UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
3/10/2010

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

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Loads (TMDLs) of Sediment in the Gwynns Falls Watershed, Baltimore City and Baltimore County, Maryland*. The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated September 25, 2009, and was received by EPA for review and approval on September 28, 2009. 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 Gwynns Falls watershed (MD02130905) was included on Maryland's Section 303(d) List as impaired by sediments (1996), nutrients - phosphorus (1996), bacteria (2002), and impacts to biological communities (2002). This TMDL addresses the sediment 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 sediment TMDLs for the Gwynns Falls watershed 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,

/S/

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Nauth Panday, 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 the Gwynns Falls Watershed
Baltimore City and Baltimore County, Maryland

/S/

Jon M. Capacasa, Director
Water Protection Division

Date:3/10/2010

Decision Rationale
Total Maximum Daily Load of
Sediment in the Gwynns Falls Watershed
Baltimore City and Baltimore County, 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 Gwynns Falls 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 Gwynns Falls Watershed, Baltimore City and Baltimore County, Maryland*, dated September 2009, to EPA for final review on September 25, 2009. The TMDL in this report addresses the sediment impairment in the Gwynns Falls watershed as identified on Maryland's Section 303(d) List. The basin identification for the Gwynns Falls watershed is MD02130905.

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 allowable sediment loading to the Gwynns Falls watershed. There are 57 active permitted 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 developed to meet TMDL endpoints under a range of conditions observed throughout the year. The long term daily sediment TMDL is presented in tons per day. The calculation of the long term daily TMDLs is explained in Appendix C of the TMDL report. The average annual and long term daily TMDLs are presented in Tables 1 and 2, respectively. Individual annual and daily WLAs for permitted point sources are provided in Table 3.

Table 1. Gwynns Falls Average Annual TMDL of Sediment/TSS (tons/yr)

TMDL (tons/year)	=	LA	+	WLA			MOS
13,996.2	=	1,759.3	+	NPDES Stormwater WLA		Process Water WLA	Implicit
				12,023.7	+	213.2	
				= 12,236.9			Implicit

Table 2. Gwynns Falls Maximum Daily Load of Sediment/TSS (tons/day)

TMDL (tons/day)	=	LA	+	WLA			MOS
558.7	=	70.4	+	NPDES Stormwater WLA		Process Water WLA	Implicit
				486.5	+	1.82	
				= 488.32			Implicit

Table 3. Wasteload Allocations for Permitted Point Sources in the Gwynns Falls Watershed

Facility	NPDES ID Number	WLA (tons/year)	WLA (tons/day)
Ashburton Water Filtration Plant	MD0003034	212.8	1.813
Arundel Corporation - Delight Quarry	MDG490975	0.046	0.0003
Larry E. Knight, Inc.	MDG499722	0.046	0.0002
S&G Concrete – Grantley	MDG499831	0.228	0.0012
AJO Concrete contracting, Inc.	MDG499866	0.046	0.0002
Other NPDES Regulated Stormwater[1]	N/A	12,023.7	486.5
Baltimore County Phase I MS4	MD0068314		
Baltimore City Phase I MS4	MD0068292		
SHA Phase I MS4	MD0068276		

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

Table 4. Other MDE NPDES Regulated Stormwater

Permit #	Facility
MD0003034	Ashburon Water Filtration Plant
MDG490975	Arundel Corporation – Delight Quarry
MDG499722	Larry E. Knight, Inc.
MDG499831	S&G Concrete – Grantley
MDG499866	AJO Concrete Contracting, Inc.
MD0068276	State Highway Administration MS4
MD0068314	Baltimore County MS4
MD0068292	Baltimore City MS4
02SW0025	Solo Cup Operating Corporation
02SW0034	Foundry Service & Supply Co., Inc.
02SW0155	Nurad Technologies, Inc.
02SW0306	Quest International Flavors & Food Ingredients
02SW0659	Pitt Ohio Express, Inc. – Baltimore
02SW0703	Baltimore City DPW – Western Substation
02SW0705	Baltimore City DPW – Northwestern Substation
02SW0712	New England Motor Freight
02SW0739	Rubber Millers, Inc.
02SW0777	Emanuel Tire Company – Moreland
02SW0779	Safety – Kleen Systems, Inc. – Baltimore
02SW0805	George G. Ruppersberger & Sons, Inc.
02SW0848	United Parcel Service – Vero Road
02SW0864	P. Flanigan & Sons Inc. – Westport
02SW0868	Baltimore Concrete Products, Inc.
02SW0930	Estes Express Lines
02SW1014	P. Flanigan & Sons, Inc.
02SW1016	Capitol Cake Company
02SW1027	National Instrument Company, Inc.
02SW1053	Ligon and Ligon, Inc.
02SW1137	Woodlawn Motor Coach, Inc.
02SW1138	All Supplies & Parts, Inc. – ASAP Compressors
02SW1206	Trifinity Manufacturing Baltimore, LLC
02SW1216	United Iron and Metal, LLC
02SW1248	Potts & Callahan, Inc. – Gwynns Falls
02SW1272	Unilever Bestfoods North America
02SW1297	Winchester Homes, Inc.
02SW1307	Northwest Transfer Station
02SW1375	Mr. Martin L. Reese
02SW1398	Daniel G. Schuster, LLC. – Owings Mills
02SW1492	Crusader Chemical Company, Inc.
02SW1495	Carroll Awning Company, Inc.
02SW1563	Chemlime N.J., Inc.
02SW1656	Joe Corbi's Wholesale Pizza
02SW1657	Alpharma USHP – Baltimore
02SW1673	MTA – Northeast Maintenance Shop
02SW1677	MTA – Northwest Bus Division
02SW1716	Shire U.S. Manufacturing, Inc.
02SW1778	Triad Incorporated

Permit #	Facility
02SW1836	Patuxent Materials, Inc. – Baltimore
02SW1884	Crispy Bagel Company
02SW1912	Decker's Salvage Company, Inc.
02SW1964	Baltimore County Bureau of Highways – Shop 2
02SW1978	P & J Contracting Company, Inc.
02SW1992	Beverage Capital Corporation
02SW1996	MTA – Old Court Metro Maintenance Facility
02SW2009	SHA – Owings Mills Shop
02SW3031	Railoid Corporation
	MDE General Permit to Construct

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 Gwynns Falls watershed is located in the Patapsco River sub-basin of the Chesapeake Bay watershed within Baltimore County and Baltimore City, Maryland and covers approximately 65 square miles. The watershed consists primarily of urban land (87.5%), with a small amount of forest land use (10.5%). There are also small amounts of crop (1.7%) and pasture (0.2%). Listed from north to south, there are five major tributaries in the Gwynns Falls watershed which include: Red Run, Horsehead Branch, Scotts Level Branch, Dead Run, and Maidens Choice Creek. The total population of the watershed is approximately 315,828.

The Gwynns Falls watershed (MD02130905) was included on Maryland's Section 303(d) List as impaired by sediments (1996), nutrients - phosphorus (1996), bacteria (2002), and impacts to biological communities (2002). This TMDL addresses the sediment impairment only.

The Surface Water Use Designation for Gwynns Falls mainstem and its tributaries is Use I: (*Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*), except for the Gwynns Falls mainstem and its tributaries above Reisterstown Road and Red Run and its tributaries, which are designated as Use III (*Nontidal Cold Water*), and Dead Run and its tributaries, which are classified as Use IV (*Recreational Trout Waters*) (Code of Maryland Regulations, COMAR, 2008 a, b, c, d, e). The water quality impairment of the Gwynns Falls watershed consists of an elevated sediment load beyond a level to support aquatic health, where aquatic health is evaluated based on Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) scores. Applicable BIBI and FIBI scores indicate that the Gwynns Falls watershed is exhibiting a significant negative deviation from reference conditions. To determine the cause for the aquatic health impairment, a Biological Stressor Identification (BSID) methodology was applied. A BSID analysis applies a case-control, risk-based, weight-of-evidence approach to identify potential causes of biological impairment. The primary dataset for the BSID analysis was round two Maryland Department of Natural Resources (DNR) Maryland

Biological Stream Survey (MBSS) data (collected between 2000 – 2004) because it provides a broad spectrum of paired data variables, which allow for a more comprehensive stressor analysis. In addition to the MBSS round two data applied within the BSID analysis, data from the Maryland DNR Core/Trend Program was also used for water quality characterization in the TMDL. The program collected benthic macroinvertebrate data between 1976 and 2006. A total of 30 water quality monitoring samples were used to characterize the Gwynns Falls watershed.

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 Gwynns Falls watershed. Refer to Tables 1 and 2 above for a summary of allowable loads.

The computational framework utilized for the MD 8-digit watershed Gwynns Falls TMDL was the Chesapeake Bay Program Phase 5 (CBP P5) long-term average annual watershed model edge-of-stream (EOS) loading rates. The spatial domain of the CBP P5 watershed model segmentation aggregates to the Gwynns Falls watershed, which is consistent with the impairment listing. The baseline sediment loads generated within the Gwynns Falls watershed are calculated as the sum of corresponding land use EOS loads within the watershed and represents a long-term average loading rate. Individual land use EOS loads are calculated as a product of the land use area, land use target loading rate, and loss from the edge-of-field (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 for each land use type based on the proximity of the land use to the main channel. The Gwynns Falls watershed was evaluated using two TMDL segments. TMDL Segment 1 represents the sediment loads generated in the northwestern portion of the watershed. TMDL segment 2 represents the sediment loads generated in the southeastern portion of the watershed.

There are no specific numeric criteria that quantify the impact of sediment on the aquatic health on non-tidal stream systems. Therefore, in order to quantify the impact of sediment on the aquatic health of non-tidal stream systems, a reference watershed TMDL approach was used which resulted in the establishment of a sediment-loading threshold for watersheds within the Highland and Piedmont physiographic regions. 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 is calculated as the current watershed sediment load divided by the all forest sediment load. The resulting forest normalized sediment load represents how many times greater the current watershed sediment load is than the all forested sediment load.

In the TMDL calculation, the allowable load is calculated as the product of the forest normalized sediment load and the Gwynns Falls all forested sediment load for segments 1 and 2 of the watershed. The resulting load is considered the maximum allowable load the watershed can sustain without causing any sediment related impacts to aquatic health. In order to attain the

TMDL loading cap, the reductions allocated in the TMDL will be applied only to the predominant and controllable sediment sources. If these predominant sources are controlled, water quality standards can be achieved in the most effective, efficient, and equitable manner. In the Gwynns Falls watershed, urban land was identified as the most extensive predominant controllable source in both of the TMDL segments. Therefore, sediment loadings of urban sources were exclusively reduced. The sediment TMDL for the Gwynns Falls watershed is 13,996.2 tons per year, which represents a 36.5 percent reduction in sediment loads. The baseline total sediment load from the Gwynns Falls watershed is 22,048.5 tons per year. Section 4.3 of the TMDL Report provides a thorough description of the CBP P5 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 Gwynns Falls watershed. EPA, therefore, approves this sediment TMDL for the Gwynns Falls 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 Surface Water Use Designation for Gwynns Falls mainstem and its tributaries is Use I: (*Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*), except for the Gwynns Falls mainstem and its tributaries above Reisterstown Road and Red Run and its tributaries, which are designated as Use III (*Nontidal Cold Water*); and Dead Run and its tributaries, which are classified as Use IV (*Recreational Trout Waters*) (Code of Maryland Regulations, COMAR, 2008 a, b, c, d, e). Maryland does not currently have numeric criteria for sediments. However, the Maryland 2004 Section 303(d) report states that degraded stream water quality resulting in a sediment impairment is characterized by erosional impacts, depositional impacts, and decreased water clarity (MDE 2004). Therefore, the evaluation of suspended sediment loads are based on how the sediment related impacts are influencing the designated use of supporting aquatic health, as defined by Maryland's biocriteria. The overall objective of the TMDL is to reduce the sediment loadings in the Maryland 8-digit Gwynns Falls watershed in order to meet the narrative water quality criteria to support the Use I/III/IV designation. 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

As described above, the allowable load for the impaired watershed is calculated as the product of the normalized reference load (determined from watersheds with a healthy benthic community) and the Gwynns Falls Watershed sediment load expected from an all-forested condition. This load is considered the maximum allowable load the watershed can assimilate and still attain water quality standards. The sediment TMDL was developed for the Gwynns

Falls Watershed based on this endpoint. 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 daily sediment 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 sediment for the Gwynns Falls 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.

Wasteload Allocations

As indicated in the TMDL Report, there are 57 permitted point sources in this watershed. The permits are grouped in two categories, process water and stormwater. The types of permits identified include individual industrial, individual municipal, individual municipal separate storm sewer systems (MS4s), general mining, general industrial stormwater, and general MS4s. Permit information is shown in the Technical Memorandum *Significant Sediment Point Sources in the Gwynns Falls Watershed* and Appendix B of MDE's TMDL Report. There are five process water sources with explicit Total Suspended Solids (TSS) limits, which include one municipal source and four mineral mines. The total permitted load from all of the process water sources is 213.2 tons per year. No reductions were applied to this source because at 1.0 percent of the total load, such controls would produce no discernable water quality benefit. There are 52 NPDES Phase I or Phase II stormwater permits identified throughout the Gwynns Falls watershed which are regulated based on Best Management Practices (BMPs) and do not include TSS limits. Therefore, the NPDES regulated stormwater loads within the Maryland 8-digit Gwynns Falls watershed will be expressed as a single NPDES stormwater WLA. The total NPDES stormwater WLA is 12,023.7 ton/yr, which constitutes a 40.1 percent reduction from its baseline load.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Gwynns Falls 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. As indicated in Section III, the sediment loads were computed using the Chesapeake Bay Program Phase 5 (CBP P5) watershed model. Table 4 of the Gwynns Falls TMDL report provides the various nonpoint sources of sediment loads within the watershed. However, within this TMDL, the urban load for sediment loading sources was identified as the most predominant controllable source in the watershed (92%) and is considered a point source that must be included in the WLA. Therefore, no

reductions are required from the LA as the reductions associated with the current regulated stormwater maximum feasible scenario result in sediment loading reductions greater than those needed to achieve the TMDL. See Sections 4.5 and 4.6 of the TMDL report for further description of current maximum feasible and the nonpoint source allocations.

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. To ensure consistency with this TMDL, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Gwynns Falls watershed, any deviation from the WLAs set forth in the TMDL Report and described herein for a point source, must be documented in the permit Fact Sheet and made available for public review along with the proposed draft permit and the Notice of Tentative Decision. The documentation should: (1) demonstrate that the loading change is consistent with the goals of the TMDL and will implement the applicable water quality standards; (2) demonstrate that the changes embrace the assumptions and methodology of the TMDL; and (3) describe that portion of the total allowable loading determined in the State's approved TMDL Report that remains for any other point sources (and future growth where included in the original TMDL) not yet issued a permit under the TMDL. It is also expected that Maryland will provide this Fact Sheet for review and comment to EPA for each point source included in the TMDL analysis, as well as, any local and State agency with jurisdiction over land uses for which LA changes may be impacted. It is also expected that MDE will require periodic monitoring of the point source(s) for TSS, 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 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 monitoring data that was used to determine the reference watershed for the sediment/flow stressor in the Gwynns Falls watershed included biological/physical habitat monitoring data from the MBSS program (collected from 2000 - 2004), and biological monitoring data from the MD DNR Core/Trend Program collected between 1976 and 2006. The biological monitoring data that was used to determine the reference watershed addresses critical conditions in the TMDL analysis because the data accounts for the stress effects that can occur during long periods of time.

5) The TMDLs consider seasonal environmental variations.

Seasonality is considered in the biological monitoring data that is used to determine the reference watershed for the sediment/flow stressor in the Gwynns Falls watershed. The MBSS data included benthic sampling in the spring and fish sampling in the summer. Monitoring data for benthic species is collected in the spring from March extending into May because among other things, it allows for an accurate assessment of the benthic population, and therefore an excellent means of assessing the anthropogenic effects of sediment/flow impacts on the entire benthic community. Fish sampling is conducted in the summer from June extending into September when low flow conditions significantly limit their physical habitat. Monitoring for fish during the summer is therefore the best way to assess the limited conditions for fish when the quality and quantity of their physical habitat is being impacted.

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 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

[1] 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.

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 eighteen percent.

7) The TMDLs have been subject to public participation.

MDE provided an opportunity for public review and comment on the sediment TMDL for the Gwynns Falls watershed. The public review and comment period was open from July 22, 2009 through August 20, 2009. MDE received two sets of comments. All of these comments were considered and 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 that point source.

To provide the basis for reasonable assurances that the sediment TMDL will be achieved and maintained, Maryland has several well established programs to draw upon including the Water Quality Improvement Act of 1998 and the Federal Nonpoint Source Management Program.

Potential funding sources available for local governments for implementation include the Buffer Incentive Program, the State Water Quality Revolving Loan Fund, and the Stormwater Pollution Cost Share Program.

Sediment from urban areas can be reduced by stormwater retrofits, impervious surface reduction, street sweeping, inlet cleaning, increases in urban tree canopy cover, and stream restoration. The majority of sediment reductions required from the urban areas within the Gwynns Falls watershed are attributed to streambank erosion (section 2.2.1). Therefore, flow controls must be installed to reduce sheer stress and limit bank erosion in order to address this portion of the urban sediment load. It is anticipated that the implementation of the TMDL will include the array of urban BMPs and practices previously listed. Implementation is expected to occur primarily via the MS4 permitting process for medium and large municipalities, which requires that these jurisdictions retrofit 10 percent of the existing urban land area every permit cycle, or five years.

It has been estimated that the average TSS removal efficiencies for BMPs installed between the years of 1985-2002 and post 2002, which are reflective of the stormwater management regulations in place during these time periods, is 50 percent and 80 percent, respectively. Based on these average TSS reduction efficiencies, BMP specific reduction efficiencies as estimated by CBP, and professional judgment, MDE estimates that future stormwater retrofits will have approximately 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.

The CBP estimates riparian buffer sediment reduction efficiencies in the Gwynns Falls region to be approximately 50 percent (US EPA 2006). Additionally, reforestation, whether adjacent to part of the watershed stream system or in a watershed's interior, can decrease upland sediment sources as well. In summary, through the use of the aforementioned funding mechanisms and BMPs, there is reasonable assurance that this TMDL can be implemented.