1999 SWAT MONITORING PROGRAM REPORT

PART 3 RIVERS AND STREAMS

3.1 COPLANAR PCB IN FISH

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3.1

COPLANAR PCB IN FISH

COPLANAR PCB IN FISH

In 1999 the SWAT program was again integrated with the Dioxin Monitoring Program (DMP). Coplanar PCBs were measured from all 19 stations in the DMP in most all samples of bass and suckers. Coplanar toxic equivalents often matched or exceeded dioxin levels in fish at sites above and below known point sources of dioxin and contribute significantly to fish consumption advisories. Concentrations varied within an order of magnitude from those of previous years on the Penobscot, Sebasticook and St. Croix rivers, mostly following lipid concentrations. Concentrations were more variable at some stations on the Androscoggin River and less explained by lipid content. Sampling should continue in 2000 at all stations.

STATION LOCATIONS

STATION	SPECIES
Androscoggin R	
Gilead	bass, sucker
Rumford	bass, sucker
Riley	bass, sucker
Liv Fls(Otis imp)	bass, sucker
Turner (GIP)	bass
Lisbon Falls	bass
Androscoggin Lake	bass, white perch
Kennebec R	
Norridgewock	bass, sucker
Fairfield	bass, sucker
Augusta	bass
Penobscot R	
Woodville	bass, sucker
S Lincoln	bass, sucker
Milford	bass, sucker
Veazie	bass, sucker
Bangor	eel
Presumpscot R	
Windham	bass, sucker
Westbrook	bass, sucker
Salmon Falls R	
S Berwick	bass
Sebasticook R	
W Br Palmyra	bass
St. Croix	
Woodland (above)	bass,suckers
Woodland (below)	bass,suckers

TABLE 3.1 SUMMARY OF COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

WATER/STATION	SPECIES	DTEh	CTEh	TTEh
ANDROSCOGGIN R				
Gilead	rainbow trout	2.0	2.6	2.6
	brown trout	1.2	0.9	2.1
	bass	1.4	0.7	2.1
	sucker	3.1	4.0	7.1
Rumford	bass	1.7	0.9	2.6
	sucker	3.0	1.3	1.3
Riley	bass	0.8	2.9	3.7
	sucker	2.7	1.4	4.1
Livermore Falls	bass	1.0	1.3	1.3
	sucker	2.4	1.9	4.3
Auburn-GIP	bass sm	1.7	1.1	2.8
Lisbon Falls	bass	1.9	4.0	5.9
Androscoggin L	bass	0.5	0.1	0.6
	w perch	0.6	0.3	0.9
	sucker			
KENNEBEC R				
Norridgewock	bass	0.4	0.4	0.8
	sucker	0.4	0.3	0.7
Fairfield	bass	0.7	0.1	0.8
	sucker	0.7	0.5	1.2
Augusta	bass	0.7	0.2	0.9
PENOBSCOT R				
Woodville	bass	0.4	0.6	1.0
	sucker	0.4	1.4	1.8
S Lincoln	bass	0.8	3.1	3.9
	sucker	1.5	2.2	3.7
Milford	bass	0.6	1.5	2.1
	sucker	1.6	1.6	3.2
Veazie	bass	0.6	1.2	1.8
	sucker	1.5	1.5	3.0
SALMON FALLS R				
S Berwick	sm bass	0.4	0.7	1.1
	lm bass	0.6	0.7	1.3
SEBASTICOOK R				
W Br Palmyra	bass	0.7	0.1	0.8
ST CROIX				
Woodland	bass	0.4	1.5	1.9
	sucker	0.4	0.8	1.2
Baring	bass	0.4	0.6	1.0
	sucker	0.4	1.1	1.5

Coplanar PCB (CTE), Dioxin (DTE) and total (TTE) toxic eqiivalents using
WHO 98 toxic equivalency factors (TEF) at ND=1/2 MDL.

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ARP-SMB-1	ARP-SMB-2	ARP-SMB-3	ARP-SMB-4	ARP-SMB-5
3,3',4,4'-TCB	77	0.5	**	10.50	14.30	12.30	16.10
2',3,4,4',5-PeCB	123	0.5		18.90	29.60	16.90	28.70
2,3',4,4',5-PeCB	118	0.5		224.00	395.00	257.00	374.00
2,3,4,4',5-PeCB	114	0.5		4.03	6.65	5.35	6.91
2,3,3',4,4'-PeCB	105	0.5		38.90	58.90	41.60	60.20
3,3',4,4',5-PeCB	126	0.5		4.22	7.33	4.01	5.99
2,3',4,4',5,5'-HxCB	167	1.0		7.11	11.20	8.96	12.60
2,3,3',4,4',5-HxCB	156	1.0		69.70	114.00	81.40	127.00
2,3,3',4,4',5'-HxCB	157	1.0		3.27	7.32	4.28	5.06
3,3',4,4',5,5'-HxCB	169	1.0		0.65	1.61	1.02	1.24
2,3,3',4,4',5,5'-HpCB	189	1.0		7.31	14.70	8.46	13.60
Total TEQ (ND=0)				0.497	0.864	0.490	0.730
Total TEQ (ND=DL)				0.497	0.864	0.490	0.730
% Lipids			2.86	0.62	0.81	0.76	1.02
Sample weight (g)			50.2	50.0	50.2	50.2	50.2

DEP ID congener	IUPAC#	DL ng/kg	ARP-SMB-6 99-315	ARP-SMB-7 99-316	ARP-SMB-8 99-317	ARP-SMB-9 99-318	ARP-SMB-10 99-319
3,3',4,4'-TCB	77	0.5	13.60	11.70	15.80	12.50	16.70
2',3,4,4',5-PeCB	123	0.5	24.70	20.60	34.50	27.30	33.20
2,3',4,4',5-PeCB	118	0.5	291.00	259.00	351.00	284.00	388.00
2,3,4,4',5-PeCB	114	0.5	5.88	7.00	6.23	5.52	7.06
2,3,3',4,4'-PeCB	105	0.5	64.30	48.90	71.40	53.60	67.90
3,3',4,4',5-PeCB	126	0.5	4.56	5.71	7.02	6.27	6.41
2,3',4,4',5,5'-HxCB	167	1.0	12.90	9.61	13.60	10.50	14.30
2,3,3',4,4',5-HxCB	156	1.0	118.00	86.70	95.70	71.40	135.00
2,3,3',4,4',5'-HxCB	157	1.0	5.52	4.03	4.91	5.36	6.25
3,3',4,4',5,5'-HxCB	169	1.0	0.68	1.32	1.55	1.17	0.98
2,3,3',4,4',5,5'-HpCB	189	1.0	11.90	9.75	11.60	8.91	12.60
Total TEQ (ND=0)			0.568	0.668	0.819	0.719	0.777
Total TEQ (ND=DL)			0.568	0.668	0.819	0.719	0.777
% Lipids			0.93	0.83	1.04	0.80	1.08
Sample weight (g)			49.9	50.2	50.0	50.2	50.2

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ARF-SMB-1	ARF-SMB-2	ARF-SMB-3	ARF-SMB-4	ARF-SMB-5
3,3',4,4'-TCB	77	0.5	18.60	10.90	19.60	13.70	16.80
2',3,4,4',5-PeCB	123	0.5	48.70	27.60	42.10	32.60	22.50
2,3',4,4',5-PeCB	118	0.5	445.00	269.00	431.00	304.00	288.00
2,3,4,4',5-PeCB	114	0.5	8.26	4.86	7.66	5.92	6.01
2,3,3',4,4'-PeCB	105	0.5	85.40	57.60	82.30	64.20	70.50
3,3',4,4',5-PeCB	126	0.5	7.63	6.72	9.61	7.01	5.19
2,3',4,4',5,5'-HxCB	167	1.0	12.50	10.70	11.60	9.24	7.11
2,3,3',4,4',5-HxCB	156	1.0	130.00	142.00	121.00	86.10	102.00
2,3,3',4,4',5'-HxCB	157	1.0	8.12	5.94	8.31	6.72	8.07
3,3',4,4',5,5'-HxCB	169	1.0	2.95	1.35	2.59	1.72	1.48
2,3,3',4,4',5,5'-HpCB	189	1.0	20.60	13.30	18.60	15.70	14.80
Total TEQ (ND=0)			0.928	0.800	1.115	0.811	0.633
Total TEQ (ND=DL)			0.928	0.800	1.115	0.811	0.633
% Lipids			1.32	0.71	1.10	0.74	0.75
Sample weight (g)			50.1	50.1	49.9	50.1	50.0

DEP ID congener	IUPAC#	DL ng/kg	ARF-SMB-6	ARF-SMB-7	ARF-SMB-8	ARF-SMB-9	ARF-SMB-10
3,3',4,4'-TCB	77	0.5	15.30	10.60	21.60	17.40	9.97
2',3,4,4',5-PeCB	123	0.5	30.10	28.30	35.90	28.90	17.30
2,3',4,4',5-PeCB	118	0.5	325.00	285.00	401.00	359.00	221.00
2,3,4,4',5-PeCB	114	0.5	6.62	5.21	8.02	7.88	4.23
2,3,3',4,4'-PeCB	105	0.5	54.70	36.90	75.30	79.40	41.80
3,3',4,4',5-PeCB	126	0.5	8.31	4.35	10.60	8.81	5.95
2,3',4,4',5,5'-HxCB	167	1.0	7.63	5.67	9.95	11.10	6.33
2,3,3',4,4',5-HxCB	156	1.0	115.00	67.90	136.00	147.00	78.70
2,3,3',4,4',5'-HxCB	157	1.0	6.51	4.26	7.91	7.52	5.02
3,3',4,4',5,5'-HxCB	169	1.0	2.49	1.87	3.65	3.15	2.03
2,3,3',4,4',5,5'-HpCB	189	1.0	16.80	11.40	19.20	18.40	10.60
Total TEQ (ND=0)			0.964	0.530	1.228	1.044	0.689
Total TEQ (ND=DL)			0.964	0.530	1.228	1.044	0.689
% Lipids			0.84	0.53	1.16	0.91	0.51
Sample weight (g)			50.0	50.2	49.9	50.2	50.0

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ARY-SMB-1	ARY-SMB-2	ARY-SMB-3	ARY-SMB-4	ARY-SMB-5
3,3',4,4'-TCB	77	0.5	14.20	25.70	15.60	31.40	17.30
2',3,4,4',5-PeCB	123	0.5	26.30	42.10	21.70	55.20	25.60
2,3',4,4',5-PeCB	118	0.5	224.00	328.00	184.00	361.00	175.00
2,3,4,4',5-PeCB	114	0.5	14.60	23.60	12.40	42.80	20.60
2,3,3',4,4'-PeCB	105	0.5	78.90	94.80	59.80	102.00	52.30
3,3',4,4',5-PeCB	126	0.5	18.30	36.30	17.60	41.60	21.70
2,3',4,4',5,5'-HxCB	167	1.0	15.10	29.80	13.20	52.00	22.80
2,3,3',4,4',5-HxCB	156	1.0	132.00	221.00	121.00	253.00	175.00
2,3,3',4,4',5'-HxCB	157	1.0	15.90	31.50	16.70	35.70	20.60
3,3',4,4',5,5'-HxCB	169	1.0	0.99	1.25	<DL	1.53	0.75
2,3,3',4,4',5,5'-HpCB	189	1.0	7.61	13.70	6.39	16.20	10.60
Total TEQ (ND=0)			1.956	3.831	1.864	4.398	2.314
Total TEQ (ND=DL)			1.956	3.831	1.874	4.398	2.314
% Lipids			0.45	1.00	0.49	1.35	0.66
Sample weight (g)			50.3	50.2	40.6	49.7	49.9

DEP ID congener	IUPAC#	DL ng/kg	ALV-SMB-1	ALV-SMB-2	ALV-SMB-3	ALV-SMB-4	ALV-SMB-5
3,3',4,4'-TCB	77	0.5	28.60	31.60	24.60	14.20	15.40
2',3,4,4',5-PeCB	123	0.5	66.20	91.50	75.10	50.60	47.30
2,3',4,4',5-PeCB	118	0.5	289.00	352.00	306.00	251.00	232.00
2,3,4,4',5-PeCB	114	0.5	11.60	10.80	8.35	5.19	6.60
2,3,3',4,4'-PeCB	105	0.5	59.70	78.90	69.80	48.60	53.20
3,3',4,4',5-PeCB	126	0.5	8.69	18.60	15.30	8.33	9.85
2,3',4,4',5,5'-HxCB	167	1.0	22.10	34.10	26.70	20.20	18.60
2,3,3',4,4',5-HxCB	156	1.0	86.70	121.00	98.90	71.40	63.70
2,3,3',4,4',5'-HxCB	157	1.0	14.90	15.60	13.50	11.60	8.33
3,3',4,4',5,5'-HxCB	169	1.0	1.15	1.02	0.88	<DL	0.71
2,3,3',4,4',5,5'-HpCB	189	1.0	7.33	10.30	8.71	8.33	5.21
Total TEQ (ND=0)			0.982	2.001	1.648	0.915	1.067
Total TEQ (ND=DL)			0.982	2.001	1.648	0.925	1.067
% Lipids			0.74	0.92	0.69	0.41	0.42
Sample weight (g)			50.1	49.7	50.1	44.5	40.8

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	AGI-SMB-1	AGI-SMB-2	AGI-SMB-3	AGI-SMB-4	AGI-SMB-5
3,3',4,4'-TCB	77	0.5	14.60	18.50	13.70	22.60	11.60
2',3,4,4',5-PeCB	123	0.5	83.20	91.30	71.30	102.00	75.30
2,3',4,4',5-PeCB	118	0.5	181.00	195.00	155.00	233.00	169.00
2,3,4,4',5-PeCB	114	0.5	28.30	20.60	32.60	41.70	25.20
2,3,3',4,4'-PeCB	105	0.5	63.90	69.80	48.10	55.60	53.60
3,3',4,4',5-PeCB	126	0.5	7.75	9.01	8.66	11.30	10.20
2,3',4,4',5,5'-HxCB	167	1.0	12.60	15.60	9.59	10.90	13.60
2,3,3',4,4',5-HxCB	156	1.0	91.70	101.00	71.60	79.60	86.50
2,3,3',4,4',5'-HxCB	157	1.0	18.30	22.30	13.30	19.40	15.40
3,3',4,4',5,5'-HxCB	169	1.0	1.41	1.36	1.02	1.48	1.26
2,3,3',4,4',5,5'-HpCB	189	1.0	26.80	25.30	21.90	27.30	22.90
Total TEQ (ND=0)			0.895	1.027	0.966	1.259	1.130
Total TEQ (ND=DL)			0.895	1.027	0.966	1.259	1.130
% Lipids			0.59	0.61	0.49	0.71	0.49
Sample weight (g)			50.3	50.2	50.1	50.2	50.2

DEP ID congener	IUPAC#	DL ng/kg	ALS-SMB-1	ALS-SMB-2	ALS-SMB-3	ALS-SMB-4	ALS-SMB-5
3,3',4,4'-TCB	77	0.5	25.60	22.10	39.40	28.40	29.70
2',3,4,4',5-PeCB	123	0.5	61.30	68.90	125.00	71.20	88.30
2,3',4,4',5-PeCB	118	0.5	245.00	301.00	395.00	271.00	296.00
2,3,4,4',5-PeCB	114	0.5	24.70	31.60	49.60	26.90	38.60
2,3,3',4,4'-PeCB	105	0.5	65.90	72.40	131.00	116.00	108.00
3,3',4,4',5-PeCB	126	0.5	24.50	31.40	51.60	36.70	47.70
2,3',4,4',5,5'-HxCB	167	1.0	18.70	19.30	33.40	21.40	26.90
2,3,3',4,4',5-HxCB	156	1.0	88.60	110.00	154.00	132.00	141.00
2,3,3',4,4',5'-HxCB	157	1.0	16.30	14.20	33.60	22.10	26.70
3,3',4,4',5,5'-HxCB	169	1.0	0.99	1.75	1.55	1.36	1.22
2,3,3',4,4',5,5'-HpCB	189	1.0	37.20	28.60	51.60	41.70	47.60
Total TEQ (ND=0)			2.568	3.285	5.369	3.827	4.943
Total TEQ (ND=DL)			2.568	3.285	5.369	3.827	4.943
% Lipids			0.69	0.89	1.19	0.79	1.09
Sample weight (g)			49.9	49.8	50.2	50.2	49.8

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ALW-SMB-1	ALW-SMB-2	ALW-SMB-3	ALW-SMB-4	ALW-SMB-5
3,3',4,4'-TCB	77	0.5	6.69	12.50	4.26	15.90	10.50
2',3,4,4',5-PeCB	123	0.5	28.90	48.70	15.90	57.60	28.40
2,3',4,4',5-PeCB	118	0.5	67.80	115.00	40.20	148.00	95.30
2,3,4,4',5-PeCB	114	0.5	1.05	2.33	0.88	3.94	1.66
2,3,3',4,4'-PeCB	105	0.5	13.90	24.70	12.90	34.70	18.70
3,3',4,4',5-PeCB	126	0.5	0.41	0.75	<DL	1.00	0.58
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	30.60	51.60	18.90	81.30	61.30
2,3,3',4,4',5'-HxCB	157	1.0	8.81	14.20	3.61	20.40	12.70
3,3',4,4',5,5'-HxCB	169	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5,5'-HpCB	189	1.0	2.66	5.01	3.09	8.84	5.69
Total TEQ (ND=0)			0.073	0.130	0.019	0.179	0.112
Total TEQ (ND=DL)			0.083	0.140	0.079	0.189	0.122
% Lipids			0.58	1.12	0.27	1.68	1.01
Sample weight (g)			50.0	49.9	49.9	50.2	49.9

DEP ID congener	IUPAC#	DL ng/kg	ALW-WHP-1	ALW-WHP-2	ALW-WHP-3	ALW-WHP-4	ALW-WHP-5
3,3',4,4'-TCB	77	0.5	17.30	7.91	14.10	9.24	5.23
2',3,4,4',5-PeCB	123	0.5	153.00	88.30	124.00	86.70	42.70
2,3',4,4',5-PeCB	118	0.5	301.00	163.00	294.00	225.00	119.00
2,3,4,4',5-PeCB	114	0.5	17.60	10.50	22.60	15.90	6.34
2,3,3',4,4'-PeCB	105	0.5	35.60	18.30	27.50	21.70	15.90
3,3',4,4',5-PeCB	126	0.5	2.41	1.33	2.63	1.96	1.08
2,3',4,4',5,5'-HxCB	167	1.0	17.90	8.24	15.50	10.30	5.54
2,3,3',4,4',5-HxCB	156	1.0	226.00	115.00	237.00	186.00	121.00
2,3,3',4,4',5'-HxCB	157	1.0	13.70	7.66	15.10	9.58	7.38
3,3',4,4',5,5'-HxCB	169	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5,5'-HpCB	189	1.0	8.66	5.27	7.69	5.97	3.64
Total TEQ (ND=0)			0.421	0.228	0.447	0.337	0.194
Total TEQ (ND=DL)			0.431	0.238	0.457	0.347	0.204
% Lipids			5.28	3.35	5.31	4.65	2.52
Sample weight (g)			49.9	49.8	50.1	50.0	50.0

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ALW-WHP-6	ALW-WHP-7	ALW-WHP-8	ALW-WHP-9	ALW-WHP-10
3,3',4,4'-TCB	77	0.5	8.65	7.31	4.28	6.67	6.19
2',3,4,4',5-PeCB	123	0.5	74.20	42.80	46.90	62.80	58.70
2,3',4,4',5-PeCB	118	0.5	165.00	159.00	91.40	129.00	142.00
2,3,4,4',5-PeCB	114	0.5	9.63	5.32	5.21	7.15	8.81
2,3,3',4,4'-PeCB	105	0.5	15.80	17.70	7.81	16.30	14.60
3,3',4,4',5-PeCB	126	0.5	1.42	0.96	0.85	0.94	1.03
2,3',4,4',5,5'-HxCB	167	1.0	8.89	5.35	5.69	5.09	6.95
2,3,3',4,4',5-HxCB	156	1.0	124.00	95.60	62.10	83.70	107.00
2,3,3',4,4',5'-HxCB	157	1.0	7.27	5.48	3.04	7.06	6.21
3,3',4,4',5,5'-HxCB	169	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5,5'-HpCB	189	1.0	4.16	2.65	2.29	2.95	2.26
Total TEQ (ND=0)			0.239	0.172	0.135	0.165	0.186
Total TEQ (ND=DL)			0.249	0.182	0.145	0.175	0.196
% Lipids			3.13	2.45	1.49	2.77	2.31
Sample weight (g)			50.2	50.2	50.0	50.1	50.0

DEP ID congener	IUPAC#	DL ng/kg	AGL-RBT-C1	AGL-BNT-C1	ARP-WHS-C1	ARP-WHS-C2	ARF-WHS-C1
3,3',4,4'-TCB	77	0.5	56.90	37.40	96.40	81.70	31.40
2',3,4,4',5-PeCB	123	0.5	42.10	10.50	36.90	42.60	92.10
2,3',4,4',5-PeCB	118	0.5	406.00	165.00	487.00	453.00	577.00
2,3,4,4',5-PeCB	114	0.5	62.30	25.60	29.30	24.20	18.20
2,3,3',4,4'-PeCB	105	0.5	41.80	11.80	83.70	71.60	316.00
3,3',4,4',5-PeCB	126	0.5	24.00	8.69	35.20	40.10	12.90
2,3',4,4',5,5'-HxCB	167	1.0	7.64	2.11	15.40	16.90	56.60
2,3,3',4,4',5-HxCB	156	1.0	233.00	68.90	212.00	198.00	94.20
2,3,3',4,4',5'-HxCB	157	1.0	4.12	1.06	7.58	6.32	7.33
3,3',4,4',5,5'-HxCB	169	1.0	0.85	<DL	1.64	1.47	1.12
2,3,3',4,4',5,5'-HpCB	189	1.0	47.90	15.70	74.20	80.30	13.90
Total TEQ (ND=0)			2.618	0.941	3.739	4.212	1.465
Total TEQ (ND=DL)			2.618	0.951	3.739	4.212	1.465
% Lipids			3.01	4.54	8.73	8.48	14.70
Sample weight (g)			50.1	50.1	49.3	49.3	50.0

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	ARF-WHS-C2	ARY-WHS-C1	ARY-WHS-C2	ALV-WHS-C1	ALV-WHS-C2
3,3',4,4'-TCB	77	0.5	21.40	64.90	53.70	48.60	61.40
2',3,4,4',5-PeCB	123	0.5	74.20	244.00	226.00	231.00	295.00
2,3',4,4',5-PeCB	118	0.5	488.00	491.00	465.00	574.00	630.00
2,3,4,4',5-PeCB	114	0.5	12.60	21.30	15.90	13.30	14.80
2,3,3',4,4'-PeCB	105	0.5	274.00	116.00	103.00	248.00	275.00
3,3',4,4',5-PeCB	126	0.5	10.60	9.94	10.50	15.90	17.70
2,3',4,4',5,5'-HxCB	167	1.0	41.70	48.70	39.40	24.60	21.60
2,3,3',4,4',5-HxCB	156	1.0	75.40	304.00	288.00	142.00	167.00
2,3,3',4,4',5'-HxCB	157	1.0	3.61	35.70	21.60	18.70	17.10
3,3',4,4',5,5'-HxCB	169	1.0	0.85	14.20	6.71	3.36	5.26
2,3,3',4,4',5,5'-HpCB	189	1.0	8.74	13.90	7.22	10.40	14.80
Total TEQ (ND=0)			1.201	1.410	1.366	1.822	2.050
Total TEQ (ND=DL)			1.201	1.410	1.366	1.822	2.050
% Lipids			12.08	11.45	9.43	6.89	9.14
Sample weight (g)			49.9	50.2	50.3	50.4	50.0

DEP ID congener	IUPAC#	DL ng/kg	KNW-SMB-3	KNW-SMB-4	KNW-SMB-6	KNW-SMB-7	KNW-SMB-9
3,3',4,4'-TCB	77	0.5	2.61	4.06	2.13	3.66	1.25
2',3,4,4',5-PeCB	123	0.5	6.32	8.32	4.22	5.94	3.19
2,3',4,4',5-PeCB	118	0.5	49.7	86.7	41.3	36.8	25.6
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	4.06	6.39	4.87	5.79	3.01
3,3',4,4',5-PeCB	126	0.5	2.85	4.02	3.98	3.19	1.44
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	94.2	158	106	121	51.7
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	0.88	1.95	0.63	2.01	<DL
2,3,3',4,4',5,5'-HpCB	189	1.0	8.63	17.6	6.26	10.6	5.26
Total TEQ (ND=0)			0.348	0.513	0.463	0.406	0.174
Total TEQ (ND=DL)			0.349	0.514	0.464	0.407	0.184
% Lipids			0.71	1.35	0.43	0.55	0.32
Sample weight (g)			50.5	50.1	50.2	49.7	49.9

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	KFF-SMB-1	KFF-SMB-2	KFF-SMB-3	KFF-SMB-4	KFF-SMB-5
3,3',4,4'-TCB	77	0.5	6.09	3.41	1.57	2.06	2.85
2',3,4,4',5-PeCB	123	0.5	5.87	6.89	2.21	0.87	3.97
2,3',4,4',5-PeCB	118	0.5	89.6	105	36.7	42.1	56.3
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	5.29	6.35	2.58	1.89	3.05
3,3',4,4',5-PeCB	126	0.5	0.75	0.87	<DL	<DL	0.44
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	105	95.6	38.9	52.8	48.7
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	2.66	2.14	0.89	1.35	1.21
2,3,3',4,4',5,5'-HpCB	189	1.0	8.59	11.6	3.61	4.22	5.31
Total TEQ (ND=0)			0.166	0.170	0.033	0.045	0.088
Total TEQ (ND=DL)			0.166	0.170	0.134	0.146	0.088
% Lipids			1.12	0.59	0.38	0.38	0.62
Sample weight (g)			49.9	49.9	50.2	50.2	50.0

DEP ID congener	IUPAC#	DL ng/kg	KNW-WHS-2	KNW-WHS-3	KNW-WHS-7	KNW-WHS-8	KNW-WHS-9
3,3',4,4'-TCB	77	0.5	11.8	8.61	7.75	6.12	8.94
2',3,4,4',5-PeCB	123	0.5	10.2	7.22	5.68	4.87	8.33
2,3',4,4',5-PeCB	118	0.5	78.6	45.7	25.9	39.2	57.9
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	5.68	3.05	4.81	3.61	4.26
3,3',4,4',5-PeCB	126	0.5	3.51	2.89	3.06	2.17	2.55
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	65.9	47.1	39.4	29.8	33.5
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	5.26	3.69	2.88	2.37	3.09
2,3,3',4,4',5,5'-HpCB	189	1.0	8.48	5.29	5.02	4.26	5.91
Total TEQ (ND=0)			0.448	0.356	0.359	0.261	0.311
Total TEQ (ND=DL)			0.449	0.357	0.360	0.262	0.312
% Lipids			3.19	2.24	1.90	1.84	2.53
Sample weight (g)			50.1	50.0	50.0	50.2	50.3

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	KNW-WHSS-1	KNW-WHSS-2	KNW-WHSS-3	KNW-WHSS-4	KNW-WHSS-5
3,3',4,4'-TCB	77	0.5	6.48	4.26	7.06	10.6	8.12
2',3,4,4',5-PeCB	123	0.5	5.21	3.84	4.91	9.95	7.25
2,3',4,4',5-PeCB	118	0.5	78.9	52.9	71.3	148	125
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL1.0)	<DL(0.75)
2,3,3',4,4'-PeCB	105	0.5	6.21	5.64	8.95	13.6	10.2
3,3',4,4',5-PeCB	126	0.5	3.98	4.21	6.55	8.35	7.96
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL(2.0)	<DL(1.5)
2,3,3',4,4',5-HxCB	156	1.0	75.4	53.6	101	126	115
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL(2.0)	<DL(1.5)
3,3',4,4',5,5'-HxCB	169	1.0	3.69	2.55	6.94	7.54	8.06
2,3,3',4,4',5,5'-HpCB	189	1.0	8.57	4.95	12.3	16.3	14.6
Total TEQ (ND=0)			0.483	0.480	0.785	0.993	0.951
Total TEQ (ND=DL)			0.484	0.481	0.786	0.995	0.952
% Lipids			3.38	2.72	3.50	6.40	4.03
Sample weight (g)			50.3	50.2	50.2	21.8	36.2

DEP ID congener	IUPAC#	DL ng/kg	KFF-WHS-4	KFF-WHS-6	KFF-WHS-7	KFF-WHS-8	KFF-WHS-9
3,3',4,4'-TCB	77	0.5	2.25	2.56	1.06	2.01	1.59
2',3,4,4',5-PeCB	123	0.5	3.68	2.03	2.58	3.45	3.04
2,3',4,4',5-PeCB	118	0.5	39.8	28.9	21.7	33.5	40.2
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	3.46	2.88	1.56	3.02	2.34
3,3',4,4',5-PeCB	126	0.5	4.59	2.74	3.27	4.15	5.03
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	84.1	42.8	38.1	52.4	61.2
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	3.24	2.05	1.26	2.66	1.59
2,3,3',4,4',5,5'-HpCB	189	1.0	14.6	6.91	8.69	13.5	10.7
Total TEQ (ND=0)			0.540	0.320	0.362	0.473	0.555
Total TEQ (ND=DL)			0.541	0.321	0.363	0.474	0.556
% Lipids			3.98	2.16	1.97	2.37	2.27
Sample weight (g)			49.9	50.1	50.0	49.8	50.1

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	KFF-WHSS-1	KFF-WHSS-2	KFF-WHSS-3	KFF-WHSS-4	KFF-WHSS-5
3,3',4,4'-TCB	77	0.5	5.81	6.08	6.78	5.12	4.71
2',3,4,4',5-PeCB	123	0.5	7.36	9.59	9.01	8.32	5.68
2,3',4,4',5-PeCB	118	0.5	89.7	106	77.2	91.7	69.3
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	4.21	6.33	5.96	5.26	4.75
3,3',4,4',5-PeCB	126	0.5	8.56	13.7	12.4	10.8	6.68
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	130	145	129	106	89.5
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	6.19	8.32	7.94	5.26	7.32
2,3,3',4,4',5,5'-HpCB	189	1.0	28.8	35.9	39.4	41.7	21.8
Total TEQ (ND=0)			0.996	1.542	1.398	1.201	0.797
Total TEQ (ND=DL)			0.997	1.543	1.398	1.202	1.297
% Lipids			4.66	6.97	5.53	5.79	3.91
Sample weight (g)			50.0	50.5	49.7	49.7	49.8

DEP ID congener	IUPAC#	DL ng/kg	KAG-SMB-1	KAG-SMB-2	KAG-SMB-3	KAG-SMB-4	KAG-SMB-5
3,3',4,4'-TCB	77	0.5	2.71	1.45	3.06	3.95	4.21
2',3,4,4',5-PeCB	123	0.5	4.82	2.66	4.15	5.21	4.86
2,3',4,4',5-PeCB	118	0.5	24.6	13.2	20.6	26.3	18.7
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	2.25	1.84	2.88	4.81	3.61
3,3',4,4',5-PeCB	126	0.5	0.89	0.51	0.75	1.06	1.22
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	66.9	32.9	94.2	101	84.7
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	2.27	1.05	1.84	2.33	2.56
2,3,3',4,4',5,5'-HpCB	189	1.0	8.19	4.54	11.6	13.5	6.91
Total TEQ (ND=0)			0.149	0.080	0.145	0.185	0.194
Total TEQ (ND=DL)			0.150	0.081	0.145	0.186	0.195
% Lipids			0.60	0.34	0.62	1.10	1.01
Sample weight (g)			50.0	49.8	50.1	49.8	48.9

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	PBW-SMB-1	PBW-SMB-2	PBW-SMB-3	PBW-SMB-4	PBW-SMB-5
3,3',4,4'-TCB	77	0.5	5.03	6.33	5.21	3.69	4.91
2',3,4,4',5-PeCB	123	0.5	4.81	6.91	3.95	4.78	4.26
2,3',4,4',5-PeCB	118	0.5	112	142	85.7	56.9	95.4
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	5.09	3.84	3.61	4.22	3.06
3,3',4,4',5-PeCB	126	0.5	4.21	5.21	2.59	3.85	2.88
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	123	169	102	71.6	89.4
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	4.35	5.88	3.04	1.91	3.85
2,3,3',4,4',5,5'-HpCB	189	1.0	4.81	5.29	2.77	2.01	4.26
Total TEQ (ND=0)			0.539	0.681	0.351	0.447	0.382
Total TEQ (ND=DL)			0.540	0.681	0.351	0.448	0.383
% Lipids			0.35	0.65	0.31	0.16	0.34
Sample weight (g)			50.0	50.2	49.9	50.0	50.1

DEP ID congener	IUPAC#	DL ng/kg	PBW-SMB-6	PBW-SMB-7	PBW-SMB-8	PBW-SMB-9	PBW-SMB-10
3,3',4,4'-TCB	77	0.5	7.26	7.68	6.41	5.71	5.26
2',3,4,4',5-PeCB	123	0.5	8.01	6.32	7.11	5.66	6.01
2,3',4,4',5-PeCB	118	0.5	164	159	127	131	114
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	6.59	6.01	5.37	4.23	4.68
3,3',4,4',5-PeCB	126	0.5	5.48	5.42	4.78	4.78	3.95
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	184	166	135	158	149
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	6.39	5.98	4.71	5.24	4.32
2,3,3',4,4',5,5'-HpCB	189	1.0	7.15	6.63	5.5	6.09	4.15
Total TEQ (ND=0)			0.723	0.703	0.608	0.625	0.526
Total TEQ (ND=DL)			0.724	0.704	0.608	0.625	0.527
% Lipids			0.71	0.61	0.61	0.55	0.46
Sample weight (g)			50.2	49.7	50.2	49.8	50.0

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	PBL-SMB-1	PBL-SMB-2	PBL-SMB-3	PBL-SMB-4	PBL-SMB-5
3,3',4,4'-TCB	77	0.5	13.6	10.8	12.1	13.0	9.75
2',3,4,4',5-PeCB	123	0.5	29.8	18.9	30.4	24.7	21.9
2,3',4,4',5-PeCB	118	0.5	316	251	288	297	224
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	42.7	29.6	41.6	38.6	33.7
3,3',4,4',5-PeCB	126	0.5	30.6	28.7	32.9	24.1	21.6
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	347	267	321	297	268
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	21.6	16.3	19.4	20.1	15.7
2,3,3',4,4',5,5'-HpCB	189	1.0	18.4	22.2	20.6	17.3	12.1
Total TEQ (ND=0)			3.492	3.200	3.684	2.799	2.481
Total TEQ (ND=DL)			3.492	3.201	3.685	2.799	2.482
% Lipids			1.36	1.13	1.18	1.21	0.85
Sample weight (g)			49.7	50.2	50.1	50.3	49.9

DEP ID congener	IUPAC#	DL ng/kg	PBL-SMB-6	PBL-SMB-7	PBL-SMB-8	PBL-SMB-9	PBL-SMB-10
3,3',4,4'-TCB	77	0.5	10.5	14.7	12.8	15.1	13.2
2',3,4,4',5-PeCB	123	0.5	19.7	21.6	26.7	31.8	25.7
2,3',4,4',5-PeCB	118	0.5	201	275	293	310	284
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	31.6	35.9	26.4	37.9	40.6
3,3',4,4',5-PeCB	126	0.5	29.8	20.7	26.6	30.4	27.9
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	291	322	306	274	351
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	14.3	18.7	20.6	17.4	21.2
2,3,3',4,4',5,5'-HpCB	189	1.0	10.3	14.5	16.3	13.2	19.4
Total TEQ (ND=0)			3.296	2.454	3.057	3.392	3.216
Total TEQ (ND=DL)			3.297	2.455	3.057	3.393	3.217
% Lipids			0.90	0.89	0.94	1.00	1.04
Sample weight (g)			50.2	49.8	49.6	49.8	49.7

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	PBC-SMB-1	PBC-SMB-2	PBC-SMB-3	PBC-SMB-4	PBC-SMB-5
3,3',4,4'-TCB	77	0.5	8.26	13.6	12.4	6.33	10.7
2',3,4,4',5-PeCB	123	0.5	9.12	18.4	14.6	6.12	11.7
2,3',4,4',5-PeCB	118	0.5	178	288	321	135	301
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	11.6	15.1	12.4	5.21	17.3
3,3',4,4',5-PeCB	126	0.5	5.29	11.3	8.95	3.03	15.4
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	285	325	311	148	226
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	16.7	22.4	18.4	9.51	13.4
2,3,3',4,4',5,5'-HpCB	189	1.0	19.4	28.9	21.6	10.6	25.9
Total TEQ (ND=0)			0.861	1.553	1.273	0.488	1.824
Total TEQ (ND=DL)			0.862	1.554	1.273	0.489	1.824
% Lipids			1.00	1.80	1.20	0.41	1.11
Sample weight (g)			50.0	50.0	49.9	49.7	50.4

DEP ID congener	IUPAC#	DL ng/kg	PBC-SMB-6	PBC-WHS-C1	PBC-WHS-C2	PBV-WHS-C1	PBV-WHS-C2
3,3',4,4'-TCB	77	0.5	7.81	12.6	14.6	18.1	16.3
2',3,4,4',5-PeCB	123	0.5	26.3	15.7	19.1	26.7	25.4
2,3',4,4',5-PeCB	118	0.5	247	326	355	589	547
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	35.6	17.2	16.7	21.9	26.9
3,3',4,4',5-PeCB	126	0.5	27.1	13.1	11.3	9.47	8.33
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	286	242	267	524	495
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	15.2	20.4	23.7	26.8	24.6
2,3,3',4,4',5,5'-HpCB	189	1.0	17.6	19.5	18.4	17.7	15.0
Total TEQ (ND=0)			3.038	1.674	1.543	1.544	1.390
Total TEQ (ND=DL)			3.039	1.675	1.544	1.545	1.390
% Lipids			0.94	8.12	9.38	4.63	3.86
Sample weight (g)			50.0	49.7	49.6	49.6	49.8

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	PBV-SMB-1	PBV-SMB-2	PBV-SMB-3	PBV-SMB-4	PBV-SMB-5
3,3',4,4'-TCB	77	0.5	22.1	26.7	12.7	24.7	20.6
2',3,4,4',5-PeCB	123	0.5	36.2	38.7	16.9	31.6	29.8
2,3',4,4',5-PeCB	118	0.5	324	381	167	345	297
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	22.3	25.4	9.95	21.6	18.6
3,3',4,4',5-PeCB	126	0.5	10.7	13.6	4.63	10.4	9.85
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	316	378	165	322	266
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	14.9	16.9	8.33	15.7	13.1
2,3,3',4,4',5,5'-HpCB	189	1.0	30.6	38.7	15.4	35.1	24.7
Total TEQ (ND=0)			1.421	1.769	0.651	1.404	1.288
Total TEQ (ND=DL)			1.421	1.770	0.652	1.405	1.289
% Lipids			0.90	1.19	0.37	0.95	0.78
Sample weight (g)			49.7	49.9	50.0	50.1	50.3

DEP ID congener	IUPAC#	DL ng/kg	PBV-SMB-6	PBV-SMB-7	PBV-SMB-8	PBV-SMB-9	PBV-SMB-10
3,3',4,4'-TCB	77	0.5	16.1	18.7	19.6	22.6	15.7
2',3,4,4',5-PeCB	123	0.5	22.3	26.4	28.3	30.4	18.9
2,3',4,4',5-PeCB	118	0.5	297	301	316	316	267
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	13.2	15.9	16.4	23.6	11.3
3,3',4,4',5-PeCB	126	0.5	6.22	7.31	8.77	10.1	8.33
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	221	207	238	351	247
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	10.6	13.3	14.6	13.7	11.3
2,3,3',4,4',5,5'-HpCB	189	1.0	21.4	25.6	22.9	30.9	18.9
Total TEQ (ND=0)			0.876	1.006	1.182	1.365	1.103
Total TEQ (ND=DL)			0.876	1.007	1.183	1.366	1.103
% Lipids			0.50	0.69	0.77	0.96	0.51
Sample weight (g)			50.2	49.8	49.6	48.2	49.7

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	PBW-WHS-C1	PBW-WHS-C2	PBL-WHS-C1	PBL-WHS-C2
3,3',4,4'-TCB	77	0.5	13.6	10.8	19.6	14.2
2',3,4,4',5-PeCB	123	0.5	20.1	14.7	20.4	16.9
2,3',4,4',5-PeCB	118	0.5	294	254	298	245
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	12.4	13.6	25.7	20.7
3,3',4,4',5-PeCB	126	0.5	11.9	9.55	16.1	18.3
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	291	244	324	281
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	16.3	14.7	26.3	24.3
2,3,3',4,4',5,5'-HpCB	189	1.0	12.9	13.1	21.9	20.9
Total TEQ (ND=0)			1.534	1.255	2.074	2.245
Total TEQ (ND=DL)			1.535	1.255	2.074	2.246
% Lipids			5.68	3.13	10.14	8.43
Sample weight (g)			50.3	50.1	49.9	50.0

DEP ID congener	IUPAC#	DL ng/kg	SFS-SMB-1	SFS-LMB-1	SFS-LMB-2	SFS-LMB-3	SFS-LMB-4
3,3',4,4'-TCB	77	0.5	13.60	20.10	18.60	16.70	12.10
2',3,4,4',5-PeCB	123	0.5	36.40	15.90	25.80	21.90	19.30
2,3',4,4',5-PeCB	118	0.5	42.60	33.70	29.40	22.50	21.60
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	18.90	11.40	14.20	13.60	10.30
3,3',4,4',5-PeCB	126	0.5	5.89	6.21	7.34	8.01	5.22
2,3',4,4',5,5'-HxCB	167	1.0	15.60	10.20	6.94	5.64	4.01
2,3,3',4,4',5-HxCB	156	1.0	21.40	18.30	16.80	13.20	14.90
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	7.63	8.06	4.21	3.66	5.33
2,3,3',4,4',5,5'-HpCB	189	1.0	15.20	14.10	12.60	10.70	9.85
Total TEQ (ND=0)			0.689	0.720	0.795	0.853	0.590
Total TEQ (ND=DL)			0.690	0.721	0.795	0.854	0.591
% Lipids			0.67	0.98	1.18	0.97	0.79
Sample weight (g)			50.2	50.2	50.2	50.1	50.3

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	SWP-SMB-1	SWP-SMB-2	SWP-SMB-3	SWP-SMB-4	SWP-SMB-5
3,3',4,4'-TCB	77	0.5	2.53	6.08	4.62	5.06	6.88
2',3,4,4',5-PeCB	123	0.5	13.80	12.40	10.80	8.41	14.20
2,3',4,4',5-PeCB	118	0.5	12.70	13.90	12.90	10.90	13.70
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	5.51	5.84	5.14	6.33	6.02
3,3',4,4',5-PeCB	126	0.5	<DL	<DL	<DL	<DL	<DL
2,3',4,4',5,5'-HxCB	167	1.0	7.26	7.17	6.31	4.29	7.75
2,3,3',4,4',5-HxCB	156	1.0	24.30	28.60	24.20	18.60	31.60
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	5.07	4.63	3.62	2.58	5.11
2,3,3',4,4',5,5'-HpCB	189	1.0	3.45	3.16	2.09	3.61	2.47
Total TEQ (ND=0)			0.067	0.065	0.052	0.039	0.071
Total TEQ (ND=DL)			0.117	0.116	0.103	0.089	0.122
% Lipids			0.95	0.98	1.00	0.84	1.29
Sample weight (g)			50.0	50.2	50.1	49.9	50.1

DEP ID congener	IUPAC#	DL ng/kg	SCW-SMB-1	SCW-SMB-2	SCW-SMB-3	SCW-SMB-4	SCW-SMB-5
3,3',4,4'-TCB	77	0.5	15.60	24.60	21.40	23.70	19.80
2',3,4,4',5-PeCB	123	0.5	13.90	22.50	15.70	20.90	18.60
2,3',4,4',5-PeCB	118	0.5	82.40	129.00	97.40	115.00	81.30
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	16.70	28.60	18.40	24.70	22.50
3,3',4,4',5-PeCB	126	0.5	12.80	14.30	13.60	15.10	12.20
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	115.00	131.00	124.00	148.00	125.00
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	4.21	6.65	3.87	6.02	5.91
2,3,3',4,4',5,5'-HpCB	189	1.0	16.90	29.80	18.30	27.60	20.20
Total TEQ (ND=0)			1.394	1.585	1.478	1.665	1.358
Total TEQ (ND=DL)			1.395	1.586	1.479	1.666	1.358
% Lipids			0.96	1.87	1.03	1.24	1.05
Sample weight (g)			49.7	49.9	50.2	50.2	50.3

TABLE 3.2 COPLANAR PCB AND DIOXIN TOXIC EQUIVALENTS IN 1999 FISH SAMPLES

DEP ID congener	IUPAC#	DL ng/kg	SCB-SMB-1	SCB-SMB-2	SCB-SMB-3	SCB-SMB-4	SCB-SMB-5
3,3',4,4'-TCB	77	0.5	15.90	16.40	23.50	26.30	18.70
2',3,4,4',5-PeCB	123	0.5	9.98	13.80	11.50	17.10	10.60
2,3',4,4',5-PeCB	118	0.5	26.40	48.90	41.70	54.20	31.90
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	3.11	2.84	2.56	3.31	2.06
3,3',4,4',5-PeCB	126	0.5	5.02	5.68	4.95	6.09	4.71
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	61.40	72.40	78.30	84.20	56.80
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	2.87	3.27	3.61	4.14	2.95
2,3,3',4,4',5,5'-HpCB	189	1.0	7.33	8.06	8.95	10.70	6.36
Total TEQ (ND=0)			0.568	0.646	0.579	0.704	0.536
Total TEQ (ND=DL)			0.568	0.647	0.580	0.704	0.537
% Lipids			0.57	0.76	0.80	0.90	0.53
Sample weight (g)			50.1	50.1	50.1	50.2	50.1

DEP ID congener	IUPAC#	DL ng/kg	SCW-WHS-C1	SCW-WHS-C2	SCB-WHS-C1	SCB-WHS-C2
3,3',4,4'-TCB	77	0.5	22.70	20.80	38.10	35.40
2',3,4,4',5-PeCB	123	0.5	7.93	8.58	29.70	31.60
2,3',4,4',5-PeCB	118	0.5	69.80	79.60	63.90	51.90
2,3,4,4',5-PeCB	114	0.5	<DL	<DL	<DL	<DL
2,3,3',4,4'-PeCB	105	0.5	4.99	5.41	15.40	13.20
3,3',4,4',5-PeCB	126	0.5	7.06	6.72	8.11	10.10
2,3',4,4',5,5'-HxCB	167	1.0	<DL	<DL	<DL	<DL
2,3,3',4,4',5-HxCB	156	1.0	58.30	69.70	113.00	98.70
2,3,3',4,4',5'-HxCB	157	1.0	<DL	<DL	<DL	<DL
3,3',4,4',5,5'-HxCB	169	1.0	8.85	9.41	13.70	12.30
2,3,3',4,4',5,5'-HpCB	189	1.0	14.20	17.30	15.20	14.90
Total TEQ (ND=0)			0.836	0.814	1.021	1.197
Total TEQ (ND=DL)			0.836	0.815	1.021	1.198
% Lipids			7.84	8.27	11.10	9.24
Sample weight (g)			50.3	50.3	49.9	50.0

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
ANDROSCOGGIN RIVER			
Gilead			
AGL-RBT-1	06/03/1999	287	300
AGL-RBT-2	06/03/1999	260	190
AGL-RBT-3	06/03/1999	320	380
AGL-RBT-4	06/03/1999	290	290
AGL-RBT-5	06/15/1999	320	390
AGL-RBT-6	06/15/1999	325	360
AGL-RBT-7	06/15/1999	290	250
AGL-BNT-1	06/15/1999	275	240
AGL-BNT-2	06/15/1999	268	220
AGL-BNT-3	06/15/1999	280	230
AGL-BNT-4	06/15/1999	320	410
AGL-BNT-5	06/15/1999	277	250
ARP-SMB-1	07/19/1999	292	460
ARP-SMB-2	07/22/1999	298	490
ARP-SMB-3	07/22/1999	295	480
ARP-SMB-4	07/22/1999	290	470
ARP-SMB-5	07/22/1999	285	430
ARP-SMB-6	07/22/1999	337	740
ARP-SMB-7	07/22/1999	328	700
ARP-SMB-8	07/22/1999	367	990
ARP-SMB-9	07/22/1999	315	600
ARP-SMB-10	07/22/1999	335	780
ARP-WHS-1	07/20/1999	440	1340
ARP-WHS-2	07/20/1999	440	1330
ARP-WHS-3	07/20/1999	445	1480
ARP-WHS-4	07/20/1999	433	1340
ARP-WHS-5	07/20/1999	442	1450
ARP-WHS-6	07/20/1999	432	1320
ARP-WHS-7	07/20/1999	441	1410
ARP-WHS-8	07/20/1999	450	1510
ARP-WHS-9	07/20/1999	430	1230
ARP-WHS-10	07/20/1999	434	1220
Rumford			
ARF-SMB-1	07/14/1999	295	420
ARF-SMB-2	07/14/1999	305	410
ARF-SMB-3	07/14/1999	284	430
ARF-SMB-4	07/14/1999	292	400
ARF-SMB-5	07/14/1999	289	390
ARF-SMB-6	07/14/1999	295	390
ARF-SMB-7	07/14/1999	302	440
ARF-SMB-8	07/14/1999	283	380
ARF-SMB-9	07/14/1999	286	400
ARF-SMB-10	07/14/1999	282	340

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
Rumford			
ARF-WHS-1	07/15/1999	424	1210
ARF-WHS-2	07/15/1999	433	1320
ARF-WHS-3	07/15/1999	430	1300
ARF-WHS-4	07/15/1999	425	1090
ARF-WHS-5	07/15/1999	422	1220
ARF-WHS-6	07/15/1999	425	1120
ARF-WHS-7	07/15/1999	421	1120
ARF-WHS-8	07/15/1999	443	1500
ARF-WHS-9	07/15/1999	449	1380
ARF-WHS-10	07/15/1999	424	1260
Riley			
ARY-SMB-1	07/08/1999	365	750
ARY-SMB-2	07/08/1999	324	550
ARY-SMB-3	07/08/1999	304	410
ARY-SMB-4	07/08/1999	300	560
ARY-SMB-5	07/08/1999	284	400
ARY-WHS-1	07/08/1999	432	1300
ARY-WHS-2	07/09/1999	440	1400
ARY-WHS-3	07/09/1999	440	1350
ARY-WHS-4	07/09/1999	422	1240
ARY-WHS-5	07/09/1999	423	940
ARY-WHS-6	07/15/1999	444	1580
ARY-WHS-7	07/15/1999	440	1300
ARY-WHS-8	07/15/1999	430	1350
ARY-WHS-9	07/15/1999	444	1520
ARY-WHS-10	07/15/1999	440	1250
Livermore Falls			
ALV-SMB-1	07/08/1999	302	430
ALV-SMB-2	07/08/1999	297	450
ALV-SMB-3	07/27/1999	302	480
ALV-SMB-4	07/27/1999	288	440
ALV-SMB-5	07/27/1999	296	450
ALV-WHS-1	07/27/1999	440	1780
ALV-WHS-2	07/27/1999	443	1710
ALV-WHS-3	07/27/1999	434	1640
ALV-WHS-4	07/27/1999	422	1600
ALV-WHS-5	07/27/1999	420	1440
ALV-WHS-6	07/27/1999	430	1530
ALV-WHS-7	07/27/1999	440	1720
ALV-WHS-8	07/27/1999	437	1680
ALV-WHS-9	07/27/1999	439	1420
ALV-WHS-10	07/27/1999	428	1640

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
Androscoggin Lake			
ALW-SMB-1	07/29/1999	280	440
ALW-SMB-2	07/29/1999	330	660
ALW-SMB-3	08/03/1999	412	1180
ALW-SMB-4	08/03/1999	371	1010
ALW-SMB-5	08/03/1999	420	1380
ALW-WHP-1	07/29/1999	289	500
ALW-WHP-2	07/29/1999	287	460
ALW-WHP-3	07/29/1999	290	550
ALW-WHP-4	07/29/1999	291	540
ALW-WHP-5	07/29/1999	282	490
ALW-WHP-6	07/29/1999	292	560
ALW-WHP-7	07/29/1999	293	560
ALW-WHP-8	07/29/1999	291	490
ALW-WHP-9	07/29/1999	303	550
ALW-WHP-10	07/29/1999	305	610
ALW-WHS-1	07/29/1999	425	1260
ALW-WHS-2	07/29/1999	428	1380
ALW-WHS-3	07/29/1999	437	1480
Turner			
AGI-SMB-1	07/30/1999	300	490
AGI-SMB-2	07/30/1999	295	510
AGI-SMB-3	07/30/1999	285	380
AGI-SMB-4	07/30/1999	299	490
AGI-SMB-5	07/30/1999	327	650
Lisbon Falls			
ALS-SMB-1		322	610
ALS-SMB-2		302	570
ALS-SMB-3		315	660
ALS-SMB-4		398	1180
ALS-SMB-5		358	890
KENNEBEC RIVER			
Norridgewock			
KNW-SMB-3	09/08/1999	319	600
KNW-SMB-4	09/08/1999	322	580
KNW-SMB-6	09/08/1999	319	560
KNW-SMB-7	09/08/1999	310	620
KNW-SMB-9	09/08/1999	327	600
KNW-WHS-2	09/08/1999	440	1500
KNW-WHS-3	09/08/1999	438	1500
KNW-WHS-7	09/08/1999	442	1340
KNW-WHS-8	09/08/1999	424	1550
KNW-WHS-9	09/08/1999	424	1500

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
Norridgewock			
small suckers			
KNW-WHSS-1		216	180
KNW-WHSS-2	09/09/1999	202	90
KNW-WHSS-3	09/09/1999	137	25
KNW-WHSS-4	09/09/1999	156	40
KNW-WHSS-5	09/09/1999	205	100
Fairfield			
KFF-SMB-1	09/05/1999	320	580
KFF-SMB-2	09/06/1999	312	540
KFF-SMB-3	09/06/1999	305	500
KFF-SMB-4	09/06/1999	305	500
KFF-SMB-5	09/06/1999	313	415
KFF-WHS-4	09/06/1999	435	1040
KFF-WHS-6	09/06/1999	441	1090
KFF-WHS-7	09/06/1999	437	1210
KFF-WHS-8	09/06/1999	436	1010
KFF-WHS-9	09/06/1999	420	1020
small suckers	09/06/1999		
KFF-WHS-11	09/06/1999	259	220
KFF-WHS-12	09/06/1999	240	160
KFF-WHS-13	09/06/1999	240	150
KFF-WHS-14	09/06/1999	215	100
KFF-WHS-15	09/06/1999	200	90
Augusta			
KAG-SMB-1	08/09/1999	329	660
KAG-SMB-2	08/09/1999	333	680
KAG-SMB-3	08/09/1999	326	580
KAG-SMB-4	08/09/1999	300	560
KAG-SMB-5	08/09/1999	321	620
PENOBSCOT RIVER			
Woodville			
PBW-SMB-1	08/26/1999	351	485
PBW-SMB-2	08/26/1999	426	900
PBW-SMB-3	09/21/1999	334	490
PBW-SMB-4	09/21/1999	360	520
PBW-SMB-5	09/21/1999	365	550
PBW-SMB-6	09/22/1999	340	550
PBW-SMB-7	09/22/1999	330	520
PBW-SMB-8	09/22/1999	332	440
PBW-SMB-9	09/22/1999	351	560
PBW-SMB-10	09/23/1999	351	560

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
Woodville			
PBW-WHS-1	08/26/1999	418	790
PBW-WHS-2	08/26/1999	402	750
PBW-WHS-3	08/26/1999	404	750
PBW-WHS-4	08/26/1999	401	650
PBW-WHS-5	08/26/1999	419	720
PBW-WHS-6	08/26/1999	385	610
PBW-WHS-7	08/26/1999	390	620
PBW-WHS-8	09/04/1999	457	1050
PBW-WHS-9	09/21/1999	429	800
PBW-WHS-10	09/21/1999	392	660
Lincoln			
PBL-SMB-1	08/25/1999	352	620
PBL-SMB-2	08/25/1999	350	560
PBL-SMB-3	08/25/1999	330	530
PBL-SMB-4	09/01/1999	347	640
PBL-SMB-5	09/02/1999	385	850
PBL-SMB-6	09/02/1999	380	800
PBL-SMB-7	09/02/1999	380	750
PBL-SMB-8	09/02/1999	410	890
PBL-SMB-9	09/29/1999	338	540
PBL-SMB-10	09/30/1999	362	680
PBL-WHS-1	08/25/1999	248	190
PBL-WHS-2	08/25/1999	220	125
PBL-WHS-3	08/26/1999	303	320
PBL-WHS-4	08/26/1999	301	360
PBL-WHS-5	09/01/1999	369	600
PBL-WHS-6	09/01/1999	384	700
PBL-WHS-7	09/02/1999	410	800
PBL-WHS-8	09/02/1999	400	780
PBL-WHS-9	09/02/1999	350	510
PBL-WHS-10	09/02/1999	370	660
Costigan			
PBC-SMB-1	08/31/1999	445	1050
PBC-SMB-2	08/31/1999	465	1400
PBC-SMB-3	09/01/1999	385	830
PBC-SMB-4	09/03/1999	335	510
PBC-SMB-5	09/03/1999	435	1100
PBC-SMB-6	09/03/1999	325	490

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
Costigan			
PBC-WHS-1	08/31/1999	500	1300
PBC-WHS-2	08/31/1999	455	1150
PBC-WHS-3	08/31/1999	460	1050
PBC-WHS-4	08/31/1999	470	1050
PBC-WHS-5	08/31/1999	520	1250
PBC-WHS-6	08/31/1999	375	600
PBC-WHS-7	08/31/1999	487	1050
PBC-WHS-8	08/31/1999	527	1325
PBC-WHS-9	08/31/1999	470	1175
PBC-WHS-10	08/31/1999	426	900
Veazie			
PBV-SMB-1	08/20/1999	305	330
PBV-SMB-2	08/31/1999	310	350
PBV-SMB-3	08/31/1999	365	505
PBV-SMB-4	08/31/1999	392	520
PBV-SMB-5	08/31/1999	348	540
PBV-SMB-6	09/01/1999	300	300
PBV-SMB-7	09/01/1999	300	310
PBV-SMB-8	09/02/1999	313	390
PBV-SMB-9	09/03/1999	309	360
PBV-SMB-10	09/03/1999	328	440
PBV-WHS-1	08/31/1999	270	230
PBV-WHS-2	09/01/1999	333	320
PBV-WHS-3	09/02/1999	308	380
PBV-WHS-4	09/03/1999	300	320
PBV-WHS-5	09/03/1999	340	520
PBV-WHS-6	09/03/1999	266	240
PBV-WHS-7	09/15/1999	342	460
PBV-WHS-8	09/15/1999	334	510
PBV-WHS-9	09/16/1999	353	510
PBV-WHS-10	09/17/1999	334	510
SALMON FALLS RIVER			
S. Berwick			
SFS-SMB-1	07/01/1999	268	320
SFS-SMB-2	07/02/1999	375	860
SFS-LMB-1	09/21/1999	350	590
SFS-LMB-2	09/21/1999	307	470
SFS-LMB-3	09/21/1999	268	310
SFS-LMB-4	09/21/1999	258	240
SFS-PKL-1	07/07/1999	565	1480
SFS-WHS-1	07/02/1999	440	1120
SFS-WHS-2	07/02/1999	484	1550

TABLE 3.3 LENGTHS AND WEIGHTS OF 1999 COPLANAR PCB FISH SAMPLES

field ID	Date	Length mm	Weight gm.
SEBASTICOOK RIVER			
W BR -Palmyra			
SWP-SMB-1	09/08/1999	416	840
SWP-SMB-2	09/08/1999	310	390
SWP-SMB-3	09/08/1999	300	320
SWP-SMB-4	09/08/1999	310	400
SWP-SMB-5	09/08/1999	325	450
ST CROIX R			
Woodland above			
SCW-SMB-1	08/23/1999	329	580
SCW-SMB-2	08/23/1999	304	400
SCW-SMB-3	08/23/1999	311	460
SCW-SMB-4	08/23/1999	353	620
SCW-SMB-5	08/23/1999	366	760
SCW-WHS-1	08/23/1999	454	1010
SCW-WHS-2	08/23/1999	446	1040
SCW-WHS-3	08/23/1999	451	1000
SCW-WHS-4	08/23/1999	450	1080
SCW-WHS-5	08/23/1999	744	990
SCW-WHS-6	08/23/1999	452	1110
SCW-WHS-7	08/23/1999	453	1080
SCW-WHS-8	08/23/1999	450	1050
SCW-WHS-9	08/23/1999	453	1080
SCW-WHS-10	08/23/1999	449	1080
Baring			
SCB-SMB-1	8/24/99	320	660
SCB-SMB-2	8/24/99	325	680
SCB-SMB-3	8/24/99	331	740
SCB-SMB-4	8/24/99	316	640
SCB-SMB-5	8/24/99	321	680
SCB-WHS-1	8/24/99	453	2000+
SCB-WHS-2	8/24/99	440	1790
SCB-WHS-3	8/24/99	452	2000+
SCB-WHS-4	8/24/99	446	1760
SCB-WHS-5	8/24/99	454	1990
SCB-WHS-6	8/24/99	450	1920
SCB-WHS-7	8/24/99	440	1860
SCB-WHS-8	8/24/99	454	1910
SCB-WHS-9	8/24/99	430	1620
SCB-WHS-10	8/24/99	460	2000+

3.2

DDT IN FISH

DDT IN FISH

Results from previous SWAT fish tissue monitoring found significant levels of DDT and metabolites in fish from 4 streams in Aroostook County. While some more intensive sampling has been conducted on 3 of those, additional sampling is needed to determine the extent of contamination in other rivers and streams in the St. John River watershed. Ten omnivorous fish and 10 piscivorous fish were to be collected from each of 10 rivers and streams in the county and analyzed as 2 composite samples each for DDT and metabolites. We were unable to collect fish from any river or stream. This study will be conducted in 2000.

3.3

EFFECTS-BASED FISH STUDY

EFFECTS-BASED FISH STUDY

This study was to examine direct cummulative effects to fish of long term exposure to relatively low levels of contaminants. These responses to pollutant challenge are often within the same magnitude as natural variation and therefore difficult to measure with the methods that are currently used. Many new techniques have been developed to measure some of these effects.

In 1999 Environment Canada (EC) initiated a large 3 year study of the St John River watershed with focus on the upper river from the headwaters to Grand Falls during the first year. A variety of studies were performed, including 1. On-station flow-through bioassay with fathead minnows, 2. A invertebrate mesocosm study, 3. Laboratory studies of the responses of fish to changes in effluents before and after process changes, and 4. In-stream invertebrate and fish monitoring.

In cooperation with the EC study of the St John River, DEP chose the North Branch of Presque Isle Stream and Prestile Stream in Maine for in-depth studies of fish populations. Due to high rainfall and resulting stream flows we were unable to collect enough fish from the latter two streams. Later in the fall, working with Environment Canada, we were able to collect slimy sculpins from the St. John River downstream of the Fraser Paper Inc. paper mill in Madawaska, where whole effluent toxicity (WET) test data indicate a discharge highly toxic to the water flea, *Ceriodaphnia dubia*, one of DEP's two standard test species. Environment Canada performed all evaluations, including assessments of population age, growth, and sex structure, condition factors, gonadosomatic indices, hepatosomatic indices, circulating sex-steroids and detoxification (mixed function oxidase- MFO) enzymes.

The sex steroid and MFO data are not yet available. The only possible negative impacts measured in sculpins so far were an increased liver size in males and decreased gonad size in females compared to the St. Hilaire reference station and other Canadian reference stations. A reference station near Ft Kent reference station showed similar effects to that downstream of the paper mill suggesting possible sources of toxic contaminants in the upper river. Therefore, in 2000, this study will be conducted at stations on the St John River upstream of Ft. Kent to try to determine other sources. In addition DEP and EC will attempt to perform these studies on the two streams unsuccessfully sampled in 1999.

TABLE 3.3.1 Length, weight, and age of adult slimy sculpin at 3 reference sites upstream and a study site downstream of Fraser Paper pulp mill discharge to the St John River in Edmundston, NB (mean +- sem, n letters denote significant differences at p=0.05)

SEX	SITE	LENGTH mm	WEIGHT g	AGE y
male	ref 3	67.0+-2.0 (23)A	2.80+-0.44 (23)A	1.3+-0.2 (21)A
	ref 2	68.9+-1.1 (71)A	3.13+-0.15 (62)A	1.5+-0.1 (62)A
	ref1	85.1+-2.1 (19)B	6.43+-0.44 (19)B	2.3+-0.2 (19)B
	study	76.0+-1.5 (21)C	4.53+-0.22 (21)C	1.5+-0.2 (17)A
female	ref 3	62.4+-1.8 (21)A	2.09+-0.17 (21)A	1.4+-0.1 (18)A
	ref 2	60.9+-1.3 (42)A	2.02+-0.12 (42)A	0.6+-0.1 (36)B
	ref1	73.5+-1.9 (22)B	3.60+-0.25 (22)B	1.5+-0.2 (19)A
	study	65.5+-1.5 (26)A	2.84+-0.18 (26)C	0.8+-0.1 (26)B

TABLE 3.3.2 LSI, GSI, and K of adult slimy sculpin at 3 reference sites upstream and a study site downstream of Fraser Paper pulp mill discharge to the St John River in Edmundston, NB (mean +- sem, n letters denote significant differences at p=0.05)

SEX	SITE	LSI	GSI	K
male	ref 3	0.98+-0.05 (23)A	1.17+-0.06 (23)A	0.85+-0.02 (23)A
	ref 2	0.92+-0.06 (66)A	1.29+-0.06 (66)A	0.91+-0.01 (66)A
	ref1	1.17+-0.04 (19)AB	1.46+-0.07 (19)A	1.01+-0.02 (19)B
	study	1.48+-0.09 (17)B	1.24+-0.08 (17)A	1.02+-0.02 (17)B
female	ref 3	2.40+-0.78 (21)A	1.38+-0.10 (21)*	0.83+-0.02 (21)A
	ref 2	2.08+-0.16 (36)A	2.49+-0.24 (36)*	0.87+-0.02 (36)A
	ref1	2.96+-0.14 (19)A	4.53+-0.50 (19)*	0.97+-0.02 (19)B
	study	2.87+-0.19 (26)A	2.78+-0.34 (26)*	0.98+-0.02 (26)B

LSI=100(liver weight/body weight
GSI=100(gonad weight/body weight

TABLE 3.3.3 Length, weight, and age of adult slimy sculpin at 2 reference sites upstream and a study site downstream of Fraser Paper paper mill discharge to the St John River in Madawaska, Maine (mean +- sem, n letters denote significant differences at p=0.05)

SEX	SITE	LENGTH mm	WEIGHT g	AGE y
male	ref 3	67.0+-2.0 (23)A	2.80+-0.44 (23)A	1.3+-0.2 (21)A
	ref 2	68.9+-1.1 (71)A	3.13+-0.15 (71)A	1.5+-0.1 (62)A
	study	67.2+-3.3 (19)A	3.22+-0.50 (19)A	1.1+-0.3 (19)A
female	ref 3	62.4+-1.8 (21)A	2.09+-0.17 (21)A	1.4+-0.1 (18)A
	ref 2	60.9+-1.3 (42)A	2.02+-0.12 (42)A	0.6+-0.1 (36)B
	study	63.3+-2.2 (12)A	2.28+-0.23 (12)A	0.3+-0.2 (12)B

TABLE 3.3.4 LSI, GSI, and K of adult slimy sculpin at 2 reference sites upstream and a study site downstream of Fraser Paper paper mill discharge to the St John River in Madawaska, Maine (mean +- sem, n letters denote significant differences at p=0.05)

SEX	SITE	LSI	GSI	K
male	ref 3	0.96+-0.05 (23)AB	1.17+-0.06 (23)A	0.85+-0.02 (23)A
	ref 2	0.92+-0.06 (66)A	1.29+-0.06(66)A	0.91+-0.01 (66)AB
	study	1.37+-0.15 (19)B	1.28+-0.16 (19)A	0.93+-0.02 (19)B
female	ref 3	2.40+-0.78 (21)A	1.38+-0.10 (21)AC	0.83+-0.02 (21)A
	ref 2	2.08+-0.16 (36)A	2.55+-0.24 (35)B	0.87+-0.02 (36)A
	study	1.54+-0.14 (12)A	1.28+-0.12 (12)C	0.87+-0.02 (12)A

LSI=100(liver weight/body weight
GSI=100(gonad weight/body weight

3.4

PCB IN RIVERS AND STREAMS

PCB IN RIVERS AND STREAMS

Previous SWAT studies measured high PCB concentrations in fish from some river and streams. To help identify sources we have been using an ELISA procedure to assay for PCBs in sediments from sites that are suspect. This assay reacts with other Aroclors with the same(1260) or lesser sensitivity. In sediment samples, the assay detects 50 to 500 ppb of Aroclor 1254; the detection limit for other Aroclors is lower. It is particularly useful as a screening assay because the costs of $10-20/ sample is much less than a chemical assay and allows one to survey suspect areas with chemical assay follow-up as indicated.

In past years we have assayed samples of sediment from Portland Harbor at the mouth of the Fore river and found levels from 116 to 790 ppb. Soils in areas of residential access contaminated at these levels would likely be recommended for remediation. PCBs are highly bioaccumulative, so we expect that benthic feeders would be taking them up. We also ran samples of sediments from Boothbay Harbor in response to a concern that storage of electrical transformers in a structure near the bay might have resulted in contamination. However, levels here ran from 45 to 125 ppb, too low to be judged a problem without further testing.

In 1999 we sampled sediment from Goosefare Brook, Great Works River, and the Salmon Fall River, where fish had relatively high levels of PCBs. None of the sediment samples were above background. We also sampled the Kennebec River and tribs in the Augusta area. We have previously found the highest levels of contamination in freshwater fish in Maine from the Kennebec, that resulted in a no consumption fish advisory. None of the trib sediment samples were greater than background. However, two samples taken from the Kennebec River near shore at the Augusta public boat ramp on the east side of the river were elevated. One sample was in excess of 0.5 ppm. Given the fact that the sediment is not dried-only pressed between paper towels-and the sediment extraction efficiency is about 85% on average, the true level may approach one ppm. This impressed us particularly because the sample was largely sand--- and PCBs bind to organic material, not to minerals. Additional samples will be collected from the river in 2000 and analyzed to map contamination in sediments.

It is suspected that elevated PCB levels in coastal eagles in Maine may be contributing to a lowered reproductive rate in these animals. One of the sites that may be contributing PCB contaminated fish to these eagles is a former U.S.Navy installation in the Winter Harbor area. We sampled sediment in six brooks in strategic areas encompassing the navy site. All of these samples were below the detection level of this assay.

3.5

XENOESTROGENS

XENOESTROGENS

The following report is for preliminary work conducted at no charge in 1999. Funds allocated for this study have been reallocated for a study, 'Investigation of the Estrogenic potential of Agrochemicals and their effect on Altlantic salmon (*Salmo salar*)'.

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Introduction: Endocrine disruptors are exogenous compounds which mimic the effects of steroid hormones, and have been shown to have detrimental effects on wildlife (fishes, birds, reptiles) and humans. Included in this group are the dioxins (which act as estrogen antagonists), some PCBs, DDE (a metabolite of DDT) and numerous other compounds used in quantity in many industries. Environmental estrogens have biological activity qualitatively similar to that of endogenous estrogens. Exposure to these compounds is known to affect the development and sexual maturation of vertebrates and, like dioxins, these have also been implicated as cancer promoters.

Vitellogenin (VTG), a serum phospholipoprotein precursor to yolk proteins, is a widely-used biomarker for the presence of environmental estrogens. Vitellogenin is synthesized and secreted by the liver in response to circulating estrogens in maturing females. It is not normally expressed in males, nor in the plasma of immature females. The use of vitellogenin as a biomarker has been explored in several fish species and both *in vitro* and *in vivo* assays have been developed.

Methods: White sucker *(Catostomus commersoni*) were collected from the Penobscot River at three sites: (1) south of Lincoln; (2) south of Weldon Dam; (3) Greenbush at Costigan, an upstream control for the James River Plant. The Lincoln site is just south of the Lincoln Paper Mill. Weldon Dam is a reference site. The Greenbush site is upstream of the James River plant, about 20 miles downstream of Lincoln. Fish were measured (head to tail), weighed and their gender recorded. Blood was collected from individual fish into syringes containing anticoagulants and protease inhibitors. Blood cells were removed by low-speed centrifugation and the plasma frozen at -80^0C in the presence of protease inhibitors.

Determination of VTG levels was done using a capture ELISA. Antibodies (AA-1 and BN-5) to VTG were obtained from Biosense (Bergen, Norway); HL1473 and HL1149 from Dr. N. Denslow, University of Florida (Gainesville, FL). AA-1 is a polyclonal antibody made against Atlantic salmon (*Salmo salar*)VTG; BN-5 is an affinity-purified monoclonal Ab also made to Atlantic salmon; HL1473 was made to brown bullhead and HL1149 to carp. The positive control was plasma from estradiol-induced Atlantic salmon (Biosense). Antibodies were diluted at 1:100, 1:1000 or 1:10,000. In the capture ELISA method, the plate was first coated with a primary antibody, then the VTG sample added,

followed by a second primary antibody. Finally, the secondary antibody, conjugated to horseradish peroxidase is added. The presence of VTG is indicated by a colorimetric change at 492nm on using an ELISA plate reader.

Results and Discussion: Data are summarized in Table I. Twenty-four fish were analyzed, including five males and nineteen females. Values were low for all samples. No significant gender-specific differences were observed. We also looked for correlations of VTG levels with specific sites. Levels of VTG were lowest in fish collected south of the Weldon Dam (SWD) for both males and females. Sample size, however, was very small here (1 male and 3 females). In an attempt to optimize the ELISAs, mABs HL1473 and HL1149 were used in place of the BN-5 antibody. Both gave values of zero with the Atlantic salmon positive control, indicating that these antibodies from brown bullhead and carp do not cross react with salmon.

Our hypothesis was that the highest levels of VTG would be found in gravid female fish and that male fish collected south of Lincoln would have elevated levels of VTG relative to males from reference sites. Our data indicate that levels are very low in all the fish and not significantly different among sites or between males and females. It is likely that the use of a heterologous antibody did not allow for optimum detection of the white sucker VTG. Although these proteins are fairly well conserved, previous studies suggest that there is low Ab cross reactivity between species. A second explanation may be that VTG is being expressed in males at both the SL and GBC sites, both of which are downstream of Lincoln Pulp and Paper. However, since the sample numbers are low and the data are so variable, we are not able to confidently interpret these data.

Table I. Results of Capture ELISAs on plasma from Penobscot River White Sucker (*Catostomus clarkii*)

Sample	Description	Absorbance at 492 nm (ELISA)
SL2-092397	male	0.011
SL8-092397	male	0.023
SL6-092397	female	0.024
SL10-092397	female	0.018
SL3-092397	female, gravid	0.025
SL4-092397	female, gravid	0.034
SL5-092397	female, gravid	0.033
SL7-092397	female, gravid	0.013
SL9-092397	female, gravid	0.021
SL11-092397	female, gravid	0.018
GBC6-090997	male	0.025
GBC7-090997	male	0.016
GBC8-090997	female	0.036
GBC1-090997	female, gravid	0.012
GBC2-090997	female, gravid	0
GBC9-090997	female, gravid	0.038
GBC10-090997	female, gravid	0.003
GBC11-090997	female, gravid	0.015
GBC12-090997	female, gravid	0.006
GBC13-090997	female, gravid	0.011
SWD2-090497	male	0
SWD1-090497	female, gravid	0.010
SWD3-090497	female, gravid	0.005
SWD4-090497	female, gravid	0

SL, south of Lincoln; GBC, Greenbush at Costigan; SWD, south of the Weldon dam. The Lincoln site is just south of the Lincoln Paper Mill. Weldon Dam is a reference site. The Greenbush site is upstream of the James River plant, about 20 miles downstream of Lincoln.

3.6

AMBIENT BIOLOGICAL MONITORING

Ambient Biological Monitoring

Thirty-eight stations were sampled during the 1999 field season to evaluate benthic macroinvertebrate communities for evidence of impairment due to toxic contamination. Biological monitoring in 1999 was concentrated in the St. John and Presumpscot River Basins, in keeping with the Land and Water Bureau Five- Year Basin sampling rotation. The station list is essentially unchanged from that proposed in the 1999 SWAT Workplan, except for minor substitutions. These substitutions include a selection of small agricultural streams located in the St. John Basin.

Table 3.6.1 summarizes the results of biological monitoring activities for the 1999 SWAT Program, which are sorted by waterbody name. Since waterbodies are sometimes sampled in more than one location, each sampling event was assigned a "LOG" number and each sampling location was assigned a "Station Number", which are listed on Table 3.6.1. Table 3.6.1 also includes a "Map" number for each sampling event. Using the "Map" number and the "Station Number", locations of each sampling location can be found on Maps 1 – 12. Individual data reports for each sampling event (Key Reports) a presented following the summary table and maps. Use the "LOG" number of each sampling event to identify the correct Key Report. NPS denotes non-point source runoff or pollution.

Results Summary

- Thirty-eight stations were assessed for the condition of the benthic macroinvertebrate community.
- Twelve of the thirty-eight stations fail to attain the minimum aquatic life standards of their assigned class.
- Four of the twelve non-attainment sites have a probable urban non-point source toxic problems.
- Probable causes explaining the remaining eight non-attainment sites include: non-point source enrichment, possible non-toxic problems, hazardous waste contamination, and one station with a probable agricultural non-point source toxic problem.
- Twenty-six of the thirty-eight sampled stations meet or exceed the aquatic life standards of their legally assigned class.
- Seven of the sampled stations exhibit natural aquatic communities (Class A).

TABLE 3.6.1 - 1999 SWAT Benthic Macroinvertebrate Biomonitoring Results

Waterbody	Map	Station	LOG	Town	Location	Issue*	Legal Class/ Model Class	Attains Class	Probable Cause*
Aroostook River	1	S369	766	Caribou	above	Control	C/B	Y	Exceeds Class
Aroostook River	1	S370	767	Caribou	below	Municipal	C/C	Y	
Barberry Brook	6	S387	799	S. Portland	below	Urban NPS	C/NA	**N**	**NPS Toxics**
Capisic Brook	6	S256	792	Portland	above	Control	B/C	**N**	
Capisic Brook	6	S257	793	Portland	below	Urban NPS	B/NA	**N**	**NPS Toxics**
Caribou Stream	1	S96	769	Caribou	above	Control	B/A	Y	Exceeds Class
Caribou Stream	1	S95	770	Caribou	below	Urban NPS	B/B	Y	Note: unusually high wat during sampling
Cole Brook	12	S316	809	Gray	above	Control	B/A	Y	Exceeds Class
Cole Brook	12	S317	810	Gray	below	Agric NPS	B/C	**N**	NPS Enrichment; Possib Toxics
Dennys River	9	S297	814	Meddybemps	below	HazMat site	AA/C	**N**	Possible NPS Toxics; La Outlet
Dudley Brook	10	S215	768	Chapman	below	Agric NPS	B/C	**N**	Possible NPS Toxics
Fish River	3	S373	771	Wallagrass	above	Reference	B/B	Y	
Fish River	3	S371	773	Fort Kent	below	Urban NPS	B/B	Y	
Fish River	3	S372	772	Wallagrass	below	Reference	B/B	Y	
Hardwood Brook	11	S378	781	Presque Isle	below	Agric NPS	B/A	Y	Exceeds Class
Mousam River	7	S388	800	Sanford	above	Control	C/B	Y	Exceeds Class
Mousam River	7	S259	801	Sanford	below	Landfill; NPS	C/C	Y	
Mousam River	7	S275	804	Sanford	below	Municipal; NPS	C/C	Y	
Mousam River	7	S390	802	Sanford	below	Urban NPS	C/B	Y	Exceeds Class
Mousam River	7	S391	803	Sanford	below	Municipal; NPS	C/A	Y	Exceeds Class
Ohio St. Stream	5	S312	790	Bangor	below	Urban NPS	B/C	**N**	**NPS Toxics**
Ohio St. Stream	5	S384	791	Bangor	below	Urban NPS	B/NA	**N**	**NPS Toxics**
Prestile Stream	4	S99	774	Mars Hill	above	NPS	B/B	Y	
Prestile Stream	4	S3	775	Blaine	below	NPS; Municipal	B/B	Y	
Prestile Stream	4	S4	815	Easton	below	Waste water	A/C	**N**	NPS Enrichment
Pretty Brook	4	S374	776	Westfield	above	Control	A/A	Y	
Pretty Brook	4	S458	777	Mars Hill	below	Agric NPS	A/B	**N**	Possible NPS Enrichme
Red Brook	6	S218	796	Scarborough	above	Control	C/B	Y	Exceeds Class
Red Brook	6	S219	797	Scarborough	below	Landfill; NPS	C/NA	**N**	Possible NPS Toxics
Rocky Brook	4	S375	778	Mars Hill	below	Agric NPS	B/B	Y	
Sheepscot River	8	S74	808	N. Whitefield	above	Reference	AA/A	Y	
St. John River	2	S187	762	Grand Isle	above	Industrial	C/B	Y	Exceeds Class
St. John River	3	S8	764	Fort Kent	above	Control	A/B	**N**	Possible NPS Enrichme
St. John River	2	S186	761	Van Buren	below	Industrial/ Municipal	C/C	Y	
St. John River	2	S368	763	Madawaska	below	Industrial	C/B	Y	Exceeds Class
St. John River	3	S9	765	Fort Kent	below	Municipal	B/B	Y	
Trout Brook	6	S302	798	S. Portland	below	Urban NPS	C/C	Y	Note: Best Professiona Judgement
W.Br. Sheepscot	8	S268	807	Weeks Mills	above	Reference	AA/A	Y	