



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

FEB 06 2002

Ms. Denise Ferguson Southerd
Assistant Secretary
Maryland Department of the Environment
2500 Broening Highway
Baltimore, Maryland 21224

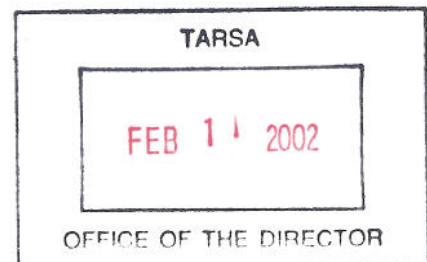
Re: Georges Creek
Total Maximum Daily Load (TMDL)

Dear Ms. Southard:

The Environmental Protection Agency (EPA) Region III, has reviewed the report "Total Maximum Daily Loads (TMDLs) of Carbonaceous Biochemical Oxygen Demand (CBOD) and Nitrogenous Biochemical Oxygen Demand (NBOD) for Georges Creek in Allegany and Garrett Counties, Maryland" and other supporting documentation which was submitted by the Maryland Department of Environment (MDE) for final agency review on January 8, 2002. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act. The TMDL was established to address impairment of water quality as identified in Maryland's 1996 and 1998 Section 303(d) lists. Maryland identifies the impairment for this water quality limited waterbody based on low dissolve oxygen levels. Georges Creek is located in Allegany and Garrett Counties, Maryland. EPA has determined that a TMDL for addressing a dissolved oxygen (DO) problem is not required for the Georges Creek and recommends that Maryland consider these data and modeling for their next Section 303(d) list.

In general, EPA makes this determination based on the following:

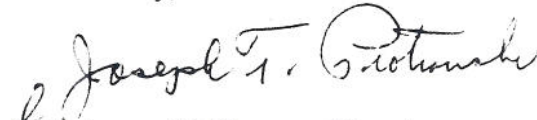
1. The data show that the Georges Creek is meeting water quality standards for DO.
2. The model shows that more stringent water quality standards for DO for Tier 2 designated waters will also be met with increased point source and nonpoint sources loadings.



EPA encloses a more comprehensive rationale setting forth the details of this determination and recommendation.

If you have any questions or concerns, please call me or have your staff contact Mr. Thomas Henry, the TMDL Program Manager, at (215) 814-5752.

Sincerely,


f Rebecca W. Hanmer, Director
Water Protection Division

Enclosure

cc: Mr. Jim George, MDE
Mr. Robin Groves, MDE

**EPA's Rationale for Determining
that no TMDL addressing Dissolved Oxygen is required
for Georges Creek in Allegany and Garrett Counties, Maryland**

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) 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, that may be discharged to a water quality-limited water body.

The submitted document, which includes modeling and references to available data, shows that Georges Creek is not impaired. The Maryland Department of Environment (MDE) is recommended to consider these data and modeling for their next Section 303(d) list.

This document sets forth the United States Environmental Protection Agency's (USEPA) rationale that the submitted document should be considered for informational purposes. The regulations allow for informational TMDLs at CFR 40 130.7(e) where it states, "For the specific purpose of developing information and as resources allow, each State shall identify all segments within its boundaries which it has not identified under paragraph (b) of this section and estimate for such waters the TMDLs with seasonal variations and margins of safety, for those pollutants which the Regional Administrator identifies under section 304(a)(2) as suitable for such calculation and for thermal discharges, at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife." TMDLs submitted for informational purposes do not require EPA approval.

MDE submitted a report titled "Total Maximum Daily Loads of Carbonaceous Biochemical Oxygen Demand (CBOD) and Nitrogenous Biochemical Oxygen Demand (NBOD) for Georges Creek in Allegany and Garrett Counties, Maryland" dated December 2001 and received by EPA on January 8, 2002. Georges Creek was first identified on Maryland's 1996 Section 303(d) list for nutrients and suspended sediments. It was identified on Maryland's 1998 Section 303(d) list for low pH. Suspended sediments and pH will be addressed separately by MDE in separate TMDL documents.

The Technical Memorandum, *Significant BOD Point and Nonpoint Sources in Georges Creek Watershed*, submitted by MDE, specifically allocates BOD loads to the following point source: Georges Creek Waste Water Treatment Plant (WWTP). The current BOD loads are based on the point source's monthly maximum National Pollutant Discharge Elimination System (NPDES) permit limits. The nonpoint source current loads are based on water quality data collected in 1999. MDE has determined that low flow is the critical condition. This document is based on the TMDL report, the Technical Memorandum, and other information/data submitted by MDE.

II. Summary

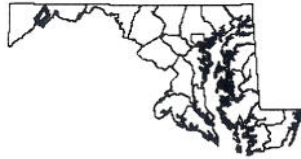
Georges Creek is a tributary of the North Branch Potomac River, located in Allegany County, Maryland (Figure 1). The North Branch Potomac River joins the South Branch forming the Potomac River. The mainstem of Georges Creek is approximately 15 miles long. The watershed of Georges Creek has an area of approximately 47,693 acres. The predominant land uses in the watershed, based on 1997 Maryland Office of Planning land cover data, are forest comprising 34,046 acres or 71% of the total area, with urban at 4,532 acres or 10%, surface mining at 3,259 acres or 7%, and agricultural land uses at 5,856 acres or 12%.

The Georges Creek watershed lies in the Allegheny Plateau. The geological strata include shale and sandstone of the Devonian Chemung and Hampshire formations (Maryland Geological Survey, Geologic Map of Maryland, 1968). Soils in the watershed are primarily Calvin-Gilpin association, gently sloping to steep, moderately deep, well-drained soils; formed over acid, red to gray shale and sandstone (U.S. Department of Agriculture, Soil Survey of Garrett/Allegany Counties, 1977).

Georges Creek Watershed

Basin Code
02-14-10-04

Garrett/Allegany Counties, Maryland

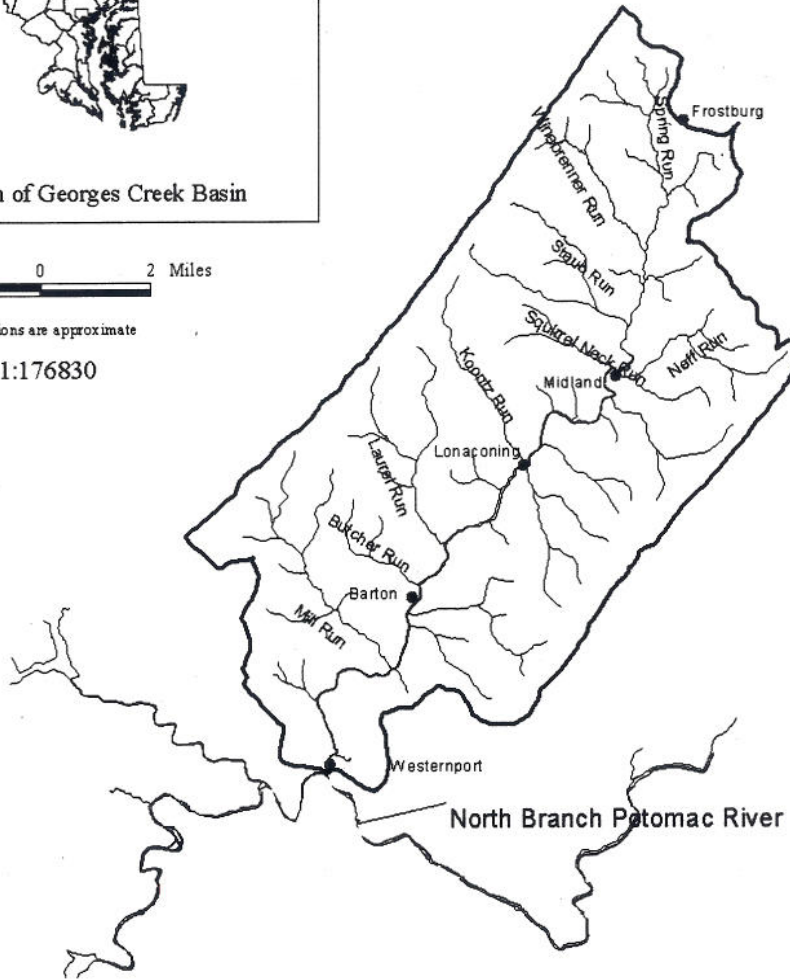


Location of Georges Creek Basin

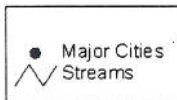
2 0 2 Miles

Site locations are approximate

1:176830



Legend



This map depicts the Georges Creek in relation to Garrett/Allegany County and the State of Maryland. The watershed boundaries are from the MD Department of Natural Resources 12 digit watersheds. The streams are from MD Office of Planning. For further information contact MDE's Water Management Administration @ 410-631-3671.



Map Date
July 2000
Revised
October 2000

Figure 1- Location of Georges Creek

Georges Creek was identified on Maryland's 1996 Section 303(d) list of water quality limited segments (WQLS) because of nutrients and suspended sediments. It was identified on Maryland's 1998 Section for low pH. TMDLs for sediment and pH will be addressed separately. Maryland listed the Georges Creek in 1996 based on a single sample with a high chlorophyll-a concentration downstream of the WWTP discharge point. A water quality survey was conducted in 1999. The initial nutrient impairment conclusion cannot be supported on the basis of the single chlorophyll-a sample and could not be confirmed with subsequent water quality data collected in 1999 and 2001. Based on available data, MDE concluded that CBOD and NBOD are the principal threat to water quality in Georges Creek. Therefore, the TMDL for the Georges Creek addresses BOD in the 2 BOD forms of carbonaceous BOD (CBOD) and nitrogenous BOD (NBOD).

MDE is also considering designating Georges Creek as a Tier II waterbody for dissolved oxygen (DO) pursuant to Maryland's anti-degradation regulations (COMAR §26.08.02.04). A Tier II designation would result in more stringent reviews before BOD loadings could increase.

Problems with DO are expected to occur only at low flow conditions. There are 15 combined sewer overflows (CSO) in the watershed. Based on available data, the CSOs occur mostly during wet weather conditions. Both a low-flow and high-flow scenario were analyzed. The high flow scenario included CSO loadings. MDE determined that the low-flow scenario was the critical condition. Since CSOs do not normally occur during low flow, the CSOs were not included in the waste load allocation for the TMDL.

The TMDL was calculated only for 7Q10 conditions. The 7Q10 flow refers to the seven-day consecutive lowest flow expected to occur every 10 years. Because 7Q10 conditions are only likely to occur during summer months, the TMDLs only apply from June 1 to October 31. See Table 1 for the low-flow TMDLs.

The allocation of BOD for nonpoint sources was increased by 50% to account for future growth. The point source allocation was based on the future maximum NPDES permit limits at the Georges Creek WWTP.

Georges Creek is designated as a Use I-P, natural trout water according to the Code of Maryland Regulations 26.08.02. The DO standard for a Use I-P water is 5.0 milligram per liter (mg/L) at any time. MDE has indicated that DO concentrations were above 7.8 mg/L during summer stream surveys conducted in 1999. This concentration exceeds the water quality standard (WQS). However, MDE is considering this waterbody for Tier II water quality protection under MDE's existing Antidegradation Policy. Tier II waters required that current high water quality, in this case DO, be maintained. Therefore, MDE expects future degradation of DO may occur if CBOD and NBOD loads are allowed to increase. Though both nutrients and BOD contribute to DO impairment, MDE's analysis demonstrated that BOD loadings principally affect DO levels. Therefore, MDE describes the development of TMDLs for BOD in the Georges Creek.

MDE completed an analysis to determine a Tier II DO minimum for Georges Creek. MDE used data collected in the summer of 1999 to arrive at this target. A target of 7.5 mg/L was derived. The appendix includes a detailed account of MDE's methodology to arrive at this value. Based on the above discussion, EPA finds that the submitted BOD TMDL will ensure that the designated use and water quality criteria and targets for the Georges Creek are met and maintained.

III. Detailed Considerations

The bases on which EPA made the decision that a TMDL to address the DO issue is not necessary for Georges Creek are: (1) The data show that the Georges Creek is meeting water quality standards for dissolved oxygen (DO) and (2) The model shows that water quality standards for DO will also be met with increased point source and nonpoint source loadings.

MDE used a mathematical water quality model, INPRG, for free-flowing streams. INPRG is a steady state mathematical model, developed within MDE, to assess the impact of point and nonpoint source load discharges of material that exert an oxygen demand in free-flowing streams. The model prepares input data and runs a free-flowing stream model based on the Streeter Phelp's equation. The INPRG model predicts receiving stream CBOD, NBOD, and DO concentrations for selected stream input conditions.

The model was used to determine allowable BOD loadings that would maintain the target DO levels in the receiving stream. The model was also used to investigate seasonal variations in stream conditions and to establish margins of safety that are environmentally conservative. Load allocations were determined for distributing allowable loads between point and nonpoint sources.

EPA believes that MDE's modeling approach and assumptions adequately present the DO concentration in the waterbasin.

MDE's modeling approach

- a. Conservative assumptions were made in the modeling. Problems with DO normally occur at low flow conditions. MDE performed an intermediate scenario to verify that average flow conditions with combined sewer overflow (CSO) loadings was not the critical condition. The TMDL was calculated only for 7Q10 conditions. The 7Q10 flow refers to the seven-day consecutive lowest flow expected to occur every 10 years. Because 7Q10 conditions are only likely to occur during summer months, the TMDLs only apply from June 1 to October 31.
- b. MDE anticipates that Georges Creek will receive a Tier II designation, which will result in raising the DO minimum standards for this waterbody. MDE determined a required minimum DO based on this designation using observed data from 1999. MDE's analysis resulted in a targeted minimum DO standard of 7.5 mg/L which is higher than Maryland's existing DO standard of 5.0 mg/L.

- c. MDE modeled three scenarios with the INPRG model.
 - i. The first scenario, a preliminary scenario, was analyzed which represented “existing” or baseline conditions. In this scenario, maximum monthly permitted limits were used for point source inputs and water quality data were used for nonpoint source loads. The 7Q10 flow was used. The DO standard of 7.5 mg/L was met.
 - ii. MDE then modeled a 2nd scenario to determine if during high flow winter/spring events, the CSO discharge would result in high loading and therefore be the critical period. Average CSO flows based on data collected in 2001 were used as well as average stream flow. The nonpoint source loads were based on observed data collected in 1999. The point source loads were the same as in scenario 1 (maximum monthly permit limits). This analysis also showed that DO values are expected well above 7.5 mg/L and that this was not the critical condition.
 - iii. The 3rd scenario increased nonpoint source loads by 50% and included future allocations for point source loads. The future allocation was a 50% increase in the monthly maximum permit limits. In other words, both point and nonpoint source loads were increased by 50%. The DO standard of 7.5 mg/L was met.
- c. The critical season for DO problems in the Georges Creek has been identified by Maryland as the summer months. During these months, flow in the channel is reduced resulting in slower moving, warmer water which has less dilution potential and is susceptible to algal blooms and low DO concentrations.
- d. Seasonal variations involve changes in streamflow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flow normally occurs during the colder period of winter and in early spring from snowmelt and spring rain. Seasonal low flow typically occurs during the warmer summer and early fall drought periods¹. The INPRG water quality model effectively considers seasonal environmental variations.

Public Participation

The TMDL for CBOD and NBOD in Georges Creek was open for public comment from October 29, 2001 to November 26, 2001. A total of one set of written comments was received by MDE. The comments and the MDE response document were provided with the submitted documentation. EPA notified the United States Fish and Wildlife Service (USFWS) and to the United States National Marine Fisheries Service (USNMFS) on October 4, 2001 about the availability of the TMDL and where to acquire a copy of the TMDL. The EPA did not receive a response from the USFWS or USNMFS on the proposed TMDL.

¹ Technical Guidance Manual for Developing Total Maximum Daily Loads, Book 2, Part 1, Section 2.3.3, (EPA 823-B-97-002, 1997).

IV. Conclusion

The submitted TMDL presented information on which EPA has determined that a TMDL for addressing a DO problem is not required for the Georges Creek and recommends that MDE consider these data and modeling for the next Section 303(d) list. Based on the data and model analysis, Georges Creek is meeting Maryland's DO standard and has assimilative capacity to meet a higher minimum DO standard even with additional nonpoint and point source loadings. Should the waterbody be delisted, the submitted document would be considered as an informational TMDL per Section 303(d)(3) of the CWA.