EPA NEW ENGLAND'S TMDL REVIEW

TMDLs: Moon, Stevens and Rugg Brooks, Vermont

STATUS: Final

DATE: February 19th, 2009

IMPAIRMENT/POLLUTANT: Biological impairment (aquatic life support) caused by stormwater-related stressors: the TMDLs are proposed for stormwater runoff volume as a surrogate for the pollutant sediment and a variety of other stressors associated with stormwater.

BACKGROUND: The Vermont Department of Environmental Conservation (VTDEC) submitted drafts of the TMDLs on July 11, 2008. A public comment period was held from July 11, 2008 to September 5, 2008. The state submitted the final TMDLs with a letter dated October 2, 2008. In addition to the TMDLs themselves, the submittal included, either directly or by reference, the following additional documents:

- Expanded Technical Analysis: Utilizing Hydrologic Targets as Surrogates for TMDL Development in Vermont's Stormwater Impaired Streams, US EPA and VT DEC, September 2006.

- Stormwater Modeling for Flow Duration Curve Development in Vermont, TetraTech, 2005.

- Final Report – Investigation into Developing Cleanup Plans for Stormwater Impaired Waters, Vermont Water Resources Board, 2004.

- University of Vermont Stormwater Project – Statistical Analysis of Watershed Variables, prepared for VT ANR by the University of Vermont, October 2005

REVIEWER: Eric Perkins (617) 918-1602.

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 chlorophyl a and phosphorus loadings for excess algae and reduced clarity in the water column.

A. Description of Waterbodies and Background Information

The TMDL documents provide a description of each brook (Moon, Stevens and Rugg) including location, drainage area, and tributary information. They also provide background information on the development of the TMDLs, explaining that the roots of the TMDL approach go back to the Investigative Docket conducted by the Vermont Water Resources Board in 2004.

B. Pollutant of Concern

The primary pollutant of concern for these TMDLs is sediment. However, as the TMDL documents explain, the aquatic life impairments in these streams are believed to be caused by the mix of pollutants found in stormwater runoff. The TMDLs use the surrogate of stormwater runoff volume to address needed reductions in sediment and other pollutants. This surrogate is appropriate because the amount of pollutant load discharged from a watershed is a function of the amount of stormwater runoff generated from a watershed for a given set of conditions. This relationship is especially strong for sediment and sediment-associated pollutants, as described in the "Expanded Technical Analysis: Utilizing Hydrologic Targets as Surrogates for TMDL Development in Vermont's Stormwater Impaired Streams" (EPA and VT DEC, 2006). There are no known wastewater or non-stormwater related discharges contributing to the impairments, so the stormwater runoff surrogate effectively represents the pollutants of concern.

Use of this surrogate has the secondary benefit of addressing the physical impacts to the stream channels (such as scour and channel over-widening) caused by stormwater runoff. These physical alterations to the stream are additional contributors to the aquatic life impairment. Also, reductions in stormwater runoff volume will help restore diminished base flow (another aquatic life stressor) by increasing infiltration and groundwater recharge. Because of the difficulty of sorting out the impacts of all the different stressors, both hydrologic and pollutant-related, VT DEC listed these streams on the 2008 Vermont §303(d) list as impaired by “stormwater”.

C. Pollutant Sources

The documents explain that the source of the pollutant loads is stormwater runoff from the Moon, Stevens, and Rugg Brook watersheds. In addition to carrying pollutants from the watersheds, increased stormwater volume is destabilizing the stream channels, releasing sediment from the stream banks, degrading stream habitat and washing out biota, as discussed above.

D. Priority Ranking

The 2008 §303(d) list indicates that Moon, Stevens and Rugg Brooks are in the high priority category, meaning that they are scheduled for TMDL completion by 2010.

Assessment: EPA concludes that the TMDL documents meet the requirements for describing the waterbodies, pollutant of concern, pollutant sources, and priority ranking.

Some comments on the draft TMDL suggested that the Moon Brook impairment is caused more by increased temperature than stormwater-related causes. In its response to public comments and in subsequent communications with EPA, VTDEC noted that while an upper portion of the brook may be affected by elevated temperatures, it is VTDEC’s firm opinion that the controlling lower reach of the brook (where the State monitors compliance) is impaired due to stormwater-related impacts. EPA believes VTDEC’s explanation in the response to public comments is reasonable, and that the focus of the TMDL on stormwater is appropriate and consistent with the Moon Brook impairment information in Vermont’s 2008 §303(d) list.

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 documents describe the applicable water quality standards on pages 8-10 of each document. The brooks are listed as impaired based on narrative criteria relating to aquatic biota. The impact of excessive stormwater runoff flows into the brooks has resulted in violation of the VTWQS §3-04(B)(4) which states that there shall be:

> *"No change from the reference condition that would prevent the full support of aquatic biota, wildlife, or aquatic habitat uses. Biological integrity is maintained and all expected functional groups are present in a high quality habitat. All life-cycle functions, including overwintering and reproductive requirements are maintained and protected."*

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."*

Pursuant to the above provisions in its water quality standards, VT DEC developed numeric biological indices to aid in the determination of whether aquatic biota and habitat uses are supported. These indices are described in the document: "Biocriteria for Fish and Macroinvertebrate Assemblages in Vermont Wadeable Streams and Rivers" published by VT DEC in February 2004. Biological data collected from Moon, Stevens and Rugg Brooks were evaluated in accordance with the procedures laid out in this guidance document (or prior versions for data evaluated prior to 2004). Macroinvertebrates were assessed as in the poor range for a majority of the samples, and fish were assessed as either fair or poor for most samples. The TMDL documents explain that in most cases, including these, biological condition ratings of fair or poor indicate impaired status for Class B waters.

Establishment of the water quality targets

Because the impairments are based on biological indices, there are no numeric pollutant criteria to use as TMDL targets. Instead, the instream targets are expressed as measures of the hydrologic conditions believed necessary to achieve the Vermont water quality criteria for aquatic life. As described in more detail below, a target expressed as a percent flow reduction in relation to the 0.3% flow (the flow that is equaled or exceeded 0.3% of the time) was established for each brook, based on the hydrologic conditions of a reference (attainment) watershed where the aquatic life criteria are met. The flow reduction targets are 10.9% for Moon Brook, 25.5% for Stevens Brook, and 22% for Rugg Brook (see Table 3 of each TMDL document). These hydrologic targets serve as indicators for sediment and sediment-associated pollutants, along with the other stressors to aquatic life such as channel scour and loss of pool/riffle habitat. Based on the comparison with the attainment watersheds, the target hydrologic conditions represent the conditions in which all these stressors are reduced to levels compatible with attainment of the aquatic life criteria. The TMDL documents explain which attainment watersheds were selected for each impaired stream, and the statistical and scientific basis for the selection.

The TMDL documents note that the VT Water Resources Board's 2004 report identifies flow duration curves (FDCs) as the best method for defining hydrologic targets. The following text from the TMDL documents (pages 10-12 of each TMDL) summarizes the benefits of the FDC approach:

"FDCs are very useful for describing the hydrologic condition of a stream/watershed because the curves incorporate the full spectrum of flow conditions (very low to very high, including critical conditions) that occur in the stream system over a long period of time. The FDCs also incorporate any flow variability due to seasonal variations. A comparison of the FDCs for an impaired and appropriate attainment stream/watershed can reveal obvious patterns. For example, a FDC for a stormwater-impaired stream/watershed will typically show significantly higher flow rates per unit area for high flow events and significantly lower flow rates per unit area for low-base flow conditions than the FDC for the attainment watersheds. The increased predominance of high flow events in the impaired watershed creates the potential for increased watershed stormwater pollutant loadings, increased scouring and stream bank erosion events, and the possible displacement of biota from within the system. Also the reduction in stream base flow revealed by the FDC can create a potential loss of habitat for low flow conditions."

For the above reasons, the TMDLs used FDCs to establish the hydrologic targets for each of the three brooks. For each brook, a high flow value (0.3%) and a low flow value (95%) were selected as points along the continuum of the FDCs useful for setting specific hydrologic targets. The 0.3% exceedance flow closely matches the one year return flow (the flow level that occurs on average once a year) and the 95% exceedance flow represents a low flow condition comparable to the 7Q10. The 0.3% flow was selected for the high flow targets because: 1) the one year flow level is generally considered the channel forming flow for small streams, and by targeting the channel forming flow one can directly reduce key channel altering events that damage biota and produce large amounts of sediment from within the stream system; 2) the 0.3% flow is close to the upper end of the high flow portion of the flow duration curve – selecting a target close to the upper end of the curve helps ensure that the implementation measures chosen to meet the target will also reduce the impact of the full range of storms that drive the shape of the rest of the flow duration curve; and 3) the design specifications for stormwater management measures in Vermont's stormwater manual are largely based on controlling the one year storm events -- the task of determining and implementing the mix of controls necessary to achieve the in-stream target can be accomplished most efficiently if reductions are measured with respect to one year flows.

Since there are limited hydrologic data for either impaired or attainment streams, the Water Resources Board's 2004 report recommended developing synthetic FDCs by employing a calibrated rainfall-runoff model based on land use and cover. Accordingly, FDCs were developed for both impaired and attainment streams and the relative difference between the two was used to establish the flows needed to restore a stream's hydrology. In the TMDLs, the hydrologic targets are expressed as percentage reductions or increases relative to the attainment watersheds' FDCs at the representative high and low flow values. Only the high flow targets are actually used for the load and wasteload allocations, but the low flow targets are included for informational purposes and to help communicate the overall aim and expected result of the TMDLs: to match all attainment stream FDC points (both on the high and low ends of the curve).

The TMDL documents explain that, based on available data and the model outputs necessary to develop the FDCs, the P8-Urban Catchment Model (P8-UCM) was selected to simulate the hydrology of impaired and attainment watersheds. Inputs to P8-UCM include climatological data, percent watershed imperviousness, pervious curve number, and times of concentration for ground water base flow and surface runoff. After initial calibration and review, additional changes were made to improve the low flow prediction capability of the model and refine the estimated surface runoff time of concentration. Upon final review and model verification, the calibrated model was used to develop FDCs for all impaired and attainment streams. 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).

Assessment: EPA concludes that VTDEC has properly described its water quality standards, the relevant criteria and uses, and the water quality targets.

The use of surrogate hydrologic targets in place of numeric aquatic biota or pollutant targets is appropriate for these TMDLs because the hydrologic targets serve as indicators for conditions under which the water quality criteria for aquatic life can be attained. 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 noted in the "Expanded Technical Analysis: Utilizing Hydrologic Targets as Surrogates for

TMDL Development in Vermont's Stormwater Impaired Streams," (US EPA and VT DEC, 2006), this surrogate approach is consistent with the recommendations of the "Report of the Federal Advisory Committee on the Total Maximum Daily Load Program" (National Advisory Council for Environmental Policy and Technology, 1998). The report recommends that: "When the impairment is tied to a pollutant for which a numeric criterion is not possible, or where the impairment is identified but cannot be attributed to a single traditional 'pollutant', the state should try to identify another (surrogate) environmental indicator that can be used to develop a quantified TMDL, using numeric analytical techniques where they are available, and best professional judgment where they are not….If they are used, surrogate environmental indicators should be clearly related to the water quality standard that the TMDL is designed to achieve."

For these TMDLs, the relationship between the surrogate indicator and the water quality criteria is carefully laid out in the Expanded Technical Analysis report referenced above. This expanded analysis further describes the link between the aquatic biota impairment and sediment (the key pollutant), and then how watershed hydrology is driving sediment levels in these streams. Based on these clear linkages to Vermont's water quality standards, EPA concludes that the surrogate approach has been used appropriately in these TMDLs, and that the surrogates for the water quality targets have been appropriately selected. EPA has also reviewed the supplemental report entitled "University of Vermont Stormwater Project: Statistical Analysis of Watershed Variables" (2005), and concluded that the target setting process and the establishment of the surrogate water quality targets has been well documented and completed with admirable scientific rigor.

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.

Use of stormwater runoff volume as a surrogate for sediment and other pollutants

Just as an instream flow target is used as the surrogate for the instream water quality target, stormwater runoff volume is used as the surrogate for the loading capacity (i.e. the maximum amount of pollutant inputs from the watershed that still allows attainment of Vermont's water quality standards).

As discussed in the TMDL reports, 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 these brooks. 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 TMDLs and supporting documentation. Therefore the TMDLs use the surrogate measure of stormwater runoff volume to represent the combination of pollutants that contribute to the impairment of these streams.

The supplemental document titled: "Expanded Technical Analysis: Utilizing Hydrologic Targets as Surrogates for TMDL Development in Vermont's Stormwater Impaired Streams" provides a detailed explanation of all stressors potentially contributing to the biological impairment in these streams (using the similar Potash Brook as an example), and how these stressors are linked to stormwater runoff. The relative importance of each stressor is also described in Table 3-1 of this document. Given that increased sedimentation is believed to be the most important pollutant stressor, the document includes, among other things, substantial detail on the relationship between sediment and streamflow. Figure 5-16 shows, for example, that based on sediment and flow data from similar streams, a 25% decrease in the 1-year (0.3%) flow can result in a 70% reduction in annual sediment load. This means that a relatively modest reduction in stormwater runoff volume can be expected to substantially reduce sedimentation. The document also lays out similar stormwater runoff linkages to all other identified stressors. While the exact levels of sediment needed to be achieved in Moon, Stevens and Rugg brooks are not defined, the use of the reference watershed approach ensures that the necessary sediment levels will be achieved. This is because by achieving the reduced stormwater runoff volumes occurring in the attainment watersheds, the corresponding sediment reductions necessary to meet water quality standards are expected to be achieved as well.

The TMDL documents and the expanded technical analysis describe how each stressor contributing to the biological impairment is related either directly or indirectly to stormwater runoff volumes. The stressors include: increased watershed pollutant load (e.g. sediment), increased pollutant load from in-stream sources (e.g., bank erosion), habitat degradation (e.g. siltation, scour, over-widening of stream channel), washout of biota, and loss of habitat due to reductions in stream base flow. The stressors associated with stormwater runoff are acting individually or cumulatively to degrade the overall biological community to a point where aquatic life uses are not fully supported and the streams do not attain the VTWQS.

Establishment of stormwater runoff volume targets

In a pollutant-specific TMDL, a stream's loading capacity is the greatest amount of pollutant loading the water can receive without violating water quality standards. In these TMDLs, because the "pollutant of concern" is represented by the surrogate measure of stormwater runoff volume, the loading capacity is the greatest volume of stormwater runoff each stream can receive without violating the aquatic life criteria. The challenge is to determine what this maximum stormwater runoff volume is for each brook.

As explained above (in Section 2), the TMDLs use a reference watershed approach in which hydrologic targets are developed by using similar "attainment" watersheds as a guide. The streams within the attainment watersheds meet or exceed the Vermont water quality standards criteria for aquatic life. Based on the comparison of the 0.3% flow point (approximately the one-year flow event) on the flow duration curve (FDC) for each impaired stream with the mean value of the 0.3% points on the FDCs for the appropriate attainment stream, the TMDLs establish stream flow reduction targets of 10.9% for Moon Brook, 25.5% for Stevens Brook, and 22% for Rugg Brook during these high flow events. Because stream flow during the high flow events in these small streams is nearly entirely a result of stormwater runoff, the percent reduction targets are used not only as the in-stream surrogate water quality targets, but also as the stormwater runoff volume reduction targets.

The use of the FDC to establish reduction targets also ensures that critical conditions are accounted for in these TMDLs. The impacts to aquatic biota generally occur throughout the year on a cumulative basis – i.e., it is the cumulative effect of the stressors throughout the course of a year (or years) that ultimately degrade conditions and result in an aquatic life impairment. By targeting the conditions under which the key stressors are introduced (high flow conditions), the TMDLs address critical conditions and the cumulative effects caused by these conditions throughout the year. In addition, any one-time impacts (such as the washout of biota due to channel scour) will also be addressed by these TMDLs through the reductions of the runoff volume from storm events that cause this damage.

Assessment:
EPA concludes that Vermont selected a reasonable surrogate for the loading capacity, adequately documented the assumptions and strengths and weaknesses in the modeling approach used to support the establishment of the loading capacity, and properly accounted for critical conditions. The basis for each of these conclusions is explained below.

Vermont's use of a surrogate is reasonable and appropriate
While TMDLs are intended to address impairments resulting from pollutants, there is nothing in EPA's regulations that forbids expression of a TMDL in terms of a surrogate for pollutant-related impairments. And as noted above (under Section 2) 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). For the same reasons described above relating to the appropriateness of using stream hydrology as a surrogate water quality target,

EPA concludes that the use of stormwater runoff volume as a surrogate for the loading capacity is also reasonable and appropriate. EPA believes this surrogate approach is suitable for small stream systems such as Moon, Stevens, and Rugg brooks, where the impairment is for aquatic life, where stormwater is the cause of the impairment, and where no specific pollutant criterion is being violated.

The modeling assumptions and strengths and weaknesses are adequately documented
The assumptions and strengths and weaknesses of the modeling approach used to support the establishment of the loading capacity are discussed in the supplemental TMDL report entitled: "Stormwater Modeling for Flow Duration Curve Development in Vermont". Strengths and weaknesses associated with use of the P8 model are discussed on pages 14 and 17, and assumptions pertaining to each step in the modeling process are presented throughout the report. The results of the modeling work are thoroughly presented in this report. In addition, strengths and weaknesses and assumptions related to the use of statistical analyses of the modeling results to select an appropriate attainment watershed for Moon, Stevens and Rugg Brooks are presented in a second supplemental report entitled: "University of Vermont Stormwater Project: Statistical Analysis of Watershed Variables" (2005). EPA concludes that the assumptions and results of both the modeling and statistical analysis steps are adequately documented in these reports.

Critical conditions have been accounted for
The critical conditions for the three brooks are associated with storm events which, in addition to potential immediate damage to aquatic biota, produce cumulative impacts to the biota over time. Because the TMDL reduction targets directly address these high flow conditions, EPA concludes that critical conditions are adequately accounted for.

Daily Loading
EPA's November 15, 2006 guidance entitled "Establishing TMDL 'Daily' Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in *Friends of the Earth, Inc. v. EPA, et al.*, No.05-5015, (April 25, 2006) and Implications for NPDES Permits," recommends that TMDL submittals express allocations in terms of daily time increments. This guidance also acknowledges that the decision of the U.S. Court of Appeals for the Second Circuit, *NRDC v. Muszynski*, 268 F.3d 91 (2nd Cir. 2001), established the controlling legal precedent for cases brought in the Second Circuit, which includes Vermont. In this decision, the Court required a reasoned explanation for the choice of any particular non-daily load. For the reasons discussed below, the Region believes that Vermont has provided a reasonable basis for not including daily loads in these three TMDLs.

Even though the TMDL targets are expected to achieve reductions during all storms large enough to generate runoff throughout the year, the TMDLs do not express the loading capacity in terms of specific loadings (or runoff volume amounts) for each day. The rationale for this decision is two-fold:
1) The biological impairment in these brooks resulted from the cumulative effects of a range of stormwater runoff events throughout the year over a multiple year period. It is not the magnitude

of loadings on any particular day that drives attainment of the biological criteria; instead, attainment will result from a long-term overall reduction in the amount of stormwater runoff. The flow duration curve approach provides for identification of this overall reduction target.
2) Stormwater runoff will vary dramatically from one day to the next depending on rainfall amounts. There will be no runoff on some days, while storms may generate large runoff events on others. Because of this variability, it is neither feasible nor logical to establish specific daily loads linked to attainment of the biological criteria. In the face of such variability, the approach taken in these TMDLs, based on percent reductions tied to the flow duration curves, is both a practical and effective way to establish reduction targets. Rather than imposing particular daily limits, this approach establishes percent reduction targets for stormwater runoff volume that effectively apply to all storm events whenever they occur (i.e., on any given day) throughout the year.

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 load allocations for each brook are presented in Table 7 of each TMDL document. The stormwater runoff volume reductions for each stream were divided into WLA and LA portions, based on major land use categories in the watershed. The three major land use categories in these watersheds are urban/developed, agriculture/open, and forest/wetland. For all three of the TMDLs, the forest/wetland category received a load allocation of zero percent reduction, or no expected change in stormwater runoff, since the runoff characteristics from these areas are considered near optimal with regard to overall watershed hydrology. To assign allocations to the remaining two land use categories, a runoff coefficient was used to determine the relative influence of each land use category on runoff characteristics, and thus the FDC. The following paragraphs from the Moon Brook TMDL document (page 18) explain how this was done for all three of the TMDLs:

"A runoff coefficient (R_v) is an expression of the percentage of precipitation that appears as runoff. The value of the coefficient is determined on the basis of climatic conditions and physiographic characteristics of the drainage area and is expressed as a constant between zero and one. By determining the relative contribution to stormwater runoff from each land use category using the R_v, the allocation between WLA and LA can be made accordingly.

The primary influence on R_v is the degree of watershed imperviousness. This is shown through data collected from numerous watersheds during the National Urban Runoff Program Study from which an equation was developed to define the R_v. as shown below (Schueler 1987):

$R_v = 0.05 + 0.9(I_a)$

Where: I_a = Impervious fraction

Percent imperviousness was estimated using a previously developed relationship…for the Vermont Center for Geographic Information land use data layer."

Using the runoff coefficients and the area of each land use category, VT DEC determined the weighted influence on runoff in the Rugg Brook watersheds to be 69% for urban/developed land and 31% for the agriculture/open category. For the Stevens Brook watershed, which contains less land in the agriculture/open category, the weighted influence on runoff was found to be 89% for urban/developed land and only 11% for agriculture/open land. For the Moon Brook watershed, which has almost no land in the agriculture/open category, the relative influence on runoff was found to be 99% for the urban/developed land and 1% for agriculture/open land.

Given that all stormwater discharges from the urban/developed land category are included in the wasteload allocation portions of the TMDLs (for reasons explained below in the WLA section), the load allocations include only discharges from the agriculture/open land category. There are no CAFOs in these watersheds, and the agricultural/open land is outside of the MS4 portions of the watersheds, so the TMDLs assign all runoff from the agricultural/open category into the load allocation portion. Based on the weighting factors, the load allocations work out to a 0.1% reduction in stormwater runoff for Moon Brook, a 2.9% reduction for Munroe Brook, and a 6.6% reduction for Rugg Brook, as indicated in Table 7 of each TMDL document.

Assessment: The State's approach to breaking out the load and wasteload allocations is reasonable because the forest/wetlands land use category corresponds to "natural background" conditions, and the urban/developed and agricultural/open space categories are reasonable surrogates for the relative contribution of point and nonpoint source runoff, respectively. The agriculture/open land category is a reasonable reflection of nonpoint source stormwater runoff because there are no regulated point source discharges within these portions of the watersheds. The State's use of a runoff coefficient to estimate the amount of runoff from the various land use categories (and to subsequently establish the load and wasteload allocations), is a logical approach to this task given the influence of watershed imperviousness on runoff volumes. EPA concludes that the load allocations are adequately specified in the TMDLs at a level sufficient (when combined with the wasteload allocations) to attain and maintain water quality standards.

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.

The wasteload allocations are presented in Table 7 of each TMDL and are expressed as percent reductions in stormwater runoff volume at Q0.3%. The reductions are 11.9% for Moon Brook, 24.4% for Stevens Brook, and 16.0% for Munroe Brook. Sections 3 and 4, above, explain how overall allocations were established based on the flow duration curve targets, and how these overall allocations were then divided into load and wasteload components based on land use categories and the amount of runoff generated from each category.

All stormwater discharges from the urban/developed land category were included in the wasteload allocation portions of the TMDLs. This was done because EPA interprets 40 C.F.R. §130.2(h) to require that allocations for point source discharges subject to the requirement for an NPDES permit must be included in the wasteload allocation portion of the TMDL. The urban/developed portions of these watersheds include the following types of NPDES permitted stormwater discharges:

- Discharges subject to Phase 2 municipal separate storm sewer system (MS4) permits
- Discharges subject to Phase 1 and 2 construction site stormwater permits
- Discharges subject to permits for stormwater associated with industrial activities

There are also some areas within the urban/developed portions of these watersheds that generate nonpoint source runoff and point source runoff not subject to NPDES permits. Discharges from nonpoint sources and point sources not regulated by the NPDES program normally receive load allocations rather than wasteload allocations. In the case of stormwater, however, where it is often difficult to identify and distinguish between discharges subject to NPDES and those that are not, EPA has stated that it is permissible to include all stormwater discharges from a particular land use category in the wasteload allocation portion of the TMDL. For these watersheds, insufficient data are currently available to separate out the parcels that generate stormwater that is not subject to NPDES permits and calculate the runoff volumes from these parcels. Therefore, the wasteload allocations include runoff from the NPDES regulated stormwater point sources listed above, runoff from nonpoint sources, and runoff from non-NPDES regulated point sources such as commercial areas and small construction sites (under an acre).

The runoff from sources within the urban/developed land category was then lumped into an aggregate wasteload allocation for each TMDL. The rationale for this aggregate allocation is described below. As indicated above, 40 C.F.R. § 130.2(h) provides that point source discharges 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 storm water 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 storm water discharges on an outfall-specific basis.

In the case of these three watersheds, VTDEC has determined that because the stormwater discharges are highly variable in frequency and duration, and because insufficient data is available on each parcel (e.g. detailed soils information) it is not feasible to establish specific wasteload allocations for each stormwater outfall. Although the State is developing this capability (to support implementation of the TMDLs), it is currently impossible to determine with any precision or certainty runoff amounts for individual discharges or groups of discharges. Therefore, all the stormwater runoff from the urban/developed land use category is combined into the aggregate wasteload allocations presented in Table 7 of each TMDL. Because it was determined that the urban/developed portions of these watersheds contribute from 69% to 99% of the total runoff to these brooks (depending on the watershed), the vast majority of the needed reductions are in the wasteload allocations.

Future Growth

The wasteload allocations include allocations for future growth ranging from a 1.0% to a 1.8% reduction in stormwater flow (see Table 7 of each TMDL document). The future growth allocation is for runoff expected to result from the maximum projected 10-year growth of single family homes or other small development creating less than one acre of impervious cover. The projected additional runoff for each stream was added to the initial reduction targets identified for the streams in Table 3 of each TMDL. Because future growth is expected to be concentrated in the urban/developed portion of the watersheds, the future growth allocations are included as part of the wasteload allocations.

The TMDLs do not include an allocation for future growth that creates more than one acre of impervious cover because this category of development is required by state law to comply with Vermont's stormwater manual. VT DEC believes that the channel protection and groundwater recharge standards in the stormwater manual will prevent stream degradation from this category of growth.

Assessment:
Ideally, if data are available, separate wasteload allocations for each NPDES stormwater discharge would be established. Given the data limitations discussed above, however, it is acceptable to group all NPDES eligible stormwater discharges into one wasteload allocation for stormwater. In addition, given the difficulty of separating out regulated from unregulated stormwater discharges in these cases (as described above), it is also acceptable to include both discharges subject to NPDES as well as nonpoint source runoff in this aggregate wasteload category.

The State's two-pronged approach to accounting for future growth is well thought out, and the allocations for small development projects are based on a reasonable calculation of projected stormwater runoff from this category of development.

EPA concludes that the wasteload allocations are adequately specified in the TMDLs at levels sufficient (when combined with the load allocations) to attain and maintain water quality standards, and that future growth is 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 documents explain that the MOS in these TMDLs is implicit, and is incorporated through conservative assumptions in the target setting approach.

For the other VT TMDLs previously developed and approved using this approach, the mean flows of the attainment streams were selected as the target flow conditions to provide an implicit margin of safety that the selected targets would result in the attainment of the Vermont Water Quality Standards. The flows for the attainment streams 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 the impaired streams that are capable of sustaining appropriate aquatic life standards as defined by the VTWQS. It is reasonable to assume that attainment of flows at the high end of this range would allow the matched impaired stream to comply with the VTWQS, however, by lowering the targets to the attainment stream mean, a margin of safety is incorporated.

In the case of Moon, Stevens and Rugg Brooks, only one attainment stream (Tenney Brook) was found to be statistically appropriate for grouping with the impaired streams, so there was no range of flows from which to calculate a mean value. Therefore, a modified approach was used to simulate an attainment range and develop a more conservative target. The other attainment ranges developed for the lowland stormwater-impaired streams in Vermont were analyzed to determine the difference between the high flow end of the attainment range and the mean of the range. This analysis showed an average difference of 5% between the highest flow in the attainment range and the attainment mean. VTDEC then assumed that the modeled flows from Tenney Brook represented the highest flows of a hypothetical attainment range for each impaired stream. The flow at the 0.3% exceedence interval was then reduced by 5% to represent the mean of the attainment range and thus the new calculated high flow target for each impaired stream.

Assessment: EPA-New England concludes that the documentation for these three TMDLs provides an adequate MOS. The MOS provided by using the mean of a simulated range of attainment stream targets rather than the higher of the attainment stream targets is reasonable for these TMDLs, given the scientific rigor of the attainment stream selection and target setting process.

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 Clean Water Act and implementing regulations require that a TMDL be established with consideration of seasonal variations. The VT Water Resources Board's 2004 report identifies flow duration curves (FDCs) as the best surrogate for defining hydrologic targets. The FDCs developed for these TMDLs are very useful for describing the hydrologic condition of a stream/watershed because the curves incorporate the full spectrum of flow conditions (very low to very high) that occur in the stream system over a long period of time. The FDCs also incorporate any flow variability due to seasonal variations.

As noted above in Section 3, while the high flow targets in these TMDLs are established for a particular storm size or flow event (the flow that is equaled or exceeded 0.3 percent of the year) the reductions called for in the TMDLs actually apply on a daily basis throughout the year. This is because the ultimate goal of the TMDLs is to match the full length of the flow duration curves (which include targets for all storm sizes) derived from the attainment watershed. The 0.3% flow point was selected as a representative point to use as a target. Because the stormwater controls to be implemented to meet the 0.3% target will also control the full spectrum of smaller storms (those that produce 99.7% of the flows) throughout the year, it is reasonable to expect that TMDL implementation will result in most other points on the curves coming into alignment with the corresponding points on the attainment curves.

Assessment: Given that the controls necessary to achieve the reduction targets for large storms will be effective throughout the year and will also control the full range of smaller storms, EPA concludes that seasonal variation has been adequately accounted for in the TMDLs.

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), and EPA's 2006 guidance, Clarification Regarding "Phased" Total Maximum Daily Loads, recommend a monitoring plan when a TMDL is developed using the phased approach. The guidance indicates that a State may use the phased approach for situations where TMDLs need to be developed despite significant data uncertainty and where the State expects that the loading capacity and allocation scheme will be revised in the near future. EPA's guidance provides that a TMDL developed under the phased approach, should include, in addition to the other TMDL elements, a monitoring plan that describes the additional data to be collected, and a scheduled timeframe for revision of the TMDL.

These three TMDLs are not phased TMDLs, but the documents include descriptions of monitoring plans designed to measure progress toward TMDL implementation and attainment of water quality standards. While the monitoring plans will not be finalized until the State issues watershed permits for stormwater in each watershed, the TMDL documents indicate that the monitoring will include three main components, as recommended by the VT Water Resources Board's 2004 report. The three components are: 1) tracking stormwater treatment and control practices implemented; 2) monitoring of the primary stressors in the watershed; and 3) monitoring of in-stream habitat and biological and geomorphic condition.

The first component involves tracking progress towards implementing the requirements in the watershed permits. In addition to tracking BMP implementation, VT DEC also expects to track the percentage of stormwater controlled and the percent of land area retrofitted with BMPs in each watershed.

The monitoring of primary stressors will include continuous flow monitoring in each brook (already underway) and the accurate tracking of impervious cover changes within the watersheds.

Last but by no means least, monitoring of biological and geomorphic conditions will be key to measuring progress towards attaining water quality standards. Baseline biological and geomorphic assessments have already been completed; regular assessments will be continued as implementation proceeds.

Assessment: Because the monitoring plans will include, at a minimum, both continuous flow monitoring to measure progress towards TMDL targets and on-going biological monitoring to measure progress towards achieving water quality standards, EPA concludes that the proposed monitoring by VTDEC will be sufficient to evaluate the effects of TMDL implementation.

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.*

Although implementation plans are not a required element of a TMDL, and EPA does not approve implementation plans, VT DEC has included an implementation plan in each TMDL document.

The State's implementation strategy for these TMDLs includes two central permitting components. Vermont is authorized to implement both a federally-authorized NPDES permit program for all Clean Water Act-regulated stormwater discharges (such as stormwater associated with construction and other industrial activities and municipal discharges under the MS4 program) and a state-authorized permitting program for stormwater discharges from impervious surfaces equal to or greater than one acre. This dual permitting authority provides Vermont with powerful tools for requiring the implementation of stormwater treatment and control practices necessary to meet the stormwater runoff reduction targets in these TMDLs.

The State anticipates that it will utilize an iterative, adaptive management approach to implementing these TMDLs. The first prong of implementation will involve the issuance of watershed-wide general permits pursuant to Vermont's state stormwater law. Stormwater treatment and control measures will be required in the first-round watershed-wide general permits, including the construction and/or upgrade of stormwater treatment and control systems by specifically identified dischargers of stormwater runoff. The mix of stormwater control practices required by the permits will be calculated to achieve the TMDL stormwater runoff reduction targets for each watershed. The first-round general permits will include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the general permits provide for the attainment of the VTWQS and to determine the appropriate conditions or limitations for subsequent permits. Such a monitoring program may include ambient monitoring, receiving water assessment, discharge monitoring (as needed), or a combination of monitoring procedures designed to gather the necessary information. Based on this information, the permits will be amended, as needed, through the implementation of more widespread and/or more stringent treatment and controls or other best management practices as necessary to meet water quality standards in the stream. This adaptive management approach is a cyclical process in which a TMDL implementation plan is periodically assessed for its achievement of water quality standards and adjustments to the plan are made as necessary.

The second prong of the implementation plans includes NPDES permits issued by the Agency for stormwater discharges subject to the federal Clean Water Act and corresponding state authority (as described above). These permits contain conditions for implementation of appropriate best management practices to provide for attainment of the VTWQS.

In addition, the State plans to aggressively implement a variety of nonpoint source control measures specified in Vermont's Clean and Clear Action Plan. These measures are described in more detail in the reasonable assurances section, below.

Assessment: EPA is taking no action on the implementation plans but notes that the State appears to have a strong implementation strategy in place to achieve the goals of the TMDLs.

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."

Given that at least slightly less stringent wasteload allocations are included in these three TMDLs based on the assumption that nonpoint source reductions will occur, EPA's guidance interpreting the regulations requires that there be reasonable assurance that these nonpoint source reductions will be achieved in these cases.

The load allocation applies to discharges from the agriculture/open land use category and ranges from a 0.2% reduction in stormwater runoff volume for Moon Brook to a 6.6% reduction for Rugg Brook. The vast majority of the runoff reduction for these TMDLs is assigned to the wasteload allocations. VTDEC believes that nonpoint source control measures being implemented through Vermont's Clean and Clear Action Plan will achieve the modest load reductions set forth in the TMDLs. Although the Clean and Clear Action Plan is primarily a phosphorus reduction plan, action items in that Plan will also reduce sediment loadings and otherwise benefit Moon, Stevens, Rugg, and the other stormwater-impaired streams in the Champlain Basin. As presented in the TMDL, the State plans to:

- Expand the Conservation Reserve Enhancement Program statewide to create conservation easements on farms along streams for buffer implementation.
- Provide technical assistance by Agricultural Resource Specialists to help farmers statewide with best management practices, riparian buffer conservation, nutrient management, compliance with Accepted Agricultural Practices, basin planning, and other technical needs.
- Support agricultural participation in the basin planning process.

- Hire Watershed Coordinators for Lake Champlain Basin watersheds to help develop and implement river basin plans.
- Expand the Department's River Management Program to promote stream stability and reduce phosphorus loading from stream bank and stream channel erosion in the Lake Champlain Basin through a comprehensive program of assessment, protection, management, restoration, and education, with additional federal funding being sought from the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and other agencies.
- Enhance the Vermont Better Backroads Program throughout the Lake Champlain Basin with staffing for technical assistance and increased funding for erosion control grants to towns.
- Offer technical assistance to towns in the Lake Champlain Basin seeking to provide better water quality protection through local ordinances and other municipal actions. This may lead, for example, to improved protection of riparian areas in agricultural and open space areas.
- Protect and/or restore riparian wetlands.

Based on communications with VTDEC, EPA is aware that good progress has already been made on a number of the actions, including the following: 1) 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 some potential wetland restoration sites have been identified in these watersheds, 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 plans that include these watersheds; 3) both phase 1 and 2 geomorphic assessments of all four brooks have now been completed (following the VT ANR stream geomorphic assessment protocols), and specific recommendations for next steps are laid out; 4) an Agricultural Resource Specialist has been assigned to the region including these watersheds, 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; and 5) the Vermont League of Cities and Towns recently hired a staff person under the Clean and Clear Action Plan to assist municipalities with improvements to conservation oriented ordinances, and this person has or will be offering assistance to the municipalities in these watersheds. In addition, VT ANR is currently revising the Clean and Clear Action Plan to ensure that its strategies are up-to-date, effective, and more specific.

The TMDL documents indicate that, taken together, these components of the Clean and Clear Initiative (many of which are already underway) provide reasonable assurance that the modest nonpoint source reductions in the TMDLs will be achieved.

Assessment: EPA concurs that the TMDLs provide reasonable assurance that the nonpoint source load reductions will be achieved.

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.

A summary of the public participation process is included in each TMDL document. VTDEC provided an opportunity for public comment on the three TMDLs, beginning on July 11, 2008 and closing on September 5, 2008. Notice of the comment period was posted on the State's website and announced via newspaper. Informational public meetings were conducted in Rutland on August 27th and St. Albans on August 28th, 2008 to present the TMDL and answer any questions. Additionally, notification of the public meetings was posted on the Vermont Department of Libraries website. At the close of the public comment period, VTDEC received comments from three parties. A summary of these comments, along with responses from VTDEC, is included in each of the final TMDL documents.

Assessment: EPA concludes that VTDEC adequately involved the public during the development of the TMDLs, and provided reasonable and thorough responses to the public comments.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody, the pollutant(s) of concern, and the priority ranking of the waterbody.

Assessment: VT DEC's letter of October 2, 2008 states that the TMDLs are being formally submitted for EPA approval.

References

This document cites the following references in addition to those listed as part of the TMDL submittal package on page 1:

Fitzgerald, E. 2006. *University of Vermont Geomorphic Assessment Project*. Prepared for Vermont Agency of Natural Resources. Burlington VT.

National Advisory Council for Environmental Policy and Technology. July 1998. *Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program.* U.S. Environmental Protection Agency, Office of the Administrator. EPA-100-R-98-006. Washington, DC.

Simon, A. and Rinaldi, M. 2006. *Disturbance, Stream Incision, and Channel Evolution: The Roles of Excess Transport Capacity and Boundary Materials in Controlling Channel Response*. Geomorphology Vol. 79, p. 361-383.

Trimble, S.W. 1997. *Contribution of Stream Channel Erosion to Sediment Yield from an Urbanizing Watershed.* Science Vol. 278, p. 1442-1444.

Zarriello, P.J. and L.K. Barlow. 2002. *Measured and simulated runoff to the Lower Charles River, Massachusetts, October 1999-September 2000*. USGS, Northbrough, Massachusetts, WRIR 02-4129.