-31-9	2.0	13	650		9.9	84	848		7.2	58	806		5.1	110	2157	

			Composite 5				Composite 6				Composite 7				Composite 8			
			Species Carp				Species Bass				Species Bass				Species Carp			
			Sample Type WB				Sample Type Fillet				Sample Type Fillet				Sample Type Fillet			
				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)		
Chemical	IUPAC NO.	CAS#	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie
33'44'-TeCB	77	32598-13-3	8.5	99	1165		1.4	12	857		1.3	14	1077		3.5	38	1086	
233'44'-PeCB	105	32598-14-4	8.5	2800	32941		1.4	420	30000		1.3	470	36154		3.5	1000	28571	
2344'5-PeCB	114	74472-37-0	8.5	280	3294		1.4	39	2786		1.3	42	3231		3.5	92	2629	
23'44'5-PeCB	118	31508-00-6	8.5	11000	129412		1.4	1300	92857		1.3	1600	123077		3.5	3800	108571	
2'344'5-PeCB	123	65510-44-3	8.5	270	3176		1.4	33	2357		1.3	33	2538		3.5	140	4000	J
33'44'5-PeCB	126	57465-28-8	8.5	24	282	U	1.4	3.7	264		1.3	4.7	362	U	3.5	8.9	254	
233'44'5-HxCB	156/157	38380-08-4 / 69782-90-7	8.5	1800	21176		1.4	210	15000	C	1.3	250	19231		3.5	600	17143	
23'44'55'-HxCB	167	52663-72-6	8.5	870	10235		1.4	80	5714		1.3	87	6692		3.5	280	8000	
33'44'55'-HxCB	169	32774-16-6	8.5	36	424	J	1.4	2.9	207		1.3	4.7	362	J	3.5	11	314	J
22'33'44'5-HpCB	170	35065-30-6	8.5	4000	47059		1.4	340	24286		1.3	370	28462		3.5	1100	31429	
22'344'55'-HpCB	180/193	8	8.5	13000	152941		1.4	950	67857	C	1.3	980	75385		3.5	3000	85714	
233'44'55'-HpCB	189	39635-31-9	8.5	180	2118		1.4	12	857		1.3	17	1308		3.5	50	1429	

Table B-5. PCB congener concentrations (ng/g) in composite fish samples collected from the Willamette River

			Composite 9				Composite 10				Composite 11				Composite 12			
			Species Carp				Species Pikeminnow				Species Pikeminnow				Species Sucker			
			Sample Type WB-fillet				Sample Type Fillet				Sample Type WB-fillet				Sample Type WB			
				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)		
Chemical	IUPAC NO.	CAS#	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normaliz	Data Qualifie
33'44'-TeCB	77	32598-13-3	7.6	84	1105		1.8	35	1944		8.1	190	2346		7.9	68	861	
233'44'-PeCB	105	32598-14-4	7.6	2300	30263		1.8	750	41667		8.1	3800	46914		7.9	1700	21519	
2344'5-PeCB	114	74472-37-0	7.6	220	2895		1.8	71	3944		8.1	370	4568		7.9	120	1519	
23'44'5-PeCB	118	31508-00-6	7.6	9200	121053		1.8	2500	138889		8.1	13000	160494		7.9	5100	64557	
2'344'5-PeCB	123	65510-44-3	7.6	270	3553		1.8	61	3389		8.1	320	3951		7.9	200	2532	J
33'44'5-PeCB	126	57465-28-8	7.6	21	276		1.8	6.7	372		8.1	38	469		7.9	16	203	
233'44'5-HxCB	156/157	38380-08-4 / 69782-90-7	7.6	1400	18421		1.8	400	22222		8.1	2000	24691		7.9	790	10000	C
23'44'55'-HxCB	167	52663-72-6	7.6	680	8947		1.8	170	9444		8.1	820	10123		7.9	330	4177	
33'44'55'-HxCB	169	32774-16-6	7.6	20	263	J	1.8	6.1	339	J	8.1	35	432		7.9	20	253	
22'33'44'5-HpCB	170	35065-30-6	7.6	2500	32895		1.8	610	33889		8.1	2900	35802		7.9	1400	17722	
22'344'55'-HpCB	180/193	8	7.6	8600	113158		1.8	1800	100000		8.1	9900	122222		7.9	3600	45570	C
233'44'55'-HpCB	189	39635-31-9	7.6	120	1579		1.8	30	1667		8.1	160	1975		7.9	59	747	

			Composite 13				Composite 14				Composite 15			
			Species Pikeminnow				Species Carp				Species Pikeminnow			
			Sample Type WB				Sample Type WB				Sample Type WB			
				Concentration (pg/g)				Concentration (pg/g)				Concentration (pg/g)		
Chemical	IUPAC NO.	CAS#	Percent Lipid	Wet Weigh	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weigh	Lipid Normalized	Data Qualifie	Percent Lipid	Wet Weight	Lipid Normalized	Data Qualifie
33'44'-TeCB	77	32598-13-3	5.8	100	1724		6.1	70	1148		3.6	62	1722	
233'44'-PeCB	105	32598-14-4	5.8	2400	41379		6.1	1600	26230		3.6	1200	33333	
2344'5-PeCB	114	74472-37-0	5.8	220	3793		6.1	130	2131		3.6	74	2056	
23'44'5-PeCB	118	31508-00-6	5.8	9700	167241		6.1	6800	111475		3.6	4100	113889	
2'344'5-PeCB	123	65510-44-3	5.8	210	3621	J	6.1	200	3279		3.6	86	2389	
33'44'5-PeCB	126	57465-28-8	5.8	21	362		6.1	15	246		3.6	9.0	250	
233'44'5-HxCB	156/157	38380-08-4 / 69782-90-7	5.8	1600	27586	C	6.1	930	15246		3.6	470	13056	
23'44'55'-HxCB	167	52663-72-6	5.8	770	13276		6.1	440	7213		3.6	180	5000	
33'44'55'-HxCB	169	32774-16-6	5.8	27	466		6.1	22	361		3.6	9.0	250	
22'33'44'5-HpCB	170	35065-30-6	5.8	1800	31034		6.1	1900	31148		3.6	650	18056	
22'344'55'-HpCB	180/193	8	5.8	7400	127586	C	6.1	6700	109836		3.6	2100	58333	
233'44'55'-HpCB	189	39635-31-9	5.8	100	1724		6.1	90	1475		3.6	32	889	

Table B-6. Dioxin and furan concentrations (ng/kg) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	Collection Location[a] (RM)	Percent Lipid	2,3,7,8-TCDD CAS# 1746-01-6 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,7,8-PeCDD 40321-76-4 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,4,7,8-HxCDD 39227-28-6 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,6,7,8-HxCDD 57653-85-7 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,7,8,9-HxCDD 19408-74-3 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.14	10		0.11	7.9		0.10	7.1	U	0.10	7.1	U	0.10	7.1	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.10	7.7		0.10	7.7		0.10	7.7	U	0.10	7.7	U	0.10	7.7	U
Carp	WB	3	43.0 - 71.9	7.2	0.82	11		1.1	15		0.75	10		3.3	45		0.32	4.4	
Carp	WB	4	34.4 - 43.0	5.1	0.64	13		0.89	17		0.57	11		2.5	49		0.24	4.7	
Carp	WB	5	34.4 - 43.0	8.5	1.3	15		1.6	19		1.3	15		5.1	60		0.59	6.9	
Carp	Fillet	8	43.0 - 50.0	3.5	0.38	11		0.42	12		0.31	8.9		1.2	34		0.10	2.9	
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.86	11		1.1	15		0.80	11		2.9	38		0.38	5.0	
Carp	WB	14	56.5 - 71.9	6.1	0.63	10		0.80	13		0.45	7.4		1.8	29		0.29	4.8	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.13	7.2		0.18	10		0.10	5.6	U	0.10	5.6	U	0.10	5.6	U
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	0.70	8.6		1.1	14		0.50	6.2		2.1	26		0.10	1.2	U
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.46	7.9		0.69	12		0.37	6.4		1.2	21		0.23	4.0	
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.19	5.3		0.25	6.9		0.12	3.3		0.46	13		0.08	2.2	
Sucker	Fillet	1	26.5 - 34.4	2.0	0.08	4.0		0.06	3.0		0.10	5.0	U	0.10	5.0	U	0.10	5.0	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.47	4.7		0.43	4.3		0.15	1.5		0.55	5.6		0.10	1.0	U
Sucker	WB	12	50.0 - 56.5	7.9	0.39	4.9		0.58	7.3		0.33	4.2		0.77	9.7		0.22	2.8	

Species	Sample Type	Composite Sample	Collection Location[a] (RM)	Percent Lipid	1,2,3,4,6,7,8-HpCDD CAS# 35822-46-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	OCDD 3268-87-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	2,3,7,8-TCDF 51207-31-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,7,8-PeCDF 57177-41-6 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	2,3,4,7,8-PeCDF 57117-31-4 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.15	10.7	U	0.30	21.4	U	0.17 [b]	12		0.07	5.0	U	0.07	5.0	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.15	12	U	0.30	23	U	0.14	11		0.05	3.8	U	0.08	6.2	
Carp	WB	3	43.0 - 71.9	7.2	6.0	83		7.4	103		1.1	15		0.28	3.9		0.69	9.6	
Carp	WB	4	34.4 - 43.0	5.1	4.6	91		6.4	126		0.69	14		0.11	2.2	U	0.47	9.2	
Carp	WB	5	34.4 - 43.0	8.5	9.6	113		11	129		1.3	15		0.38	4.5		1.1	12	
Carp	Fillet	8	43.0 - 50.0	3.5	2.1	59		1.9	54		0.40	11		0.10	2.9		0.29	8.3	
Carp	WB-fillet	9	43.0 - 50.0	7.6	5.2	69		5.5	72		0.95	13		0.28	3.7		0.70	9.2	
Carp	WB	14	56.5 - 71.9	6.1	3.7	61		5.1	83		0.95	16		0.21	3.4		0.49	8.0	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.51	28		0.89	49		0.44	24		0.08	4.4	U	0.13	7.2	
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	3.3	41		3.7	46		2.8	35		0.29	3.6		0.78	9.6	
Pikeminnow	WB	13	50.0 - 56.5	5.8	2.0	34		2.9	49		1.5	26		0.09	1.6	U	0.53	9.1	
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.91	25		1.6	44		0.68	19		0.09	2.5	U	0.17	4.7	
Sucker	Fillet	1	26.5 - 34.4	2.0	0.14	7.0		0.45	23		0.14	7.0		0.05	2.5	U	0.05	2.5	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	2.0	21		11	115		0.85	8.6		0.10	1.0		0.22	2.2	
Sucker	WB	12	50.0 - 56.5	7.9	1.3	16		2.7	34		0.97	12		0.18	2.3		0.48	6.1	

Table B-6. Dioxin and furan concentrations (ng/kg) in composite fish samples collected from the Willamette River

Species	Sample Type	Composite Sample	Collection Location[a] (RM)	Percent Lipid	1,2,3,4,7,8-HxCDF CAS# 70648-26-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,6,7,8-HxCDF 57117-44-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,7,8,9-HxCDF 72918-21-9 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	2,3,4,6,7,8-HxCDF 60851-34-5 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	1,2,3,4,6,7,8-HpCDF 67562-39-4 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.10	7.1	U	0.10	7.1	U	0.10	7.1	U	0.10	7.1	U	0.15	10.7	U
Bass	Fillet	7	43.0 - 71.9	1.3	0.10	7.7	U	0.10	7.7	U	0.10	7.7	U	0.10	7.7	U	0.15	12	U
Carp	WB	3	43.0 - 71.9	7.2	0.39	5.4		0.28	3.9		0.10	1.4	U	0.15	2.1		0.17	2.4	U
Carp	WB	4	34.4 - 43.0	5.1	0.26	5.1		0.17	3.3		0.10	2.0	U	0.14	2.7		0.15	2.9	U
Carp	WB	5	34.4 - 43.0	8.5	0.65	7.6		0.40	4.7		0.10	1.2	U	0.26	3.1		1.1	13	
Carp	Fillet	8	43.0 - 50.0	3.5	0.15	4.3		0.10	2.9	U	0.10	2.9	U	0.10	2.9	U	0.15	4.3	U
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.42	5.5		0.30	3.9		0.10	1.3	U	0.26	3.4		0.65	8.6	
Carp	WB	14	56.5 - 71.9	6.1	0.25	4.1		0.22	3.6		0.10	1.6	U	0.21	3.4		0.48	7.9	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.10	5.6	U	0.10	5.6	U	0.10	5.6	U	0.10	5.6	U	0.15	8.3	U
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	0.30	3.7		0.20	2.5		0.10	1.2	U	0.18	2.2		0.15	1.9	U
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.10	1.7	U	0.16	2.8		0.10	1.7	U	0.19	3.3		0.28	4.8	
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.10	2.8	U	0.10	2.8	U	0.10	2.8	U	0.10	2.8	U	0.15	4.2	U
Sucker	Fillet	1	26.5 - 34.4	2.0	0.10	5.0	U	0.10	5.0	U	0.10	5.0	U	0.10	5.0	U	0.15	7.5	U
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.10	1.0	U	0.10	1.0	U	0.10	1.0	U	0.10	1.0	U	0.15	1.5	U
Sucker	WB	12	50.0 - 56.5	7.9	0.22	2.8		0.18	2.3		0.20	2.5		0.26	3.3		0.27	3.4	

Species	Sample Type	Composite Sample	Collection Location[a] (RM)	Percent Lipid	1,2,3,4,7,8,9-HpCDF CAS# 55673-89-7 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	OCDF 39001-02-0 Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	TEC (nd = DL) Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	TEC (nd = 1/2 DL) Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier	TEC (nd= 0) Concentration (ng/kg) Wet Weight	Lipid Normalize	Data Qualifier
Bass	Fillet	6	34.4 - 43.0	1.4	0.15	10.7	U	0.30	21.4	U	0.38	27		0.32	23		0.27	19	
Bass	Fillet	7	43.0 - 71.9	1.3	0.15	12	U	0.30	23	U	0.33	25		0.29	23		0.25	20	
Carp	WB	3	43.0 - 71.9	7.2	0.17	2.4	U	0.30	4.2		3.0	41		3.0	41		3.0	41	
Carp	WB	4	34.4 - 43.0	5.1	0.15	2.9	U	0.30	5.9	U	2.3	45		2.3	45		2.3	45	
Carp	WB	5	34.4 - 43.0	8.5	0.15	1.8	U	0.30	3.5	U	4.6	54		4.6	54		4.6	54	
Carp	Fillet	8	43.0 - 50.0	3.5	0.15	4.3	U	0.30	8.6	U	1.2	35		1.2	34		1.2	34	
Carp	WB-fillet	9	43.0 - 50.0	7.6	0.15	2.0	U	0.30	3.9	U	3.0	40		3.0	39		3.0	39	
Carp	WB	14	56.5 - 71.9	6.1	0.15	2.5	U	0.30	4.9	U	2.2	35		2.1	35		2.1	35	
Pikeminnow	Fillet	10	43.0 - 50.0	1.8	0.15	8.3	U	0.30	17	U	0.50	28		0.46	26		0.42	24	
Pikeminnow	WB-fillet	11	43.0 - 50.0	8.1	0.15	1.9	U	0.30	3.7	U	2.9	36		2.9	36		2.9	36	
Pikeminnow	WB	13	50.0 - 56.5	5.8	0.15	2.6	U	0.30	5.2	U	1.8	32		1.8	31		1.8	31	
Pikeminnow	WB	15	56.5 - 71.9	3.6	0.15	4.2	U	0.30	8.3	U	0.72	20		0.69	19		0.67	19	
Sucker	Fillet	1	26.5 - 34.4	2.0	0.15	7.5	U	0.30	15	U	0.26	13		0.21	10		0.16	7.8	
Sucker	WB-fillet	2	26.5 - 34.4	9.9	0.15	1.5	U	0.55	5.6		1.2	13		1.2	12		1.2	12	
Sucker	WB	12	50.0 - 56.5	7.9	0.20	2.5		0.47	5.9		1.6	20		1.6	20		1.6	20	

NOTE: CAS # - Chemical Abstracts Services
DL - detection limit
nd - non-detects
TEC - toxicity equivalent concentration
U - undetected
WB - whole body
WB-fillet - whole body minus the fillet portions

[a] Segment 4 terminated at mouth of Yamhill River prior to RM 50 due to dredging activities in main channel

[b] Average of 2 duplicates (0.15 and 0.19 ng/kg)

APPENDIX C

Data Quality Assurance Review

DATA QUALITY ASSURANCE REVIEW

Project data quality objectives were established in the Quality Assurance Project Plan (QAPP) (EVS 1999). The overall quality assurance objective for this project was to collect analytical data of known and acceptable quality so that potential health risk to fish consumers could be estimated. Data quality objectives (DQOs) were established for holding times, accuracy, precision, detection limits, and completeness to ensure that the data of acceptable quality were obtained in this project (Table C-1). The DQOs established for each chemical method are discussed below along with an assessment of data collected during this project.

METALS

Fifteen composite fish samples were analyzed for silver, arsenic, beryllium, cadmium, chromium, copper, nickel, lead, antimony, thallium, and zinc via inductively coupled plasma-mass spectrometry using USEPA Method 1638/ 200.8 modified (EVS 1999). Mercury was analyzed via cold vapor atomic fluorescence using USEPA Method 1631modified. Total inorganic arsenic was analyzed by atomic absorption spectrometry using USEPA Method 1632 modified. Frontier Geosciences, Inc. in Seattle, Washington performed all metal analyses.

Holding Times

Axys Analytical Services, Ltd. prepared the composite samples and shipped tissue homogenate samples to Frontier Geosciences. All homogenate samples arrived at Frontier Geosciences on September 21, 1999. A holding time of two years was established as the DQO for all metals except mercury; the holding time for mercury was 86 days (EVS 1999). The 86-day mercury holding time determined from the earliest collection date for individual fish used to form a composite sample expired on November 5-13, 1999. All analyses for total mercury occurred prior to these dates from October 8 to October 10, 1999. All other metal analyses were conducted between October 8, 1999 and November16, 1999, well within the two year holding time for this study.

Accuracy

Three standard reference materials (SRMs) were analyzed along with the samples to assess accuracy. DORM-2 is a dogfish muscle standard; DOLT-2 is a dogfish liver standard, and NIST 1643d is a freshwater standard. The percent recoveries determined from analyses of these SRMs were within the range of 60 to 140 percent established as a data quality objective for this study for all metals except chromium and nickel (Table C-2). The percent recovery for chromium in dogfish muscle (47.6 percent) was

Table C-1. Summary of data quality objectives for analyses

Parameter	Units	Method Detection Limit	Sample Size	Precision (RPD)	Accuracy	Completeness	Method	Reference	Container (Field/ Laboratory)	Sample Holding Time	Preservative
Metals											
11 metals[a]	mg/kg	0.005–0.1	5 g	30%	60–140%	90%	ICP-MS	USEPA Method 1638/ 200.8 mod.	Aluminum foil/glass	2 years	Freeze
Arsenic (inorganic)	mg/kg	0.05	from 5g for metals	30%	60–140%	90%	HG-CT-AAS	USEPA Method 1632 mod.	Collected with metals	2 years	Freeze
Mercury	mg/kg	0.0005	from 5g for metals	30%	60–140%	90%	CV-AFS	USEPA Method 1631 mod.	Collected with metals	86 days	Freeze
Pesticides	µg/kg	0.1–2	from 10g for PCB Aroclors	50%	30–150%	90%	HRGC-LRMS	Axys Method CL-T-03, Version 2 1997	Collected with PCBs	1 year (sample) 40 days (extract)	Freeze
PAHs	µg/kg	0.1–0.3[b]	10 g	50%	30–140%	90%	HRGC-LRMS	Axys Method PH-01, Version 2 1997	Aluminum foil/glass	1 year (sample) 40 days (extract)	Freeze
PCB Aroclors	µg/kg	1–2	10 g	50%	30–150%	90%	HRGC-LRMS	Axys Method CL-T-03, Version 2 1997	Aluminum foil/glass	1 year (sample) 40 days (extract)	Freeze
PCB congeners	ng/kg	5.0	10 g	40%	70–140%	90%	HRGC-HRMS	USEPA Method 1668	Aluminum foil/glass	1 year (sample) 1 year (extract)	Freeze
Dioxins/ furans	ng/kg	0.05–0.3	10 g	40%	70–140%	90%	HRGC-HRMS	USEPA Method 1613B	Aluminum foil/glass	1 year (sample) 1 year (extract)	Freeze
Moisture content	%	0.1	10 g	10%	±20%	90%	Gravimetric	Axys SOP Lab-15 Revision 1	Collected with PCBs	6 months	Freeze
Percent lipids	%	0.1	5 g	30%	na	90%	Gravimetric	Bligh and Dyer 1959	Collected with PCBs	1 year	Freeze

NOTE: PAH - polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
ICP-MS – inductively coupled plasma-atomic emission spectrometry/mass spectrometry
HRGC - high resolution gas chromatography
LRMS - low resolution mass spectrometry
HRMS - high resolution mass spectrometry

[a] Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc

[b] Parent PAH

Table C-2. Standard reference material (SRM) analyses for metals

Analyte	SRM	Certified Conc. (mg/kg)	Measured Conc. (mg/kg)	Percent Recovery (%)
Silver	DORM-2	0.041	0.05	122.0
Arsenic	DORM-2	18.00	17.08	94.9
Beryllium	DORM-2	na	na	na
Cadmium	DORM-2	0.043	0.04	93.0
Chromium	DORM-2	34.70	16.50	47.6
Copper	DORM-2	2.34	2.01	85.9
Mercury	DORM-2	4.640	4.341	93.6
Nickel	DORM-2	19.40	9.69	49.9
Lead	DORM-2	0.065	0.049	75.4
Antimony	DORM-2	na	na	na
Thallium	DORM-2	na	na	na
Zinc	DORM-2	25.60	21.42	83.7
Silver	DOLT-2	0.608	0.61	100.3
Arsenic	DOLT-2	56.02	54.13	96.6
Beryllium	DOLT-2	na	na	na
Cadmium	DOLT-2	20.80	19.01	91.4
Chromium	DOLT-2	0.37	0.83	224.3
Copper	DOLT-2	25.80	27.87	108.0
Mercury	DOLT-2	2.140	1.980	92.5
Nickel	DOLT-2	0.20	0.23	115.0
Lead	DOLT-2	0.220	0.196	89.1
Antimony	DOLT-2	na	na	na
Thallium	DOLT-2	na	na	na
Zinc	DOLT-2	85.80	81.54	95.0
Silver	NIST 1643d	1.270	1.15	90.6
Arsenic	NIST 1643d	16.60	14.20	85.5
Beryllium	NIST 1643d	12.53	12.3	98.2
Cadmium	NIST 1643d	6.47	6.32	97.7
Chromium	NIST 1643d	18.53	18.77	101.3
Copper	NIST 1643d	20.50	22.15	108.0
Mercury	NIST 1643d	1.400	1.376	98.3
Nickel	NIST 1643d	58.10	58.80	101.2
Lead	NIST 1643d	18.18	18.49	101.7
Antimony	NIST 1643d	54.10	53.62	99.1
Thallium	NIST 1643d	7.28	7.65	105.1
Zinc	NIST 1643d	85.80	81.54	95.0

NOTE: na - not available

below the DQO of 60 percent, while the percent recovery in dogfish liver (224.3 percent) was well above the upper DQO of 140 percent. The percent recovery of chromium in the freshwater sample (101.3 percent) was within acceptable DQO limits. The percent recovery of nickel in dogfish muscle (49.9 percent) was below the DQO of 60 percent. Nickel analyses for the other two SRMs were within acceptable percent recovery limits. The average percent recovery for all metals except chromium and nickel was 95.9 percent.

Precision

The precision of metal analyses was assessed by performing a duplicate analysis of Composite 2 (largescale sucker: whole body minus fillets) for all metals except inorganic arsenic. The precision of inorganic arsenic was assessed by performing a duplicate analysis of Composite 1 (largescale sucker: whole body). Table C-3 shows the results of these analyses along with the measure of precision expressed as a relative percent difference (RPD). The RPDs for silver (85.7 percent) and antimony (66.7 percent) exceeded the DQO for precision of 30 percent for metals (EVS 1999). The concentration of silver and antimony in the duplicate samples were near their respective detection limits of 0.01 and 0.001 mg/kg, which may account for the higher variability of the analyses. The average RPD of all metals except silver and antimony was 4.4 percent.

Table C-3. Laboratory duplicate analyses for metals

Analyte	Sample ID	Replicate 1 Conc. (mg/kg)	Replicate 2 Conc. (mg/kg)	RPD (%)
Silver	Composite #2	0.05	0.02	85.7
Arsenic	Composite #2	0.17	0.15	12.5
Inorganic Arsenic	Composite #1	0.004	0.004	0.0
Beryllium	Composite #2	0.006	0.007	15.4
Cadmium	Composite #2	0.01	0.01	0.0
Chromium	Composite #2	0.62	0.61	1.6
Copper	Composite #2	2.86	2.78	2.8
Mercury	Composite #2	0.096	0.100	4.1
Nickel	Composite #2	0.51	0.50	2.0
Lead	Composite #2	0.141	0.135	4.3
Antimony	Composite #2	0.001	0.002	66.7
Thallium	Composite #2	ND	ND	na
Zinc	Composite #2	17.52	17.28	1.4

NOTE: RPD - relative percent difference
ND - not detected
na - not applicable

Detection Limits

Table C-4 shows the method detection limits achieved for the analysis of metals in this study. The detection limits for all metals except mercury were within the range of detection limits of 0.005–0.1 mg/kg established as a DQO for this study. The detection limit achieved for mercury, 0.003 mg/kg, was higher than the DQO of 0.0005 mg/kg. However, all sample results for mercury had detected concentrations that were a minimum of 10 times the detection limit, so the detection limit achieved has no affect on the data quality.

Table C-4. Method detection limits for metal analyses

Analyte	Method Detection Limit (mg/kg)
Silver	0.01
Arsenic	0.05
Inorganic Arsenic	0.003
Beryllium	0.001
Cadmium	0.01
Chromium	0.02
Copper	0.01
Mercury	0.003
Nickel	0.01
Lead	0.005
Antimony	0.001
Thallium	0.002
Zinc	0.06

Completeness

Completeness is the percentage of valid results obtained as compared to the total number of samples taken for a parameter. A completeness of 90 percent was established as a DQO for this study. All analyses of metals were considered to be valid and of acceptable quality for this risk assessment.

PAHs

Fifteen composite fish samples were analyzed for polycyclic aromatic hydrocarbons using Axys Method PH-01, Version 2. Tissue samples were spiked with 12 PAH surrogate samples and solvent extracted. The raw extract was fractionated on silca gel into polar and non-polar fractions. The polar fraction was analyzed for PAHs by high resolution gas chromatography (HRGC) / low resolution mass spectrometry (LRMS). HRGC/LRMS analysis was conducted using a Finnigan Incos 50 mass spectrometer equipped with a Varian 3400 gas chromatograph. The final volume of sample extracts was 20 µl; 1 µl was injected onto a Restek Rt_x-5 gas chromatography column.

Holding Times

A holding time of 40 days for sample extraction and 1 year for PAH analysis was established as a DQO for this study (EVS 1999). These holding times were met for 6 of the 15 tissue samples analyzed (Table C-5). The extraction holding times were exceeded by 14 to 73 days for the remaining 9 samples. The PAH data for all samples for which extraction holding times were exceeded have been qualified as estimates using a J data qualifier. All samples were analyzed prior to the 1-year holding time DQO (Table C-5).

Table C-5. Extraction and analysis holding times for PAH analyses

Composite No.	Species	Sample Type	Collection Date[a]	Extraction Date	Analysis Date	Extraction Holding Time (days)	Analysis Holding Time (days)
1	Sucker	F	8/11/1999	9/14/1999	10/29/1999	34	79
2	Sucker	WB-F	8/11/1999	9/14/1999	10/30/1999	34	80
3	Carp	WB	8/12/1999	9/14/1999	10/30/1999	33	79
4	Carp	WB	8/12/1999	9/14/1999	10/30/1999	33	79
5	Carp	WB	8/18/1999	12/2/1999	12/8/1999	106	112
6	Bass	F	8/12/1999	9/14/1999	10/30/1999	33	79
7	Bass	F	8/11/1999	12/2/1999	12/8/1999	113	119
8	Carp	F	8/14/1999	12/2/1999	12/8/1999	110	116
9	Carp	WB-F	8/14/1999	12/2/1999	12/8/1999	110	116
10	Pikeminnow	F	8/13/1999	12/2/1999	12/8/1999	111	117
11	Pikeminnow	WB-F	8/13/1999	9/20/1999	11/2/1999	38	81
12	Sucker	WB	8/15/1999	10/9/1999	11/2/1999	55	79
13	Pikeminnnow	WB	8/15/1999	10/9/1999	11/2/1999	55	79
14	Carp	WB	8/16/1999	10/9/1999	11/2/1999	54	78
15	Pikeminnnow	WB	8/16/1999	10/9/1999	11/2/1999	54	78

NOTE: F - fillet with skin
WB - whole body
WB-F - whole body minus the fillets

[a] First date of collection for the individual fish comprising the composite sample.

Accuracy

Accuracy was assessed by calculating the percent recovery of nine isotope-labeled surrogate PAH standards in accordance with Axys Method PH-01, Version 2. Low percent recoveries outside the method acceptance limits were obtained for the analysis of naphthalene in five samples and for acenaphthene in one laboratory duplicate sample (Table C-6). The percent recoveries for all other samples were within the method acceptance limits. Chemical results associated with percent recoveries that fell outside the method acceptance limits have been qualified as estimates using a J data qualifier.

Table C-6. Matrix spike percent recovery results for deuterium-labeled PAH surrogate standards

	Composite No.																
Labeled Compounds	1	1-D	2	3	4	5	6	7	8	8-D	9	10	11	12	13	14	15	15-D
Naphthalene d-8	30	NQ	16	16	12[a]	20	NQ	14[a]	12[a]	6.6	22	16	12[a]	14[a]	24	23	25	18
Acenaphthene d-10	45	26	35	37	32	41	34	22	20	18[b]	36	26	34	34	45	46	51	38
Phenanthrene d-10	75	60	66	70	52	65	59	42	42	34	57	43	56	51	61	57	77	63
Pyrene d-10	97	78	83	87	88	77	94	61	65	46	79	59	74	68	77	76	87	80
Chrysene d-12	100	78	78	79	74	77	100	73	64	49	80	58	87	77	87	86	94	83
Benzo[a]pyrene d-12	120	120	110	86	69	79	55	68	66	47	86	48	31	78	57	84	100	90
Perylene d-12	130	110	110	100	83	71	90	62	64	44	83	49	23	72	63	78	94	86
Dibenzo[ah]anthracene d-14	81	67	76	74	75	67	89	66	58	38	80	37	72	56	72	62	78	58
Benzo[ghi]perylene d-12	110	91	100	92	88	65	110	73	62	44	81	41	74	60	78	67	89	70

NOTE: NQ = not quantifiable
D - duplicate

[a] Surrogate recovery is outside the acceptance limits of 15–120 percent for naphthalene.
[b] Surrogate recovery is outside the acceptance limits of 20–120 percent for acenaphthene.

Precision

Precision was assessed by analyzing laboratory duplicates for three tissue samples (Table C-7). Nine PAHs were not detected in any of the three sample-duplicate pairs. The relative percent difference (RPD) of the duplicate analyses fell outside the 50 percent DQO established for this study for acenaphthene, anthracene, and pyrene in Composite 1, a composite sample of largescale sucker fillets. All other detected PAHs in these samples had RPD values ranging from 6 to 19 percent.

Detection Limits

Detection limits achieved for the analysis of PAH compounds are shown in Table C-8. With the exception of Composite 12 (whole body largescale sucker), Composite 14 (whole body carp), and Composite 15 (whole body northern pikeminnow) and, all

Table C-7. Laboratory duplicate analyses for PAHs

Chemical	Composite 1 Conc. (µg/kg)	Qual.	Composite 1-dup Conc (µg/kg)	Qual	RPD (%)	Composite 8 Conc. (µg/kg)	Qual.	Composite 8-dup Conc (µg/kg)	Qual	RPD (%)	Composite 15 Conc. (µg/kg)	Qual.	Composite 15-dup Conc (µg/kg)	Qual	RPD (%)
Naphthalene	5.2		NQ	NQ	na	13	J	12	J	8	4.1	J	4	J	2
Acenaphthylene	0.64		0.53		19	1.8	UJ	1.4	UJ	na	0.52	J	0.56	J	7
Acenaphthene	0.21		0.67	U	105	1.9	UJ	1.5	UJ	na	2.2	J	2.4	J	9
Fluorene	0.51		0.62		19	1.9	UJ	1.5	UJ	na	1.2	J	1.3	J	8
Phenanthrene	0.33	J	0.38	J	14	1.9	J	1.7	J	11	1.2	J	1.4	J	15
Anthracene	1.2	J	4.5	J	116	0.86	UJ	0.92	UJ	na	0.14	J	0.17	J	19
Fluoranthene	0.39		0.52	J	29	0.56	UJ	0.74	UJ	na	0.28	J	0.26	J	7
Pyrene	0.89		2.9		106	0.62	J	0.73	UJ	16	0.16	J	0.15	J	6
Benz[a]anthracene	0.16	U	0.24	U	na	0.57	UJ	0.66	UJ	na	0.03	UJ	0.035	UJ	na
Chrysene	0.15	U	0.35	U	na	0.59	UJ	0.69	UJ	na	0.031	UJ	0.098	UJ	na
Benzo[b,j,k]fluoranthenes	0.38	U	0.5	U	na	0.54	UJ	0.78	UJ	na	0.048	UJ	0.15	UJ	na
Benzo[e]pyrene	0.32	U	0.48	U	na	0.56	UJ	0.82	UJ	na	0.095	UJ	0.11	UJ	na
Benzo[a]pyrene	0.47	U	0.7	U	na	0.59	UJ	0.85	UJ	na	0.11	UJ	0.16	UJ	na
Perylene	0.75	U	0.98	U	na	0.67	UJ	0.92	UJ	na	0.22	UJ	0.17	UJ	na
Dibenzo[a,h]anthracene	0.5	U	1.2	U	na	0.7	UJ	1.1	UJ	na	0.098	UJ	0.15	UJ	na
Indeno[1,2,3-cd]pyrene	0.28	U	0.54	U	na	0.67	UJ	0.93	UJ	na	0.027	UJ	0.09	UJ	na
Benzo[g,h,i]perylene	0.3	U	0.63	U	na	0.33	UJ	0.82	UJ	na	0.037	UJ	0.073	UJ	na

NOTE: RPD - relative percent difference
NQ - not quantifiable
na - not applicable

Table C-8. Detection limits (µg/kg) achieved for the analysis of PAH compounds

Chemical	Composite No.																	
	1	1-D	2	3	4	5	6	7	8	8-D	9	10	11	12	13	14	15	15-D
Naphthalene	0.34[b]	NQ	0.31[b]	0.44[b]	0.95[b]	1.1[b]	NQ	1.8[b]	1.8[b]	5.5[b]	1.8[b]	2.7[b]	0.16	0.099	0.23	0.059	0.024	0.077
Acenaphthylene	0.16	0.39[b]	0.62[b]	0.49[b]	0.31[b]	0.59[b]	0.38[b]	1.4[a]	1.8[a]	1.4[a]	0.7[a]	0.98[a]	0.071	0.27	0.13	0.049	0.062	0.057
Acenaphthene	0.17	0.67[a]	0.39[b]	0.45[b]	0.4[b]	0.62[b]	0.15	1.5[a]	1.9[a]	1.5[a]	0.74[b]	1[a]	0.17	0.081	0.13	0.1	0.081	0.042
Fluorene	0.18	0.35	0.35[b]	0.41[b]	0.2	0.61[b]	0.62[a]	1.5[a]	1.9[a]	1.5[a]	0.72[a]	1[a]	0.071	0.071	0.21	0.12	0.025	0.016
Phenanthrene	0.14	0.14	0.28	0.3	0.32[b]	0.66[b]	0.17	0.65[b]	0.78[b]	0.83[b]	0.34[b]	0.62[b]	0.14	0.18	0.3	0.23	0.039	0.06
Anthracene	0.24	0.37[b]	0.31[b]	0.22	0.41[a]	0.72[a]	0.23	0.71[a]	0.86[a]	0.92[a]	0.37[b]	0.68[a]	0.3	0.14	0.68[a]	0.15	0.073	0.07
Fluoranthene	0.16	0.36[b]	0.38[b]	0.41[b]	0.31[b]	0.89[a]	0.16	0.2	0.56[a]	0.74[a]	0.65[a]	0.31[b]	0.094	0.12	0.16	0.2	0.041	0.052
Pyrene	0.19	0.44[b]	0.34[b]	0.44[b]	0.33[b]	0.88[b]	0.17	0.2	0.56[b]	0.73[a]	0.64[b]	0.3	0.13	0.082	0.12	0.11	0.042	0.053
Benz[a]anthracene	0.16	0.24	0.52[a]	0.4[b]	0.36[a]	0.59[a]	0.17	0.2	0.57[a]	0.66[a]	0.81[a]	0.31[a]	0.049	0.07	0.2	0.078	0.03	0.035
Chrysene	0.15	0.35[a]	0.4[b]	0.69[b]	0.31[b]	0.61[a]	0.15	0.21	0.59[a]	0.69[a]	0.84[a]	0.32[a]	0.078	0.062	0.19	0.09	0.031	0.098
Benzo[b,j,k]fluoranthenes	0.38[a]	0.5[a]	0.85[a]	1.2[b]	0.73[a]	0.56[a]	1.1[a]	0.27	0.54[a]	0.78[a]	0.47[a]	0.56[a]	1.3[a]	0.066	0.89[a]	0.063	0.048	0.15
Benzo[e]pyrene	0.32[a]	0.48[a]	0.81[a]	1.4[b]	0.72[a]	0.58[a]	1.1[a]	0.28	0.56[a]	0.82[a]	0.49[a]	0.58[a]	1.3[a]	0.069	3.6[a]	0.18	0.095	0.11
Benzo[a]pyrene	0.47[a]	0.7[a]	1.2[a]	1.2[b]	1.1[a]	0.61[a]	1.4[a]	0.3	0.59[a]	0.85[a]	0.51[a]	0.6[a]	1.4[a]	0.11	0.88[a]	0.17	0.11	0.13
Perylene	0.75[a]	0.98[a]	0.72[b]	0.78	0.81[a]	0.69[a]	1.1[a]	0.33[a]	0.67[a]	0.92[a]	0.54[a]	0.61[a]	2[a]	0.11	0.76[a]	0.22	0.22	0.17
Dibenzo[a,h]anthracene	0.5[a]	1.2[a]	0.47[a]	0.97[a]	0.4[a]	0.75[a]	0.28	0.72[a]	0.7	1.1[a]	0.43[a]	1.1[a]	0.089	0.089	0.064	0.091	0.098	0.15
Indeno[1,2,3-cd]pyrene	0.28	0.54[a]	0.4[b]	1.9[b]	0.34[a]	0.48[a]	0.31[a]	0.63[a]	0.67[a]	0.93[a]	0.45[a]	0.97[a]	0.041	0.036	0.043	0.034	0.027	0.09
Benzo[g,h,i]perylene	0.3	0.63[a]	0.36[b]	1.1[b]	0.25	0.42[a]	0.22	0.56[a]	0.33	0.82[a]	0.4[a]	0.86[a]	0.036	0.045	0.026	0.024	0.037	0.073

NOTE: D - duplicate
NQ - not quantifiable

[a] Detection limit exceeded the data quality objective of 0.3 *u*g/kg.

[b] Detection limit exceeded the data quality objective of 0.3 *u*g/kg; however, the measured concentration exceeded this concentration.

samples had detection limits for three or more PAHs that exceeded 0.3 µg/kg, the upper detection limits established as a DQO for PAHs in this study. Overall, 56 percent of PAH analyses exceeded a detection limit of 0.3 µg/kg. The quality of the data is impacted only when a detected quantity was not measured. This occurred in 37 percent of the PAH analyses.

Completeness

Completeness is the percentage of valid results obtained as compared to the total number of samples taken for a parameter. A completeness of 90 percent was established as a DQO for the analysis of PAHs in this study (EVS 1999). Sixty-eight percent of the PAH data were qualified as estimates due to the exceedance of extract holding times, low surrogate recovery, or failure to meet all method quantification criteria. Naphthalene could not be quantified due to low recoveries and matrix interferences in two samples. All data qualified as estimates were considered to be valid and of acceptable quality for this risk assessment. Ninety nine percent of the PAH data were used to assess potential human health risk in this study.

PESTICIDES AND PCB AROCLORS

Organochlorine pesticides and PCB Aroclors were measured using Axys Method CL-T-03, Version 3. Sample extracts were spiked with a suite of isotopically labeled surrogate standards (^{13}C-hexachlorobenzene, ^{13}C-gamma HCH, ^{13}C-p,p'-DDE, ^{13}C-p,p'-DDT, ^{13}C-PCB 101, ^{13}C-PCB 180, ^{13}C-PCB 209), split into two fractions on Florosil, and spiked with an isotopically labeled recovery standard just prior to instrumental analysis. One fraction (F1/F2) was analyzed separately by high resolution gas chromatography/low resolution mass spectrometry (HRGC/LRMS). The other fraction (F3/F4) was analyzed by high resolution gas chromatography/ECD detection (HRGC/ECD). Target concentrations were determined by the isotope dilution or internal standard method.

Holding Times

A one-year holding time for tissue samples and a 40-day holding time for extracts stored in the dark at –20ºC were established as DQOs for the analysis of pesticides and PCB Aroclors in this study (EVS 1999). All analyses met these holding times (Table C-9).

Table C-9. Extraction and analysis holding times for pesticide/Aroclor analyses

Composite No.	Species	Sample Type	Collection Date[a]	Extraction Date	Analysis Date	Extraction Holding Time (days)	Analysis Holding Time (days)
1	Sucker	F	8/11/1999	9/11/1999	9/19/1999	31	39
2	Sucker	WB-F	8/11/1999	9/11/1999	9/19/1999	31	39
3	Carp	WB	8/12/1999	9/11/1999	9/19/1999	30	38
4	Carp	WB	8/12/1999	9/11/1999	9/19/1999	30	38
5	Carp	WB	8/18/1999	9/16/1999	9/20/1999	24	33
6	Bass	F	8/12/1999	9/11/1999	9/19/1999	30	38
7	Bass	F	8/11/1999	9/11/1999	9/19/1999	31	39
8	Carp	F	8/14/1999	9/16/1999	9/20/1999	33	37
9	Carp	WB-F	8/14/1999	9/16/1999	9/20/1999	33	37
10	Pikeminnow	F	8/13/1999	9/16/1999	10/10/1999	34	58
11	Pikeminnow	WB-F	8/13/1999	9/16/1999	9/21/1999	34	39
12	Sucker	WB	8/15/1999	9/16/1999	9/21/1999	32	37
13	Pikeminnnow	WB	8/15/1999	9/11/1999	9/20/1999	27	36
14	Carp	WB	8/16/1999	9/16/1999	9/21/1999	31	36
15	Pikeminnnow	WB	8/16/1999	9/16/1999	9/21/1999	31	36

NOTE: F - fillet with skin
WB - whole body
WB-F - whole body minus the fillets

[a] First date of collection for the individual fish comprising the composite sample.

Accuracy

Accuracy was assessed by calculating the percent recovery of spiked isotope-surrogate standards (Table C-10). All percent recoveries were within the DQO limits of 30-140 percent. The average percent recovery for all surrogate standards and samples analyzed in this study was 78 percent. The concentrations of all target congeners were corrected for the percent recovery of the labeled surrogate standards.

Table C-10. Matrix spike percent recovery results for pesticide/PCB labeled surrogate standards

Labeled Surrogate Standards	Composite No.							
	1	2	3	4	5	6	7	8
^{13}C-Hexachlorobenzene	82	39	66	63	66	64	74	72
^{13}C-gamma HCH	84	37	62	58	60	63	75	72
^{13}C-p,p'-DDE	57	45	100	100	120	72	83	150
^{13}C-p,p'-DDT	44	28	48	48	65	43	52	60
^{13}C-PCB 101	72	36	74	75	88	61	75	91
^{13}C-PCB 180	50	30	66	70	100	49	57	68
^{13}C-PCB 209	42	31	56	66	96	57	66	71
d4-alpha-endosulphan	60	100	96	80	120	76	67	78

Labeled Surrogate Standards	Composite No.							
	9	9 Duplicate	10	11	12	13	14	15
^{13}C-Hexachlorobenzene	74	64	58	72	72	50	45	86
^{13}C-gamma HCH	75	61	71	70	71	47	52	100
^{13}C-p,p'-DDE	150	140	110	120	120	80	120	160
^{13}C-p,p'-DDT	71	66	80	63	88	42	62	74
^{13}C-PCB 101	100	94	91	93	92	62	85	110
^{13}C-PCB 180	90	88	87	85	85	60	83	92
^{13}C-PCB 209	85	93	84	99	77	60	80	110
d4-alpha-endosulphan	130	110	95	120	130	80	120	95

Precision

Precision was assessed by analyzing one laboratory duplicate of Composite 9 (Table C-11). Three chemicals (alpha-HCH, beta-HCH, aldrin) had RPD percentages that exceeded the DQO for this study of 50 percent. The concentrations of beta HCH in these tissue samples were near their detection limits (<5 times the detection limit), which may account for the higher variability of the analyses. The overall average precision for all pesticide and Aroclors analyzed in these two samples was 24 percent.

Table C-11. Laboratory duplicate analyses for pesticides and Aroclors

Chemical	Composite 9 Conc. (µg/kg)	Qual.	Composite 9-dup Conc. (µg/kg)	Qual.	RPD ()
Hexachlorobenzene	5.1		5.6		9
Alpha HCH	0.75		0.31		83
Beta HCH	0.38		0.22		53
Gamma HCH	1.6		1.8		12
Heptachlor	0.22	U	0.1	U	na
Aldrin	5.2		2.4		74
Oxychlordane	2.2		3.2		37
Trans-chlordane	1.8		2		11
Cis-chlordane	4.2		4.9		15
o,p'-DDE	0.5		0.54		8
p,p'-DDE	380		380		0
Trans-nonachlor	9.7		11		13
Cis-nonachlor	3.7		4.3		15
o,p'-DDD	1.8		2		11
p,p'-DDD	17		20		16
o,p'-DDT	2.2		2.2		0
p,p'-DDT	2.8		2.1		29
Mirex	0.21		0.25		17
Heptachlor epoxide	0.4		0.34		16
Alpha-endosulfan (I)	0.66		0.67		2
Dieldrin	4.4		4.2		5
Endrin	0.05	U	0.03	U	na
Methoxychlor	0.12	U	0.07	U	na
Aroclor 1242	6.6		6.5		2
Aroclor 1254	82		91		10
Aroclor 1260	65		69		6

NOTE: RPD - relative percent difference
na - not applicable

Detection Limits

Table C-12 shows the sample detection limits achieved for the composite samples analyzed during this study. The detection limits established as DQOs for pesticides in this study ranged from 0.1 to 2 µg/kg (EVS 1999). The analysis of all samples except Composite 1 (largescale sucker fillet) and Composite 10 (northern pikeminnow fillet) met the DQOs for detection limits. For Composite 10, the sample detection limit of

oxychlordane (2.9 µg/kg) exceeded the DQO of 2.0 µg/kg. For Composite 1, 13 of the 23 pesticides analyzed had sample detection limits that exceed the DQO of 2.0 µg/kg. Overall, 4 percent of pesticide analyses exceeded the detection limits established as DQOs. The quality of this data is impacted when a detected quantity was not measured. This occurred in 4 percent of the pesticide analyses.

The detection limit established as DQOs for PCB Aroclors in this study was 2.0 µg/kg (EVS 1999). Overall, 16 percent of PCB Aroclor analyses exceeded the detection limit of 2.0 µg/kg. The quality of the PCB Aroclor data is impacted when a detected quanitity was not measured. This occurred in 8 percent of the PCB Aroclor analyses.

Table C12. Detection limits (µg/kg) achieved for the analysis of pesticide and Aroclor compounds

	Composite No.							
Analyte	1	2	3	4	5	6	7	8
Hexachlorobenzene	2	0.05	0.02	0.01	0.02	0.02	0.04	0.03
Alpha HCH	6.2[a]	0.41	0.41	0.13	0.09	0.11	0.13	0.11
Beta HCH	8.7[a]	0.58	0.57	0.18	0.12	0.15	0.19	0.15
Gamma HCH	5[a]	0.33	0.33	0.11	0.07	0.08	0.11	0.09
Heptachlor	17[a]	0.37	0.2	0.17	0.25	0.23	0.31	0.26
Aldrin	3.6[a]	0.26	0.31	0.06	0.11	0.08	0.09	0.07
Oxychlordane	27[a]	2	1.4	0.81	0.3	0.79	0.59	0.35
Trans-chlordane	2.7[a]	0.14	0.03	0.02	0.06	0.06	0.06	0.26
Cis-chlordane	2.3[a]	0.12	0.03	0.01	0.05	0.05	0.05	0.22
o,p'-DDE	3.2[a]	0.35	0.27	0.23	0.19	0.06	0.03	0.05
p,p'-DDE	0.12	0.44	0.22	0.21	0.04	0.05	0.02	0.06
Trans-nonachlor	3[a]	0.12	0.08	0.11	0.11	0.04	0.06	0.07
Cis-nonachlor	2.1[a]	0.08	0.06	0.08	0.08	0.03	0.04	0.05
o,p'-DDD	1.2	0.09	0.11	0.05	0.09	0.01	0.02	0.02
p,p'-DDD	0.027	0.09	0.14	0.13	0.21	0.01	0.02	0.02
o,p'-DDT	2.5[a]	0.09	0.12	0.06	0.11	0.05	0.03	0.07
p,p'-DDT	3.1[a]	0.11	0.15	0.08	0.14	0.06	0.03	0.08
Mirex	1.6	0.07	0.07	0.06	0.03	0.04	0.02	0.04
Heptachlor epoxide	0.03	0.02	0.006	0.01	0.02	0.01	0.007	0.02
Alpha-endosulphan (I)	0.02	0.02	0.007	0.01	0.02	0.01	0.01	0.03
Dieldrin	0.42	0.01	0.005	0.009	0.06	0.008	0.006	0.02
Endrin	0.02	0.03	0.01	0.02	0.14	0.02	0.01	0.05
Methoxychlor	0.02	0.05	0.02	0.03		0.03	0.02	0.13
Aroclor 1242	30[a]	2.5[b]	2.2[b]	0.81	1.7	0.66	0.99	0.6
Aroclor 1254	63[a]	7.2[b]	0.49	1.2	3.2[b]	1.3	0.75	1.5
Aroclor 1260	46[a]	1.2	0.5	0.51	0.29	1.2	1.4	1.1

Table C-12, continued

Analyte	Composite 9	9 Duplicate	10	11	12	13	14	15
Hexachlorobenzene	0.02	0.01	0.04	0.01	0.01	0.02	0.02	0.01
Alpha HCH	0.11	0.04	0.54	0.05	0.08	0.32	0.1	0.04
Beta HCH	0.16	0.06	0.69	0.06	0.11	0.44	0.13	0.06
Gamma HCH	0.09	0.03	0.38	0.04	0.06	0.25	0.08	0.04
Heptachlor	0.22	0.1	0.24	0.09	0.16	0.27	0.14	0.17
Aldrin	0.37	0.24	0.07	0.1	0.07	0.23	0.05	0.03
Oxychlordane	0.75	0.2	2.9[a]	0.17	0.32	1.7	0.46	0.29
Trans-chlordane	0.06	0.04	0.02	0.04	0.04	0.05	0.06	0.05
Cis-chlordane	0.05	0.04	0.02	0.04	0.04	0.04	0.05	0.04
o,p'-DDE	0.18	0.03	0.1	0.02	0.12	0.09	0.11	0.03
p,p'-DDE	0.24	0.3	0.09	0.33	0.33	0.16	0.24	0.2
Trans-nonachlor	0.11	0.12	0.02	0.1	0.07	0.03	0.15	0.05
Cis-nonachlor	0.08	0.08	0.01	0.07	0.05	0.02	0.1	0.04
o,p'-DDD	0.14	0.08	0.12	0.06	0.08	0.04	0.08	0.01
p,p'-DDD	0.32	0.33	0.01	0.21	0.17	0.04	0.16	0.01
o,p'-DDT	0.16	0.11	0.07	0.06	0.04	0.05	0.05	0.04
p,p'-DDT	0.2	0.13	0.05	0.08	0.05	0.07	0.06	0.05
Mirex	0.1	0.08	0.07	0.03	0.03	0.04	0.03	0.02
Heptachlor epoxide	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.03
Alpha-endosulphan (I)	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.04
Dieldrin	0.02	0.01	0.01	0.01	0.01	0.009	0.01	0.03
Endrin	0.05	0.03	0.03	0.03	0.03	0.02	0.03	0.07
Methoxychlor	0.12	0.07	0.06	0.07	0.06	0.03	0.06	0.15
Aroclor 1242	0.8	0.82	3.4[a]	0.55	0.69	0.83	0.73	0.33
Aroclor 1254	1.4	1.8	1.3	1.9	0.41	1.5	0.46	1.2
Aroclor 1260	0.78	0.37	0.52	0.23	0.32	1	0.28	0.63

[a] Detection limit exceeded the data quality objective of 2 µg/kg.

[b] Detection limit exceeded the data quality objective of 2 *u*g/kg; however, the measured concentration exceeded this concentration.

Completeness

Completeness is the percentage of valid results obtained as compared to the total number of samples taken for a parameter. A completeness of 90 percent was established as a DQO for this study (EVS 1999). Nineteen percent of the pesticide data were qualified as estimates due to the exceedance of extract holding times, low surrogate recovery, or failure to meet all method quantification criteria. All analyses of pesticides were considered to be valid and of acceptable quality for this risk assessment.

Twenty-five percent of the PCB Aroclor data were qualified as estimates due to the exceedance of extract holding times, low surrogate recovery, or failure to meet all

method quantification criteria. All analyses of PCB Aroclor were considered to be valid and of acceptable quality for this risk assessment.

PCB CONGENERS

USEPA Method 1668 was used to measure tissue concentrations of 14 PCB congeners in 15 composite samples. The high resolution GC/MS analysis was conducted using a Micromass Autospec Ultima high resolution mass spectrometer (MS) equipped with a HP 5890 gas chromatograph (GC) with a CTC autosampler and an Alpha data system. Project samples were extracted according to Method 1668. The final volume of sample extracts was 20 µl; 1 µl was injected onto a SPB-Octyl GC column. A second run was performed on a DB-1 column to separate PCB 156 and PCB 157 which coelute on the SPB-octyl column.

Holding Times

A one-year holding time for tissue samples and a one year holding for extracts stored in the dark at –20ºC was established as data quality objectives (DQOs) for this study (EVS 1999). All analyses met these holding times (Table C-13).

Table C-13. Extraction and analysis holding times for PCB congener analyses

Composite No.	Species	Sample Type	Collection Date[a]	Extraction Date	Analysis Date	Extraction Holding Time (days)	Analysis Holding Time (days)
1	Sucker	F	8/11/1999	10/10/1999	10/20/1999	60	70
2	Sucker	WB-F	8/11/1999	10/10/1999	10/20/1999	60	70
3	Carp	WB	8/12/1999	10/4/1999	10/19/1999	53	68
4	Carp	WB	8/12/1999	10/10/1999	10/20/1999	59	69
5	Carp	WB	8/18/1999	10/10/1999	10/20/1999	47	62
6	Bass	F	8/12/1999	10/4/1999	10/19/1999	53	68
7	Bass	F	8/11/1999	10/10/1999	10/20/1999	60	70
8	Carp	F	8/14/1999	10/10/1999	10/20/1999	57	67
9	Carp	WB-F	8/14/1999	10/9/1999	10/20/1999	56	67
10	Pikeminnow	F	8/13/1999	10/10/1999	10/20/1999	58	68
11	Pikeminnow	WB-F	8/13/1999	10/4/1999	10/19/1999	52	67
12	Sucker	WB	8/15/1999	10/4/1999	10/19/1999	50	65
13	Pikeminnnow	WB	8/15/1999	10/4/1999	10/19/1999	50	65
14	Carp	WB	8/16/1999	10/4/1999	10/19/1999	49	64
15	Pikeminnnow	WB	8/16/1999	10/4/1999	10/23/1999	49	68

NOTE: F - fillet with skin
WB - whole body
WB-F - whole body minus the fillets

[a] First date of collection for the individual fish comprising the composite sample.

Accuracy

Accuracy was assessed by calculating the percent recovery of spiked isotope-labeled congeners in accordance with Method 1668 (Table C-14). The recoveries of all congeners were within the labeled recovery ranges specified by Method 1668. The average percent recovery for all congeners and samples analyzed in this study was 66 percent. The concentrations of all target congeners were corrected for the percent recovery of the labeled congeners in accordance with Method 1668.

Table C-14. Matrix spike percent recovery results for labeled PCB congener surrogate standards

Labeled Surrogate Standards	Composite No.							
	1	2	3	4	5	6	7	8
^{13}C-PCB 77	66	56	70	64	64	92	56	78
^{13}C-PCB 123	61	45	62	55	56	80	55	62
^{13}C-PCB 118	66	61	67	81	88	83	65	87
^{13}C-PCB 114	62	40	61	50	53	84	59	62
^{13}C-PCB 105	64	46	66	55	72	88	58	60
^{13}C-PCB 126	64	40	60	48	48	82	55	58
^{13}C-PCB 167	61	43	67	47	59	66	62	57
^{13}C-PCB 156/157	62	41	66	46	56	64	61	53
^{13}C-PCB 169	65	39	62	43	52	66	57	53
^{13}C-PCB 180	85	69	77	93	100	66	99	110
^{13}C-PCB 170	nr	nr	69	nr	nr	57	nr	nr
^{13}C-PCB 189	69	44	71	55	54	65	74	67

Labeled Surrogate Standards	Composite No.						
	9	10	11	12	13	14	15
^{13}C-PCB 77	77	70	73	80	83	71	63
^{13}C-PCB 123	68	61	62	73	71	61	59
^{13}C-PCB 118	86	79	71	79	84	74	70
^{13}C-PCB 114	61	61	60	70	69	58	57
^{13}C-PCB 105	79	66	67	69	77	64	61
^{13}C-PCB 126	56	60	60	63	69	55	55
^{13}C-PCB 167	62	61	61	61	69	61	54
^{13}C-PCB 156/157	62	60	62	62	68	63	54
^{13}C-PCB 169	54	60	59	59	61	62	52
^{13}C-PCB 180	100	100	nr	91	100	nr	nr
^{13}C-PCB 170	nr	nr	nr	71	75	nr	nr
^{13}C-PCB 189	58	73	78	82	81	81	81

NOTE: nr- not reported

Detection Limits

Sample detection limits for the PCB congeners analyzed in this study ranged from 0.14 to 46 ng/kg for this study (Table C-15). The detection limit of 5.0 ng/kg established as a DQO for this study was exceeded for eight of the PCB congeners analyzed. Overall, 36 percent of the congener analyses exceeded a detection limit of 5.0 ng/kg. The quality of the data is impacted only when a detected quantity was not measured. This occurred in 1 percent of the PCB congener analyses.

Table C-15. Detection limits (ng/kg) achieved for the analysis of PCB congeners

	Composite No.							
Chemical	1	2	3	4	5	6	7	8
PCB 77	2.5	17[b]	4.2	13[b]	21[b]	2.7	4	8.3[b]
PCB 123	3	11[b]	4.6	11[b]	17[b]	3.3	4.7	7.3[b]
PCB 118	3	19[b]	19[b]	20[b]	40[b]	3.3	4	11[b]
PCB 114	3.3	13[b]	5.1[b]	13[b]	19[b]	3.4	4.8	7.9[b]
PCB 105	2.8	10[b]	4.2	10[b]	46[b]	2.9	4.3	7.2[b]
PCB 126	2.9	12[b]	5	12[b]	20[a]	0.67	4.7	7.7[b]
PCB 167	0.99	4.6	4.3	3.7	3.3	0.67	0.82	2.9
PCB 156/157	1.3	6.6[b]	6.3[b]	5.1[b]	4.8	1	1.2	4.5
PCB 169	0.94	5.1[b]	5.2[b]	3.9	3.9	0.74	0.92	3.3
PCB 180/193	0.11	0.12	0.062	0.39	0.38	0.22	0.12	0.21
PCB 170	0.15	0.27	0.15	0.32	0.4	0.28	0.18	0.4
PCB 189	0.32	0.97	0.74	1	1.3	0.39	0.36	0.58

	Composite No.						
Chemical	9	10	11	12	13	14	15
PCB 77	14[b]	3.7	16[b]	4.1	3	11[b]	7.6[b]
PCB 123	11[b]	5	28[b]	4.4	4.9	11[b]	8.3[b]
PCB 118	24[b]	11[b]	28[b]	3.7	22[b]	18[b]	12[b]
PCB 114	13[b]	5.6[b]	29[b]	4.4	5.4[b]	12[b]	9[b]
PCB 105	24[b]	4.	24[b]	4.2	4.4	9.6[b]	7.8[b]
PCB 126	13[b]	5.1[b]	7.6[b]	4.7	5.2[b]	4.1	2.5
PCB 167	2	1.6	3.7	4.7	3.6	2.6	4
PCB 156/157	2.7	2.2	5.4[b]	7[b]	5.2[b]	3.7	5.6[b]
PCB 169	2.2	1.7	4.4	5.3[b]	4.7	3.1	0.5
PCB 180/193	0.11	0.16	0.034	0.019	0.067	0.59	0.02
PCB 170	0.41	0.24	0.24	0.47	0.14	0.5	0.32
PCB 189	1	0.5	1.4	1.1	1.2	0.89	0.58

[a] Detection limit exceeded the data quality objective of 5.0 *u*g/kg.

[b] Detection limit exceeded the data quality objective of 5.0 *u*g/kg; however, the measured concentration exceeded this concentration.

Completeness

Completeness is the percentage of valid results obtained as compared to the total number of samples taken for a parameter. A completeness of 90 percent was established as a DQO for this study (EVS 1999). Seven percent of the PCB congener data were qualified as estimates due to the exceedance of extract holding times, low surrogate recovery, or failure to meet all method quantification criteria. All analyses of PCB congeners were considered to be valid and of acceptable quality for this risk assessment.

DIOXINS AND FURANS

USEPA Method 1613B was used to measure tissue concentrations of polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzo-*p*-furans (PCDDs/PCDFs) in 15 composite samples. The high resolution GC/MS analysis was conducted using a Micromass Autospec Ultima high resolution mass spectrometer (MS) equipped with a HP 5890 gas chromatograph (GC) with a CTC autosampler and an Alpha data system. Project samples were extracted according to Method 1613B. The final volume of sample extracts was 20 µl; 1 µl was injected onto the GC column. Isomer specificity for 2,3,7,8-TCDF cannot be confirmed using the primary DB-5 capillary column specified for Method 1613B. All samples in which this isomer was detected on the DB-5 column underwent confirmatory analysis using a secondary DB-225 column. The concentrations reported for 2,3,7,8-TCDF in this report are from the secondary DB-225 column.

Holding Times

The one year holding times for extracts and analysis recommended for the analysis of tissue samples using Method 1613B (USEPA 1994) were established as DQOs for this study. All analyses met these holding times (Table C-16).

Table C-16. Extraction and analysis holding times for dioxin/furan analyses

Composite No.	Species	Sample Type	Collection Date[a]	Extraction Date	Analysis Date	Extraction Holding Time (days)	Analysis Holding Time (days)
1	Sucker	F	8/11/1999	9/26/1999	10/29/1999	46	79
2	Sucker	WB-F	8/11/1999	9/26/1999	10/28/1999	46	78
3	Carp	WB	8/12/1999	9/26/1999	10/28/1999	45	77
4	Carp	WB	8/12/1999	9/26/1999	10/28/1999	45	77
5	Carp	WB	8/18/1999	9/26/1999	10/28/1999	39	71
6	Bass	F	8/12/1999	11/24/1999	12/10/1999	104	120
7	Bass	F	8/11/1999	9/26/1999	10/28/1999	46	78
8	Carp	F	8/14/1999	9/26/1999	10/28/1999	43	75
9	Carp	WB-F	8/14/1999	9/24/1999	10/28/1999	41	75
10	Pikeminnow	F	8/13/1999	9/24/1999	10/28/1999	42	76
11	Pikeminnow	WB-F	8/13/1999	9/24/1999	10/28/1999	42	76
12	Sucker	WB	8/15/1999	9/24/1999	10/28/1999	40	74
13	Pikeminnnow	WB	8/15/1999	9/24/1999	10/28/1999	40	74
14	Carp	WB	8/16/1999	9/24/1999	10/28/1999	39	73
15	Pikeminnnow	WB	8/16/1999	9/24/1999	10/28/1999	39	73

NOTE: F - fillet with skin
WB - whole body
WB-F - whole body minus the fillets

[a] First date of collection for the individual fish comprising the composite sample.

Accuracy

Accuracy was assessed by calculating the percent recovery of spiked isotope-labeled congeners in accordance with Method 1613B (Table C-17). The recovery of all PCDD/PCDF congeners were within the labeled recovery ranges specified by Method 1613B (USEPA 1994). The average percent recovery for all congeners and samples analyzed in this study was 75 percent. The concentrations of all target congeners were corrected for the percent recovery of the labeled congeners in accordance with Method 1613B.

Table C-17. Matrix spike percent recovery results for labeled dioxin/furan congener surrogate standards

^{13}C Labeled Surrogate Standards	Composite No. 1	2	3	4	5	6	7	8
2,3,7,8-TCDD	81	80	75	66	82	67	85	87
1,2,3,7,8-PeCDD	97	82	97	96	81	81	128	92
1,2,3,4,7,8-HxCDD	84	95	88	82	83	71	88	87
1,2,3,6,7,8-HxCDD	83	89	84	80	82	73	86	84
1,2,3,4,6,7,8-HpCDD	63	75	58	68	62	75	75	80
OCDD	51	64	30	51	48	58	59	67
2,3,7,8-TCDF	73	64	69	72	72	73	82	82
1,2,3,7,8-PeCDF	78	65	69	67	70	81	84	73
2,3,4,7,8-PeCDF	81	63	71	69	68	82	87	72
1,2,3,4,7,8-HxCDF	83	93	89	82	79	76	87	79
1,2,3,6,7,8-HxCDF	81	90	85	79	76	75	85	68
1,2,3,7,8,9-HxCDF	77	81	61	67	77	71	81	80
2,3,4,6,7,8-HxCDF	83	93	78	78	82	77	88	85

^{13}C Labeled Surrogate Standards	Composite No. 9	10	11	12	13	14	15
2,3,7,8-TCDD	90	79	76	68	80	80	72
1,2,3,7,8-PeCDD	105	87	81	89	85	77	81
1,2,3,4,7,8-HxCDD	95	86	81	87	85	78	80
1,2,3,6,7,8-HxCDD	90	81	76	79	83	75	74
1,2,3,4,6,7,8-HpCDD	67	65	65	60	68	59	63
OCDD	53	51	54	44	53	43	52
2,3,7,8-TCDF	84	67	68	63	81	77	65
1,2,3,7,8-PeCDF	78	62	64	66	68	69	62
2,3,4,7,8-PeCDF	83	64	67	77	75	72	73
1,2,3,4,7,8-HxCDF	94	86	81	85	84	81	81
1,2,3,6,7,8-HxCDF	88	81	78	82	81	77	77
1,2,3,7,8,9-HxCDF	85	72	72	71	78	76	72
2,3,4,6,7,8-HxCDF	90	79	79	79	84	78	78

NOTE: nr- not reported

Detection Limits

The use of an ultra-low sensitivity high-resolution mass spectrometer system and the stipulation that Method 1613B be enhanced by measuring a low initial calibration point of 0.1 ng/ml along with the other five calibration standards normally recommended by this method, allowed detection limits ranging from 0.05 to 0.3 ng/kg to be achieved for this study. Table C-18 shows the range of detection limits obtained for each congener. All values are within the DQOs established for this study.

Table C-18. Detection limits (ng/kg) achieved for the analysis of PCB congeners

	Composite No.							
Chemical	1	2	3	4	5	6	7	8
2,3,7,8-TCDD	0.05	0.05	0.1	0.09	0.05	0.09	0.06	0.07
1,2,3,7,8-PeCDD	0.05	0.09	0.07	0.09	0.08	0.1	0.05	0.08
1,2,3,4,7,8-HxCDD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.15	0.15	0.18	0.15	0.15	0.15	0.15	0.15
OCDD	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,3,7,8-TCDF	0.05	0.06	0.07	0.05	0.05	0.05	0.05	0.05
1,2,3,7,8-PeCDF	0.05	0.08	0.09	0.11	0.06	0.07	0.05	0.08
2,3,4,7,8-PeCDF	0.05	0.08	0.09	0.11	0.06	0.07	0.05	0.08
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

	Composite No.						
Chemical	9	10	11	12	13	14	15
2,3,7,8-TCDD	0.05	0.09	0.05	0.05	0.06	0.06	0.08
1,2,3,7,8-PeCDD	0.07	0.07	0.08	0.06	0.06	0.07	0.1
1,2,3,4,7,8-HxCDD	0.11	0.1	0.1	0.1	0.06	0.1	0.1
1,2,3,6,7,8-HxCDD	0.11	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDD	0.11	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.15	0.15	0.15	0.15	0.15	0.15	0.15
OCDD	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,3,7,8-TCDF	0.05	0.07	0.07	0.08	0.06	0.05	0.06
1,2,3,7,8-PeCDF	0.08	0.08	0.07	0.07	0.09	0.06	0.09
2,3,4,7,8-PeCDF	0.08	0.08	0.07	0.07	0.09	0.06	0.09
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Completeness

Completeness is the percentage of valid results obtained as compared to the total number of samples taken for a parameter. A completeness of 90 percent was established as a DQO for this study. All analyses of dioxin and furans were considered to be valid and of acceptable quality for this risk assessment.

APPENDIX D

Summary Statistics for Fish Species

APPENDIX E

Regional Comparisons of COPC Concentrations

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Bass	Fillet	2,3,7,8-TCDD	Dioxin/Furans	2	2	0.00010	0.00014	0.00012	0.000028
Bass	Fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	2	2	0.00010	0.00011	0.00011	0.0000071
Bass	Fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	2	0	0.00015	0.00015	0.00015	0.00
Bass	Fillet	OCDD	Dioxin/Furans	2	0	0.00030	0.00030	0.00030	0.00
Bass	Fillet	2,3,7,8-TCDF	Dioxin/Furans	2	2	0.00014	0.00017	0.00016	0.000021
Bass	Fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	2	0	0.000050	0.000070	0.000060	0.000014
Bass	Fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	2	1	0.000070	0.000080	0.000058	0.000032
Bass	Fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	2	0	0.00010	0.00010	0.00010	0.00
Bass	Fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	2	0	0.00015	0.00015	0.00015	0.00
Bass	Fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	2	0	0.00015	0.00015	0.00015	0.00
Bass	Fillet	OCDF	Dioxin/Furans	2	0	0.00030	0.00030	0.00030	0.00
Bass	Fillet	Antimony	Trace Metals	2	0	1.0	1.0	1.0	0.00
Bass	Fillet	Arsenic	Trace Metals	2	2	80	110	95	21
Bass	Fillet	Total Inorganic Arsenic	Trace Metals	2	1	3.0	5.0	3.3	2.5
Bass	Fillet	Beryllium	Trace Metals	2	0	1.0	1.0	1.0	0.00
Bass	Fillet	Cadmium	Trace Metals	2	0	10	10	10	0.00
Bass	Fillet	Chromium	Trace Metals	2	2	190	190	190	0.00
Bass	Fillet	Copper	Trace Metals	2	2	680	950	820	190
Bass	Fillet	Lead	Trace Metals	2	0	5.0	5.0	5.0	0.00
Bass	Fillet	Mercury	Trace Metals	2	2	330	420	380	58
Bass	Fillet	Nickel	Trace Metals	2	2	100	130	120	21
Bass	Fillet	Silver	Trace Metals	2	0	10	10	10	0.00
Bass	Fillet	Thallium	Trace Metals	2	0	2.0	2.0	2.0	0.00
Bass	Fillet	Zinc	Trace Metals	2	2	6,200	9,000	7,600	2,000
Bass	Fillet	Aroclor 1242	PCB Aroclors	2	2	1.2	1.3	1.3	0.071
Bass	Fillet	Aroclor 1254	PCB Aroclors	2	2	13	15	14	1.4
Bass	Fillet	Aroclor 1260	PCB Aroclors	2	2	11	11	11	0.00
Bass	Fillet	33'44'-TeCB	PCB Congeners	2	2	0.012	0.014	0.013	0.0014
Bass	Fillet	233'44'-PeCB	PCB Congeners	2	2	0.42	0.47	0.45	0.035
Bass	Fillet	2344'5-PeCB	PCB Congeners	2	2	0.039	0.042	0.041	0.0021
Bass	Fillet	23'44'5-PeCB	PCB Congeners	2	2	1.3	1.6	1.5	0.21
Bass	Fillet	2'344'5-PeCB	PCB Congeners	2	2	0.033	0.033	0.033	0.00
Bass	Fillet	33'44'5-PeCB	PCB Congeners	2	1	0.0037	0.0047	0.0030	0.00095
Bass	Fillet	233'44'5-HxCB	PCB Congeners	2	2	0.21	0.25	0.23	0.028
Bass	Fillet	23'44'55'-HxCB	PCB Congeners	2	2	0.080	0.087	0.084	0.0049
Bass	Fillet	33'44'55'-HxCB	PCB Congeners	2	2	0.0029	0.0047	0.0038	0.0013
Bass	Fillet	22'33'44'5-HpCB	PCB Congeners	2	2	0.34	0.37	0.36	0.021
Bass	Fillet	22'344'55'-HpCB	PCB Congeners	2	2	0.95	0.98	0.97	0.021
Bass	Fillet	233'44'55'-HpCB	PCB Congeners	2	2	0.012	0.017	0.015	0.0035
Bass	Fillet	Aldrin	Pesticides	2	0	0.080	0.090	0.085	0.0071
Bass	Fillet	alpha HCH	Pesticides	2	0	0.11	0.13	0.12	0.014
Bass	Fillet	alpha-Endosulfan (I)	Pesticides	2	0	0.010	0.010	0.010	0.00
Bass	Fillet	beta HCH	Pesticides	2	0	0.15	0.19	0.17	0.028
Bass	Fillet	cis-Chlordane	Pesticides	2	2	0.21	0.22	0.22	0.0071
Bass	Fillet	cis-Nonachlor	Pesticides	2	2	0.30	0.36	0.33	0.042
Bass	Fillet	o,p'-DDD	Pesticides	2	2	0.12	0.14	0.13	0.014
Bass	Fillet	o,p'-DDE	Pesticides	2	2	0.080	0.090	0.085	0.0071
Bass	Fillet	o,p'-DDT	Pesticides	2	2	0.21	0.22	0.22	0.0071
Bass	Fillet	p,p'-DDD	Pesticides	2	2	1.0	1.3	1.2	0.21
Bass	Fillet	p,p'-DDE	Pesticides	2	2	14	18	16	2.8
Bass	Fillet	p,p'-DDT	Pesticides	2	2	1.4	1.5	1.5	0.071
Bass	Fillet	Dieldrin	Pesticides	2	2	0.23	0.24	0.24	0.0071
Bass	Fillet	Endrin	Pesticides	2	0	0.010	0.020	0.015	0.0071
Bass	Fillet	gamma HCH	Pesticides	2	2	0.79	0.82	0.81	0.021
Bass	Fillet	Heptachlor	Pesticides	2	0	0.23	0.31	0.27	0.057
Bass	Fillet	Heptachlor Epoxide	Pesticides	2	0	0.0070	0.010	0.0085	0.0021
Bass	Fillet	Hexachlorobenzene	Pesticides	2	2	0.67	0.90	0.79	0.16
Bass	Fillet	Methoxychlor	Pesticides	2	0	0.020	0.030	0.025	0.0071
Bass	Fillet	Mirex	Pesticides	2	2	0.040	0.050	0.045	0.0071
Bass	Fillet	Oxychlordane	Pesticides	2	0	0.59	0.79	0.69	0.14
Bass	Fillet	trans-Chlordane	Pesticides	2	2	0.090	0.13	0.11	0.028
Bass	Fillet	trans-Nonachlor	Pesticides	2	2	1.1	1.1	1.1	0.00
Bass	Fillet	Acenaphthene	PAHs	2	1	0.22	1.5	0.49	0.37
Bass	Fillet	Acenaphthylene	PAHs	2	1	0.76	1.4	0.73	0.042
Bass	Fillet	Anthracene	PAHs	2	0	0.23	0.71	0.47	0.34
Bass	Fillet	Benz[a]anthracene	PAHs	2	0	0.17	0.20	0.19	0.021
Bass	Fillet	Benzo[a]pyrene	PAHs	2	0	0.30	1.4	0.85	0.78
Bass	Fillet	Benzo[e]pyrene	PAHs	2	0	0.28	1.1	0.69	0.58
Bass	Fillet	Benzo[ghi]perylene	PAHs	2	0	0.22	0.56	0.39	0.24
Bass	Fillet	Benzo[b/j/k]fluoranthenes	PAHs	2	0	0.27	1.1	0.69	0.59
Bass	Fillet	Chrysene	PAHs	2	0	0.15	0.21	0.18	0.042

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Bass	Fillet	Dibenz[ah]anthracene	PAHs	2	0	0.28	0.72	0.50	0.31
Bass	Fillet	Fluoranthene	PAHs	2	2	0.31	0.54	0.43	0.16
Bass	Fillet	Fluorene	PAHs	2	0	0.62	1.5	1.1	0.62
Bass	Fillet	Indeno[1,2,3-cd]pyrene	PAHs	2	0	0.31	0.63	0.47	0.23
Bass	Fillet	Naphthalene	PAHs	2	1	11	11	11	na
Bass	Fillet	Perylene	PAHs	2	0	0.33	1.1	0.72	0.54
Bass	Fillet	Phenanthrene	PAHs	2	2	1.1	2.2	1.7	0.78
Bass	Fillet	Pyrene	PAHs	2	2	0.20	0.33	0.27	0.092
Carp	Fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.00038	0.00038	0.00038	na
Carp	Fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.00042	0.00042	0.00042	na
Carp	Fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	1	0.00031	0.00031	0.00031	na
Carp	Fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	1	0.0012	0.0012	0.0012	na
Carp	Fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	1	0.00010	0.00010	0.00010	na
Carp	Fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.0021	0.0021	0.0021	na
Carp	Fillet	OCDD	Dioxin/Furans	1	1	0.0019	0.0019	0.0019	na
Carp	Fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.00040	0.00040	0.00040	na
Carp	Fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	1	0.00010	0.00010	0.00010	na
Carp	Fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	1	0.00029	0.00029	0.00029	na
Carp	Fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	1	0.00015	0.00015	0.00015	na
Carp	Fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Carp	Fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Carp	Fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Carp	Fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Carp	Fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Carp	Fillet	OCDF	Dioxin/Furans	1	0	0.00030	0.00030	0.00030	na
Carp	Fillet	Antimony	Trace Metals	1	0	1.0	1.0	1.0	na
Carp	Fillet	Arsenic	Trace Metals	1	1	120	120	120	na
Carp	Fillet	Total Inorganic Arsenic	Trace Metals	1	0	3.0	3.0	3.0	na
Carp	Fillet	Beryllium	Trace Metals	1	0	1.0	1.0	1.0	na
Carp	Fillet	Cadmium	Trace Metals	1	0	10	10	10	na
Carp	Fillet	Chromium	Trace Metals	1	1	230	230	230	na
Carp	Fillet	Copper	Trace Metals	1	1	670	670	670	na
Carp	Fillet	Lead	Trace Metals	1	0	5.0	5.0	5.0	na
Carp	Fillet	Mercury	Trace Metals	1	1	250	250	250	na
Carp	Fillet	Nickel	Trace Metals	1	0	10	10	10	na
Carp	Fillet	Silver	Trace Metals	1	0	10	10	10	na
Carp	Fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na
Carp	Fillet	Zinc	Trace Metals	1	1	30,000	30,000	30,000	na
Carp	Fillet	Aroclor 1242	PCB Aroclors	1	1	3.0	3.0	3.0	na
Carp	Fillet	Aroclor 1254	PCB Aroclors	1	1	36	36	36	na
Carp	Fillet	Aroclor 1260	PCB Aroclors	1	1	32	32	32	na
Carp	Fillet	33'44'-TeCB	PCB Congeners	1	1	0.038	0.038	0.038	na
Carp	Fillet	233'44'-PeCB	PCB Congeners	1	1	1.0	1.0	1.0	na
Carp	Fillet	2344'5-PeCB	PCB Congeners	1	1	0.092	0.092	0.092	na
Carp	Fillet	23'44'5-PeCB	PCB Congeners	1	1	3.8	3.8	3.8	na
Carp	Fillet	2'344'5-PeCB	PCB Congeners	1	1	0.14	0.14	0.14	na
Carp	Fillet	33'44'5-PeCB	PCB Congeners	1	1	0.0089	0.0089	0.0089	na
Carp	Fillet	233'44'5-HxCB	PCB Congeners	1	1	0.60	0.60	0.60	na
Carp	Fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.28	0.28	0.28	na
Carp	Fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.011	0.011	0.011	na
Carp	Fillet	22'33'44'5-HpCB	PCB Congeners	1	1	1.1	1.1	1.1	na
Carp	Fillet	22'344'55'-HpCB	PCB Congeners	1	1	3.0	3.0	3.0	na
Carp	Fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.050	0.050	0.050	na
Carp	Fillet	Aldrin	Pesticides	1	1	0.080	0.080	0.080	na
Carp	Fillet	alpha HCH	Pesticides	1	0	0.11	0.11	0.11	na
Carp	Fillet	alpha-Endosulfan (I)	Pesticides	1	0	0.030	0.030	0.030	na
Carp	Fillet	beta HCH	Pesticides	1	0	0.15	0.15	0.15	na
Carp	Fillet	cis-Chlordane	Pesticides	1	1	2.2	2.2	2.2	na
Carp	Fillet	cis-Nonachlor	Pesticides	1	1	1.7	1.7	1.7	na
Carp	Fillet	o,p'-DDD	Pesticides	1	1	0.81	0.81	0.81	na
Carp	Fillet	o,p'-DDE	Pesticides	1	1	0.18	0.18	0.18	na
Carp	Fillet	o,p'-DDT	Pesticides	1	1	0.92	0.92	0.92	na
Carp	Fillet	p,p'-DDD	Pesticides	1	1	9.7	9.7	9.7	na
Carp	Fillet	p,p'-DDE	Pesticides	1	1	170	170	170	na
Carp	Fillet	p,p'-DDT	Pesticides	1	1	0.92	0.92	0.92	na
Carp	Fillet	Dieldrin	Pesticides	1	1	1.8	1.8	1.8	na
Carp	Fillet	Endrin	Pesticides	1	0	0.050	0.050	0.050	na
Carp	Fillet	gamma HCH	Pesticides	1	1	0.89	0.89	0.89	na
Carp	Fillet	Heptachlor	Pesticides	1	0	0.26	0.26	0.26	na
Carp	Fillet	Heptachlor Epoxide	Pesticides	1	1	0.17	0.17	0.17	na
Carp	Fillet	Hexachlorobenzene	Pesticides	1	1	2.6	2.6	2.6	na
Carp	Fillet	Methoxychlor	Pesticides	1	0	0.13	0.13	0.13	na
Carp	Fillet	Mirex	Pesticides	1	1	0.10	0.10	0.10	na
Carp	Fillet	Oxychlordane	Pesticides	1	1	0.86	0.86	0.86	na
Carp	Fillet	trans-Chlordane	Pesticides	1	1	0.88	0.88	0.88	na
Carp	Fillet	trans-Nonachlor	Pesticides	1	1	3.8	3.8	#N/A	na
Carp	Fillet	Acenaphthene	PAHs	2	0	1.7	1.7	1.7	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Carp	Fillet	Acenaphthylene	PAHs	2	0	1.6	1.6	1.6	na
Carp	Fillet	Anthracene	PAHs	2	0	0.89	0.89	0.89	na
Carp	Fillet	Benz[a]anthracene	PAHs	2	0	0.62	0.62	0.62	na
Carp	Fillet	Benzo[a]pyrene	PAHs	2	0	0.72	0.72	0.72	na
Carp	Fillet	Benzo[e]pyrene	PAHs	2	0	0.69	0.69	0.69	na
Carp	Fillet	Benzo[ghi]perylene	PAHs	2	0	0.58	0.58	0.58	na
Carp	Fillet	Benzo[b/j/k]fluoranthenes	PAHs	2	0	0.66	0.66	0.66	na
Carp	Fillet	Chrysene	PAHs	2	0	0.64	0.64	0.64	na
Carp	Fillet	Dibenz[ah]anthracene	PAHs	2	0	0.90	0.90	0.90	na
Carp	Fillet	Fluoranthene	PAHs	2	0	0.65	0.65	0.65	na
Carp	Fillet	Fluorene	PAHs	2	0	1.7	1.7	1.7	na
Carp	Fillet	Indeno[1,2,3-cd]pyrene	PAHs	2	0	0.80	0.80	0.80	na
Carp	Fillet	Naphthalene	PAHs	2	1	13	13	13	na
Carp	Fillet	Perylene	PAHs	2	0	0.80	0.80	0.80	na
Carp	Fillet	Phenanthrene	PAHs	2	1	1.8	1.8	1.8	na
Carp	Fillet	Pyrene	PAHs	2	1	0.49	0.49	0.49	na
Carp	WB	2,3,7,8-TCDD	Dioxin/Furans	5	5	0.00063	0.0013	0.00082	0.00029
Carp	WB	1,2,3,7,8-PeCDD	Dioxin/Furans	5	5	0.00080	0.0016	0.0011	0.00035
Carp	WB	1,2,3,4,7,8-HxCDD	Dioxin/Furans	5	5	0.00045	0.0013	0.00073	0.00031
Carp	WB	1,2,3,6,7,8-HxCDD	Dioxin/Furans	5	5	0.0018	0.0051	0.0030	0.0013
Carp	WB	1,2,3,7,8,9-HxCDD	Dioxin/Furans	5	5	0.00024	0.00059	0.00034	0.00014
Carp	WB	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	5	5	0.0037	0.0096	0.0056	0.0024
Carp	WB	OCDD	Dioxin/Furans	5	5	0.0041	0.011	0.0068	0.0027
Carp	WB	2,3,7,8-TCDF	Dioxin/Furans	5	5	0.00069	0.0013	0.00094	0.00024
Carp	WB	1,2,3,7,8-PeCDF	Dioxin/Furans	5	4	0.00011	0.00038	0.00023	0.00012
Carp	WB	2,3,4,7,8-PeCDF	Dioxin/Furans	5	5	0.00047	0.0011	0.00065	0.00024
Carp	WB	1,2,3,4,7,8-HxCDF	Dioxin/Furans	5	5	0.00025	0.00065	0.00037	0.00016
Carp	WB	1,2,3,6,7,8-HxCDF	Dioxin/Furans	5	5	0.00017	0.00040	0.00025	0.000090
Carp	WB	1,2,3,7,8,9-HxCDF	Dioxin/Furans	5	0	0.00010	0.00010	0.00010	0.00
Carp	WB	2,3,4,6,7,8-HxCDF	Dioxin/Furans	5	5	0.00014	0.00026	0.00019	0.000049
Carp	WB	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	5	3	0.00015	0.0011	0.00043	0.00042
Carp	WB	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	5	0	0.00015	0.00017	0.00016	0.000010
Carp	WB	OCDF	Dioxin/Furans	5	1	0.00030	0.00030	0.00018	0.000067
Carp	WB	Antimony	Trace Metals	5	2	1.0	1.0	0.70	0.27
Carp	WB	Arsenic	Trace Metals	5	5	130	160	150	11
Carp	WB	Total Inorganic Arsenic	Trace Metals	5	5	3.0	9.0	5.7	2.4
Carp	WB	Beryllium	Trace Metals	5	3	1.0	3.0	1.6	1.1
Carp	WB	Cadmium	Trace Metals	5	5	10	40	17	13
Carp	WB	Chromium	Trace Metals	5	5	340	640	480	120
Carp	WB	Copper	Trace Metals	5	5	1,300	2,800	1,700	610
Carp	WB	Lead	Trace Metals	5	5	14	49	30	13
Carp	WB	Mercury	Trace Metals	5	5	96	160	130	29
Carp	WB	Nickel	Trace Metals	5	3	1.0	310	100	130
Carp	WB	Silver	Trace Metals	5	5	10	30	20	7.1
Carp	WB	Thallium	Trace Metals	5	0	2.0	2.0	2.0	0.00
Carp	WB	Zinc	Trace Metals	5	5	75,000	100,000	86,000	13,000
Carp	WB	Aroclor 1242	PCB Aroclors	5	5	3.9	7.6	5.6	1.7
Carp	WB	Aroclor 1254	PCB Aroclors	5	5	59	110	75	21
Carp	WB	Aroclor 1260	PCB Aroclors	5	5	40	120	65	32
Carp	WB	33'44'-TeCB	PCB Congeners	5	5	0.052	0.099	0.074	0.018
Carp	WB	233'44'-PeCB	PCB Congeners	5	5	1.6	2.8	2.0	0.47
Carp	WB	2344'5-PeCB	PCB Congeners	5	5	0.13	0.28	0.18	0.058
Carp	WB	23'44'5-PeCB	PCB Congeners	5	5	6.4	11	7.8	1.8
Carp	WB	2'344'5-PeCB	PCB Congeners	5	5	0.00	0.27	0.22	0.027
Carp	WB	33'44'5-PeCB	PCB Congeners	5	4	0.014	0.024	0.015	0.0020
Carp	WB	233'44'5-HxCB	PCB Congeners	5	5	0.78	1.8	1.1	0.39
Carp	WB	23'44'55'-HxCB	PCB Congeners	5	5	0.37	0.87	0.54	0.19
Carp	WB	33'44'55'-HxCB	PCB Congeners	5	5	0.00	0.036	0.023	0.0077
Carp	WB	22'33'44'5-HpCB	PCB Congeners	5	5	1.4	4.0	2.3	1.00
Carp	WB	22'344'55'-HpCB	PCB Congeners	5	5	4.5	13	7.6	3.2
Carp	WB	233'44'55'-HpCB	PCB Congeners	5	5	0.058	0.18	0.11	0.045
Carp	WB	Aldrin	Pesticides	5	4	0.11	2.4	1.3	1.1
Carp	WB	alpha HCH	Pesticides	5	3	0.12	0.37	0.17	0.11
Carp	WB	alpha-Endosulfan (I)	Pesticides	5	2	0.0075	0.74	0.23	0.33
Carp	WB	beta HCH	Pesticides	5	2	0.13	0.40	0.15	0.066
Carp	WB	cis-Chlordane	Pesticides	5	5	3.7	5.7	4.7	0.86
Carp	WB	cis-Nonachlor	Pesticides	5	5	2.9	4.2	3.3	0.53
Carp	WB	o,p'-DDD	Pesticides	1	5	1.5	2.4	2.0	0.38
Carp	WB	o,p'-DDE	Pesticides	1	5	0.34	0.66	0.50	0.14
Carp	WB	o,p'-DDT	Pesticides	1	5	1.7	2.0	1.8	0.12
Carp	WB	p,p'-DDD	Pesticides	1	5	15	19	17	1.8
Carp	WB	p,p'-DDE	Pesticides	1	5	120	300	190	73
Carp	WB	p,p'-DDT	Pesticides	1	5	1.6	3.5	2.2	0.79
Carp	WB	Dieldrin	Pesticides	5	5	1.9	5.6	3.7	1.4
Carp	WB	Endrin	Pesticides	5	1	0.020	0.060	0.020	0.0080
Carp	WB	gamma HCH	Pesticides	5	5	0.82	1.4	1.1	0.27
Carp	WB	Heptachlor	Pesticides	5	0	0.14	0.25	0.19	0.041

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Carp	WB	Heptachlor Epoxide	Pesticides	5	5	0.18	0.44	0.31	0.11
Carp	WB	Hexachlorobenzene	Pesticides	1	5	4.1	7.6	5.1	1.5
Carp	WB	Methoxychlor	Pesticides	1	1	0.020	0.64	0.16	0.27
Carp	WB	Mirex	Pesticides	1	5	0.13	0.33	0.19	0.081
Carp	WB	Oxychlordane	Pesticides	1	4	1.3	4.3	2.1	1.3
Carp	WB	trans-Chlordane	Pesticides	1	5	1.5	2.4	2.1	0.36
Carp	WB	trans-Nonachlor	Pesticides	1	5	7.0	11	3.8	1.5
Carp	WB	Acenaphthene	PAHs	5	5	1.1	3.6	1.9	1.2
Carp	WB	Acenaphthylene	PAHs	5	4	0.87	1.1	0.89	0.22
Carp	WB	Anthracene	PAHs	5	3	0.18	0.83	0.40	0.26
Carp	WB	Benz[a]anthracene	PAHs	5	1	0.078	2.7	0.70	1.1
Carp	WB	Benzo[a]pyrene	PAHs	5	1	0.17	4.3	1.1	1.8
Carp	WB	Benzo[e]pyrene	PAHs	5	1	0.18	3.4	0.90	1.4
Carp	WB	Benzo[ghi]perylene	PAHs	5	2	0.087	4.9	1.1	2.1
Carp	WB	Benzo[b/j/k]fluoranthenes	PAHs	5	1	0.063	6.0	1.4	2.6
Carp	WB	Chrysene	PAHs	5	3	0.22	3.0	0.85	1.2
Carp	WB	Dibenz[ah]anthracene	PAHs	5	0	0.091	0.97	0.62	0.37
Carp	WB	Fluoranthene	PAHs	5	3	0.57	3.8	1.3	1.4
Carp	WB	Fluorene	PAHs	5	4	1.0	1.5	1.1	0.38
Carp	WB	Indeno[1,2,3-cd]pyrene	PAHs	5	2	0.059	3.4	0.83	1.4
Carp	WB	Naphthalene	PAHs	5	5	7.4	17	11	3.7
Carp	WB	Perylene	PAHs	5	1	0.22	1.9	0.62	0.73
Carp	WB	Phenanthrene	PAHs	5	5	1.7	3.4	2.2	0.71
Carp	WB	Pyrene	PAHs	5	5	0.68	5.6	1.8	2.1
Carp	WB-fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.00086	0.00086	0.00086	na
Carp	WB-fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.0011	0.0011	0.0011	na
Carp	WB-fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	1	0.00080	0.00080	0.00080	na
Carp	WB-fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	1	0.0029	0.0029	0.0029	na
Carp	WB-fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	1	0.00038	0.00038	0.00038	na
Carp	WB-fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.0052	0.0052	0.0052	na
Carp	WB-fillet	OCDD	Dioxin/Furans	1	1	0.0055	0.0055	0.0055	na
Carp	WB-fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.00095	0.00095	0.00095	na
Carp	WB-fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	1	0.00028	0.00028	0.00028	na
Carp	WB-fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	1	0.00070	0.00070	0.00070	na
Carp	WB-fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	1	0.00042	0.00042	0.00042	na
Carp	WB-fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	1	0.00030	0.00030	0.00030	na
Carp	WB-fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Carp	WB-fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	1	0.00026	0.00026	0.00026	na
Carp	WB-fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	1	0.00065	0.00065	0.00065	na
Carp	WB-fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Carp	WB-fillet	OCDF	Dioxin/Furans	1	0	0.00030	0.00030	0.00030	na
Carp	WB-fillet	Antimony	Trace Metals	1	0	1.0	1.0	1.0	na
Carp	WB-fillet	Arsenic	Trace Metals	1	1	170	170	170	na
Carp	WB-fillet	Total Inorganic Arsenic	Trace Metals	1	1	6.0	6.0	6.0	na
Carp	WB-fillet	Beryllium	Trace Metals	1	0	1.0	1.0	1.0	na
Carp	WB-fillet	Cadmium	Trace Metals	1	1	20	20	20	na
Carp	WB-fillet	Chromium	Trace Metals	1	1	510	510	510	na
Carp	WB-fillet	Copper	Trace Metals	1	1	1,800	1,800	1,800	na
Carp	WB-fillet	Lead	Trace Metals	1	1	33	33	33	na
Carp	WB-fillet	Mercury	Trace Metals	1	1	75	75	75	na
Carp	WB-fillet	Nickel	Trace Metals	1	0	10	10	10	na
Carp	WB-fillet	Silver	Trace Metals	1	1	30	30	30	na
Carp	WB-fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na
Carp	WB-fillet	Zinc	Trace Metals	1	1	110,000	110,000	110,000	na
Carp	WB-fillet	Aroclor 1242	PCB Aroclors	2	1	6.6	6.6	6.6	na
Carp	WB-fillet	Aroclor 1254	PCB Aroclors	2	1	87	87	87	na
Carp	WB-fillet	Aroclor 1260	PCB Aroclors	2	1	67	67	67	na
Carp	WB-fillet	33'44'-TeCB	PCB Congeners	1	1	0.084	0.084	0.084	na
Carp	WB-fillet	233'44'-PeCB	PCB Congeners	1	1	2.3	2.3	2.3	na
Carp	WB-fillet	2344'5-PeCB	PCB Congeners	1	1	0.22	0.22	0.22	na
Carp	WB-fillet	23'44'5-PeCB	PCB Congeners	1	1	9.2	9.2	9.2	na
Carp	WB-fillet	2'344'5-PeCB	PCB Congeners	1	1	0.27	0.27	0.27	na
Carp	WB-fillet	33'44'5-PeCB	PCB Congeners	1	1	0.021	0.021	0.021	na
Carp	WB-fillet	233'44'5-HxCB	PCB Congeners	1	1	1.4	1.4	1.4	na
Carp	WB-fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.68	0.68	0.68	na
Carp	WB-fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.020	0.020	0.020	na
Carp	WB-fillet	22'33'44'5-HpCB	PCB Congeners	1	1	2.5	2.5	2.5	na
Carp	WB-fillet	22'344'55'-HpCB	PCB Congeners	1	1	8.6	8.6	8.6	na
Carp	WB-fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.12	0.12	0.12	na
Carp	WB-Fillet	Aldrin	Pesticides	5	1	3.8	3.8	3.8	na
Carp	WB-Fillet	alpha HCH	Pesticides	5	1	0.53	0.53	0.53	na
Carp	WB-Fillet	alpha-Endosulfan (I)	Pesticides	5	1	0.67	0.67	0.67	na
Carp	WB-Fillet	beta HCH	Pesticides	5	1	0.30	0.30	0.30	na
Carp	WB-Fillet	cis-Chlordane	Pesticides	5	1	4.6	4.6	4.6	na
Carp	WB-Fillet	cis-Nonachlor	Pesticides	5	1	4.0	4.0	4.0	na
Carp	WB-Fillet	o,p'-DDD	Pesticides	5	1	1.9	1.9	1.9	na
Carp	WB-Fillet	o,p'-DDE	Pesticides	5	1	0.52	0.52	0.52	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Carp	WB-Fillet	o,p'-DDT	Pesticides	5	1	2.2	2.2	2.2	na
Carp	WB-Fillet	p,p'-DDD	Pesticides	5	1	19	19	19	na
Carp	WB-Fillet	p,p'-DDE	Pesticides	5	1	380	380	380	na
Carp	WB-Fillet	p,p'-DDT	Pesticides	5	1	2.5	2.5	2.5	na
Carp	WB-Fillet	Dieldrin	Pesticides	5	1	4.3	4.3	4.3	na
Carp	WB-Fillet	Endrin	Pesticides	5	0	0.040	0.040	0.040	na
Carp	WB-Fillet	gamma HCH	Pesticides	5	1	1.7	1.7	1.7	na
Carp	WB-Fillet	Heptachlor	Pesticides	5	0	0.16	0.16	0.16	na
Carp	WB-Fillet	Heptachlor Epoxide	Pesticides	5	1	0.37	0.37	0.37	na
Carp	WB-Fillet	Hexachlorobenzene	Pesticides	5	1	5.4	5.4	5.4	na
Carp	WB-Fillet	Methoxychlor	Pesticides	5	0	0.095	0.095	0.095	na
Carp	WB-Fillet	Mirex	Pesticides	5	1	0.23	0.23	0.23	na
Carp	WB-Fillet	Oxychlordane	Pesticides	5	1	2.7	2.7	2.7	na
Carp	WB-Fillet	trans-Chlordane	Pesticides	5	1	1.9	1.9	1.9	na
Carp	WB-Fillet	trans-Nonachlor	Pesticides	5	1	10	10	10	na
Carp	WB-Fillet	Acenaphthene	PAHs	1	1	1.2	1.2	1.2	na
Carp	WB-Fillet	Acenaphthylene	PAHs	1	0	0.70	0.70	0.70	na
Carp	WB-Fillet	Anthracene	PAHs	1	1	0.39	0.39	0.39	na
Carp	WB-Fillet	Benz[a]anthracene	PAHs	1	0	0.81	0.81	0.81	na
Carp	WB-Fillet	Benzo[a]pyrene	PAHs	1	0	0.51	0.51	0.51	na
Carp	WB-Fillet	Benzo[e]pyrene	PAHs	1	0	0.49	0.49	0.49	na
Carp	WB-Fillet	Benzo[ghi]perylene	PAHs	1	0	0.40	0.40	0.40	na
Carp	WB-Fillet	Benzo[b/j/k]fluoranthenes	PAHs	1	0	0.47	0.47	0.47	na
Carp	WB-Fillet	Chrysene	PAHs	1	0	0.84	0.84	0.84	na
Carp	WB-Fillet	Dibenz[ah]anthracene	PAHs	1	0	0.43	0.43	0.43	na
Carp	WB-Fillet	Fluoranthene	PAHs	1	0	0.65	0.65	0.65	na
Carp	WB-Fillet	Fluorene	PAHs	1	0	0.72	0.72	0.72	na
Carp	WB-Fillet	Indeno[1,2,3-cd]pyrene	PAHs	1	0	0.45	0.45	0.45	na
Carp	WB-Fillet	Naphthalene	PAHs	1	1	12	12	12	na
Carp	WB-Fillet	Perylene	PAHs	1	0	0.54	0.54	0.54	na
Carp	WB-Fillet	Phenanthrene	PAHs	1	1	1.7	1.7	1.7	na
Carp	WB-Fillet	Pyrene	PAHs	1	1	0.68	0.68	0.68	na
Pikeminnow	Fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.00013	0.00013	0.00013	na
Pikeminnow	Fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.00018	0.00018	0.00018	na
Pikeminnow	Fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.00051	0.00051	0.00051	na
Pikeminnow	Fillet	OCDD	Dioxin/Furans	1	1	0.00089	0.00089	0.00089	na
Pikeminnow	Fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.00044	0.00044	0.00044	na
Pikeminnow	Fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	0	0.000080	0.000080	0.000080	na
Pikeminnow	Fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	1	0.00013	0.00013	0.00013	na
Pikeminnow	Fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	Fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Pikeminnow	Fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Pikeminnow	Fillet	OCDF	Dioxin/Furans	1	0	0.00030	0.00030	0.00030	na
Pikeminnow	Fillet	Antimony	Trace Metals	1	0	1.0	1.0	1.0	na
Pikeminnow	Fillet	Arsenic	Trace Metals	1	0	50	50	50	na
Pikeminnow	Fillet	Total Inorganic Arsenic	Trace Metals	1	0	3.0	3.0	3.0	na
Pikeminnow	Fillet	Beryllium	Trace Metals	1	1	2.0	2.0	2.0	na
Pikeminnow	Fillet	Cadmium	Trace Metals	1	0	10	10	10	na
Pikeminnow	Fillet	Chromium	Trace Metals	1	1	180	180	180	na
Pikeminnow	Fillet	Copper	Trace Metals	1	1	490	490	490	na
Pikeminnow	Fillet	Lead	Trace Metals	1	0	5.0	5.0	5.0	na
Pikeminnow	Fillet	Mercury	Trace Metals	1	1	720	720	720	na
Pikeminnow	Fillet	Nickel	Trace Metals	1	1	40	40	40	na
Pikeminnow	Fillet	Silver	Trace Metals	1	0	10	10	10	na
Pikeminnow	Fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na
Pikeminnow	Fillet	Zinc	Trace Metals	1	1	6,900	6,900	6,900	na
Pikeminnow	Fillet	Aroclor 1242	PCB Aroclors	1	0	3.4	3.4	3.4	na
Pikeminnow	Fillet	Aroclor 1254	PCB Aroclors	1	1	16	16	16	na
Pikeminnow	Fillet	Aroclor 1260	PCB Aroclors	1	1	17	17	17	na
Pikeminnow	Fillet	33'44'-TeCB	PCB Congeners	1	1	0.035	0.035	0.035	na
Pikeminnow	Fillet	233'44'-PeCB	PCB Congeners	1	1	0.75	0.75	0.75	na
Pikeminnow	Fillet	2344'5-PeCB	PCB Congeners	1	1	0.071	0.071	0.071	na
Pikeminnow	Fillet	23'44'5-PeCB	PCB Congeners	1	1	2.5	2.5	2.5	na
Pikeminnow	Fillet	2'344'5-PeCB	PCB Congeners	1	1	0.061	0.061	0.061	na
Pikeminnow	Fillet	33'44'5-PeCB	PCB Congeners	1	1	0.0067	0.0067	0.0067	na
Pikeminnow	Fillet	233'44'5-HxCB	PCB Congeners	1	1	0.40	0.40	0.40	na
Pikeminnow	Fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.17	0.17	0.17	na
Pikeminnow	Fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.0061	0.0061	0.0061	na
Pikeminnow	Fillet	22'33'44'5-HpCB	PCB Congeners	1	1	0.61	0.61	0.61	na
Pikeminnow	Fillet	22'344'55'-HpCB	PCB Congeners	1	1	1.8	1.8	1.8	na
Pikeminnow	Fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.030	0.030	0.030	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Pikeminnow	Fillet	Aldrin	Pesticides	1	1	6.5	6.5	6.5	na
Pikeminnow	Fillet	alpha HCH	Pesticides	1	0	0.54	0.54	0.54	na
Pikeminnow	Fillet	alpha-Endosulfan (I)	Pesticides	1	0	0.020	0.020	0.020	na
Pikeminnow	Fillet	beta HCH	Pesticides	1	0	0.69	0.69	0.69	na
Pikeminnow	Fillet	cis-Chlordane	Pesticides	1	1	0.45	0.45	0.45	na
Pikeminnow	Fillet	cis-Nonachlor	Pesticides	1	1	0.45	0.45	0.45	na
Pikeminnow	Fillet	o,p'-DDD	Pesticides	1	1	0.24	0.24	0.24	na
Pikeminnow	Fillet	o,p'-DDE	Pesticides	1	1	0.16	0.16	0.16	na
Pikeminnow	Fillet	o,p'-DDT	Pesticides	1	1	0.32	0.32	0.32	na
Pikeminnow	Fillet	p,p'-DDD	Pesticides	1	1	2.5	2.5	2.5	na
Pikeminnow	Fillet	p,p'-DDE	Pesticides	1	1	22	22	22	na
Pikeminnow	Fillet	p,p'-DDT	Pesticides	1	1	0.28	0.28	0.28	na
Pikeminnow	Fillet	Dieldrin	Pesticides	1	1	0.52	0.52	0.52	na
Pikeminnow	Fillet	Endrin	Pesticides	1	0	0.030	0.030	0.030	na
Pikeminnow	Fillet	gamma HCH	Pesticides	1	1	1.1	1.1	1.1	na
Pikeminnow	Fillet	Heptachlor	Pesticides	1	0	0.24	0.24	0.24	na
Pikeminnow	Fillet	Heptachlor Epoxide	Pesticides	1	0	0.010	0.010	0.010	na
Pikeminnow	Fillet	Hexachlorobenzene	Pesticides	1	1	1.0	1.0	1.0	na
Pikeminnow	Fillet	Methoxychlor	Pesticides	1	0	0.060	0.060	0.060	na
Pikeminnow	Fillet	Mirex	Pesticides	1	1	0.090	0.090	0.090	na
Pikeminnow	Fillet	Oxychlordane	Pesticides	1	0	2.9	2.9	2.9	na
Pikeminnow	Fillet	trans-Chlordane	Pesticides	1	1	0.22	0.22	0.22	na
Pikeminnow	Fillet	trans-Nonachlor	Pesticides	1	1	1.5	1.5	1.5	na
Pikeminnow	Fillet	Acenaphthene	PAHs	1	0	1.0	1.0	1.0	na
Pikeminnow	Fillet	Acenaphthylene	PAHs	1	0	0.98	0.98	0.98	na
Pikeminnow	Fillet	Anthracene	PAHs	1	0	0.68	0.68	0.68	na
Pikeminnow	Fillet	Benz[a]anthracene	PAHs	1	0	0.31	0.31	0.31	na
Pikeminnow	Fillet	Benzo[a]pyrene	PAHs	1	0	0.60	0.60	0.60	na
Pikeminnow	Fillet	Benzo[e]pyrene	PAHs	1	0	0.58	0.58	0.58	na
Pikeminnow	Fillet	Benzo[ghi]perylene	PAHs	1	0	0.86	0.86	0.86	na
Pikeminnow	Fillet	Benzo[b/j/k]fluoranthenes	PAHs	1	0	0.56	0.56	0.56	na
Pikeminnow	Fillet	Chrysene	PAHs	1	0	0.32	0.32	0.32	na
Pikeminnow	Fillet	Dibenz[ah]anthracene	PAHs	1	0	1.1	1.1	1.1	na
Pikeminnow	Fillet	Fluoranthene	PAHs	1	1	0.46	0.46	0.46	na
Pikeminnow	Fillet	Fluorene	PAHs	1	0	1.0	1.0	1.0	na
Pikeminnow	Fillet	Indeno[1,2,3-cd]pyrene	PAHs	1	0	0.97	0.97	0.97	na
Pikeminnow	Fillet	Naphthalene	PAHs	1	1	9.9	9.9	9.9	na
Pikeminnow	Fillet	Perylene	PAHs	1	0	0.61	0.61	0.61	na
Pikeminnow	Fillet	Phenanthrene	PAHs	1	1	1.6	1.6	1.6	na
Pikeminnow	Fillet	Pyrene	PAHs	1	1	1.1	1.1	1.1	na
Pikeminnow	WB	2,3,7,8-TCDD	Dioxin/Furans	3	3	0.00019	0.00047	0.00037	0.00016
Pikeminnow	WB	1,2,3,7,8-PeCDD	Dioxin/Furans	3	3	0.00025	0.00075	0.00056	0.00027
Pikeminnow	WB	1,2,3,4,7,8-HxCDD	Dioxin/Furans	3	3	0.00012	0.00037	0.00027	0.00013
Pikeminnow	WB	1,2,3,6,7,8-HxCDD	Dioxin/Furans	3	3	0.00046	0.0013	0.00099	0.00046
Pikeminnow	WB	1,2,3,7,8,9-HxCDD	Dioxin/Furans	3	2	0.000080	0.00023	0.00012	0.000096
Pikeminnow	WB	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	3	3	0.00091	0.0022	0.0017	0.00069
Pikeminnow	WB	OCDD	Dioxin/Furans	3	3	0.0016	0.0029	0.0023	0.00068
Pikeminnow	WB	2,3,7,8-TCDF	Dioxin/Furans	3	3	0.00068	0.0018	0.0013	0.00060
Pikeminnow	WB	1,2,3,7,8-PeCDF	Dioxin/Furans	3	1	0.000090	0.00019	0.000093	0.000083
Pikeminnow	WB	2,3,4,7,8-PeCDF	Dioxin/Furans	3	3	0.00017	0.00053	0.00041	0.00020
Pikeminnow	WB	1,2,3,4,7,8-HxCDF	Dioxin/Furans	3	1	0.00010	0.00020	0.000100	0.000086
Pikeminnow	WB	1,2,3,6,7,8-HxCDF	Dioxin/Furans	3	2	0.00010	0.00016	0.00012	0.000059
Pikeminnow	WB	1,2,3,7,8,9-HxCDF	Dioxin/Furans	3	0	0.00010	0.00010	0.00010	0.00
Pikeminnow	WB	2,3,4,6,7,8-HxCDF	Dioxin/Furans	3	2	0.00010	0.00019	0.00012	0.000070
Pikeminnow	WB	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	3	1	0.00015	0.00028	0.00014	0.00012
Pikeminnow	WB	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	3	0	0.00015	0.00015	0.00015	0.00
Pikeminnow	WB	OCDF	Dioxin/Furans	3	0	0.00030	0.00030	0.00030	0.00
Pikeminnow	WB	Antimony	Trace Metals	3	0	1.0	1.0	1.0	0.00
Pikeminnow	WB	Arsenic	Trace Metals	3	0	50	50	50	0.00
Pikeminnow	WB	Total Inorganic Arsenic	Trace Metals	3	0	3.0	3.0	3.0	0.00
Pikeminnow	WB	Beryllium	Trace Metals	3	1	1.0	1.1	0.70	0.35
Pikeminnow	WB	Cadmium	Trace Metals	3	1	10	20	10	8.7
Pikeminnow	WB	Chromium	Trace Metals	3	3	170	180	180	3.4
Pikeminnow	WB	Copper	Trace Metals	3	3	560	1,100	800	270
Pikeminnow	WB	Lead	Trace Metals	3	2	5.0	7.0	5.2	2.4
Pikeminnow	WB	Mercury	Trace Metals	3	3	57	490	340	250
Pikeminnow	WB	Nickel	Trace Metals	3	1	10	19	9.7	8.1
Pikeminnow	WB	Silver	Trace Metals	3	0	10	10	10	0.00000016
Pikeminnow	WB	Thallium	Trace Metals	3	0	2.0	2.0	2.0	0.00
Pikeminnow	WB	Zinc	Trace Metals	3	3	10,000	18,000	14,000	4,100
Pikeminnow	WB	Aroclor 1242	PCB Aroclors	2	3	2.4	5.4	3.6	1.2
Pikeminnow	WB	Aroclor 1254	PCB Aroclors	2	3	28	66	51	20
Pikeminnow	WB	Aroclor 1260	PCB Aroclors	2	3	17	62	47	26
Pikeminnow	WB	33'44'-TeCB	PCB Congeners	3	3	0.062	0.13	0.097	0.033
Pikeminnow	WB	233'44'-PeCB	PCB Congeners	3	3	1.2	2.6	2.1	0.75
Pikeminnow	WB	2344'5-PeCB	PCB Congeners	3	3	0.074	0.25	0.18	0.094
Pikeminnow	WB	23'44'5-PeCB	PCB Congeners	3	3	4.1	9.7	7.5	3.0

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Pikeminnow	WB	2'344'5-PeCB	PCB Congeners	3	3	0.086	0.22	0.17	0.073
Pikeminnow	WB	33'44'5-PeCB	PCB Congeners	3	3	0.0090	0.025	0.018	0.0085
Pikeminnow	WB	233'44'5-HxCB	PCB Congeners	3	3	0.47	1.6	1.1	0.59
Pikeminnow	WB	23'44'55'-HxCB	PCB Congeners	3	3	0.18	0.77	0.50	0.30
Pikeminnow	WB	33'44'55'-HxCB	PCB Congeners	3	3	0.00	0.027	0.020	0.0095
Pikeminnow	WB	22'33'44'5-HpCB	PCB Congeners	3	3	0.65	2.0	1.5	0.72
Pikeminnow	WB	22'344'55'-HpCB	PCB Congeners	3	3	2.1	7.4	5.4	2.9
Pikeminnow	WB	233'44'55'-HpCB	PCB Congeners	3	3	0.032	0.11	0.080	0.042
Pikeminnow	WB	Aldrin	Pesticides	3	1	0.030	4.1	1.4	2.3
Pikeminnow	WB	alpha HCH	Pesticides	3	1	0.040	0.54	0.20	0.21
Pikeminnow	WB	alpha-Endosulfan (I)	Pesticides	3	0	0.010	0.040	0.021	0.016
Pikeminnow	WB	beta HCH	Pesticides	3	1	0.060	0.44	0.16	0.11
Pikeminnow	WB	cis-Chlordane	Pesticides	3	3	0.89	2.1	1.6	0.61
Pikeminnow	WB	cis-Nonachlor	Pesticides	3	3	0.87	2.2	1.6	0.69
Pikeminnow	WB	o,p'-DDD	Pesticides	1	3	0.29	0.81	0.64	0.30
Pikeminnow	WB	o,p'-DDE	Pesticides	1	3	0.22	0.63	0.45	0.21
Pikeminnow	WB	o,p'-DDT	Pesticides	1	3	0.85	2.1	1.4	0.64
Pikeminnow	WB	p,p'-DDD	Pesticides	1	3	2.8	9.0	6.9	3.5
Pikeminnow	WB	p,p'-DDE	Pesticides	1	3	45	120	86	38
Pikeminnow	WB	p,p'-DDT	Pesticides	1	3	0.12	0.43	0.30	0.16
Pikeminnow	WB	Dieldrin	Pesticides	3	3	0.86	2.1	1.6	0.67
Pikeminnow	WB	Endrin	Pesticides	3	0	0.020	0.070	0.040	0.026
Pikeminnow	WB	gamma HCH	Pesticides	1	3	0.64	1.1	0.93	0.25
Pikeminnow	WB	Heptachlor	Pesticides	1	0	0.15	0.27	0.20	0.064
Pikeminnow	WB	Heptachlor Epoxide	Pesticides	1	2	0.030	0.17	0.11	0.082
Pikeminnow	WB	Hexachlorobenzene	Pesticides	1	3	2.3	3.2	2.9	0.52
Pikeminnow	WB	Methoxychlor	Pesticides	1	1	0.030	0.19	0.088	0.080
Pikeminnow	WB	Mirex	Pesticides	1	3	0.070	0.25	0.18	0.094
Pikeminnow	WB	Oxychlordane	Pesticides	1	3	0.89	3.6	1.9	1.0
Pikeminnow	WB	trans-Chlordane	Pesticides	1	3	0.43	0.91	0.70	0.24
Pikeminnow	WB	trans-Nonachlor	Pesticides	1	3	3.4	8.0	6.0	2.4
Pikeminnow	WB	Acenaphthene	PAHs	4	2	1.4	2.3	1.7	0.57
Pikeminnow	WB	Acenaphthylene	PAHs	4	3	0.46	0.88	0.56	0.12
Pikeminnow	WB	Anthracene	PAHs	4	1	0.16	0.68	0.24	0.093
Pikeminnow	WB	Benz[a]anthracene	PAHs	4	0	0.033	0.20	0.13	0.087
Pikeminnow	WB	Benzo[a]pyrene	PAHs	4	0	0.12	1.1	0.69	0.51
Pikeminnow	WB	Benzo[e]pyrene	PAHs	4	0	0.10	3.6	1.6	1.8
Pikeminnow	WB	Benzo[ghi]perylene	PAHs	4	2	0.052	0.75	0.22	0.31
Pikeminnow	WB	Benzo[b/j/k]fluoranthenes	PAHs	4	0	0.099	1.0	0.66	0.49
Pikeminnow	WB	Chrysene	PAHs	4	0	0.065	0.19	0.14	0.069
Pikeminnow	WB	Dibenz[ah]anthracene	PAHs	4	1	0.064	0.92	0.26	0.38
Pikeminnow	WB	Fluoranthene	PAHs	4	3	0.27	0.66	0.53	0.22
Pikeminnow	WB	Fluorene	PAHs	4	3	1.3	1.8	1.5	0.28
Pikeminnow	WB	Indeno[1,2,3-cd]pyrene	PAHs	4	1	0.043	0.72	0.19	0.29
Pikeminnow	WB	Naphthalene	PAHs	4	3	3.9	7.0	5.0	1.8
Pikeminnow	WB	Perylene	PAHs	4	0	0.20	1.4	0.80	0.62
Pikeminnow	WB	Phenanthrene	PAHs	4	3	1.3	2.0	1.7	0.37
Pikeminnow	WB	Pyrene	PAHs	4	2	0.16	0.69	0.49	0.29
Pikeminnow	WB-fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.00070	0.00070	0.00070	na
Pikeminnow	WB-fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.0011	0.0011	0.0011	na
Pikeminnow	WB-fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	1	0.00050	0.00050	0.00050	na
Pikeminnow	WB-fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	1	0.0021	0.0021	0.0021	na
Pikeminnow	WB-fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	WB-fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.0033	0.0033	0.0033	na
Pikeminnow	WB-fillet	OCDD	Dioxin/Furans	1	1	0.0037	0.0037	0.0037	na
Pikeminnow	WB-fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.0028	0.0028	0.0028	na
Pikeminnow	WB-fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	1	0.00029	0.00029	0.00029	na
Pikeminnow	WB-fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	1	0.00078	0.00078	0.00078	na
Pikeminnow	WB-fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	1	0.00030	0.00030	0.00030	na
Pikeminnow	WB-fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	1	0.00020	0.00020	0.00020	na
Pikeminnow	WB-fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Pikeminnow	WB-fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	1	0.00018	0.00018	0.00018	na
Pikeminnow	WB-fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Pikeminnow	WB-fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Pikeminnow	WB-fillet	OCDF	Dioxin/Furans	1	0	0.00030	0.00030	0.00030	na
Pikeminnow	WB-fillet	Antimony	Trace Metals	1	0	1.0	1.0	1.0	na
Pikeminnow	WB-fillet	Arsenic	Trace Metals	1	0	50	50	50	na
Pikeminnow	WB-fillet	Total Inorganic Arsenic	Trace Metals	1	0	3.0	3.0	3.0	na
Pikeminnow	WB-fillet	Beryllium	Trace Metals	1	0	1.0	1.0	1.0	na
Pikeminnow	WB-fillet	Cadmium	Trace Metals	1	0	10	10	10	na
Pikeminnow	WB-fillet	Chromium	Trace Metals	1	1	170	170	170	na
Pikeminnow	WB-fillet	Copper	Trace Metals	1	1	610	610	610	na
Pikeminnow	WB-fillet	Lead	Trace Metals	1	0	5.0	5.0	5.0	na
Pikeminnow	WB-fillet	Mercury	Trace Metals	1	1	340	340	340	na
Pikeminnow	WB-fillet	Nickel	Trace Metals	1	0	10	10	10	na
Pikeminnow	WB-fillet	Silver	Trace Metals	1	0	10	10	10	na
Pikeminnow	WB-fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Pikeminnow	WB-fillet	Zinc	Trace Metals	1	1	13,000	13,000	13,000	na
Pikeminnow	WB-fillet	Aroclor 1242	PCB Aroclors	1	1	6.8	6.8	6.8	na
Pikeminnow	WB-fillet	Aroclor 1254	PCB Aroclors	1	1	100	100	100	na
Pikeminnow	WB-fillet	Aroclor 1260	PCB Aroclors	1	1	92	92	92	na
Pikeminnow	WB-fillet	33'44'-TeCB	PCB Congeners	1	1	0.19	0.19	0.19	na
Pikeminnow	WB-fillet	233'44'-PeCB	PCB Congeners	1	1	3.8	3.8	3.8	na
Pikeminnow	WB-fillet	2344'5-PeCB	PCB Congeners	1	1	0.37	0.37	0.37	na
Pikeminnow	WB-fillet	23'44'5-PeCB	PCB Congeners	1	1	13	13	13	na
Pikeminnow	WB-fillet	2'344'5-PeCB	PCB Congeners	1	1	0.32	0.32	0.32	na
Pikeminnow	WB-fillet	33'44'5-PeCB	PCB Congeners	1	1	0.038	0.038	0.038	na
Pikeminnow	WB-fillet	233'44'5-HxCB	PCB Congeners	1	1	2.0	2.0	2.0	na
Pikeminnow	WB-fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.82	0.82	0.82	na
Pikeminnow	WB-fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.035	0.035	0.035	na
Pikeminnow	WB-fillet	22'33'44'5-HpCB	PCB Congeners	1	1	2.9	2.9	2.9	na
Pikeminnow	WB-fillet	22'344'55'-HpCB	PCB Congeners	1	1	9.9	9.9	9.9	na
Pikeminnow	WB-fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.16	0.16	0.16	na
Pikeminnow	WB-Fillet	Aldrin	Pesticides	3	1	2.4	2.4	2.4	na
Pikeminnow	WB-Fillet	alpha HCH	Pesticides	3	1	0.54	0.54	0.54	na
Pikeminnow	WB-Fillet	alpha-Endosulfan (I)	Pesticides	3	0	0.010	0.010	0.010	na
Pikeminnow	WB-Fillet	beta HCH	Pesticides	3	1	0.13	0.13	0.13	na
Pikeminnow	WB-Fillet	cis-Chlordane	Pesticides	3	1	2.5	2.5	2.5	na
Pikeminnow	WB-Fillet	cis-Nonachlor	Pesticides	1	1	2.8	2.8	2.8	na
Pikeminnow	WB-Fillet	o,p'-DDD	Pesticides	1	1	1.2	1.2	1.2	na
Pikeminnow	WB-Fillet	o,p'-DDE	Pesticides	1	1	0.72	0.72	0.72	na
Pikeminnow	WB-Fillet	o,p'-DDT	Pesticides	1	1	1.9	1.9	1.9	na
Pikeminnow	WB-Fillet	p,p'-DDD	Pesticides	1	1	13	13	13	na
Pikeminnow	WB-Fillet	p,p'-DDE	Pesticides	1	1	140	140	140	na
Pikeminnow	WB-Fillet	p,p'-DDT	Pesticides	1	1	0.53	0.53	0.53	na
Pikeminnow	WB-Fillet	Dieldrin	Pesticides	1	1	3.2	3.2	3.2	na
Pikeminnow	WB-Fillet	Endrin	Pesticides	1	0	0.030	0.030	0.030	na
Pikeminnow	WB-Fillet	gamma HCH	Pesticides	1	1	1.0	1.0	1.0	na
Pikeminnow	WB-Fillet	Heptachlor	Pesticides	1	0	0.090	0.090	0.090	na
Pikeminnow	WB-Fillet	Heptachlor Epoxide	Pesticides	1	1	0.27	0.27	0.27	na
Pikeminnow	WB-Fillet	Hexachlorobenzene	Pesticides	1	1	4.7	4.7	4.7	na
Pikeminnow	WB-Fillet	Methoxychlor	Pesticides	1	1	0.27	0.27	0.27	na
Pikeminnow	WB-Fillet	Mirex	Pesticides	1	1	0.29	0.29	0.29	na
Pikeminnow	WB-Fillet	Oxychlordane	Pesticides	1	1	4.0	4.0	4.0	na
Pikeminnow	WB-Fillet	trans-Chlordane	Pesticides	1	1	1.1	1.1	1.1	na
Pikeminnow	WB-Fillet	trans-Nonachlor	Pesticides	1	1	10	10	10	na
Pikeminnow	WB-Fillet	Acenaphthene	PAHs	1	1	1.6	1.6	1.6	na
Pikeminnow	WB-Fillet	Acenaphthylene	PAHs	1	1	0.82	0.82	0.82	na
Pikeminnow	WB-Fillet	Anthracene	PAHs	1	0	0.30	0.30	0.30	na
Pikeminnow	WB-Fillet	Benz[a]anthracene	PAHs	1	0	0.049	0.049	0.049	na
Pikeminnow	WB-Fillet	Benzo[a]pyrene	PAHs	1	0	1.4	1.4	1.4	na
Pikeminnow	WB-Fillet	Benzo[e]pyrene	PAHs	1	0	1.3	1.3	1.3	na
Pikeminnow	WB-Fillet	Benzo[ghi]perylene	PAHs	1	1	0.68	0.68	0.68	na
Pikeminnow	WB-Fillet	Benzo[b/j/k]fluoranthenes	PAHs	1	0	1.3	1.3	1.3	na
Pikeminnow	WB-Fillet	Chrysene	PAHs	1	0	0.078	0.078	0.078	na
Pikeminnow	WB-Fillet	Dibenz[ah]anthracene	PAHs	1	1	0.80	0.80	0.80	na
Pikeminnow	WB-Fillet	Fluoranthene	PAHs	1	1	0.78	0.78	0.78	na
Pikeminnow	WB-Fillet	Fluorene	PAHs	1	1	2.3	2.3	2.3	na
Pikeminnow	WB-Fillet	Indeno[1,2,3-cd]pyrene	PAHs	1	1	0.55	0.55	0.55	na
Pikeminnow	WB-Fillet	Naphthalene	PAHs	1	1	5.1	5.1	5.1	na
Pikeminnow	WB-Fillet	Perylene	PAHs	1	0	2.0	2.0	2.0	na
Pikeminnow	WB-Fillet	Phenanthrene	PAHs	1	1	2.3	2.3	2.3	na
Pikeminnow	WB-Fillet	Pyrene	PAHs	1	1	0.42	0.42	0.42	na
Sucker	Fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.000080	0.000080	0.000080	na
Sucker	Fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.000060	0.000060	0.000060	na
Sucker	Fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.00014	0.00014	0.00014	na
Sucker	Fillet	OCDD	Dioxin/Furans	1	1	0.00045	0.00045	0.00045	na
Sucker	Fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.00014	0.00014	0.00014	na
Sucker	Fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	0	0.000050	0.000050	0.000050	na
Sucker	Fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	0	0.000050	0.000050	0.000050	na
Sucker	Fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	Fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Sucker	Fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Sucker	Fillet	OCDF	Dioxin/Furans	1	0	0.00030	0.00030	0.00030	na
Sucker	Fillet	Antimony	Trace Metals	1	0	1.0	1.0	1.0	na
Sucker	Fillet	Arsenic	Trace Metals	1	1	80	80	80	na
Sucker	Fillet	Total Inorganic Arsenic	Trace Metals	1	1	4.0	4.0	4.0	na
Sucker	Fillet	Beryllium	Trace Metals	1	0	1.0	1.0	1.0	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Sucker	Fillet	Cadmium	Trace Metals	1	0	10	10	10	na
Sucker	Fillet	Chromium	Trace Metals	1	1	140	140	140	na
Sucker	Fillet	Copper	Trace Metals	1	1	390	390	390	na
Sucker	Fillet	Lead	Trace Metals	1	0	5.0	5.0	5.0	na
Sucker	Fillet	Mercury	Trace Metals	1	1	160	160	160	na
Sucker	Fillet	Nickel	Trace Metals	1	1	20	20	20	na
Sucker	Fillet	Silver	Trace Metals	1	1	20	20	20	na
Sucker	Fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na
Sucker	Fillet	Zinc	Trace Metals	1	1	8,300	8,300	8,300	na
Sucker	Fillet	Aroclor 1242	PCB Aroclors	1	0	30	30	30	na
Sucker	Fillet	Aroclor 1254	PCB Aroclors	1	0	63	63	63	na
Sucker	Fillet	Aroclor 1260	PCB Aroclors	1	0	46	46	46	na
Sucker	Fillet	33'44'-TeCB	PCB Congeners	1	1	0.012	0.012	0.012	na
Sucker	Fillet	233'44'-PeCB	PCB Congeners	1	1	0.36	0.36	0.36	na
Sucker	Fillet	2344'5-PeCB	PCB Congeners	1	1	0.031	0.031	0.031	na
Sucker	Fillet	23'44'5-PeCB	PCB Congeners	1	1	1.2	1.2	1.2	na
Sucker	Fillet	2'344'5-PeCB	PCB Congeners	1	1	0.045	0.045	0.045	na
Sucker	Fillet	33'44'5-PeCB	PCB Congeners	1	0	0.0029	0.0029	0.0029	na
Sucker	Fillet	233'44'5-HxCB	PCB Congeners	1	1	0.17	0.17	0.17	na
Sucker	Fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.074	0.074	0.074	na
Sucker	Fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.0032	0.0032	0.0032	na
Sucker	Fillet	22'33'44'5-HpCB	PCB Congeners	1	1	0.32	0.32	0.32	na
Sucker	Fillet	22'344'55'-HpCB	PCB Congeners	1	1	0.85	0.85	0.85	na
Sucker	Fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.013	0.013	0.013	na
Sucker	Fillet	Aldrin	Pesticides	1	0	3.6	3.6	3.6	na
Sucker	Fillet	alpha HCH	Pesticides	1	0	6.2	6.2	6.2	na
Sucker	Fillet	alpha-Endosulfan (I)	Pesticides	1	0	0.020	0.020	0.020	na
Sucker	Fillet	beta HCH	Pesticides	1	0	8.7	8.7	8.7	na
Sucker	Fillet	cis-Chlordane	Pesticides	1	0	2.3	2.3	2.3	na
Sucker	Fillet	cis-Nonachlor	Pesticides	1	0	2.1	2.1	2.1	na
Sucker	Fillet	o,p'-DDD	Pesticides	1	0	1.2	1.2	1.2	na
Sucker	Fillet	o,p'-DDE	Pesticides	1	0	3.2	3.2	3.2	na
Sucker	Fillet	o,p'-DDT	Pesticides	1	0	2.5	2.5	2.5	na
Sucker	Fillet	p,p'-DDD	Pesticides	1	1	3.8	3.8	3.8	na
Sucker	Fillet	p,p'-DDE	Pesticides	1	1	21	21	21	na
Sucker	Fillet	p,p'-DDT	Pesticides	1	0	3.1	3.1	3.1	na
Sucker	Fillet	Dieldrin	Pesticides	1	1	0.42	0.42	0.42	na
Sucker	Fillet	Endrin	Pesticides	1	0	0.020	0.020	0.020	na
Sucker	Fillet	gamma HCH	Pesticides	1	0	5.0	5.0	5.0	na
Sucker	Fillet	Heptachlor	Pesticides	1	0	17	17	17	na
Sucker	Fillet	Heptachlor Epoxide	Pesticides	1	1	0.030	0.030	0.030	na
Sucker	Fillet	Hexachlorobenzene	Pesticides	1	0	2.0	2.0	2.0	na
Sucker	Fillet	Methoxychlor	Pesticides	1	0	0.020	0.020	0.020	na
Sucker	Fillet	Mirex	Pesticides	1	0	1.6	1.6	1.6	na
Sucker	Fillet	Oxychlordane	Pesticides	1	0	27	27	27	na
Sucker	Fillet	trans-Chlordane	Pesticides	1	0	2.7	2.7	2.7	na
Sucker	Fillet	trans-Nonachlor	Pesticides	1	0	3.0	3.0	3.0	na
Sucker	Fillet	Acenaphthene	PAHs	2	1	0.44	0.44	0.44	na
Sucker	Fillet	Acenaphthylene	PAHs	2	1	0.59	0.59	0.59	na
Sucker	Fillet	Anthracene	PAHs	2	1	2.9	2.9	2.9	na
Sucker	Fillet	Benz[a]anthracene	PAHs	2	0	0.20	0.20	0.20	na
Sucker	Fillet	Benzo[a]pyrene	PAHs	2	0	0.59	0.59	0.59	na
Sucker	Fillet	Benzo[e]pyrene	PAHs	2	0	0.40	0.40	0.40	na
Sucker	Fillet	Benzo[ghi]perylene	PAHs	2	0	0.47	0.47	0.47	na
Sucker	Fillet	Benzo[b/j/k]fluoranthenes	PAHs	2	0	0.44	0.44	0.44	na
Sucker	Fillet	Chrysene	PAHs	2	0	0.25	0.25	0.25	na
Sucker	Fillet	Dibenz[ah]anthracene	PAHs	2	0	0.85	0.85	0.85	na
Sucker	Fillet	Fluoranthene	PAHs	2	1	0.46	0.46	0.46	na
Sucker	Fillet	Fluorene	PAHs	2	1	0.57	0.57	0.57	na
Sucker	Fillet	Indeno[1,2,3-cd]pyrene	PAHs	2	0	0.28	0.54	0.41	0.18
Sucker	Fillet	Naphthalene	PAHs	2	1	5.2	5.2	5.2	na
Sucker	Fillet	Perylene	PAHs	2	0	0.87	0.87	0.87	na
Sucker	Fillet	Phenanthrene	PAHs	2	1	0.36	0.36	0.36	na
Sucker	Fillet	Pyrene	PAHs	2	1	1.9	1.9	1.9	na
Sucker	WB	2,3,7,8-TCDD	Dioxin/Furans	2	2	0.00031	0.00039	0.00035	0.000057
Sucker	WB	1,2,3,7,8-PeCDD	Dioxin/Furans	2	2	0.00028	0.00058	0.00043	0.00021
Sucker	WB	1,2,3,4,7,8-HxCDD	Dioxin/Furans	2	2	0.00011	0.00033	0.00022	0.00016
Sucker	WB	1,2,3,6,7,8-HxCDD	Dioxin/Furans	2	2	0.00034	0.00077	0.00056	0.00030
Sucker	WB	1,2,3,7,8,9-HxCDD	Dioxin/Furans	2	1	0.00022	0.00022	0.00014	0.00012
Sucker	WB	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	2	2	0.0013	0.0013	0.0013	0.0000010
Sucker	WB	OCDD	Dioxin/Furans	2	2	0.0027	0.0069	0.0048	0.0030
Sucker	WB	2,3,7,8-TCDF	Dioxin/Furans	2	2	0.00056	0.00097	0.00076	0.00029
Sucker	WB	1,2,3,7,8-PeCDF	Dioxin/Furans	2	2	0.000069	0.00018	0.00012	0.000078
Sucker	WB	2,3,4,7,8-PeCDF	Dioxin/Furans	2	2	0.00014	0.00048	0.00031	0.00024
Sucker	WB	1,2,3,4,7,8-HxCDF	Dioxin/Furans	2	1	0.00022	0.00022	0.00014	0.00012
Sucker	WB	1,2,3,6,7,8-HxCDF	Dioxin/Furans	2	1	0.00018	0.00018	0.00012	0.000092
Sucker	WB	1,2,3,7,8,9-HxCDF	Dioxin/Furans	2	1	0.00020	0.00020	0.00013	0.00011

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Sucker	WB	2,3,4,6,7,8-HxCDF	Dioxin/Furans	2	1	0.00026	0.00026	0.00016	0.00015
Sucker	WB	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	2	1	0.00027	0.00027	0.00017	0.00014
Sucker	WB	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	2	1	0.00020	0.00020	0.00014	0.000088
Sucker	WB	OCDF	Dioxin/Furans	2	2	0.00039	0.00047	0.00043	0.000060
Sucker	WB	Antimony	Trace Metals	2	1	0.79	1.0	0.65	0.21
Sucker	WB	Arsenic	Trace Metals	2	2	120	130	130	9.2
Sucker	WB	Total Inorganic Arsenic	Trace Metals	2	2	16	23	19	4.8
Sucker	WB	Beryllium	Trace Metals	2	2	3.7	10	6.9	4.4
Sucker	WB	Cadmium	Trace Metals	2	2	7.9	10	9.0	1.5
Sucker	WB	Chromium	Trace Metals	2	2	320	420	370	73
Sucker	WB	Copper	Trace Metals	2	2	1,800	1,800	1,800	45
Sucker	WB	Lead	Trace Metals	2	2	37	84	61	33
Sucker	WB	Mercury	Trace Metals	2	2	110	120	120	6.9
Sucker	WB	Nickel	Trace Metals	2	2	310	310	310	1.1
Sucker	WB	Silver	Trace Metals	2	1	10	38	21	23
Sucker	WB	Thallium	Trace Metals	2	0	2.0	2.0	2.0	0.00
Sucker	WB	Zinc	Trace Metals	2	2	11,000	14,000	13,000	1,700
Sucker	WB	Aroclor 1242	PCB Aroclors	1	2	6.7	18	9.3	3.6
Sucker	WB	Aroclor 1254	PCB Aroclors	1	2	53	78	59	8.3
Sucker	WB	Aroclor 1260	PCB Aroclors	1	2	36	53	40	5.4
Sucker	WB	33'44'-TeCB	PCB Congeners	2	2	0.053	0.068	0.061	0.010
Sucker	WB	233'44'-PeCB	PCB Congeners	2	2	1.6	1.7	1.7	0.057
Sucker	WB	2344'5-PeCB	PCB Congeners	2	2	0.12	0.12	0.12	0.0033
Sucker	WB	23'44'5-PeCB	PCB Congeners	2	2	5.1	5.1	5.1	0.010
Sucker	WB	2'344'5-PeCB	PCB Congeners	2	2	0.18	0.20	0.19	0.012
Sucker	WB	33'44'5-PeCB	PCB Congeners	2	2	0.010	0.016	0.013	0.0042
Sucker	WB	233'44'5-HxCB	PCB Congeners	2	2	0.72	0.79	0.75	0.051
Sucker	WB	23'44'55'-HxCB	PCB Congeners	2	2	0.31	0.33	0.32	0.016
Sucker	WB	33'44'55'-HxCB	PCB Congeners	2	2	0.00	0.020	0.016	0.0057
Sucker	WB	22'33'44'5-HpCB	PCB Congeners	2	2	1.3	1.4	1.4	0.064
Sucker	WB	22'344'55'-HpCB	PCB Congeners	2	2	3.6	3.8	3.7	0.16
Sucker	WB	233'44'55'-HpCB	PCB Congeners	2	2	0.055	0.059	0.057	0.0030
Sucker	WB	Aldrin	Pesticides	2	1	1.1	1.6	0.96	0.20
Sucker	WB	alpha HCH	Pesticides	2	2	0.83	3.4	1.5	0.90
Sucker	WB	alpha-Endosulfan (I)	Pesticides	2	0	0.010	0.033	0.022	0.016
Sucker	WB	beta HCH	Pesticides	2	1	0.27	3.9	1.1	1.2
Sucker	WB	cis-Chlordane	Pesticides	2	2	2.5	3.5	2.8	0.40
Sucker	WB	cis-Nonachlor	Pesticides	2	2	1.8	2.5	1.9	0.20
Sucker	WB	o,p'-DDD	Pesticides	2	2	1.1	2.7	1.8	0.94
Sucker	WB	o,p'-DDE	Pesticides	2	2	0.40	1.8	0.76	0.51
Sucker	WB	o,p'-DDT	Pesticides	2	2	1.7	3.1	2.1	0.62
Sucker	WB	p,p'-DDD	Pesticides	1	2	7.6	20	14	8.6
Sucker	WB	p,p'-DDE	Pesticides	1	2	66	85	76	14
Sucker	WB	p,p'-DDT	Pesticides	1	2	14	15	14	1.4
Sucker	WB	Dieldrin	Pesticides	2	2	1.8	5.0	3.4	2.2
Sucker	WB	Endrin	Pesticides	2	0	0.026	0.030	0.028	0.0029
Sucker	WB	gamma HCH	Pesticides	2	2	0.98	3.2	1.6	0.83
Sucker	WB	Heptachlor	Pesticides	2	0	0.16	7.2	3.7	5.0
Sucker	WB	Heptachlor Epoxide	Pesticides	2	2	0.18	0.38	0.28	0.14
Sucker	WB	Hexachlorobenzene	Pesticides	2	2	3.7	4.4	3.8	0.78
Sucker	WB	Methoxychlor	Pesticides	2	0	0.038	0.060	0.049	0.016
Sucker	WB	Mirex	Pesticides	2	2	0.11	0.76	0.27	0.23
Sucker	WB	Oxychlordane	Pesticides	2	2	1.3	13	4.3	4.3
Sucker	WB	trans-Chlordane	Pesticides	1	2	1.1	2.4	1.5	0.53
Sucker	WB	trans-Nonachlor	Pesticides	1	2	5.1	5.5	5.0	0.17
Sucker	WB	Acenaphthene	PAHs	2	2	0.62	9.7	5.1	6.5
Sucker	WB	Acenaphthylene	PAHs	2	2	0.60	1.3	0.95	0.50
Sucker	WB	Anthracene	PAHs	2	1	0.52	9.4	5.0	6.3
Sucker	WB	Benz[a]anthracene	PAHs	2	1	0.14	0.39	0.17	0.038
Sucker	WB	Benzo[a]pyrene	PAHs	2	1	0.14	0.94	0.31	0.23
Sucker	WB	Benzo[e]pyrene	PAHs	2	1	0.099	0.64	0.21	0.16
Sucker	WB	Benzo[ghi]perylene	PAHs	2	2	0.17	0.84	0.46	0.41
Sucker	WB	Benzo[b/j/k]fluoranthenes	PAHs	2	1	0.078	1.0	0.30	0.31
Sucker	WB	Chrysene	PAHs	2	1	0.22	0.36	0.26	0.060
Sucker	WB	Dibenz[ah]anthracene	PAHs	2	0	0.089	0.62	0.35	0.38
Sucker	WB	Fluoranthene	PAHs	2	2	0.80	1.0	0.92	0.17
Sucker	WB	Fluorene	PAHs	2	2	1.6	2.5	2.1	0.60
Sucker	WB	Indeno[1,2,3-cd]pyrene	PAHs	2	1	0.13	0.44	0.24	0.16
Sucker	WB	Naphthalene	PAHs	2	2	4.4	8.0	6.2	2.6
Sucker	WB	Perylene	PAHs	2	1	0.48	1.1	0.71	0.33
Sucker	WB	Phenanthrene	PAHs	2	1	2.6	3.9	3.2	0.89
Sucker	WB	Pyrene	PAHs	2	1	0.44	1.7	1.1	0.91
Sucker	WB-fillet	2,3,7,8-TCDD	Dioxin/Furans	1	1	0.00047	0.00047	0.00047	na
Sucker	WB-fillet	1,2,3,7,8-PeCDD	Dioxin/Furans	1	1	0.00043	0.00043	0.00043	na
Sucker	WB-fillet	1,2,3,4,7,8-HxCDD	Dioxin/Furans	1	1	0.00015	0.00015	0.00015	na
Sucker	WB-fillet	1,2,3,6,7,8-HxCDD	Dioxin/Furans	1	1	0.00055	0.00055	0.00055	na
Sucker	WB-fillet	1,2,3,7,8,9-HxCDD	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Sucker	WB-fillet	1,2,3,4,6,7,8-HpCDD	Dioxin/Furans	1	1	0.0020	0.0020	0.0020	na
Sucker	WB-fillet	OCDD	Dioxin/Furans	1	1	0.011	0.011	0.011	na
Sucker	WB-fillet	2,3,7,8-TCDF	Dioxin/Furans	1	1	0.00085	0.00085	0.00085	na
Sucker	WB-fillet	1,2,3,7,8-PeCDF	Dioxin/Furans	1	1	0.00010	0.00010	0.00010	na
Sucker	WB-fillet	2,3,4,7,8-PeCDF	Dioxin/Furans	1	1	0.00022	0.00022	0.00022	na
Sucker	WB-fillet	1,2,3,4,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	WB-fillet	1,2,3,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	WB-fillet	1,2,3,7,8,9-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	WB-fillet	2,3,4,6,7,8-HxCDF	Dioxin/Furans	1	0	0.00010	0.00010	0.00010	na
Sucker	WB-fillet	1,2,3,4,6,7,8-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Sucker	WB-fillet	1,2,3,4,7,8,9-HpCDF	Dioxin/Furans	1	0	0.00015	0.00015	0.00015	na
Sucker	WB-fillet	OCDF	Dioxin/Furans	1	1	0.00055	0.00055	0.00055	na
Sucker	WB-fillet	Antimony	Trace Metals	1	1	1.0	1.0	1.0	na
Sucker	WB-fillet	Arsenic	Trace Metals	1	1	170	170	170	na
Sucker	WB-fillet	Total Inorganic Arsenic	Trace Metals	1	1	36	36	36	na
Sucker	WB-fillet	Beryllium	Trace Metals	1	1	6.0	6.0	6.0	na
Sucker	WB-fillet	Cadmium	Trace Metals	1	1	10	10	10	na
Sucker	WB-fillet	Chromium	Trace Metals	1	1	620	620	620	na
Sucker	WB-fillet	Copper	Trace Metals	1	1	2,900	2,900	2,900	na
Sucker	WB-fillet	Lead	Trace Metals	1	1	140	140	140	na
Sucker	WB-fillet	Mercury	Trace Metals	1	1	75	75	75	na
Sucker	WB-fillet	Nickel	Trace Metals	1	1	510	510	510	na
Sucker	WB-fillet	Silver	Trace Metals	1	1	50	50	50	na
Sucker	WB-fillet	Thallium	Trace Metals	1	0	2.0	2.0	2.0	na
Sucker	WB-fillet	Zinc	Trace Metals	1	1	18,000	18,000	18,000	na
Sucker	WB-fillet	Aroclor 1242	PCB Aroclors	1	1	9.6	9.6	9.6	na
Sucker	WB-fillet	Aroclor 1254	PCB Aroclors	1	1	88	88	88	na
Sucker	WB-fillet	Aroclor 1260	PCB Aroclors	1	1	58	58	58	na
Sucker	WB-fillet	33'44'-TeCB	PCB Congeners	1	1	0.082	0.082	0.082	na
Sucker	WB-fillet	233'44'-PeCB	PCB Congeners	1	1	2.5	2.5	2.5	na
Sucker	WB-fillet	2344'5-PeCB	PCB Congeners	1	1	0.19	0.19	0.19	na
Sucker	WB-fillet	23'44'5-PeCB	PCB Congeners	1	1	7.8	7.8	7.8	na
Sucker	WB-fillet	2'344'5-PeCB	PCB Congeners	1	1	0.28	0.28	0.28	na
Sucker	WB-fillet	33'44'5-PeCB	PCB Congeners	1	1	0.016	0.016	0.016	na
Sucker	WB-fillet	233'44'5-HxCB	PCB Congeners	1	1	1.1	1.1	1.1	na
Sucker	WB-fillet	23'44'55'-HxCB	PCB Congeners	1	1	0.47	0.47	0.47	na
Sucker	WB-fillet	33'44'55'-HxCB	PCB Congeners	1	1	0.018	0.018	0.018	na
Sucker	WB-fillet	22'33'44'5-HpCB	PCB Congeners	1	1	2.0	2.0	2.0	na
Sucker	WB-fillet	22'344'55'-HpCB	PCB Congeners	1	1	5.9	5.9	5.9	na
Sucker	WB-fillet	233'44'55'-HpCB	PCB Congeners	1	1	0.084	0.084	0.084	na
Sucker	WB-fillet	Aldrin	Pesticides	2	0	0.26	0.26	0.26	na
Sucker	WB-fillet	alpha HCH	Pesticides	2	1	1.4	1.4	1.4	na
Sucker	WB-fillet	alpha-Endosulfan (I)	Pesticides	2	0	0.020	0.020	0.020	na
Sucker	WB-fillet	beta HCH	Pesticides	2	0	0.58	0.58	0.58	na
Sucker	WB-fillet	cis-Chlordane	Pesticides	2	1	4.4	4.4	4.4	na
Sucker	WB-fillet	cis-Nonachlor	Pesticides	2	1	2.8	2.8	2.8	na
Sucker	WB-fillet	o,p'-DDD	Pesticides	2	1	3.7	3.7	3.7	na
Sucker	WB-fillet	o,p'-DDE	Pesticides	2	1	0.79	0.79	0.79	na
Sucker	WB-fillet	o,p'-DDT	Pesticides	2	1	3.5	3.5	3.5	na
Sucker	WB-fillet	p,p'-DDD	Pesticides	2	1	31	31	31	na
Sucker	WB-fillet	p,p'-DDE	Pesticides	2	1	130	130	130	na
Sucker	WB-fillet	p,p'-DDT	Pesticides	2	1	21	21	21	na
Sucker	WB-fillet	Dieldrin	Pesticides	2	1	2.8	2.8	2.8	na
Sucker	WB-fillet	Endrin	Pesticides	2	0	0.030	0.030	0.030	na
Sucker	WB-fillet	gamma HCH	Pesticides	2	1	1.9	1.9	1.9	na
Sucker	WB-fillet	Heptachlor	Pesticides	2	0	0.37	0.37	0.37	na
Sucker	WB-fillet	Heptachlor Epoxide	Pesticides	2	1	0.28	0.28	0.28	na
Sucker	WB-fillet	Hexachlorobenzene	Pesticides	2	1	4.9	4.9	4.9	na
Sucker	WB-fillet	Methoxychlor	Pesticides	2	0	0.050	0.050	0.050	na
Sucker	WB-fillet	Mirex	Pesticides	2	1	0.18	0.18	0.18	na
Sucker	WB-fillet	Oxychlordane	Pesticides	2	1	3.0	3.0	3.0	na
Sucker	WB-fillet	trans-Chlordane	Pesticides	2	1	2.2	2.2	2.2	na
Sucker	WB-fillet	trans-Nonachlor	Pesticides	2	1	7.2	7.2	7.2	na
Sucker	WB-Fillet	Acenaphthene	PAHs	1	1	0.75	0.75	0.75	na
Sucker	WB-Fillet	Acenaphthylene	PAHs	1	1	1.8	1.8	1.8	na
Sucker	WB-Fillet	Anthracene	PAHs	1	1	14	14	14	na
Sucker	WB-Fillet	Benz[a]anthracene	PAHs	1	0	0.52	0.52	0.52	na
Sucker	WB-Fillet	Benzo[a]pyrene	PAHs	1	0	1.2	1.2	1.2	na
Sucker	WB-Fillet	Benzo[e]pyrene	PAHs	1	0	0.81	0.81	0.81	na
Sucker	WB-Fillet	Benzo[ghi]perylene	PAHs	1	1	1.1	1.1	1.1	na
Sucker	WB-Fillet	Benzo[b/j/k]fluoranthenes	PAHs	1	0	0.85	0.85	0.85	na
Sucker	WB-Fillet	Chrysene	PAHs	1	1	0.43	0.43	0.43	na
Sucker	WB-Fillet	Dibenz[ah]anthracene	PAHs	1	0	0.47	0.47	0.47	na
Sucker	WB-Fillet	Fluoranthene	PAHs	1	1	1.5	1.5	1.5	na
Sucker	WB-Fillet	Fluorene	PAHs	1	1	2.4	2.4	2.4	na
Sucker	WB-Fillet	Indeno[1,2,3-cd]pyrene	PAHs	1	1	0.46	0.46	0.46	na
Sucker	WB-Fillet	Naphthalene	PAHs	1	1	10	10	10	na

Table D-1. Summary statistics for fish species

Species	Sample Type	Chemical	Chemical Group	Number of Samples	Detection Frequency	Minimum (ug/kg)	Maximum (ug/kg)	Average (ug/kg)	Standard Deviation
Sucker	WB-Fillet	Perylene	PAHs	1	1	1.3	1.3	1.3	na
Sucker	WB-Fillet	Phenanthrene	PAHs	1	1	6.3	6.3	6.3	na
Sucker	WB-Fillet	Pyrene	PAHs	1	1	1.6	1.6	1.6	na

APPENDIX E

Regional Comparisons of COPC Concentrations

Table E-1. Comparison summary statistics

Analyte		Bass Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
TIA	Detection Frequency	1/2			
	Minimum	< 0.003			
	Maximum	0.005			
	Mean	0.0033			
	Standard Deviation	0.0025			
	Units	mg/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
Hg	Detection Frequency	2/2	1/1		
	Minimum	0.33	0.1		
	Maximum	0.42	0.1		
	Mean	0.38	0.1		
	Standard Deviation	0.057	na		
	Units	mg/kg	mg/kg		
	Collection Date	1999	1988		
	Data Source	EVS 2000	ODEQ 1994		
Aldrin	Detection Frequency	0/2			0/1
	Minimum	< 0.08			< 10
	Maximum	< 0.09			< 10
	Mean	0.043			5
	Standard Deviation	0.0035			na
	Units	ug/kg			ug/kg
	Collection Date	1999			1990
	Data Source	EVS 2000			Schuler 1994
Chlordane	Detection Frequency	2/2	0/1	0/1	1/1
	Minimum	2.3	< 5	< 3	30
	Maximum	2.6	< 5	< 3	30
	Mean	2.1	2.5	1.5	30
	Standard Deviation	0.092	na	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988	1988	1990
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	Schuler 1994
DDE	Detection Frequency	2/2			1/1
	Minimum	14			190
	Maximum	18			190
	Mean	16			190
	Standard Deviation	2.8			na
	Units	ug/kg			ug/kg
	Collection Date	1999			1990
	Data Source	EVS 2000			Schuler 1994
Dieldrin	Detection Frequency	2/2	0/1	1/1	1/1
	Minimum	0.23	< 5	4	10
	Maximum	0.24	< 5	4	10
	Mean	0.24	2.5	4	10
	Standard Deviation	0.007	na	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988	1988	1990
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	Schuler 1994
Heptachlor Epoxide	Detection Frequency	0/2	0/1	0/1	0/1
	Minimum	< 0.007	< 5	< 3	< 10
	Maximum	< 0.01	< 5	< 3	< 10
	Mean	0.0043	2.5	1.5	5
	Standard Deviation	0.0016	na	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988	1988	1990
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	Schuler 1994

Table E-1. Comparison summary statistics

Analyte		Bass Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
1,2,3,7,8-PeCDD	Detection Frequency	2/2			
	Minimum	0.1			
	Maximum	0.11			
	Mean	0.11			
	Standard Deviation	0.0072			
	Units	ng/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
2,3,7,8-TCDD	Detection Frequency	2/2			
	Minimum	0.1			
	Maximum	0.14			
	Mean	0.12			
	Standard Deviation	0.028			
	Units	ng/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
TEC (WHO) [g]	Detection Frequency	2/2			
	Minimum	0.29			
	Maximum	0.32			
	Mean	0.31			
	Standard Deviation	0.022			
	Units	ng/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
Aroclor 1254	Detection Frequency	2/2	0/1	0/1	
	Minimum	13	< 5	< 3	
	Maximum	15	< 5	< 3	
	Mean	14	2.5	1.5	
	Standard Deviation	1.4	na	na	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988	1988	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
Aroclor 1260	Detection Frequency	2/2	0/1	0/1	
	Minimum	11	< 5	< 3	
	Maximum	11	< 5	< 3	
	Mean	11	2.5	1.5	
	Standard Deviation	na	na	na	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988	1988	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
PCB 105	Detection Frequency	2/2			
	Minimum	0.42			
	Maximum	0.47			
	Mean	0.45			
	Standard Deviation	0.035			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

Table E-1. Comparison summary statistics

Analyte		Bass Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
PCB 118	Detection Frequency	2/2			
	Minimum	1.3			
	Maximum	1.6			
	Mean	1.5			
	Standard Deviation	0.21			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 126	Detection Frequency	1/2			
	Minimum	< 0.0037			
	Maximum	0.0047			
	Mean	0.0033			
	Standard Deviation	0.0009			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 156/157	Detection Frequency	2/2			
	Minimum	0.21			
	Maximum	0.25			
	Mean	0.23			
	Standard Deviation	0.028			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Carp Fillet and *Fillet w/o skin				
		WFWF (current) [a]	WFWF (historical) [b]	UWR [e]	LWR [c]	LCR [d]
TIA	Detection Frequency	0/1				1/1
	Minimum	< 0.003				0.001
	Maximum	< 0.003				0.001
	Mean	0.0015				0.001
	Standard Deviation	na				na
	Units	mg/kg				mg/kg
	Collection Date	1999				1994
	Data Source	EVS 2000				Tetra Tech 1996
Hg	Detection Frequency	1/1	9/9	3/3		1/1
	Minimum	0.25	0.02	0.12		0.145
	Maximum	0.25	0.46	0.2		0.145
	Mean	0.25	0.17	0.15		0.145
	Standard Deviation	na	0.12	0.046		na
	Units	mg/kg	mg/kg	mg/kg		mg/kg
	Collection Date	1999	1988-1989	1989-1990		1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994		Tetra Tech 1996
Aldrin	Detection Frequency	1/1	0/9	1/9	0/10	0/1
	Minimum	0.08	< 2	2	<2	< 0.01
	Maximum	0.08	< 3	20	<3	< 0.01
	Mean	0.08	1.2	3.2	1.2	0.005
	Standard Deviation	na	0.26	6.3	0.26	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989-1990	1988-1990	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	Tetra Tech 1996
Chlordane	Detection Frequency	1/1	0/9	0/9	0/3	
	Minimum	9.4	< 3	< 25	< 25	
	Maximum	9.4	< 25	< 30	< 25	
	Mean	9.4	7.6	13	13	
	Standard Deviation	na	5.8	1.3	na	
	Units	ug/kg	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988-1989	1989-1990	1990	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	
DDE	Detection Frequency	1/1			3/3	1/1*
	Minimum	170.2			2	130
	Maximum	170.2			68	130
	Mean	170.2			41	130
	Standard Deviation	na			35	na
	Units	ug/kg			ug/kg	ug/kg
	Collection Date	1999			1990	1994
	Data Source	EVS 2000			ODEQ 1994	Tetra Tech 1996
Dieldrin	Detection Frequency	1/1	1/9	0/9	0/3	0/1
	Minimum	1.8	< 2	< 2	< 2	< 0.02
	Maximum	1.8	10	< 3	< 2	< 0.02
	Mean	1.8	2.2	1.2	1	0.01
	Standard Deviation	na	2.9	0.25	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989-1990	1990	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	Tetra Tech 1996
Heptachlor Epoxide	Detection Frequency	1/1	2/9	0/9	0/3	0/1
	Minimum	0.17	< 2	< 2	< 2	< 0.01
	Maximum	0.17	6	< 3	< 2	< 0.01
	Mean	0.17	2.1	1.2	1	0.005
	Standard Deviation	na	1.7	0.25	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989-1990	1990	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	Tetra Tech 1996

Table E-1. Comparison summary statistics

Analyte		Carp Fillet and *Fillet w/o skin				
		WFWF (current) [a]	WFWF (historical) [b]	UWR [e]	LWR [c]	LCR [d]
1,2,3,7,8-PeCDD	Detection Frequency	1/1				0/1
	Minimum	0.42				< 1.14
	Maximum	0.42				< 1.14
	Mean	0.42				0.57
	Standard Deviation	na				na
	Units	ng/kg				ng/kg
	Collection Date	1999				1994
	Data Source	EVS 2000				Tetra Tech 1996
2,3,7,8-TCDD	Detection Frequency	1/1		6/6*		0/1
	Minimum	0.38		0.16		< 1.14
	Maximum	0.38		0.58		< 1.14
	Mean	0.38		0.34		0.57
	Standard Deviation	na		0.18		na
	Units	ng/kg		ng/kg		ng/kg
	Collection Date	1999		1990		1994
	Data Source	EVS 2000		Curtis 1994		Tetra Tech 1996
TEC (WHO) [g]	Detection Frequency	1/1			3/3*	1/1
	Minimum	1.2			0.48	3.27
	Maximum	1.2			3.7	3.27
	Mean	1.2			1.6	3.27
	Standard Deviation	na			1.8	na
	Units	ng/kg			ng/kg	ng/kg
	Collection Date	1999			1990	1994
	Data Source	EVS 2000			Curtis 1994	Tetra Tech 1996
Aroclor 1254	Detection Frequency	1/1	2/9	0/9	0/3	0/1
	Minimum	36	< 3	< 25	< 25	< 1.11
	Maximum	36	205	< 30	< 25	< 1.11
	Mean	36	42	13	13	0.56
	Standard Deviation	na	70	1.3	na	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989-1990	1990	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	Tetra Tech 1996
Aroclor 1260	Detection Frequency	1/1	3/9	0/9	2/3	1/1
	Minimum	32	< 3	< 25	< 25	140
	Maximum	32	119	< 30	1400	140
	Mean	32	29	13	480	140
	Standard Deviation	na	38	1.3	800	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989-1990	1990	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	ODEQ 1994	Tetra Tech 1996
PCB 105	Detection Frequency	1/1		0/6	1/3	
	Minimum	1		< 2	< 2	
	Maximum	1		< 2	6	
	Mean	1		1	2.7	
	Standard Deviation	na		na	2.9	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990	
	Data Source	EVS 2000		ODEQ 1994	ODEQ 1994	

Table E-1. Comparison summary statistics

		Carp Fillet and *Fillet w/o skin				
Analyte		**WFWF (current) [a]**	**WFWF (historical) [b]**	**UWR [e]**	**LWR [c]**	**LCR [d]**
PCB 118	Detection Frequency	1/1				
	Minimum	3.8				
	Maximum	3.8				
	Mean	3.8				
	Standard Deviation	na				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
PCB 126	Detection Frequency	1/1		0/6	1/3	
	Minimum	0.0089		< 2	< 2	
	Maximum	0.0089		< 2	21	
	Mean	0.0089		1	7.7	
	Standard Deviation	na		na	12	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990	
	Data Source	EVS 2000		ODEQ 1994	ODEQ 1994	
PCB 156/157	Detection Frequency	1/1				
	Minimum	0.6				
	Maximum	0.6				
	Mean	0.6				
	Standard Deviation	na				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Carp WB				
		WFWF (current) [a]	LCR [d]	LCR [d]	LCR [d]	LCR [d]
TIA	Detection Frequency	5/5				
	Minimum	0.003				
	Maximum	0.009				
	Mean	0.0057				
	Standard Deviation	0.0024				
	Units	mg/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
Hg	Detection Frequency	5/5	8/8	1/2		
	Minimum	0.096	0.056	< 0.001		
	Maximum	0.162	1	0.15		
	Mean	0.13	0.219	0.073		
	Standard Deviation	0.029	0.32	0.1		
	Units	mg/kg	mg/kg	mg/kg		
	Collection Date	1999	1991	1993		
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994		
Aldrin	Detection Frequency	4/5	1/9	0/2		0/7
	Minimum	0.11	3	< 2.5		< 10
	Maximum	2.4	9.6	< 2.5		< 10
	Mean	1.3	2.5	1.3		5
	Standard Deviation	1.1	2.7	na		na
	Units	ug/kg	ug/kg	ug/kg		ug/kg
	Collection Date	1999	1991	1993		1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994		Schuler 1994
Chlordane	Detection Frequency	5/5	0/9			5/7
	Minimum	18	< 3			< 10
	Maximum	26	< 3			40
	Mean	21	1.5			16
	Standard Deviation	3.5	na			13
	Units	ug/kg	ug/kg			ug/kg
	Collection Date	1999	1991			1990-1991
	Data Source	EVS 2000	Tetra Tech 1993			Schuler 1994
DDE	Detection Frequency	5/5	9/9	2/2	3/3	13/13
	Minimum	120	20	68	24	20
	Maximum	300	102	105	49	270
	Mean	190	43	84	40	108
	Standard Deviation	73	32	26	14	71
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994
Dieldrin	Detection Frequency	6/6	2/9	0/2	3/3	0/13
	Minimum	1.9	< 3	< 5	0.72	< 10
	Maximum	5.6	10	< 5	3.9	< 20
	Mean	3.7	2.6	2.5	2.2	5.8
	Standard Deviation	1.4	1.7	na	1.6	1.9
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994
Heptachlor Epoxide	Detection Frequency	6/6	0/9	0/2	2/3	0/13
	Minimum	0.18	< 3	< 2.5	< 0.24	< 10
	Maximum	0.44	< 4	< 2.5	0.47	< 10
	Mean	0.31	1.6	1.25	0.26	5
	Standard Deviation	0.11	0.17	na	0.2	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994

Table E-1. Comparison summary statistics

Analyte		Carp WB				
		WFWF (current) [a]	LCR [d]	LCR [d]	LCR [d]	LCR [d]
1,2,3,7,8-PeCDD	Detection Frequency	5/5	5/5	0/2	1/3	2/4
	Minimum	0.8	0.84	< 0.5	< 0.3	< 1
	Maximum	1.6	1.9	< 1.1	0.3	9
	Mean	1.1	1.4	0.4	0.25	2.8
	Standard Deviation	0.35	0.46	0.2	0.05	4.2
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994
2,3,7,8-TCDD	Detection Frequency	5/5	5/5	0/2	3/3	9/13
	Minimum	0.63	1.3	< 0.3	0.2	< 1
	Maximum	1.31	2.1	< 1.1	1	5
	Mean	0.82	1.6	0.35	0.7	2
	Standard Deviation	0.29	0.33	0.28	0.44	1.5
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994
TEC (WHO) [g]	Detection Frequency	5/5	5/5	2/2	3/3	13/13
	Minimum	2.2	3.3	1.5	0.9	0.55
	Maximum	11	6.1	2.3	2.4	28
	Mean	4.6	5	1.9	1.5	4.9
	Standard Deviation	3.8	1.2	0.57	0.76	7.2
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
	Collection Date	1999	1991	1993	1994	1990-1991
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994
Aroclor 1254	Detection Frequency	5/5	5/9	2/2		
	Minimum	59	< 50	36		
	Maximum	110	270	65		
	Mean	75	110	51		
	Standard Deviation	21	104	21		
	Units	ug/kg	ug/kg	ug/kg		
	Collection Date	1999	1991	1993		
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994		
Aroclor 1260	Detection Frequency	5/5	4/9	1/2		
	Minimum	40	< 50	< 30		
	Maximum	120	110	52		
	Mean	65	50	28		
	Standard Deviation	32	32	2.8		
	Units	ug/kg	ug/kg	ug/kg		
	Collection Date	1999	1991	1993		
	Data Source	EVS 2000	Tetra Tech 1993	Tetra Tech 1994		
PCB 105	Detection Frequency	5/5				
	Minimum	1.6				
	Maximum	2.8				
	Mean	2				
	Standard Deviation	0.47				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				

Table E-1. Comparison summary statistics

Analyte		Carp WB				
		WFWF (current) [a]	LCR [d]	LCR [d]	LCR [d]	LCR [d]
PCB 118	Detection Frequency	5/5				
	Minimum	6.4				
	Maximum	11				
	Mean	7.8				
	Standard Deviation	1.8				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
PCB 126	Detection Frequency	4/5				
	Minimum	< 0.014				
	Maximum	0.024				
	Mean	0.015				
	Standard Deviation	0.002				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
PCB 156/157	Detection Frequency	5/5				
	Minimum	0.78				
	Maximum	1.8				
	Mean	1.1				
	Standard Deviation	0.39				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Pikeminnow Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
TIA	Detection Frequency	0/1			
	Minimum	< 0.003			
	Maximum	< 0.003			
	Mean	0.0015			
	Standard Deviation	na			
	Units	mg/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
Hg	Detection Frequency	1/1	4/4	1/1	4/4
	Minimum	0.72	0.14	0.49	0.23
	Maximum	0.72	0.44	0.49	0.74
	Mean	0.72	0.29	0.49	0.42
	Standard Deviation	na	0.13	na	0.22
	Units	mg/kg	mg/kg	mg/kg	mg/kg
	Collection Date	1999	1988-1989	1989	1987
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	USEPA 1992
Aldrin	Detection Frequency	1/1	0/4	0/3	
	Minimum	6.5	< 2	< 2	
	Maximum	6.5	< 8	< 4	
	Mean	6.5	2.1	1.5	
	Standard Deviation	na	1.3	0.5	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988-1989	1988-1989	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
Chlordane	Detection Frequency	1/1	0/4	0/2	
	Minimum	5.5	< 2	< 25	
	Maximum	5.5	< 8	< 30	
	Mean	4.1	2.3	14	
	Standard Deviation	na	1.3	1.8	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988-1989	1989	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
DDE	Detection Frequency	1/1			
	Minimum	22			
	Maximum	22			
	Mean	22			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
Dieldrin	Detection Frequency	1/1	0/4	0/2	0/2
	Minimum	0.52	< 2	< 2	< 2.5
	Maximum	0.52	< 8	< 3	< 2.5
	Mean	0.52	2.1	1.3	1.3
	Standard Deviation	na	1.3	0.35	na
	Units	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1988-1989	1989	1987
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	USEPA 1992
Heptachlor Epoxide	Detection Frequency	0/1			
	Minimum	< 0.01			
	Maximum	< 0.01			
	Mean	0.005			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

Table E-1. Comparison summary statistics

Analyte		Pikeminnow Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
1,2,3,7,8-PeCDD	Detection Frequency	1/1			3/5
	Minimum	0.18			< 0.49
	Maximum	0.18			1.2
	Mean	0.18			0.68
	Standard Deviation	na			0.19
	Units	ng/kg			ng/kg
	Collection Date	1999			1987
	Data Source	EVS 2000			USEPA 1992
2,3,7,8-TCDD	Detection Frequency	1/1			5/5
	Minimum	0.13			1.1
	Maximum	0.13			1.8
	Mean	0.13			1.5
	Standard Deviation	na			0.27
	Units	ng/kg			ng/kg
	Collection Date	1999			1987
	Data Source	EVS 2000			USEPA 1992
TEC (WHO) [g]	Detection Frequency	1/1			
	Minimum	0.46			
	Maximum	0.46			
	Mean	0.46			
	Standard Deviation	na			
	Units	ng/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
Aroclor 1254	Detection Frequency	1/1	0/3	0/2	
	Minimum	16	< 3	< 25	
	Maximum	16	< 25	< 30	
	Mean	16	5.3	14	
	Standard Deviation	na	6.2	1.8	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988-1989	1989	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
Aroclor 1260	Detection Frequency	1/1	0/3	0/2	
	Minimum	17	< 3	< 25	
	Maximum	17	< 25	< 30	
	Mean	17	5.3	14	
	Standard Deviation	na	6.2	1.8	
	Units	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1988-1989	1989	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	
PCB 105	Detection Frequency	1/1			
	Minimum	0.75			
	Maximum	0.75			
	Mean	0.75			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

Table E-1. Comparison summary statistics

Analyte		Pikeminnow Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
PCB 118	Detection Frequency	1/1			
	Minimum	2.5			
	Maximum	2.5			
	Mean	2.5			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 126	Detection Frequency	1/1			
	Minimum	0.0067			
	Maximum	0.0067			
	Mean	0.0067			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 156/157	Detection Frequency	1/1			
	Minimum	0.4			
	Maximum	0.4			
	Mean	0.4			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Pikeminnow WB				
		WFWF (current) [a]	UWR [e]	LWR [c]	LCR [d]	OCR [f]
TIA	Detection Frequency	0/3				
	Minimum	< 0.003				
	Maximum	< 0.006				
	Mean	0.002				
	Standard Deviation	0.0009				
	Units	mg/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
Hg	Detection Frequency	3/3				
	Minimum	0.057				
	Maximum	0.49				
	Mean	0.34				
	Standard Deviation	0.25				
	Units	mg/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
Aldrin	Detection Frequency	1/3	1/12	0/6	0/4	
	Minimum	< 0.03	< 2	< 2	< 10	
	Maximum	4.1	4	< 6	< 10	
	Mean	1.4	1.3	1.3	5	
	Standard Deviation	2.3	0.87	0.82	na	
	Units	ug/kg	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1990	1990	1990-1991	
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	Schuler 1994	
Chlordane	Detection Frequency	3/3		0/3	2/4	
	Minimum	6.5		< 25	< 20	
	Maximum	15		< 75	40	
	Mean	12		21	23	
	Standard Deviation	4.6		14	15	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990-1991	
	Data Source	EVS 2000		ODEQ 1994	Schuler 1994	
DDE	Detection Frequency	3/3		3/3	4/4	
	Minimum	45		2	90	
	Maximum	120		52	380	
	Mean	87		19	220	
	Standard Deviation	38		29	120	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990-1991	
	Data Source	EVS 2000		ODEQ 1994	Schuler 1994	
Dieldrin	Detection Frequency	3/3		0/3	0/4	
	Minimum	0.86		< 2	< 10	
	Maximum	2.1		< 6	< 20	
	Mean	1.6		1.7	7.5	
	Standard Deviation	0.67		1.2	2.9	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990-1991	
	Data Source	EVS 2000		ODEQ 1994	Schuler 1994	
Heptachlor Epoxide	Detection Frequency	2/3		0/3	0/4	
	Minimum	< 0.03		< 2	< 10	
	Maximum	0.16		< 6	< 10	
	Mean	0.11		1.7	5	
	Standard Deviation	0.082		1.2	na	
	Units	ug/kg		ug/kg	ug/kg	
	Collection Date	1999		1990	1990-1991	
	Data Source	EVS 2000		ODEQ 1994	Schuler 1994	

Table E-1. Comparison summary statistics

Analyte		Pikeminnow WB				
		WFWF (current) [a]	UWR [e]	LWR [c]	LCR [d]	OCR [f]
1,2,3,7,8-PeCDD	Detection Frequency	3/3			3/5	
	Minimum	0.25			< 0.5	
	Maximum	0.75			3	
	Mean	0.56			1.3	
	Standard Deviation	0.27			1.2	
	Units	ng/kg			ng/kg	
	Collection Date	1999			1990-1991	
	Data Source	EVS 2000			Schuler 1994	
2,3,7,8-TCDD	Detection Frequency	3/3			4/5	
	Minimum	0.19			< 1	
	Maximum	0.47			9	
	Mean	0.37			3.9	
	Standard Deviation	0.16			3.2	
	Units	ng/kg			ng/kg	
	Collection Date	1999			1990-1991	
	Data Source	EVS 2000			Schuler 1994	
TEC (WHO) [g]	Detection Frequency	3/3		3/3	5/5	
	Minimum	0.69		2.4	2.9	
	Maximum	8.1		4.9	22	
	Mean	3.5		3.4	11	
	Standard Deviation	4		1.3	7.4	
	Units	ng/kg		ng/kg	ng/kg	
	Collection Date	1999		1990	1990-1991	
	Data Source	EVS 2000		Curtis 1994	Schuler 1994	
Aroclor 1254	Detection Frequency	3/3		0/3		
	Minimum	28		< 25		
	Maximum	66		< 25		
	Mean	51		13		
	Standard Deviation	20		na		
	Units	ug/kg		ug/kg		
	Collection Date	1999		1990		
	Data Source	EVS 2000		ODEQ 1994		
Aroclor 1260	Detection Frequency	3/3		2/3		
	Minimum	17		< 25		
	Maximum	62		209		
	Mean	47		106		
	Standard Deviation	26		99		
	Units	ug/kg		ug/kg		
	Collection Date	1999		1990		
	Data Source	EVS 2000		ODEQ 1994		
PCB 105	Detection Frequency	3/3	0/12	3/6		
	Minimum	1.2	< 2	< 2		
	Maximum	2.6	< 2	4		
	Mean	2.1	1	2		
	Standard Deviation	0.75	na	1.3		
	Units	ug/kg	ug/kg	ug/kg		
	Collection Date	1999	1990	1990		
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994		

Table E-1. Comparison summary statistics

Analyte		Pikeminnow WB				
		WFWF (current) [a]	UWR [e]	LWR [c]	LCR [d]	OCR [f]
PCB 118	Detection Frequency	3/3				
	Minimum	4.1				
	Maximum	9.7				
	Mean	7.5				
	Standard Deviation	3				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				
PCB 126	Detection Frequency	3/3		1/3		
	Minimum	9		< 2		
	Maximum	25		6		
	Mean	19		2.7		
	Standard Deviation	8.5		2.9		
	Units	ug/kg		ug/kg		
	Collection Date	1999		1990		
	Data Source	EVS 2000		ODEQ 1994		
PCB 156/157	Detection Frequency	3/3				
	Minimum	0.47				
	Maximum	1.6				
	Mean	1.1				
	Standard Deviation	0.59				
	Units	ug/kg				
	Collection Date	1999				
	Data Source	EVS 2000				

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Sucker Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
TIA	Detection Frequency	1/1			8/9
	Minimum	0.004			< 0.001
	Maximum	0.004			0.038
	Mean	0.004			0.013
	Standard Deviation	na			0.012
	Units	mg/kg			mg/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Hg	Detection Frequency	1/1			9/9
	Minimum	0.16			0.12
	Maximum	0.16			0.19
	Mean	0.16			0.15
	Standard Deviation	na			0.026
	Units	mg/kg			mg/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Aldrin	Detection Frequency	0/1	0/1	0/2	0/9
	Minimum	< 3.6	< 2	< 2	< 0.01
	Maximum	< 3.6	< 2	< 2	< 0.02
	Mean	1.8	1	1	0.008
	Standard Deviation	na	na	na	0.0025
	Units	ug/kg	ug/kg	ug/kg	ug/kg
	Collection Date	1999	1989	1989	1994
	Data Source	EVS 2000	ODEQ 1994	ODEQ 1994	Tetra Tech 1996
Chlordane	Detection Frequency	0/1			
	Minimum	< 37			
	Maximum	< 37			
	Mean	19			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
DDE	Detection Frequency	1/1			9/9
	Minimum	24			130
	Maximum	24			130
	Mean	23			130
	Standard Deviation	na			na
	Units	ng/kg			ug/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Dieldrin	Detection Frequency	1/1			0/9
	Minimum	0.42			< 0.02
	Maximum	0.42			< 0.04
	Mean	0.42			0.017
	Standard Deviation	na			0.005
	Units	ug/kg			ug/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Heptachlor Epoxide	Detection Frequency	1/1			0/9
	Minimum	0.03			< 0.01
	Maximum	0.03			< 0.02
	Mean	0.03			0.008
	Standard Deviation	na			0.0025
	Units	ug/kg			ug/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996

Table E-1. Comparison summary statistics

Analyte		Sucker Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
1,2,3,7,8-PeCDD	Detection Frequency	1/1			0/9
	Minimum	0.06			< 0.27
	Maximum	0.06			< 1.24
	Mean	0.06			0.28
	Standard Deviation	na			0.14
	Units	ng/kg			ng/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
2,3,7,8-TCDD	Detection Frequency	1/1			0/9
	Minimum	0.08			< 0.14
	Maximum	0.08			< 0.77
	Mean	0.08			0.19
	Standard Deviation	na			0.12
	Units	ng/kg			ng/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
TEC (WHO) [g]	Detection Frequency	1/1			9/9
	Minimum	0.21			0.47
	Maximum	0.21			1.9
	Mean	0.21			0.98
	Standard Deviation	na			0.47
	Units	ng/kg			ng/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Aroclor 1254	Detection Frequency	0/1			0/9
	Minimum	< 63			< 1.11
	Maximum	< 63			< 2.22
	Mean	32			0.93
	Standard Deviation	na			0.28
	Units	ug/kg			ug/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
Aroclor 1260	Detection Frequency	0/1			9/9
	Minimum	< 46			14
	Maximum	< 46			58
	Mean	23			37
	Standard Deviation	na			13
	Units	ug/kg			ug/kg
	Collection Date	1999			1994
	Data Source	EVS 2000			Tetra Tech 1996
PCB 105	Detection Frequency	1/1			
	Minimum	0.36			
	Maximum	0.36			
	Mean	0.36			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

Table E-1. Comparison summary statistics

Analyte		Sucker Fillet			
		WFWF (current) [a]	WFWF (historical) [b]	LWR [c]	LCR [d]
PCB 118	Detection Frequency	1/1			
	Minimum	1.2			
	Maximum	1.2			
	Mean	1.2			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 126	Detection Frequency	0/1			
	Minimum	< 0.0029			
	Maximum	< 0.0029			
	Mean	0.0014			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			
PCB 156/157	Detection Frequency	1/1			
	Minimum	0.17			
	Maximum	0.17			
	Mean	0.17			
	Standard Deviation	na			
	Units	ug/kg			
	Collection Date	1999			
	Data Source	EVS 2000			

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values

Table E-1. Comparison summary statistics

Analyte		Sucker WB						
		WFWF (current) [a]	LWR [c]	LCR [d]	LCR [d]	LCR [d]	LCR [d]	OCR [f]
TIA	Detection Frequency	2/2						
	Minimum	0.016						
	Maximum	0.022						
	Mean	0.019						
	Standard Deviation	0.0048						
	Units	mg/kg						
	Collection Date	1999						
	Data Source	EVS 2000						
Hg	Detection Frequency	2/2		18/18	16/16			
	Minimum	0.11		0.022	0.1			
	Maximum	0.12		0.14	0.264			
	Mean	0.12		0.08	0.168			
	Standard Deviation	0.007		0.033	0.054			
	Units	mg/kg		mg/kg	mg/kg			
	Collection Date	1999		1991	1993			
	Data Source	EVS 2000		Tetra Tech 1993	Tetra Tech 1994			
Aldrin	Detection Frequency	2/2		3/18	0/16		0/3	
	Minimum	1.1		< 3	< 2.5		< 10	
	Maximum	1.6		5.6	< 38		< 10	
	Mean	0.96		1.9	2.4		5	
	Standard Deviation	0.2		1.1	4.4		na	
	Units	ug/kg		ug/kg	ug/kg		ug/kg	
	Collection Date	1999		1991	1993		1990-1991	
	Data Source	EVS 2000		Tetra Tech 1993	Tetra Tech 1994		Schuler 1994	
Chlordane	Detection Frequency	2/2		0/18			2/4	
	Minimum	12		< 3			< 20	
	Maximum	27		< 3			30	
	Mean	16		1.5			26.7	
	Standard Deviation	5.2		na			5.77	
	Units	ug/kg		ug/kg			ug/kg	
	Collection Date	1999		1991			1990	
	Data Source	EVS 2000		Tetra Tech 1993			Schuler 1994	
DDE	Detection Frequency	2/2	1/1	9/18	16/16	2/2	21/21	
	Minimum	66	70	< 7	42.2	1.45	20	
	Maximum	87	70	103	240	105	350	
	Mean	76	70	34	107.8	53.2	91.9	
	Standard Deviation	14	na	16	40.6	73	77.9	
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	
Dieldrin	Detection Frequency	2/2	1/1	1/18	0/16	2/2	0/4	
	Minimum	1.8	27	< 3	< 5	1.96	< 10	
	Maximum	5	27	4.5	< 65	4.62	< 20	
	Mean	3.4	27	1.7	4.375	3.29	8.3	
	Standard Deviation	2.2	na	0.7	7.5	1.88	5.99	
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	
Heptachlor Epoxide	Detection Frequency	2/2	1/1	0/18	0/16	2/2	0/4	
	Minimum	0.18	2.4	< 3	< 2.5	0.34	< 10	
	Maximum	0.38	2.4	< 3	< 22	0.34	< 10	
	Mean	0.28	2.4	1.5	2.3	0.34	5.23	
	Standard Deviation	0.14	na	na	2.6	na	1.1	
	Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	

Table E-1. Comparison summary statistics

Analyte		Sucker WB						
		WFWF (current) [a]	LWR [c]	LCR [d]	LCR [d]	LCR [d]	LCR [d]	OCR [f]
1,2,3,7,8-PeCDD	Detection Frequency	2/2	1/1	12/12	1/16	1/2	3/5	
	Minimum	0.28	0.6	0.4	< 0.3	< 0.6	< 0.981	
	Maximum	0.58	0.6	1.1	1.4	0.6	0.995	
	Mean	0.43	0.6	0.6	0.37	0.325	0.494	
	Standard Deviation	0.21	na	0.21	0.16	0.39	0.003	
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	
2,3,7,8-TCDD	Detection Frequency	2/2	1/1	12/12	2/16	2/2	4/5	
	Minimum	0.31	0.7	0.49	< 0.1	0.4	< 0.55	
	Maximum	0.39	0.7	1.56	1.8	0.5	2.6	
	Mean	0.35	0.7	0.99	0.4	0.45	1.1	
	Standard Deviation	0.057	na	0.35	0.26	0.071	0.58	
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	
TEC (WHO) [g]	Detection Frequency	2/2	1/1	12/12	16/16	2/2	17/17	
	Minimum	1.6	2	1.7	0.98	0.75	0.55	
	Maximum	4.7	2	4.3	3.5	1.9	4.04	
	Mean	3.1	2	3	1.96	1.3	2.12	
	Standard Deviation	2.2	na	0.88	0.71	0.79	1	
	Units	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	
	Collection Date	1999	1994	1991	1993	1994	1990	
	Data Source	EVS 2000	Thomas 1997	Tetra Tech 1993	Tetra Tech 1994	Thomas 1997	Schuler 1994	
Aroclor 1254	Detection Frequency	2/2		17/18	16/16			
	Minimum	53		< 50	26			
	Maximum	78		380	2700			
	Mean	59		130	230			
	Standard Deviation	8.3		82	660			
	Units	ug/kg		ug/kg	ug/kg			
	Collection Date	1999		1991	1993			
	Data Source	EVS 2000		Tetra Tech 1993	Tetra Tech 1994			
Aroclor 1260	Detection Frequency	2/2		1/18	8/16			
	Minimum	36		< 50	< 27			
	Maximum	53		130	250			
	Mean	40		31	39			
	Standard Deviation	5.4		25	25.7			
	Units	ug/kg		ug/kg	ug/kg			
	Collection Date	1999		1991	1993			
	Data Source	EVS 2000		Tetra Tech 1993	Tetra Tech 1994			
PCB 105	Detection Frequency	2/2						
	Minimum	1.6						
	Maximum	1.7						
	Mean	1.7						
	Standard Deviation	0.057						
	Units	ug/kg						
	Collection Date	1999						
	Data Source	EVS 2000						

Table E-1. Comparison summary statistics

Analyte		Sucker WB						
		WFWF (current) [a]	LWR [c]	LCR [d]	LCR [d]	LCR [d]	LCR [d]	OCR [f]
PCB 118	Detection Frequency	2/2						
	Minimum	5.1						
	Maximum	5.1						
	Mean	5.1						
	Standard Deviation	0.01						
	Units	ug/kg						
	Collection Date	1999						
	Data Source	EVS 2000						
PCB 126	Detection Frequency	2/2						
	Minimum	0.01						
	Maximum	0.016						
	Mean	0.013						
	Standard Deviation	0.004						
	Units	ug/kg						
	Collection Date	1999						
	Data Source	EVS 2000						
PCB 156/157	Detection Frequency	2/2						
	Minimum	0.72						
	Maximum	0.79						
	Mean	0.75						
	Standard Deviation	0.05						
	Units	ug/kg						
	Collection Date	1999						
	Data Source	EVS 2000						

NOTE: na - not applicable

[a] WFWF (current) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – study area for this risk assessment

[b] WFWF (historical) – middle Willamette River reach extending downstream from Wheatland Ferry (RM 72) to Willamette Falls (RM 26.5) – historical data

[c] LWR - lower Willamette River reach extending downstream from Willamette Falls to the river mouth (RM 0)

[d] LCR - lower Columbia River reach extending downstream from Bonneville Dam (RM 146) to the river mouth (RM 0)

[e] UWR - upper Willamette River reach extending downstream from the city of Eugene (RM 185) to Wheatland Ferry (RM 72)

[f] OCR - Other Columbia River refers to data collected in the main stem of the Columbia River upstream of Bonneville Dam (RM 146). The most upstream data grouped within this category was collected at RM 600.

[g] Toxicity equivalency concentration (TEC) is based on the sum of dioxin/furan World Health Organization (WHO) TEC values