



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

Richard Eskin, Ph.D., Director  
Technical and Regulatory Service Administration  
Maryland Department of the Environment  
1800 Washington Blvd., Suite 540  
Baltimore, Maryland 21230-1718

MAR 22 2011

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Loads (TMDLs) of Polychlorinated Biphenyls in the Sassafras River, Oligohaline Segment, Cecil and Kent Counties, Maryland*. The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated September 28, 2009, for review and approval by EPA. Also, based on EPA's comments, MDE sent a final revised TMDL report on March 4, 2011. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) List. The Sassafras River, Oligohaline Segment, (MD-SASOH) was included on Maryland's Section 303(d) List as impaired by: nutrients (1996), sediments (1996 – later changed to a total suspended solids (TSS) listing), and polychlorinated biphenyls (PCBs) in fish tissue (2002). This TMDL addresses the PCBs impairment only.

In accordance with Federal regulations at 40 CFR §130.7, 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 for point sources and load allocations 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. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the PCBs TMDL for the Sassafras River, Oligohaline Segment, satisfy each of these requirements.

As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL wasteload allocation pursuant to 40 CFR §122.44 (d)(1)(vii)(B). Please submit all such permits to EPA for review as per EPA's letter dated October 1, 1998.

If you have any questions or comments concerning this letter, please do not hesitate to contact María García, at 215-814-3199.

Sincerely,

*Signed* *Jon M. Capacasa*

Jon M. Capacasa, Director  
Water Protection Division

Enclosure

cc: Lee Currey, MDE-TARSA  
Melissa Chatham, MDE-TARSA



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**Decision Rationale**  
**Total Maximum Daily Loads of**  
**Polychlorinated Biphenyls in the Sassafras River**  
**Oligohaline Segment, Cecil and Kent Counties**  
**Maryland**

Signed  
Jon M. Capacasa, Director  
Water Protection Division

Date: 3-22-11

**Decision Rationale**  
**Total Maximum Daily Loads**  
**Polychlorinated Biphenyls in Sassafras River, Oligohaline Segment**  
**Cecil and Kent Counties, Maryland**

**I. Introduction**

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those waterbodies identified as impaired by the State where technology based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a Margin of Safety (MOS), that may be discharged to a waterbody without exceeding water quality standards.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for total polychlorinated biphenyls (tPCB) in the Sassafras River Oligohaline segment (also referred to as the Sassafras River embayment). The TMDL was established to address impairments of water quality, caused by tPCB in fish tissue, as identified in Maryland's 2002 Section 303(d) List for water quality limited segments. The Maryland Department of the Environment (MDE) submitted the report, *Total Maximum Daily Loads of Polychlorinated Biphenyls in the Sassafras River, Oligohaline Segment, Cecil and Kent Counties, Maryland*, dated September 2009, to EPA for final review on September 28, 2009. Based on EPA's comments, MDE sent a final revised TMDL report to EPA for review and approval on March 4, 2011. The TMDL in this report addresses the tPCB impairment in the Sassafras River, Oligohaline segment, as identified on Maryland's Section 303(d) List. The Integrated Report Assessment Unit Identification for the Sassafras River, Oligohaline segment, is MD-SASOH.

EPA's rationale is based on the TMDL Report and information contained in the computer files provided to EPA by MDE. EPA's review determined that the TMDLs meet the following seven regulatory requirements pursuant to 40 CFR Part 130.

1. The TMDL is designed to implement applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. The TMDL has been subject to public participation.

In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

## II. Summary

The TMDL specifically allocates the tPCB loading to the Sassafras River, Oligohaline segment watershed. There are four permitted point sources of tPCB that are included in the WLA. The fact that the TMDL does not assign WLAs to any other sources in the watershed should not be construed as a determination by either EPA or MDE that there are no additional sources in the watershed that are subject to the NPDES program. In addition, the fact that EPA is approving this TMDL does not mean that EPA has determined whether some of the sources discussed in the TMDL, under appropriate conditions, might be subject to the NPDES program. The annual average TMDL and Maximum Daily Load (MDL) for tPCB are presented in Tables 1 and 2, respectively. The TMDLs include an upstream load generated from Delaware. Individual annual and maximum daily WLAs for permitted point sources are provided in Table 3. Note that the MDLs were developed based on EPA guidance and the methods used are specific to each source as described in Appendix F of the TMDL document.

**Table 1. Sassafras River, Oligohaline Segment Watershed Annual Average TMDL (grams/year)**

TMDL	LA		+	WLA			+	MOS
	LA <sub>DE</sub> <sup>(1)</sup>	+		LA	+	NPDES Stormwater WLA		
1,112.6	2.6	+	996.2	+	0.5	+	2.0	111.3
	Upstream Load Allocation		Sassafras River Oligohaline Segment TMDL Allocation (998.7)					

<sup>(1)</sup> Although the upstream load is reported here as a single value, it could include point and nonpoint sources.

<sup>(2)</sup> WWTP Loads were considered to be *de minimis*.

**Table 2. Sassafras River Oligohaline Segment Watershed Maximum Daily Load (grams/day)**

MDL	LA		+	WLA			+	MOS
	LA <sub>DE</sub> <sup>(1)</sup>	+		LA	+	NPDES Stormwater WLA		
4.19	0.010	+	3.738	+	0.002	+	0.017	0.419
	Upstream Load Allocation		Sassafras River Oligohaline Segment MDL Allocation (3.757)					

<sup>(1)</sup> Although the upstream load is reported here as a single value, it could include point and nonpoint sources.

<sup>(2)</sup> WWTP Loads were considered to be *de minimis*.

**Table 3. Wasteload Allocations for Permitted Point Sources in the Sassafras River Oligohaline Segment Watershed**

Facility		NPDES Permit Number	MDE Permit Number	Annual Average TMDL (grams/year)	Maximum Daily Load (grams/day)
Betterton WWTP <sup>(1)</sup>		MD0020575		1.96	0.017
Galena WWTP <sup>(1)</sup>		MD0020605		0.08	0.0007
NPDES <sup>(2)</sup> Regulated Stormwater	Cecil County MS4	MDR055500		0.5	0.002
	MDE General Permit to Construct		MDR10		

<sup>(1)</sup> WWTP Loads were considered to be *de minimis*.

<sup>(2)</sup> Although not listed in this table, some individual process water permits for municipal and industrial discharges may also incorporate stormwater requirements. Loads from such facilities as well as from general Phase II state and federal MS4s (e.g., military bases, hospitals, etc.) within the Cecil County portion of the watershed are inherently included as part of the NPDES stormwater WLA.

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically based strategy that considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. The option is always available to refine the TMDL for resubmittal to EPA for approval if environmental conditions, new data, or the understanding of the natural processes change more than what was anticipated by the MOS.

### III. Background

The Sassafras River watershed is located in Cecil and Kent Counties, with the eastern most portion of the watershed extending through Delaware. It drains into the Chesapeake Bay. The tidal portion of the watershed extends as far east as its intersection with Route 301. The tidal range is 1.6 feet (0.49 meters (m)) based on the United States National Oceanic and Atmospheric Administration tidal station in Betterton, Maryland. The depths of the river range from about 6 inches (0.15 m) in the headwaters to greater than 35 feet (11 m) in the middle of the river. The widths vary from 400 feet (122 m) at the headwaters of the tidal embayment to 6,560 feet (2,000 m) at the mouth (MDE 2002).

There are no Tier II (i.e., high quality) stream segments (Benthic Index of Biotic Integrity/Fish Index of Biotic Integrity aquatic health scores > 4 – scale 1 to 5) located within the watershed requiring the implementation of Maryland’s antidegradation policy procedures (COMAR 2007d; MDE 2009c). The total population in the Maryland portion of the Sassafras River watershed is approximately 10,000 (US Census Bureau 2000).

The entire Sassafras River watershed stretches over approximately 97 square miles (252 kilometers (km<sup>2</sup>)). The tidal portion of the river is approximately 16 miles (26 km) in length. The watershed is predominately rural in nature consisting of 28.54% forest and 45.92% agricultural land.

MDE has identified the waters of the Sassafras River Oligohaline segment (Integrated Report Assessment Unit Identification: MD-SASOH) on the State's Integrated Report as impaired by the following pollutants (listing year in parentheses): nutrients (1996), sediments (1996 – later changed to a total suspended solids (TSS) listing), and polychlorinated biphenyls (PCBs) in fish tissue (2002). A phosphorus TMDL was approved by EPA in 2002 to address the 1996 nutrients listing. The TSS listing was moved from Category 5 of the Integrated Report (waterbody is impaired, does not attain the water quality standard, and a TMDL is required) to Category 2 (waterbody is meeting some (in this case TSS-related) water quality standards, but with insufficient data to assess all impairments) in the 2008 Integrated Report. This TMDL addresses the PCBs impairment only.

The Maryland water quality regulations state that all surface waters of Maryland shall be protected for water contact recreation, fishing, and protection of aquatic life and wildlife (COMAR 2007a). The specific designated use for Sassafras River Oligohaline segments is Use II – Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007b). The Sassafras River Oligohaline segment (MD-SASOH) is identified as impaired by PCBs on the State's Integrated Report based on fish tissue PCB data from MDE's monitoring program that exceeded the tPCB fish tissue listing threshold of 39 nanograms/gram (ng/g, ppb) -- wet weight (MDE 2008, 72-74).

CWA Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the State where technology based and other required controls do not provide for attainment of water quality standards. The tPCB TMDL submitted by MDE is designed to allow for the attainment of the Sassafras River, Oligohaline segment watershed's designated uses and to ensure that there will be no tPCB impacts affecting aquatic health in the watershed. Refer to Tables 1 and 2 above for a summary of allowable loads.

For this TMDL analysis, the Sassafras River, Oligohaline segment was divided into eight segments and the watershed into 14 subwatersheds. To establish baseline and allowable pollutant loads for this TMDL, a tidally averaged multi-segment one-dimensional transport model was applied to simulate the tPCB dynamic interactions between the water column and bottom sediments within the Sassafras River embayment and the Chesapeake Bay. In general, tidal waters are exchanged through their connecting boundaries. Within the Sassafras River embayment, the dominant processes affecting the transport of PCBs throughout the water column include: the tide-induced dispersion and concentration gradient between the Bay and the embayment, fresh water discharge, the atmospheric exchange due to volatilization and deposition, and the exchange with the bottom sediments (through diffusion, resuspension, and settling). Burial to the deeper inactive layers and the exchange with the water column (through diffusion, resuspension, and settling) are the dominant processes affecting the transport of PCBs in the bottom sediments.

Both point and nonpoint sources were identified as contributing tPCB loads to the Sassafras River embayment. Nonpoint sources include:

- *Chesapeake Bay (Tidal Influence)*. Based on the tPCB concentrations measured at the mouth of the Sassafras River and the dispersion coefficient calculated and calibrated from the available salinity data, the Chesapeake Bay tPCB Baseline Load

of 5,133.2 g/year is one of the major sources of tPCBs to the Sassafras River embayment. Analysis has shown that tPCB concentrations in the Upper Chesapeake Bay are decreasing at a rate of 6.5% per year (Ko and Baker 2004). This rate was applied in the model to account for the expected temporal changes in tPCB concentrations at the Sassafras River embayment boundary.

- *Bottom Sediments (Resuspension and Diffusion).* Because PCBs tend to bind to sediments, a large portion of the tPCB loads delivered to the embayment from various sources will quickly end up in the bottom sediments. This accumulation of PCBs can subsequently become a significant source of PCBs to the water column in the embayment. Based on the measured tPCB concentrations in the water column and bottom sediments, the Bottom Sediment tPCB Baseline Load of 4,496.1 g/year is one of the major sources of tPCBs to the Sassafras River embayment.
- *Atmospheric Deposition.* The TMDL analysis accounts for both atmospheric deposition and volatilization. The observed annual atmospheric tPCB loading to the entire surface of the Chesapeake Bay is approximately  $38 \pm 7$  kg/year (Leister and Baker 1994). Based on the Chesapeake Bay surface area of  $1.15 \times 10^{10}$  m<sup>2</sup> and Sassafras River embayment surface area of  $3.568 \times 10^7$  m<sup>2</sup>, the estimated direct tPCB atmospheric deposition to the surface of the Sassafras River embayment is 117.9 g/yr. The watershed runoff calculation (see below) accounts for the atmospheric deposition load to the watershed land surface.
- *Watershed Runoff:* The Total Watershed tPCB Baseline Load of the Sassafras River was estimated by multiplying the mean ambient water column tPCB concentration (0.33 ng/L) observed at the nontidal watershed stations by the average watershed stream flow. Using the 20-year monthly mean flows at the United States Geological Survey (USGS) station located at New Castle County, Delaware (USGS 01483200) and Kent County, Maryland (USGS 01493500), and the ratio of the Sassafras River watershed area to the USGS station drainage area, the Sassafras River watershed average stream flow was estimated to be equal to 2.7 m<sup>3</sup>/s (95 cfs). The average stream flow was then distributed between Delaware (0.25 m<sup>3</sup>/s) and Maryland (2.45 m<sup>3</sup>/s), according to their respective areas, and used to calculate the watershed tPCB baseline loads (Delaware Load: 2.6 g/yr; Maryland Load: 25.5 g/yr).

Point sources include: two wastewater treatment plant (WWTP), and NPDES Regulated Stormwater discharges. One of the WWTPs was monitored for the discharge of tPCBs and the baseline tPCB loads were based on the permit design flow. The tPCB concentration for the other facility was estimated as the median tPCB concentration of 31 samples from 13 WWTPs monitored by MDE in the Chesapeake Bay watershed. The total tPCBs baseline loads for these two facilities is 2.0 g/yr. MDE estimated pollutant loadings from NPDES regulated stormwater areas based on urban land use classification within the watershed. The NPDES regulated load was estimated by multiplying the proportion of the CBP P5 urban land area that is considered regulated out of the total watershed land use area (1.8%) by the total Maryland Watershed Baseline load (25.5 g/year) giving a load of 0.5 g/year

The average observed tPCB concentrations in each segment were used as the model inputs representing baseline (2006) conditions. In instances where PCB data were not available for a specific segment, the average concentration from the adjacent segments was used. Based on the available literature, the TMDL methodology assumes that on average the tPCB



concentrations at the Sassafras open boundary with the Bay are decreasing at a rate of 6.5% per year (Ko and Baker 2004). All other inputs (i.e., fresh water inputs, dispersion coefficients, sediment and water column exchange rates, atmosphere exchange rates, and burial rates) were kept constant.

The model was run for 40,000 days to predict the time needed for the water column tPCB concentration to meet the site-specific tPCB water column TMDL endpoint. The results indicated that when the site-specific water column TMDL endpoint (0.11 ng/L) was met, the site-specific sediment TMDL endpoint (2.34 ng/g) was met as well. Simulation results showed that after 13,996 days (about 38 years) the tPCB water column concentration reached 0.11 ng/L, at which time the sediment tPCB concentration was equal to 2.29 ng/g.

Resuspension and diffusion from the bottom sediments as well as the Chesapeake Bay tidal influence are the two primary sources of tPCB baseline loads resulting in the PCB impairment in the Sassafras River embayment. Attainment of the site-specific tPCB water quality TMDL endpoints will only be possible with significant reduction in these primary loadings, which is expected to take place over time as the Upper Chesapeake Bay concentrations continue to decline resulting also in natural attenuation of tPCB levels in the legacy sediments (i.e., the covering of contaminated sediments with newer, less contaminated materials, flushing of sediments during periods of high stream flow, and biodegradation). Assuming that the tPCB concentrations in the Upper Chesapeake Bay will continue to decline, at or above the current rate, no additional tPCB reductions will be necessary to meet the "fishing" designated use in the Sassafras River embayment.

The tPCB long-term annual average TMDL for the Sassafras River, Oligohaline segment, is 1,112.6 grams/year, which includes a load allocation for subwatersheds located in Delaware (LA<sub>DE</sub>). The LA<sub>DE</sub> (2.6 grams/year) was the same as the baseline Delaware load as no reductions were required as part of the TMDL condition. The TMDL represents an 88.6 percent reduction from the baseline load (9,777.3 grams/year).

#### **IV. Discussion of Regulatory Conditions**

EPA finds that MDE has provided sufficient information to meet all seven of the basic requirements for establishing a tPCB TMDL for the Sassafras River Oligohaline segment watershed. EPA, therefore, approves this tPCB TMDL for the Sassafras River, Oligohaline segment watershed. This approval is outlined below according to the seven regulatory requirements.

##### ***1) The TMDLs are designed to implement applicable water quality standards.***

Water Quality Standards consist of three components: designated and existing uses; narrative and/or numerical water quality criteria necessary to support those uses; and an anti-degradation statement. The specific designated use for Sassafras River, Oligohaline segment, is Use II – Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007b). The State of Maryland adopted three separate water column tPCB criteria: human health criterion for protection of human health associated with consumption of PCB contaminated fish, as well as fresh and salt water chronic tPCB criteria for protection of aquatic life. The Maryland

water column human health tPCB criterion is set at 0.64 nanograms/liter (ng/L, ppt) (COMAR 2007c; US EPA 2006). The Maryland fresh and salt water chronic aquatic life tPCB criteria are set at 14 ng/L and 30 ng/L, respectively (COMAR 2007c; US EPA 2006). A sediment tPCB criterion has not been established within Maryland water quality standards.

The overall objective of the tPCB TMDL is to ensure that the “fishing” designated use in the Sassafras River embayment is protected. MDE evaluates PCB water quality conditions with the use of either the tPCB fish tissue listing threshold (39 ng/g), or the Maryland water column human health tPCB criterion (0.64 ng/L). In order to determine which one of these targets is more environmentally protective, the tPCB fish tissue listing threshold was converted to a corresponding tPCB water column concentration. This was done with the use of a site-specific Adjusted Total Bioaccumulation Factor (Adj-tBAF) of 343,114 L/kg, following the method of the Tidal Potomac River PCB TMDLs (MDE 2007b). Based on this analysis, the water column tPCB target of 0.11 ng/L derived from the tPCB fish tissue listing threshold is more environmentally protective than the Maryland water column human health tPCB criterion of 0.64 ng/L; and, therefore, was applied as the site-specific tPCB water column TMDL endpoint. Similarly, in order to establish whether levels of PCBs in the sediment are protective of the “fishing” designated use, a site-specific tPCB sediment target for the Sassafras River embayment was derived based on the tPCB fish tissue listing threshold. This was done with the use of a site-specific adjusted sediment bioaccumulation factor (Adj-SediBAF) of 16.7 (unitless) following the method of the Tidal Potomac River PCB TMDLs (MDE 2007b). EPA believes the derived tPCB water column and sediment endpoints are reasonable and appropriate for the development of tPCB TMDLs for the Sassafras River Oligohaline segment.

**2) *The TMDLs include a total allowable load as well as individual wasteload allocations and load allocations.***

**Total Allowable Load**

As described above, the allowable load was determined by first estimating a baseline load from current monitoring data. The baseline load was estimated using a tidally averaged multi-segment one-dimensional transport model that was applied to simulate the tPCB dynamic interactions between the water column and bottom sediments within the Sassafras River embayment and the Chesapeake Bay. The TMDL for tPCB was established after running the model for 40,000 days to predict the time needed for the water column tPCB concentration to meet the site-specific tPCB water column TMDL endpoint. The results indicated that when the site-specific water column TMDL endpoint (0.11 ng/L) was met, the site-specific sediment TMDL endpoint (2.34 ng/g) was met as well. The TMDL load is considered the maximum allowable load the watershed can assimilate and still attain water quality standards. The allowable load was reported in units of grams/year for the average annual load and in grams/day for the long term daily load. Expressing TMDLs using these units is consistent with Federal regulations at 40 CFR §130.2(i), which states that *TMDLs can be expressed in terms of either mass per time, or other appropriate measure*. The average annual and long term daily tPCB TMDLs are presented in Tables 1 and 2, respectively.

EPA regulations at 40 CFR §130.2(i) state that *the total allowable load shall be the sum of individual WLAs for point sources, LAs for nonpoint sources, and natural background*

*concentrations.* The TMDL for tPCB for the Sassafras River, Oligohaline segment watershed is consistent with 40 CFR §130.2(i) because the total loads provided by MDE equal the sum of the individual WLAs for point sources and the land based LAs for nonpoint sources.

### Load Allocations

According to Federal regulations at 40 CFR §130.2(g), LAs are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loadings should be distinguished. As described above, bottom sediment, the Chesapeake Bay tidal influence, direct atmospheric deposition to the surface of the embayment, Maryland watershed nonpoint sources, and Delaware upstream sources are the nonpoint sources that are included in the TMDL LA. Table 7, of the TMDL Report, provides a breakdown of the existing average annual tPCB loads from these source categories. In this analysis, the upstream load ( $LA_{DE}$ ) was reported as a single value, but it could include point and nonpoint sources.

### Wasteload Allocations

As indicated in the TMDL Report, there are four permitted point sources regulating the discharge of tPCB in this watershed. These point sources include two active municipal NPDES permitted facilities (Wastewater Treatment Plants (WWTPs)). The WWTP loads were considered to be *de minimis*. Therefore, no appreciable environmental benefit would be gained by reducing this load.

The other permitted point sources are NPDES stormwater permits within the watershed. These permits include the area covered under Cecil County's Phase II jurisdictional MS4 permit, and the state and federal general MS4s, industrial, and construction permits in both counties, collectively termed "Other NPDES Regulated Stormwater." The NPDES Regulated Stormwater WLA constitutes a proportional allocation of the watershed tPCB baseline load to the regulated portion of the CBP P5 urban land use within Cecil County. This NPDES Regulated Stormwater WLA may include any or all of the NPDES stormwater discharges listed above within the Cecil County portion of the watershed. A WLA for NPDES regulated stormwater within the Kent County portion of the watershed was not characterized as part of the analysis because the majority of the urban land use within the Kent County portion of the watershed constitutes unregulated stormwater runoff, and the tPCB loadings from the portion of the CBP P5 urban land use area that is considered regulated is relatively insignificant. Therefore, any tPCB loads associated with the regulated portion of the CBP P5 urban land use within the Kent county portion of the watershed are included as part of the watershed nonpoint source LA. The NPDES Regulated stormwater tPCB baseline load to the Sassafras River embayment was considered to be insignificant relative to the resuspension and diffusion from the bottom sediments and Chesapeake Bay tidal influence. Therefore, no reductions were applied to this source category and the stormwater WLA was set as equivalent to the baseline load.

Federal regulations at 40 CFR §122.44(d)(1)(vii)(B) require that, for an NPDES permit for an individual point source, the effluent limitations must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by

EPA.

There is no expressed or implied statutory requirement that effluent limitations in NPDES permits necessarily be expressed in daily terms. The CWA definition of “effluent limitation” is quite broad (effluent limitation is “any restriction ... on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources...”). See CWA 502(11). Unlike the CWA’s definition of TMDL, the CWA definition of “effluent limitation” does not contain a “daily” temporal restriction. NPDES permit regulations do not require that effluent limits in permits be expressed as maximum daily limits or even as numeric limitations in all circumstances, and such discretion exists regardless of the time increment chosen to express the TMDL. For further guidance, refer to Benjamin H. Grumbles memo (November 15, 2006) titled *Establishing TMDL Daily Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015 (April 25, 2006) and implications for NPDES Permits.*

EPA has authority to object to the issuance of an NPDES permit that is inconsistent with WLAs established for that point source. Based on the foregoing, EPA has determined that the TMDLs are consistent with the regulations and requirements of 40 CFR Part 130.

**3) *The TMDLs consider the impacts of background pollutant contributions.***

The TMDLs consider the impact of background pollutants by considering the tPCB loads from sources such as atmospheric deposition and bottom sediments.

**4) *The TMDLs consider critical environmental conditions.***

EPA regulations at 40 CFR §130.7(c)(1) require TMDLs to account for critical conditions for stream flow, loading, and water quality parameters. The intent of the regulations is to ensure that (1) the TMDLs are protective of human health, and (2) the water quality of the waterbodies is protected during the times when they are most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards<sup>1</sup>. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable worst-case scenario condition. For this TMDL, the critical condition was determined to be associated with the long-term exposure of fish to ambient environmental conditions. Total PCB levels in fish become elevated due to long-term exposure, rather than temporary spikes in water column tPCB concentration. The selection of the average tPCB concentrations within each model segments as representing the baseline conditions adequately considers the impact of seasonal variations and critical conditions on the “fishing” designated use in the Sassafra River embayment.

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<sup>1</sup> EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

**5) *The TMDLs consider seasonal environmental variations.***

Seasonality was considered by using the average tPCB concentrations within each model segments as representing the baseline conditions.

**6) *The TMDLs include a Margin of Safety.***

The requirement for a MOS is intended to add a level of conservatism to the modeling process in order to account for uncertainty. Based on EPA guidance, the MOS can be achieved through two approaches. One approach is to reserve a portion of the loading capacity as a separate term, and the other approach is to incorporate the MOS as part of the design conditions. MDE adopted an explicit MOS of 10 percent of the TMDL condition (111.3 grams/year).

**7) *The TMDLs have been subject to public participation.***

MDE provided an opportunity for public review and comment on the tPCB TMDL for the Sassafras River, Oligohaline segment watershed. The public review and comment period was open from August 6, 2009 through September 4, 2009. MDE received one set of comments. All of the comments were addressed appropriately.

A letter was sent to the U.S. Fish and Wildlife Service pursuant to Section 7(c) of the Endangered Species Act, requesting the Service's concurrence with EPA's findings that approval of this TMDL does not adversely affect any listed endangered and threatened species, and their critical habitats.

**V. Discussion of Reasonable Assurance**

EPA requires that there be a reasonable assurance that the TMDLs can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR §122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA. Furthermore, EPA has the authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for the point source.

As discussed above, resuspension and diffusion from the bottom sediments and the Chesapeake Bay tidal influence have been identified as the two major sources of tPCBs to the Sassafras River embayment. It has been estimated that on average the tPCB concentrations in the Upper Chesapeake Bay are decreasing at a rate of 6.5% per year (Ko and Baker 2004). Given this rate of decline, the tPCB levels in the Sassafras River embayment are expected to decline over time due to natural attenuation, such as the burial of contaminated sediments with newer, less contaminated materials, flushing of sediments during periods of high stream flow, and biodegradation.

Also, MDE has stated that discovering and remediating any existing PCB land sources throughout the Upper Chesapeake Bay watershed via future TMDL development and

implementation efforts will further help to meet water quality goals in the SassafRAS River embayment. They will continue to monitor PCB levels in Maryland fish. This information will be used to evaluate the PCB impairment in the SassafRAS River embayment on an ongoing basis.