

DEPARTMENT OF ECOLOGY

September 21, 2000

TO: John Roland, TCP/ERO

FROM: Art Johnson, EAP/HQ

SUBJECT: **Results from Analyzing PCBs in 1999 Spokane River
Fish and Crayfish Samples**

Manchester Laboratory has completed their analysis of PCBs in the Spokane River fish and crayfish samples collected in July, August, and October of last year. Their data reports and quality assurance reviews are attached.

Four tables were prepared that summarize this information:

- Table 1. Plan of Analysis
- Table 2. Location Information and Biological Data
- Table 3. PCB Concentrations as Aroclor-Equivalents
- Table 4. PCB Congener Concentrations

A quality assurance project plan (Johnson, 1999) describes how the tissues were prepared. All whole fish and whole crayfish samples were composites. Five individuals were used in each composite, except for one crayfish composite of three individuals (see Table 2). Each fillet sample was from a single fish and all were skin on. The ages of the fish were determined from scales and other parts provided to John Sneva of the Department of Fish and Wildlife.

Only enough crayfish were collected to analyze three whole body samples. Some data already exist on PCBs in Spokane River crayfish muscle from samples collected in 1994 (Johnson, 1994).

If there are questions about these data, please call me at (360) 407-6766 or send email to arjo461@ecy.wa.gov.

AJ:dj
Attachments

cc: Flora Goldstein, TCP, ERO
Dale Norton, EAP, HQ
Lon Kissinger, TCP, HQ
Rob Duff, WDOH
Will Kendra, EAP, HQ

References

Johnson, A., 1994. PCB and Lead Results for 1994 Spokane River Fish Samples. Memorandum to Glen Patrick, Washington State Department of Health. Washington State Department of Ecology, Olympia, WA.

Johnson, A., 1999. Metals and PCB Analysis of Spokane River Fish and Crayfish Samples Collected in 1999 - Quality Assurance Project Plan. Washington State Department of Ecology, Olympia, WA.

Table 1. Plan of Analysis for 1999 Spokane River Fish Samples

(Number of samples indicated; whole body samples are composites, fillets are individual fish)

Location	Species	Tissue	Zn, Pb,Cd	Pb only	Aroclor Equivalents	PCB Congeners	Percent Lipid
Stateline	Largescale Sucker	Whole	1		1		1
	"	Fillet		5	5		5
	Rainbow Trout*	Whole	1		1		1
	"	Fillet		5	5		5
Plante Ferry Park	Largescale Sucker	Whole	1		1	1	1
	"	Fillet		5	5	3	5
	Rainbow Trout*	Whole	1		1	1	1
	"	Fillet		5	5	3	5
	Crayfish	Whole	1		1		1
Greene Street	Largescale Sucker	Whole	1		1		1
	"	Fillet		5	5		5
	Rainbow Trout*	Whole	1		1		1
	"	Fillet		5	5		5
	Montain Whitefish	Whole	1		1		1
	"	Fillet		5	5	3	5
	Crayfish	Whole	1		1		1
7-Mile Bridge	Largescale Sucker	Whole	1		1		1
	"	Fillet		5	5		5
	Rainbow Trout**	Whole	1		1		1
	"	Fillet		5	5		5
	Rainbow Trout*	Fillet		2	2		2
	Montain Whitefish	Whole	1		1		1
	"	Fillet		5	5		5
	Crayfish	Whole	1		1		1
Total Samples =			13	52	65	11	65

*wild **hatchery

Table 2. Location and Biological Data for 1999 Spokane River Fish Samples

Location	Species	Tissue	Sample Number	Total Length (mm)	Weight (grams)	Sex	Age
Stalene	Rainbow Trout	Fillet	485000	457	855	F	4
River Mile 96.0	(wild)	"	485001	405	715	F	2S
USGS #12429500	"	"	485002	453	975	F	2S
Reach Length 1099 m	"	"	485003	460	895	F	2SS
7/27/99	"	"	485004	335	472	M	2S
	"	Whole	485005a	365	540	F	2
	"	"	485005b	390	660	M	2
	"	"	485005c	368	581	M	2
	"	"	485005d	385	609	M	3S
	"	"	485005e	360	557	F	2
	Largescale Sucker	Whole	485006a	490	1056	F	6+
	"	"	485006b	492	1144	F	5+
	"	"	485006c	485	1196	F	6+
	"	"	485006d	470	963	M	7+
	"	"	485006e	460	902	M	8+
	"	Fillet	485007	490	1214	F	8
	"	"	485008	455	969	M	9
	"	"	485009	525	1275	F	13
	"	"	485010	427	834	M	8
	"	"	485011	436	803	F	4

Table 2. (continued)

Location	Species	Tissue	Sample Number	Total Length (mm)	Weight (grams)	Sex	Age
Plante Ferry Site Park River Mile 85.0 USGS #12420800 Reach Length 1436 m 7/28/99	Rainbow Trout	Whole	485012a	346	433	M	3S
	(wild)	"	485012b	438	840	F	3S
	"	"	485012c	392	623	F	2S
	"	"	485012d	324	387	F	2
	"	"	485012e	360	479	F	2
	"	Fillet	485013	413	754	F	3SS
	"	"	485014	276	235	M	1
	"	"	485015	387	538	F	1
	"	"	485016	345	438	M	2
	"	"	485017	395	584	F	2S
	Largescale Sucker	Whole	485018a	425	810	M	4+
	"	"	485018b	405	805	F	6+
	"	"	485018c	440	925	F	7+
	"	"	485018d	447	1030	M	7+
	"	"	485018e	425	780	M	5+
	"	Fillet	485019	435	963	M	7
	"	"	485020	445	1002	M	5
	"	"	485021	450	1025	F	8
	"	"	485022	395	696	M	4
	"	"	485023	445	897	M	7

Table 2. (continued)

Location	Species	Tissue	Sample Number	Total Length (mm)	Weight (grams)	Sex	Age
Greene Street	Rainbow Trout	Fillet	485024	326	353	F	4
River Mile 77.0	(wild)	"	485025	270	209	F	2S
USGS #12422000	"	"	485026	359	476	F	3
Reach Length 1300 m	"	"	485027	347	432	M	3
7/29/99	"	"	485028	259	202	M	1S
	"	Whole	485029a	247	184	F	1S
	"	"	485029b	280	248	M	2
	"	"	485029c	265	223	F	1S
	"	"	485029d	309	392	M	R
	"	"	485029e	338	460	F	3S
	Mountain Whitefish	Fillet	485030	355	436	F	3
	"	"	485031	305	320	M	2
	"	"	485032	400	641	F	5
	"	"	485033	344	426	F	4
	"	"	485034	310	311	F	3
	"	Whole	485035a	356	489	F	5
	"	"	485035b	300	313	F	2
	"	"	485035c	302	296	M	2
	"	"	485035d	302	284	M	2
	"	"	485035e	300	301	F	2

Table 2. (continued)

Location	Species	Tissue	Sample Number	Total Length (mm)	Weight (grams)	Sex	Age
Greene Street River Mile 77.0 USGS #12422000 Reach Length 1300 m 7/29/99	Largescale Sucker	Fillet	485036	435	877	M	11
	"	"	485037	475	1087	M	12
	"	"	485038	415	731	M	11
	"	"	485039	496	1221	F	10
	"	"	485040	419	759	F	9
	"	Whole	485041a	430	633	M	6+
	"	"	485041b	450	878	F	6+
	"	"	485041c	478	1039	M	8+
	"	"	485041d	430	648	F	5+
	"	"	485041e	455	753	F	R
7-Mile Bridge River Mile 63.0 USGS #1242500 Reach Length 1069 m 7/30/99	Rainbow Trout (hatchery)	Whole	485042a	334	406	F	1
	"	"	485042b	332	383	M	1
	"	"	485042c	324	353	M	1
	"	"	485042d	337	363	F	1
	"	"	485042e	343	390	F	1
	"	Fillet	485043	318	340	F	1
	"	"	485044	305	303	M	1
	"	"	485045	335	410	M	1
	"	"	485046	317	335	F	1
	"	"	485047	351	506	F	1
Rainbow Trout (wild)	Fillet	485048	368	605	F	2S	
"	"	485049	502	1300	F	3SSS	

Table 2. (continued)

Location	Species	Tissue	Sample Number	Total Length (mm)	Weight (grams)	Sex	Age	
7-Mile Bridge River Mile 63.0 USGS #1242500 Reach Length 1069 m 7/30/99	Mountain Whitefish	Fillet	485050	374	405	F	4	
	"	"	485051	356	440	M	4	
	"	"	485052	375	460	F	5	
	"	"	485053	335	351	M	3	
	"	"	485054	353	399	F	4	
	"	Whole	485055a	353	474	F	4	
	"	"	485055b	314	339	M	3	
	"	"	485055c	327	382	F	2	
	"	"	485055d	328	320	F	2	
	"	"	485055e	329	309	F	3	
	Largescale Sucker	"	Fillet	485056	425	846	M	9
		"	"	485057	484	954	F	9
		"	"	485058	425	923	M	7
		"	"	485059	490	1131	F	7
		"	Whole	485060	444	818	M	9
"		"	485061a	479	943	F	7+	
"		"	485061b	445	914	F	R	
"		"	485061c	421	783	M	5+	
"		"	485061d	430	859	F	4+	
"	"	485061e	462	1074	M	8+		

Table 2. (continued)

Location	Species	Tissue	Sample Number	Carapace Length (mm)	Weight (grams)	Sex	Age
Plante Ferry Site Park River Mile 84.7 10/14/99	Crayfish	Whole	485062	53	40	--	--
	"	"	"	43	32	--	--
	"	"	"	48	35	--	--
Trent Ave. Bridge River Mile 76.3 10/14/99	Crayfish	Whole	485063	65	92	--	--
	"	"	"	50	37	--	--
	"	"	"	46	30	--	--
	"	"	"	55	47	--	--
7-Mile Bridge River Mile 62.0 10/14/99	"	"	"	53	37	--	--
	Crayfish	Whole	485064	57	50	--	--
	"	"	"	47	25	--	--
	"	"	"	50	33	--	--
	"	"	"	37	16	--	--
"	"	"	"	43	23	--	--

S = indicates a spawning check coincident with an annulus

R = regenerated scales, no age estimate possible

Scientific Names:

Rainbow trout = *Oncorhynchus mykiss*

Largescale sucker = *Catostomus macrocheilus*

Mountain whitefish = *Prosopium williamsoni*

Crayfish = *Pacifastacus leniusculus*

Table 3. PCB Concentrations (Aroclor-equivalents) in 1999 Spokane River Fish Samples (ug/Kg, wet weight basis)

Location	Species	Tissue	Sample Number	PCB-1248	PCB-1254	PCB-1260	Lipid (%)
Stateline	Rainbow Trout	Fillet	485000	15 U	47	38	2.8
River Mile 96.0	(wild)	"	485001	20 J	74	39	4.0
USGS #12429500	"	"	485002	9.9 J	61	34	4.1
Reach Length 1099 m	"	"	485003	8.8 J	79	45	3.6
7/27/99	"	"	485004	14 J	37	23	6.1
	"	Whole	485005	15 J	44	18 J	8.3
	Largescale Sucker	Whole	485006	8.8 J	75	36	6.1
	"	Fillet	485007	150	160	32	1.9
	"	"	485008	6.4 J	38	18 J	1.5
	"	"	485009	5.3 J	34	22 J	1.7
	"	"	485010	15 U	5.9 J	15 U	1.0
	"	"	485011	3.0 J	12 J	5.5 J	4.2
Plante Ferry Site Park	Rainbow Trout	Whole	485012	320	370	65	7.7
River Mile 85.0	(wild)	Fillet	485013	790	480	83	3.4
USGS #12420800	"	"	485013-dup	710	460	78	3.0
Reach Length 1436 m	"	"	485014	26	32	12 J	4.7
7/28/99	"	"	485015	700	800	110	2.0
	"	"	485016	25	55	20	2.8
	"	"	485017	680	530	110	4.5
	Largescale Sucker	Whole	485018	100	150	33 J	4.5
	"	Fillet	485019	97	98	12	1.9
	"	"	485020	110	91	14 J	2.7
	"	"	485021	25	36	6.3 J	2.4
	"	"	485022	21 J	33	5.6 J	0.6
	"	"	485023	110	70	11 J	1.6
Greene Street	Rainbow Trout	Fillet	485024	35	80	21	1.2
River Mile 77.0	(wild)	"	485025	60	210	55	2.9
USGS #12422000	"	"	485026	110 J	230	58	2.2
Reach Length 1300 m	"	"	485027	36	82	25	1.1
7/29/99	"	"	485028	20 J	83	23	1.8
	"	Whole	485029	82	210	70	4.3
	Mountain Whitefish	Fillet	485030	82 J	310	86	8.3
	"	"	485031	120	180	38	8.2
	"	"	485032	51 J	210	74	5.8
	"	"	485033	82 J	230	68 J	7.4
	"	"	485034	19 J	120	23 J	9.1
	"	Whole	485035	100	250	47	16.7

Table 3. PCB Aroclors (continued)

Location	Species	Tissue	Sample Number	PCB-1248	PCB-1254	PCB-1260	Lipid (%)
Greene Street	Largescale Sucker	Fillet	485036	29 U	120	24	1.2
River Mile 77.0	"	"	485037	150	230	49	0.8
USGS #12422000	"	"	485038	23 J	55	14 J	0.7
Reach Length 1300 m	"	"	485039	34 J	130	29	1.7
7/29/99	"	"	485040	9.0 J	65	14	0.6
	"	Whole	485041	160	240	49 J	2.5
	"	"	485041-dup	150 J	240	50 J	na
7-Mile Bridge	Rainbow Trout	Whole	485042	31 J	140	50	2.1
River Mile 63.0	(hatchery)	Fillet	485043	22 J	290	51	0.6
USGS #1242500	"	"	485044	10 J	44	21	0.3
Reach Length 1069 m	"	"	485045	8.8 J	39	17	0.6
7/30/99	"	"	485046	8.7 J	52	25	0.6
	"	"	485047	10 J	100	29	0.9
	Rainbow Trout	Fillet	485048	29	110	46	3.2
	(wild)	"	485049	10 J	23 J	52	2.3
	Mountain Whitefish	Fillet	485050	14 J	190	87	3.9
	"	"	485051	130	280	73	7.2
	"	"	485052	43	100	29	3.7
	"	"	485053	310	1100	180	6.2
	"	"	405053-dup	340	1600	230 J	na
	"	"	485054	28 J	270	88	3.8
	"	Whole	485055	120 J	630	180 J	14.9
	Largescale Sucker	Fillet	485056	20	61	19	0.8
	"	"	485057	50	82	22	1.3
	"	"	485058	63	150	34	3.0
	"	"	485059	23	73	17	2.6
	"	"	485059-dup	15	40	15	na
	"	"	485060	26	94	22	2.6
	"	Whole	485061	130	460	90	2.2
Plante Ferry Site Park	Crayfish	Whole	485062	15 U	15 U	15 U	0.2
River Mile 84.7							
10/14/99							
Trent Ave. Bridge	Crayfish	Whole	485063	15 U	8.2 J	4.9 J	0.2
River Mile 76.3							
10/14/99							
7-Mile Bridge	Crayfish	Whole	485064	15 U	15 U	15 U	0.3
River Mile 62.0							
10/14/99							

U = not detected at or above reported value J = estimated value

Table 4. PCB Congener Concentrations in 1999 Spokane River Fish Samples (ug/Kg, wet weight basis)

Location:		Plante Ferry Site Park											
Species:		Rainbow	Rainbow	Rainbow	Rainbow	Rainbow	Rainbow	Rainbow	Sucker	Sucker	Sucker	Sucker	Sucker
Tissue:		Whole	Fillet	Fillet	Fillet	Fillet	Fillet	Fillet	Whole	Fillet	Fillet	Fillet	Fillet
Sample Number:		485012	485013	485013-dup	485014	485015	485018	485019	485021	485022			
PCB congener 8		0.91 U	0.89 U	0.89 U	0.89 U	1.7 U	1.6 U	1.5 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
18		0.95	3.0	2.7	0.29 J	1.7 U	0.95 J	1.9	0.26 J	0.91 U	0.91 U	0.91 U	0.91 U
28		8.0	37	33	1.0	17	5.7	6.5	1.1	0.47 J	0.47 J	0.47 J	0.47 J
44		15	27	25	1.1	29	7.5	8.0	1.3	0.87	0.87	0.87	0.87
52		32	80	73	2.0	81	7.7	7.1	1.3	1.3	1.3	1.3	1.3
66		59	130	120	2.6	170	17	13	2.7	3.0	3.0	3.0	3.0
101		27	48	44	1.5	74	10	7.1	2.0	2.3	2.3	2.3	2.3
77		0.91 U	0.89 UJ	0.89 UJ	0.89 U	13 UJ	1.6 UJ	1.5 UJ	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
118		43	70	62	2.0	100	13	7.5	2.7	2.9	2.9	2.9	2.9
153		13	17	15	1.5	25	6.2	2.7	1.1	1.2	1.2	1.2	1.2
105		27	46	41	1.3	64	6.9	4.3	1.4	1.6	1.6	1.6	1.6
138		3.3 J	4.6 NJ	4.3 NJ	1.2	30	5.9	2.8	0.26 J	0.29 J	0.29 J	0.29 J	0.29 J
126		0.91 U	0.78 NJ	0.79 NJ	0.89 U	6.6 U	1.6 U	1.5 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
128		3.0	4.4	3.9	0.25 J	7.4	1.4 J	0.71 J	0.23 J	0.28 J	0.28 J	0.28 J	0.28 J
180		6.6	8.9	8.2	0.86	13	3.0	1.3 J	0.62 J	0.51 J	0.51 J	0.51 J	0.51 J
170		3.3	4.4	4.1	0.39 J	4.9	1.4 J	0.65 J	3.2 J	0.30 J	0.30 J	0.30 J	0.30 J
187		3.6	4.6	4.3	0.61 J	3.3	1.6 J	0.83 J	3.0 J	0.35 J	0.35 J	0.35 J	0.35 J
195		0.66 J	0.85	0.79 J	0.89 U	1.7 U	1.6 U	1.5 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
206		0.62 J	0.89	0.79 J	0.89 U	1.7 U	1.6 U	1.5 U	0.91 U	0.15 J	0.15 J	0.15 J	0.15 J
81		0.91 U	0.89 UJ	0.89 UJ	0.89 UJ	6.6 U	2.3	1.5 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
114		3.3	5.3	4.6	0.47 J	13	2.5	1.5 U	0.44 J	0.47 J	0.47 J	0.47 J	0.47 J
156		2.2	3.6	2.9	0.36 J	12	1.6 U	1.5	0.36 J	0.34 J	0.34 J	0.34 J	0.34 J
169		0.91 U	0.89 UJ	0.89 UJ	0.89 UJ	6.6 U	1.6 U	1.5	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U

Table 4. PCB Congeners (continued)

Location:	Greene Street			
	Whitefish Fillet	Whitefish Fillet	Whitefish Fillet	Whitefish Fillet
Species:	Whitefish	Whitefish	Whitefish	Whitefish
Tissue:	Fillet	Fillet	Fillet	Fillet
Sample Number:	485031	485032	485032 -dup	485033
PCB congener	8	8	8	8
18	0.90 U	0.90 U	3.2 U	0.89 U
28	0.76 J	0.90 U	3.2 U	0.89 U
44	5.4	18	23	12
52	5.8	0.61 J	14 U	1.4
66	11	0.65 J	39 U	2.1
101	13	42	53	27
77	14	2.4 UJ	4.5	5.7 J
118	0.90 U	3.3 UJ	6.4 UJ	0.89 UJ
153	14	37	44	28
105	7.9	16	19	14
138	7.9	22	24	16
126	1.9 J	15	19	12
128	0.90 U	0.90 U	3.2 U	0.78 NJ
180	1.6	3.4	4.6	3.0
170	3.5	9.0	11	6.8
187	1.8	4.3	4.6	3.3
195	2.2	2.5	3.2 U	2.8
206	0.40 J	0.76 J	3.2 U	0.60 J
81	0.47 J	0.72 J	3.2 U	0.64 J
114	0.90 U	0.90 U	8.4	0.89 UJ
156	2.4	2.5	3.2 U	2.9
169	2.3	2.7	3.2 U	4.6
	0.90 U	4.0 UJ	6.4	5.7 UJ

U = not detected at or above reported value J = estimated value N = evidence that analyte is present

The Case Narratives for this study are not available electronically.
For a printed copy call 360-407-6764.