Site-Specific BAFs and Revised Water Quality Criteria for the Protection of Human Health for Total PCBs for the Delaware River Estuary Zones 2 to 5

Spring 2002 (Revision 4)

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BAF Calculations

Freely-Dissolved Fraction:

			Freely-Dissolved Fraction												
	POC	DOC	Mono	Di	Tri	Tetra	Penta	Hexa	Hepta	Octa	Nona	Deca	**Median**	**Minimum**	**Maximum**
Zone 2	1.06	5.68	0.931	0.849	0.629	0.376	0.214	0.099	0.044	0.017	0.012	0.004	0.156	0.004	0.931
Zone 3	1.54	6.25	0.909	0.807	0.558	0.309	0.168	0.075	0.033	0.012	0.009	0.003	0.122	0.003	0.909
Zone 4	1.19	9.56	0.913	0.814	0.569	0.319	0.174	0.078	0.035	0.013	0.009	0.003	0.126	0.003	0.913
Zone 5	2.48	5.99	0.874	0.742	0.465	0.236	0.122	0.053	0.023	0.009	0.006	0.002	0.088	0.002	0.874
All Zones	1.51	6.44	0.910	0.808	0.559	0.311	0.169	0.076	0.033	0.013	0.009	0.003	0.122	0.003	0.910

	Kow
Mono	4.69
Di	5.07
Tri	5.59
Tetra	6.04
Penta	6.39
Hexa	6.78
Hepta	7.16
Octa	7.59
Nona	7.74
Deca	8.18

Note: POC, DOC and Kow are all median values.

Spring 2002

	White Perch Concentration in Tissue (Ct) ng/g	Channel catfish Concentration in Tissue (Ct) ng/g
Zone 2	659.88	510.88
Zone 3	1127.98	1659.77
Zone 4	1202.04	1815.17
Zone 5	1127.26	1582.18
All Zones (median)	1127.62	1620.98

Zone	Sample ID	Wet Weight (ng/g)	(ng/g lipid)
2	2CORE WF	659.88	10965
3	3CORE WF	1127.98	15983
4	4CORE WF	1202.04	17037
5	5CORE WF	1127.26	26479

Zone	Sample ID	Wet Weight (ng/g)	(ng/g lipid)
2	2CORE WF	510.88	10577
3	3CORE WF	1659.77	22582
4	4CORE WF	1815.17	20213
5	5CORE WF	1582.18	15681

Baseline BAF Calculation

Channel catfish - Spring 2002
Whole Body Conc.

	Concentration in Tissue (Ct) ng/g	Total Water Concentration (Cw) pg/l	Measured BAF	Log BAF	% lipid	Fraction fd	Baseline BAF
Zone 2	510.88	3231.88	158,075	5.20	4.83	0.156	20,934,071
Zone 3	1659.77	5591.25	296,851	5.47	7.35	0.122	33,201,302
Zone 4	1815.17	5121.32	354,434	5.55	8.98	0.126	31,211,276
Zone 5	1582.18	4262.28	371,205	5.57	10.09	0.088	41,899,468
All Zones (median)	1620.98	4691.80	345,491	5.54	8.17	0.122	34,561,293

Note: Tissue concentration is converted to ng/kg and water concentration is converted to ng/l in the formula.

White Perch - Spring 2002
Whole Body Conc.

	Concentration in Tissue (Ct) ng/g	Total Water Concentration (Cw) pg/l	Measured BAF	Log BAF	% lipid	Fraction fd	Baseline BAF
Zone 2	659.88	3231.88				0.156	
Zone 3	1127.98	5591.25	201,740	5.30	7.33	0.122	22,625,172
Zone 4	1202.04	5121.32	234,713	5.37	6.84	0.126	27,135,217
Zone 5	1127.26	4262.28	264,473	5.42	4.26	0.088	70,706,321
All Zones (median)	1127.62	4691.80	234,713	5.37	6.84	0.122	28,027,885

Final Trophic Level BAF Calculation

Trophic Level 3

	Baseline BAF	Fraction lipid	Fraction fd	Trophic Level BAF
Zone 2	20,934,071	0.048	0.156	158,075
Zone 3	33,201,302	0.074	0.122	296,851
Zone 4	31,211,276	0.090	0.126	354,434
Zone 5	41,899,468	0.101	0.088	371,205
All Zones	34,561,293	**0.0387**	0.122	163,754

Trophic Level 4

	Baseline BAF	Fraction lipid	Fraction fd	
Zone 2		0.000	0.156	
Zone 3	22,625,172	0.073	0.122	201,740
Zone 4	27,135,217	0.068	0.126	234,713
Zone 5	70,706,321	0.043	0.088	264,473
All Zones	28,027,885	**0.0248**	0.122	85,101

Note: All Zones fraction lipid is derived from the estuary-wide data compilation and UMd-CBL/ANSP data.

Final BAF Calculation

ALL ZONES

Trophic Level	Trophic Level BAF	Proportion of Fish Intake*	Trophic Level Fish Intake (g/day)	BAF& Fish Intake Term
3	163,754	0.5	8.95	1,466
4	85,101	0.5	10.85	923
Total			19.8	
	Final BAF& Fish Intake Term (All Zones Combined) -		**2,389**	

* - This proportion based upon data from the PSU study that indicated that 42.6% of fish consumedhas been assumed to be 50% for each trophic level.
was channel catfish or carp while 42.0% of fish consumed was white perch or striped bass. Therefore, equal proportions from each trophic level was used in the calculation.

ZONE 2

Trophic Level	Trophic Level BAF	Proportion of Fish Intake*	Trophic Level Fish Intake (g/day)	BAF& Fish Intake Term
3	158,075	0.5	8.75	1,383
4		0.5	8.75	
Total			17.5	
	Final BAF& Fish Intake Term (Zone 2)-		**1,383**	

ZONE 3

Trophic Level	Trophic Level BAF	Proportion of Fish Intake*	Trophic Level Fish Intake (g/day)	BAF& Fish Intake Term
3	296,851	0.5	8.75	2,597
4	201,740	0.5	8.75	1,765
Total			17.5	
	Final BAF& Fish Intake Term (Zone 3)-		**4,363**	

ZONE 4

Trophic Level	Trophic Level BAF	Proportion of Fish Intake*	Trophic Level Fish Intake (g/day)	BAF& Fish Intake Term
3	354,434	0.5	8.75	3,101
4	234,713	0.5	8.75	2,054
Total			17.5	
	Final BAF& Fish Intake Term (Zone 4)-		**5,155**	

ZONE 5

Trophic Level	Trophic Level BAF	Proportion of Fish Intake*	Trophic Level Fish Intake (g/day)	BAF& Fish Intake Term
3	371,205	0.5	8.75	3,248
4	264,473	0.5	8.75	2,314
Total			17.5	
	Final BAF& Fish Intake Term (Zone 5)-		**5,562**	

Final BAF Calculation Using Spring & Fall Data

Mean of Fall & Spr original	Mean of Fall & Spr revised	Mean of Fall & Spr revised*	Mean of Fall & Spr revised**
3,637	2,935	1,510	1,481
2,569	1,896	762	832
6,206	**4,830**	**2,271**	**2,313**

*** - Using %lipid values of 3.87% for trophic level 3 and 2.48% for trophic level 4 for consumed fish**

**** - Using %lipid values for consumed fish as above, and PSU data for consumption rate and proportion of trophic level consumed.**