

COMMONWEALTH OF VIRGINIA


Department of Environmental Quality

Water Division

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Subject: Guidance Memo No. 03-2013
Method for Calculating E. Coli TMDLs based on Fecal Coliform Modeling

To: Regional Directors

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Summary:

This guidance addresses the issue of calculating E. coli TMDLs from HSPF-modeled fecal coliform time series.

Electronic Copy:

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET, and for the general public on DEQ's website at: <http://www.deq.state.va.us/water/>.

Contact information:

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Disclaimer:

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, It does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Method for Calculating E. Coli TMDLs Based on Fecal Coliform Modeling

Background

During the transition from fecal coliform to *E. coli* as the indicator species for recreational use support, DCR, DEQ and EPA have agreed to apply a translator to in-stream fecal coliform data to determine whether reductions applied to the fecal coliform load would result in meeting in-stream *E. coli* criteria (for additional details, please refer to Guidance Memorandum No. 03-2012 *Model Calibration and Verification for Bacteria TMDLs*).

Issue

For bacteria TMDLs under development for the 2004 submittal requirements, *E. coli* is the primary applicable water quality target because the fecal coliform criteria will be phased out and the *E. coli* criteria are the more stringent. However, the loading rates for watershed-based modeling are available only in terms of fecal coliform. Therefore, a method is needed to calculate *E. coli* TMDLs by using a fecal coliform model and the in-stream translator.

Modeling Procedure

The following procedure has been developed by DEQ and DCR staff in collaboration with several TMDL consultants. The steps to ensure compliance with both the single sample maximum and the calendar month geometric mean criteria for *E. coli* using a fecal coliform model are as follows:

- Determine, by source category, the allocation scenarios to meet the single sample maximum fecal coliform criterion (400 cfu/100ml).
- Apply the in-stream translator to evaluate compliance with the single sample maximum *E. coli* criterion (235 cfu/100ml).
- Simulate additional reductions if necessary to achieve compliance.
- After compliance with the single sample maximum criterion has been achieved, evaluate compliance with the calendar month geometric mean fecal coliform criterion (200 cfu/100ml).
- Apply the in-stream translator to evaluate compliance with the calendar month geometric mean *E. coli* criterion (126 cfu/100ml).
- Simulate additional reductions if necessary to achieve compliance.

TMDL Calculation

The modeling procedure described above can result in multiple potential allocation scenarios that all meet the applicable *E. coli* targets. One scenario must be selected for presentation in the TMDL report. The *E. coli* loadings in the final allocation scenario and in the TMDL equation presented in the TMDL report should be calculated as average annual in-stream loads at the

downstream limit of the impairment. The *E. coli* loadings for WLA and LA should be calculated as follows:

- Translate the modeled fecal coliform time series to an *E. coli* time series using the in-stream translator
- Calculate a total average annual in-stream load at the downstream limit of the impaired segment by multiplying the *E. coli* time series by the modeled flow
- Develop an annual WLA table for *E. coli* using permitted concentration (126 cfu/100 mL) and the appropriate design flow and calculate the total WLA as the sum of all permitted facility *E. coli* loads
- Subtract the annual WLA from the total average annual load to obtain the annual LA.

If possible, the LA should be equal to the sum of the source category loads presented in the allocation scenario table. These loads should be obtained by generating source specific fecal coliform time series, translating these to *E. coli* time series and multiplying by the modeled flow. The process for calculating the source category loads must be described in the TMDL development chapter of the TMDL report.

Implementation

The procedure described above should be applied in all currently ongoing and future bacteria TMDLs until further notice. The TMDL reports will contain descriptions of the process as well as clearly labeled tables indicating that the TMDL, LA and WLA load is presented as an in-stream load.

DEQ TMDL staff will distribute this memo to all contractors currently developing bacteria TMDLs. DCR TMDL staff is responsible for communicating the content of this memo to the contractual staff developing TMDLs in the Middle and South River watersheds.