

**Comment Response Document  
Regarding the Water Quality Analysis (WQA) of Eutrophication for the Gwynns Falls  
Watershed in Baltimore County and Baltimore City, Maryland**

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed WQA of Eutrophication for the Water Quality Analysis of Eutrophication for the Gwynns Falls Watershed in Baltimore County and Baltimore City, MD. The public comment period was open from July 22, 2009 through August 20, 2009. MDE received one set of 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
Steve Stewart	Baltimore County Department of Environmental Protection and Resource Management	August 20, 2009	1-3

**Comments and Responses**

1. The commentor states the focus of the eutrophication analysis is on chlorophyll *a* in the water column, yet for non-tidal streams, particularly, the lower order streams, the chlorophyll *a* of the benthic algal community may be more important. Filamentous green algae, or mats of other algal types can significantly reduce habitat available for the benthic macroinvertebrate community.

**Response:** The focus of the water quality analysis is not only on chlorophyll *a* in the water column. The main focus is on dissolved oxygen (DO) levels in the water column and the degradation of biological communities. As demonstrated by the analysis, in conjunction with the Biological Stressor Identification Analysis (BSID) results, neither DO levels nor aquatic life are being negatively affected by nutrient loadings to the stream. MDE assesses DO levels because the State has established numeric DO criteria in the Code of Maryland Regulations, which also provides narrative criteria for chlorophyll *a* in the water column, but not for benthic algae. The relationship between nutrient levels in the water and benthic algae growth has not yet been well-defined by scientific research. There are many factors affecting whether or not streams with high levels of nutrients can become impaired by algal growth (e.g., shading of the stream, gradient to allow re-aeration, bottom scouring events, etc.). The water quality analysis of DO and water column chlorophyll *a* in the Gwynns Falls, together with the BSID results, demonstrates that DO levels are appropriate for the designated uses of

the stream and that aquatic life is not being affected by nutrients, therefore concluding that nutrients are not impairing the designated uses of the Gwynns Falls.

2. The commentor states that it is not indicated at what time of day the dissolved oxygen concentrations were measured. Dissolved oxygen may undergo a daily cycle of dissolved oxygen concentrations, with high concentrations during the lowest concentrations at night just before dawn. This is related to the dynamics of oxygen generation and respiration of the algal community. While the chlorophyll a analysis would indicate that there is not a problem; because the analysis is limited to water column chlorophyll a, it may be missing a significant benthic algal community contribution.

**Response:** Dissolved oxygen concentrations are collected throughout the day by MDE field office staff, starting very early in the morning. As noted by the commentor, lowest concentrations of DO are measured just before dawn, but the data show that there are no extreme changes (DO swings) in the data collected from the early hours of the morning (6:00 am or earlier) into the afternoon hours, indicating that significant DO swings between night and day DO concentrations are unlikely, and therefore not a significant benthic algal community contribution to DO levels in the stream. See also Response to Comment #1.

3. The commentor states that Red Run is a Use III stream. It has been left out of the Executive Summary (page iv, 2nd paragraph) and the Water Quality Characterization (page 6, 1st paragraph). The Use III dissolved oxygen criteria should be applied to the samples in Red Run as well as the Use III waters above Reisterstown Road.

**Response:** Thanks for the comment. The analysis and the report have been corrected to include Red Run as an additional Use III stream.

4. The commentor references page 2, 3rd paragraph: The statement that the rocks (schist and gneiss) are of volcanic origin is incorrect. These are metamorphic rocks, changed from the original sedimentary rocks through heating.

**Response:** Thanks for the comment. The report has been corrected to reflect the suggested edit.