

Total maximum daily load guidance

Interpreting wasteload allocations for the development of water quality based effluent limits

The following discussion addresses interpretation of “daily” time increment wasteload allocations (WLAs) in total maximum daily load (TMDL) documents for the development of water quality-based effluent limits for National Pollutant Discharge Elimination System (NPDES) permits.

In its November 15, 2006, memorandum [“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”](#) (Anacostia memorandum), U.S. Environmental Protection Agency (EPA) describes its expectations with respect to the appropriate time increments used to express TMDLs. The EPA recommends that “... all TMDLs and associated load allocations and wasteload allocations be expressed in terms of daily time increments. In addition, TMDL submissions may include alternative, non-daily pollutant load expressions in order to facilitate implementation of the applicable water quality standards.”

The “time increments” considered in models and data analysis used to establish TMDLs vary depending on various factors including water quality standard requirements, model design, data availability, water body or watershed specific hydrologic factors and the nature of the impairment amongst others. Understanding the analytical basis for the TMDL is fundamental in selecting appropriate restoration strategies for TMDL implementation. Unfortunately, emphasis placed on the expression of daily time increments for WLAs also leads to the probability that implementation will focus on daily time increments regardless of whether these are supported by the analysis underlying the TMDL. This has particular relevance for the development of water quality based effluent limitations for NPDES permits. The EPA’s memorandum addresses this issue as follows:

Facilitating implementation of WLAs through the NPDES Permit process

In certain circumstances (e.g., impairments caused by stormwater), or where the applicable water quality criteria are expressed as a long-term average, it may be appropriate for TMDL documents or their supporting analysis to clearly set forth the implementation-related assumptions underlying any WLA expressed as a “daily” load. To facilitate implementation of such a load in water bodies where the applicable water quality standard is expressed in non-daily terms, it may be appropriate for the TMDL documentation to include, in addition to WLAs expressed in daily time increments, WLAs expressed as weekly, monthly, seasonal, annual, or other appropriate time increments. When this approach is taken, the TMDL and its supporting documentation should clearly explain that the non-daily loads and allocations are implementation-related assumptions of the daily WLAs and are included to facilitate implementation of the daily allocations as appropriate in NPDES permits and nonpoint source directed management measures. The supporting documentation should discuss the reasons for, and assumptions behind, the non-daily loads to facilitate their understanding and use in the implementation phase.

The purpose of this discussion is to ensure that TMDL documents include language to assist in the selection of the appropriate time increments for development of water quality based effluent limits (WQBELs) for NPDES permits. The EPA’s memorandum notes that 40 CFR § 122.44(d)(1)(vii) requires the permitting authority to

ensure that “...effluent limitations developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR. 130.7. This provision does not require that effluent limits in NPDES permits be expressed in a form that is identical to the form in which an available waste load allocation for the discharge is expressed in a TMDL. Rather, permit limits need only be “consistent with the assumptions and requirements” of a TMDL’s wasteload allocation.”

The use of the appropriate time increments in developing effluent limits for NPDES permits has significant implications with respect to the costs associated with TMDL implementation. Shorter time period effluent limits are more challenging and expensive to achieve and should be developed if TMDLs are predicated on model outcomes or data analysis requiring short time increment waste load allocations for point sources in the watershed. On the other hand, TMDLs that are based on assumptions of longer term (seasonal or annual) pollutant load contributions from point sources should not result in the development of short time increment WQBELs. The TMDL documents should include language to assist NPDES permit staff to correctly interpret WLAs and the time increments that should be used to derive appropriate water quality based effluent limitations.

An example from a TMDL that is currently under development:

The draft Carver County five lakes TMDL includes a WLA for the Bongards Creamery. The TMDL analyzed phosphorus loads to Winkler Lake on an annual basis and made no attempt to model daily phosphorus contributions from point or nonpoint sources. The standard approach is to derive the loading capacity from annual watershed loads, then divide the total by 365 in order to conform to the court’s decision and EPA’s guidance about the need for “daily” time increment load expressions in TMDLs.

The following table illustrates the potential problem by comparing the WLA values from the TMDL and actual monitoring data from the facility:

TMDL		2008 Discharge monitoring reports data	
Annual WLA	Daily WLA	Annual Load	Daily Load (cal. mo. avg.)
210 kg/yr	0.58 kg/day	38.2 kg/yr	1.4 kg/day

The Bongards Creamery operates a stabilization pond wastewater treatment facility which is able to meet a permit limit based on the wasteload allocation expressed as an annual load but will need to make significant improvements to comply with a permit limit based on the WLA expressed as a daily load. The calendar month average daily load was calculated by dividing the annual load by the number of days (27) during which the facility discharged in 2008.

While the TMDL does not require daily time-increment load reductions from Bongards in order to restore water quality in Winkler Lake, expression of the WLA in kilograms/day could be construed to require the development of a daily NPDES permit limit. Such a limit would result in significant noncompliance and/or have substantial financial implications for the Bongards Creamery.

WQBELs must be consistent with the assumptions and requirements of the WLAs from which they are derived. Wasteload allocations should not be interpreted to require the development of WQBELs that are more restrictive than justifiable based on the assumptions upon which the TMDL’s WLAs have been established. Clarifying these concepts in TMDL documents will assist NPDES permit staff in appropriately translating WLAs into water quality based effluent limitations. To that end, the following language should be included in TMDL reports:

Wasteload allocation section: Watershed scale pollutant load modeling was conducted and analyzed on a(n) _____ (annual, seasonal, daily, four day average, flow and load duration curve, other) basis to establish this TMDL at a level necessary to attain and maintain applicable water quality standards. Daily WLAs were derived from this analysis. See the Implementation Section of this report for alternative, non-daily, pollutant load expressions recommended for the development of water quality based effluent limits.*

Implementation section: Although the TMDL's individual WLAs are expressed in terms of both daily (Kg/day) and _____ (Kg/___), for implementation purposes, water quality based effluent limits (WQBELs) developed for NPDES permits do not necessarily have to be expressed in terms of a daily limit*. WQBELs should be consistent with the time increment assumptions upon which the TMDL was established. Additional considerations for the development of permit limits include the type of facility, the nature and frequency of the discharge and compatibility with any other applicable effluent limits.

*See EPA November 15, 2006, memorandum ["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"](#)