**Comment Response Document**
**Regarding the Total Maximum Daily Load (TMDL) of Nutrients (Phosphorus) for the Catoctin Creek Watershed, Frederick County, Maryland.**

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Load (TMDL) of Nutrients (Phosphorus) in the Catoctin Creek Watershed. The public comment period was open from July 16, 2012 through August 15, 2012. MDE received two sets of written comments from Mr. Barry Miller of Redland Brick and Commissioner Blaine Young of Frederick County.

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

| Author | Affiliation | Date | Comment Number |
|---|---|---|---|
| **Mr. Barry Miller** | **Redland Brick** | **8/3/2012** | **1 – 4** |
| **Hon. Blaine Young** | **Frederick County Board of County Commissioners** | **8/15/2012** | **5 – 13** |

**Comments and Responses**

**Comment 1:** I request that the news releases of Governor Martin O'Malley listed on the Maryland DNR website dated February 13, 2012 and April 19, 2012 are included in the public comments for these TMDL developments. In the February news release the Governor announced the "results of Maryland's 2001 Fall Oyster Survey show the highest survival rate" and that this has been the trend in recent years. In the April news release the Governor announced that based on the winter dredge survey, the "Chesapeake Bay's juvenile blue crab population is at the highest level on record and the overall blue crab population is at its highest level since 1993". Furthermore, the Governor specifically noted, "Today's announcement marks four years in a row of progress to restore the blue crab." Remarkably, the increases in oyster and crab populations have occurred at the same time that the moratorium on the harvest of striped bass was eliminated and possession limits have been liberalized. (The blue crab is the primary food source of the striped bass in the Chesapeake Bay.) This information is based on scientific data and shows that the water quality in the Chesapeake Bay is currently adequate if not good. It also shows that prior improvements in water quality may be adequate. This is a basis to show that this TMDL may not be necessary.

> **Response:** The news releases requested by the commentor to be included in the TMDL report are related to the Chesapeake Bay and its tidal tributaries and MDE does not considered them necessary within this TMDL report. While nutrient and other pollutants reductions from the non-tidal tributaries draining into the Chesapeake Bay may have contributed to progress made towards a healthier Chesapeake Bay, this doesn't prove that it is due to nutrient reductions in the

Catoctin Creek watershed and that the Catoctin Creek is meeting its local water quality standards. The TP reductions required by this TMDL are necessary to meet local water quality standards in the Catoctin Creek.

**Comment 2: No cost analysis was conducted in the development of this TMDL.** We are limited in our environmental stewardship by only two things- the limits of available technology and the economics of available technology. If the economics are not acceptable it does not matter if technology is available. Our country and state is in the deepest depression since 1929. As an example, our Rocky Ridge Plant has been shut down and our employees have been laid off for significant periods each year since 2006. I sat in prior Water Implementation Plan (WIP) and TMDL meetings and have heard farmers, business, and residents say they cannot add additional cost to their business. In a study issued to the Maryland Chamber of Commerce last October it was noted that the cost of the Water Implementation Plan (WIP) will cost each Maryland resident over $10,000. I am aware that a number of municipalities in Washington County, Maryland have formally told Washington County that they will not implement their portion of the WIP as they cannot afford it. Business and residents do not have that luxury. In the [August 1, 2012] meeting, County Commissioner Paul Smith noted that Frederick County has the largest land mass of any county in Maryland but only on fourth of the population of neighboring Montgomery County. Therefore, the implementation costs will be four times as much for Frederick County residents. I do not question if MDE followed the EPA protocol in the development of this TMDL but if the protocol does not require a cost analysis to be performed it is significantly shortsighted. All residents and businesses want clean water but how clean can we afford it to be?

**Response:** The development of a TMDL is a process to determine the assimilative capacity of a particular substance based on a combination of the water quality criteria and the designated uses. Neither the Clean Water Act nor current EPA regulations direct states to develop implementation plans and/or cost analysis as part of the TMDL development and approval process.

Specific implementation measures and cost analysis are beyond the scope of the traditional TMDL process, and analyzing the costs of potential mitigation measures would occur at a later implementation stage in which the concerns raised by the commentor could be considered by the interested parties responsible for the TMDL implementation. However, reasonable assurance of implementation is demonstrated through technical feasibility and funding mechanisms outlined in Maryland's Phase II Chesapeake Bay Watershed Implementation Plan and further summarized in this document.

**Comment 3: The data used in the development of the WIP and the TMDL is flawed and should not be used to set TMDL limits for these waterways.** In addition, data used is dated and better data is available. In my comments on the WIP prior, I noted that MDE used data for Sideling Hill Creek, 15 Mile Creek, and the Savage River in the

models used to set TMDL limits. These waterways are cold water streams, in a colder climate, in mountainous areas, are predominantly covered by forest, and primarily spring fed, with significant tree cover, and has never supported naturally reproducing trout. They do not compare and the data for one should not be used to propose regulations for the other. If MDE does not have the data it needs to implement the model, it either needs to get the appropriate data or it needs to use a different model prior to writing regulations. Comparable streams for the Monocacy River would be the Conococheague Creek in Washington County, MD. The data used in the development of this TMDL originates in the 1970's. Land use had dramatically changed during that same time making that data obsolete. Participants in the [August 1, 2012] meeting talked of having data that MDE refused to use. This gives the impression that MDE has handpicked that data to get the TMDL it wants.

> **Response:** MDE conducted a data solicitation for information relevant to this TMDL in 2009. All available data consistent with state monitoring protocols from 1998 to the time of TMDL development were considered. The land use and phosphorus loads used in the development of this TMDL represent conditions in 2009. Please also see the response to Comment #8 below.
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> The TMDL endpoint, the phosphorus loading threshold compatible with meeting Maryland's standards for protecting aquatic life, was set based on the median forest normalized phosphorus loading rates for the geographic scale of MD 8-digit watersheds which are currently supporting their Aquatic Life Use in 1$^{st}$ through 4$^{th}$ order streams in the Eastern Piedmont and Highland regions. Biologists developing MD's biological assessment methodology consider the fish and benthic invertebrates in this combined region to have similar community structure, and thus comparisons across watersheds in this region are valid. Because the calculation of the median is fairly insensitive to outliers or extreme values, it is not the case that all of the 1$^{st}$ through 4$^{th}$ order streams in a watershed would have to be high-quality waters to meet the threshold. Please also see the response to Comment #12 below.

**Comment 4: MDE should converse with EPA rather than impact the residents and businesses.** On slide 36 of their presentation, MDE admits they could have a better scientific understanding of the impact of nutrients on aquatic life. MDE admits it would like more data. MDE is bound on implementing a TMDL while other states wait. We do not know what will happen upstream. It is great that MDE will revisit the status of nutrient impairment in 2025 but the residents and businesses will be impacted upon finalization of the TMDL on the issue of their next NPDES permit. The public is not opposed to implementing sound environmental regulation. MDE should delay the finalization of the TMDL and WIP until they have better data and the financial climate is better.

> **Response:** MDE is following EPA guidance and regulations in addressing this phosphorus impairment listing by establishing this TMDL with the best readily available science and data and within the timeframe required by EPA. MDE can

not delay the finalization of this TMDL based upon the current economic climate. As stated in comment #2, the development of a TMDL is a scientific process to determine the maximum amount of a specific substance or pollutant that a waterbody can assimilate and still meet its water quality standards. Implementation and costs related to it, therefore, are beyond the scope of this process.

Additionally, independently of the establishment of this TMDL, residents and businesses will be required to do their share in reducing nutrients to meet Chesapeake Bay water quality standards under the Bay TMDL Watershed Implementation Plan. Permits for municipal NPDES WWTPs will not require further phosphorus reductions, beyond those listed in the Bay TMDL, because the waste allocations for WWTPs established have been adopted for the Catoctin Creek phosphorus TMDL. The 20% restoration requirement in Phase I MS4 permits and successive permits should achieve the phosphorus reductions to meet both the Bay TMDL and the local TMDL. Similarly, jurisdictions upstream of Maryland's waters will also be required to implement measures necessary to meet water quality standards in the Chesapeake Bay; therefore it is reasonable to expect that nutrient reductions will take place in upstream waters. As explained in the TMDL report, by 2025 when the Bay TMDL is fully implemented, MDE will review the status of the nutrient impairments in the Catoctin Creek, based on additional monitoring data and any improvements in the scientific understanding of the impact of nutrients on aquatic life.

**Comment 5:** The loads assigned to Frederick County Government's NPDES MS4 permit in the technical memos use a calculation of the MS4 are to calculate the load. We have observed that the Maryland Department of the Environment (MDE) is currently using two different definitions of the MS4 area, and that neither is consistent with the Clean Water Act. One method is described in the "Accounting for Stormwater Wasteload Allocations and Impervious Areas Treated" draft document dated June 2011 and used by the Stormwater program. This method includes the entire jurisdictional boundary of the County in the MS4 and subtracts non-urban areas and areas operated by other permit holders. The second method, used by the TMDL program, used census-designated urban areas to define the MS4. This includes agricultural land and excludes some of the county's actual MS4. The Clean Water Act specifically designated the Phase I MS4 as the storm sewer system, its appurtenant conveyances and drainage areas. The MDE's methods overestimated the area of the MS4 and the sweep of the county government's control.

**Response:** The method used in calculating the National Pollutant Discharge Elimination System (NPDES) Regulated Stormwater Wasteload Allocation (WLA) is based on Frederick County's Municipal Separate Storm Sewer System (MS4) permit applied jurisdiction wide and covering all urban areas within the County, except for those developed areas regulated under a separate NPDES stormwater permit. Within the Catoctin Creek watershed, the urban areas not covered under the County's Phase I

MS4 permit include those areas associated with the Myersville and Middletown Phase II Municipal MS4s, the State Highway Administration's (SHA) Phase I MS4, and "Other Regulated Stormwater Sources" (including state and federal Phase II MS4s, industrial facilities regulated for stormwater discharges, and construction sites). The individual Frederick County Phase I MS4 WLA, presented within the point source technical memorandum to the Total Maximum Daily Load (TMDL), is based on reductions applied to the urban stormwater loads associated solely with the Frederick County MS4 area and excludes urban stormwater loads associated with the other NPDES stormwater permits within the watershed. This methodology is consistent with the MS4 definition outlined within the Maryland Department of the Environment (MDE) Stormwater Program's guidance document, *Accounting for Stormwater Wasteload Allocations and Impervious Areas Treated*, which states that a County's MS4 permit applies jurisdiction-wide, except to those areas regulated under a separate NPDES stormwater permit. Furthermore, this methodology is consistent with the definition outlined within the Clean Water Act, which states that the areas draining to a storm-sewer system that are owned and operated by a Phase I jurisdiction are regulated via that jurisdiction's MS4 permit.

However, the methodology for calculating the NPDES Regulated Stormwater WLA within the Catoctin Creek Nutrient TMDL does represent a deviation from the original methodology applied in calculating the NPDES Regulated Stormwater Target Loads within Maryland's Phase II Watershed Implementation Plan (WIP) for the Chesapeake Bay Nutrient and Sediment TMDLs. The original methodology applied in the Draft Phase II WIP assumed that very low density and rural developed areas were not covered under a given County's MS4 permit. In order to exclude these areas from MDE's delineation of NPDES regulated stormwater, the combination of the US census "urbanized areas" (from the 2009 US Census Update Data) and "core" urban areas from the United States Geological Survey (USGS) Chesapeake Bay Program Office's (CBPO) 2006 Chesapeake Bay Land-Cover Dataset (CBLCD) were applied. This method is consistent with the landuse assumptions in the Bay TMDL. To accurately reflect new MS4 permit conditions, the final version of the Draft Phase II WIP has been revised to include the entire urban area within a given MS4 County as being included within the NPDES Regulated Stormwater Target Loads.

**Comment 6:** The implications [of this TMDL] to wastewater treatment plants several years down the road are unclear, and we would like MDE to explain them to us.

**Response:** As explained above, the Chesapeake Bay TMDL WLA for municipal WWTPs has been adopted for this TMDL. There are no additional requirements for WWTPs under this TMDL. For major municipal or industrial WWTPs, the facilities have an individual WLA which is the same as the Bay TMDL allocation and it is stated in the TMDL report. For minor facilities, as in the Bay TMDL, an aggregate WLA has been developed and is to be shared among all minor facilities. This aggregate load and the facilities to which this load apply are also presented in the report. All facilities will have to comply with their NPDES permit

requirements as established by MDE's NPDES Permits Program under the regular permitting process. Currently, no facility has additional requirements from the local TMDL over what will be required for the Bay TMDL.

**Comment 7:** Developing TMDLs at such a large scale means that even if there are substantial areas within a watershed that are not contributing to an impairment, they are also included as impaired. We believe that MDE can effectively delist many of these areas by modeling to the catchment scale, which Frederick County has done using EPA's SWMM Model.

**Response:** Currently MDE is managing biological listings at the Maryland 8-digit watershed scale using a stratified random sampling approach to obtain a statistically valid assessment. This is a balance of resources and scale when managing Maryland's 135 watersheds. Because of this, the TMDLs were developed to be consistent with the 303(d) listing scale. The commentor is correct to say, however, that at a finer scale there may be streams with healthy biological communities. It is MDE's expectation that implementation should focus on specific areas of the watershed that are known to have localized impacts and is encouraging localities to focus on local implementation. Therefore, it would be appropriate for Frederick County to target its phosphorus reduction efforts on catchments which are likely to have significant phosphorus impacts on biota and thereby accelerate the restoration of the biological community in the 1$^{st}$ through 4$^{th}$ order streams in the watershed.

**Comment 8:** MDE did not use data from Frederick or Montgomery County to develop its assessment despite the availability of randomly stratified data points using Maryland Biological Stream Survey methodologies. Furthermore, the number of recent data points in the sample used to create the TMDL does not appear to represent a statistically valid sample size unless you include Round 1 data collected in the 1990s.

**Response:** MDE conducted a data solicitation for information relevant to this TMDL in 2009. All available data consistent with state monitoring protocols from 1998 to the time of TMDL development were considered. The land use and phosphorus loads used in the development of this TMDL represent conditions in 2009.

MDE would like to incorporate all available data into the Biological Stressor Identification (BSID) analysis; however, all data must contain all parameters included in the MBSS Round 2 dataset. Many counties conduct biological sampling with MBSS protocols; however, currently there are no counties that collect all the same parameters as DNR (water chemistry, all habitat assessments, fish sampling, etc). Without all the same parameters there would be gaps in the dataset. The BSID analysis uses only the Round 2 data set since the MBSS Round 1 does not have all parameters that are contained in the Round 2 dataset.

Round 1 data is only included if the attributable risk value (AR) for all stressors identified is under 75%.

Related to the validity of using a small sample size of recent data, the results in the BSID analysis are statistically valid because they are based on the exact Mantel- Haenszel approach.[1] The exact Mantel-Haenszel method was applied due to the small sample size and stressors were not considered unless they were determined to be statistically significant and also determined to be ecologically plausible.

**Comment 9:** An "impaired stream miles" calculation was used. What is the methodology for this calculation?

**Response:** Maryland's Biological Listing Methodology (BLM) is based on the Maryland Biological Stream Survey (MBSS), which assesses biological conditions in 1st through 4th order streams. MBSS monitoring sites are selected based on a random sample design which allows for unbiased estimates of overall watershed conditions. The BLM is based on the MBSS fish and benthic indices of biological integrity (IBI) scores. An IBI greater or equal to 3 generally means that the site supports aquatic life, but year-to-year variability is taken into account by calculating a minimum allowable limit (MAL), based on comparison with the variation in biocritiera observed at MBSS sentinel sites, which are sampled every year. The percent impaired stream miles is calculated based on the percent of sites in a watershed which have IBI scores below the MAL. Reporting the number of biologically-impaired stream miles is a requirement of the EPA for 303(d) listing purposes.

Documentation of BLM can be found at http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Documents/Assessment_Methodologies/Biological_AM-streams_2012.pdf

**Comment 10:** The nutrient trading program in the draft offset policy as well as Maryland Assessment Scenario Tool models from MDE focus on nitrogen reductions, but P is the limiting nutrient here. This fact is predicted to make the tracking for P less accurate and the reductions more difficult to achieve.

**Response:** The commentor's question or concern is not clear. However, MAST has been developed for the assessment of nitrogen, phosphorus and sediments reductions. The draft offset policy is still undergoing public review and concerns and comments raised by the many stakeholders are being discussed.

[1] Mantel, N., and W. Haenszel. (1959) *Statistical aspects of the analysis of data from retrospective studies of disease.* Journal of the National Cancer Institute, 22, 719-748.

**Comment 11:** The loss of agriculture in Frederick County is unfortunate, and we are working to protect the family farm. As farms release more phosphorus pollution per acre than other land uses, and there are predictions as to the decline [in farming acreage in the County], has anyone looked at [any] predicted [decline in] future phosphorus loads from farms becoming inactive.

> **Response:** Phosphorus loading rates for all different land use sectors have been estimated using the Chesapeake Bay Watershed Model. Using these loading rates, the decrease in phosphorus loads resulting from farmland changing to forest or developed land can be estimated. MDE is not clear if the commentor refers to inactive farms as potentially different land uses (urban, forest, pasture) or as "abandoned" land. The decline in phosphorus loads from active farms becoming inactive or abandoned is included in the Phase II WIP under the "land retirement" BMP. Details of this can be found in Maryland's Phase II WIP (http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/FINAL_PhaseII_WIPDocument_Main.aspx).

**Comment 12:** There is no numeric criterion for phosphorus in non-tidal streams. The TMDL is set at the loading rates for reference streams which are not only unimpaired, but also contain some of the highest quality waters in the state, several of which include Tier II Antidegradation areas. There is no clear sense of how much phosphorus these reference streams could take before becoming impaired. This suggests that all water bodies must meet high quality reference stream conditions in order to not be impaired. This sets an impossible standard for areas which have existing development and agriculture, and sets restoration thresholds that require additional costs to retrofit over and above meeting the designated use of the water body. MDE suggests that we can make improvements and then reevaluate; however we are working with real dollars and long budget horizons that make such a suggestion impractical. The real question is at what point phosphorus begins to impair the water body, which is where the TMDL should be set. We have not addressed that here [This is not addressed in the TMDL].

> **Response:** See response to Comment #3. The phosphorus loading threshold, which is the endpoint for this TMDL, was based on the median forest normalized phosphorus load from all unimpaired watersheds in the Eastern Piedmont and Highlands. Some of these watersheds have a significant amount of Tier II Antidegradation areas, some do not: what these watersheds have in common is that they are supporting their Aquatic Life Use, which is the minimum acceptable requirement for meeting water quality standards.
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> The reference watershed approach is the standard method to set a TMDL endpoint when there are no numerical criteria. The loading rates from unimpaired watershed are used to set the maximum load compatible with meeting water quality standards. MDE has already used this methodology to develop sediment TMDLs approved by the EPA. In Region III, both Pennsylvania and Virginia have also developed TMDLs based on the reference watershed approach.

MDE recognizes the uncertainty inherent in setting a phosphorus loading threshold using the reference watershed approach for non-tidal nutrient TMDLs. EPA guidance[2] specifies that greater margins of safety should be used when there is more uncertainty. The margin of safety for non-tidal nutrient TMDLs is implicit and is based on selecting the median rather than the 75th percentile, for example, of the forest normalized phosphorus load from unimpaired watersheds.

**Comment 13:** The following table illustrates [that] the reductions required by the Chesapeake Bay TMDL for stormwater are dwarfed by the reductions required by local TMDLs. Green cells represent approved TMDLs. Yellow cells are under development and red cells have no activity. The cost numbers for the Bay TMDL for Frederick County are $1,503,450,109 for stormwater to reduce 7000 pounds of phosphorus. What will be the cost to reduce 1,204,192 pounds?

| Watershed | Stormwater Reductions (all sources) | | |
|---|---|---|---|
| | Sediment tons | Nitrogen lbs | Phosphorus lbs |
| Chesapeake Bay**** | 2,286* | 78,000* | 7,000* |
| Lower Monocacy River | 5,055.7*** | | 17,030*** |
| Lake Linganore**** | 130,975** | | 1,168,900** |
| Upper Monocacy River | 1,987.6*** | | 772*** |
| Double Pipe Creek | 1,811.9*** | | 16,132*** |
| Catoctin Creek | 1,342.4*** | | 1,358*** |

*Regulated Developed Stormwater. Includes all MS4 permit holders.

** Nonpoint source load. Earlier TMDL developed with MS4 loads in NPS loads.

***NPDES stormwater WLA. Includes all MS4 permit holders.

****Linganore is part of the Lower Monocacy. All watersheds are part of Chesapeake Bay.

**Response:** It is not clear whether the phosphorus reductions from Chesapeake Bay and Lake Linganore are comparable to the phosphorus reductions reported for the Lower Monocacy River, Upper Monocacy River, Double Pipe Creek, and Catoctin Creek. The latter include loads from all permit holders, even those in neighboring counties, and also include the revisions in the definitions of MS4 areas discussed in the response to Comment #5. In contrast, from the comment, the Chesapeake Bay phosphorus reduction appears to be restricted to Frederick County. The Bay reduction reported is also seems to be measured in delivered load, unlike the non-tidal TMDLs where the reductions are in EOS loads. The

[2] U.S. Environmental Protection Agency. 1999. Protocol for Developing Nutrient TMDLs. EPA 841-B-99-007.Office of Water (4503F), United States Environmental Protection Agency, Washington D.C. 135 pp.

Lake Linganore load reduction reported in the table is approximately twenty times the baseline load reported in the Lake Linganore TMDL. Therefore, the suggestion that the phosphorus TMDLs for the Lower Monocacy River, Upper Monocacy River, Double Pipe Creek, or Catoctin Creek would entail a significant additional burden on the County is not supported by the table as it now stands.

However, any load reduction differences between the lake TMDLs and the Draft Phase II Bay WIP can be due to differing model assumption, including landuse and precipitation periods. Currently, MDE is working to resolve the differences in lake TMDLs when compared to the Draft Bay Phase II WIP. Because the Double Pipe Creek, Upper Monocacy and Lower Monocacy phosphorus TMDLs use the same modeling systems as that in the Phase II WIP, the loads are comparable. Moreover, because the Bay WIP has a tracking and accountability component, credit from load reduction practices can be consistently applied to both the local TMDL and Bay TMDL.

Regarding the costs, what is presented in the comment assumes that it will cost approximately $240,000 per pound of phosphorus reduced. Current figures from a 2012 Chesapeake Bay Commission report[3] indicate that the average cost per pound of phosphorus reduction in for urban BMPs is between $20,000 to $50,000 per pound, which is about 5 to 10 times less than the figure presented. MDE is committed to working with both the local jurisdictions and EPA to identify current costs.

[3] Nutrient credit trading for the Chesapeake Bay: An economic study
Van Houtven, G., Loomis, R., Baker, J., Beach, R., & Casey, S. (May 2012). Nutrient credit trading for the Chesapeake Bay: An economic study: Prepared for Chesapeake Bay Commission. Research Triangle Park, NC: RTI International.