

**Comment Response Document
Regarding the Water Quality Analysis of Eutrophication for the Patuxent River Upper
Watershed, Anne Arundel, Prince George's, and Howard Counties, Maryland**

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Water Quality Analysis of Eutrophication for the Patuxent River Upper Watershed, Anne Arundel, Prince George's and Howard Counties, Maryland. The public comment period was open from July 27, 2006 to August 25, 2006. MDE received two sets of written comments.

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 |
|--------------|---|-----------------|----------------|
| Allan Smith | Chairman Patuxent River Commission | July 31, 2006 | 1 through 3 |
| Mary Searing | Anne Arundel County, Office of Environmental & Cultural Resources | August 18, 2006 | 4 through 7 |

Comments and Responses

1. The commentor opens with the discussion of a Patuxent River Commission (PRC) meeting held in July 2006 where a presentation and discussion were had about the referenced WQA. The commentor states that during this discussion a question was asked about the criteria used to determine that the area is not impaired for nutrients. At this time, the commentors learned that DO was used as the endpoint for the analysis. The commentor states it is the belief of more than one commissioner that DO levels are not a satisfactory way of measuring nutrient levels. The commentor continues by stating a suggestion was made that DO levels are a second or third-order effect of nutrient pollution and that there are other reasons the suggest that DO levels are an unreliable measure of nutrient pollution. The commentor additionally states that total nitrogen (TN) and total phosphorus (TP) levels are a more accurate way to determine nutrient impact.

Response: Water quality standards, a designated use and criteria to support that use, are the foundation on which a TMDL is developed. As the direct impact on the designated use, support of fish and aquatic life, is from dissolved oxygen, DO is in fact the very best measure of use attainment. It is the nutrients that are several steps removed from the attainment decision since excess nutrients result in excess algae, which decompose and use up oxygen lowering DO to the point where the aquatic life use is no longer supported.

2. The commentor states there is a concern that nutrient introduction from the northern sections of the Patuxent River causes many of the water quality issues found in the southern portions

of the river. The commentor continues that it is the Commission's position that the delisting of this section of the river for nutrient impairments would do a disservice to the river as a whole and it would suggest the sections of the river that are creating many of the problems downstream are healthy. The commentor additionally states that such an action would create false hopes in those working to improve water quality in the Patuxent River and that it would portray the health of the river taking a turn for the better when it actually is not.

Response: MDE develops TMDLs or WQAs for listed waterbodies based on available data collected by MDE for analysis purposes (covering high flow and low flow conditions), as well as any supplemental data from other agencies or any other sources. Based on available data, the analysis shows no evidence of DO violation or elevated chlorophyll *a* levels. Barring any contradictory future data, this information provides sufficient justification to revise Maryland's 303(d) list to remove nutrients as an impairing substance in relation to the Patuxent River Upper watershed. However, if any contradictory data exist in the future indicating violation of water quality standards, the 303(d) listings can be revised. Analyses of the more southern portion of the River, and the Bay will determine if additional nutrient reductions are needed in this section of the River, those reductions will be implementation through the Tributary Strategies.

3. The commentor states that at this time, the PRC does not support the removal of the Upper Patuxent River from the 303(d) list and the commission requests a more accurate method of qualifications be used to determine the nutrient impact in the Patuxent River.

Response: Please see response to Comment 2.

4. The commentor states that Anne Arundel County has recently completed a 2006 Targeted Bioassessment for the County's Upper Patuxent Subwatershed. The project involved the data collection and condition assessment for twenty-three (23) targeted sites in nineteen (19) sub-basins of the Upper Patuxent Watershed, a Use I stream, at which water quality sampling, benthic macroinvertebrate collection/ assessment, and physical habitat assessment were performed between April 24 and May 5, 2006. The following information is a summary from the report:
 - a. The drainage areas for the nineteen (19) sub-basins ranged in size from 75 acres to 4,371 acres. The impervious percentages ranged from 1.2 percent to 13.8 percent.
 - b. The instream water quality parameters measured included pH, Temperature, Dissolved Oxygen, Turbidity, Conductivity, and Total Dissolved Solids. Results of the water quality sampling indicate that "Overall, the water quality fell within the COMAR limits for a use I stream and are typical of a coastal plain stream." Water quality results indicate that there were three (3) sites with pH values below the acceptable limits, and one (1) site with a pH above the acceptable range. There was also one site with a dissolved oxygen reading just below the acceptable level of 5.0 mg/l. All sites met the acceptable standards for turbidity and temperature.
 - c. Results of the physical habitat assessment indicate that eleven (11) sites received the highest rating of 'Minimally Degraded,' another eleven (11) sites received a rating of

- ‘Partially Degraded,’ one (1) site received a rating of ‘Degraded,’ and zero (0) sites received a rating of ‘Severely Degraded,’ the lowest rating.
- d. Results of the benthic macroinvertebrate sampling indicate that four (4) sites received a ‘Good’ rating, nine (9) sites received a ‘Fair’ rating, another nine (9) sites received a ‘Poor’ rating, and one (1) site received a ‘Very Poor’ rating.
 - e. Sub-basins with an impervious value of less than five percent (5%), did not necessarily receive a ‘Minimally Degraded’ physical habitat assessment rating and/or a ‘Good’ benthic macroinvertebrate rating. In particular, two (2) sub-basins in the vicinity of the Patuxent Research Refuge received a ‘Poor’ benthic macroinvertebrate rating, while the physical habitat assessment was rated as ‘Minimally Degraded’ or ‘Partially Degraded.’

The commentor states that the data collected and analyses generated will be utilized as the County continues to further study the Upper Patuxent Watershed. Additional stream information, as well as watershed information, such as Best Management Practices, will be collected in the coming year. Please contact me if you would like to have a copy of the targeted bioassessment results.

Response: As part of the 303(d) listing and TMDL development process, a data solicitation letter will be sent to watershed stakeholders asking for pertinent information to the specified analysis. MDE requests that Anne Arundel County share the referenced information when it becomes available.

- 5. The commentor states that the drainage area of the Patuxent River Upper is stated in the report to be 88 mi² or 56,351 acres. The part that is located in Anne Arundel County consists of 34.8 mi² or 22,555 acres, which is approximately 40% of the total watershed. The commentor asks what is the area of the drainage area to the water quality monitoring station locations? In other words, do the monitoring stations receive drainage from enough of the watershed to support the request for a nutrients listing change for the Patuxent River Upper from Category 5 to Category 2? The commentor states that it appears the majority of the data are from one station, PXT0603 and asks if this station is located on the main stem of the Patuxent. The location information for the stations given in the report was only reported to two (2) decimal places; therefore, the exact location of the stations in reference to their stream data was hard to determine. For the purposes of this response, the commentor has assumed that station PXT0603 is located in the mainstem and captures the drainage area shown in Figure 1 submitted with her comments. As shown in Figure 1 submitted with her comments, the commentor states that it appears that a large portion of the southern part of the Patuxent River Upper is not covered with data from the water quality monitoring stations (The yellow boundary identifies the County’s drainage area to station PXT0603. The extent of the County’s part of the Upper Patuxent Watershed is shown in a green). However, as seen in Figure 2 also submitted with her comments, the landcover in the southern part of the watershed is different than the northern part.

Response: Station PXT0603 is a Department of Natural Resources (DNR) CORE station. It should be on the mainstem of the Patuxent similar to other Core station locations. South of

Station PXT0630 is tidally influenced and the tidal area of the watershed is not included in this report since the listing being addressed is only for the non-tidal nutrient listing.

6. The commentor states that Figure 1 of the document, which shows the locations of the monitoring stations, does not include the locations of MDE monitoring stations (PXT0630 and PXT0771).

Response: The MDE monitoring stations have been added to Figure 1.

7. The commentor states that the County has developed a Countywide landcover and impervious cover dataset. It was developed using 1-meter true color (RGB) and color infrared (NIR) 11-bit orthorectified IKONOS imagery captured in May of 2004. Plans are underway to update this dataset with information from 2006. The commentor requests that MDE contact her if the Department would be interested in this data for the referenced draft document or for other purposes.

Response: MDE has requested that Anne Arundel County share the most updated land use information for the County with MDE when it is available.

Appendix A

As a result of comments on the public draft document, MDE staff collected additional data in this basin. These additional data are presented in Table A1 below.

Table A1: Additional sample data collected Sept. 14, Sept. 27, Oct. 3, and Oct. 10, 2006.

| Station | Sample date | Water temp | pH | DO | Conductivity | Salinity | Turbidity | Comments |
|---------|-------------|------------|-----|-----|--------------|----------|-----------|--|
| PXT0630 | 9/14/2006 | 18.7 | 6.7 | 7.2 | 314 | 0.2 | 14.3 | |
| PXT0630 | 9/21/2006 | 17.0 | 7.3 | 7.7 | 325 | 0.2 | 4.3 | |
| PXT0630 | 9/27/2006 | 18.0 | 7.6 | 7.9 | 344 | 0.2 | 3.3 | |
| PXT0630 | 10/3/2006 | 16.8 | 7.6 | 8.1 | 324 | 0.2 | 1.3 | |
| PXT0630 | 10/10/2006 | 16.0 | 7.4 | 8.1 | 287 | 0.1 | 5.1 | |
| PXT0613 | 9/14/2006 | 18.7 | 6.8 | 7.6 | 333 | 0.2 | 12.1 | The station was originally PXT0603 (Route 50); however, the sampling team moved it to Governors Bridge Road - PXT0613 on the first run due to access issues at Route 50. |
| PXT0613 | 9/21/2006 | 17.5 | 7.2 | 7.5 | 327 | 0.2 | 7.4 | |
| PXT0613 | 9/27/2006 | 18.1 | 7.5 | 7.9 | 333 | 0.2 | 5.0 | |
| PXT0613 | 10/3/2006 | 16.9 | 7.6 | 8.6 | 314 | 0.2 | 7.1 | |
| PXT0613 | 10/10/2006 | 15.6 | 7.3 | 8.0 | 280 | 0.1 | 11.4 | |
| PXT0771 | 9/21/2006 | 18.1 | 7.1 | 7.8 | 180 | 0.1 | 2.2 | |
| PXT0771 | 9/14/2006 | 19.8 | 7.0 | 6.9 | 157 | 0.1 | 47.7 | |
| PXT0771 | 9/27/2006 | | | | | | | Road closed due to police activity. Could not sample river. |
| PXT0771 | 10/3/2006 | 18.6 | 7.7 | 7.6 | 183 | 0.1 | 1.4 | |
| PXT0771 | 10/10/2006 | 17.1 | 7.2 | 8.1 | 203 | 0.1 | 3.1 | |