Responses to Public Comments on the Draft Potash Brook TMDL

Comments received on the Draft Potash Brook TMDL

Identification	Submitted by:	Signed by:
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Following each numbered comment below, the [] identifies the commentor's identification.

Part 1: Comments pertaining to legal interpretations of CWA and various implementing regulations

1. Section 303(d) of the Clean Water Act specifically requires that DEC establish TMDLs for "pollutants." The draft TMDL contains no maximum pollutant load calculation for sediment or any other "pollutant" as that term is defined in 33 U.S.C. Section 1362(6). The pollutant-surrogate approach cannot legally be labeled a TMDL consistent with 33 U.S.C. Section 1313(d)(1)(C) and thus EPA has no authority to approve it as such. Sediment is the appropriate "pollutant" for which a TMDL should be issued. [CLF]

   Response to 1:
   Section 303(d)(1)(C) of the Clean Water Act (33 U.S.C. Section 1313(d)(1)(C)) provides that each State shall establish, for waters listed pursuant to Section 303(d)(1)(A), the total maximum daily load ("TMDL") for those pollutants which EPA has identified as suitable for such calculation. The term "total maximum daily load" is not specifically defined in the Clean Water Act. While TMDLs are intended to address impairments resulting from pollutants, there is nothing in EPA's regulations that forbid expression of a TMDL in terms of a surrogate for pollutant-related impairments.

EPA's regulations state that TMDLs can be expressed in several ways, including in terms of toxicity, which is a characteristic of one or more pollutants, or by some "other appropriate measure." 40 C.F.R. § 130.2(i). They also state that TMDLs may be established using a biomonitoring approach as an alternative to the pollutant-by-pollutant approach. 40 C.F.R. § 130.7(c)(1). This flexibility in the expression of TMDLs supports reliance on a surrogate where, as in this case, there is a reasonable rationale and the TMDL is designed to ensure attainment with water quality standards.

As discussed in the TMDL documentation, a combination of pollutants found in stormwater, including sediment (from wash-off and instream sources) and associated pollutants such as metals, is contributing to the aquatic life impairment in Potash Brook. However, there is no information that indicates that any pollutant is causing or contributing to an exceedence of any pollutant specific water quality criterion. Nor is there sufficient information available to identify specific pollutant loadings which, in combination, are contributing to the aquatic life impairment, particularly given the variability in types and amounts of pollutants depending on a range of storm events.

On the other hand, there is a strong correlation between pollutant loads and stormwater flows, for the reasons explained in the TMDL and supporting documentation. Therefore it is reasonable to rely on the surrogate measure of stormwater runoff volume to represent the combination of pollutants that contribute to the impairment of Potash Brook.

2. TMDL development is premature since DEC has not exhausted all of its options for bringing Potash Brook into compliance with WQS. TMDLs are only for those waters for which effluent limitations are not stringent enough to implement WQS and since DEC has failed to impose effluent limitations on eligible discharges, there is no basis yet to conclude that a TMDL is required. [CLF]

Response to 2:
Pollutants associated with stormwater flows causing impairments of Potash Brook come from NPDES-regulated point sources, such as discharges from municipal separate storm sewer systems (MS4s); non-NPDES regulated point sources, such as commercial parking lot runoff; and nonpoint sources, such as overland runoff and instream sediment erosion. EPA's regulations require the listing of an impaired segment on the CWA Section 303(d) list -- and the preparation of a TMDL -- if technology-based effluent limitations required under the CWA, more stringent effluent limitations required by federal, state, or local authority, or other pollution control requirements required by local, state, or federal authority are not sufficient to meet state water quality standards. See 40 CFR §130.7(b)(1). Conversely, as set forth in EPA's July 29, 2005 Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, EPA interprets §130.7(b)(1) to allow the removal of a water from the § 303(d) list, and its placement into the integrated list's § 4(b) category of waters that are impaired but no TMDL is needed, if effluent limitations and/or other pollution control requirements are stringent enough to implement water quality standards within a reasonable period of time. See EPA 2005 Guidance, p. 54.

Neither the statute nor the regulations obligate states to implement all possible actions to control the full suite of point and nonpoint sources before establishing a TMDL. This is particularly true where, as here, there are many varied sources within the watershed that cumulatively result in the adverse effects on the brook. In this case, the TMDL is a valuable tool for establishing reasonable targets on which future implementation actions can be based.

Finally, the commenter argues that DEC should exercise its residual designation authority under 40 C.F.R. § 122.26(a)(9)(i)(d) so that NPDES permits are required for all stormwater discharges to Potash Brook. This would enable DEC to remove Potash Brook from the § 303(d) list, and to place it in the § 4(b) listing category. Forty C.F.R. § 122.26(a)(9)(i)(d) provides the permitting agency with residual designation authority to require a NPDES permit for stormwater discharges that are determined to be causing or contributing to a water quality standards violations or are a significant contributor of pollutants. As a result of a recent Vermont Supreme Court decision, In Re Stormwater NPDES Petition, __A.2d __, 2006 WL 2457167, 2006 Vt 91 (August 25, 2006), DEC will be evaluating the petition for residual designation of stormwater discharges to Potash Brook. However, there is no statutory or regulatory reason to halt completion of the TMDL pending any final residual designation determinations. Even if additional point source stormwater discharges are required to obtain an NPDES permit, there will still be nonpoint sources of stormwater, including overland runoff and, in the case of sediment, instream erosion.

3. Clean Water Act regulations define a wasteload allocation as "the portion of a receiving water's loading capacity that is allocated to <u>one</u> of its existing or future point sources." 40 C.F.R. § 130.2(h) (Emphasis added). The regulatory definition does not contemplate the type of aggregate WLA contained in the Draft. To be consistent with the regulatory definition, the Draft must give some indication of the per capita responsibility for the overall flow reduction/increase assigned to each point source. [CLF]

<u>Response to 3:</u>
Forty C.F.R. Section 130.2(h) provides that point source discharges (interpreted by EPA to mean discharges subject to the NPDES permit program) must be addressed by the wasteload allocation component of a TMDL. Discharges involving process wastewater, non-contact cooling water, and other non-stormwater discharges are assigned individual waste load allocations pursuant to this regulation. Stormwater discharges, however, are less amenable to individual wasteload allocations. In recognition of this fact, EPA's November 22, 2002 guidance entitled "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Stormwater Sources and NPDES Permit Requirements Based on Those WLAs," provides that it is reasonable to express allocations for NPDES-regulated stormwater discharges from multiple point sources as a single categorical or aggregate wasteload allocation when data and information are insufficient to assign each source or outfall individual WLAs. EPA's guidance recognizes that the available data and information usually are not detailed enough to determine waste load allocations for NPDES-regulated stormwater discharges on an outfall-specific basis.

In the case of Potash Brook, VTDEC has determined that because the stormwater discharges are highly variable in frequency and duration, it is not feasible to establish specific wasteload allocations for each stormwater outfall. It is impossible to determine with any precision or certainty the actual and projected loadings for individual discharges or groups of discharges. During the implementation of the Potash Brook TMDL, through a watershed wide general permit, DEC will assign responsibilities to stormwater dischargers as necessary to meet the remediation targets.

4. A water quality remediation plan should be developed for Potash Brook so that it can be "delisted" from the 303(d) list via Category 4(b), thereby negating the need for a TMDL. [CLF]

Response to 4:
DEC has addressed the commenter's comment in the response to Comment #2. DEC, in full cooperation with EPA and in keeping with the spirit and recommendation of the Docket, has decided to prepare a TMDL for Potash Brook and the other Vermont urban stormwater-impaired watersheds.

5. The Draft TMDL determines that stormwater controls on point source discharges into Potash Brook are needed based on the Draft TMDL's wasteload allocations. Once the Draft TMDL is issued, all operators of point source stormwater discharges subject to state stormwater permitting in the Potash Brook watershed may need to obtain NPDES permits pursuant to Section 122.26(a)(9)(i)(C) of EPA's Phase II stormwater regulations. In addition, the state stormwater permitting system presumes that all stormwater discharges to which it applies are significant contributors of stormwater pollutants. Consequently, pursuant to section 122.26(a)(9)(i)(D) of EPA's Phase II stormwater regulations, ANR may need to issue NPDES permits for all point source stormwater discharges subject to state stormwater permitting in the Potash Brook watershed. [WRP]

Response to 5:
As stated in Response #2, 40 C.F.R. Section 122.26(a)(9)(i)(D) provides the permitting agency with residual designation authority to require a NPDES permit for stormwater discharges that are determined to be causing or contributing to a water quality standards violation or are a significant contributor of pollutants. In In Re Stormwater NPDES Petition, __A.2d __, 2006 WL 2457167, 2006 Vt 91 (August 25, 2006), the Vermont Supreme Court held that any designation decision under Section 122.26(a)(9)(i)(D) involves a particularized, fact-specific determination on a case-by-case basis as to whether certain discharges or categories of discharges should be designated as requiring a NPDES permit. Contrary to the comment submitted,the Court did not find that the state permitting system "presumes that all stormwater discharges to which it applies are significant contributors of stormwater pollutants" under federal law. Although the Vermont Supreme Court case did not deal with designation pursuant to 40 C.F.R. 122.26(a)(9)(i)(C), it is anticipated that a court would find that a similar fact-specific determination on a case-by-case basis would be applicable in that case also. As a result of the recent Vermont Supreme Court case, DEC will be evaluating the petition for the residual designation of stormwater discharges to Potash Brook.

6. The Draft TMDL inaccurately refers to areas of growth not currently subject to ANR's stormwater permitting program as non-jurisdictional. ANR has the duty and authority to manage and control all point source and nonpoint source discharges into Potash Brook as may be necessary to ensure that the receiving waters comply with the Vermont Water Quality Standards. [WRP]

   Response to 6:
   The draft TMDL's reference to "non-jurisdictional" discharges is a general reference to stormwater discharges from impervious surfaces less than one acre. Generally, a state stormwater permit is only required for stormwater discharges from impervious surfaces greater than one acre. Despite this, DEC clearly has the authority to require state stormwater discharge permits for any discharge from impervious surfaces less than one acre as necessary to meet the TMDL targets. See Section 22-302(a)(5) of DEC's Stormwater Management Rule for Stormwater-Impaired Waters.

7. Given the highly innovative and experimental nature of the approach taken by the Draft, it is important that the Draft include some mechanism to revisit the model's artificial targets in the event that the synthetic targets are met, but predicted in-stream responses do not occur. The commenter urges DEC to include a reopener clause that would allow DEC to "recalculate the TMDL" if new data demonstrates that recalculation is necessary. [CLF]

   Response to 7:
   EPA's "Guidance for Water-Quality based Decisions: The TMDL Process," US EPA, 1991, EPA440-4-91-001, states that if water quality standards are not met after implementation of a TMDL, the TMDL and allocations of load and wasteloads must be modified. See EPA Guidance, p. 25. The modification should be based on the additional data and information gathering required as part of the TMDL implementation process. Vermont will use the monitoring plan described in the TMDL, and the specific monitoring requirements set out in the general permit to implement the TMDL, to determine if the stormwater control measures required by the general permit are meeting the TMDL targets. If controls are meeting the TMDL targets, but water quality standards are not met, then Vermont will reevaluate the TMDL targets.

Part 2: Comments pertaining to technical or policy decisions

Use of Hydrology as Surrogate

8. The Draft states that it is based on the Water Resources Board's "Stormwater Cleanup Plan Framework" (Framework), but it discards a key aspect of the Framework by failing to establish "loading targets" for wash-off sediment. [CLF]

9. The Water Resources Board's Stormwater Investigation Docket outlined a plan for using both hydrology and sediment as surrogates for the full panoply of stormwater pollutants addressed by stormwater TMDLs. The Draft Potash Brook TMDL uses hydrology as a surrogate but not sediment. [WRP]

Response to 8 & 9:
The hydrologic targets selected for the Potash Brook TMDL are consistent with the recommended approach in the Docket report, which advocates the establishment of surrogate hydrologic targets as being the most useful and predictable way to attain water quality standards. The Docket also suggested including wash-off sediment as an additional surrogate for the pollutants that may be found in stormwater. However, VTDEC's subsequent detailed evaluation of Potash Brook has led VTDEC to conclude that wash-off sediment loading targets would not be a useful addition to the TMDL, as explained below.

Wash-off sediment is a subset of the sediment loads that are contributing to impairments in the urbanized streams. The 2005 geomorphic assessment for Potash Brook revealed that the brook is in a less than stable condition (undergoing active erosion) and 11 out of 15 assessed reaches were found to be highly sensitive to further channel instability. The assessment confirmed that the endogenous (i.e., instream) sediment load plays a much greater role than wash-off sediment in this system. Setting wash-off sediment targets would not address the endogenous sediment loads. In contrast, the selected approach of using hydrologic targets, focusing on the volume of stormwater runoff, acts to address both the wash-off sediment and the instream sediment dynamics associated with high flow runoff events. As explained in the TMDL documentation[1], there is a high correlation between sediment loads and stormwater flows. Stormwater targets are therefore a reasonable surrogate for sediment loads. Stormwater flow reductions will result in reductions of sediment inputs, as well as improvement in other stressors that contribute to impairment, such as channel instability and habitat destruction.

Given that stormwater flow is a reasonable surrogate for sediment loads, the question is whether there is any value in adding wash-off sediment load targets either as a surrogate for other pollutants that may be in stormwater, or as an additional basis for controlling sediment. In this case, there is nothing in the record that suggests that pollutants other

[1] *Expanded Technical Analysis: Utilizing Hydrologic Targets as Surrogates for TMDL Development in Vermont's Stormwater Impaired Streams*. Prepared by the U.S. Environmental Protection Agency and the Vermont Department of Environmental Conservation, September, 2006.

than sediment are significantly contributing to the impairments in the brook, so there is no apparent need to establish wash-off sediment load targets for the specific purpose of controlling such other pollutants. Moreover, to the extent that such pollutants exist and are associated with wash-off sediment, their loads will be reduced along with sediment reductions through the implementation of measures to meet the hydrologic targets.

VTDEC also sees little value in adding wash-off sediment targets to the TMDL in order to address sediment loads. Such targets would not be useful for purposes of TMDL implementation. The Docket report itself plainly states that hydrologic targets are more predictable in their connection to attainment of WQS than sediment loading. The Docket states on page 5 of Appendix A:

> *"Although both the water flow and sediment targets could be used to guide the development of the specific management measures, currently there is a better understanding of the hydrologic responses in streams than there is of the sediment dynamics in streams. Therefore, in most cases the hydrologic targets will be the primary ones driving the development of specific management strategies."*

Implementation efforts to achieve specific wash-off sediment loading targets would be incomplete, because they would ignore the larger problem of instream sediment production, as well as other stressors such as channel instability and habitat destruction. Management actions primarily focused on achieving the wash-off sediment targets could potentially conflict with more beneficial actions to address the hydrologic targets. For example, in a retrofit situation with limited space for a stormwater treatment practice, design decisions may need to be made to either maximize control of sediment (water quality) or runoff volumes. Even if sediment loading targets that include both wash-off and instream sediment could be established, the only reasonable way to achieve such targets would be to control stormwater flow. Therefore, the addition to the TMDL of sediment loading targets would not improve the VTDEC's or the public's understanding of what control measures would be needed to attain water quality standards.

In summary, the bottom line as to why hydrologic targets were used exclusively is that VTDEC believes these targets provide the best and most comprehensive measure to predict when an impaired stream will attain WQS. As stated above, it's believed that application of the hydrologic targets provides a reasonable expectation that watershed sediment loading from surface and gully erosion will be sufficiently controlled since a reduction in stormwater runoff will result in reduced wash-off and endogenous sediment loading. Since the publication of the Docket report, VTDEC has worked closely with and received financial support from EPA to develop the modeling framework upon which this TMDL is based. The sole purpose of the P8 modeling effort was to develop flow based targets for the impaired watersheds. EPA has supported the stormwater runoff approach as a surrogate for the "pollutant of concern" for TMDL development in this case.

10. Please remove the word "stormwater" from the title of the TMDL. We suggest the following title: Total Maximum Daily Load to Address Biological Impairment in Potash Brook. This may seem like a subtle distinction, but the TMDL is really being developed

for pollutant loads and other stressors to aquatic life, and stormwater is a surrogate for those loads and stressors. [USEPA-R1]

Response to 10:
VTDEC will re-title the TMDL as suggested.

11. The TMDL should include a short description or table of the most likely stressors (e.g., increased sedimentation, other pollutant stressors, impaired habitat, and low base flow) contributing to the biological impairment with citations to the various studies that have been done of the Potash watershed. Each stressor should then be linked to the surrogate selected for this TMDL: stormwater runoff volume. [USEPA-R1]

    Response to 11:
    VTDEC has made a determination that stormwater flows and the resultant instability and degradation of aquatic habitat in the stream channel is the primary cause of impairment in Potash Brook and therefore, hydrologic targets have been established to address that problem. While other stressors may be at play in Potash Brook, VTDEC doesn't believe, at this time, that they are contributing the same level of disturbance as the stormwater flows. Stormwater treatment and reduction of flows will lead to improved water quality in Potash Brook.

12. We also recommend that the section on fluvial geomorphic considerations be made more specific to Potash Brook. [USEPA-R1]

    Response to 12:
    The TMDL will be edited to reflect fluvial geomorphic considerations specific to Potash Brook.

13. We suggest the following formatting/organizational changes to the "Pollutant of Concern" section to help accommodate the additions referred to above: We suggest the title "Pollutant of Concern" be changed to " Description of Impairment" and that the subsection "Surrogate Measure for Biological Impairment" be changed to "Pollutants of Concern and Other Stressors". The additional site-specific information on stressors, including a revised section on reduced base flow tailored to Potash, would all fit under the Pollutants of Concern and Other Stressors heading. The bottom paragraph on page 4 (describing the surrogate approach) and the section on fluvial geomorphic considerations could be included in a section titled "Surrogate Measure for Multiple Stressors". [USEPA-R1]

    Response to 13:
    VTDEC will reorganize as suggested.

14. To further document the relationship between stormwater runoff and sedimentation, we recommend including an analysis of substrate composition and related data for Potash Brook and the attainment watersheds to the extent these data are available. This could be included as a technical addendum to the TMDL. [USEPA-R1]

Response to 14:
While substrate composition is a very good measure of aquatic life habitat in streams, VTDEC believes that a better overall measure of the instream habitat condition is the departure that exists between Potash Brook and an appropriate reference condition as related in the Stream Geomorphic Assessment data. This departure data will be added to the TMDL to further illustrate the link between stormwater runoff and habitat degradation.

Target Setting Approach

15. Please include a statement in the first paragraph under "Target Setting Approach" on page 8 that clarifies that all attainment watersheds meet or exceed Vermont's water quality standards criteria for aquatic life. Also, we suggest revising the first sentence under the Numeric Water Quality Target section to read "In a pollutant-specific TMDL, a stream's water quality target, or loading capacity, is the greatest amount of pollutant loading the water can receive without violating water quality standards." [USEPA-R1]

Response to 15:
VTDEC will edit as suggested.

16. We recommend that the target setting process be explained a little more clearly. In particular, the final paragraph starting at the bottom of page 11 may leave readers with the impression that the target is based on the mean of all 15 attainment FDCs rather than just the two matched with Potash. [USEPA-R1]

Response to 16:
VTDEC will edit as suggested.

Margin of Safety

17. TMDL lacks a sufficiently conservative Margin of Safety due to significant uncertainty, limited attainment stream data and untested nontraditional approach. [CLF, VNRC]

18. TMDL does not include a reasonably derived margin of safety and it is not clear as to how the selection of the mean flow value of the attainment streams is conservative. [WRP]

19. Please explain more clearly why the use of the mean of the attainment flow duration curves for target setting provides a margin of safety. [USEPA-R1]

Response to 17, 18, & 19:The mean flow of the two attainment streams was selected as the target flow condition in the Potash Brook TMDL to provide an intrinsic margin of safety that the selected targets would provide for the attainment of the Vermont Water Quality Standards. Due to the rigorous application of the attainment stream approach in

the Potash Brook TMDL, the targets are believed to be particularly accurate thus reducing the need for an overly conservative or arbitrary margin of safety.

The use of the attainment stream approach is a particularly good approach to identify flow targets because it relates appropriate flow conditions in streams that comply with the VTWQS (attainment streams) back to Potash Brook. However, haphazard matching of attainment streams, and thus flow targets, to Potash Brook could lead to targets with a high degree of uncertainty as to whether standards would be met. To provide a more rigorous target setting approach, attainment streams for Potash Brook were selected using an analysis described in "Statistical Analysis of Watershed Variables" (Foley, J. and Bowden, 2005). VTDEC believes that by utilizing this approach, Potash Brook was paired with the "most similar" attainment streams available in the Lake Champlain Valley. By identifying the "most similar" attainment streams through standard statistical approaches, a significant amount of uncertainty is eliminated regarding what are the best target values.

According to the attainment stream approach, by definition, the flows for the attainment streams (LaPlatte and Little Otter Creek) represent flows under which the biologic criteria are currently being met. This can be thought of as a range of flows in streams most similar to Potash Brook that are capable of sustaining appropriate aquatic life standards as defined by the VTWQS. At the high flow target interval, this represents a range of flows from 9.02 to 11.52 cfs/sq mi. It is reasonable to assume that attainment of flows at the high end of this range (11.52 cfs/sq mi) would allow Potash Brook to comply with the VTWQS. However, rather than basing the Potash Brook target on the high end of the range for the attainment streams, VTDEC took a more conservative approach by selecting the mean of the range (10.27 cfs/sq mi). This had the effect of providing a 10% margin of safety.

Additionally, it is likely that the flows represented by the attainment stream are not at the "threshold" of attainment. That is, the modeled flows in the streams currently meeting standards likely represent flows somewhat below that which impairment would occur, thus adding an additional level of safety.

VTDEC affirms the attainment stream approach outlined in the Docket report and has taken steps to reduce a significant level of target setting uncertainty by incorporating a solid statistical approach. The fact that the stormwater runoff volume target approach has not routinely been utilized in the development of TMDLs should not detract from its firm basis in sound science and logical experimental design.

Further, the Docket strongly urges the concept of adaptive management when implementing controls in the stormwater-impaired streams and VTDEC is firmly committed to this idea. Various types of watershed monitoring, many of which have already been initiated, will provide the necessary data to either adjust the targets or implementation measures to ensure ultimate compliance in Potash Brook. While VTDEC believes there is an adequately conservative margin of safety associated with these

targets, post-implementation adaptive management provides yet another layer of "safety" that the WQS will be met.

Additional language will be added to the TMDL to provide more clarity regarding the conservative nature of the mean attainment flow target and how it provides an adequate margin of safety.

Allocation of Loads

20. VNRC recommends that DEC take the calculations one step further and depict the targets as the amount of water surplus or deficit that must be achieved when applying the percent differences. [VNRC]

Response to 20:
VTDEC does not believe that such a calculation, though easily computed, is a useful item to include in the TMDL. First, the TMDL included the percentage allocations rather than modeled runoff volumes because this approach was specifically suggested in the Docket report at page 2 of Appendix A:

> *"The same models would be run in the impaired watershed and the attainment watersheds, and the relative difference between the two conditions would be used to establish the flows needed to restore the stream's hydrology. Hydrologic targets could be expressed as percentage reductions in distribution of runoff volumes over time within the impaired watershed."*

VTDEC believes that this is the proper approach based on the TMDL development framework applied for target development.

Second, the TMDL explains on page 13 that due to possible discrepancies between model outputs and actual stream flows, percentage differences between modeled attainment and impaired flows best represent the amount of flow change necessary. Presenting the targets as flow volumes based on modeled outputs could confuse readers as to what is really necessary to fulfill the TMDL allocations. It's the relative differences between the impaired and attainment stream flows that is the premise of this TMDL approach, not the attainment of the modeled flow differences as an absolute volume. Basing the TMDL on the volumes produced by the model could leave the false impression that simply implementing controls to produce those volumes would be sufficient to bring the impaired water into compliance with the WQS. For example, given that modeled flows rarely equate exactly to actual flows, it could turn out (hypothetically) that measured flows obtained prior to BMP implementation are found to be already at the target volume levels identified through the modeling work. In this scenario, if the TMDL target was expressed as an absolute flow (cubic feet/second), one could conclude that the target was met and no more work was needed. However, if the target was expressed as a percentage reduction, it would be clear that significant work would still be needed (a 16% reduction in the case of Potash). Clearly, attainment of WQS will be the ultimate gauge of whether more work is needed, but the expression of the flow target as a percentage reduction

ensures that the goal of the TMDL (bringing the hydrologic regime of the impaired stream into line with the hydrologic regimes of the matched attainment streams) is preserved.

21. VNRC urges DEC to issue the draft general permit that will implement the TMDL and allow public comment on both the TMDL and the general permit simultaneously. This would give the public the opportunity to understand how these percent differences translate into actual load allocations, and how the load reductions will be achieved. Unless this is done, it is very difficult to understand and comment on the TMDL. [VNRC]

    Response to 21:
    There is nothing in federal or state law that requires DEC to issue a draft general permit simultaneously with the TMDL. DEC believes that it is more appropriate to follow a two-step process. First, to issue the TMDL which establishes scientifically based hydrologic targets. Second, to issue a watershed wide general permit to require actions to reach those targets. In this way, the scientifically based TMDL targets will not be influenced by the pressures, both political and otherwise, that will inevitably surface when the general permit is issued and dischargers are required to spend potentially significant sums of money to construct and/or upgrade their stormwater systems.

22. VNRC does not understand the basis for assuming that all WLA's or point sources are in urban areas and all LA's or non-point sources are in agricultural areas. Isn't it true that farms that are discharging in agricultural areas would be considered point source CAFO's? Why does DEC assume that no MS4, multi-sector or NPDES construction discharges do occur in agricultural areas? Federal law requires that WLA's and LA's be allocated according to actual point and non-point sources. DEC's proposal to lump point and non-point discharges based on land use does not satisfy this requirement. 40 CFR §130.7. [VNRC]

    Response to 22:
    The Wasteload/Load allocation process applied in this TMDL allocates stormwater control responsibilities based on the sources and magnitude of stormwater runoff generated. As indicated in the TMDL, USEPA TMDL guidance suggests that oftentimes when dealing with the allocation of stormwater it is only possible to allocate by gross allotments due to a lack of specific data. This is the case in the Potash Brook TMDL. EPA guidance states (USEPA, 2002[2], p.2) :

    > *"Waste load allocations among point source dischargers are usually based on the relative contribution of pollutant load to the waterbody. We realize that estimating an aggregated load contribution to a particular waterbody from the stormwater phase I and II sources is imprecise, given the variability in sources,*

[2] USEPA, 2002(a). EPA New England Guidelines to States for Characterizing TMDL Allocations for NPS/Stormwater. April 2002. USEPA Region 1, Boston, MA.

runoff volumes, and pollutant loads over time. We therefore anticipate that any stormwater WLA portion of the TMDL may be based on a rough estimate.

The simplest way to estimate a gross regulated-stormwater WLA could probably be done on a watershed basis using land use analysis and export coefficients to estimate loading. One option might be to assess land area involved in urban and industrial uses and assign loading from that area to a WLA. If only part of a given community is regulated under phase II, the WLA estimate could be limited to the regulated land area (see "urbanized areas" delineated on stormwater maps). We're interested in working with you to develop reasonable approaches that work for your TMDLs."

Following this guidance, the runoff coefficient approach was applied to determine in a broad sense the sources and magnitude of stormwater runoff. The weighted proportion of runoff from the more developed areas, where the vast majority of the "regulated" stormwater was generated, established the limit of the WLA. In other words, the "regulated" areas, including all the NPDES permitted sources required to be in the WLA, are responsible for reducing and maintaining a 91% decrease in the high flow target. The same is true for the LA whereby the "nonregulated" areas are responsible for reducing and maintaining a 9% decrease in the high flow target.

Language will be added to the TMDL to clarify this procedure.

23. There is an error in the formula on page 14 for calculating Rv. A decimal place has been left off in the second constant. The correct formula according to the VT Stormwater Manual should read: Rv = 0.05 + 0.009(I). However, calculations in Table 6 appear to be based on the correct formula. [LCC]

Response to 23:
The formula provided in the TMDL for calculating Rv at page 16 will be corrected. The formula given in the TMDL is presented in a slightly different form than the Vermont Stormwater Manual. The Vermont Stormwater Manual requires that "I" (impervious cover) be given as a whole number percentage while the formula in the TMDL asks that "I" be given as an "impervious fraction" as stated. Both forms of the equation will provide the same result.

24. The narrative explaining development of an Rv for each land use does not make clear what level of percent impervious cover was used in the calculation. The narrative states that the Rv for each land use group was weighted, however it is not clear whether this was done only between urban/developed land and agricultural land, or for each of the sub-categories within urban/developed as well. To the extent possible, weighting should be done by sub-category. The final TMDL should clarify the approach used. [LCC]

Response to 24:
The percent impervious cover value was applied to each sub-category of land use (e.g Residential, Row Crop, etc.) based on Table 5 of the TMDL. The total area of

impervious cover for each land use sub-category was then calculated based on the acreage of that specific land use found in the Potash Brook watershed. The impervious area was then summed for all sub-categories according to Table 4 and divided by the total area of the major land use categories. It was from this impervious cover number the Rv was calculated for each major land use category. The relative influence of each major land use category on runoff generation was then determined by calculating the ratio of that specific major land use category to the sum of the Rv's for both Urban/Developed and Agriculture/Open. The final step involved multiplying this relative influence value by the actual amount of area in each major land use category to determine the weighted influence of each major land use category on runoff generated.

25. Allocations p. 13-15: Not all transportation within Potash watershed should be characterized as urban/ developed broad land use class. The interstate and some other roads in the watershed do not have substantial collection systems representative of other urban curb and gutter closed systems. In these areas, sheet flow through vegetation and shallow concentrated flow in vegetated swales (with infiltration) is more dominant. Suggest that transportation be split into 2 categories to better represent actual conditions. A 41% percent impervious cover is quite high and not representative of the interstate. Have railroads been considered? [VTrans]

    Response to 25:
    The degree to which VTDEC was able to differentiate between existing land use categories for the determination of the Wasteload and Load Allocation was based solely on the quality of the land use data available. The LU/LC data available at the time of TMDL development does not distinguish between various types and locations of roads and highways but rather lumps all into a "Transportation" category (including railroads). VTDEC believes that while the 41% percent impervious value may not be absolutely accurate when looking at one specific section of road, when compiled across entire watersheds it reflects a reasonable value for the Transportation land use category.

26. Agriculture may have low impervious percent cover, but can have substantial hydrologic impacts associated with ditching, stream straightening, filling in of depressions, removal of trees and other large vegetative cover. Using % impervious cover, while convenient is not fully representative of actual hydrologic impacts. [VTrans]

    Response to 26:
    It is true that a more detailed hydrologic analysis could consider more site specific conditions that affect runoff. However, neither the data nor the resources to develop the data are currently available for inclusion in the TMDL. VTDEC believes that the 91%/9% allocation breakdown provides a reasonably realistic picture of the landscape conditions in the Potash Brook watershed as they relate to stormwater runoff generation.

27. While EPA appreciates the value of including a base flow target for informational purposes (as presented in the target setting section) we have concluded that it is not appropriate to include low flow targets as an actual allocation in the TMDL. The TMDL's loading capacity is presented in terms of a maximum volume of stormwater

runoff, and available information cited in the TMDL and its supporting documents indicates that the majority of the stressors, including pollutant loads, are associated with the high flows. We believe the low flow target should be included only for informational purposes to help promote awareness of the fact that infiltration practices should be an important part of selected stormwater controls. [USEPA-R1]

Response to 27:
VTDEC believes that restoring the low flow dynamics in Potash Brook are a vital component in the recovery of the stream and these targets will remain a management objective of the implementation. However, VTDEC will decouple the low flow targets from the TMDL allocation process as currently presented in the TMDL. VTDEC agrees that the current high flow regime is the primary stressor in Potash Brook.

28. In the allocation section, please specify regulated and non-regulated stormwater sources covered by the TMDL, e.g., MS4 stormwater discharges, other NPDES stormwater discharges (construction, industrial), state regulated (non-NPDES) stormwater discharges, and non-regulated nonpoint source discharges. [USEPA-R1)]

Response to 28:
As stated in the TMDL:

> "Because of data limitations and the wide variability of stormwater discharges, it is not possible to separate the stormwater discharges subject to the NPDES program (e.g. stormwater discharges from construction activity and multi-sector industries) from stormwater discharges that are not subject to NPDES permitting (e.g. stormwater discharges from impervious surfaces regulated under Vermont's stormwater program). Therefore, all stormwater discharges from the urban/developed land category are included in the wasteload allocation portion of this TMDL. This category includes the NPDES-regulated stormwater discharges as well as other sources of stormwater runoff not regulated as NPDES discharges."

29. Please explain why use of the runoff coefficient (primarily influenced by watershed imperviousness) is appropriate for establishing the load allocation for agricultural land. [USEPA-R1]

Response to 29:
VTDEC believes that this is a reasonable approach considering the types and condition of the Agriculture/Open spaces that are present in the Potash Brook watershed. The vast majority of Ag/Open spaces currently present are open fields with minimal manmade ditching drainage. Very little row crop production remains in the Potash Brook watershed where one would expect enhanced drainage infrastructure and significant sediment export.

Future Growth Allocation

30. The Draft's "Future Growth" section appears to be based on the unrealistic assumption that Potash Brook's pollution budget will never be exceeded as long as compliance with

the Vermont Stormwater Manual's Channel Protection Volume (CPv) criterion is achieved. CLF cannot agree that this is a scientifically sound concept. [CLF, VNRC]

Response to 30:
It's important to remember that there are two components to the future growth section of the TMDL. First, to address the impacts of new single family residential or other small develoment under 1 acre, the TMDL builds in an allocation for runoff expected to result from the maximum projected growth in this category over the next 10 years. Second, to address the impacts of development larger than 1 acre, the TMDL notes that this category of growth will need to comply with the current stormwater manual. The manual requires sites to meet channel protection (CPv) as well as groundwater recharge treatment standards. The premise of the channel protection standard is that runoff would be stored and released in such a gradual manner that critical erosive velocities would seldom be exceeded in downstream channels. MacRae (1991) found that the traditionally used 2-year control approach failed to protect channels worn into more sensitive boundary materials and actually aggravated erosion hazard in very sensitive channels. Therefore, MacRae (1991) developed the DRC (Distributed Runoff Control) as a method to vary the degree of control from the 2-year control to the 80% over control based on the strength of boundary material. A study done in Maryland (Cappuccitti, 2000) showed that "the CPv and DRC methods provide a comparable level of management." Additionally, the Center for Watershed Protection (CWP) recommends the use of the channel protection criteria stating that "the criterion balances the need to use a scientifically valid approach with a methodology that is relatively easy to implement in the context of a statewide program." (CWP, 2000) VTDEC believes that if future growth complies with the channel protection standard as well as the groundwater treatment standard, Potash Brook will still be able to meet both the high and low flow targets of the TMDL. Language will be added to the TMDL to further clarify this approach.

31. VNRC believes that to satisfy the requirements of federal law, TMDLs must include an actual allocation of loads for new growth, not just broad assumptions that best management practices can address any amount of new pollutant loading in an impaired water. *See* 40 CFR §130.7. [VNRC]

Response to 31:
See Response to Comment #30. DEC believes that the Potash Brook TMDL has been prepared in conformance with federal law and adequately addresses future growth.

32. Even with rigorous implementation and enforcement of the Manual's CPv requirements, there will come a point at which the amount of new impervious being added to the watershed will make it impossible to meet the flow reduction targets set by the Draft. Moreover, unchecked increases in the percentage impervious cover in the watershed will make it increasingly difficult, if not impossible, to achieve low-flow targets. Natural processes, like groundwater recharge that safeguard low flows, depend on large nonimpervious areas into which stormwater can infiltrate. Accordingly, the Draft's WLA's and LA's must expressly quantify the amount of additional impervious that the watershed can accommodate and still meet both the high and low flow targets. [CLF]

Response to 32:
See response to 30.

33. TMDL provides unrealistic allocation for future growth since it is based on unproven assumptions in the SWMM. Additional in situ effectiveness studies should be conducted to quantify and verify the actual load reductions. [VNRC]

Response to 33:
See response to 30.

34. What is the methodology employed to estimate thirty acres of "nonjurisdictional" impervious surfaces, at a maximum, will be created over the next ten years? Estimates should include full build out, not just what is expected in the next ten years. Additionally, the TMDL does not indicate that future growth in this category will be limited to 30 acres. [VNRC]

Response to 34:
VTDEC consulted with the City of South Burlington Planning Department to obtain an estimate of the non-jurisdictional impervious surfaces expected to be created over the next ten years. This estimate provides a basis from which to develop the future growth allocation incorporated in the TMDL. The overall TMDL is not intended to establish some "development limit" but rather to establish a stormwater runoff volume target that must be met and maintained through stormwater control measures. Implementation of the TMDL and future monitoring and adaptive management will inform the process as to whether future non-jurisdictional development (beyond that projected for the next 10 years) can be accommodated without further stormwater runoff controls. It should also be noted that there are a variety of projects currently underway in the Potash watershed which are promoting and funding the voluntary use of such stormwater controls as rain gardens and rain barrels at new and existing residential sites. The benefits provided by these measures are not factored into the TMDL allocations, and will help to further offset and minimize the impacts associated with new non-jurisdictional development. Considering all of the above, VTDEC believes future growth is adequately addressed in the TMDL.

35. The allocation for future growth is incomplete. Depending upon the Channel Protection Volume to mitigate impacts from future growth addresses peak flows, but does not necessarily address the need to maintain base flows, the importance of which was stressed in the TMDL. This weakness should be addressed in the final TMDL. [LCC]

Response to 35:
The VTDEC at the request of EPA Region 1 (see response to 27 above) is decoupling the low flow allocation from the TMDL allocation process. Therefore, there is no formal future growth allocation as it relates to the low flow target. However, the VTDEC believes that retaining the low flow target is instrumental in restoring Potash Brook. For the "jurisdictional" new growth, the Vermont Stormwater Management Manual requires

that the recharge volume be maintained from predevelopment conditions. For the "non-jurisdictional" new growth, a separate allocation was incorporated into the low flow target to account for any impact new impervious surfaces might have on groundwater recharge and base flow. VTDEC will add language to the TMDL to address new growth in relation to the low flow targets.

36. In the future growth section, please explain whether new development regulated through the NPDES program would also be required to meet the channel protection requirements in the Vermont Stormwater Management Manual. [USEPA-R1]

Response to 36:
New development is subject to Vermont's approved NPDES program, including the stormwater construction permit, multi-sector permit and MS4 permit. New development regulated through these NPDES programs only needs to meet the channel protection requirements in the Vermont Stormwater Management Manual if such development also requires a state stormwater permit. In general, the development of one or more acres of impervious surfaces requires a state stormwater permit, which includes channel protection requirements. However, DEC's Stormwater Rule for Stormwater-Impaired Waters also provides that a state stormwater permit, with channel protection requirements, may also be required for impervious surfaces of any size if necessary to implement a TMDL. This broad authority allows DEC to "reach down" to any size of impervious surfaces and require a state stormwater permit to ensure that the TMDL targets will be met.

Reasonable Assurance

37. The Clean and Clear plan is a statewide plan not specifically targeted at Potash Brook. The Draft fails to provide any indication of whether and to what extent the Clean and Clear action steps upon which it relies for reasonable assurances of nonpoint source reduction will actually occur in the Potash Brook watershed. Therefore, the Draft fails to provide a reasonable assurance that Clean and Clear will deliver nonpoint source reductions in Potash Brook sufficient to achieve the flow targets in the Draft's LA. Also, funding is not guaranteed. [CLF, VNRC, WRP]

Response to 37:
VTDEC strongly believes that the Clean and Clear initiative provides a robust framework by which to identify and ultimately remediate non-point source problems that are contributing to the stormwater impairment in Potash Brook. Rarely does a nonpoint source pollution abatement program exist that takes such a multidisciplinary approach (wetlands, agriculture, stream geomorphology, transportation, planning, etc.) to the improvement of water quality. Not only does the multidisciplinary approach benefit a holistic assessment of the watershed, including stormwater impacts, but funding sources for implementing fixes have been high and consistent since Clean and Clear's inception. According to the Clean and Clear Action Plan 2005 Annual Report:

"Clean and Clear remains on track to reach its TMDL funding goal of $103 million from state and federal sources by 2009 (SFY 2010). Appropriate funding is critical in order to maintain the positive momentum of these programs which are so important to the task of removing phosphorus from Vermont waterways. State and federal government sources have contributed more than $33 million to Clean and Clear. Full funding of the FY2007 request will bring the program close to the half-way point of the overall funding goal." See also the response to comment #38, below.

38. Given that a (modestly) less stringent wasteload allocation is included in the TMDL based on the assumption that nonpoint source reductions will occur, EPA regulations require that there be reasonable assurance that these nonpoint source reductions will be achieved. The activities planned under the Clean and Clear initiative are broad actions that will have varying application throughout the Lake Champlain basin. Please indicate which actions will likely apply directly to the Potash Brook watershed (e.g., expansion of the Conservation Reserve Enhancement Program?) and make a significant impact on loadings, and the amount of funding provided and projected to be available for these particular actions. [USEPA-R1]

Response to 38:
The eight (8) bulleted items included in the Reasonable Assurance section of the TMDL are the Clean and Clear efforts that VTDEC believes are the most beneficial and relevant to the Potash Brook watershed. The Clean and Clean initiative includes many other types of work through many programs that would have lesser benefit to the Potash Brook stormwater impairment if applied in the watershed.

Since the TMDL was first drafted, work has progressed on a number of these efforts that will directly address the stormwater impacts to Potash Brook. This work includes the following: 1) the State-led basin planning process that includes the Potash watershed is now well underway, and is developing a number of strategies for the conservation of open space and restoration of riparian buffers, etc.; 2) an agricultural basin planner has been hired by the Otter Creek Natural Resources Conservation District, and this planner is facilitating input on agricultural components of the basin plan; 3) both phase 1 and 2 geomorphic assessments of Potash Brook have now been completed, and specific recommendations for next steps are laid out; 4) an Agricultural Resource Specialist has been assigned to the region including Potash Brook, and will be conducting a needs survey to determine opportunities for technical assistance on riparian buffer conservation, the Accepted Agricultural Practices, and other technical assistance needs; 5) the State Department of Forests, Parks and Recreation recently established a Wetland Restoration and Protection Program that provides funding for the protection or restoration of wetland areas in the Lake Champlain Basin, and basin planners have noted a number of wetland areas in the upper portion of the Potash watershed that might be good candidates for this program; and 6) The Vermont League of Cities and Towns recently hired a staff person under the Clean and Clear Initiative to assist municipalities with improvements to conservation oriented ordinances, and this person will be offering assistance to South Burlington. Taken together, these Potash Brook components of the Clean and Clear

Initiative (many of which are already underway) provide reasonable assurance that the modest nonpoint source reductions in the TMDL will be achieved.

Regarding the funding concern, see response to comment #37.

Monitoring Plan

39. In addition to the parameters discussed in the monitoring section of the TMDL report, EPA recommends that VT DEC also include monitoring for sediment and other pollutant stressors such as chloride. [USEPA-R1]

Response to 39:
A finalized monitoring plan has yet to be fully developed for Potash Brook; although, VTDEC will give thorough consideration to all potential parameters to be monitored and what methodologies will be applied for data collection.

Permit Related Comments

40. TMDL fails to provide interim targets to gauge effectiveness of implementation plan or a schedule as to when these targets would be met. [VNRC]

Response to 40:
Pursuant to federal regulation and guidance, the TMDL is not required to provide either of these things. The general permit that is issued to implement the TMDL will include a monitoring program to determine the effectiveness of the implementation plan in the permit and the permit will be amended as needed using the concept of adaptive management.

41. No timeline provided for adaptive management approach including Permit issuance and aquatic biota at a minimum. Fear that modifications to the permit could be put off for decades. [VNRC]

Response to 41:
The general permit that is issued to implement the TMDL will include timeframes for monitoring and amending the permit as necessary to ensure that water quality standards are met in Potash Brook.

42. The TMDL should be based on a five year time period and contain a provision that requires DEC to review the assumptions and calculations in the TMDL after data is collected over this period of time. Without a reasonable time frame and firm commitment to revisit the TMDL, there is no assurance that DEC will adapt and alter the TMDL as we learn more about its effectiveness. [VNRC]

Response to 42:
DEC is committed to taking whatever action is required to ensure that water quality standards are met in Potash Brook. This may include amending the TMDL as necessary.

43. Permit actions should be "front-loaded" so that dischargers with the greatest impact be required to take action first. [VNRC]

    Response to 43:
    The TMDL implementation plan will be reflected in the general permit that is issued to implement the TMDL. That permit will require actions that DEC determines are necessary to meet water quality standards in Potash Brook and that permit will be amended over time to include additional actions as necessary.

44. No guarantee that the permit will meet specific requirements of the TMDL. DEC should wait until implementation plan (permit) is further defined before moving forward with TMDL adoption. [VNRC]

    Response to 44:
    There is nothing in state or federal law that requires that DEC must wait until the implementation plan is further defined before moving forward with the TMDL for Potash Brook.

45. NPDES Construction permit should require stricter controls in Potash Brook. [VNRC]

    Response to 45:
    NPDES construction permits are issued by DEC in conformance with federal and state law. These permits will serve as one more tool to ensure that water quality standards are met in Potash Brook.

46. A detailed enforcement program must be included in the TMDL if it relies on other stormwater NPDES programs to restore Potash Brook. [VNRC]

    Response to 46:
    DEC is committed to taking whatever action is necessary to ensure that water quality standards are met in Potash Brook, including the use of enforcement tools, as necessary. There is no requirement in federal or state law that requires that an enforcement program be included in a TMDL.

47. The Potash Brook TMDL should contain a fully developed monitoring plan even without a detailed implementation plan in place. [VNRC]

    Response to 47:
    While not required by EPA to be included, the Potash TMDL does describe several monitoring plan items that have already been initiated such as the stream geomorphic assessments, flow and precipitation monitoring, impervious surface mapping and aquatic biological monitoring. The watershed specific monitoring plan, including parameters, methodologies, and sampling frequencies will likely not be fully compiled until an implementation plan and time line is developed.

48. The allocation process in the Draft Potash Brook TMDL does not demonstrate how management measures proposed for existing and new discharges will bring the receiving waters into compliance with the Vermont Water Quality Standards. [WRP]

Response to 48:
The purpose of the Potash Brook TMDL, and TMDLs in general, is to establish the targets necessary to implement the applicable Water Quality Standards, and to allocate portions of that target among point sources (WLA) and nonpoint sources (LA). VTDEC has accomplished this in the Potash Brook TMDL. Specific management measures to implement this target and the WLA are to be specified in the forthcoming general permit. A description of the LA management measures has been provided in the TMDL in the "Reasonable Assurances" section.

Miscellaneous

49. Table 1. Biomonitoring frequency in Potash Brook from 1987 – 2004. The table body says # of samples. Question - is this an annual frequency of yearly samples, or the total number of samples taken in that 17 year timespan? This seems to be insufficient data on which to establish targets that will likely result in substantial costs. [VTrans]

Response to 49:
At the time of the TMDL writing, the values in Table 1 represent the total number of biological sampling events conducted from 1987 through 2004. This totals 28 macroinvertebrate sampling events and 16 fish sampling events. VTDEC believes that this frequency of sampling is more than adequate to categorize Potash Brook as impaired and is fully consistent with the Vermont Surface Water Assessment and Listing Methodology. One should note that biological monitoring varies significantly from other pollutant-based sampling schemes that may normally require a high sampling frequency. The primary utility of biological monitoring is that it is a direct measure of the aquatic life supporting conditions in a waterbody and that it integrates and relates the long-term impacts (usually annually) of multiple stressors on aquatic life.

50. The last few devastating storms experienced in VT have been small cell, localized downpours that devastated small areas while barely causing a ripple in rivers with larger drainage areas. Streams like the White River (10 -25 yr) when Granville (>100 yr) washed out. The same was true for the Rupert /Pawlet area. It should be recognized up front that if such an event occurs in Potash Bk. causing biological washout and geomorphologic changes, the monitoring may appear to reflect that the TMDL is not achieving it's attainment goals. [VTrans]

Response to 50:
VTDEC pays thorough attention to past hydrologic conditions (i.e. extreme high flows and drought conditions) when interpreting biomonitoring data as it can have a significant impact on instream habitat and therefore biological community structure. Current and ongoing precipitation and flow monitoring will provide a useful reference to better consider extreme hydrologic impacts on the aquatic communities in Potash Brook.

51. Some stream base flow is partly maintained through highway subsurface drainage such as curtain drains, roadway underdrains and other features that intercept groundwater flow. Ironically, this clean cool water likely helps stream biological integrity. Drinking water in this watershed is taken mostly from the lake rather than wells, so Aquifer recharge is not as much a concern as other locations. There are areas of substantial ground water flowing out into the streams during much of the year. It doesn't seem that this is adequately accounted for in the P8 model (includes only a small constant GW contribution) or discussed in the TMDL. [VTrans]

    Response to 51:
    In the P8 model, percolated stormwater is collected and stored in an aquifer device and discharged to the river with a time of concentration. Using this single time of concentration limits the accuracy of developing flow duration curves. To improve the groundwater simulation using P8, a tool was developed by TetraTech which uses simulated percolation from the P8 output and estimates base flow reaching the river using the "Linear Reservoir Groundwater Model" following Haan (1972). For a complete discussion of the model setup, calibration, adjustments and results can be found in the report entitled *"Stormwater Modeling for Flow Duration Curve development in Vermont"* (Tetra Tech, 2005).

52. Please delete the first sentence in the water quality standards section, as the focus of this section should be on the aquatic life criteria. For clarification, please add the words "for aquatic life" to the second sentence of this section. [USEPA-R1]

    Response to 52:
    VTDEC will edit as suggested.

53. For clarity purposes, we recommend that the TMDL include a discussion of the basis for equating the numeric biological indices to levels of aquatic health or impairment. [USEPA-R1]

    Response to 53:
    In Vermont, numeric biological indices are used to determine the condition of fish and aquatic life uses. Vermont's Water Quality Standards at 3-01(D)(1) and (2) provide the following regulatory basis for these numeric biological indices:

    > *"(1) In addition to other applicable provisions of these rules and other appropriate methods of evaluation, the Secretary may establish and apply numeric biological indices to determine whether there is full support of aquatic biota and aquatic habitat uses. These numeric biological indices shall be derived from measures of the biological integrity of the reference condition for different water body types. In establishing numeric biological indices, the Secretary shall establish procedures that employ standard sampling and analytical methods to characterize the biological integrity of the appropriate reference condition. Characteristic measures of biological integrity include but are not limited to*

community level measurements such as: species richness, diversity, relative abundance of tolerant and intolerant species, density, and functional composition.

(2) In addition, the Secretary may determine whether there is full support of aquatic biota and aquatic habitat uses through other appropriate methods of evaluation, including habitat assessments." [VWQS 3-01(D)(1) & (2)].

Additional language will be added to the TMDL to clarify this relationship between numeric biological indices and aquatic life conditions.

54. The City of South Burlington, through Pioneer Environmental Associates, submitted a technical review memo in response to the call for public comments regarding the Potash brook TMDL. Theses comments addressed two general areas. First, the comments were in support of the approach used in developing the Potash Brook TMDL. Second, an alternative approach was offered for consideration for the development of the Potash Brook implementation plan. This approach utilizes a calibrated SWMM model rather than the current P8 model.

VTDEC subsequently contacted Pioneer to confirm that the technical comments submitted were directed at the future implementation plan rather than the TMDL methodology. Pioneer then submitted a clarification memo stating that indeed the previous comments were directed at the future, yet undeveloped, implementation plan.

Response to 54:
VTDEC will take into consideration the City of South Burlington's suggestions for developing the Potash Brook implementation plan when that plan comes under development. These comments have no bearing on the development of the TMDL.