UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
12/27/2006

Dr. Richard Eskin, Ph. D., Director
Technical and Regulatory Services Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 540
Baltimore, MD 21230

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA) is pleased to approve the Total Maximum Daily Load (TMDL) for sediment in the Georges Creek Watershed, Garrett and Allegany Counties, Maryland. The TMDL Report was submitted by the Maryland Department of the Environment (MDE) on October 3, 2006, to EPA for review and approval. This 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 non-tidal waters of the Georges Creek Watershed (basin number 02141004) were first identified on Maryland's 1996 Section 303(d) list as impaired by nutrients and sediments with low pH added in 1998, and, listings of bacteria and impacts to biological communities added in 2002. A TMDL for biochemical oxygen demand (BOD) to address the nutrients listing was approved by EPA in 2002. A TMDL to address bacteria was submitted to EPA in 2006. The listings for low pH and impacts to biological communities will be addressed by MDE at a future date. The TMDL described in this document was developed to address localized water quality impairments identified within the watershed, specifically excessive sediment in the Georges Creek Watershed.

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 (WLAs) for point sources and load allocations (LAs) for nonpoint sources, (3) consider the impacts of background pollutant contributions, (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated), (5) consider seasonal variations, (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and in-stream water quality), (7) consider reasonable assurance that the TMDL can be met, and (8) be subject to public participation. The enclosure to this letter describes how the sediment TMDL for the Georges Creek Watershed satisfies each of these requirements.

As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL WLA 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 Mr. Thomas Henry at (215) 814-5752.

Sincerely,

Signed

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Melissa Chatham, MDE-TARSA
Nauth Panday, MDE-TARSA

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Decision Rationale
Total Maximum Daily Load of Sediment in the Georges Creek Watershed, Garrett and Allegany Counties, Maryland

Signed

Jon M. Capacasa, Director
Water Protection Division

Date: ***12/27/2006***

Decision Rationale

Total Maximum Daily Load of
Sediment in the Georges Creek Watershed,
Garrett and Allegany Counties, Maryland

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be developed for those water bodies 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 water body.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDL for sediment in the Georges Creek 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 Georges Creek Watershed, Garrett and Allegany Counties, Maryland*, on October 3, 2006. The TMDL in this report addresses the sediment impairment in the Georges Creek Watershed as identified on Maryland's Section 303(d) lists. The basin identification for the Georges Creek Watershed is 02141004.

EPA's rationale is based on the information contained in the TMDL Report, the Appendices to the report, the Comment Response Document, and MDE's responses to EPA's comments. EPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130.

1. The TMDLs are designed to implement applicable water quality standards.
2. The TMDLs include a total allowable load as well as individual waste load allocations (WLA) and load allocations (LA).
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider the critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a MOS.
7. There is reasonable assurance that the TMDLs can be met.
8. The TMDLs have been subject to public participation.

II. Summary

The TMDL specifically allocates the allowable sediment loading to the Georges Creek Watershed. There are 46 permitted point sources of sediment within the watershed. Only 38 of these permitted point sources were included in the WLA since the sediment loads from the remaining permitted point sources were considered *de minimis*. 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/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 also presented in pounds/day. The average annual and long term daily TMDLs are presented in Tables 1 and 2, respectively.

Table 1 – Average Annual Sediment TMDL for the Georges Creek Watershed

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Georges Creek Watershed	Tons/year	4,056.2	33.7	4,022.5	Implicit

Table 2 – Long Term Daily Sediment TMDL for the Georges Creek Watershed

Area	Rate	TMDL
Georges Creek Watershed	Pounds/day	22,226

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 account for uncertainty with the inclusion of a MOS value. The option is always available to refine the TMDL for re-submittal 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 Georges Creek Watershed is located in Allegany and Garrett Counties, Maryland and covers 47,694 acres (75 square miles). Georges Creek flows southwest from its headwaters in Frostburg, Maryland to its confluence with the North Branch Potomac River below the Town of Westernport, Maryland. Elklick Run, Mill Run, Winebrenner Run, and Koontz Run are major tributaries to Georges Creek. The Chesapeake Bay Program Phase V (CBP P5) land use GIS framework shows that the watershed has predominantly forest (71.9%), urban (15.7%), pasture (5.4%), cropland (4.9%) and extractive (2.1%) land uses. Section 2.0 of MDE's TMDL Report provides additional information about the Georges Creek Watershed, including land use information.

The Georges Creek Watershed (02141004) was first identified on Maryland's 1996 Section 303(d) list of water quality-limited segments as impaired by nutrients and sediments

with low pH added in 1998, and, listings of bacteria and biological impacts added in 2002. A TMDL for biochemical oxygen demand (BOD) to address the nutrients listing was approved by EPA in 2002. A TMDL to address bacteria was submitted to EPA in 2006. The listings for low pH and biological impacts will be addressed by MDE at a future date.

The Maryland water quality standards Surface Water Use Designation for the Georges Creek Watershed is Use I-P: Water Contact Recreation, and Protection of Aquatic Life and Public Water Supply (Code of Maryland Regulations, COMAR, 26.08.02.08R) for the mainstem from the confluence with the North Branch Potomac River, and Use I: Water Contact Recreation and Protection of Aquatic Life (COMAR, 26.08.02.08) for the remainder of the mainstem and all tributaries. Maryland currently does not have specific numeric criteria for sediment. Maryland's general water quality criteria prohibit pollution of waters of the State by any material in amounts sufficient to create nuisance or interfere in designated uses (COMAR, 26.08.02.03). Therefore, MDE determined the assimilative capacity of the Georges Creek Watershed by using a reference watershed approach that resulted in the establishment of a sediment loading threshold. This threshold is based on a detailed analysis of sediment loads from watersheds identified as supporting aquatic life based on Maryland's biocriteria. The sediment loading threshold was determined to be approximately 3.3 times the sediment load of an all forested watershed. This value is representative of watersheds in the Highland and Piedmont physiographic regions with land use distributions within the range of the reference watersheds.

The Georges Creek Watershed was evaluated using one watershed TMDL segment within the CBP P5 model. Figure 5 of the TMDL report shows the TMDL segmentation. The Georges Creek Watershed sediment load is approximately 5.1 times the all forested condition which is well above the sediment loading threshold of 3.3. This analysis indicates that sediment loads are beyond levels to support aquatic health and confirms that the Georges Creek Watershed is impaired by elevated sediment loads to the stream system.

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 Georges Creek Watershed. Refer to Tables 1 and 2 above for a summary of allowable loads.

For this TMDL analysis, Maryland used sediment load, embeddedness, and epifaunal substrate condition data collected in 2004 by the Maryland Biological Stream Survey (MBSS) program at 10 stations in the Georges Creek Watershed. The computational framework utilized for the Georges Creek Watershed TMDL was the CBP P5 watershed model target edge-of-field (EOF) land use sediment loading rate calculations. 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 spatial effect of sediment delivery from EOF to EOS is captured as a function of the average transport distance from individual land uses within the model segment. Therefore, each land use category will have a specific sediment delivery ratio. The spatial domain of the CBP P5 model segmentation aggregates to the Maryland 8-digit watersheds. The Georges Creek Watershed is represented by one CBP P5 model segment.

A reference sediment yield approach was applied to determine the assimilative capacity of the watershed stream system. The reference yield was estimated from watersheds that are identified as supporting aquatic life based on Maryland's biocriteria. To reduce the variability when comparing watersheds within and across regions, the watershed sediment yield is normalized by a constant background condition. The normalized sediment yield for this TMDL is calculated as the current watershed sediment load divided by the forest sediment load expected from an all-forested condition. The current total sediment load from the Georges Creek is 6,231.1 tons/year. The sediment TMDL is 4,056.2 tons/year, a 34.9% reduction from the baseline sediment load. Section 4.0 of the TMDL Report provides a thorough description of the CBP P5 model and calculations.

Maryland conducted a nonpoint source assessment by reviewing land use data to estimate the contributions of sediment from agricultural activities, urban (developed), extractive land, and forest. Agricultural activities include various cropland, pasture, and feeding operations. Developed land includes both pervious urban, impervious urban, and construction areas. Extractive land use includes active and unclaimed mines, gravel pits, etc. Forest land use includes both natural undisturbed woodland areas and harvested forest lands. The largest portions of the sediment load are from urban and extractive land uses (35.0% and 33.3%, respectively) followed by forest (17.1%), cropland (11.0%), and pasture (3.1%) land uses. Permitted point sources of sediments account for 0.5% of all sources. Detailed explanations of the nonpoint source assessment and estimated sediment budget for each land use are described in Section 2.2.1 and Table 3 of the TMDL Report. The results of the nonpoint source assessment allowed Maryland to calculate the percent contribution for each of the five major types of nonpoint sources. This method is further described in Section IV of this Decision Rationale.

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all of the eight basic requirements for establishing a sediment TMDL for the Georges Creek Watershed. EPA therefore approves this sediment TMDL for the Georges Creek Watershed. This approval is outlined below according to the eight 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 Maryland water quality standards Surface Water Use Designation for the Georges Creek Watershed is Use I-P: Water Contact Recreation, and Protection of Aquatic Life and Public Water Supply (COMAR, 26.08.02.08R) for the mainstem from the confluence with the North Branch Potomac River, and Use I: Water Contact Recreation and Protection of Aquatic Life (COMAR, 26.08.02.08) for the remainder of the mainstem and all tributaries. Maryland's general water quality criteria prohibit pollution of waters of the State by any material in amounts sufficient to create nuisance or interfere in designated uses (COMAR, 26.08.02.03). Maryland currently does not have specific numeric criteria that quantify the

impact of sediment on the aquatic health of non-tidal stream systems. Excessive sedimentation in the Georges Creek Watershed beyond a level to support aquatic life has led to violations of the narrative criteria. The limiting sediment load was estimated using reference watersheds, where the assimilative capacity is determined to be approximately 3.3 times the sediment load, assuming an all forested condition. The current sediment load of the Georges Creek Watershed is approximately 5.1 times the all forested condition which is beyond levels to support aquatic health. Therefore, a TMDL was developed for the watershed area. The overall objective of the TMDL is to reduce the sediment loadings in order to meet the narrative water quality criteria to support the Use I-P and Use I designations. EPA believes that this is a reasonable and appropriate water quality goal.

2) The TMDLs include a total allowable load as well as individual waste load 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 sediment yield (determined from watersheds with a healthy benthic community), the Georges Creek Watershed forest sediment yield, and the watershed drainage area. 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 Georges Creek Watershed based on this endpoint. The sediment TMDL and allocations are presented as mass loading rates of tons/year for the average annual load and pounds 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 state 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 Georges Creek 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.

Waste Load Allocations

According to the TMDL Report, there are 46 permitted point source facilities in the Georges Creek Watershed but only 38 of these permitted sources have explicit total suspended solids (TSS) limits, including four industrial facilities, five municipal wastewater treatment plants (WWTP), and 29 mining permits. The estimated TSS loads from these sources were assigned to the WLA using the current permit limits. No reductions were applied to the permitted point sources. There are no MS4 permits in the Georges Creek Watershed. Therefore, all rainfall-driven TSS loads were allocated to the LA. The sediment loads from six industrial stormwater permits were considered *de minimis* and do not have explicit TSS limits;

therefore, their sediment loads were included in the LA. Two municipal permits for the Westernport combined sewer overflow (CSO) and the Allegany County CSO were not included in the TMDL because the published Long Term Control Plans require complete elimination of these CSOs. Based on the permit information shown in Section 4.6 and Appendix B of MDE's TMDL Report, the total permitted load is 33.7 tons/year and will be included as the WLA. No reductions were applied to the permitted point sources.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Georges Creek 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 described above in Section III, Maryland conducted a nonpoint source assessment in order to estimate the contributions of cropland, pasture, urban (developed), extractive land, and forest to the overall nonpoint source loadings. Table 3 of the TMDL Report provides a breakdown of the existing average annual sediment load from the five nonpoint source categories (cropland, pasture, urban, extractive land, and forest) as well as point sources. A similar breakdown was developed for the allocations, which are shown in Table 5 of the TMDL Report. For the purpose of TMDL development, reductions are estimated for predominant controllable nonpoint sources. In this watershed, forest is considered to be the only non-controllable source since it represents the most natural condition in the watershed.

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. 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 Georges Creek 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 each point source included in the TMDL analyses 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 total suspended solids, through the NPDES permit process, in order to monitor and determine compliance with the TMDLs WLAs.

In addition, EPA regulations and program guidance provides for effluent trading. Federal

regulations at 40 CFR § 130.2(i) state: "if Best Management Practices (BMP) or other nonpoint source pollution controls make more stringent LAs practicable, then WLAs may be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs." The state may trade between point sources and nonpoint sources identified in the TMDL as long as three general conditions are met: 1) the total allowable load to the waterbody is not exceeded; 2) the trading of loads from one source to another continues to properly implement the applicable water quality standards and embraces the assumptions and methodology of the TMDL; and 3) the trading results in enforceable controls for each source. Any changes such as these should be subject to public comment. Any revisions to WLAs and/or LAs should be submitted to EPA for review.

Based on the foregoing, EPA has determined that the TMDLs are consistent with the regulations and requirements of 40 CFR Section 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 biological monitoring data used to determine the reference watersheds integrates the stress effects over the course of time and thus inherently addresses critical conditions.

5) The TMDLs consider seasonal environmental variations.

Seasonality is considered in two components. First, it is implicitly included in the biological monitoring data, since results integrate the stress effects over the course of time as discussed in Requirement 4 above. Second, the MBSS sampling included benthic sampling in the spring and fish sampling in the summer to incorporate both spring and summer flow

[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.

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 has adopted an implicit MOS for this TMDL. Sediment yield analysis of the reference watersheds indicates that approximately 75% of the reference watersheds have a normalized reference sediment yield less than 3.6, and 50% of the normalized sediment yields are less than 3.3. The reference sediment yield was set at the median value of 3.3. This is considered an environmentally conservative estimate, since 50% of the reference watersheds have a normalized sediment yield above this value. This reference sediment yield results in an implicit MOS of approximately 8%.

7) There is reasonable assurance that the TMDLs can be met.

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.

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. BMPs can be implemented through a number of existing programs and funding sources, including: Water Quality Improvement Act of 1998 (WQIA), Federal Nonpoint Source Management Program (§ 319 of the Clean Water Act), Buffer Incentive Program (BIP), Maryland Agriculture water quality cost share program (MACS), State Water Quality Revolving Loan Fund, and Stormwater Pollution Cost Share Program.

8) The TMDLs have been subject to public participation.

MDE provided an opportunity for public review of and comment on the sediment TMDL for the Georges Creek Watershed. The public review and comment period was open from July 27, 2006 through August 28, 2006. The public comment period was extended through September 4, 2006 to allow for review and comment of the "Addendum 1: Adjustment to CSO Loads – Georges Creek Sediment TMDL." MDE received one set of comments for this TMDL which were addressed in MDE's Comment Response Document.

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