



## State of Vermont

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Department of Fish and Wildlife  
Department of Forests, Parks and Recreation  
Department of Environmental Conservation  
State Geologist  
RELAY SERVICE FOR THE HEARING IMPAIRED  
1-800-253-0191 TDD>Voice  
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES  
Department of Environmental Conservation

**Office of the Commissioner**  
103 South Main Street  
Building 1 South

Waterbury, VT 05671-0401

<http://www.anr.state.vt.us/dec/dec.htm>

Phone: (802) 241-3808

Fax: (802) 244-5141

October 11, 2006

Robert Varney, Regional Administrator  
EPA Region 1  
United States Environmental Protection Agency  
1 Congress Street, Suite 1100  
Boston, MA 02114-2023

Dear Mr. Varney:

The Vermont Agency of Natural Resources is pleased to formally submit the Potash Brook TMDL for EPA's review and approval. The Agency anticipates submitting similar TMDLs for eleven additional urban stormwater-impaired streams over the next year.

The Potash Brook TMDL, and the other TMDLs to follow, represent the culmination of nearly two years and over \$1.2 million of joint effort among the Vermont Agency of Natural Resources (VANR), the U.S. Environmental Protection Agency (EPA), the University of Vermont (UVM) and TetraTech, Inc. This effort also incorporates findings of the Vermont Water Resources Board's scientific docket proceeding (Investigation into Developing Cleanup Plans for Stormwater Impaired Waters – VWRB Docket No. INV-03-01). The docket involved a cooperative effort among all sides of the stormwater issue, including many local and national experts and EPA, and was designed to identify the most expeditious way to remediate Vermont's stormwater-impaired streams.

The enclosed TMDL also incorporates invaluable input from the Vermont Stormwater Advisory Group (SWAG), which is comprised of representatives of government agencies, private consulting companies, environmental organizations and academia. The SWAG was convened by the Vermont Department of Environmental Conservation (VTDEC) after the scientific docket closed in order to develop the actual science and implementation process necessary to implement the conceptual ideas developed through the docket process. A SWAG steering committee closely guided the development of hydrologic models, selection of attainment watersheds and TMDL target development. This committee included Mark Voorhees and Eric Perkins from EPA-Region 1, Bruce Cleland from EPA-Region 10, who was then serving as the ACWF National TMDL Circuit Rider, Dr. Breck Bowden from UVM, and Tham Saravanapavan from TetraTech Inc. As a result of a generous offer of support from EPA-Region 1, an existing contract with TetraTech was used to jump-start the hydrologic modeling of the impaired watersheds as an initial step towards developing the necessary hydrologic targets.

The fundamental concept upon which the Potash Brook TMDLs is based – that the focus of any successful water quality remediation efforts must be the control of impervious surface runoff-driven hydrologic modification – was a principle finding of the Vermont Water Resources Board scientific docket process. An excerpt of docket findings relative to the development of these TMDLs specifically states that:

*“Both the water flow and sediment targets can be used to guide the development of the stormwater management plan. However, currently there is less uncertainty about stream hydrology than there is about stream sediment dynamics. Therefore, in most cases the hydrologic targets will be the primary ones driving the load allocation and development of specific management strategies. Hydrology is also the major driver for stream channel erosion, so control of high water flows will also achieve reductions in channel sediment movement. If sediment does not respond as desired over time, sediment loading might be revisited. In some streams, where geomorphic condition is relatively good, sediment targets could be used initially to determine management actions designed to control wash-off from developed sites. This strategy is based on the assumption that there is a relationship between healthy in-stream geomorphology/habitats and stormwater management. Although the precise nature of this relationship is uncertain, it is reasonable to expect that as hydrology and sediment dynamics are restored, habitats will improve, and the macroinvertebrate and fish community will recover. Although decisions about stormwater impairment are ultimately made based on the biotic criteria, positive changes in physical habitat conditions within the stream will indicate progress towards the VWQS within an adaptive management approach.”*

This fundamental approach was supported by both the SWAG and EPA representatives throughout VTDEC’s development of the Potash Brook TMDL, and has been guiding the hydrologic modeling developed for all of Vermont’s urban stormwater TMDLs. For instance, at the second SWAG meeting held on October 21, 2004 Bruce Cleland made a presentation on the specific logic path that linked the instream aquatic life support impairments to the recommended surrogate of stormwater runoff rates and volumes. The following excerpt is from a draft of the “Vermont Storm Water TMDLs Expanded Technical Analysis -- Potash Brook” written by Bruce Cleland, in the section entitled “Surrogate Measures”:

*“Potash Brook is on Vermont’s §303(d) list as a result of bioassessment data. Existing information suggests that the impairment is most likely caused by water flow and sediment dynamics being out of balance. Physical habitat in the channel no longer supports healthy macroinvertebrate communities, as measured using biological criteria developed by VTDEC pursuant to the Vermont’s Water Quality Standards. Hydrology is a major driver for both upland and stream channel erosion. Consequently, control of high water flows will also achieve reductions in delivery and transport of sediment in Potash Brook (Figure 4-1). Best professional judgment suggests that a storm water management plan targeted toward restoring an appropriate balance of water flow and sediment loading has the greatest potential for success.”*

In further support of this effort, in October, 2004 an EPA Preliminary draft document for Internal

Discussion was prepared by EPA regarding *Stormwater/Hydrologic Targets for TMDLs that Address Stormwater/Aquatic Life Impairments*. The document's stated objective was:

*"To provide justification for using stormwater/hydrologic targets as a surrogate in the TMDL process for aquatic life impairments due to excessive stormwater runoff. The stormwater/hydrologic targets will be used to identify and quantify meaningful targets in the TMDL process to represent loading capacities and estimate necessary allocations when excessive stormwater runoff and associated effects are believed to be responsible for aquatic life impairments."*

The document continues, in the section entitled Storm Water/Aquatic Life Impaired Streams In Vermont:

*"Channel Alterations and Increased Pollutant Loads from In-Stream Sources. Increased storm water runoff rates from developed and impervious areas results in increased frequency and magnitude of higher in-stream flow rates which may de-stabilize stream channels and result in the increased generation of in-stream pollutants (i.e., sediments) through bank erosion and scouring. Increased frequency and magnitude of higher flow rates means greater erosion potential in the stream because of increased shear stress at the sediment/water interface due to increased flow velocities. Sediments from in-stream sources may contribute to aquatic life impairments through habitat degradation because of subsequent sedimentation further downstream in the system (i.e., increased embeddedness) and increased turbidity. In addition, channel alterations such as stream over-widening may eliminate pools and other important habitat features."*

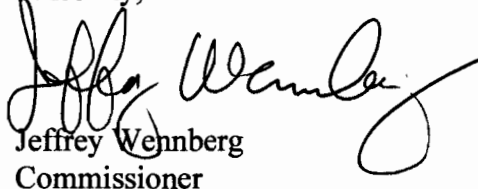
*"Increased scouring and bank erosion due to increased in-stream flow velocities is directly proportional to stormwater runoff volumes and rates. It is very difficult without extensive data to accurately estimate and predict the in-stream sediment processes that determine in-stream sediment load and its fate (i.e., transport out of the system or sediment deposition within the system). To provide reasonable estimates a detailed hydro-dynamic sediment transport model of the system is needed. Developing such a model is highly resource and time intensive and requires extensive field data/information that is not presently available for the stormwater-impaired streams. For example, the model would require detailed stream channel hydraulic information (e.g., cross sectional and slope data) as well as a thorough inventory of stream bank materials. As in the case of estimating the effects of watershed pollutant load, it would be very difficult to confidently estimate the effects of the in-stream sediment loading on the aquatic life community especially when other stressors may be affecting the biological community."*

In consideration of the above statements, it follows that attempts to quantify and/or monitor the actual instream sediment loads are both highly complicated and expensive, and will ultimately represent a futile pursuit. The stream geomorphic assessment data that has been collected on these streams points once again to the conclusion that endogenous sources of sediment loading are the preponderant source. Therefore, the only effective, scientifically based and rational approach to remediation of these sediment impaired streams is to control and stabilize the watershed hydrology, and in doing so, concurrently reduce endogenic loadings.

VTDEC faces a statutorily imposed deadline of September 2007 for the submittal of seventeen stormwater TMDLs or Water Quality Remediation Plans to EPA. It is critical, therefore, that we hear quickly whether or not the enclosed TMDL is acceptable to EPA. If it is approved, then VTDEC will, as soon as possible, submit eleven additional TMDLs based on the same fundamental approach for Vermont's remaining urban stormwater-impaired streams. The final five TMDLs, which relate to individual ski areas, will also be submitted by September 2007.

VTDEC thanks EPA for its support and input in the development of the Potash Brook TMDL. Region 1 should be proud of its leadership in championing this innovative approach to stormwater-impaired waters.

Sincerely,



Jeffrey Wennberg  
Commissioner

Cc: Ann Williams, Esq., EPA Region 1  
Canute Dalmasse, ANR Secretary  
Mary Borg, Esq., Agency of Natural Resources  
Wallace McLean, Director, Water Quality Division  
Pete LaFlamme, VTDEC Stormwater Management Program