

**TOTAL SUSPENDED SEDIMENT
TOTAL MAXIMUM DAILY LOADS
UPPER ANACOSTIA RIVER
LOWER ANACOSTIA RIVER
in the
DISTRICT OF COLUMBIA**

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 3
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Date

Decision Rationale
Total Maximum Daily Loads
Total Suspended Solids
Upper Anacostia River
Lower Anacostia River
District of Columbia

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 did 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.

This document will set forth the Environmental Protection Agency's (EPA) rationale for establishing the Total Maximum Daily Loads (TMDLs) of total suspended solids (TSS) for the upper and lower Anacostia River. A more detailed description of these issues is set forth in the TMDL Report on TSS for the upper and lower Anacostia River, which is being incorporated into this Decision Rationale. EPA's rationale is based on the determination that the TMDLs meet the following eight regulatory conditions pursuant to 40 CFR §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 and load allocations.
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a margin of safety.
7. There is reasonable assurance that the TMDLs can be met.
8. The TMDLs have been subject to public participation.

EPA's establishment of these TMDLs is required today in order to meet a binding legal commitment. The District of Columbia has also been working to establish TMDLs to address TSS in the Anacostia River, using a numerical endpoint derived from new water quality standards for water clarity which were adopted on an emergency basis in January 2002. EPA is not acting on the District's proposed TMDLs for TSS, submitted in January 2002, pending resolution of scientific questions which EPA posed on the District's new water quality standards. However, EPA and the D.C. Department of Health, Environmental Health Administration, have been working together, and EPA has based its TMDLs on the extensive work which the District completed on present loadings, locations of pollutant

sources, water quality models and other related work. The relationship of EPA's TMDLs and those proposed by the District is discussed in section II of this Decision Rationale .

EPA and the District will work together to resolve remaining issues associated with the new water quality standards. Should the District elect to make modifications to its proposed TMDLs based on any standards changes and submit the changes to EPA for action, EPA will review the proposal and take the appropriate action. If EPA approves the modified TMDLs, they may modify or even replace the TMDLs EPA is establishing today. The District of Columbia may also provide additional clarification, documentation and justification for its currently-proposed TMDLs and request EPA action. Again, EPA will review the submitted information and take the appropriate action. The TMDLs being finalized today, however, are the effective TMDLS unless and until such time as the District of Columbia takes one of the above actions and EPA approves modified TMDLs.

II. Background

The Anacostia River drainage area covers 117,353 acres (approximately 176 square miles) in the District of Columbia and Maryland. Forty-nine percent of the drainage area is located in Prince George's County, with 34 percent located in Montgomery County, and the remaining 17 percent located in the District of Columbia. The basin is highly urbanized, with a population of 804,500 and a population density of 4,570 per square mile in 1990 (Warner *et al.*, 1997). Only 25 percent of the watershed is forested and another 3 percent is wetlands. The non-tidal portion of the Anacostia River is divided into two branches, the Northeast Branch and the Northwest Branch. Their confluence is at Bladensburg, MD. For all practical purposes the tidal portion of the Anacostia River can be considered to begin at their confluence, although the Northeast and Northwest Branches are tidally-influenced up to the location of the USGS gages on each branch.

The length of the tidal portion of the Anacostia River is 8.4 miles with an average depth of six feet at Bladensburg and 20 feet at the confluence with the Potomac River. The average tidal variation in water surface elevation is 2.9 feet all along the tidal river. The average width of the river increases from 375 feet at Bladensburg to 1,300 feet at the mouth. Average discharge to the tidal river from the Northeast and Northwest Branches is 133 cubic feet per second (cfs). Under average flow conditions, the mean volume of the tidal river is approximately 415 million cubic feet. Detention time in the tidal Anacostia under average conditions is thus over 36 days and longer detention times can be expected under low-flow conditions in summer months.

Just over 25 percent of the Anacostia Watershed drains into the tidal river below the confluence of the Northwest and Northeast Branches. Much of this drainage is controlled by storm sewers or combined storm and sanitary sewers. The two largest tributaries are Lower Beaverdam Creek (15.7 sq. mi. drainage area), and the Watts Branch (3.8 sq. mi. drainage area).

Land use in the Anacostia River watershed is mostly residential and forested. There are 30 percent park and forest lands evenly dispersed throughout the watershed, such as the National Park Service parklands, the National Arboretum, Greenbelt Park, and Beltsville Agricultural Research Center. The industrial and manufacturing land use is largely confined to the tidal area of the basin such as Hickey Run, Lower Beaverdam Creek, and Indian Creek. Fifty-three percent of Watts Branch watershed is in Maryland and 46 percent is in the District.

This TMDL Report addresses the impairment of the aquatic life use in the Anacostia River. Of the pollutants of concern listed on the 1998 Section 303(d) list of impaired waters for these segments, these TMDLs address total suspended solids.

A 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 which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a margin of safety value. Conditions, available data, and the understanding of the natural processes can change more than anticipated by the margin of safety. The option is always available to refine the TMDLs based on new information.

These TSS TMDLs are required as first-year TMDL milestone commitments under the requirements of the 2000 TMDL lawsuit settlement of *Kingman Park Civic Association et al. v. EPA*, Civil Action No. 98-758 (D.D.C.). First-year milestones include the development of TMDLs for biochemical oxygen demand (BOD), which were established by the District and approved by EPA on December 14, 2001, and total suspended solids (TSS) for the upper and lower Anacostia River. Because of issues associated with the District's establishment of new water quality standards for water clarity, in order to provide a regulatory numerical endpoint for the District's TSS TMDL, EPA requested and received from the plaintiffs additional time to public notice EPA's TSS TMDL on January 4, 2002, and complete that TMDL no later than March 1, 2002.

At the time of EPA's public notice, both EPA and the District hoped that the scientific questions associated with the District's new water clarity standards, and the TMDLs based on the new numerical endpoint, could be worked out in time to meet the legal commitment date. If so, EPA would have been able to withdraw its proposed TMDLs and approve the District of Columbia's submission. However, issues still remain, resulting in this action to finalize EPA's TMDLS.

Although there have been two separate TMDL reports made available for public comment¹ - the District of Columbia's draft TMDLs and EPA's proposed TMDLs - the differences between the two are not great. The main distinction between the two TMDLs is the endpoint that was used to establish the allocations. The allocations of the TSS load are similar - 83 percent to 86 percent

¹ The proposed TMDL developed by the District and the proposed TMDL developed by EPA to assure that the legal commitments were met.

reduction from current loads (depending on the type of source) in the District of Columbia's TMDLs and 77 percent reduction from all sources based on EPA's TMDLs.

As noted earlier, EPA based its TMDLs on the District's assessment of present loadings, locations of pollutant sources, water quality models and other related work. EPA did not need to start from "scratch". The modeling that was completed by EPA is consistent with that completed by the District of Columbia, and the allocation process used the models as developed by the District of Columbia. EPA used the same pollutant loadings input data, the same calibrated water quality model, the same stream segmentation and the same outfall locations as did the District.

To develop a TMDL, an appropriate water quality endpoint is necessary. This endpoint is generally the water quality criterion set by the state in its numerical water quality standards. However, in the Section 303(d) list decision, the District of Columbia identified the TSS water quality impairment based on its narrative standard to protect aquatic life uses (TSS being the main component of turbidity in the Anacostia River²). In order to have a numerical endpoint that could be used to assess and quantify loading reductions, the District of Columbia elected to develop new water quality standards for water clarity, based on numerical criteria for secchi depth and Chlorophyll 'a', instead of interpreting the narrative standard. The District completed its draft criteria and public-noticed them for comment on October 12, 2001. Following consideration of comments, the criteria were prepared for final publication. Because of timing problems, the new standards were adopted by the District by emergency rule on January 25, 2002, and not noticed as final standards. The standards, and supporting documentation, were sent to EPA for consideration, and EPA believes that the District is pursuing an ambitious and promising approach. However, there remain several scientific issues with the criteria and their application. Sufficient time was not available to resolve these remaining issues before the legal deadline for establishing these TMDLs.

Because of the lack of documentation for some aspects of the new criteria, EPA based its TMDLs on interpretation of the District's narrative standard, relying upon scientific work completed by the Chesapeake Bay Program, as discussed in detail in the TMDL Report. The two approaches result in different instream TSS concentrations being used as the endpoint for the TMDLs: the District's approach resulted in an instream TSS value of about 7 mg/l, while EPA's approach resulted in a TSS concentration of less than 15 mg/l. Further, flows at which these concentrations apply also vary between the two approaches - the District's new water quality standards for secchi depth do not apply at flows greater than the long-term seasonal average flow and for Chlorophyll 'a' the design flow is the average seasonal flow for July through September. In the EPA approach, the TSS concentration of less than 15 mg/l applies to all flows during the growing season of April 1 through October 31.

² Based on the listing of the Anacostia River on the 1998 Section 303(d) list of waters still needing TMDLs.

III. Discussion of Regulatory Conditions

EPA finds that the TSS TMDLs it is establishing today for the Anacostia River meet of the Clean Water Act and implementing regulations. EPA's decision is outlined according to the regulatory requirements listed below.

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

The designated uses for the Anacostia River include:

- A. Primary contact recreation,
- B. Secondary contact recreation and aesthetic enjoyment,
- C. Protection and propagation of fish, shellfish and wildlife,
- D. Protection of human health related to consumption of fish and shellfish, and
- E. Navigation.

Prior to January 25, 2002, the only numeric water clarity standard for clarity in the D.C. water quality standards was applicable to a localized impairment, *i.e.*, dredging or construction activity. Turbidity increases were limited to 20 NTUs above ambient. As discussed above, in anticipation of this TSS TMDL, the District established, by emergency rulemaking, additional numeric standards relating to water clarity. The added water quality standards are as follows:

1104.7	Table 1	
	Secchi Depth (m) (seasonal segment average) [Note 1]	0.8
	April through October	
	Biological	
	Chlorophyll a	
	Concentration ($\mu\text{g/L}$) (seasonal segment average) [Note 1]	
	July through September	25

[Note 1] Shall apply to the tidal Anacostia River only and will be calculated as the seasonal average.

1105.5 The design flow to be used for establishing permit limitations for discharges to the District waters shall be as follows:

- (d) The numerical criteria for clarity shall not apply at flows greater than the long-term seasonal average flow.
- (e) For chlorophyll a the design flow shall be the average seasonal flow for July through September.

Section 1199, Definitions, does not define “segment.”

Federal regulations at 40 CFR §130.7(c) require that TMDLs “shall be established at levels necessary to attain and maintain the applicable narrative and numerical WQS.” On January 25, 2002, the District adopted by emergency rulemaking these changes to their current water quality standards. By its terms the emergency rule, which was both adopted and became effective on January 25, 2002, will expire on May 25, 2002, or upon publication of a final rulemaking in the D.C. Register, whichever occurs first. For purposes of the Clean Water Act (CWA), including the establishment of these TMDLs, the District’s promulgation of the above standards by emergency rulemaking does not constitute applicable water quality standards until they have formally submitted to EPA for review, and approved by EPA. See 40 CFR § 131.21.

To date the District has not submitted sufficient technical justification for the proposed water quality standards changes. The District has not made a complete submission of these water quality standards consistent with 40 CFR Part 131.

In light of the above discussion, EPA determined that application of the District’s narrative standard contained in Title 21 of the District of Columbia Municipal Regulations (DCMR), Chapter 11, Section 1104.1 is the appropriate and applicable water quality standard for these TMDLs. These TMDLs specifically protect the critical designated use C, protection and propagation of fish, shellfish, and wildlife, through the protection of submerged aquatic vegetation (SAV). While turbid water interferes with recreational use and aesthetic enjoyment of water, EPA believes recreational pursuits such as boating and fishing, use designation B, will be adequately protected by suspended solids criteria developed for protection of fish and other aquatic life. (Gold Book, 1986) See also Section 2.2 of the TMDL Report explaining how EPA interpreted the District’s narrative water quality criteria.

The TMDL Report, Section 3, TMDL Endpoint Determination, explains how the measurable TMDL endpoint, TSS concentration less than 15 mg/l, was developed. Because the Anacostia River is tidal, it is assumed that the Potomac River is also at this TSS concentration.

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

TMDLs are comprised of the sum of individual waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, and natural background levels. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving water body. Conceptually, this definition is denoted by the equation:

$$\text{TMDL} = \text{WLAs} + \text{LAs} + \text{MOS}$$

The CSOs are permitted point sources or waste load allocations (WLAs). Storm water that is not subject to permitting is a nonpoint source or load allocations (LA). However, much of the storm water runoff in the District is subject to permitting, either under the MS4 NPDES permit³ or a facility storm water permit. Because of data and modeling limitations, these TMDLs could not separate out the NPDES-regulated point sources of storm water from the nonpoint sources of storm water. Allocations representing a 77 percent reduction from current estimated loads apply to all sources, regardless of whether the allocation is a WLA or LA. Because of those specific limitations, this TSS TMDL will be expressed as:

$$\text{TMDL} = \text{CSOs} + \text{SW} + \text{MOS}$$

The TMDLs for the Anacostia River are summarized in the following table representing a 77 percent reduction in Maryland's and the District's storm water loads and 77 percent reduction in the District's combined sewer outfall (CSO) loads:

TMDL Loads (tons) Based on the 1989 Growing Season

TMDL (tons)	Background (tons)	CSO (tons)	SW (tons)	MOS
Maryland				
3,059.8	--	--	--	Implicit
Upper Anacostia River				
3,231.1	3,059.8	58.0	113.3	Implicit
Lower Anacostia River				
3,310.8	3,231.1	45.4	34.3	Implicit

Daily TMDL Loads (tons) for the 1989 Growing Season

TMDL (tons)	Background (tons)	CSO (tons)	SW (tons)	MOS
Maryland				
14.4	--	--	--	Implicit
Upper Anacostia River				
15.2	14.4	0.3	0.5	Implicit
Lower Anacostia River				
15.5	15.2	0.2	0.2	Implicit

³Municipal Separate Storm Sewer System permit.

Although TMDL values in the above table are total TSS loads, Sections 7.4.2 and 8.1 and Appendix C demonstrate that the turbidity results primarily from the clay size fraction and the 77 percent reduction must be applied to the clay size fraction and not just to the total existing loads.

According to federal regulations at 40 CFR 130.2(g), load allocations 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 loads should be distinguished.

Load allocations were developed for the dominant source categories. The District of Columbia Water and Sewer Authority (WASA) developed load estimates as part of the *Draft Long Term Control Plan* intended to control CSO discharges to the waters of the District and attain water quality standards. WASA provided the CSO load files used in developing these TMDLs. Other loads were estimated as detailed in Interstate Commission on the Potomac River Basin's *Calibration of the TAM/WASP Sediment Transport Model - Draft Report*, October 2001.

See TMDL Report, Section 8, Allocation Analysis, for further information.

3. The TMDLs consider the impacts of background pollutants.

The District is at the confluence of the Anacostia River with the Potomac River and occupies 17 percent to the Anacostia River watershed. EPA assigned all Maryland sources a gross allocation representing a 77 percent reduction over estimated current loadings to achieve and maintain the TSS TMDL endpoint of less than 15 mg/l. See TMDL Report, Section 6.1, Assessment of Non-point Sources, for further information.

4. The TMDLs consider critical environmental conditions.

The instream TSS concentrations were simulated for a three-year period consisting of a wet, dry, and average rainfall years in order to determine that the wet year, 1989, was the critical year. See TMDL Report, Section 7.4.1, Critical Conditions, for further information.

5. The TMDLs consider seasonal environmental variations.

Seasonal environmental variations were considered by modeling the TMDLs with observed weather data over an extended period of time. SAV is the critical element being protected by these TMDLs. These TMDLs apply to the SAV growing season, April through October.

6. *The TMDLs include a margin of safety.*

An implicit Margin of Safety (MOS) has been included in the TMDL by a daily simulation. The allocation representing 77 percent reduction over current estimated loads also provides an explicit two percent MOS. See the TMDL Report, Section 8.3, Margin of Safety.

7. *There is a reasonable assurance that the TMDL can be met.*

The District submitted a TSS TMDL dated January 4, 2002, which contained information on implementing the TMDL. The District's ongoing programs are identified in Section 9, Reasonable Assurance.

8. *The TMDLs have been subject to public participation.*

EPA published in the *Washington Post* notice of a 30-day comment period from January 4 through February 4, 2002, seeking public comment. In addition, the District held almost monthly TMDL meetings with all interested parties, public-noticed its TSS TMDLS, and held a public hearing on November 1, 2001. EPA sent by electronic mail the proposed EPA TMDL to many interested persons. EPA believes that all parties interested in the TSS TMDL were aware of EPA's TSS TMDLs. EPA received comments from WASA, the District's Department of Health, and EarthJustice.