Comment Response Document
Regarding the Total Maximum Daily Loads of Fecal Bacteria for the Loch Raven Reservoir Basin in Baltimore, Carroll, and Harford Counties, MD

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Loads (TMDLs) of Fecal Bacteria for the Loch Raven Reservoir basin. The public comment period was from May 11, 2009 through June 9, 2009. MDE received two sets of written comments during the public comment period.

Below is a list of commentors, their affiliation, the date comments were submitted, and the numbered references to the comments submitted. In the pages that follow, comments are summarized and listed with MDE's response.

List of Commentors

Author	Affiliation	Date	Comment Number
Steve Stewart	Baltimore County Department of Environmental Protection	June 8, 2009	1 through 7
Gould Charshee	Reservoir Watershed Management Group/Reservoir Technical Group (RTG)	June 9, 2009	8 through 9
James E. Slater, Jr.	Carroll County Government Department of Planning	June 9, 2009	10 through 20

Comments and Responses

1. Tier II waters are listed and the antidegradation policy is discussed on page 3, but does not seem to be linked to the bacteria TMDL in any fashion.

   Response: The Tier II waters and Maryland's anti-degradation policy are provided for informational purposes as part of the description of the watershed's general setting. Waters can be of very high quality relative to supporting aquatic life (the basis for Tier II classification) and still have high bacteria levels.

2. Table 2.2.4 lists the four USGS stations that were used to derive flow data. One of these stations 01582500 is a regulated site, with stream flows affected by releases from Prettyboy Reservoir. As such, it is not reflective of an unregulated stream flow and may bias the surface water flow results.

   Response: MDE is aware that USGS station 01582500 is affected by releases from Prettyboy Reservoir. Flow data from this station were thus used to account for the release from the reservoir. For the subwatersheds of GUN0387-sub, GUN0284-sub, and GUN0233-sub, flow data from the unregulated site 01582000 were used to determine the surface flow of the specific subwatershed, while data from 01582500 were used in conjunction with 01582000 to determine the flow from the entire watershed area draining

to the MDE bacteria monitoring station which includes releases from Prettyboy Reservoir.

3. Page 13, recreational waters: The paragraph states that "data shall be collected during steady-state, dry weather conditions". Again on page 14, 1st paragraph it states "…was assessed by comparing both the annual and seasonal (May 1st – September 30th) dry weather steady-state…" This would seem to indicate that both the standards and the analysis will be applied to low flow conditions when the potential for human contact is greatest (ie. people do not usually go into the stream during storm events). Yet the following analysis includes both wet weather and dry weather sampling results.

   Response: The reductions are based on dry weather samples, where dry weather is defined by precipitation, to ensure protection during the critical condition (period of highest water contact recreational use). However, all samples (i.e., both wet weather and dry weather sampling results) are used to calculate the annual average baseline load.

4. Page 16: Because of an insufficient number of samples it was not possible to calculate separate geometric means for high and low flows, so the overall geometric mean was used. The use of the overall geometric mean may over estimate the dry weather flow concentrations. This could result in a TMDL that over estimates the reductions required.

   Response: The guidelines for interpreting bacteria data, as given in Maryland's 2008 Integrated Report, require that at least five samples are necessary to calculate the geometric mean. Hence there is no other option than to use the overall geometric mean in this case, since there are insufficient samples for calculating separate geometric means for high and low flows. This, though, does not render the overall geometric mean as less representative of the water quality, since the sampling design doesn't target any particular flow condition.

5. Page 26: The downstream subwatershed source loads were estimated by averaging the results from 3 monitoring stations (GUN0233, WGP0050, and BEV0005). This may not be an appropriate approach. First only a small portion of the downstream subwatershed is actually "downstream" of these three stations. The bulk of the acreage drains directly to the Loch Raven reservoir. Secondly, the land use composition is distinctly different than the 3 stations. Using forest an example the average and range for the three stations is 31.5% (23.7-35.2) versus 39.5. Water comprises 7.9 % of the downstream subwatershed and <0.1 % for the three stations. The loadings for the downstream subwatershed are suspect in this report.

   Response: MDE conducts water quality monitoring to provide as much data as limited resources allow in support of TMDL development projects. Sometimes field staff are unable to collect data in a subwatershed for various reasons (time and budgetary constraints, limited accessibility, etc.). Where data are not available, MDE uses other methods to develop TMDL analyses, such as literature values, data from nearby watersheds, or estimating values using statistical approaches. Based on EPA guidance (40 CFR 130.2) "load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data

and appropriate techniques for predicting the loading." For the Loch Raven Reservoir fecal bacteria TMDL, MDE believes that using data from monitoring stations located within the watershed under study was the best appropriate technique to estimate loads in the unmonitored areas. Collecting data in all of the streams of the "downstream" subwatershed would be prohibitively expensive.

Furthermore, for bacteria load calculations, similarity of land uses and land use proportions from one subwatershed to another is not necessarily a reliable indicator of a similarity in loads. Unlike sediment or nutrients, bacteria loads are not calculated in Maryland TMDLs based on land use, but rather on BST, flow data, and average geometric mean concentrations from monitoring data. Land use is only one of a number of variables that may impact predicted loadings from one subwatershed to another; one would also have to consider population densities, livestock numbers, number of septic systems, etc., in attempting a comparison of the estimated load for a monitored watershed to that projected for an unmonitored watershed. Even consideration of such variables, though, may not result in similar loads between two watersheds, as bacteria are so unpredictable. Given the variability of bacteria, and lacking any direct correlation with land use proportions, using an average of the loads from several monitored subwatersheds to project an estimated load for the "downstream" subwatershed is the best approach, since averaging generates a sort of middle ground, and "evens out" different load contributions from the various subwatersheds within one watershed.

6. Page 33, Table 4.3-1: The Spring Branch station (SBH0002) is listed as being upstream of the downstream subwatershed, yet this site discharges directly to the reservoir and is therefore not technically "up stream".

   Response: Station SBH0002 is located 0.2 miles upstream of where Spring Branch discharges to the reservoir. The model is partitioned at that point, so that SBH0002 drains to the subwatershed that has direct drainage to the Reservoir.

7. Page 53, Assurance of Implementation: Baltimore County is under a Consent Decree regarding its sanitary sewer overflows. Implementation of the conditions of the Consent Decree should assist in addressing the bacterial sources (particularly human) in the sewered portion of the watershed. This should be included in the assurances of implementation.

   Response: The information has been added the Assurance of Implementation section of the draft final TMDL report.

8. The proposed load reductions seem to be unattainable. The commentor references the maximum practicable reduction (MPR) scenario in the draft TMDL and the statement therein that three of the six sub-watersheds could not meet water quality standards based on MPRs. As the commentor notes, this is followed by a second scenario that allows reductions to increase up to 98%for all sources including wildlife in those three watersheds, in order to meet the standards. The commentor states that members of the RTG question the validity of adopting a load reduction strategy with such extreme load reductions. Since it appears from the TMDL analysis that it will be impossible to attain

the desired annual and seasonal bacterial loading goals through any combination of ordinary pollution control measures, what is the practical value of adopting such a TMDL (with the force of law)? What are signatories to the RWMA to do with these numbers? What kinds of extreme control measures would have to be adopted—and at whose expense?

Response: The TMDL is an objective technical analysis that identifies the maximum load of the impairing substance that the waterbody can assimilate and still meet the water quality criteria. The primary purpose of a TMDL is to provide planning information to direct implementation activities. TMDLs also generate information that may be used to refine the overall water resource management framework under the Clean Water Act. For example, bacteria TMDLs that have been developed across the nation are revealing, and quantifying, the contribution of wildlife sources. Current bacteria water quality criteria do not distinguish among sources, despite scientific evidence that the relative risk to public health may vary by source. The mounting evidence generated by bacteria TMDL analyses has motivated a national dialogue about bacteria criteria development.

The purpose of the MPR scenario mentioned above is to determine whether applying maximum practicable reductions (i.e., those that are technically feasible to implement) will result in achieving the goals of the TMDL. When that is shown not to be the case, as in six of eight subwatersheds of the Loch Raven Reservoir basin, the second scenario is applied in order to quantify the additional reductions needed beyond the MPRs. The results of this quantitative analysis in the Loch Raven Reservoir TMDL, requiring very high reductions in order to meet water quality standards in certain subwatersheds, reflect the issues under discussion in the ongoing national dialogue on bacteria water quality criteria.

The Assurance of Implementation section of the TMDL report proposes implementing the maximum practicable reductions as the initial stage of a long-term process. Additional information generated during this first stage of implementation will support future decisions regarding the feasibility of achieving the existing criteria. Further, when and if additional data are obtained, the TMDL may be revised. As part of its continuing effort to refine the TMDL, MDE welcomes any data that the counties have or will gather. During that time, it is likely that the national dialogue on bacteria criteria in which Maryland is participating will also advance. In the interim, MDE will work with local governments on common sense actions. These will include ways of achieving bacteria reductions as a concomitant benefit of nutrient and sediment controls, and strategies for protecting human health, which is the ultimate purpose of the bacteria criteria.

9. The commentor expresses the concerns of the RTG over the potential of this TMDL to divert efforts to reduce phosphorus and sediment loads as required by the 2005 Reservoir Watershed Management Agreement which is committed to reduce annual sediment and phosphorus loadings to three Baltimore Metropolitan water supply reservoirs. The RTG questions whether it is possible to begin implementation of ambitious new efforts to reduce bacterial inputs to the streams in the Loch Raven Reservoir watershed (which apparently do not have significant effects on Loch Raven Reservoir water quality) without being forced to diminish or compromise our ongoing efforts to significantly

reduce phosphorus and sediment inputs (with their well-documented in-lake effects) to all three reservoirs. RTG's concerns relate directly to the Assurance of Implementation presented in the TMDL report.

Response: The State shares the concern that TMDLs could potentially disrupt local programs and has since the late 1990s. MDE believes it is possible to start efforts to reduce bacteria inputs to the streams and we urge local governments and the agricultural community to make use of implementation methods that reduce bacteria as a concomitant benefit of nutrient and sediment reduction activities. This includes proper management of animals and their waste, stormwater management practices involving filtering and settling, programs to identify and correct illicit connections to storm sewers, and programs to manage failing sewage infrastructure. In addition, some nutrient management plans, although not directly linked, will help reduce bacteria loads (e.g., management of manure application practices). We also urge local governments to identify any sources of bacteria that pose a particularly high human health risk and thus warrant special attention (e.g., sanitary overflows, popular outdoor areas that are subject to improper human waste disposal due to lack of bathroom facilities).

10. This TMDL is a result of relisting of the Loch Raven Watershed for bacteria in 2008 after a previous delisting in 2004. It appears that all the calculations and thus results are based on 2004 data (Appendix A). Explain how this TMDL can be developed based on delisting year data and without what appears as more recent data.

    Response: The delisting in 2004 was based on fecal coliform data at one DNR CORE station from 1997-2002. The TMDL was developed based on *E. coli* data collected by MDE in 2003-2004, which was not available at the time of the 2004 delisting. The text of the draft TMDL has been revised to indicate only the most recent listing (2008).

11. Scenarios for loadings and reductions should be based on adequate scientific data. Specifically, bacteria may vary widely from sample to sample as well as seasonally. Also, attributing load reductions from wildlife seems to be unrealistic.

    Response: Bacteria concentrations do vary widely from sample to sample. For this reason, the water quality is assessed using a geometric mean of the concentrations. Bacteria concentrations can also vary seasonally. To account for this, sampling is conducted for a full year to capture any seasonal variability, and both annual and seasonal conditions are evaluated.

    Our guidance on controlling bacteria identifies human sources as the first priority for remediation. We recognize that controlling wildlife sources of bacteria might not be practical in many cases. In some circumstances, human disruptions of predator/prey relationships may be responsible for unnatural population booms in certain species, notably deer. Over population of deer, which can decimate the forest understory, can cause other water quality problems as well. In response, wildlife management measures can be a reasonable way of controlling such populations. Managed bow hunts have been initiated by Baltimore County in the Loch Raven drainage to control deer populations,

which were estimated to be about seven times the sustainable level. Another practical case of wildlife management is the control of rat populations in urban settings.

12. The commentor references p. 23 of the TMDL report, Municipal and Industrial Wastewater Treatment Plants (WWTPs), and notes that the flow and Avg Annual Fecal concentrations differ from the County's records. First the average flow should be adjusted to reflect an average flow of .52 MGD. Also, the plants recorded fecal coliform testing shows much lower levels in the discharge. Testing averaged closer to 2, as opposed to the 7.9 indicated. Information regarding how the 7.9 was determined would be helpful. Testing at the plant indicates 9 samples that indicated readings less than 2, 2 samples @ 2 and 1 @ 3. If the table is representing discharge levels at the source, then those samples are more representative. If they represent samples taken in the stream at or near the discharge, then there are other factors influencing bacteria levels.

    Response: The flow and concentrations presented on page 23 in Table 2.4.2 are based on DMR data reported for the period of the TMDL bacteria monitoring duration (November 2003 – October 2004). The reported monthly average flow for that period ranged from 0.66 MGD to 1.58 MGD with an average of 0.94 MGD. The reported monthly average fecal coliform concentrations ranged from 2 MPN/100ml to 48 MPN/100ml with an average of 7.9 MPN/100ml.

13. Referencing Table 4.3.3 Baseline Loads Summary, on p. 35 of the draft TMDL report, the commentor states that it would seem that adjustments to flow and average fecal discharge level from Table 2.4.2 should affect the baseline load represented as WWTP BL_{LR} in Table 4.3.3. Does this then also change all the Tables that follow?

    Response: The WWTP baseline load represented in Table 4.3.3 is calculated based on the plant's permit flow and *E. coli* limit. If there were changes to Table 2.4.2 the baseline load given in Table 4.3.3 would not be affected.

14. Referring to the scenario of higher fecal bacteria reductions than MPRs on pp. 41-42 of the draft TMDL report, the commentor states that the discussion supporting this Second Scenario revolves around reductions in Wildlife contributions. The commentor points out that although this scenario appears to achieve compliance, it is so far from reality that to propose it seems ridiculous. The whole scenario is unrealistic, the commentor continues, and does not appear to be a valid alternative, not even as a goal. Therefore, the commentor questions the continued use of this methodology to justify an overall unachievable end point--in each case, load reductions are represented as coming from wildlife. It is also suggested, the commentor notes, that any such reductions are impossible to predict and still more difficult to rely on.

    Response: TMDLs are intended to be an objective analysis that determines the loading limit necessary to meet water quality criteria. The drafters of the federal Clean Water Act envisioned the situation in which a TMDL analysis would reveal loading limits that were infeasible to achieve. In such cases, the analysis provides information that can be used to reconsider the viability of the water quality criteria, either in general or on a site-specific basis. The concerns raised by the commentor are consistent with similar concerns being

voiced as part of a national dialogue on water quality standards for pathogens. Until such time as the criteria are refined, MDE will continue to document the necessary load reductions as part of the TMDL analysis. That said, as noted in our response to Question 11, Maryland provides possible options for addressing these impairments, including consideration of wildlife management options when practical.

15. The commentor references Section 4.8 TMDL Allocations, p. 46-47 of the draft TMDL report, and states that the discussion regarding source categories as in past TMDLs places stormwater as both Point and Non-point. If stormwater is now to be considered a point source via the NPDES permitting process, then what stormwater is considered non-point source? The commentor continues that clear definition and percents should be assigned to the point vs. non-point if locals are to be "required" to mitigate through the permit process: some rational proportion of nonpoint vs. point sources being transported through designed systems would be beneficial to any implementation scenario.

    Response: Stormwater from areas regulated under the NPDES permitting process are considered point sources. Any non-regulated stormwater or areas that do not have an NPDES permit for stormwater (i.e. counties with no MS4 permits) are considered non-point sources. For the second part of the comment, the percentages of the different bacteria sources assigned to point vs. non-point sources are available upon request, and the definitions can be found in the TMDL report. In addition, please see response to comment #16.

16. On the same subject as comment #15, the commentor cites the draft TMDL document statement that "data and information usually are not detailed enough to define WLAs for NPDES-regulated stormwater discharges on an outfall-specific basis…" The commentor asks then how will local jurisdictions develop implementation plans required under future permit requirements for bacteria?

    Response: It is envisioned that implementation planning will be addressed on a broader geographic basis than individual stormwater outfalls. Such planning may also take the form of identifying and implementing programmatic activities that, in aggregate, are anticipated to reduce bacteria loads. The uncertain benefits of such activities imply that the associated implementation will likely be an adaptive process. Jurisdictions are advised to, 1) research the control measures that have been proven to be effective, 2) as part of the planning process, estimate the potential reductions associated with implementing those measures, 3) then, begin implementation with small-scale demonstrations of a variety of such management measures, and 4) based on experience, try to determine which are more effective, and expand the use of those control measures.

17. The commentor further asks: Is it so that any "Allowable Load" presumes that any deviation below that standard would be added?

    Response: The meaning and intent of the question is not clear.

18. The commentor notes that Table 4.8.1 indicates a point source WLA for both domestic animals and wildlife, and asks: Is this fraction of the WLA starting off as nonpoint source?

    Response: Any waste product that is deposited in such a manner that it is conveyed via a NPDES-regulated storm sewer system must be managed as part of the Stormwater WLA. Thus, it is ideal to prevent the pollutant from being generated so that it is not necessary to manage it as part of a pollutant in the storm sewer system. The classic example of this is the deposition of pollutants carried through the atmosphere. It may be true that the atmospheric source was at one time "non point source," but that becomes academic once it enters the storm sewer system. If domestic or wild animal waste is discharged into a storm sewer system, then the storm sewer managers become responsible for its management. Consequently, it is in the interest of stormwater managers to engage other units of government to promote source controls, for example solid waste managers who may have influence over the control of rat infestations and trash.

19. The commentor recommends checking tables and text on p. 49 for correctness based on adjustments to page 23.

    Response: The tables and text on page 49 are not affected by Table 2.4.2 on page 23.

20. Referring to Section 5.0 Assurance of Implementation, pp. 53-54, the commentor cites discussion of the link between the TMDL and the County & Municipal MS4 permit. The commentor is concerned that this TMDL, which by its own admission is not feasible, is expected to be implemented and implied to be somehow met by the MS4 permits, and thus appears to leave local jurisdictions "holding the Bag" legally for the assurance, which may not be possible. The commentor continues by noting that, strictly speaking, noncompliance with the TMDL implementation schedule may constitute noncompliance. Since achievement of adequate improvement regarding bacterial impairments is at the least questionable, inferring that local governments will be legally responsible for load reductions that in many cases are out of their control will expose them to unwarranted legal actions. In conclusion, the commentor states that, notwithstanding the need to make improvements, the implementation should be based on a reasonable and achievable approach: stating that such improvements are not achievable and then linking their betterment to a Clean Water Act regulatory program without offering some protection for the implementing governments, is in itself unreasonable.

    Response: The TMDL is a technical analysis to determine the assimilative capacity of a waterbody. Until it is utilized or incorporated in a permit, it is not enforceable. Generally, a MS4 permit requires controls to the maximum extent practicable (MEP). If a MS4 permit holder demonstrates that they have truly applied controls to the MEP, MDE may conduct or require additional testing and may consider a revision of the water quality standards. A permit applicant will also have the opportunity to present additional data to refine the TMDL. Further, generally, application of controls to the MEP is considered compliance with an MS4 permit.