

March 5, 2000

Canute Dalmasse  
Vermont Department of Environmental Conservation  
103 South Main St. 1 S  
Waterbury VT 05671-0401

**SUBJECT: Notification of Approval of Winooski River at Cabot TMDL**

Dear Mr. Dalmasse:

Thank you for your submittal of the Total Maximum Daily Load (TMDL) for the Winooski River Below Cabot Village (for pathogens). This waterbody is included on Vermont's 1998 303(d) list as a high priority for TMDL development to address bacteria loading from failing septic systems and direct sewage discharges.

The U.S. Environmental Protection Agency (EPA) hereby approves Vermont's January 2001 Winooski River Below Cabot Village TMDL. EPA has determined that this TMDL meets the requirements of §303(d) of the Clean Water Act (CWA), and of EPA's implementing regulations (40 CFR Part 130). Attached is a copy of our approval documentation.

We are pleased with the quality of your TMDL submittal. My staff and I look forward to continued cooperation with the VT DEC in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA.

Sincerely,

Ronald Manfredonia  
Surface Water Branch Chief  
Office of Ecosystem Protection

cc: Wally McLean, VT DEC  
Tim Clear, VT DEC

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EPA NEW ENGLAND'S REVIEW of VERMONT'S  
**TMDL FOR WINOOSKI RIVER BELOW CABOT VILLAGE**

**TMDL:** Winooski River, below Cabot Village (Waterbody ID: VT08-09)  
Winooski River Watershed in Washington County  
Towns: Cabot and Woodbury

**DATE:** February 15, 2001

**STATUS:** Final

**IMPAIRMENT/POLLUTANT:** Pathogens. The TMDL is for E. coli.

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**BACKGROUND:** The Vermont Department of Environmental Conservation (VTDEC) submitted to EPA New England the final *Total Maximum Daily Load for Pathogens: Winooski River Below Cabot Village* with a transmittal letter dated January 31, 2001 (received by EPA on February 5, 2001). Also included in the administrative record file are the following documents:

- *Draft Total Maximum Daily Load for Pathogens: Winooski River Below Cabot Village* (VT DEC, July 2000)

- *EPA New England's Review of Vermont's TMDL for the Winooski River Below Cabot Village* (EPA, October 31, 2000)

## **REVIEW ELEMENTS OF TMDLS**

*Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. § 130 describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.*

### **1. Description of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking**

*The TMDL analytical document must identify the waterbody as it appears on the State/Tribe's 303(d) list, the pollutant of concern and the priority ranking of the waterbody. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and, (4) explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments, or chlorophyll a and phosphorus loadings for excess algae.*

The TMDL for the Winooski River describes the waterbody and the cause of impairment as identified in Vermont's 1998 303(d) list. The impaired reach is located in the uppermost portion of the Winooski River Basin upstream from Lower Cabot Village. The document describes the pollutant of concern, pathogens. The TMDL notes that because the VT Water Quality Standards identify E. coli as the indicator organism for the presence of pathogens, the TMDL was developed for E. coli. The document states that the waterbody is among those scheduled for TMDL development in 2000, which represents a high priority ranking. The document identifies the sole pollutant sources as failed septic systems (nonpoint sources), direct domestic sewer discharge pipes (point sources) from residences, and an NPDES permitted direct discharge from the Cabot High School. These residential sources were identified through sanitary surveys conducted by the Vermont Agency of Natural Resources in 1992 and 1993. The decision to list this Winooski River reach on the 1998 303(d) List was based on the results of these sanitary surveys and the presumed impairment; instream monitoring data were not available. No loading is attributed to nonpoint sources (other than the failed septic systems) as available information provides no indication of such sources. A new municipal waste water treatment plant will be built; all direct domestic discharges and failed septic systems will be tied into the new plant, as will the permitted discharge from Cabot High School.

Assessment: VT DEC has adequately identified the water body, the pollutant of concern, the magnitude (see TMDL pages 7 and 8) and location of the sources of pollution. The TMDL also includes an adequate description of assumptions made in developing the TMDL.

## **2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target**

*The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.*

The TMDL describes the applicable water quality standards, which include numeric E. coli criteria (not to exceed 77 organisms/100ml) as well as the designated uses for a Class B water, which include swimming and other primary contact recreation. The TMDL also cites Vermont's antidegradation policy. The water quality target is set equal to the E. coli water quality standard of 77 organisms/100ml.

**Assessment:** Adequately addressed.

## **3. Loading Capacity - Linking Water Quality and Pollutant Sources**

*As described in EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 C.F.R. § 130.2(f) ). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. § 130.2(i) ). The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation.*

*In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. § 130.7(c)(1) ). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading*

*expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.*

The TMDL sets the loading capacity equal to the maximum concentration of E. coli allowed in the water quality standards, 77 organisms/100ml. The document justifies the use of concentration rather than mass per time by stating that loading capacity expressed as concentration establishes a clearer link between attainment of water quality standards (which are expressed as concentration) and the allowable loading. In addition, VT DEC monitors and permits point sources of E. coli based on concentration rather than mass loadings.

The TMDL concludes that low flow periods represent the critical condition, as discharges from sources are fairly constant year round resulting in higher concentrations as streamflow decreases. Because in-stream water quality monitoring data are not available, current in-stream E. coli concentrations for 7Q10 conditions were determined through dilution calculations (using estimates of direct discharges and inputs from failing septic systems). In this calculation, background conditions including nonpoint source inputs (other than failed septic systems) were assumed to be 77 E. coli organisms/100ml (the water quality standard) which was considered conservative (i.e., actual concentrations are likely to be lower) based on land use and soils in the watershed and considering that low flow conditions correspond to dry weather and little overland flow.

**Assessment:** Adequately addressed. EPA agrees that expressing loading capacity in terms of concentration is appropriate for bacteria TMDLs.

#### **4. Load Allocations (LAs)**

*EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 C.F.R. § 130.2(g) ). Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. § 130.2(g) ). Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.*

*If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this*

*decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable water quality standard, and all nonpoint and background sources will be removed.*

The TMDL sets the load allocation equal to the water quality standard of 77 organisms/100ml for forested, agricultural and urban/developed land. The TMDL assumes there are no significant nonpoint sources (other than the failing septic systems) of fecal contamination based on the low degree of development and the high degree of permeable land cover in the watershed (70% is forested). Because no sampling data exist to enumerate nonpoint or background sources, 77 organisms/100ml was selected as a conservative allocation.

**Assessment:** Adequately addressed. EPA agrees that the selection of 77 organisms/100 ml is a reasonable load allocation given the limited data available, and given that the TMDL provides for follow-up monitoring to verify the accuracy of background loading assumptions.

## **5. Wasteload Allocations (WLAs)**

*EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 C.F.R. § 130.2(h) ). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable water quality standard, and all point sources will be removed.*

*In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity.*

*When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. But it is necessary to allocate the loading capacity among individual point sources as necessary to meet the water quality standard.*

*The TMDL submittal should also discuss whether a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. In such cases, the State/Tribe will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.*

Once the new treatment plant is built, it will be the only point source of pathogens in the watershed. Existing direct domestic discharges, failed septic systems, and

the Cabot High School discharge will all be tied into the new plant and treated. The TMDL sets the wasteload allocation at 77 organisms/100ml., the in-stream water quality standard for E. coli.

**Assessment:** Adequately addressed.

## **6. Margin of Safety (MOS)**

*The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1) ). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.*

The TMDL identifies an implicit MOS in the selection of the water quality standard for the load and wasteload allocations. For the wasteload contribution, likely instream die-off and loss due to settling of bacteria should cause actual concentrations to be well below the 77 organisms /100ml standard.

**Assessment:** Adequately addressed.

## **7. Seasonal Variation**

*The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1) ).*

The TMDL states that the expression of wasteload allocations in terms of concentrations set equal to the water quality standard applies for all seasons and for all environmental conditions. Thus the TMDL accounts for all seasonal variations.

Assessment: Adequately addressed

## **8. Monitoring Plan for TMDLs Developed Under the Phased Approach**

*EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan when a TMDL is developed under the phased approach. The guidance recommends that a TMDL developed under the phased approach also should provide assurances that*



*nonpoint source controls will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. EPA's guidance provides that a TMDL developed under the phased approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.*

The TMDL provides for monitoring at the soon-to-be-built Cabot Village WWTP to ensure compliance with the TMDL and with the effluent limits in the NPDES permit. Periodic ambient monitoring will also be conducted at the lower end of the impaired segment once all connections to the new treatment facility are complete. Among other things, this monitoring will verify assumptions in the TMDL regarding nonpoint background sources.

**Assessment:** Adequately addressed.

## **9. Implementation Plans**

*On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.*

The TMDL does not include a specific section describing an implementation plan, but implementation is described elsewhere in the TMDL as being achieved primarily through construction of the WWTP.

**Assessment:** Adequately addressed.

## **10. Reasonable Assurances**

*EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both*

*point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for EPA to determine that the load and wasteload allocations will achieve water quality standards.*

*In a water impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State/Tribe implementation plans and “may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs.”*

The TMDL demonstrates reasonable assurance through reference to the NPDES permit for the Cabot WWTP that was issued May 8, 2000, and through reference to the extensive planning effort that the state and town have engaged in on this project.

**Assessment:** Adequately addressed

## **11. Public Participation**

*EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. § 130.7(c)(1)(ii) ). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe’s public participation process, including a summary of significant comments and the State/Tribe’s responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. § 130.7(d)(2) ).*

*Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.*

Public participation has been provided through the NPDES permit process, which included public distribution of a fact sheet indicating that the construction of the Cabot plant will result in attainment of water quality standards in the Winooski pursuant to section 303(d) of the CWA. The fact sheet indicates that pollutant reductions brought

about by the WWTP will allow the water quality goals to be met for this section of the Winooski River. In addition to the public comment process associated with the NPDES permit, public notice was given (via two daily area newspapers and the VT ANR website) and comments solicited on the TMDL document itself. No comments were received.

**Assessment:** Adequately addressed.