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

SEP 3 0 2011

Dear Dr. Rick Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Load (TMDLs) of Sediment in the Little Patuxent River Watershed, Howard and Anne Arundel Counties, Maryland.* The TMDL report was submitted by the Maryland Department of the Environment to EPA for final review on September 27, 2010. Based on EPA's review, a revised TMDL report was submitted on September 15, 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 Maryland Department of the Environment(MDE) has identified the waters of the Little Patuxent River watershed (MD-02131105) on the State's 2008 Integrated Report as impaired by cadmium (1996), nutrients – phosphorus (1996, Centennial Lake – 1998), sediment (1996, Centennial Lake – 1998), and impacts to biological communities (2006) (MDE 2008a). A Water Quality Analysis (WQA) for cadmium was approved by EPA in 2008, and a WQA for eutrophication to address the nutrient (phosphorus) listing was approved by EPA in 2010. A TMDL of phosphorus and sediments for Centennial Lake was approved by the EPA in 2002. In the 2012 Integrated Report, the listing for impacts to biological communities will include the results of a stressor identification analysis. The TMDL in this report addresses only the sediment impairment.

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 nonpoint sources can be reasonably met. The enclosure to this letter describes how the sediment TMDL for the Little Patuxent River watershed satisfies each of these requirements.

As you know, any new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL's 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, Director
Water Protection Division

Enclosure

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

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

Decision Rationale
Total Maximum Daily Loads of
Sediment in
Little Patuxent River Watershed
Howard and Anne Arundel Counties, Maryland

Signed

Jon M. Capacasa, Director
Water Protection Division

Date: 9/30/2011

Decision Rationale
Total Maximum Daily Load of
Sediment in the Little Patuxent River Watershed
Howard and Anne Arundel 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 water quality limited waterbody.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDL for sediment in the Little Patuxent River Watershed. The TMDL was established to address impairments of water quality, caused by sediment, as identified in Maryland's 1996 Section 303(d) List for water quality limited segments. The Maryland Department of the Environment (MDE) submitted the report, *Total Maximum Daily Load of Sediment in the Little Patuxent River Watershed, Howard and Anne Arundel Counties, Maryland,* dated September 2010, to EPA for final review on September 30, 2010. The TMDL in this report addresses the sediment impairment in the Little Patuxent River Watershed as identified on Maryland's Section 303(d) List. The basin identification for the Little Patuxent River Watershed is MD-02131105.

EPA's rationale is based on the TMDL Report, Technical Memorandum *Significant Sediment Point Sources in the Little Patuxent River Watershed, and* Technical Memorandum *Significant Sediment Nonpoint Sources in the Little Patuxent River Watershed,* and electronic files provided by MDE. EPA's review determined that the TMDL meets 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, this TMDL considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

II. Summary

The TMDL specifically allocates the allowable sediment loading to the Little Patuxent River watershed. There are 14 permitted process water point sources and 37 permitted stormwater point sources of sediment which 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 National Pollutant Discharge Elimination System (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 sediment TMDL is presented as an average annual load in tons per year because it was calculated so as to not cause any sediment related impacts to aquatic health. The long term maximum daily sediment TMDL is presented in tons per day. The calculation of the long term maximum daily TMDLs is explained in Appendix C of the TMDL report. The average annual Little Patuxent River Watershed TMDL is summarized in Table 1. The TMDL is the sum of the LAs, NPDES Stormwater WLA, Process Water WLA, and MOS. The LAs include nonpoint source loads generated within the Little Patuxent River Watershed and upstream loads from the Middle Patuxent River watershed. The long term maximum daily TMDL is presented in Table 2. Individual annual and daily WLAs for permitted point sources are provided in Table 3.

Table 1. Little Patuxent River Watershed Average Annual TMDL of Sediment/TSS (ton/yr)

TMDL (ton/yr)	=	**LA**			+	**WLA**			+	**MOS**
		LA_{MP}[1]	+	**LA_{LP}**		**NPDES Stormwater WLA_{LP}**	+	**Process Water WLA_{LP}**		
31,199.8		11,899.1		6,042.1		11,225.8		2,032.8	+	Implicit
		Upstream LA		Little Patuxent River TMDL Contribution						

[1]Although, for the purpose of this analysis, the upstream load is referred to as an LA, it could include loads from upstream point and nonpoint sources from the Middle Patuxent.

Table 2. Little Patuxent River Watershed Maximum Daily Loads of Sediment/TSS (ton/day)

MDL (ton/day)	=	**LA**			+	**WLA**			+	**MOS**
		LA_{MP}[1]	+	**LA_{LP}**		**NPDES Stormwater WLA_{LP}**	+	**Process Water WLA_{LP}**		
1,067.3	=	428.4	+	217.5	+	404.1	+	17.3	+	Implicit
		Upstream LA		Little Patuxent River MDL Contribution						

[1]Although for the purpose of this analysis the upstream loadis referred to as an LA, it could include loads from upstream point and nonpoint sources from the Middle Patuxent.

Table 3. Wasteload Allocations for Permitted Point Sources in the Little Patuxent River Watershed

Permitted Point Source	NPDES Permit Number	TMDL Long-Term Average Annual Load (tons/year)	Maximum Daily Load (tons/day)
Minor Wastewater Facilities[1]	N/A	17.3	0.09
Piney Orchard WWTP	MD0059145	54.72	0.5
Dorsey Run Advanced Wastewater Treatment Plant	MD0063207	91.20	0.8
Little Patuxent Water Reclamation Plant	MD0055174	1,322.4	11.3
U.S. Army -- Fort George G. Meade	MD0021717	205.20	1.8
Patuxent Water Reclamation Facility	MD0021652	342.00	2.9
Anne Arundel County Phase I MS4	MD0068314	2,632.3	94.8
Howard County Phase I MS4	MDR05550	3.609.3	129.9
SHA Phase I MS4	MD0068276	875.8	31.5
"Other NPDES Regulated Stormwater"[2]	N/A	4,108.4	147.9

[1] A complete list of these permitted sources can be found in Table 4 below.

[2] The "Other NPDES Regulated Stormwater" WLA includes sediment loadings from UrbanBarren land use, which represents the permitted construction site WLA within the watershed. A complete list of permitted sources in this category can be found in Table 5 below.

Table 4. Minor Wastewater Facilities

Permit No.	Facility Name
MD0068713	John Ritter Trucking, Inc.
MD0068993	BBSS, Inc. - Turner Pit
MD0000469	Maryland & Virginia Milk Producers
MDG490344	Aggregrate Industries- Crofton
MDG492410	Classic Group
MDG499709	Cunningham Excavating, Inc.
MDG499725	Reliable Contracting Company, Inc. - - Asphalt Div.
MDG499739	Daniel G. Schuster Inc.- Jessup
MDG499860	Lafarge -- Jessup Concrete Plant

Table 5. Other MDE NPDES Regulated Stormwater

Permit No.	Facility Name
02SW0123	ISP PHARMA SYSTEMS
02SW0260	LITTLE PATUXENT WATER RECLAMATION PLANT
02SW0331	DORSEY RUN ADVANCED WASTEWATER
02SW0371	CLEAN HARBORS OF LAUREL, LLC
02SW0544	GIANT OF MARYLAND, LLC - JESSUP
02SW0700	U.S. ARMY - FORT GEORGE G. MEADE
02SW0727	PINEY ORCHARD WWTP
02SW0735	CINDER & CONCRETE BLOCK CORP. – JESSUP

Permit No.	Facility Name
02SW0744	U.S. POSTAL SERVICE - COLUMBIA VMF
02SW0759	PATUXENT WATER RECLAMATION FACILITY
02SW0773	FLINT GROUP NORTH AMERICA LIMITED
02SW0776	FEDEX NATIONAL LTL, INC.
02SW0833	ALLIED SYSTEMS, LTD.
02SW0957	TDS, INC.
02SW0966	AGGREGRATE INDUSTRIES - ANNAPOLIS JUNCTION ASPHALT PLANT
02SW1160	GENERAL ELECTRIC COMPANY
02SW1164	AMTRAK - ODENTON MAINTENANCE OF WAY BASE
02SW1168	UNITED PARCEL SERVICE - JESSUP
02SW1177	ANNE ARUNDEL COUNTY - ODENTON
02SW1197	CG ENTERPRISES, INC.
02SW1203	CON-WAY CENTRAL EXPRESS - XJP
02SW1259	DREYER'S GRAND ICE CREAM
02SW1268	TATE ACCESS FLOORS
02SW1269	NATIONAL DISTRIBUTING COMPANY
02SW1361	D.G.& G, INC. DBA CRAZY RAY'S
02SW1436	HOWARD COUNTY CENTRAL FLEET/GUILFORD SHOP
02SW1439	HOWARD COUNTY CENTRAL FLEET UTILITES SHOP
02SW1441	VEOLIA TRANSPORTATION - SAVAGE
02SW1503	LAUREL BLOCK CORPORATION
02SW1697	TIPTON AIRPORT
02SW1706	WASTE MANAGEMENT OF MARYLAND - ANNAPOLIS JUNCTION TRANSFER STATION
02SW1807	MARYLAND PAVING & SEALANT, INC.
02SW1974	D B CONCRETE CONSTRUCTION, INC
N/A	MDE General Permit to Construct

The TMDL is a written plan 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 Little Patuxent River is a free flowing stream that originates just north of Route 70 near the Howard County Landfill and flows 38 miles in a southeasterly direction until it joins the Patuxent River. The watershed is located in the Patuxent River sub-basin of the Chesapeake Bay watershed within both Howard and Anne Arundel Counties, Maryland, and covers approximately 66,214 acres. There are no "high quality," or Tier II, stream segments located within the watershed requiring the implementation of Maryland's antidegradation policy. Approximately, 0.2 percent of the watershed area is covered by water (i.e., streams ponds, etc.). The total population in the watershed is nearly 266,000 (US Census Bureau 2000).

MDE has identified the waters of the Little Patuxent River watershed on the State's 2008 Integrated Report as impaired by cadmium (1996); nutrients--phosphorus (1996, Centennial Lake--1998); sediment (1996, Centennial Lake--1998); and impacts to biological communities (2006) (MDE 2008a). A Water Quality Analysis (WQA) for cadmium was approved by EPA in 2008, and a WQA for eutrophication to address the nutrient (phosphorus) listing was approved by EPA in 2010. A TMDL of phosphorus and sediments for Centennial Lake was approved by the EPA in 2002. In the 2012 Integrated Report, the listing for impacts to biological communities will include the results of a stressor identification analysis. This TMDL addresses the sediment impairment only.

The designated use of the Little Patuxent River mainstem and its tributaries downstream of Old Forge Bridge is Use I (Water Contact Recreation and Protection of Aquatic Life), upstream of US Route 1 is Use IV-P (Recreational Trout Waters), and in between US Route 1 and Old Forge Bridge is Use I-P (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply) (COMAR 2009a,b,c,d,e,f). The objective of the TMDL is to ensure that there will be no sediment impacts affecting aquatic health, thereby establishing a sediment load that supports the Use I/IV-P/I-P designations for the Little Patuxent River watershed. Currently in Maryland, there are no specific numeric criteria that quantify the impact of sediment on the aquatic life of nontidal stream systems. Therefore, to determine whether aquatic life is impacted by elevated sediment loads, MDE's *Biological Stressor Identification* (BSID) methodology was applied.

The BSID identifies the most probable cause(s) for observed biological impairments throughout Maryland's 8-digit watersheds by ranking the likely stressors affecting a watershed using a suite of physical, chemical, and land use data. The BSID analysis identifies individual stressors (pollutants) as probable or unlikely causes of the poor biological conditions and concludes whether or not these individual stressors or groups of stressors are contributing to the impairment. The BSID analysis has determined that the degradation of biological communities in the Little Patuxent River watershed is strongly associated with urban land use and its concomitant effects. The BSID analysis has determined that the biological impairment in the Little Patuxent River watershed is due in part to flow/sediment related stressors. Specifically, the analysis confirmed that individual stressors within the sediment and habitat parameter groupings were contributing to the biological impairment in the watershed. Overall, sediment and flow

stressors within the sediment and habitat parameter groupings were identified as having a statistically significant association with impaired biological communities at, approximately, 84 percent of the sites with BIBI and/or FIBI scores significantly less than 3.0 throughout the watershed. Since sediment is identified as a stressor to the biological communities in the Little Patuxent River Watershed, a TMDL is required.

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 sediment TMDL submitted by MDE is designed to allow for the attainment of the designated uses and to ensure that there will be no sediment impacts affecting aquatic health in the Maryland 8-digit Little Patuxent River Watershed. Refer to Tables 1 and 2 above for a summary of allowable loads.

For this TMDL analysis, a total of 29 water quality monitoring stations were used to characterize the Little Patuxent River Watershed. The BSID analysis used 13 biological/physical habitat monitoring stations from the Maryland Department of Natural Resources (DNR) and Maryland Biological Stream Survey (MBSS) round two data collected in 2000. Additionally, two biological monitoring stations from the Maryland Core/Trend monitoring network were applied within the TMDL analysis as well.

DNR Core/Trend monitoring data demonstrates that the Little Patuxent River mainstem exhibits good aquatic health conditions. Since the water quality in the mainstem can be classified as good, MDE concluded that the sediment impairment in the Little Patuxent River watershed is restricted to the lower order streams within the watershed. Therefore, sediment reductions have only been applied to the loads within the watershed and not the loads transported from the upstream Middle Patuxent River watershed to the Little Patuxent River mainstem.

The computational framework chosen for the Little Patuxent watershed TMDL was the Chesapeake Bay Program Phase 5.2 (CBP P5.2) watershed model target *edge-of-field* (EOF) land use sediment loading rate calculations combined with a *sediment delivery ratio*. The *edge-of-stream* (EOS) sediment load is calculated per land use as a product of the land use area, land use target loading rate, and loss from the EOF to the main channel. The Little Patuxent River watershed was evaluated using one watershed TMDL segment consisting of three CBP P5.2 model segments. The spatial domain of the CBP P5.2 watershed model segmentation aggregates to the Maryland 8-digit watersheds, which is consistent with the impairment listing.

The nonpoint source and NPDES stormwater baseline sediment loads generated within the Little Patuxent River watershed are calculated as the sum of corresponding land use EOS loads within the watershed and represent a long-term average loading rate. Individual land use EOS loads are calculated as the product of the land use area, land use target loading rate, and loss from the EOF to the main channel. The loss from the EOF to the main channel is the *sediment delivery ratio* and is defined as the ratio of the sediment load reaching a basin outlet to the total erosion within the basin. A *sediment delivery ratio* is estimated from each land use type based on the proximity of the land use to the main channel. Thus, as the distance to the main channel increases, more sediment is stored within the watershed (i.e., *sediment delivery ratio* increases).

In order to quantify the impact of sediment on the aquatic health of the Little Patuxent River watershed, a reference watershed approach was used and resulted in the establishment of a sediment loading threshold for the watershed within the Highland and Piedmont physiographic regions. Nine reference watersheds were selected from the Highland/Piedmont region. To reduce the variability when comparing watersheds within and across regions, the watershed sediment loads are normalized by a constant background condition, the all forested watershed condition. The new normalized load, defined as the *forest normalized sediment load* represents how many times greater the current watershed sediment load is than the all *forested sediment load.* The *forest normalized sediment load* is calculated as the current watershed sediment load divided by the *all forested sediment load.* The reference watershed *forest normalized sediment load* was calculated as 3.3 and 4.2 for the median and 75th percentile, respectively. The 3.3 median value was selected as the *sediment loading threshold* to develop the TMDL as an environmentally conservative approach. The forest *normalized sediment load* for the Little Patuxent River watershed (estimated as 4.0) was calculated using CBP P5.2 land use, to best represent current conditions. A comparison of the Little Patuxent River watershed *forest normalized sediment load* to the *forest normalized reference sediment load* (also referred to as the *sediment loading threshold*) demonstrates that the watershed exceeds the *sediment loading threshold*, indicating that it is receiving loads that are above the maximum allowable load that it can sustain and still meet water quality standards. The allowable load for the impaired watershed is calculated as the product of the *sediment loading threshold* (determined from watersheds with healthy biological community) and the Little Patuxent River *all forested sediment load.*

The current total sediment load from the Little Patuxent River watershed is 37,066.5 tons per year. An overall reduction of 15.8 percent from current estimated loads was required to meet the sediment TMDL allocation of 31,199.8 tons/year, and Maryland's water quality standards. Section 4.0 of the TMDL Report provides a thorough description of the CBP P5.2 model and calculations.

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all seven of the basic requirements for establishing a sediment TMDL for the Little Patuxent River watershed. EPA therefore approves this sediment TMDL for the Little Patuxent River 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 designated use of the Little Patuxent River mainstem and its tributaries downstream of Old Forge Bridge is Use I (Water Contact Recreation and Protection of Aquatic Life), upstream of US Route 1 is Use IV-P (Recreational Trout Waters), and in between US Route 1 and Old Forge Bridge is Use I-P (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply) (COMAR 2009a,b,c,d,e,f). A WQA for cadmium was approved

by EPA in 2008, and a WQA for eutrophication to address the nutrient (phosphorus) listing was approved by EPA in 2010.

Maryland does not currently have numeric criteria for sediments. Therefore, to determine whether aquatic life is impacted by elevated sediment loads, MDE's BSID methodology was applied. The results of the BSID analysis for the Little Patuxent watershed determined that the biological communities are likely impaired due to flow/sediment related stressors. The degradation of biological communities in the watershed is strongly associated with urban land use and its concomitant effects.

Reductions in sediment loads are expected to result from decreased watershed and streambed erosion, which will then lead to improved benthic and fish habitat conditions. Specifically, sediment load reductions are expected to result in an increase in the number of benthic sensitive species present, an increase in the available and suitable habitat for a benthic community, a possible decrease in fine sediment (fines), and improved stream habitat diversity, all of which will result in improved water quality.

The sediment TMDL, however, will not completely resolve the impairment to biological communities within the watershed. Since the BSID watershed analysis identifies other possible stressors (i.e., acute and chronic ammonia toxicity) as impacting the biological conditions, this impairment remains to be fully addressed through the Integrated Report listing process and the TMDL development process, such that all impairing substances identified as impacting biological communities in the watershed are reduced to levels that will meet water quality standards, as established in future TMDLs for those substances.

The objective of this TMDL is to ensure that there will be no sediment impacts affecting aquatic health, thereby establishing a sediment load that supports the Use I/IV-P/I-P designations for the Little Patuxent River watershed. EPA believes this is a reasonable and appropriate water quality goal.

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

Total Allowable Load

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 sediment for the Little Patuxent River 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. Pursuant to 40 CFR §130.6 and §130.7(d)(2), this TMDL and the supporting documentation should be incorporated into Maryland's current water quality management plan.

The long-term average annual TMDL was set at a load 3.3 times the all-forested condition. This load is considered the maximum allowable load the watershed can assimilate and

still attain water quality standards. The sediment TMDL and allocations are presented as mass loading rates of tons per year for the average annual load and tons per day for the long term daily load. Expressing TMDLs as annual and daily mass loading rates 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, toxicity, or other appropriate measure. The average annual and long term maximum daily sediment TMDLs are presented in Tables 1 and 2, respectively.

In order to attain the TMDL loading cap calculated for the watershed, reductions were applied to the only predominant controllable source identified within the watershed. Urban land was identified as the only predominant controllable source in the watershed at 69.3 percent of the total watershed sediment load. Thus, reductions were only applied to this source. Additionally, all urban land in the Little Patuxent River watershed is considered to represent regulated stormwater sources (i.e., all urban stormwater is regulated via a permit). The TMDL (31,199.8 tons/year) represents a total reduction of 15.8 percent.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Little Patuxent River watershed. 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.

Maryland conducted a source assessment in order to estimate the contributions of cropland, extractive land, forest, pasture, and urban to the overall nonpoint source loadings. Table 4 of the TMDL report provides a breakdown of the existing annual sediment load from the five source categories (cropland, pasture, urban, extractive land, and forest). A similar breakdown was developed for the load allocations, which are shown in Table 1of the Technical Memorandum, "Significant Sediment Nonpoint Sources in the Little Patuxent River Watershed" which was submitted as part of the final TMDL report.

Wasteload Allocations

There are 51 permitted point sources in this watershed and the permits can be grouped into two categories, process water and stormwater. There are 14 process water permits and 37 NPDES Phase I or Phase II stormwater permits, including the MDE General Permit to Construct. The WLAs for the process water permit is calculated based on the Total Suspended Sediments (TSS) limits (average monthly or weekly concentration values) and corresponding flow. The total estimated TSS load from all of the process sources are based on current permit limits and is equal to 2,032.8 ton/yr. No reductions were applied to this source, since such controls would produce no discernable water quality benefit when nonpoint sources and regulated stormwater sources comprise greater than 94.2 percent of the total watershed sediment load.

The stormwater permits identified throughout the Little Patuxent River watershed are regulated based on Best Management Practices (BMPs) and do not include TSS limits. In the

absence of TSS limits, the NPDES regulated stormwater load is calculated using CBP P5.2 urban sediment EOF target values. The Little Patuxent River NPDES stormwater WLA is based on reductions applied to the sediment load from the urban land use in the watershed and may include legacy or other sediment sources. Some of these sources may also be subject to controls from other management programs.

See Tables 3 and 4 above for a list of facilities that have been assigned WLAs.

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 express 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. It is expected that MDE will require periodic monitoring of the point source(s), through the NPDES permit process, in order to monitor and determine compliance with the TMDL's WLAs. 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 sediment load from natural sources such as forested land. The CBP P5.2 model also considers background pollutant contributions by incorporating all land uses.

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.[1] 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.

The biological monitoring data used to determine the reference watersheds reflect the impacts of stressors (i.e., sediment impacts to stream biota) over the course of time; and, therefore, depict an average stream condition (i.e., captures all high and low flow events). Since the TMDL endpoint is based on the median of forest normalized loads from watersheds assessed as having good biological conditions (i.e., passing Maryland's biocriteria), by the nature of the biological data described above, it must inherently include the critical conditions of the reference watersheds. Therefore, since the TMDL reduces the watershed sediment load to a level compatible with that of the reference watersheds, critical conditions are inherently addressed.

5) The TMDLs consider seasonal environmental variations.

In the Little Patuxent River watershed sediment TMDL, seasonality is captured in two components. First, it is implicitly included through the use of the biological monitoring data as biological communities reflect the impact of stressors over time, as described above. Second, the MBSS dataset included benthic sampling in the spring (March 1 - April 30) and fish sampling in the summer (June 1 - September 30). Benthic sampling in the spring allows for the most accurate assessment of the benthic population; and, therefore, provides an excellent means of assessing the anthropogenic effects of sediment impacts on the benthic community. Fish sampling is conducted in the summer when low flow conditions significantly limit the physical habitat of the fish community; and it is, therefore, most reflective of the effects of anthropogenic stressors as well.

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 has adopted an implicit MOS for this TMDL. The estimated variability around the reference watershed group used in the analysis accounts for such uncertainty. Analysis of the reference group's forest normalized sediment loads indicates that approximately 75 percent of the reference watersheds have a value of less than 4.2, and that 50 percent of the reference watersheds have a value of less than 3.3. Based on this analysis, the forest normalized reference sediment load was set at the median value of 3.3. This is considered an environmentally conservative estimate, since 50 percent of the reference watersheds have a load above this value, which when compared to the 75 percent value, results in an implicit MOS of approximately 18 percent.

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[1] EPA memorandum regarding EPA Actions to Support High Quality TMDLsfrom Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

7) The TMDLs have been subject to public participation.

MDE provided an opportunity for public review and comment on the sediment TMDL for the Little Patuxent River watershed. The public review and comment period was open from August 19, 2010 through September 17, 2010. MDE received no written comments on this TMDL.

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 that point source.

Maryland has several well established programs to draw upon including the Water Quality Improvement Act of 1998 (WQIA) and the Federal Nonpoint Source Management Program (§319 of the Clean Water Act). Potential funding sources available for local governments for implementation include the State Water Quality Revolving Loan Fund and the Stormwater Pollution Cost Share Program.

Nonpoint source controls to achieve LAs will be implemented in an iterative process that places priority on those sources having the largest impact on water quality, with consideration given to ease of implementation and cost. Potential BMPs for reducing sediment loads and resulting impacts can be grouped into two general categories. The first is directed toward agricultural lands and the second is directed toward urban (developed) lands.

Since urban land was identified as the only predominant controllable source of sediment within the watershed (i.e., 69.3 percent of the total Little Patuxent River Baseline Sediment Load), the entirety of the required sediment reductions within the Little Patuxent River watershed are attributed to urban (developed) land use. The BMPs applicable to reducing urban sediment loads are discussed in detail in Section 5 of the TMDL report. Implementation is expected to occur primarily via the Phase I MS4 permitting process for medium and large municipalities, specifically, in this watershed, the current Anne Arundel County and Howard County Phase I MS4 permits, which requires the jurisdiction to retrofit 10 percent of its existing impervious area within a permit cycle, or five years.

For the implementation of the WLA stormwater component, MDE estimates that future stormwater retrofits will have a 65 percent reduction efficiency for TSS, which is subject to

change over time. Additionally, any new development in the watershed will be subject to the Stormwater Management Act of 2007, and will be required to use environmental site design to the maximum extent practicable.

In summary, through the use of the aforementioned funding mechanisms and BMPs, there is reasonable assurance that this TMDL can be implemented.