UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

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OFFICE OF THE DIRECTOR

Dr. Richard A. Eskin, Director
Science Services Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Dear ~~Dr.~~ Rich Eskin:

The U.S. Environmental Protection Agency (EPA) Region III is pleased to inform you that we are approving the Total Maximum Daily Loads (TMDLs) for polychlorinated biphenyls (PCBs) in the tidal Potomac and Anacostia Rivers and their tidal tributaries. The final PCB TMDLs were submitted for EPA review and approval by the Interstate Commission on the Potomac River Basin (ICPRB) on behalf of the District of Columbia Department of the Environment and the Maryland Department of the Environment by letter dated September 27, 2007. The ICPRB transmittal also included individual TMDL transmittal letters from the District of Columbia Department of the Environment (dated September 24, 2007) and the Maryland Department of the Environment (dated September 28, 2007). It was noted in the transmittal letter that the Virginia Department of Environmental Quality (VADEQ) also participated in the development of the TMDL and have requested that the Virginia Water Control Board at its next meeting on October 25, 2007 approve the submittal of this TMDL to EPA. The Virginia Water Control Board, did in fact, approve the submittal of the TMDL to EPA and the VADEQ officially transmitted (by fax) their concurrence with the Virginia portion of the TMDL to EPA by letter dated October 25, 2007.

These TMDLs were established in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act (CWA) to address impairments of water quality to the tidal segments of the Potomac and Anacostia River and their tidal tributaries. The impaired waters were identified on the District's 303(d) lists of impaired waters in 1996 and 1998, the State of Maryland's 2006 303(d) list of impaired waters and the Commonwealth of Virginia 303(d) list of impaired waters in the 2006. These segments were identified as failing to meet the fish consumption use due to elevated levels of PCBs in fish tissue.

A total of twenty eight (28) impaired water body segments in the tidal waters in Maryland, the District of Columbia and Virginia are addressed by this TMDL, four of which are Maryland impaired water body segments. The objectives of the PCB TMDLs are 1) to ensure that the fish consumption use is protected in each of the impaired water bodies and 2) to ensure that the Virginia, Maryland and District of Columbia's numerical water quality criteria for PCBs for the protection of public health are achieved in their respective portions of the watershed.

In accordance with Federal regulations at 40 CFR §130.7 and EPA policy, a TMDL must comply with the following requirements: (1) be designed to attain and maintain the applicable water quality standards, (2) include a total allowable loading and as appropriate, wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources, (3) consider the impacts of background pollutant contributions, (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated), (5) consider seasonal variations, (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality), and (7) be subject to public participation. The PCB TMDLs for the tidal Potomac and Anacostia Rivers and their tidal tributaries watersheds satisfies each of these requirements. A copy of the EPA Decision Rationale for approval of these TMDLs is enclosed.

If you have any questions or comments concerning this letter, please do not hesitate to contact me or have your staff contact Mr. Thomas Henry, our Region III TMDL Program Manager at (215) 814-5752.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Carlton Haywood, ICPRB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Decision Rationale
Total Maximum Daily Loads
For Polychlorinated Biphenyls (PCBs)
Tidal Potomac & Anacostia River Watershed
in the District of Columbia, Maryland and Virginia

Approved

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Jon M. Capacasa, Director
Water Protection Division

Date: October 31, 2007

Decision Rationale
Total Maximum Daily Loads
For Polychlorinated Biphenyls (PCBs)
Tidal Potomac & Anacostia River Watershed
in the District of Columbia, Maryland and Virginia

Executive Summary

I. Introduction

The Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for those water bodies that will not attain water quality standards after application of technology-based and other required controls. A TMDL sets the quantity of a pollutant that may be introduced into a waterbody without causing a violation of the applicable water quality standards. EPA's regulations define a TMDL as the sum of the waste load allocations (WLAs) assigned to point sources, the load allocations (LAs) assigned to nonpoint sources and natural background, and a margin of safety. The TMDL is commonly expressed as:

$$TMDL = WLAs + LAs + MOS$$

Where:	WLA	=	waste load allocation
	LA	=	load allocation
	MOS	=	margin of safety

II. Summary

This document sets forth the United States Environmental Protection Agency's (EPA) rationale for approving the TMDLs for polychlorinated biphenyls (PCBs) in the tidal Potomac and Anacostia Rivers and their tidal tributaries. The TMDLs were submitted to EPA by the Interstate Commission on the Potomac River Basin (ICPRB) on behalf of the District of Columbia Department of the Environment, the Maryland Department of the Environment and the Virginia Department of Environmental Quality. A total of twenty eight (28) impaired water body segments in the tidal waters in Maryland, the District of Columbia and Virginia are addressed by this TMDL. The objectives of the PCB TMDLs are 1) to ensure that the fish consumption use is protected in each of the impaired water bodies and 2) to ensure that the Virginia, Maryland and District of Columbia's numerical water quality criteria for PCBs for the protection of public health are achieved in their respective portions of the watershed. The endpoint of the TMDL (the one that requires the most stringent reduction in PCB loads from the significant sources) is the fish tissue concentration of PCBs that does not exceed each State's concentration threshold for issuing a fish consumption advisory. The spatial domain considered for the calculation of the TMDLs is the entire tidal Potomac and Anacostia Rivers and their tidal tributaries, which includes the waters of Maryland, the District of Columbia and Virginia. The TMDL addresses human health concerns relative to the consumption of PCB contaminated fish from the tidal waters that are the subject of this study.

The allocations established in this TMDL were developed to attain and maintain the water quality standards related to PCBs for the tidal Potomac and Anacostia Rivers and their tidal tributaries in Maryland, the District of Columbia and Virginia. Due to 1) the District of Columbia Court of Appeals decision in Friends of the Earth, Inc (FOE) v. EPA that TMDLs must include daily loads, and 2) the fact that for human health criteria for carcinogens, such as PCBs, the risk is directly proportional to the lifetime average concentration exposure (dose), the allocations in this TMDL are expressed as both annual average loads and daily loads.

The following tables summarize the TMDLs for the for 28 listed impaired water body segments in the tidal waters of the Potomac and Anacostia Rivers in the District of Columbia, Maryland, and Virginia. Table A shows the annual TMDL compared to the baseline (2005) loads for the 28 water quality limited (impaired) segments. Tables B and C show the waste load allocation, load allocation, and margin of safety (MOS) components of the TMDL for the 28 water quality limited segments. Table D shows the waste load allocations for the individual wastewater treatment plants that are affected by the TMDL.

The TMDLs are distributed among: 1) waste load allocations (WLAs) to National Pollutant Discharge Elimination System (NPDES) municipal and industrial point source (PS) discharges, NPDES municipal separate storm sewers (MS4s) and other regulated stormwater (SW), and combined sewer overflows (CSOs) in the District of Columbia (53 overflows) and the City of Alexandria (4 overflows), and 2) load allocations (LAs) to non point sources, tributaries, atmospheric deposition and contaminated sites.

The TMDL includes both an explicit 5% margin of safety as well as an implicit margin of safety to account for any uncertainty in the calculation. The implicit margin of safety results from the conservative assumptions used in estimating loads, and in the process of determining the PCB TMDL.

EPA notes that, for each of the allocation tables, the columns and rows, when added, will not necessarily equal the totals shown on each table. This is due to the fact that each allocation has been rounded to 3 significant digits. As an example, eliminating rounding for the WLAs, LAs and MOS for the Upper Potomac (Table B), the TMDL (right-most column) would be 332.135 and not the 333.0 as shown on Table B. To display numbers with more significant digits than three is to imply a level of accuracy that is not present in the analytical method.

During the review process EPA commented on a minor inconsistency within the document with regards to MOS (Table 4 and 9 of the Final Draft) and requested that the Steering Committee clarify whether an explicit MOS was applied to wastewater treatment plants (WWTPs). The Steering Committee clarified that an explicit MOS was not applied to the WWTPs because there is a qualitative difference in the load estimation methods applied to this specific source category as compared to all other sources. Language in the text and values shown in Table 4 in the final document have been updated to clarify that the explicit MOS was not applied to the WWTP WLA category. EPA concurs with this approach.

Table A Annual Baseline and TMDL PCB loads to each impaired segment

Water Quality Limited Segment	Impairment ref. #[a]	Jurisdiction	Baseline (g/year)	TMDL (g/year)	Reduction
Upper Potomac	1	DC	16700	333	98.0%
Middle Potomac	2	DC	3610	53.7	98.5%
Lower Potomac	3	DC	1880	80.9	95.7%
Upper Anacostia	4	DC	4990	3.74	99.9%
Lower Anacostia	5	DC	2700	4.95	99.8%
Accotink Creek	6	VA	618	49.5	92.0%
Aquia Creek	7	VA	54.3	44.5	18.0%
Belmont Bay	8	VA	41.5	4.84	88.3%
Chopawamsic Creek	9	VA	7.56	5.32	29.6%
Coan River	10	VA	15	6.98	53.5%
Dogue Creek	11	VA	89.2	30.6	65.7%
Fourmile Run	12	VA	193	12.6	93.4%
Gunston Cove	13	VA	43.7	5.62	87.1%
Hooff Run & Hunting Creek	14	VA	480	89.7	81.3%
Little Hunting Creek	15	VA	46.8	15.5	66.9%
Monroe Creek	16	VA	9.35	1.66	82.2%
Neabsco Creek	17	VA	17.4	8.76	49.7%
Occoquan River	18	VA	442	71.1	83.9%
Pohick Creek	19	VA	57.8	22.4	61.2%
Potomac Creek	20	VA	24.1	11.5	52.3%
Potomac River, Fairview Beach	21	VA	11.9	1.50	87.4%
Powells Creek	22	VA	6.57	0.7	89.3%
Quantico Creek	23	VA	22	15.3	30.5%
Upper Machodoc Creek	24	VA	13.9	9.12	34.4%
Tidal Anacostia	25	MD	1970	16.2	99.2%
Potomac River Lower	26	MD	1250	138	89.0%
Potomac River Middle	27	MD	454	56.2	87.6%
Potomac River Upper	28	MD	618	61.7	90.0%
Not Listed waterbodies		ALL	777	350	55.0%
Total all tidal waters[b]		ALL	37143	1510	95.9%

[a] Locations of Water Quality Limited Segments (Impaired Water Bodies) are shown on Figure 1, by reference number.

[b] Not included in this table are changes in the Downstream Boundary with the Chesapeake Bay. There is a net export of PCBs from the Potomac with the Baseline Scenario while there is a net import of PCBs, although at lower concentration with the TMDL scenario (See TMDL Report,Section V(5.2))

Table B Annual TMDL load allocations for each PCB impairment.

All values are expressed to 3 significant digits only. Units are total PCBs in g/year. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

			WLA				LA						
Ref #	Impaired Water body	Juris.	WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA	MOS	TMDL
1	Upper Potomac	DC	0	1.46	0.604	2.07	312	0.141	1.33	0	314	16.6	333.0
2	Middle Potomac	DC	0	7.42	3.58	11.0	34.5	0.843	4.61	0.00063	40.0	2.68	53.7
3	Lower Potomac	DC	30.3	5.41	33.2	68.9	0	0.923	8.59	0	9.51	2.53	80.9
4	Upper Anacostia	DC	0	1.76	0.0562	1.81	0	0.262	1.47	0.0014	1.74	0.187	3.74
5	Lower Anacostia	DC	0	0.612	2.18	2.79	0	0.173	2.52	0	1.91	0.247	4.95
6	Accotink Creek	VA	0	0.0992	0	0.0992	46.1	0.084	0.711	0	46.9	2.47	49.5
7	Aquia Creek	VA	1.06	5.28	0	6.34	21	14.2	0.757	0	36.0	2.17	44.5
8	Belmont Bay	VA	0	0.409	0	0.409	0	1.56	2.63	0	4.19	0.242	4.84
9	Chopawamsic Creek	VA	0	1.35	0	1.35	0	3.54	0.16	0	3.70	0.266	5.32
10	Coan River	VA	0	0	0	0	0	6.06	0.573	0	6.63	0.349	6.98
11	Dogue Creek	VA	0	20.2	0	20.2	0	7.28	1.56	0	8.84	1.53	30.6
12	Fourmile Run	VA	3.54	7.50	0	11.0	0	0.218	0.905	0	1.12	0.454	12.6
13	Gunston Cove	VA	0	0.517	0	0.517	0	0.437	2.73	1.65	4.82	0.281	5.62
14	Hooff Run & Hunting Creek	VA	4.77	13.6	18.5	36.8	45.8	0.452	1.56	0.722	48.6	4.25	89.7
15	Little Hunting Creek	VA	0	10.1	0	10.1	0	3.65	0.925	0	4.58	0.774	15.5
16	Monroe Creek	VA	0.177	0	0	0.177	0	1.06	0.352	0	1.41	0.0742	1.66
17	Neabsco Creek	VA	2.94	3.69	0	6.63	0	1.13	0.716	0	1.84	0.291	8.76
18	Occoquan River	VA	0	2.86	0	2.86	51.3	4.2	8.08	1.18	64.7	3.56	71.1
19	Pohick Creek	VA	5.96	7.58	0	13.5	0	6.35	1.74	0	8.08	0.824	22.4
20	Potomac Creek	VA	0	0.556	0	0.556	0	9.47	0.898	0	10.4	0.577	11.5
21	Potomac River, Fairview Beach	VA	0	0.0183	0	0.0183	0	0.668	0.745	0	1.41	0.0752	1.50
22	Powells Creek	VA	0	0.0675	0	0.0675	0	0.177	0.42	0	0.597	0.035	0.70
23	Quantico Creek	VA	0	0.742	0	0.742	11.4	1.94	0.481	0	13.8	0.765	15.3
24	Upper Machodoc Creek	VA	0.0883	0	0	0.0883	0	8.24	0.34	0	8.58	0.452	9.12
25	Tidal Anacostia	MD	0	1.13	0	1.13	13.8	0.0404	0.41	0.00124	14.3	0.812	16.2
26	Potomac River Lower	MD	0.064	1.99	0	2.06	0	44.1	79.5	5.12	129	6.89	138.0
27	Potomac River Middle	MD	7.55	3.04	0	10.6	0	13.4	28.8	1.05	43.2	2.43	56.2
28	Potomac River Upper	MD	0	16.4	0	16.4	0	10.6	31.2	0.467	42.2	3.09	61.7
29	Not Listed water bodies	ALL	11.8	18.2	0	30.0	162	119	21.4	0.0979	303	16.9	350.0
	Total all tidal waters	ALL	68.2	132	58.1	258	699	260	206	10.3	1180	71.8	1510

Table B(continued) **Annual TMDL load allocation for Not Listed water bodies.**

All values are expressed to 3 significant digits only. Units are total PCBs in g/year. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

		WLA				LA						
Water body	Juris.	WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA	MOS	TMDL
St Marys River	MD	0	0	0	0	9.01	12.7	3.6	0	25.3	1.33	26.6
Yeocomico River	VA	0	0	0	0	0	7.78	1.6	0	9.37	0.493	9.9
Lower Machodoc	VA	0	0	0	0	0	1.85	0.704	0	2.55	0.134	2.7
Breton Bay	MD	0.245	0	0	0.245	8.87	7.31	1.3	0	17.5	0.921	18.7
Nomini Bay	VA	0	0	0	0	0	7.52	0.884	0	8.4	0.442	8.8
St. Clements Bay	MD	0	0	0	0	7.05	7.49	1.05	0	15.6	0.821	16.4
Wicomico River	MD	0	0.996	0	0.996	66.7	24.3	3.92	0	94.9	5.05	101.0
Mattox Creek	VA	0	0	0	0	0	3.93	0.233	0	4.16	0.219	4.4
Port Tobacco River	MD	0.538	4.09	0	4.63	0	11.1	0.711	0	11.9	0.842	17.4
Nanjemoy Creek	MD	0	1.38	0	1.38	6.08	14.3	1.1	0	21.4	1.2	24.0
Mattawoman Creek	MD	0.179	2.87	0	3.05	36.7	8.55	2.48	0.0979	47.8	2.67	53.5
Piscataway Creek	MD	10.8	7.7	0	18.5	27.9	6.81	2.39	0	37.1	2.36	58.0
Oxon Run	MD / DC	0	1.09	0	1.09	0	0.232	0.803	0	1.04	0.112	2.2
Hull Creek	VA	0	0	0	0	0	3.03	0.405	0	3.43	0.181	3.6
Rosier Creek	VA	0	0	0	0	0	1.87	0.24	0	2.11	0.111	2.2
Wash. Ship Channel	DC	0	0.0824	0	0.0824	0	0.0934	0.779	0	0.873	0.0503	1.0
Total Not Listed water bodies		11.8	18.2	0	30	162	119	22.2	0.0979	303	16.9	350.0

Table C Maximum Daily TMDL load allocations for each PCB impairment.

All values are expressed to 3 significant digits only. Units are mg/day total PCBs. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

			WLA				LA						
Ref #	Impaired Waterbody	Juris.	WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA	MOS	TMDL
1	Upper Potomac	DC	0	197	2.37	199	34200	19.2	3.63	0	34300	1820	36300
2	Middle Potomac	DC	0	1130	1190	2310	4210	126	12.6	0.00173	4350	351	7010
3	Lower Potomac	DC	3090	924	7250	11300	0	153	23.5	0	176	439	11900
4	Upper Anacostia	DC	0	300	26.1	326	0	51.1	4.04	0.00384	55.2	20	401
5	Lower Anacostia	DC	0	125	795	920	0	35.4	4.77	0	40.1	50.5	1010
6	Accotink Creek	VA	0	12.9	0	12.9	5780	11	1.95	0	5790	305	6110
7	Aquia Creek	VA	3.82	642	0	645	3010	1730	2.07	0	4750	284	5680
8	Belmont Bay	VA	0	58.4	0	58.4	0	223	7.22	0	230	15.2	304
9	Chopawamsic Creek	VA	0	143	0	143	0	376	0.439	0	376	27.3	546
10	Coan River	VA	0	0	0	0	0	1050	1.57	0	1050	55.3	1110
11	Dogue Creek	VA	0	2590	0	2590	0	934	4.28	0	938	186	3710
12	Fourmile Run	VA	12.7	1130	0	1140	0	32.8	2.48	0	35.3	61.3	1240
13	Gunston Cove	VA	0	67.3	0	67.3	0	57	7.47	4.53	69	7.18	143
14	Hooff Run & Hunting Creek	VA	17.1	2980	1110	4110	6590	99.4	4.26	1.98	6690	567	11400
15	Little Hunting Creek	VA	0	1300	0	1300	0	469	2.53	0	471	93.2	1860
16	Monroe Creek	VA	0.636	0	0	0.636	0	156	0.964	0	157	8.26	166
17	Neabsco Creek	VA	10.6	510	0	520	0	155	1.96	0	157	35.1	712
18	Occoquan River	VA	0	393	0	393	3180	574	22.1	3.23	3780	220	4390
19	Pohick Creek	VA	21.4	988	0	1010	0	828	4.75	0	832	95.8	1940
20	Potomac Creek	VA	0	93.5	0	93.5	0	1590	2.46	0	1600	89.1	1780
21	Potomac R. Fairview Beach	VA	0	2.76	0	2.76	0	100	2.04	0	102	5.51	110
22	Powells Creek	VA	0	10.3	0	10.3	0	27	1.15	0	28.1	2.02	40.4
23	Quantico Creek	VA	0	113	0	113	1460	297	1.32	0	1750	98.1	1960
24	Upper Machodoc Creek	VA	0.317	0	0	0.317	0	1150	0.931	0	1150	60.5	1210
25	Tidal Anacostia	MD	0	161	0	161	1580	5.78	1.12	0.00338	1590	92.2	1840
26	Potomac River Lower	MD	0.23	254	0	255	0	6420	218	14	6650	363	7270
27	Potomac River Middle	MD	27.1	401	0	428	0	1730	78.9	2.86	1810	116	2350
28	Potomac River Upper	MD	0	2140	0	2140	0	1350	85.4	1.28	1430	188	3760
	Not Listed water bodies	ALL	42.2	2310	0	2360	16500	16800	60.8	0.268	33400	1880	37600
	Total all tidal waters	ALL	3220	19000	10400	32600	76600	36600	564	28.2	114000	7540	154000

Table D Waste Load Allocations for the Wastewater Treatment Plants

Facility	NPDES	Tidal Receiving Waterbody (Ref #)	Baseline Flow (MGD)	Baseline [tPCB] (ng/l)	Baseline tPCB Load (g/year)	TMDL Design Flow (MGD)	TMDL [tPCB] (ng/l)	TMDL tPCB Load (g/year)	Reduction
Blue Plains	DC0021199	[a] DC Lower Potomac (3)	321.20	1.58	701	370.00	0.059	30.2	95.7%
Indian Head	MD0020052	MD Mattawoman Creek	0.30	0.163	0.068	0.5	0.26	0.18	-164.7%
La Plata	MD0020524	MD Port Tobacco Creek	1.17	0.163	0.264	1.5	0.26	0.539	-104.2%
NSWC-Indian Head	MD0020885	[a] MD Potomac Middle (27)	0.45	3.98	2.47	0.5	0.26	0.18	92.7%
Piscataway	MD0021539	MD Piscataway Creek	21.39	0.0554	1.64	30	0.26	10.8	-558.5%
Mattawoman	MD0021865	[a] MD Potomac Middle (27)	9.49	0.0533	0.699	20	0.26	7.18	-927.2%
Leonardtown	MD0024767	MD Breton Bay	0.43	0.376	0.224	0.68	0.26	0.244	-8.9%
NSWC-Dahlgren	VA0021067	[a] MD Potomac Lower (26)	0.28	0.0565	0.0221	0.72	0.064	0.064	-189.6%
Dale City #8	VA0024678	[a] VA Neabsco Creek (17)	2.96	0.0217	0.0887	4.6	0.064	0.407	-358.9%
Dale City #1	VA0024724	[a] VA Neabsco Creek (17)	3.05	0.0446	0.1879	4.6	0.064	0.407	-116.6%
H.L. Mooney	VA0025101	[a] VA Neabsco Creek (17)	12.25	0.107	1.8108	24	0.064	2.12	-17.1%
Arlington	VA0025143	[a] VA Four Mile Run (12)	26.38	0.462	16.8	40	0.064	3.54	78.9%
Alexandria	VA0025160	[a] VA Hooff/Hunting Creek (14)	37.37	0.323	16.7	54	0.064	4.77	71.4%
Noman M. Cole Jr.	VA0025364	[a] VA Gunston Cove (13)	42.11	0.291	16.9	67	0.064	5.92	65.0%
Colonial Beach	VA0026409	VA Mattox Creek	0.83	2.57	2.95	2	0.064	0.177	94.0%
Dahlgren Sanitary Dist.	VA0026514	[a] VA Up Machodoc Creek (24)	0.24	0.359	0.118	1	0.064	0.088	25.4%
Quantico-Mainside	VA0028363	[a] MD Potomac Middle (27)	1.20	0.0674	0.112	2.2	0.064	0.195	-74.1%
Aquia	VA0060968	[a] VA Aquia Creek (7)	4.86	0.0312	0.21	12	0.064	1.06	-404.8%
TOTAL all WWTPs					762.3			68.2	91.1%
These WWTPS are located within tributaries and are not part of the WLA for the TMDL. These calculations are provided for reference only.									
Beltsville USDA East	MD0020842	[a] MD Tidal Anacostia (25)	0.2	0.163	0.045	0.62	0.26	0.223	-395.6%
Beltsville USDA West	MD0020851	[a] MD Tidal Anacostia (25)	0.09	0.163	0.02	0.2	0.26	0.072	-260.0%
UOSA	VA0024988	[a] VA Occoquan River (18)	28.94	0.00217	0.0868	64	0.064	5.66	-6420.7%
The following WWTP was not included in this TMDL study because its current design flow is below the 0.1 MGD minimum that MDE used to determine which facilities to include in the loading model. There are plans, however, to expand this WWTP 0.6 MGD in the future. When that expansion is complete, then the facility will get a WLA of 0.216 g/year, based on the default PCB concentration for MD WWTPs of 0.26 ng/l and design flow of 0.6 MGD.									
Swan Point	MD0057525	[a] MD Potomac Lower (26)	0.067			0.6	0.26	0.216	

[a] The tidal receiving waterbody is currently listed on the Sec.303(d) list as impaired and the number in brackets corresponds to the water body reference number in tables A, B and C.

III. Background

The District of Columbia has listed as impaired due to PCBs, in five defined segments, all of the tidal Anacostia and Potomac Rivers within District borders. These impaired water body segments are designated for Class D (protection of human health related to the consumption of fish and shellfish) beneficial use, which is not supported due to elevated levels of PCBs in fish tissue. These impaired water body segments were initially listed on DC's 303(d) lists in 1996 and 1998 (DC DOH 2006). A PCB TMDL was established for the tidal Anacostia River by the District of Columbia in 2003. The TMDLs developed in the September 28, 2007 TMDL submittal will replace the 2003 tidal Anacostia River PCB TMDL.

The Commonwealth of Virginia has listed in the 2006 305(b)/303(d) Integrated Report 19 tidal embayments of the Potomac River as impaired due to PCBs. These impaired water body segments are designated for the beneficial uses of primary contact recreation, fish consumption, shellfish consumption (from Upper Machodoc Creek to the Potomac mouth), and the aquatic life use (VA DEQ 2006a). The fish consumption use is not supported due to elevated levels of PCBs in fish tissue (VA DEQ 2006b).

The State of Maryland has listed the Potomac River Lower Tidal (basin number 02140101), Potomac River Middle Tidal (basin number 02140102), and Potomac River Upper Tidal (basin number 02140201) and as impaired due to elevated levels of PCBs in fish tissue in 2002. The waters of the tidal Anacostia River watershed were placed on the State's Tidal Potomac PCB TMDL 303(d) List as impaired by toxics (PCBs in fish tissue) in 2006. These waters are designated Use II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007a, b).

In 2000, a consent decree was entered into by the EPA and the U.S. District Court (Kingman Park Civic Association, et al. v. U.S. Environmental Protection Agency, et al, No. 1:98CV00758 (D.D.C.)) that requires the District of Columbia to complete a PCB TMDL for among others, the Potomac River, by September 30, 2007. Maryland and Virginia were required to complete their PCB TMDLs by a later date. Following discussions in 2004 between the District of Columbia, the State of Maryland, the Commonwealth of Virginia, the Interstate Commission on the Potomac River Basin and the EPA, it was agreed that the most logical approach would be to complete a watershed-based PCB TMDL for the entire tidal Potomac River and tidal Anacostia River watershed. The result was a coordinated effort between those parties to develop a PCB TMDL that addresses all of the tidal Potomac River and tidal Anacostia River PCB impairments by the District's September 30, 2007 Court deadline. A tidal watershed-based TMDL was desirable because the impaired water bodies in the three jurisdictions are in such close proximity to each other that flows and loads cross state lines in each direction. Furthermore, a single, joint TMDL would be more cost effective, and the jurisdictions would avoid confusing the public with three independent TMDLs completed on different dates using potentially different models and assumptions, and possibly reaching different conclusions, particularly with respect to PCB loads crossing state lines. It was also expected that cooperation in developing the joint TMDLs would assist in the implementation of the final TMDLs.

The agreement to coordinate the tidal Potomac PCB TMDL led to the creation of a PCB TMDL Steering Committee representing the District of Columbia Department of the Environment (DDOE), the Maryland Department of the Environment (MDE), the Virginia Department of

Environmental Quality (VADEQ), the U.S. Environmental Protection Agency (US EPA), the Interstate Commission on the Potomac River Basin (ICPRB), and the Metropolitan Washington Council of Governments (MWCOG). LimnoTech, through Battelle, Inc., under contract to the EPA, was brought on board as an expert consultant to the Steering Committee to develop the Potomac PCB model and to run the model to evaluate various TMDL scenarios. The Steering Committee is the body through which the jurisdictions resolved issues, reviewed data and model results, and guided the TMDL to completion. The ICPRB was charged with coordinating the activities of the Steering Committee, managing monitoring contracts, collecting and analyzing data, and writing the TMDL document. The ICPRB, on behalf of DC, Maryland and Virginia submitted the TMDLs to EPA.

The Potomac River estuary extends for 117 miles (188 km) from its mouth at Pt. Lookout on the Maryland side and Smith Point on the Virginia side, to its head-of-tide located approximately 0.4 miles (0.64 km) upstream of Chain Bridge in the District of Columbia. In this document, "Potomac River at Chain Bridge," or simply "Chain Bridge," is used to indicate the Potomac River estuary head-of-tide. The surface area of all tidal waters, including Potomac River embayments and the tidal Anacostia River, is about 434 mi2 (1,125 km2). The land area of the lower Potomac River basin, where small rivers, streams, and runoff drain into tidal waters, is 2,537 mi2 (6,572 km2), or approximately 1/6 of the entire basin area (Lippson et al. 1979).
The lower Potomac River basin straddles the fall-line separating the Piedmont and Coastal Plain provinces of the North American East Coast. There are roughly two dozen soil groups represented in the lower basin, with each group comprised of two to three specific soil types. Generally, the nature of the soil is dependent on the underlying geologic material from which it is derived, the processes which have reworked the soil, and the soil's environment. The soils in the Piedmont Province are derived from crystalline rocks, and are on mostly hilly terrain with a dense dendritic stream network. The sediments of the Coastal Plain Province are formed from previous sea level sands, are on flat terrain, and have been reworked by the meandering streams from the west. The nature of the soils also varies roughly from east to west approaching the ocean as the depth to water generally decreases. (Braun et al. 2001, USDA 1994a,b).
The population of the entire Potomac basin is 5.8 million (US EPA 2006), with approximately 4.4 million living in metropolitan Washington, D.C., an area that straddles the lower and upper portions of the basin. Land cover in the lower basin is 30% developed, 15% agricultural, and 55% forested (CBP 2002), however the distribution of these land covers is not even. Figure 2 shows that urban development and population are concentrated around the upper end of the estuary. Developed land in the individual watersheds of the lower basin ranges from greater than 95% to less than 10%.

The sources of PCBs contributing loads to the tidal Potomac River and tidal Anacostia River watershed are numerous and include wastewater treatment plants (WWTPs), combined sewer overflows, municipal separate stormwater systems (MS4), non point source runoff, contaminated sites, atmospheric deposition to the water surface, tributaries to the tidal waters, the upstream boundary (Potomac River at Chain Bridge) and the downstream boundary with the Chesapeake Bay under certain reduced external PCB loading conditions. Of the more than 60 permitted municipal and industrial wastewater treatment plants (WWTPs) in the study area, the 22 WWTPs with the largest flows account for approximately 95% of the total WWTP flow.

Two areas, approximately 1/3 of the District of Columbia and a smaller area in Alexandria, VA, are served by a combined storm and sanitary sewer system. During high precipitation events, when storm water exceeds wastewater treatment plant capacity, the excess flow is diverted to nearby systems (the Anacostia and Potomac rivers, Rock Creek, and Four Mile Run). There are 53 combined sewer overflow (CSOs) outfalls in the District of Columbia and four CSOs in Alexandria.

Twenty one contaminated sites within the study area were identified as possible sources of PCBs by the three state environmental agencies. Of these, 13 sites are located in direct drainage watersheds and eight sites are located within tributary watersheds.

There are over 30 municipal and county level MS4 permits covering the District of Columbia, Maryland and Virginia that are considered to be sources of PCBs that will be impacted by this TMDL.

IV. The PCB TMDL Model for the Potomac River Estuary

As described by LimnoTech (2007), the overall conceptual approach followed for modeling of PCBs in the tidal Potomac River and tidal Anacostia River watershed was an integrated modeling framework that includes hydrodynamics, salinity, sorbent dynamics and PCB transport and fate. The underlying premise is that the transport and fate of toxic chemicals, especially hydrophobic organic chemicals (HOCs) like PCBs, are strongly influenced by sorption to organic carbon and interactions between the water column and sediments. In this framework, separate balances are conducted in series for water, salinity, sorbents (as organic carbon) and PCBs.

Hydrodynamics was implemented for the tidal Potomac and Anacostia rivers using a 1D branched version of DYNHYD5 (Ambrose et al. 1993a) coupled to a modified version of WASP5/TOXI5 (Ambrose et al. 1993b). This implementation closely followed the successful model implementation used for transport and fate of penta-PCBs in the Delaware River Estuary. Results from the Delaware modeling effort were judged acceptable by an expert panel of independent scientists and modeling practitioners, and the model was used to develop a Stage 1 TMDL for PCBs that was established by EPA Regions 2 and 3. Complete results for the Delaware hydrodynamic and salinity models are presented in Delaware River Basin Commission (DRBC) (2003a). Complete results for the organic carbon sorbents and PCB models are presented in DRBC (2003b, 2003c) and summarized in Bierman et al. (2004a, 2004b, 2005).

The water quality model is two dimensional in the horizontal direction and includes 257 discrete spatial segments that encompass the tidal Potomac and Anacostia rivers, their tidal tributaries, and numerous embayments. The model spatial grid includes separate representation of the main channel (Maryland waters), the DC portion of the main channel, and various embayments, tributaries and coves in both Virginia (VA) and Maryland (MD) waters. This detailed spatial representation was required because there are different water quality standards for PCBs in each of these three jurisdictions.

Hydrodynamic and salinity calibrations were conducted for 1996-1997 and 2002-2005. Sorbent and PCB calibrations were conducted for 2002-2005. Sensitivity analyses, diagnostic simulations, mass balance components analysis and an assessment of model calibration results have been performed. The PCB TMDL Steering Committee judged that the model was scientifically credible and acceptable for use in developing the PCB TMDL. EPA also finds that the model is scientifically credible and appropriate for use in developing the PCB TMDL.

V. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance. Based on this review, EPA determined that the following seven regulatory requirements have been met:

1. The TMDLs are designed to implement the applicable water quality standards,

2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations,

3. The TMDLs consider the impacts of background pollutant contributions,

4. The TMDLs consider critical environmental conditions,

5. The TMDLs consider seasonal environmental variations,

6. The TMDLs include a margin of safety,

7. The TMDLs have been subject to public participation.

In addition, EPA considered whether there was reasonable assurance that the Load Allocations for the nonpoint sources in the TMDLs would be met.

VI. Implementation

Neither the Clean Water Act nor the EPA implementing regulations, guidance or policy requires a TMDL to include an implementation plan. EPA therefore does not approve or disapprove implementation plans as part of the TMDL process. EPA offers the following summary of the submitted implementation strategy to acknowledge the important task ahead and for informational purposes.

Several activities are taking place or are planned that will begin the tidal Potomac River and tidal Anacostia River watershed PCB TMDL implementation process. These activities were described in the TMDL report and are summarized here. Further, the District of Columbia, Maryland, Virginia and the ICPRB understand the importance of coordinating the implementation activities for the watershed and intend to work together in that regard.

The states have recognized that progress toward achieving the PCB loading capacity allocations described in the TMDL report will clearly require significant reductions from atmospheric, nonpoint, and point sources of PCBs to the estuary, with an emphasis on those sources with the greatest relative impact on use impairments. The states have further agreed that pursuing an adaptive implementation approach is an appropriate course to follow in implementing the Potomac PCB TMDL, due to the uncertainty associated with the TMDL loading capacity and specific allocation scheme. As described in Wong (2006), adaptive implementation is an iterative implementation process that makes progress toward achieving water quality goals while using new data and information to reduce uncertainty and adjust implementation activities. The focus of this approach is oriented towards increasingly efficient management and restoration and is not generally anticipated to lead to a re-opening of the TMDL, but the TMDL and allocation scenarios can be changed if warranted by new data and information.

Therefore, the states intend to pursue implementation strategies that focus on additional data collection concurrently with activities to reduce PCB loadings. New data and information will be used to steer control strategies aimed to mitigate PCB loadings into the estuary and to better understand and characterize PCB loadings from key sources such as the Chain Bridge boundary, significant tributary contributions, atmospheric deposition as well as point sources.

It should also be noted that the Commonwealth of Virginia has the requirement, specified in the Code of Virginia, Section 62.1-44.19.7. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act, that an implementation plan be developed for each TMDL. The Act requires that the implementation plan include the date of expected achievement of water quality objectives, measurable goals, corrective actions necessary and the associated costs, benefits and environmental impacts of addressing the impairments as well as a description of potential funding sources.

A. Implementation of Waste Load Allocations

Following the approval of the TMDL for the tidal Anacostia and Potomac River estuary, the water quality-based effluent limitations (WQBELs) in NPDES permits that are issued, reissued or modified after the TMDL approval date must be consistent with the WLAs (CFR 2007b).

The states intend to use non-numeric WQBELs in NPDES permits when they are reissued as being consistent with the WLA provisions of the TMDL. This approach will also include additional data collection from selected NPDES permitted facilities to better characterize PCB discharges. Where warranted, non-numeric, BMPs will be implemented. These BMPs are intended to focus on PCB source tracking and elimination at the source, rather than end-of-pipe controls.

The states have agreed that non-storm water permits that are issued, reissued, or modified after the TMDL approval date should incorporate specific provisions for additional data collection. Permits for non-storm water discharges identified as possible significant PCB sources should include the following provisions when reissued or renewed:

- If not already available, congener specific data should be collected using the most current version of EPA Method 1668 (currently, Method 1668, Revision A), or other equivalent methods capable of providing low-detection level, congener specific results, or other methods appropriate under the circumstances which are approved in advance by the permitting authority.
- The frequency of testing, quality control requirements, and specific test conditions such as flow conditions shall be prescribed in the permit.
- Conditions or criteria warranting implementation of BMPs to locate sources of PCBs should be included in the permit.

Regulated stormwater permits and permits for CSO systems also may incorporate BMP based controls as described above. More details of state specific provisions are described in Section VII, "TMDL Implementation and Reasonable Assurance", of the TMDL Report.

B. Implementation of Load Allocations(LAs)

The states will use existing programs and authorities to implement the LA provisions of the TMDL. Nonpoint sources will initially be addressed through the implementation of the existing TMDLs for sediments and nutrients throughout the Potomac watershed. Since PCB concentrations in the water column are linked to TSS concentrations, a reduction in the sediment loads entering the tidal Anacostia and Potomac watersheds are expected to result in lower PCBs concentrations. Also, implementation of BMPs intended to reduce nutrient runoff will contribute to PCBs runoff reductions. Specifically, state efforts relative to the Chesapeake Bay nutrient and sediment tributary strategies will be the initial focus of the PCB non-point source load reduction effort. Reductions in sediment from construction sites and development areas will also be of benefit for reducing PCBs. This will be supplemented by additional monitoring and assessment activities to identify PCB hot spots that may require additional remedial activities.

State specific details of the implementation of the LA provisions of the TMDL are described in Section VII, "TMDL Implementation and Reasonable Assurance", of the TMDL Report.

C. Priorities for data collection

The PCB TMDL Steering Committee, in the TMDL Report, also recommended that the states, along with the ICPRB and the EPA Region III, work together to achieve the following objectives in order to effectively pursue the adaptive implementation approach for the Potomac estuary:

- develop and implement a monitoring strategy to fill key data gaps;
- craft and implement PCB load reduction strategies; and
- develop and implement programs to monitor and report progress toward achieving both PCB load reduction and water quality goals.

Priorities for data collection to better refine PCB loading estimates to the estuary from PCB sources not governed under the NPDES permitting program, and those sources that are outside of the study area (i.e., LA) include, in priority order:

1. Chain Bridge
2. Atmospheric deposition and exchange
3. Other tributaries and direct drainage
4. Downstream boundary with the Chesapeake Bay

The uncertainty associated with the Baseline PCB loadings from these sources warrants additional data collection to enhance the current understanding of PCB loadings and to help characterize the potential source(s) of the PCBs.

Decision Rationale
Total Maximum Daily Loads
For Polychlorinated Biphenyls (PCBs)
Tidal Potomac & Anacostia River Watershed
in the District of Columbia, Maryland and Virginia

I. Introduction

The Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) be developed for those water bodies that will not attain water quality standards after application of technology-based and other required controls. A TMDL sets the quantity of a pollutant that may be introduced into a water body without causing a violation of the applicable water quality standard. EPA's regulations define a TMDL as the sum of the waste load allocations (WLAs) assigned to point sources, the load allocations (LAs) assigned to nonpoint sources and natural background, and a margin of safety.

A TMDL is a written plan and analysis established to ensure that a water body will attain and maintain water quality standards. A TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a margin of safety. TMDLs may be revised in order to address new water quality data, better understanding of natural processes, refined modeling assumptions or analysis and/or reallocation.

This document sets forth the United States Environmental Protection Agency's (EPA) rationale for approving the TMDLs for polychlorinated biphenyls (PCBs) in the tidal Potomac River and tidal Anacostia River and their tidal tributaries in the District of Columbia (DC or the District), Maryland, and Virginia. These TMDLs were established by DC, Maryland and Virginia to address impairment of water quality as identified in the District of Columbia's 1998 Section 303(d) list of impaired waters, Virginia's 2006 Section 303(d) list of impaired waters and Maryland's 2006 Section 303(d) list of impaired waters.

The Interstate Commission on the Potomac River Basin (ICPRB) on behalf of the District of Columbia Department of the Environment and the Maryland Department of the Environment submitted the PCB TMDL report and supporting documentation to EPA for final review by letter dated September 27, 2007. The ICPRB transmittal also included individual TMDL transmittal letters from the District of Columbia Department of the Environment (dated September 24, 2007) and the Maryland Department of the Environment (dated September 28, 2007). It was noted in the transmittal letter that the Virginia Department of Environmental Quality (VADEQ) also participated in the development of the TMDL and have requested that the Virginia Water Control Board at its next meeting on October 25, 2007 approve the submittal of this TMDL to EPA. The Virginia Water Control Board, did in fact, approve the submittal of the TMDL to EPA and the VADEQ officially transmitted (by fax) their concurrence with the Virginia portion of the TMDL to EPA by letter dated October 25, 2007.

The report (TMDL Report) entitled *Total Maximum Daily Loads of Polychlorinated Biphenyls (PCBs) for Tidal Portions of the Potomac & Anacostia Rivers in the District of Columbia, Maryland and Virginia*, dated September, 2007 was received by EPA Region 3 on September 28, 2007. Minor edits to the TMDL Report were provided to EPA on October 23, 2007 and October 29, 2007. The TMDL Report includes five technical appendices (A through E), and uses as its technical basis the report entitled *PCB TMDL Model for the Potomac River Estuary*, prepared by LimnoTech, dated September 28, 2007.

The TMDL report as submitted by the ICPRB on behalf of the District of Columbia Department of the Environment, the Maryland Department of the Environment and the Virginia Department of Environmental Quality establishes TMDLs for PCBs that: 1) ensure that the fish consumption use is protected in each of the impaired water bodies and 2) ensure that the Virginia, Maryland and District of Columbia's numerical water quality criteria for PCBs for the protection of public health are achieved in their respective portions of the watershed.

Based on this review, EPA determined that the following seven regulatory requirements have been met:

1. The TMDLs are designed to implement the applicable water quality standards,

2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations,

3. The TMDLs consider the impacts of background pollutant contributions,

4. The TMDLs consider critical environmental conditions,

5. The TMDLs consider seasonal environmental variations,

6. The TMDLs include a margin of safety,

7. The TMDLs have been subject to public participation.

In addition, EPA considered whether there was reasonable assurance that the Load Allocations for the nonpoint sources in the TMDLs would be met.

II. Impairments Identified by the District, Maryland and Virginia

The District of Columbia has listed as impaired, in five defined segments, all of the tidal Anacostia and Potomac Rivers within District borders. These impaired water body segments are designated for Class D (protection of human health related to the consumption of fish and shellfish) beneficial use, which is not supported due to elevated levels of PCBs in fish tissue. These impaired water body segments were initially listed on DC's 303(d) lists in 1996 and 1998 (DC DOH 2006). A PCB TMDL was established for the tidal Anacostia River by the District of Columbia in 2003. The TMDLs developed in the September 28, 2007 TMDL submittal will replace the 2003 tidal Anacostia River PCB TMDL.

The Commonwealth of Virginia has listed in the 2006 305(b)/303(d) Integrated Report 19 tidal embayments of the Potomac River as impaired due to PCBs. These impaired water body segments are designated for the beneficial uses of primary contact recreation, fish consumption, shellfish consumption (from Upper Machodoc Creek to the Potomac mouth), and the aquatic life use (VA DEQ 2006a). The fish consumption use is not supported due to elevated levels of PCBs in fish tissue (VA DEQ 2006b).

The State of Maryland has listed the Potomac River Lower Tidal (basin number 02140101), Potomac River Middle Tidal (basin number 02140102), and Potomac River Upper Tidal (basin number 02140201) and as impaired due to elevated levels of PCBs in fish tissue in 2002. The waters of the tidal Anacostia River watershed were placed on the State's Tidal Potomac PCB TMDL 303(d) List as impaired by toxics (PCBs in fish tissue) in 2006. These waters are designated Use II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007a, b).

Table 1 lists the PCB impaired water bodies in the study area, which are the focus of the TMDL. Figure 1 is a map showing these PCB impaired water bodies. The numbers shown on Figure 1 correspond to the impaired water body numbers in Table 1.

EPA agrees that the impairments identified by the District, Maryland and Virginia on their respective section 303(d) lists of impaired waters are related to the fish consumption use. EPA finds that these TMDLs designed to restore and maintain the fish consumption uses in the respective state waters are in accordance with the Clean Water Act's Section 303(d) requirements to resolve the listed impairment and achieve the applicable water quality standards. EPA also agrees that the TMDLs, once implemented, will profoundly improve the levels of PCBs in fish of the tidal Potomac and Anacostia Rivers and their tidal tributaries. The TMDL is designed to improve the fish tissue levels of PCBs so that the fish consumption advisories for the impaired water bodies can be eliminated (i.e. so that humans can safely consume fish from the tidal Potomac and Anacostia Rivers and their tidal tributaries). EPA agrees with the recommendation of the PCB TMDL Steering Committee that the states, along with the ICPRB and the EPA Region III, continue to work together to achieve the following objectives in order to effectively pursue the adaptive implementation approach for the Potomac estuary:

- develop and implement a monitoring strategy to fill key data gaps;
- craft and implement PCB load reduction strategies; and
- develop and implement programs to monitor and report progress toward achieving both PCB load reduction and water quality goals.

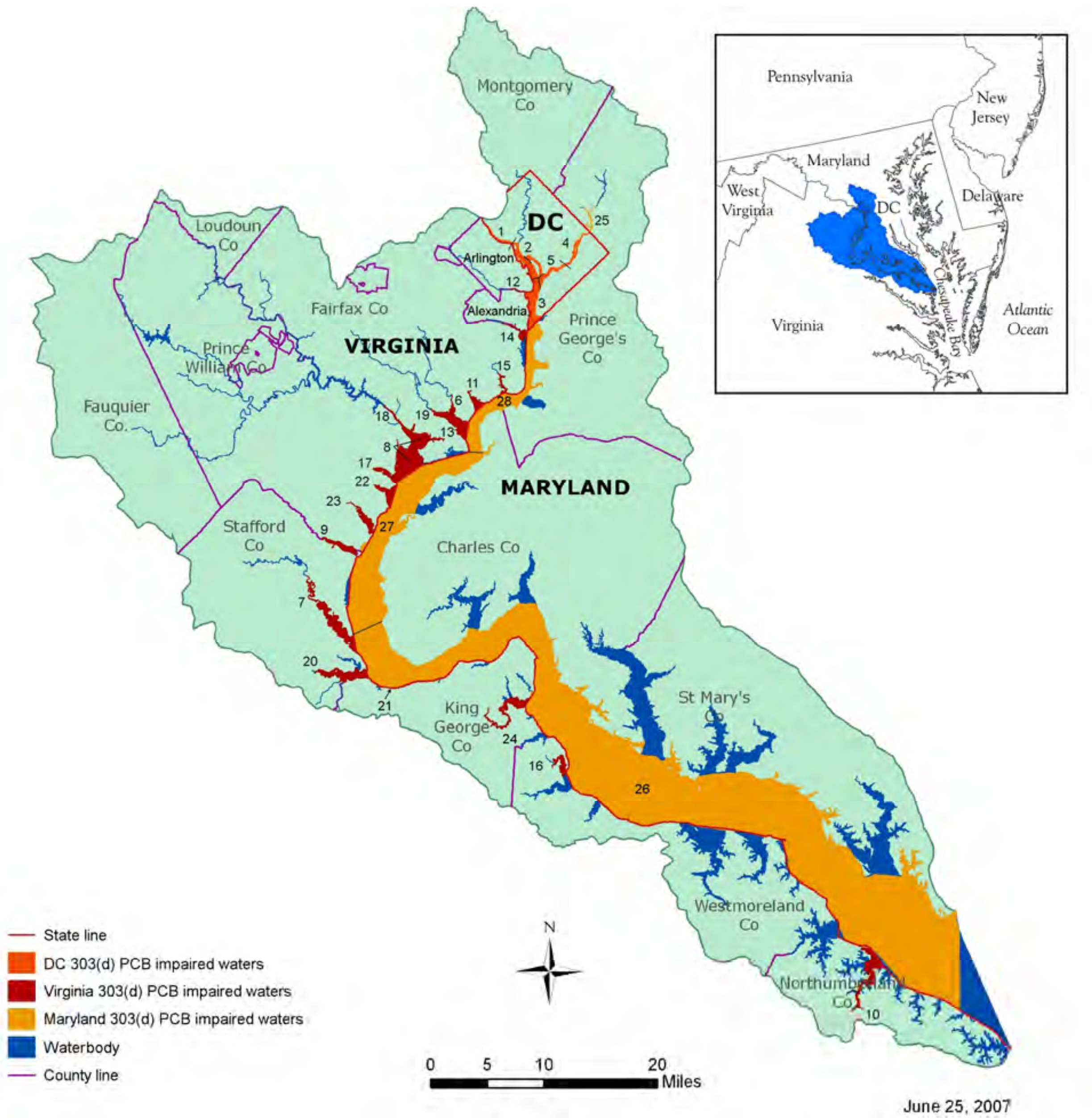
TMDLs are established at a level necessary to attain and maintain existing applicable water quality standards. Water quality standards consist of (1) designated uses, (2) both narrative and numerical criteria and (3) an antidegradation policy. The objective of the PCB TMDL established in the TMDL Report is to ensure that the "fish consumption" use is protected in each of the impaired water bodies. This is done by identifying maximum allowable loads of PCBs that would a) meet the numerical PCB water quality criteria in each state's Water Quality Standards and b) lead to fish tissue PCB concentrations that do not exceed state fish consumption advisory thresholds.

Table 1. PCB Impaired Waterbodies in the tidal Potomac and Anacostia Rivers

	Impaired Waterbody	Jurisdiction	Description
1	Upper Potomac	DC	Potomac River, Chain Bridge to Key Bridge
2	Middle Potomac	DC	Potomac River, Key Bridge to Hains Point
3	Lower Potomac	DC	Potomac River, Hains Point to Wilson Bridge (DC/MD border)
4	Upper Anacostia	DC	Anacostia River, DC/MD border to Pennsylvania Ave. bridge
5	Lower Anacostia	DC	Anacostia River, Pennsyl. Ave. bridge to Potomac River
6	Accotink Bay	VA	In each Virginia embayment, the impairment generally includes all tidal waters within the embayment, from head-of-tide to the Potomac river mainstem. The Potomac River, Fairview Beach, impairment is an area on the mainstem off the beach. See the Virginia 2006 Integrated Assessment report for specific descriptions of the geographic extent of each impairment.
7	Aquia Creek	VA	
8	Belmont Bay/ Occoquan Bay	VA	
9	Chopawamsic Creek	VA	
10	Coan River	VA	
11	Dogue Creek	VA	
12	Fourmile Run	VA	
13	Gunston Cove	VA	
14	Hooff Run & Hunting Creek	VA	
15	Little Hunting Creek	VA	
16	Monroe Creek	VA	
17	Neabsco Creek	VA	
18	Occoquan River	VA	
19	Pohick Creek/Pohick Bay	VA	
20	Potomac Creek	VA	
21	Potomac River, Fairview Beach	VA	
22	Powells Creek	VA	
23	Quantico Creek	VA	
24	Upper Machodoc Creek	VA	
25	* Tidal Anacostia	MD	Tidal Anacostia River, from head-of-tide on NE and NW Branches of the Anacostia to the DC/MD border
26	* Potomac River Lower	MD	Mouth of the Potomac to Smith Point, Charles County
27	*Potomac River Middle	MD	Smith Point to Pomonkey Point, Charles County
28	* Potomac River Upper	MD	Pomonkey Point, to DC/MD line at Wilson Bridge

*Maryland impaired waterbodies are listed by 8 digit watershed Hydrologic Unit Code (HUC). The HUC codes for these impairments are 02140101 (Potomac River Lower), 02140102 (Potomac River Middle), 02140201 (Potomac River Upper), and 02140205 (Anacostia River). For the Potomac River watersheds, only the tidal waters are listed as impaired by PCBs. For the Anacostia River watershed, tidal and nontidal impairments are listed separately. This TMDL study does not address the non-tidal PCB impairment in the Anacostia watershed. By default the Maryland-side Potomac embayments that are within each listed 8-digit watershed are part of the impairment listing. Some of the larger Maryland embayments are parts of different 8-digit watersheds and are not listed as impaired by PCBs. These include: St. Mary's River, Breton Bay, St. Clements Bay, Wicomico River, Port Tobacco River, Nanjemoy Creek, Mattawoman Creek, and Piscataway Creek.

Figure 1. PCB Impaired Waterbodies in the tidal Potomac River Basin



Note: Numbers on map correspond to the impaired waterbody numbers in Table 1.

All three jurisdictions have numerical water quality criteria for total PCBs and, in addition, have established fish tissue concentration thresholds that, when exceeded, may result in fish consumption advisories and 303(d) listings. Fish consumption advisories are health warnings issued to inform the public about the risks of consuming fish contaminated with toxics. These are shown in Table 2 below.

Table 2 State Water Quality Criteria & Fish Tissue Thresholds

	Fish Tissue Impairment Threshold(ppb)	PCB Water Quality Criteria (ng/l)
District of Columbia	20	0.064
Maryland	88	0.64
Virginia	54[1]	1.70

[1] The Virginia Department of Health uses 50 ppb as the fish tissue threshold for establishing consumption advisories

As discussed below, the criteria used as the endpoints for the PCB TMDLs are the fish tissue concentration thresholds that, when exceeded, may result in fish consumption advisories and 303(d) listings. It should be noted that the PCB TMDL Model does not provide a projection of fish tissue PCB concentration, but rather provides a projection of both water column and sediment PCB concentration in response to specified external loads, river flow and ambient water quality conditions. Model results are related to fish tissue concentration through the use of bioaccumulation factors (BAFs). The use of BAFs along with detailed guidance on their use is recommended by EPA in *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA, October 2000).*

BAF is defined as the ratio (in L/kg-tissue) of the concentration of a substance in tissue to its concentration in the ambient water, in situations where both the organism and its food are exposed. The BAF is calculated as:

$$BAF = Ct / Cw$$

where:

Ct = Concentration of the chemical in the specified wet tissue
Cw = Concentration of chemical in water

An alternative approach is the use of a biota-sediment accumulation factor (BSAF) which is conceptually similar to a BAF, except that a BSAF references the biota concentration to the sediment concentration. Both water column accumulation factors (BAFs) and sediment accumulation factors (BSAFs) were developed from field data for fish tissue (2000-2005), water column (2002-2006) and surface sediment PCB concentration (2000-2005) collected from the tidal Potomac River and its tidal tributaries. BAFs and BSAFs were calculated for 24 fish species from the tidal Potomac River watershed. The single target fish species was selected by each state that had the highest BAF and BSAF (excluding striped bass which, because they are migratory, are not representative of PCB conditions solely in the Potomac). Virginia selected gizzard shad, as their target species. Although gizzard shad is not typically consumed by most people, it is specifically mentioned in their impairment listing and was therefore selected. Although gizzard shad have the highest water BAF, there are no samples collected in MD or DC. Therefore those two jurisdictions selected channel catfish. Channel catfish also have the highest SBAF so all three jurisdictions selected that species for calculating the sediment PCB target. The use of this target species approach ensures that if the target species PCB tissue levels meet fish consumption criteria, all other species will have lower PCB levels and also meet consumption criteria.

With the target species BAF and BSAF along with each State's fish tissue impairment thresholds, a *target PCB water column* and *target sediment concentration* can be calculated. The *target water column* and *target sediment concentration* of PCBs is the concentration that produces the fish tissue impairment threshold concentration above which a fish consumption advisory may be issued. Therefore achieving the *target PCB water column* and *target sediment concentration* will result in achievement of the fish consumption use. The results of those calculations are shown below in Table 3.

Table 3 Water Column and Sediment Target Concentrations Compared to State Water Quality Criteria

	Fish Tissue PCB Impairment Threshold (ppb)	**PCB Water Quality Criteria (ng/l)**	**BAF-based Target PCB Water Concentration (ng/l)**	**BSAF-based Target PCB Sediment Concentration (ng/g dry wt.)**
DC	20	0.064	0.059	2.8
Maryland	88	0.64	0.26	12.0
Virginia	54	1.70	0.064	7.6

It is immediately clear that based on the BAF calculation, the State numerical water quality criteria for PCBs is not fully protective of the fish consumption use, particularly for Maryland and Virginia. The District's water quality criteria and *BAF-based target water concentration* differ by only 0.005 ng/l and therefore can be considered approximately the same value. Additional evidence of this for the three states is provided in Figures 7a, b and c and the accompanying discussion on pages 12-15 of the TMDL Report.

The development of the District of Columbia and Maryland's current water quality criteria for PCBs is based on EPA's *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (EPA, October 2000). Virginia's criterion is based on EPA's previous human health methodology document published in 1980. One of the significant revisions in the 2000 methodology is the use of BAFs in the calculation of a criterion, which takes into consideration the uptake and retention of a chemical by an aquatic organism from all surrounding media, rather than a bioconcentration factor (BCF) which refers to the uptake and retention from water only. Absent national BAFs or the preferred site-specific BAF, EPA allows the continued use of the BCFs or field-measured BAFs previously developed using the 1980 methodology. All of the current criteria represented in Table 3 were developed using the EPA recommended BCF for PCBs.

EPA's 2000 methodology provides defaults for all parameters of the equations for calculating human health criteria, but allows for state flexibility depending state-specific considerations or site-specific conditions. Other factors contributing to the differences between the states' current water quality criteria and the BAF-based target water concentration could be based on each state's choice of cancer risk level, fish consumption rate, drinking water consumption rate, exposure duration, and preparation and cooking loss factors used in the criteria calculation.

The use of the PCB TMDL Model along with the *target water column* and *target sediment concentration* of PCBs has shown that achievement of the *target water column concentration* of PCBs also ensures achievement of the *target sediment concentration* of PCBs. Therefore the *target water column concentration* of PCBs, which ensures the appropriate fish tissue PCB levels for consumption are achieved, is the endpoint used for the PCB TMDL.

Because the states have identified PCB impaired water uses (i.e. fish consumption) that cannot be adequately protected or maintained by using the respective state PCB numeric criteria, EPA finds it appropriate that the District, Maryland and Virginia have used their respective fish tissue threshold criteria as the endpoint to use in determining the PCB TMDLs. This endpoint is appropriately related to water column PCB concentration through the use of BAFs and the establishment of the BAF-based *target PCB water column concentration*. Achievement of this endpoint will result in achievement of the fish consumption use as well as state numerical water quality criteria for PCBs. It should be noted, however, that there is a lot of variability (approximately an order of magnitude between the 5%ile and 95%ile of the calculated BAF, by species) in the calculated BAFs for the indicator species used (gizzard shad and channel catfish) to establish the BAF-based *target PCB water column concentration*. EPA therefore recommends that as part of the states' adaptive implementation approach, additional data should be collected and analyzed to refine and/or confirm the indicator species BAFs, as well as to confirm the most appropriate species to use.

III. Allocation Summary

TMDLs are established at a level necessary to attain and maintain existing applicable water quality standards. Water quality standards consist of (1) designated uses, (2) both narrative and numerical criteria and (3) an antidegradation policy. For the tidal Potomac and Anacostia Rivers and their tidal tributaries, the TMDL must be designed to address the use impairment due to PCBs in fish tissue (fish consumption use) as well as achieve the applicable numeric criteria. As discussed in the previous section, the use of BAFs and the establishment of the BAF-based *target PCB water column concentration* will result in achievement of the fish consumption use as well as state numerical water quality criteria for PCBs.

The process used to arrive at the TMDL and its' WLA, LA and MOS components is described on pages 16-38 of the TMDL Report. A brief summary follows. A deliberate process was followed that began with a set of diagnostic model runs that provided a general sense of the overall level of load reductions required to achieve the targets in each impairment and a general sense of the contributions, both magnitude and geographic extent, of each source category to PCB levels. The next step was a series of model runs that adjusted loads from each source category (except WWTPs, see section V 5.1 of the TMDL Report) up or down in order to get as close as possible to the target concentrations in each model segment, without exceeding them. For each model run, selected source loads are reduced, the POTPCB model is run to quasi-equilibrium, and PCB concentrations are compared to water column and sediment targets. The loads specified for each model run were an iterative adjustment informed by the results of previous model runs. This process continued until a set of loads is arrived at that provides quasi-equilibrium PCB concentrations at or below water column and sediment targets in all model segments. For the categories of WWTPs, CSOs and stormwater, the following category specific details apply.

For the WWTPs, the states agreed to apply a consistent approach to all WWTPs for determining waste load allocations when it became clear that significant PCB reductions would be needed for all loading source categories to achieve the BAF-based *target PCB water column concentration*. The waste load allocations were determined by facility design flow multiplied by the applicable jurisdiction BAF-based *target PCB water column concentration*.

Pursuant to EPA Requirements, "Stormwater discharges (called MS4s) that are regulated under Phase I or Phase II of the National Pollutant Discharge Elimination System (NPDES) stormwater program are point sources that must be included in the WLA portion of a TMDL" (US EPA 2002). EPA recognizes that available data and information are usually not detailed enough to determine WLAs for NPDES regulated stormwater discharges on an outfall-specific basis (US EPA 2002). Therefore, in the tidal Potomac watershed, loads from the regulated NPDES stormwater outfalls were expressed as a single stormwater WLA for each impaired water body. The stormwater WLAs are calculated for the direct drainage areas located in the District of Columbia as well as Maryland and Virginia Counties covered by a NPDES stormwater permit. A list of the MS4 permits in the study area are included in Table 10 (pg 29-30) of the TMDL Report.

The DC CSO system and the Alexandria CSO system each were assigned one load reduction (the two systems received different load reductions). The CSO system flows for DC assumes that the DC Long Term Control Plan (LTCP) has been implemented. These flows were obtained from a DC CSO model simulation of 2005 hydrology with the LTCP and represent a reduction in the total CSO flow compared to existing conditions. Flows representing the Alexandria CSO system were the same for the TMDL and Baseline Scenarios because that city's Long Term Control Plan has already been implemented and no changes to the system are planned that would impact flows. For the DC CSO load with the LTCP, model runs indicated that further CSO load reductions would be required to achieve the in stream targets. For the Alexandria CSOs, it was determined that no further reductions would be needed for the TMDL. The WLA to the CSOs is shown in Tables III. B, and III.C.

Tables III. B, III. C and III. D show the annual TMDL allocations, the maximum daily TMDL load allocations and the waste load allocations for the wastewater treatment plants respectively.

Table III. B Annual TMDL load allocations for each PCB impairment.

All values are expressed to 3 significant digits only. Units are total PCBs in g/year. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

Ref #	Impaired Waterbody	Juris.	WLA				LA					MOS	TMDL
			WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA		
1	Upper Potomac	DC	0	1.46	0.604	2.07	312	0.141	1.33	0	314	16.6	333.0
2	Middle Potomac	DC	0	7.42	3.58	11.0	34.5	0.843	4.61	0.00063	40.0	2.68	53.7
3	Lower Potomac	DC	30.3	5.41	33.2	68.9	0	0.923	8.59	0	9.51	2.53	80.9
4	Upper Anacostia	DC	0	1.76	0.0562	1.81	0	0.262	1.47	0.0014	1.74	0.187	3.74
5	Lower Anacostia	DC	0	0.612	2.18	2.79	0	0.173	2.52	0	1.91	0.247	4.95
6	Accotink Creek	VA	0	0.0992	0	0.0992	46.1	0.084	0.711	0	46.9	2.47	49.5
7	Aquia Creek	VA	1.06	5.28	0	6.34	21	14.2	0.757	0	36.0	2.17	44.5
8	Belmont Bay	VA	0	0.409	0	0.409	0	1.56	2.63	0	4.19	0.242	4.84
9	Chopawamsic Creek	VA	0	1.35	0	1.35	0	3.54	0.16	0	3.70	0.266	5.32
10	Coan River	VA	0	0	0	0	0	6.06	0.573	0	6.63	0.349	6.98
11	Dogue Creek	VA	0	20.2	0	20.2	0	7.28	1.56	0	8.84	1.53	30.6
12	Fourmile Run	VA	3.54	7.50	0	11.0	0	0.218	0.905	0	1.12	0.454	12.6
13	Gunston Cove	VA	0	0.517	0	0.517	0	0.437	2.73	1.65	4.82	0.281	5.62
14	Hooff Run & Hunting Creek	VA	4.77	13.6	18.5	36.8	45.8	0.452	1.56	0.722	48.6	4.25	89.7
15	Little Hunting Creek	VA	0	10.1	0	10.1	0	3.65	0.925	0	4.58	0.774	15.5
16	Monroe Creek	VA	0.177	0	0	0.177	0	1.06	0.352	0	1.41	0.0742	1.66
17	Neabsco Creek	VA	2.94	3.69	0	6.63	0	1.13	0.716	0	1.84	0.291	8.76
18	Occoquan River	VA	0	2.86	0	2.86	51.3	4.2	8.08	1.18	64.7	3.56	71.1
19	Pohick Creek	VA	5.96	7.58	0	13.5	0	6.35	1.74	0	8.08	0.824	22.4
20	Potomac Creek	VA	0	0.556	0	0.556	0	9.47	0.898	0	10.4	0.577	11.5
21	Potomac River, Fairview Beach	VA	0	0.0183	0	0.0183	0	0.668	0.745	0	1.41	0.0752	1.50
22	Powells Creek	VA	0	0.0675	0	0.0675	0	0.177	0.42	0	0.597	0.035	0.70
23	Quantico Creek	VA	0	0.742	0	0.742	11.4	1.94	0.481	0	13.8	0.765	15.3
24	Upper Machodoc Creek	VA	0.0883	0	0	0.0883	0	8.24	0.34	0	8.58	0.452	9.12
25	Tidal Anacostia	MD	0	1.13	0	1.13	13.8	0.0404	0.41	0.00124	14.3	0.812	16.2
26	Potomac River Lower	MD	0.064	1.99	0	2.06	0	44.1	79.5	5.12	129	6.89	138.0
27	Potomac River Middle	MD	7.55	3.04	0	10.6	0	13.4	28.8	1.05	43.2	2.43	56.2
28	Potomac River Upper	MD	0	16.4	0	16.4	0	10.6	31.2	0.467	42.2	3.09	61.7
29	Not Listed water bodies	ALL	11.8	18.2	0	30.0	162	119	21.4	0.0979	303	16.9	350.0
	Total all tidal waters	ALL	68.2	132	58.1	258	699	260	206	10.3	1180	71.8	1510

Table III. B (continued) Annual TMDL load allocation for Not Listed waterbodies.

All values are expressed to 3 significant digits only. Units are total PCBs in g/year. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

		WLA				LA						
Waterbody	Juris.	WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA	MOS	TMDL
St Marys River	MD	0	0	0	0	9.01	12.7	3.6	0	25.3	1.33	26.6
Yeocomico River	VA	0	0	0	0	0	7.78	1.6	0	9.37	0.493	9.9
Lower Machodoc	VA	0	0	0	0	0	1.85	0.704	0	2.55	0.134	2.7
Breton Bay	MD	0.245	0	0	0.245	8.87	7.31	1.3	0	17.5	0.921	18.7
Nomini Bay	VA	0	0	0	0	0	7.52	0.884	0	8.4	0.442	8.8
St. Clements Bay	MD	0	0	0	0	7.05	7.49	1.05	0	15.6	0.821	16.4
Wicomico River	MD	0	0.996	0	0.996	66.7	24.3	3.92	0	94.9	5.05	101.0
Mattox Creek	VA	0	0	0	0	0	3.93	0.233	0	4.16	0.219	4.4
Port Tobacco River	MD	0.538	4.09	0	4.63	0	11.1	0.711	0	11.9	0.842	17.4
Nanjemoy Creek	MD	0	1.38	0	1.38	6.08	14.3	1.1	0	21.4	1.2	24.0
Mattawoman Creek	MD	0.179	2.87	0	3.05	36.7	8.55	2.48	0.0979	47.8	2.67	53.5
Piscataway Creek	MD	10.8	7.7	0	18.5	27.9	6.81	2.39	0	37.1	2.36	58.0
Oxon Run	MD / DC	0	1.09	0	1.09	0	0.232	0.803	0	1.04	0.112	2.2
Hull Creek	VA	0	0	0	0	0	3.03	0.405	0	3.43	0.181	3.6
Rosier Creek	VA	0	0	0	0	0	1.87	0.24	0	2.11	0.111	2.2
Wash. Ship Channel	DC	0	0.0824	0	0.0824	0	0.0934	0.779	0	0.873	0.0503	1.0
Total Not Listed water bodies		11.8	18.2	0	30	162	119	22.2	0.0979	303	16.9	350.0

Table III. C   Maximum Daily TMDL load allocations for each PCB impairment.

All values are expressed to 3 significant digits only. Units are mg/day total PCBs. Does not include PCB flux at Downstream Boundary (see TMDL Report, Section V(5.2)).

			WLA				LA						
Ref #	Impaired Waterbody	Juris.	WWTP	Reg. Stormwtr	CSO	Total WLA	Trib.	nonpoint source	Atmos. Dep.	Contam. Sites	Total LA	MOS	TMDL
1	Upper Potomac	DC	0	197	2.37	199	34200	19.2	3.63	0	34300	1820	36300
2	Middle Potomac	DC	0	1130	1190	2310	4210	126	12.6	0.00173	4350	351	7010
3	Lower Potomac	DC	3090	924	7250	11300	0	153	23.5	0	176	439	11900
4	Upper Anacostia	DC	0	300	26.1	326	0	51.1	4.04	0.00384	55.2	20	401
5	Lower Anacostia	DC	0	125	795	920	0	35.4	4.77	0	40.1	50.5	1010
6	Accotink Creek	VA	0	12.9	0	12.9	5780	11	1.95	0	5790	305	6110
7	Aquia Creek	VA	3.82	642	0	645	3010	1730	2.07	0	4750	284	5680
8	Belmont Bay	VA	0	58.4	0	58.4	0	223	7.22	0	230	15.2	304
9	Chopawamsic Creek	VA	0	143	0	143	0	376	0.439	0	376	27.3	546
10	Coan River	VA	0	0	0	0	0	1050	1.57	0	1050	55.3	1110
11	Dogue Creek	VA	0	2590	0	2590	0	934	4.28	0	938	186	3710
12	Fourmile Run	VA	12.7	1130	0	1140	0	32.8	2.48	0	35.3	61.3	1240
13	Gunston Cove	VA	0	67.3	0	67.3	0	57	7.47	4.53	69	7.18	143
14	Hooff Run & Hunting Creek	VA	17.1	2980	1110	4110	6590	99.4	4.26	1.98	6690	567	11400
15	Little Hunting Creek	VA	0	1300	0	1300	0	469	2.53	0	471	93.2	1860
16	Monroe Creek	VA	0.636	0	0	0.636	0	156	0.964	0	157	8.26	166
17	Neabsco Creek	VA	10.6	510	0	520	0	155	1.96	0	157	35.1	712
18	Occoquan River	VA	0	393	0	393	3180	574	22.1	3.23	3780	220	4390
19	Pohick Creek	VA	21.4	988	0	1010	0	828	4.75	0	832	95.8	1940
20	Potomac Creek	VA	0	93.5	0	93.5	0	1590	2.46	0	1600	89.1	1780
21	Potomac R. Fairview Beach	VA	0	2.76	0	2.76	0	100	2.04	0	102	5.51	110
22	Powells Creek	VA	0	10.3	0	10.3	0	27	1.15	0	28.1	2.02	40.4
23	Quantico Creek	VA	0	113	0	113	1460	297	1.32	0	1750	98.1	1960
24	Upper Machodoc Creek	VA	0.317	0	0	0.317	0	1150	0.931	0	1150	60.5	1210
25	Tidal Anacostia	MD	0	161	0	161	1580	5.78	1.12	0.00338	1590	92.2	1840
26	Potomac River Lower	MD	0.23	254	0	255	0	6420	218	14	6650	363	7270
27	Potomac River Middle	MD	27.1	401	0	428	0	1730	78.9	2.86	1810	116	2350
28	Potomac River Upper	MD	0	2140	0	2140	0	1350	85.4	1.28	1430	188	3760
	Not Listed water bodies	ALL	42.2	2310	0	2360	16500	16800	60.8	0.268	33400	1880	37600
	Total all tidal waters	ALL	3220	19000	10400	32600	76600	36600	564	28.2	114000	7540	154000

Table III. D Wasteload Allocations for the Wastewater Treatment Plants

Facility	NPDES	Tidal Receiving Waterbody (Ref #)	Baseline Flow (MGD)	Baseline [tPCB] (ng/l)	Baseline tPCB Load (g/year)	TMDL Design Flow (MGD)	TMDL [tPCB] (ng/l)	TMDL tPCB Load (g/year)	Reduction
Blue Plains	DC0021199	[a] DC Lower Potomac (3)	321.20	1.58	701	370.00	0.059	30.2	95.7%
Indian Head	MD0020052	MD Mattawoman Creek	0.30	0.163	0.068	0.5	0.26	0.18	-164.7%
La Plata	MD0020524	MD Port Tobacco Creek	1.17	0.163	0.264	1.5	0.26	0.539	-104.2%
NSWC-Indian Head	MD0020885	[a] MD Potomac Middle (27)	0.45	3.98	2.47	0.5	0.26	0.18	92.7%
Piscataway	MD0021539	MD Piscataway Creek	21.39	0.0554	1.64	30	0.26	10.8	-558.5%
Mattawoman	MD0021865	[a] MD Potomac Middle (27)	9.49	0.0533	0.699	20	0.26	7.18	-927.2%
Leonardtown	MD0024767	MD Breton Bay	0.43	0.376	0.224	0.68	0.26	0.244	-8.9%
NSWC-Dahlgren	VA0021067	[a] MD Potomac Lower (26)	0.28	0.0565	0.0221	0.72	0.064	0.064	-189.6%
Dale City #8	VA0024678	[a] VA Neabsco Creek (17)	2.96	0.0217	0.0887	4.6	0.064	0.407	-358.9%
Dale City #1	VA0024724	[a] VA Neabsco Creek (17)	3.05	0.0446	0.1879	4.6	0.064	0.407	-116.6%
H.L. Mooney	VA0025101	[a] VA Neabsco Creek (17)	12.25	0.107	1.8108	24	0.064	2.12	-17.1%
Arlington	VA0025143	[a] VA Four Mile Run (12)	26.38	0.462	16.8	40	0.064	3.54	78.9%
Alexandria	VA0025160	[a] VA Hooff/Hunting Creek (14)	37.37	0.323	16.7	54	0.064	4.77	71.4%
Noman M. Cole Jr.	VA0025364	[a] VA Gunston Cove (13)	42.11	0.291	16.9	67	0.064	5.92	65.0%
Colonial Beach	VA0026409	VA Mattox Creek	0.83	2.57	2.95	2	0.064	0.177	94.0%
Dahlgren Sanitary Dist.	VA0026514	[a] VA Up Machodoc Creek (24)	0.24	0.359	0.118	1	0.064	0.088	25.4%
Quantico-Mainside	VA0028363	[a] MD Potomac Middle (27)	1.20	0.0674	0.112	2.2	0.064	0.195	-74.1%
Aquia	VA0060968	[a] VA Aquia Creek (7)	4.86	0.0312	0.21	12	0.064	1.06	-404.8%
TOTAL all WWTPs					762.3			68.2	91.1%
These WWTPS are located within tributaries and are not part of the WLA for the TMDL. These calculations are provided for reference only.									
Beltsville USDA East	MD0020842	[a] MD Tidal Anacostia (25)	0.2	0.163	0.045	0.62	0.26	0.223	-395.6%
Beltsville USDA West	MD0020851	[a] MD Tidal Anacostia (25)	0.09	0.163	0.02	0.2	0.26	0.072	-260.0%
UOSA	VA0024988	[a] VA Occoquan River (18)	28.94	0.00217	0.0868	64	0.064	5.66	-6420.7%
The following WWTP was not included in this TMDL study because its current design flow is below the 0.1 MGD minimum that MDE used to determine which facilities to include in the loading model. There are plans, however, to expand this WWTP 0.6 MGD in the future. When that expansion is complete, then the facility will get a WLA of 0.216 g/year, based on the default PCB concentration for MD WWTPs of 0.26 ng/l and design flow of 0.6 MGD.									
Swan Point	MD0057525	[a] MD Potomac Lower (26)	0.067			0.6	0.26	0.216	

[a] The tidal receiving waterbody is currently listed on the Sec.303(d) list as impaired and the number in brackets corresponds to the water body reference number in tables 1,III B and III C.

IV. Technical Approach

a. Coupled Hydrodynamic/PCB Model

As described by LimnoTech (2007), the overall conceptual approach followed for modeling of PCBs in the tidal Potomac River and tidal Anacostia River watershed was an integrated modeling framework that includes hydrodynamics, salinity, sorbent dynamics and PCB transport and fate. The underlying premise is that the transport and fate of toxic chemicals, especially hydrophobic organic chemicals (HOCs) like PCBs, are strongly influenced by sorption to organic carbon and interactions between the water column and sediments. In this framework, separate balances are conducted in series for water, salinity, sorbents (as organic carbon) and PCBs.

Hydrodynamics was implemented for the tidal Potomac and Anacostia rivers using a 1D branched version of DYNHYD5 (Ambrose et al. 1993a) coupled to a modified version of WASP5/TOXI5 (Ambrose et al. 1993b). This implementation closely followed the successful model implementation used for transport and fate of penta-PCBs in the Delaware River Estuary. Results from the Delaware modeling effort were judged acceptable by an expert panel of independent scientists and modeling practitioners, and the model was used to develop a Stage 1 TMDL for PCBs that was established by EPA Regions 2 and 3. Complete results for the Delaware hydrodynamic and salinity models are presented in Delaware River Basin Commission (DRBC) (2003a). Complete results for the organic carbon sorbents and PCB models are presented in DRBC (2003b, 2003c) and summarized in Bierman et al. (2004a, 2004b, 2005).

The water quality model is two dimensional in the horizontal direction and includes 257 discrete spatial segments that encompass the tidal Potomac and Anacostia rivers, their tidal tributaries, and numerous embayments. The model spatial grid includes separate representation of the main channel (Maryland waters), the DC portion of the main channel, and various embayments, tributaries and coves in both Virginia (VA) and Maryland (MD) waters. This detailed spatial representation was required to represent the 28 impaired waterbody segments as well as the different water quality standards for PCBs in each of the three jurisdictions.

Hydrodynamic and salinity calibrations were conducted for 1996-1997 and 2002-2005. Sorbent and PCB calibrations were conducted for 2002-2005. Selection of these calibration periods was based primarily on availability of data for model inputs and for comparisons of computed results with observations. PCBs are represented in the model as the group of PCB homologs 3-10, or $PCB3^+$. The goal is to select a surrogate for total PCB concentrations that represent all sources, ambient conditions and impacted resources. After a comprehensive, detailed review of the PCB data and considering the goals of the TMDL development project, LimnoTech concluded that PCB3+ is the most reasonable choice, given the site-specific conditions in the Potomac and Anacostia. It should also be noted that PCB3+ (also called Tri+ PCB) had previously been successfully used as the surrogate variable for total PCBs in the transport and fate model for the Upper Hudson River Reassessment (EPA, 2000). The results from that model were approved by an Expert Panel of independent scientists and accepted by EPA Region 2. The PCB Model Report (LimnoTech, 2007) provides a detailed discussion of the rationale for selection of $PCB3^+$ and its use to model PCBs.

Sensitivity analyses, diagnostic simulations, mass balance components analysis and an assessment of model calibration results have been performed.

The assessment of model calibration results was a weight-of-evidence approach that relied on a suite of quantitative metrics and best professional judgment. No single metric provides sufficient information by itself to completely evaluate model calibration results. The metrics used included cumulative frequency distributions, bivariate plots with lines of 1:1 correspondence, regression statistics, time series plots at fixed locations, spatial profiles at fixed points in time, comparisons of seasonal median values, and comparisons of computed first-order PCB loss rates with those from available historical data for PCB body burdens in benthic feeding fish.

Given the model assumptions and the available data for model inputs and ambient water quality conditions, LimnoTech concluded that the results from the calibrated model are a reasonable representation of seasonal magnitudes and spatial distributions for water surface elevation, salinity, organic carbon sorbents, and PCBs in the tidal Potomac and Anacostia Rivers. The PCB TMDL Steering Committee judged that the model was scientifically credible and acceptable for use in developing the PCB TMDL. EPA agrees with this analysis and finds it adequate, reliable, accurate and when used to develop the TMDL, ultimately protective of the fish consumption use.

The TMDL design conditions correspond to quasi-steady state, dynamic equilibrium among external PCB mass loads, and concentrations in the water column and sediments. Under these conditions there is no net flux of PCB across the air-water interface, and both the surface and deep sediment layers are net sinks for PCB, not sources. Diagnostic simulations conducted with the calibrated model indicated that approximately 50 years or more is required to reach the TMDL design conditions of quasi-steady state, dynamic equilibrium.

b. Sources of PCBs to the Tidal Potomac and Anacostia River Watershed

A brief summary of the external load calculations follows. A full description can be found in the TMDL Report, Appendix A.

For modeling purposes, external loads of PCBs to the Potomac River estuary system are grouped into six categories: the non-tidal Potomac River at Chain Bridge, lower basin tributaries, direct drainage, wastewater treatment plants (WWTPs), combined sewer overflows (CSOs), atmospheric deposition to the water surface, and contaminated sites. The Potomac PCB model requires daily input values for flows and carbon and PCBs loads from each of these source categories (LTI 2007).

The WWTP loading category was determined by first identifying all known point sources within the study area that either have or have the potential to discharge PCB loads. This universe of point source discharges was further screened to eliminate the municipal WWTPs with a flow of 0.1 mgd or less, which were judged to contribute "de minimus" PCB loads. The resulting list of WWTPs that are the subject of this TMDL analysis is shown in Table 9 and represent the best available information regarding WWTP point source PCB loads.

Output from the Chesapeake Bay Watershed Model (WM5) was used to estimate daily flows and the associated loads from 17 lower basin tributaries and from direct drainage areas.

Loadings at Little Falls on the Potomac River (referred to as "Chain Bridge") were based on the actual observed US Geologic Survey(USGS) flows and the use of a regression model (Loadest Program, Runkel et al, 2004) to estimate daily carbon and PCB loads. These are the flows and loads from the non-tidal Potomac River, above the study area.

c. Daily Load Determination

Fish tissue concentrations are reflective of exposure to PCBs over extended time periods, ranging from season to annual in length, and human health impacts typically result from PCB exposure of many years duration. Consequently, the TMDL target condition in the POTPCB model for Maryland and Virginia waters was set at the annual median water column concentration at or below the jurisdictional water quality target. District of Columbia regulations require that the highest 30-day average water column concentration not exceed the water quality target. Thus, the 30-day average water column concentration became the TMDL target condition in model segments located in the District. To reflect the loading conditions that result in these annual median or high 30-day average concentrations, the TMDL allocations are expressed as annual loads. In order to comply with current EPA guidance the TMDL is also expressed as a daily load in two ways: a) the average daily loading condition, calculated as the annual load divided by 365; and b) peak one day loads in the TMDL evaluation year. The peak one day loads for tributaries (including the non-tidal Potomac River), direct drainage areas, CSOs, and the Blue Plains WWTP are the annual maximum daily loads in the daily load time series for the TMDL year. For atmospheric deposition and contaminated sites, which are input to the model in equal amounts each day, the peak one day loads were the annual load divided by 365. For WWTPs other than Blue Plains, the peak one day load was calculated as 1.31 times the average daily load. This multiplier was based on a statistical procedure that relates the maximum daily concentration to the long term average. In this case the 1.31 multiplier assumes 2 samples/month are collected. The procedure is explained in the EPA document entitled Technical Support Document (TSD) for Water Quality-based Toxics Control (US EPA 1991). EPA finds this approach credible.

V. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance. EPA's rationale for approval is set forth according to the regulatory requirements listed below. The TMDL is the sum of the individual waste load allocations (WLAs) for point sources and the load allocations (LAs) for nonpoint sources and natural background and must include a margin of safety (MOS). The TMDL is commonly expressed as:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

Where:
WLA = waste load allocation
LA = load allocation
MOS = margin of safety

1. The TMDLs are designed to implement the applicable water quality standards.

Based on the discussion in Sections II and III of this document, EPA finds that this TMDL is consistent with and achieves the District's, Maryland's and Virginia's water quality standards for the fish consumption use as well as the numerical criteria for PCBs .

EPA finds that the allocations were properly developed to attain and maintain existing applicable water quality standards

2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.

As documented in Tables B, C and D of this decision document and in the TMDL Report, the TMDLs include the total allowable load and the individual waste load allocations and load allocations.

EPA finds the proposed TMDLs meet the requirement to include total loads as well as wasteload allocations and load allocations.

3. The TMDLs consider the impacts of background pollutant contributions.
All loads of PCBs outside of the modeling domain were considered as background loads to the model. These loads were identified in the allocation tables as allocations to upstream.

EPA finds the proposed TMDLs appropriately considered impacts of background pollutant contributions.

4. The TMDLs consider critical environmental conditions.

The critical conditions used for development of the PCB TMDL were the actual 2005 observed flows and environmental conditions. This hydrology approximates the harmonic mean flow calculated from the long term period of record, as discussed in Section IV of this document. The use of the harmonic mean flow as the design condition is recommended by EPA when considering human health criteria for carcinogens, such as PCBs (EPA 1991). Selection of 2005 as the design year is described in Appendix C of the TMDL Report.

EPA finds the proposed TMDLs meet the requirement to consider the critical environmental conditions.

5. The TMDLs consider seasonal environmental variations.

Seasonality is captured through the use of 2005 as the hydrologic design year, and the use of daily surface flows and loads of total suspended solids and particulate carbon from 2005 as baseline conditions for development of the TMDL. In addition, the cumulative frequency distribution of the daily flows for 2005 closely resembles the cumulative frequency distribution for the long term period of record. These design year conditions were cycled through the PCB Model with the external PCB loading scenarios being evaluated until dynamic equilibrium conditions are achieved. Selection of 2005 as the hydrologic design year is described in Appendix C of the TMDL Report.

EPA finds the proposed TMDLs meet the requirement to consider seasonal environmental variations.

6. The TMDLs include a margin of safety.

The CWA and EPA's TMDL regulations require TMDLs to include a margin of safety (MOS) to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the TMDL and its allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS. The *TMDL for PCBs for tidal Portions of the Potomac & Anacostia Rivers in the District of Columbia, Maryland and Virginia* includes both an explicit MOS of 5% as well as an implicit MOS as documented on page 18 of the TMDL Report.

EPA finds the proposed TMDLs meet the requirement to include a margin of safety.

7. The TMDLs have been subject to public participation.

The draft TMDL for 28 Polychlorinated Biphenyl (PCB) impairments in the tidal Potomac and Anacostia Rivers was made available for public review on July 17, 2007 by the District of Columbia Department of the Environment (DDOE), Maryland Department of the Environment (MDE), and Virginia Department of Environmental Quality (VADEQ). Announcements were placed in the Virginia electronic Town Hall (public register), the District of Columbia public register, and local newspapers in Maryland, and distributed via e-mail to "TMDL interest groups" by each jurisdiction. The documents were placed in local libraries in Maryland and the District of Columbia and posted on the ICPRB website http://www.potomacriver.org/water_quality/pcbtmdl.htm. Notices and links to the ICPRB webpage were placed on VADEQ and MDE websites. The draft TMDL also was distributed on CD-ROMs at public meetings, one in each jurisdiction plus one for the Technical Advisory Committee, held July 17-19, 2007. An Addendum to the draft TMDL was released on August 8, and the comment period extended to August 23, 2007. A total of 95 written comments were received from 17 agencies or organizations. Detailed responses to those comments were prepared by the Steering Committee and are contained in the *Response to Comment Document for the Tidal Potomac PCB TMDL* (September, 2007), submitted to EPA with the TMDL Report. The Steering Committee carefully considered the comments in preparing the final tidal Potomac PCB TMDL report

EPA finds the proposed TMDL meets the requirement to provide adequate opportunity for public participation.

VI. There is reasonable assurance that the proposed LAs can be met.

The TMDL report provides an adequate discussion of practicable implementation measures and strategies for achieving the TMDLs' nonpoint source allocations. The TMDL report notes that the nonpoint source reductions can be achieved by application of best management practices (BMPs). The states will use existing programs and authorities to comply with the LA provisions of the TMDL. Nonpoint sources will initially be addressed through the implementation of the existing TMDLs for sediments and nutrients throughout the Potomac watershed. Since PCB concentrations in the water column are linked to TSS concentrations, a reduction in the sediment loads entering the tidal Anacostia and Potomac watersheds are expected to result in lower PCBs concentrations. Also, implementation of BMPs intended to reduce nutrient runoff will contribute to PCBs runoff reductions. Specifically, state efforts relative to the Chesapeake Bay nutrient and sediment tributary strategies will be the initial focus of the PCB non-point source load reduction effort. Reductions in sediment from construction sites and development areas will also be of benefit for reducing PCBs. This will be supplemented by additional monitoring and assessment activities to identify PCB hot spots that may require additional remedial activities.

State specific details of the implementation of the LA provisions of the TMDL are described in Section VII, "TMDL Implementation and Reasonable Assurance", of the TMDL Report and are briefly summarized in the following.

A District of Columbia

The District of Columbia has several programs in place to control the effects of storm water runoff and promote nonpoint source pollution prevention and control. For the Anacostia watershed, the District is addressing toxics and legacy contaminant issues through the Anacostia Watershed Restoration Committee, whose goal is to coordinate efforts to improve water quality in the Anacostia Watershed. Significant resources have been spent over the last several years in identifying and characterizing toxic pollutants, including PCBs in the Anacostia and Potomac rivers. A number of steps have been taken to deal with the problem, including sediment capping pilot projects in the Anacostia River.

In addition to its responsibilities under the MS4 NPDES permit to implement a stormwater management plan (SWMP) to control the discharge of pollutants from separate storm sewer outfalls, DC is also implementing a nonpoint source management plan through its Nonpoint Source Management and Chesapeake Bay Implementation programs. The District has several well-established programs to draw upon, including the Erosion and Sedimentation Control Amendment Act of 1994 and DC Law 5-188 (Storm Water Management Regulations – 1988) of The District of Columbia Water Pollution Control Act of 1984, and the Federal Nonpoint Source Management Program (Section 319 of the Clean Water Act).

The District, under authority of various laws, implements a number of action plans that involve reviewing and approving construction plans for stormwater runoff control measures, erosion and sediment control measures, and landscaping; conducting routine and programmed inspections at construction sites; providing technical assistance to developers and DC residents; and conducting investigations of citizen complaints related to drainage and erosion and sediment control. In conjunction with regulatory activities, voluntary programs are implemented through the Nonpoint Source Management and Chesapeake Bay Implementation programs. It is expected that through implementation of sediment and nutrient control measures sediment-laden pollutants, including PCBs, will also be removed.

B Maryland

Nonpoint sources will initially be addressed through the implementation of the existing TMDLs for sediments and nutrients throughout the Potomac watershed. Since PCBs concentrations in the water column are linked to TSS concentrations, a reduction in the sediment loads entering the tidal Anacostia and Potomac watersheds are expected to result in lower PCBs concentrations. Also, implementation of BMPs intended to reduce nutrient runoff will contribute to PCBs runoff reductions. The following Maryland Department of the Environment (MDE) and Prince George's County watershed restoration activities will be used.

MDE

1. Stormwater Management: In the 2000 Maryland Stormwater Design Manual, MDE requires 80% sediment reduction for new development. For existing development, MDE's NPDES stormwater permits require watershed assessments and restoration based on impervious surface area. Currently, Prince George's County is required to restore 10% of its impervious areas.
2. Sediment and Erosion Control Program: Some local governments have shown the ability to enforce the provisions of their ordinances relating to soil erosion and sediment control. In other cases, the State has retained enforcement responsibilities. MDE conducts periodic reviews of local programs to ensure that implementation is acceptable and it has the authority to suspend delegation and take over any program that does not meet State standards.
3. In 2000, the Maryland DNR initiated the Watershed Restoration Action Strategy (WRAS) Program as one of several new approaches to implementing water quality and habitat restoration and protection. The WRAS Program encouraged local governments to focus on priority watersheds for restoration and protection. Since the program's inception, local governments have received grants and technical assistance from DNR for 25 WRAS projects in which local people identify watershed priorities for restoration, protection, and implementation. MDE has directed the WRAS Program since January 2005. The WRAS project area in Prince George's County, Maryland totals about 86 square miles. In the WRAS, the County has identified and prioritized local restoration and protection needs associated with water quality and habitat (MDE 2005).

Prince Georges County

1. Conducts regular stream assessment monitoring and MS4 monitoring for constituents including TSS.
2. Implements programs of street-sweeping, storm drain-inlet cleaning, and storm pipe cleaning in urban areas.
3. Conducting the Anacostia LID demonstration project, in partnership with the Anacostia Watershed Toxics Alliance, with $1 million in funding from a Congressional appropriation

C Virginia

The Commonwealth of Virginia has the requirement, specified in the Code of Virginia, Section 62.1-44.19.7. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act, that an implementation plan be developed for each TMDL. The Act requires that the implementation plan include the date of expected achievement of water quality objectives, measurable goals, corrective actions necessary and the associated costs, benefits and environmental impacts of addressing the impairments as well as a description of potential funding sources. The implementation plan, when developed will provide the specific details of how the LA component of the TMDL will be implemented. In general, the following existing programs or activities will form the basis of LA implementation.

1. In 2006, the General Assembly passed legislation requiring the Secretary of Natural Resources to develop a plan for the cleanup of the Chesapeake Bay and Virginia's waters (HB 1150). This plan was completed in 2007 (Commonwealth of Virginia 2007). The plan addresses both point and non-point sources of pollution and includes measurable and attainable objectives for water cleanup, attainable strategies, a specified timeline, funding sources, and mitigation strategies. Additionally, challenges to meeting the clean up plan goals (i.e. lack of program funding, staffing needs, monitoring needs) are identified.

2. The Chesapeake Bay Nutrient and Sediment Tributary Strategy, published in January 2005, outlines goals for reducing nutrients and sediment inputs to the Chesapeake Bay (Commonwealth of Virginia 2005). As PCBs cling to the organic carbon on sediments, efforts to meet tributary strategy sediment goals will also be beneficial to reducing PCBs, and vise-versa.

3. Reductions in sediment from construction sites and development areas will also be of benefit for reducing PCBs. The Virginia Erosion and Sediment Control and Virginia Stormwater Management Programs – administered by the Department of Conservation and Recreation and delegated to local jurisdictions – provides the framework for implementing sediment reduction BMPs throughout localities.

EPA anticipates that the funding will continue to be provided under Section 319 of the CWA for nonpoint source control.

VII. Implementation

Neither the Clean Water Act nor the EPA implementing regulations, guidance or policy requires a TMDL to include an implementation plan. These activities were described in the TMDL report and are summarized here. However, several activities are taking place or are planned that will begin the tidal Potomac River and tidal Anacostia River watershed PCB TMDL implementation process. Further, the District of Columbia, Maryland, Virginia and the ICPRB understand the importance of coordinating the implementation activities for the watershed and intend to work together in that regard.

The states have recognized that progress toward achieving the PCB loading capacity allocations described in the TMDL report will clearly require significant reductions from atmospheric, nonpoint, and point sources of PCBs to the estuary, with an emphasis on those sources with the greatest relative impact on use impairments. The states have further agreed that pursuing an adaptive implementation approach is an appropriate course to follow in implementing the Potomac PCB TMDL, due to the uncertainty associated with the TMDL loading capacity and specific allocation scheme. As described in Wong (2006), adaptive implementation is an iterative implementation process that makes progress toward achieving water quality goals while using new data and information to reduce uncertainty and adjust implementation activities. The focus of this approach is oriented towards increasingly efficient management and restoration and is not generally anticipated to lead to a re-opening of the TMDL, but the TMDL and allocation scenarios can be changed if warranted by new data and information.

Therefore, the states intend to pursue implementation strategies that include additional data collection concurrently with activities to reduce PCB loadings. New data and information will be used to steer control strategies aimed to mitigate PCB loadings into the estuary and to better understand and characterize PCB loadings from key sources such as the Chain Bridge boundary, significant tributary contributions, atmospheric deposition as well as point sources.

It should also be noted that the Commonwealth of Virginia has the requirement, specified in the Code of Virginia, Section 62.1-44.19.7. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act, that an implementation plan be developed for each TMDL. The Act requires that the implementation plan include the date of expected achievement of water quality objectives, measurable goals, corrective actions necessary and the associated costs, benefits and environmental impacts of addressing the impairments as well as a description of potential funding sources .

A Implementation of Waste Load Allocations

Following the approval of the TMDL for the tidal Anacostia and Potomac River estuary, the water quality-based effluent limitations (WQBELs) in NPDES permits that are issued, reissued or modified after the TMDL approval date must be consistent with the WLAs (CFR 2007b).

The states intend to use non-numeric WQBELs in certain NPDES permits reissued hereafter consistent with the WLA provisions of the TMDL. This approach will include additional data collection from selected NPDES permitted facilities to better characterize PCB discharges. Where warranted, non-numeric, BMPs will be implemented. These BMPs are intended to focus on PCB source tracking and elimination at the source, rather than end-of-pipe controls.

The states have agreed that non-storm water permits that are issued, reissued, or modified after the TMDL approval date should incorporate specific provisions for additional data collection. Permits for non-storm water discharges identified as possible significant PCB sources should include the following provisions when reissued or renewed:

- If not already available, congener specific data should be collected using the most current version of EPA Method 1668 (currently, Method 1668, Revision A), or other equivalent methods capable of providing low-detection level, congener specific results, or other methods appropriate under the circumstances which are approved in advance by the permitting authority.
- The frequency of testing, quality control requirements, and specific test conditions such as flow conditions shall be prescribed in the permit.
- Conditions or criteria warranting implementation of BMPs to locate sources of PCBs should be included in the permit.

Regulated stormwater permits and permits for CSO systems also may incorporate BMP based controls as described above and additional state specific provisions as described in Section VII, "TMDL Implementation and Reasonable Assurance", of the TMDL Report.

B Implementation of Load Allocations(LAs)

The states will use existing programs and authorities to comply with the LA provisions of the TMDL. Nonpoint sources will initially be addressed through the implementation of the existing TMDLs for sediments and nutrients throughout the Potomac watershed. Since PCB concentrations in the water column are linked to TSS concentrations, a reduction in the sediment loads entering the tidal Anacostia and Potomac watersheds are expected to result in lower PCBs concentrations. Also, implementation of BMPs intended to reduce nutrient runoff will contribute to PCBs runoff reductions. Specifically, state efforts relative to the Chesapeake Bay nutrient and sediment tributary strategies will be the initial focus of the PCB non-point source load reduction effort. Reductions in sediment from construction sites and development areas will also be of benefit for reducing PCBs. This will be supplemented by additional monitoring and assessment activities to identify PCB hot spots that may require additional remedial activities.

State specific details of the implementation of the LA provisions of the TMDL are described in Section VII, "TMDL Implementation and Reasonable Assurance", of the TMDL Report.

C Priorities for data collection

The PCB TMDL Steering Committee, in the TMDL Report, also recommended that the states, along with the ICPRB and the EPA Region III, work together to achieve the following objectives in order to effectively pursue the adaptive implementation approach for the Potomac estuary:

- develop and implement a monitoring strategy to fill key data gaps;
- craft and implement PCB load reduction strategies; and
- develop and implement programs to monitor and report progress toward achieving both PCB load reduction and water quality goals.

Priorities for data collection to better refine PCB loading estimates to the estuary from PCB sources not governed under the NPDES permitting program, and those sources that are outside of the study area (i.e., LA) include, in priority order:

1. Chain Bridge
2. Atmospheric deposition and exchange
3. Other tributaries and direct drainage
4. Downstream boundary with the Chesapeake Bay

The uncertainty associated with the Baseline PCB loadings from these sources warrants additional data collection to enhance the current understanding of PCB loadings and to help characterize the potential source(s) of the PCBs.