Mountwood Park Lake, West Virginia

Total Maximum Daily Load
for
Sediment

Established by
The Environmental Protection Agency, Region III

September 30, 1998

TOTAL MAXIMUM DAILY LOAD
MOUNTWOOD PARK LAKE, WEST VIRGINIA

Introduction

The West Virginia Division of Environmental Protection (DEP) listed the Mountwood Park Lake (stream code #LK(L)-10-(1)) on its 1996 Section 303(d) list due siltation from construction and highway maintenance activities and streambank modification. EPA is establishing a Total Maximum Daily Load (TMDL) for the amount of sediment that enters the lake.

To develop this TMDL, EPA used two computer models. First, the Hydrologic Simulation Program Fortran (HSPF) was used to simulate the runoff of pollutants from the watershed, the delivery of those pollutants to the stream channels, and the routing of the pollutants to the lake. Second, the Environmental Fluid Dynamics Code (EFDC) was used to simulate the transport and fate of the pollutants once they were delivered to the lake. The models were then run with reduced pollutant load until water quality standards were met.

Table 1 summarizes the TMDL and the component wasteload (WLA) and load allocations (LA) needed to meet the TMDL.

Table 1. Summary of TMDL (kg/day)[a]

PARAMETER	WLA	LA[b]	MOS	TMDL
Sediment	0	1518.59	implicit	1518.59

TABLE NOTES:

a. The TMDL technical development report expresses the sediment loads on an annual basis. For the purpose of this table, and consistency with previous TMDLs, EPA has divided those values by 365 days to arrive at daily loads.

b. The load allocation is the sum of the loads from several categories of nonpoint sources. The separate allocations are shown below in the discussion of WLAs and LAs.

EPA developed this TMDL consistent with statutory and regulatory requirements and EPA policy and guidance. The Mountwood Park Lake TMDL addresses the following seven regulatory elements:

1. Water quality standards.

This TMDL ensure that Mountwood Park Lake will meet the applicable water quality criteria for siltation, thus ensuring that the water supports its designated use. West Virginia has only narrative criteria related to siltation.

Selecting an endpoint to represent attainment of standards is difficult in the case of siltation. Impoundments such as Mountwood Park Lake, by their nature, are subject to siltation. The challenge is to select a rate of siltation that is reasonable, recognizing that a significant amount of siltation is inevitable. Further, siltation is highly variable depending on the location within the

lake as sediment tends to accumulate at inlet points much faster than lake centers. For this TMDL, EPA determined, based on best professional judgement, that an appropriate indicator of standards attainment was a sedimentation rate that will preserve 30% of the depth (70% reduction) after 40 years. The existing rate of siltation would fill 70% of the capacity in only 30 years.

EPA believes the TMDL and the associated pollutant reductions are reasonable and implementable. A number of best management practices—both structural and non-structural—can significantly reduce sediment loads. For instance, maintained vegetated buffer strips along stream channels (in this case, the tributaries draining to Mountwood Lake) have been shown to capture a significant amount of sediment. The vegetation also helps reduce stream bank erosion. Recent estimates of the trap efficiency of buffer strips range from 70% to 90%.[1]

2. Waste load allocations and load allocations.

There are no point sources discharging to Mountwood Lake Park. The wasteload allocation, then, is zero. There is point source located in the watershed, Mountwood Park sewage treatment plant, but it discharges below the impoundment and was therefore left out of the analysis.

The TMDL includes load allocations (LA) for the nonpoint sources. The overall load allocation is broken down into allocations from the most significant categories of nonpoint sources. Table 2 summarizes the LAs.

Table 2. Load Allocations and Needed Reductions (kg/day)

SOURCE	SEDIMENT	
	Allocation	% Reduction
Residential	14.96	20
Forest	553.60	31
Cropland/Pasture	935.13	30
Barren	14.90	5
TOTAL LA	1518.59	(area-weighted) 30

[1]Qui, Z. and T. Prato, 1998. Economic Evaluation of Riparian Buffers in an Agricultural Watershed. Journal of the American Water Resources Association, Vol. 34, No. 4, pp. 877-890.

3. Background pollutant contributions.
Natural background is included as a component of the load allocations. The sediment loads associated with each land use category include the naturally occurring as well as human-induced contributions. The model was calibrated (i.e., adjusted so that the model predictions matched measured values) to water quality data that represents the cumulative impact from all sources—naturally-occurring and human-induced combined.

4. Critical conditions.
There is no single critical condition for siltation. In terms of sediment loading, the greatest amount is delivered to the lake during wet weather events. In terms of water quality, the sediment negatively impacts the lake regardless of when it is delivered. Therefore, the most meaningful and protective approach to limiting sedimentation is to consider all conditions under which the sediment is delivered. The use of a continuous simulation model in developing this TMDL accounts for all possible critical conditions, both in terms of loading and water quality.

5. Seasonal variations.
This TMDL appropriately consider seasonal variation. We have explicitly considered all seasonal variation by using a continuous simulation model that simulates loading and water quality throughout an entire year.

6. Margin of safety.
The Clean Water Act and federal regulations requires TMDLs to include a margin of safety (MOS) to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

We have employed the implicit approach to satisfying the MOS requirement in this TMDL by using conservative assumptions in the modeling process. The allocations and associated reductions are based on comparisons with the loads simulated for 1989. Of the seven years over which the model was run, 1989 had the highest loads. By prescribing reductions based on a high-load year, we have ensured that water quality standards will be met in high-load years and, with a margin of safety, in typical years with lower loads.

7. Public participation.

EPA published and requested comments on the proposed TMDLs on July 2, 1998 in the Charleston Gazette and six other newspapers across the state. EPA held a public meeting on July 16, 1998 in Parkersburg, West Virginia. In addition, EPA requested comments from United States Fish and Wildlife Service and no comments were received. EPA did not receive comments from any individuals and organizations specifically for Mountwood Park Lake.

FINAL AGENCY ACTION

W. Michael McCabe
Regional Administrator
EPA Region III

OCT 0 1 1998
Date