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**APPENDIX C: TOWN OF COLCHESTER'S COMMENTS ON DRAFT  
BACTERIA TOTAL MAXIMUM DAILY LOAD**

# Technical Review of Draft Statewide TMDL for Bacteria-Impaired Waters

## For the Department of Public Works in the Town of Colchester, Vermont

The Town of Colchester has engaged Aldrich + Elliott (A+E), of Essex, Vermont, and Stone Environmental, Inc. (Stone) of Montpelier, Vermont to review the State of Vermont Department of Environmental Conservation's Vermont Statewide Total Maximum Daily Load (TMDL) for Bacteria-Impaired Waters, Draft For Public Comment ("Draft TMDL"), dated May 2011. The focus of A+E and Stone's review is in reference to specific implications for the Town of Colchester and the two Colchester watersheds which are included in the Appendix of the Draft Bacteria TMDL for Direct Smaller Drainages to Inner Mallets Bay (Appendix 7). These direct smaller drainages are further described as Smith Hollow Brook (SHB) and Crooked Creek (CC).

This review has two parts. Within each part, overall comments and specific suggested edits are provided:

1. Review of Main Body of Draft TMDL
2. Review of Appendix 7 of Draft TMDL

TMDLs require characterization of watershed-specific land use, water quality, and potential sources of contamination; objective and sufficient data collection; sound scientific analysis of the data; establishment of a clear connection ("linkage") between apparent sources and targets; and allocation of potential sources of contamination. Finally, implementation plans should be based on the allocation and **should be achievable within the limits of the local municipality's ability to control sources**.

The overarching finding from this review is that the body of the statewide Draft TMDL, and the specific section pertaining to the Direct Smaller Drainages to Inner Mallets Bay, are based on sweeping generalizations, and very little source-specific or watershed-specific data. The State of Vermont is requesting that Towns regulate significant sources of contamination that they do not have control over, namely wildlife mammals and birds that are documented sources of bacteria in surface waters.

The State of Vermont has taken responsibility for collecting adequate data, analyzing the watersheds, and developing clear regulatory implementation plans for developing and implementing stormwater TMDLs in the MS-4 area within Chittenden County.

Portions of that program (excluding local monitoring requirements) could provide a model for a statewide bacteria TMDL that holds up to scrutiny at the local watershed level.

In conclusion, the proposed Draft TMDL for the two watersheds in Colchester is not sufficiently scientifically based to be useful as a tool for water quality planning and implementation at this time. Specific recommendations are made below that would provide a scientific basis to move forward in these watersheds, and throughout the State of Vermont.

## 1 Main Body of Draft TMDL

If Vermonters have learned anything from the past decade or more of water quality regulation and litigation, it should be that TMDLs are not to be entered into lightly. One need look only as far as the Lake Champlain Phosphorus TMDL, or the four TMDLs for Stormwater-Impaired Streams in northwestern Vermont, to see the wide-ranging and significant legal and financial implications that TMDLs have had on water quality policy in the State of Vermont. There is obviously “bean-counting” pressure from the United States Environmental Protection Agency (EPA) to produce more TMDLs, to demonstrate progress toward meeting the requirements of the Clean Water Act. However, as currently drafted, the Draft Statewide Bacteria TMDL does little to guide municipal efforts to address bacteria pollution sources. Further, absent from this TMDL are the robust data collection and analysis efforts that guided development of the Lake Champlain and stormwater TMDLs. These exclusions would seemingly open the door to further litigation from the Conservation Law Foundation or other non-governmental organizations.

Specific comments on the Draft Statewide Bacteria TMDL are enumerated below:

### 1.1 **Water Quality Standards for Bacteria (Section 2)**

At the June 7, 2011 informational meeting for this draft TMDL, Neil Kamman, a senior staffer in the Water Quality Division at the State of Vermont Department of Environmental Conservation (DEC), explained that the current water quality standard for bacteria (single sample maximum of 77 organisms/100 ml) is not based on science but rather on an administrative decision made approximately 30 years ago. He also stated that DEC staff have recommended that Vermont adopt EPA’s water quality standard for bacteria (126 organisms/100ml geometric mean and 235 organisms/100 ml single sample). Furthermore, it is our understanding that the Water Resources Panel of the Natural Resources Board is in the process of considering this change. Since the current water quality criteria on which the Draft TMDL is based are not scientifically supportable, the TMDL’s implementation should be postponed until scientifically supportable water quality criteria for indicator bacteria are adopted by the State of Vermont.

## 1.2

### **Bacteria Pollution Sources (Section 3)**

General categories of point sources of bacteria are described in Section 3.1. In Section 3.2 the following non-point sources of pollution are identified: stormwater runoff, malfunctioning onsite wastewater treatment systems, agricultural activities, pets, wildlife, and contact recreation. However, there is no methodology presented to characterize the relative significance of point and non-point sources to estimate the relative proportion of these sources. Since at least the early 1980s, Vermont's standards for design of onsite systems have required treatment in the soil and, more recently, treatment in advanced technologies prior to soil dispersal. The term "onsite wastewater systems" will be used in these comments, with the exception of direct quotes. The Draft TMDL document should also include reference to the survivability of *E. coli* in organic and mineral sediments, as has been documented in the literature as a contributing source of bacteria.

## 1.3

### **Bacteria-Impaired Waters (Section 4)**

It appears that the State of Vermont has based its determination of bacteria impairment in certain locations on the monitoring of others. It is the State's responsibility to establish monitoring protocols and to conduct consistent monitoring programs in each watershed. The State of Vermont has augmented its fixed station monitoring with data collected through volunteer monitoring programs, resulting in Clean Water Act §303(d) listings that have been created in a catch-as-catch-can fashion based on where data is available. As a result, it appears that this Draft TMDL does not uniformly cover the State of Vermont.

Under the heading Data Quality Requirements the Draft TMDL states: "In order to be used for assessment purposes, submitted data must be of known quality and should be representative of the water's condition." (page 22). The implications of this sentence will be addressed in Section 2 of this report, where we comment on the use of conclusions from secondary sources based on data that does not necessarily meet the rigorous quality assurance requirements, nor is one year of water quality data sufficient to scientifically represent the water's condition, to support the conclusions of the Draft TMDL.

## 1.4

### **TMDL Development (Section 5)**

All sources are combined to develop a concentration-based TMDL. This approach prevents the regulated community from effectively allocating resources to solve water quality problems. The State of Vermont needs to estimate the proportion of contribution of bacteria from point and non-point sources, as noted above. Particular emphasis should be placed on differentiating between natural and human-caused sources to allow solutions that are in the control of local municipalities and other stakeholders. **It should be clearly stated that the natural sources of bacteria (wildlife mammals and birds, and *E. coli* in organic and mineral sediments) are not the responsibility of local governments.**

## 1.5

### **Implementation Plans (Section 6)**

In Section 6 Implementation Plans are discussed.

#### 1.5.1

##### **Onsite Wastewater Treatment Systems (Section 6.4)**

Generic text in the “Best Management Practices for Septic Systems” section does not address the issue of locating and justifying the designation of specific areas with malfunctioning onsite wastewater treatment systems. This should be the responsibility of the State of Vermont, not of the local municipalities.

#### 1.5.2

##### **Agriculture (Section 6.4)**

Local municipalities have limited jurisdiction to regulate agriculture, as per Vermont’s right-to-farm statute (Vermont Statutes Annotated, Title 12, Chapter 195, § 5751-5754). Local control is generally limited to backyard farming practices in areas not zoned for agriculture. This section of the Draft TMDL should be revised to clarify which responsibilities for agriculture lie with the state and which with municipalities.

#### 1.5.3

##### **Best Management Practices for Wildlife (Section 6.9)**

In the Draft TMDL, implementation options for reducing wildlife contributions to bacterial loads are limited to controlling water fowl, such as Canada geese at beaches. While this may be important in some specific locations, it is certainly not sufficient to address the majority of wildlife impacts to Vermont’s streams and rivers. This section should either be expanded to include a broader range of practical BMPs, or should specifically note the dearth of options available for managing wildlife contributions to bacterial loads in many settings.

## 2

### **Direct Smaller Drainages to Inner Mallets Bay (Appendix 7)**

The Draft TMDL’s geographic extent in Colchester is limited to Crooked Creek and Smith Hollow Brook watersheds, comprising 18 miles of streams. According to the introduction to Appendix 7, “The combined watershed for the direct drainages (Figure 1) covers 3.5 square miles, entirely in the town of Colchester. Overall, land use in the watershed is 59% forest, 23% agricultural, 15% developed, and 3% wetland, as shown in Figure 2 (based on 2006 Land Cover Analysis by NOAA-CSC).” (page 1).

As noted in the Draft TMDL, the following sections are required for a TMDL:

- Source assessment
- Linkage between targets and sources
- Load allocation

The first three areas are discussed generally on a statewide basis, but are not adequately addressed on a watershed-specific basis to support the establishment of the Draft TMDL. Neither Vermont's extensive network of rivers, streams and lakes, nor potential sources of bacterial contamination were assessed comprehensively as part of this effort; rather, the State relied on existing datasets augmented with data collected by watershed groups based in their "service areas" as opposed to waters where bacterial impairments might be anticipated to exist (see section 1.2 above). The linkages are generally speculative and allocation is not provided.

## 2.1

### **"Why is a TMDL Needed?" (page 5)**

The question should be "Why is a TMDL needed at this time?" It does not appear to be the time to establish a TMDL as the State Water Resources Panel is likely to change the water quality standard in the near future, resulting in a moving, rather than a fixed, target. This comment applies to all watersheds named in the Draft TMDL. Furthermore, the following specific reasons pertain to the Direct Smaller Drainages to Inner Mallets Bay watersheds:

1. There is a lack of sufficient data to represent long-term conditions (only one year of data, at one sampling point per stream for 18 miles of streams & tributaries, is not adequate to provide a scientific basis for a TMDL).
2. Dry weather and wet weather conditions were not analyzed separately. Different management approaches are necessary for each. Therefore, water quality monitoring that differentiates between wet and dry weather conditions is needed.
3. Land use and potential causes of water quality impairment have not been adequately analyzed to provide connection between apparent sources and target water quality criteria.

## 2.2

### Source Assessment (“Bacteria Sources”) (pages 6–7)

This section does not provide quantitative watershed-specific characterization of bacteria sources in Crooked Creek and Smith Hollow Brook watersheds. For example, the statement below is not supported by any data specifically relevant to these watersheds:

“One of the most likely sources of fecal matter contamination to surface waters is sewage entering from failing or malfunctioning septic systems (VTDEC, 2009). There are many factors which make failing septic systems a likely source of bacterial contamination to the direct drainages. Nearly all of Colchester’s residents within the direct drainages watershed rely on onsite septic disposal systems to treat their wastewater. Only a small portion of the watershed near the headwaters is serviced by sanitary sewer (Colchester, 2007). Thus, the residential development within the watershed, which is often close to these streams, consists of septic systems close to the streams.”

The extensive use of secondary sources to substantiate the impact of onsite wastewater treatment systems on water quality is not valid, since the data that was developed for the secondary sources was not necessarily collected under the same quality assurance scrutiny (or for the same intended use) as the cited water quality data (Table 1 on pages 11 & 12 of Appendix 7). The term “close” in the above quotation is not defined. If onsite wastewater systems meet the required fifty foot separation distance to surface waters (Vermont DEC, 2007, State of Vermont Environmental Protection Rule, Chapter 1,§1-807), they should not be considered a problem relating to bacteria due to their proximity to surface waters. No documentation has been provided in the Draft TMDL to demonstrate that systems in these watersheds are less than 50 feet from surface waters. It is recommended that the State of Vermont analyze the consideration of soil and site suitability for onsite wastewater treatment systems and actual permitting records to provide a rationale for developing allocation to onsite wastewater systems for the Draft TMDL.

The State of Vermont needs to analyze soils, environmental constraints, and permitting data in order to provide specific information as to soil suitability, site conditions, and designs for existing onsite wastewater treatment systems located within a specific distance from streams within these watersheds. Additionally, more analysis is necessary to characterize the onsite wastewater treatment systems that are malfunctioning in these watersheds, and their proximity to streams.

## 2.3

### Linkage between Targets and Sources

This TMDL requirement is not apparent in Appendix 7. The Draft TMDL includes speculation relative to wildlife, onsite wastewater treatment systems, pets and agriculture, and contact recreation as sources, but no linkage is clearly established for these watersheds. It should be the responsibility of the State of Vermont to provide documentation to support the TMDL, which would require more detailed characterization of potential sources, wet weather and dry weather water quality monitoring, and analysis under wet weather and dry weather conditions.

The Draft TMDL for Smith Hollow Brook and Crooked Creek does not provide a clear linkage between sources and targets for the following reasons:

1. The Draft TMDL is based on extremely limited water quality data; one season of monitoring at one monitoring location is not adequate to characterize water quality.
2. No hydrologic data were used in the Draft TMDL, with no differentiation between dry and wet weather conditions.
3. Neither hydrologic flow nor water quality modeling was used in the Draft TMDL.
4. Land use data were shown; however, this data was not utilized in the characterization of sources or allocation of load.
5. Identification of bacteria sources appeared to be simplistic and based on generalizations regarding potential sources.
6. Characterization of the proportion of natural/background sources of bacteria was not done.

The State of Vermont should provide resources to complete the following tasks in order to address the above-mentioned deficiencies in the Draft TMDL:

- A. Analysis of existing water quality data
  - a. Collection of hydrologic data for these streams during summer sampling seasons
  - b. Separate analyses of *E. coli* concentrations under wet weather and dry weather conditions
- B. Collection of additional water quality sampling and *E. coli* analyses based on a statistically sound water quality monitoring plan, that includes:
  - a. Additional seasons of sampling at the locations where the samples listed in Table 1 were collected (Figure 1).
  - b. Additional sampling points upstream in each watershed to “bracket” any potential sources of contamination
  - c. Microbial source tracking at the above sampling locations, to address proportion of naturally occurring contributing sources which are not under the jurisdiction of the municipality (e.g., wild mammals and birds)
- C. Collection and analysis of existing pertinent land use data for each watershed.
- D. Hydrologic modeling and analysis of existing and additional water quality sampling to characterize the relationship between *E. coli* concentration and flow
- E. Watershed-based water quality modeling of above data to characterize the relationship between apparent sources and *E. coli* concentrations

## 2.4

### **Allocation (Appendix 7, page 11)**

The allocation is a uniform reduction in *E. coli* concentrations. For the existing water quality standard, a 97% reduction in single sample concentration is required. For the proposed water quality criteria, a 90% reduction of single sample concentration and a 53% reduction of geometric means are proposed. Considering the diverse proportion of source contribution in these watersheds (based on the proportion of land use noted in the first paragraph of the review of Section 2 above), **these are very likely to be unattainable objectives.**

It is critical to better characterize the sources of *E. coli* before developing water quality objectives and allocations, in order to ensure that the objectives are attainable. For example, if a more detailed characterization and analysis of a particular watershed estimates that the relative proportion of indicator bacteria are as follows: wildlife 60%; agriculture 5%; stormwater 25%; and onsite wastewater treatment systems 10%, it would be impossible for a municipality to achieve even a 53% reduction, since at least 65% of the sources are out of the control of the municipal government.

Based on comments above, there is insufficient data to develop a justifiable allocation at this time. If the Draft TMDL goes forward in spite of these deficiencies, then the allocation should specifically exclude municipal responsibility for the portion of *E. coli* concentrations due to natural sources (wildlife mammals and birds, and *E. coli* in organic and mineral sediments).

## 2.5

### **Recommended Next Steps (Appendix 7, page 8–9)**

The recommended next steps are laudable, but without reliable baseline data, land use and hydrologic analyses, reasonable linkages between sources and targets, and resulting allocations, there is no way to prioritize which steps will have the greatest water quality benefit.

Also relevant is the fact that existing monitoring programs are unlikely to be able to detect changes required to document response to treatment. Before finalizing the Draft TMDL, the State of Vermont should conduct additional (wet and dry weather) water quality monitoring at multiple locations in these two watersheds to establish baseline bacteria data that are statistically adequate to be able to track whether future implementation efforts can and will have the desired impact on water quality.

In summary, it is not appropriate to develop implementation plans at this time, when the Draft TMDL targets and development process needs to be revised as described above. If this Draft TMDL is to be adopted, in spite of the listed deficiencies, then the implementation in the Crooked Creek and Smith Hollow Brook should include the financial resources necessary to support the monitoring and analyses recommended in section 2.3 above.



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