Water Quality Analysis of Eutrophication for the Little Patuxent River Basin in Anne Arundel and Howard Counties, Maryland

FINAL

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Submitted to:

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1650 Arch Street
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July 2009

EPA Submittal Date: September 9, 2009
EPA Approval Date: March 15, 2010

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BOD	Biochemical Oxygen Demand
BSID	Biological Stressor Identification
CES	Coastal Environmental Services
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
DNR	Department of Natural Resources
DO	Dissolved Oxygen
EPA	United States Environmental Protection Agency
MBSS	Maryland Biological Stream Survey
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
mg/l	Milligrams Per Liter
mi^2	Square Miles
NPDES	National Pollution Discharge Elimination System
NRCS	National Resources Conservation Service
SCS	Soil Conservation Service
SSURGO	Soil Survey Geography
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSI	Trophic State Index
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WQLS	Water Quality Limited Segment
µg/l	Micrograms Per Liter

EXECUTIVE SUMMARY

Section 303(d) of the federal Clean Water Act (CWA) and the U.S. Environmental Protection Agency's (EPA) implementing regulations direct each state to identify and list waters, known as water quality limited segments (WQLSs), in which current required controls of a specified substance are inadequate to achieve water quality standards. For each WQLS, listed in the *Integrated Report of Surface Water Quality in Maryland (Integrated Report)* (MDE 2008a), the State is to either establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards, or demonstrate that water quality standards are being met (CFR 2007).

The Little Patuxent River watershed (assessment unit ID: MD-02131105) was identified in Maryland's *Integrated Report* as impaired by cadmium (listed in 1996), nutrients (1996), sediment (1996), and impacts to biological communities (2006). Centennial Lake located within the watershed as identified as impaired by nutrients (1998) and sediment (1998). The Centennial Lake listings have been addressed by TMDLs approved in 2002. The cadmium listing has been addressed by a Water Quality Analyses (WQA), submitted in 2008, showing no impairment. The 1996 nutrients listing was refined in the *Integrated Report* by identifying phosphorus as the specific impairing substance. Consequently, for the purpose of this report the terms nutrients and phosphorus will be used interchangeably. The listings for sediment and impacts to biological communities will be addressed separately at a future date.

A data solicitation for information pertaining to pollutants, including nutrients, in the Little Patuxent River basin was conducted by MDE in January 2005, and all readily available data from the past five years have been considered. Currently, Maryland's water quality standards do not contain specific numeric criteria for nutrients. Nutrients typically do not have a direct impact on aquatic life; rather, they mediate impacts through excessive algal growth leading to low dissolved oxygen. Therefore, the evaluation of potentially eutrophic conditions due to nutrient over-enrichment will be based on whether nutrient-related parameters (i.e., dissolved oxygen levels and chlorophyll *a* concentrations) are found to impair designated uses in the Little Patuxent River watershed (in this case, protection of aquatic life and wildlife, fishing, and swimming).

Recently, MDE developed a biological stressor identification (BSID) methodology to identify the most probable cause(s) of the existing biological impairments in Maryland 8-digit watersheds based on the suite of available physical, chemical, and land use data (MDE 2009a). The BSID analysis for the Little Patuxent River watershed indicates inorganic pollutants and flow/sediment stressors are associated with impacts to biological communities; these findings will be addressed separately. The BSID analysis for the Little Patuxent River watershed did not identify any nutrient-related stressors present and/or nutrient-related stressors showing a significant association with degraded biological conditions (MDE 2009b). The results of the BSID study, combined with the analysis of recent water quality data presented in this report, indicate that the Little Patuxent River watershed is not being impaired by nutrients.

This analysis supports the conclusion that a TMDL for nutrients is not necessary to achieve nutrient related water quality standards in the Little Patuxent River watershed. Although the

waters of the Little Patuxent River watershed do not display signs of eutrophication, the State reserves the right to require future controls in the watershed if evidence suggests that nutrients from the basin are contributing to downstream water quality problems. Reductions may be required by the forthcoming Chesapeake Bay TMDL, currently under development and scheduled to be completed by the EPA at the end of 2010.

Barring the receipt of contradictory data, this report will be used to support a revision of the nutrients (i.e., phosphorus) listing for the Little Patuxent River watershed, from Category 5 (waterbody is impaired, does not attain the water quality standard, and a TMDL is required) to Category 2 (waterbodies meeting some [in this case nutrients-related] water quality standards, but with insufficient data to assess all impairments) when MDE proposes the revision of the *Integrated Report*.

1.0 INTRODUCTION

Section 303(d) of the federal Clean Water Act (CWA) and the U.S. Environmental Protection Agency's (EPA) implementing regulations direct each state to identify and list waters, known as water quality limited segments (WQLSs), in which current required controls of a specified substance are inadequate to achieve water quality standards. For each WQLS, listed in the *Integrated Report of Surface Water Quality in Maryland (Integrated Report)* (MDE 2008a), the State is to either establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards, or demonstrate that water quality standards are being met (CFR 2007).

A segment identified as a WQLS may not require the development and implementation of a TMDL if more recent information invalidates previous findings. The most common scenarios that would eliminate the need for a TMDL are: 1) analysis of more recent data indicating that the impairment no longer exists (i.e., water quality standards are being met); 2) results of a more recent and updated water quality modeling which demonstrates that the segment is attaining standards; 3) refinements to water quality standards or to the interpretation of those standards accompanied by analysis demonstrating that the standards are being met; or 4) identification and correction of errors made in the initial listing.

The Little Patuxent River watershed (assessment unit ID: MD-02131105) was identified in Maryland's *Integrated Report* as impaired by cadmium (listed in 1996), nutrients (1996), sediment (1996), and impacts to biological communities (2006). Centennial Lake located within the watershed was identified as impaired by nutrients (1998) and sediment (1998). The Centennial Lake listings have been addressed by TMDLs approved in 2002. The cadmium listing has been addressed by a Water Quality Analysis (WQA), submitted in 2008, showing no impairment. The 1996 nutrients listing was refined in the 2008 *Integrated Report* by identifying phosphorus as the specific impairing substance. Consequently, for the purpose of this report the terms nutrients and phosphorus will be used interchangeably. The listings for sediment and impacts to biological communities will be addressed separately at a future date.

This report provides an analysis of recent data that supports the removal of the nutrients (phosphorus) listing for the Little Patuxent River watershed when MDE proposes the revision of the State's *Integrated Report*. The remainder of this report lays out the general setting of the Little Patuxent River watershed area, presents a discussion of the water quality characteristics in the basin in terms of the existing water quality standards relating to nutrients. This analysis supports the conclusion that the waters of the Little Patuxent River watershed do not display signs of eutrophication or nutrient over-enrichment.

2.0 GENERAL SETTING

Location

The Little Patuxent River watershed is located in the Patuxent River region of the Chesapeake Bay watershed within Maryland (see Figure 1). The Little Patuxent River originates just north of Route 70 near the Howard County Landfill. The river flows southeast through the heavily suburbanized area of Columbia crossing under Route 29 just south of Lake Kittamaqundi. The Little Patuxent River continues southeast crossing under Route 32 where the Middle Patuxent River joins the Little Patuxent River in the town of Savage. The Little Patuxent River, now larger due to the influx of the Middle Patuxent River, continues to flow southeast crossing under Route 295, through the southwest corner of the Fort Meade Military Reservation, and through the northeast section of the Patuxent Research Refuge. The Little Patuxent River joins the Patuxent River just southeast of the Patuxent Research Refuge between the towns of Bowie and Crofton just before the Routes 3 and 450. The drainage area of the Little Patuxent River watershed is approximately 66,000 acres.

Geology/Soils

The Little Patuxent River watershed is situated within the Northern Piedmont and Northern Coastal Plain Provinces in central Maryland. Sedimentary and igneous rocks that have been metamorphosed characterize the surficial geology of the Northern Piedmont Province. Most of the Northern Piedmont Province is located above the "fall line" on the east coast. Unconsolidated sand, silt, and clay sediments underlie the Northern Coastal Plain Province. The Coastal Plain Province sediments are a source of groundwater for nearby cities. The topography in the watershed is mostly characterized by rolling hills, gently sloping terrain, and broad valleys with small streams.

The Little Patuxent River watershed is comprised of several different soil series including the Chester, Beltsville, and Collington. The Chester series consists of very deep, well-drained soils on upland divides and upper slopes in the Northern Piedmont Province. Saturated hydraulic conductivity is moderately high to high. The Chester soils formed in materials weathered from micaceous schist. The Beltsville soil series consist of very deep, moderately well drained soils in the Northern Coastal Plain Province on uplands and coastal plain landscapes. Saturated Hydraulic Conductivity is high above the fragipan to moderately low or low in the fragipan. The Collington series consist of very deep well drained soils in the Northern Coastal Plain Province on a coastal plain landscape. Saturated Hydraulic Conductivity is low to moderate (USDA 1968, USDA 1973).

Land Use

The 2002 Maryland Department of Planning land use/land cover data show that the Little Patuxent River watershed is comprised primarily of urban and forest lands (see Figure 2). The

land use distribution in the watershed is approximately 52% urban, 36% forest, 9% agricultural, and 3% pasture.

Point Sources

There are a total of 12 municipal and industrial point source facilities with permits to discharge in the Little Patuxent River watershed. Of these, six facilities are regulated by a National Pollution Discharge Elimination System (NPDES) permits for the discharge of nutrients.

Table 1: Point Source Facilities Discharging Nutrients in the Little Patuxent River Watershed

Facility	NPDES Number	Maximum Permitted Flow (MGD)
Dorsey Run Advanced WWTP	MD0063207	2.0
Little Patuxent Water Reclamation Plant	MD0055174	25.0
MD & VA Milk Producers Association	MD0000469	N/A
Patuxent Water Reclamation Facility	MD0021652	N/A
Piney Orchard WWTP	MD0059145	1.2
U.S. Army – Fort George G. Meade	MD0021717	3.0

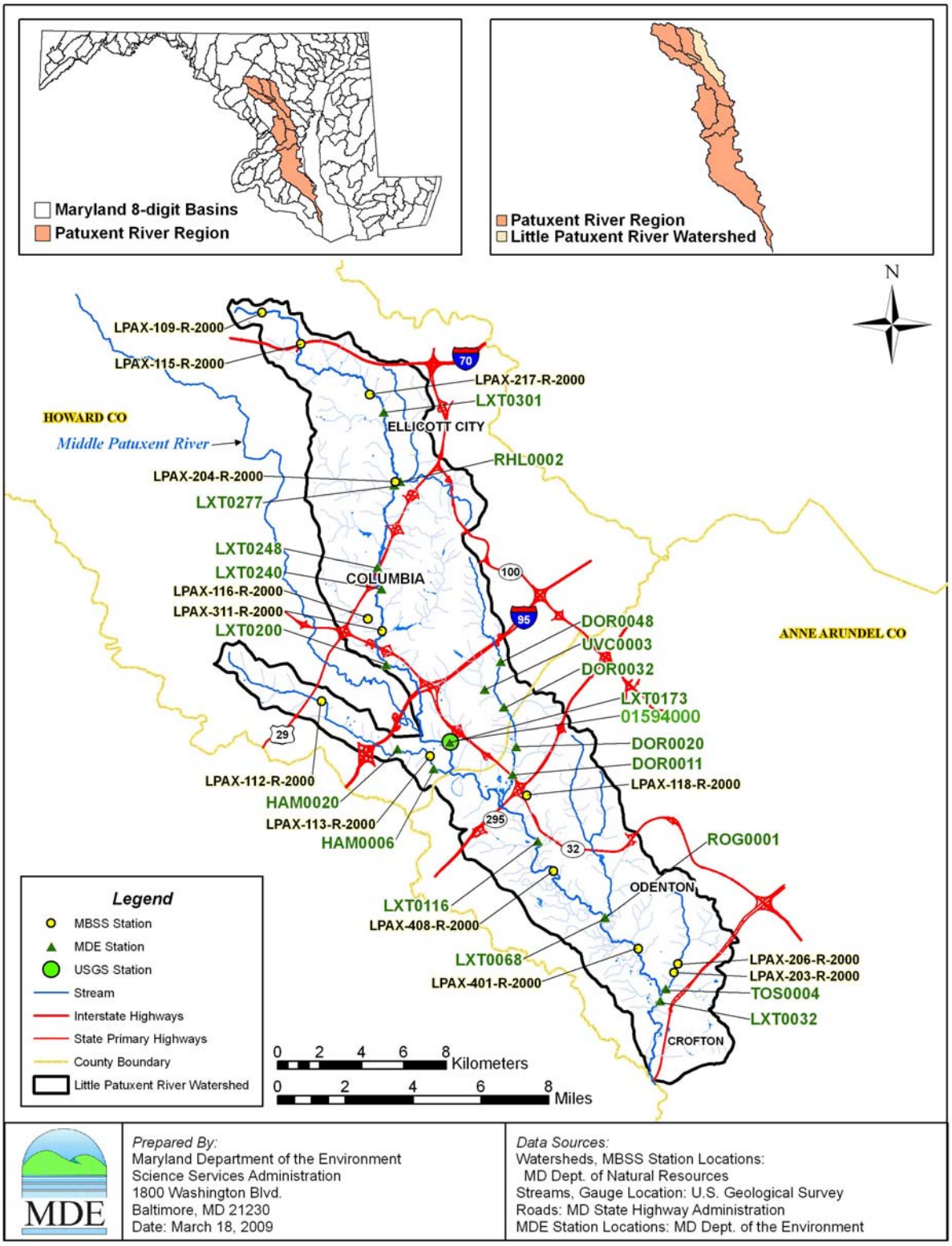

Figure 1: Location Map of the Little Patuxent River Watershed

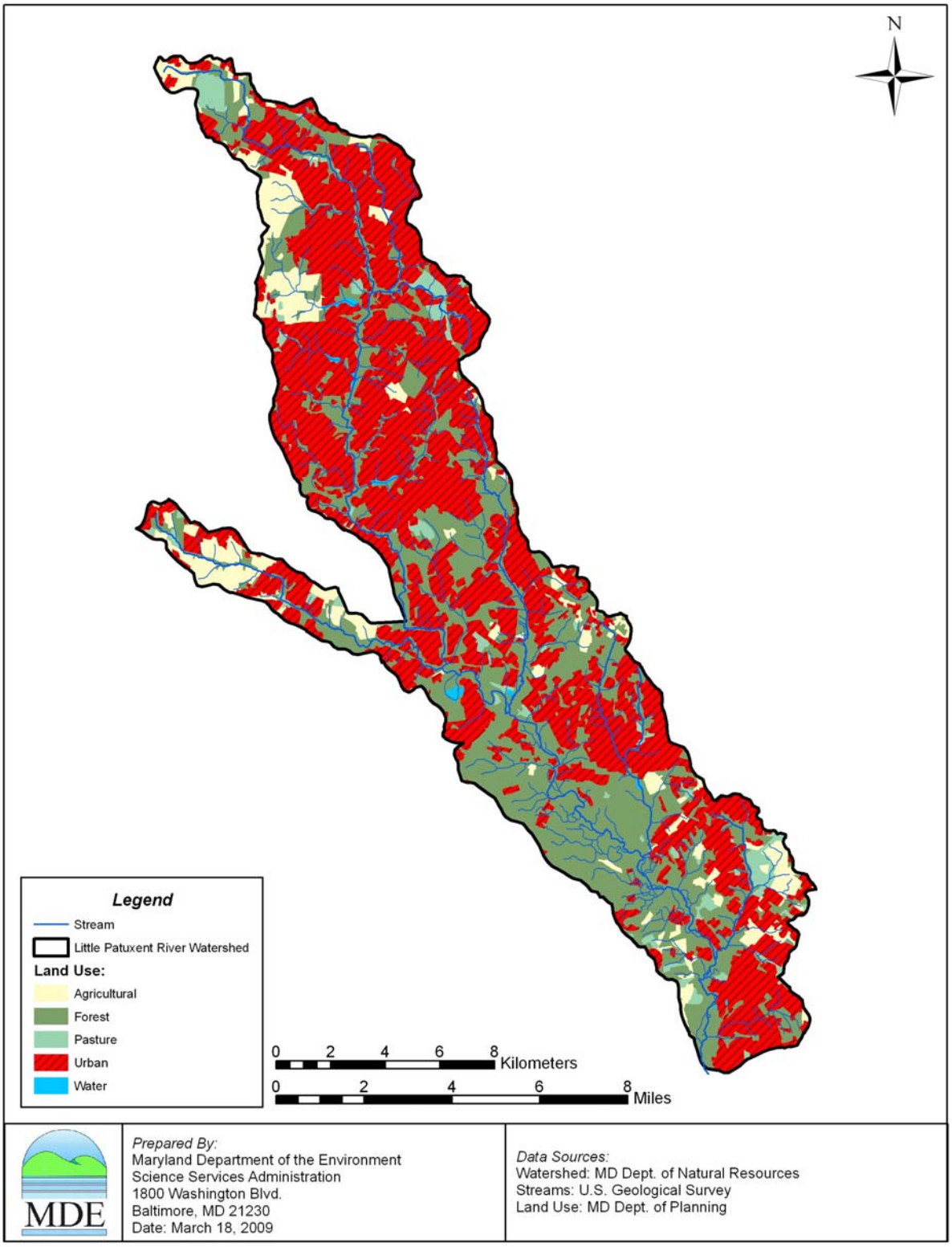

Figure 2: Land Use of the Little Patuxent River Watershed

3.0 WATER QUALITY CHARACTERIZATION

The Maryland Surface Water Use Designation for the Little Patuxent River and all tributaries is Use I-P (water contact recreation, protection of aquatic life, and public water supply) above Old Forge Bridge, and Use I (water contact recreation and protection of aquatic life) below Old Forge Bridge. *See* Code of Maryland Regulations (COMAR) 26.08.02.08M(1)(a) and 26.08.02.07F(5).

A water quality standard is the combination of a designated use for a particular body of water and the water quality criteria designed to protect that use. Designated uses include support of aquatic life, primary or secondary contact recreation, drinking water supply, and shellfish propagation and harvest. Water quality criteria consist of narrative statements and numeric values designed to protect the designated uses. The criteria developed to protect the designated use may differ and are dependent on the specific designated use(s) of a waterbody.

Currently, there are no specific numeric criteria for nutrients in Maryland's water quality standards. Therefore, the evaluation of potentially eutrophic conditions due to nutrient over-enrichment will be based on whether nutrient-related parameters (i.e., dissolved oxygen levels and chlorophyll *a* concentrations) are found to impair designated uses in the Little Patuxent River watershed. The dissolved oxygen (DO) concentration to protect Use I and Use I-P waters "may not be less than 5 milligrams per liter (mg/l) at any time" (COMAR 26.08.02.03-3A(2)). The water quality data presented in this section will show that DO concentrations in the Little Patuxent River and its tributaries meet these criteria.

In addition to the DO and chlorophyll *a* data analysis, the results of a new biological stressor identification (BSID) analysis demonstrate that any biological impairment in the watershed is not caused by nutrient enrichment. Instead, the analysis suggests that the degradation to biological communities in the Little Patuxent River watershed is strongly associated with the urban land use of the watershed, which results in altered hydrology and elevated levels of chlorides and (electrical) conductivity (MDE 2009b).

A data solicitation was conducted in 2005. All readily available water quality data from the past five years have been considered for this analysis. Water quality data from MDE surveys conducted from October 1999 through September 2000, January 2003 through December 2005, and January 2007 through December 2007, were used. United States Geological Survey (USGS) data used in the analysis were from January 1998 through September 2000. Data from Maryland Biological Stream Survey (MBSS) sampling conducted in 2000 were also used. Table 2 lists the water quality monitoring stations in the Little Patuxent River watershed with their geographical coordinates. Figures 3 through 6 provide graphical representation of the collected data for the parameters discussed below.

Table 2: Water Quality Stations in the Little Patuxent River Watershed Monitored During 1998-2007

Station ID	Agency/Program	Latitude (Decimal-Degrees)	Longitude (Decimal-Degrees)
DOR0011	MDE	39.1205	-76.7820
DOR0020	MDE	39.1325	-76.7799
DOR0032	MDE	39.1495	-76.7867
DOR0048	MDE	39.1689	-76.7884
HAM0006	MDE	39.1232	-76.8252
HAM0020	MDE	39.1316	-76.8451
LXT0032	MDE	39.0235	-76.7015
LXT0068	MDE	39.0590	-76.7320
LXT0116	MDE	39.0921	-76.7682
LXT0173	MDE	39.1345	-76.8164
LXT0200	MDE	39.1676	-76.8513
LXT0240	MDE	39.2001	-76.8539
LXT0248	MDE	39.2093	-76.8560
LXT0277	MDE	39.2445	-76.8465
LXT0301	MDE	39.2758	-76.8524
RHL0002	MDE	39.2461	-76.8434
ROG0001	MDE	39.0595	-76.7317
TOS0004	MDE	39.0288	-76.6984
UVC0003	MDE	39.1570	-76.7972
01594000	USGS	39.1344	-76.8162
LPAX-109-R-2000	DNR/MBSS	39.3182	-76.9192
LPAX-112-R-2000	DNR/MBSS	39.1519	-76.8866
LPAX-113-R-2000	DNR/MBSS	39.1283	-76.8272
LPAX-115-R-2000	DNR/MBSS	39.3047	-76.8978
LPAX-116-R-2000	DNR/MBSS	39.1872	-76.8614
LPAX-118-R-2000	DNR/MBSS	39.1115	-76.7742
LPAX-203-R-2000	DNR/MBSS	39.0354	-76.6938
LPAX-204-R-2000	DNR/MBSS	39.2456	-76.8462
LPAX-206-R-2000	DNR/MBSS	39.0392	-76.6916
LPAX-217-R-2000	DNR/MBSS	39.2832	-76.8600
LPAX-311-R-2000	DNR/MBSS	39.1820	-76.8533
LPAX-401-R-2000	DNR/MBSS	39.0458	-76.7133
LPAX-408-R-2000	DNR/MBSS	39.0791	-76.7597

3.1 Dissolved Oxygen

MDE samples were taken in the Little Patuxent River watershed from October 1999 through September 2000, January 2003 through December 2005, and January 2007 through December 2007. USGS samples were taken from January 1998 through September 2000. MBSS samples were taken during spring and summer in 2000. Samples taken during the growing season (May through October) show dissolved oxygen (DO) concentrations ranging from 5.4 to 11.9 mg/l, with all values above the criterion of 5 mg/l. The DO data are presented graphically in Figure 3 and in tabular form in Appendix A. Given the overwhelming level of attainment indicated by the total data used in the analysis, MDE considers that the water quality standard for DO is being met in the Little Patuxent River watershed.

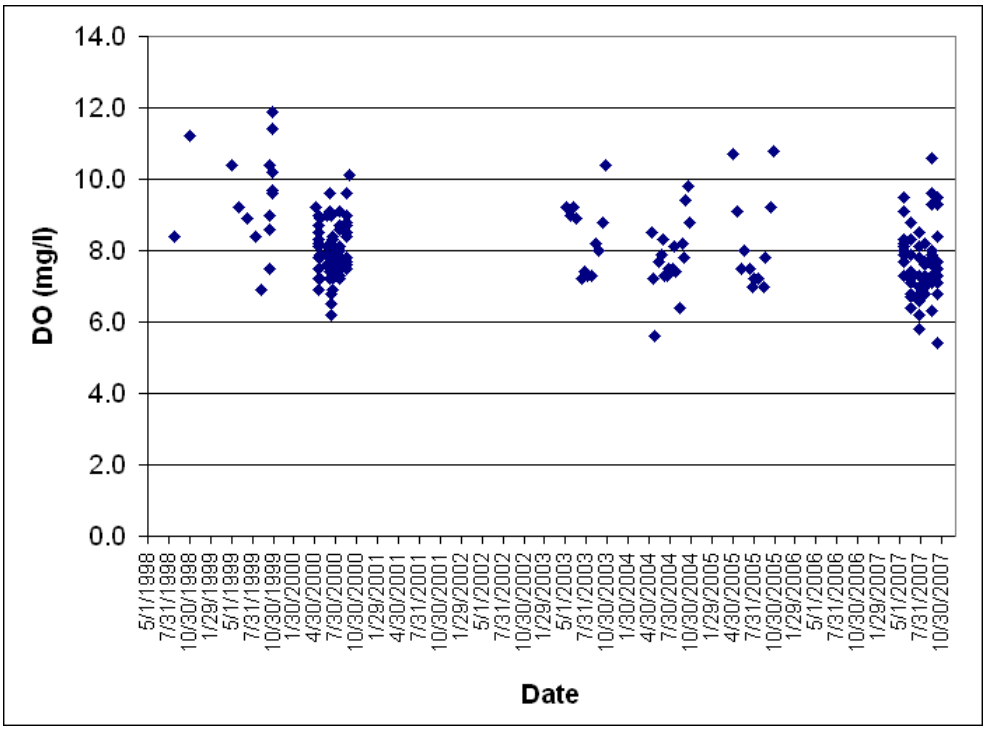

Figure 3: Little Patuxent River Watershed Dissolved Oxygen Data for Growing Season Periods May 1998 through October 2007

3.2 Chlorophyll *a*

Currently, Maryland water quality standards do not specify numeric criteria for chlorophyll *a*. However pollution of waters of the State by any material in amounts sufficient to create a nuisance or interfere with designated uses is prohibited (COMAR 26.08.02.03B(2)). Elevated chlorophyll *a* concentrations, a measure of algal growth, may indicate poor water quality that cannot support a waterbody's designated uses and may constitute a nuisance condition. Nuisance levels of algae can interfere with uses related to recreational activities such as fishing,

boating, and aesthetic appreciation. High chlorophyll *a* levels can also present taste, odor, and treatment problems in water supply systems.

Narrative water quality criteria are an important component of the State's water quality standards, but are difficult to incorporate into quantitative water quality or TMDL analyses. In the case of free-flowing non-tidal waters, there is an insufficient understanding of the relationship between chlorophyll *a* concentrations and the waterbody's designated use impairment. However, Maryland regulations include narrative criteria for acceptable chlorophyll *a* levels in tidal waters. Maryland's numeric interpretation of these criteria for application in estuarine waters is as follows:

> The chlorophyll *a* concentration goal used by the State in estuarine TMDL analyses is based on guidelines set forth by Thomann and Mueller (1987) and by the EPA Technical Guidance Manual for Developing Total Maximum Daily Loads, Book 2, Part 1 (1997). The chlorophyll *a* narrative criterion (COMAR 26.08.02.03-3C(10)) states: "Chlorophyll *a* - Concentrations of chlorophyll *a* in free-floating microscopic aquatic plants (algae) shall not exceed levels that result in ecologically undesirable consequences that would render tidal waters unsuitable for designated uses." The Thomann and Mueller guidelines acknowledge that "'Undesirable levels of phytoplankton [chlorophyll *a*] vary considerably depending on water body." MDE has determined, per Thomann and Mueller, that it is acceptable to maintain chlorophyll *a* concentrations below a maximum of 100 µg/L, and to target, with some flexibility depending on waterbody characteristics, a 30-day rolling average of approximately 50 µg/L (with some flexibility depending on waterbody characteristics). (MDE 2006).

Maryland has also developed guidelines for application of the narrative criteria in drinking water reservoirs. The guidelines, adapted from previously approved TMDLs, are as follows:

> The chlorophyll *a* endpoints selected for public water supply reservoirs are (a) a ninetieth-percentile instantaneous concentration not to exceed 30 µg/l in the surface layers, and (b) a 30-day moving average concentration not to exceed 10 µg/l in the surface layers. The concentration of 10 µg/l corresponds to a score of approximately 53 on the Carlson's Trophic State Index (TSI). This is at the boundary of mesotrophic and eutrophic conditions, which is an appropriate trophic state at which to manage these reservoirs. Mean chlorophyll *a* concentrations exceeding 10 µg/l are associated with peaks exceeding 30 µg/l, which in turn are associated with a shift to blue-green assemblages, which present taste, odor and treatment problems (Walker 1984). Achieving these chlorophyll *a* endpoints should thus safeguard such reservoirs from nuisance algal blooms. (MDE 2008b)

Using the chlorophyll *a* targets for tidal waters and public water supply reservoirs described above as screening values for non-tidal waters, the following data analysis reflects an absence of excessive algal growth in the Little Patuxent River watershed, as indicated by low chlorophyll *a* concentrations in comparison with those values.

MDE monitoring data in the Little Patuxent River watershed show growing season (May through October) averages, by station, between 0.9 and 5.0 µg/l. These samples show observed chlorophyll *a* concentrations ranging from 0.2 to 19.4 µg/l, with only six out of 123 samples greater than 10 µg/l. These monitoring data values suggest that chlorophyll *a* concentrations are not causing any nuisance in the Little Patuxent River watershed or interfering with its designated uses.

The chlorophyll *a* data are presented graphically in Figure 4 and in tabular form in Appendix A.

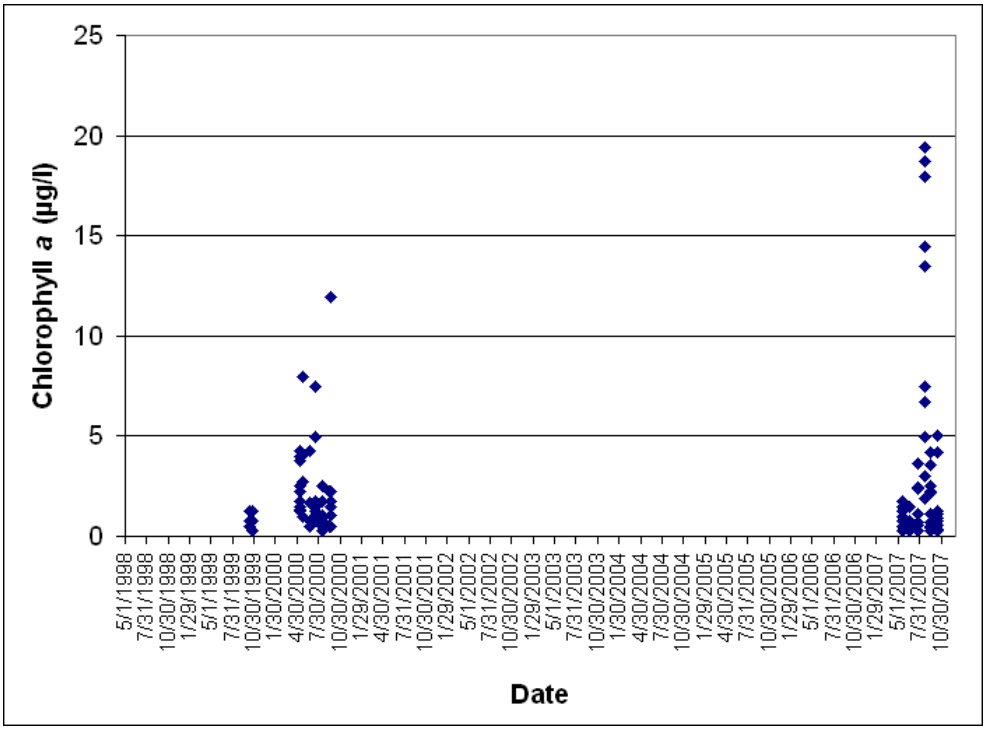

Figure 4: Little Patuxent River Watershed Chlorophyll *a* Data for Growing Season Periods May 1998 through October 2007

3.3 Nutrients

In the absence of State water quality standards with specific numeric limits for nutrients, evaluation of potentially eutrophic conditions is based on whether nutrient-related parameters (i.e., dissolved oxygen levels and chlorophyll *a* concentrations) are found to impair the designated uses in the Little Patuxent River watershed (in this case protection of aquatic life and wildlife, fishing, and swimming). Consequently, the nutrients data presented in this section are for informational purposes only.

Total nitrogen (TN) and total phosphorus (TP) data for the Little Patuxent River watershed have been collected as part of this study and the results are presented here for informational purposes, graphically in Figures 5 and 6, and in tabular form in Appendix A. In general, MDE and USGS

data show TN concentrations during the growing season (May through October) ranging from 0.44 to 10.71 mg/l and TP concentrations ranging from 0.001 to 1.91 mg/l.

In the absence of specific numeric criteria to evaluate the TP and TN monitoring data results, MDE evaluated these results using its BSID methodology, which compared Little Patuxent River watershed parameters to the results from similar control sites (i.e., watersheds with no biological impairments) and concluded that nutrients are not likely stressors associated with the degraded biological conditions (MDE 2009b). Current DO conditions in the Little Patuxent River watershed further support this conclusion.

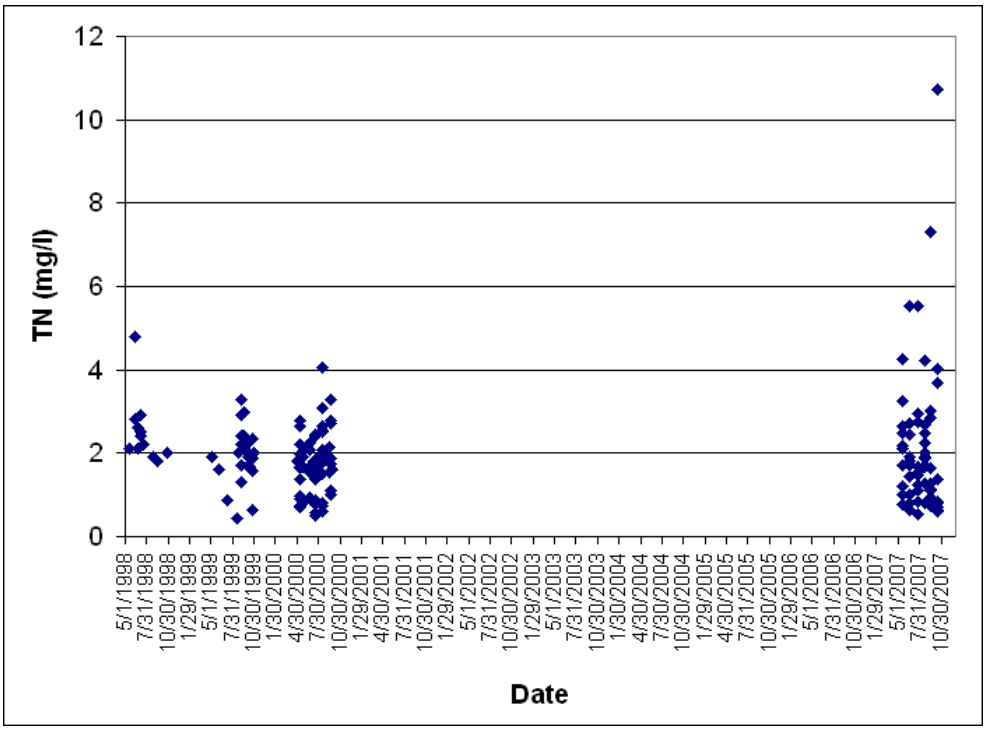

Figure 5: Little Patuxent River Watershed Total Nitrogen Data for Growing Season Periods May 1998 through October 2007

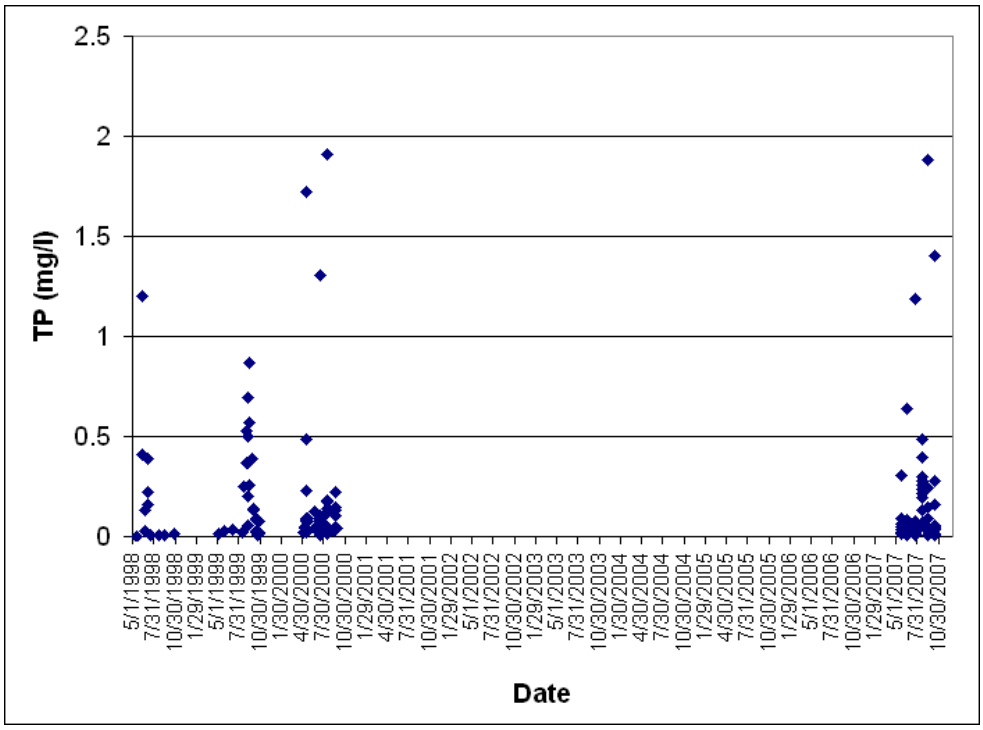

Figure 6: Little Patuxent River Watershed Total Phosphorus Data for Growing Season Periods May 1998 through October 2007

3.4 Biological Stressor Identification Analysis

In the process of evaluating the existing biological impairments, MDE developed a biological stressor identification (BSID) methodology (MDE 2009a). The BSID methodology uses data available from the statewide DNR MBSS. These data are presented in Appendix A. The current MDE biological assessment methodology is a three-step process: (1) a data quality review; (2) a systematic vetting of the dataset; and (3) a watershed assessment that presents the results of this assignment in terms of currently used *Integrated Report* listing categories.

The BSID analysis for the Little Patuxent River watershed did not identify nutrients as potential stressors or indicate any significant association between current nutrient levels and the degraded biological conditions (MDE 2009b). According to this report, nutrients are not causing any impairment to aquatic life or biological communities in the Little Patuxent River watershed. Rather, the BSID analysis results suggest that biological degradation in the Little Patuxent River watershed is strongly associated with the urban land use of the watershed, which has resulted in altered hydrology and elevated levels of chlorides and (electrical) conductivity. As explained in the BSID report, urbanization of landscapes generates broad and inter-related forms of degradation (i.e., hydrological, morphological, and water chemistry) that can affect stream ecology and biological composition. Scientific literature has established a link between highly urbanized landscapes and degradation in the aquatic health of non-tidal stream ecosystems.

4.0 CONCLUSION

Based on the analysis of data presented in the preceding section of this report, indicating that DO and chlorophyll *a* concentrations are meeting water quality criteria, and on the results of the Little Patuxent River watershed BSID analysis, MDE concludes that currently the Little Patuxent River watershed is not being impaired by nutrients. (The BSID analysis for the Little Patuxent River watershed indicates inorganic pollutants and flow/sediment stressors are associated with impacts to biological communities; these findings will be addressed separately.) Barring the receipt of contradictory data, this report will be used to support a revision of the phosphorus listing for the Little Patuxent River watershed, from Category 5 (waterbody is impaired, does not attain the water quality standard, and a TMDL is required) to Category 2 (waterbodies meeting some [in this case nutrients-related] water quality standards, but with insufficient data to assess all impairments), when MDE proposes the revision of Maryland's Integrated Report.

Although the waters of the Little Patuxent River watershed do not display signs of eutrophication, the State reserves the right to require future controls if evidence suggests that nutrients from the basin are contributing to downstream water quality problems. Reductions may be required by the forthcoming Chesapeake Bay TMDL, currently under development and due to scheduled to be completed by the EPA at the end of 2010.

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Appendix A – Tabular Water Quality Data

Table A-1: MDE Water Quality Data

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
DOR0011	3/27/2000	10.7	1.25	0.84	0.035
DOR0011	5/16/2000	7.2	1.50	0.97	0.233
DOR0011	7/18/2000	6.9		0.88	0.047
DOR0011	8/15/2000	8.6	1.00	2.65	0.041
DOR0011	9/19/2000	7.6	1.50	1.00	0.052
DOR0020	1/23/2007	12.6	1.99	3.68	0.039
DOR0020	2/21/2007	12.8	3.99	4.14	0.059
DOR0020	3/27/2007	11.4	2.74	1.33	0.016
DOR0020	4/17/2007	10.6	1.50	1.08	0.037
DOR0020	5/22/2007	7.3	0.75	1.02	0.034
DOR0020	6/19/2007	7.3	0.75	1.02	0.050
DOR0020	7/24/2007	6.7	1.12	1.12	0.077
DOR0020	8/21/2007	7.6	7.48	2.01	0.258
DOR0020	9/18/2007	7.3	2.24	1.11	0.092
DOR0020	10/16/2007	6.8	1.12	0.80	0.056
DOR0020	11/6/2007	9.2		1.65	0.075
DOR0020	12/18/2007	11.5		1.86	0.037
DOR0032	10/14/1999	7.5	0.75	1.68	0.083
DOR0032	10/27/1999	9.7		0.62	0.013
DOR0032	11/17/1999	10.8		0.45	0.023
DOR0032	12/1/1999	11.7		0.65	0.017
DOR0032	12/15/1999	11.2	1.50	0.87	0.034
DOR0032	1/13/2000	12.9		0.61	0.013
DOR0032	2/24/2000	12.1	1.07	0.74	0.012
DOR0032	3/1/2000	11.7	3.99	0.67	0.020
DOR0032	3/27/2000	10.3	1.00	0.76	0.022
DOR0032	5/16/2000	6.9	1.25	0.92	0.489
DOR0032	5/25/2000	7.2	1.00	0.81	0.077
DOR0032	6/21/2000	7.9	0.50	0.94	0.045
DOR0032	7/18/2000	6.9	1.50	0.78	0.028
DOR0032	8/15/2000	8.1	2.49	0.81	0.029
DOR0032	9/19/2000	7.5	11.96	1.76	0.221
DOR0048	3/27/2000	11.2		0.62	0.014
DOR0048	5/16/2000	8.5	1.50	0.75	0.019
DOR0048	7/18/2000	7.9		0.58	0.018
DOR0048	8/15/2000	7.3	1.74	0.74	0.028
DOR0048	9/19/2000	8.4	2.24	1.09	0.132
HAM0006	3/27/2000	12.2	3.24	2.01	0.502
HAM0006	5/16/2000	8.5	2.49	2.78	1.723
HAM0006	7/18/2000	8.1	0.75	2.42	1.302
HAM0006	8/15/2000	7.8	0.75	4.05	1.910
HAM0020	1/23/2007	12.2	3.49	3.84	0.247
HAM0020	2/21/2007	13.5	4.24	4.72	0.149
HAM0020	3/27/2007	11.8	5.73	3.11	0.078
HAM0020	4/17/2007	10.6	2.99	2.87	0.148
HAM0020	5/22/2007	7.7	1.74	4.25	0.306
HAM0020	6/19/2007	8.3	1.50	5.54	0.642

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
HAM0020	7/24/2007	7.3	2.43	5.53	1.185
HAM0020	8/21/2007	7.3	6.73	4.22	0.486
HAM0020	9/18/2007	7.9	2.54	7.31	1.882
HAM0020	10/16/2007	8.4	1.25	10.71	1.400
HAM0020	11/6/2007	10.6		5.69	0.586
HAM0020	12/18/2007	13.0	3.49	3.96	0.212
LXT0032	10/14/1999	8.6		2.27	0.087
LXT0032	10/27/1999	9.6	0.25	2.35	0.080
LXT0032	11/17/1999	10.8	1.00	2.56	0.063
LXT0032	12/1/1999	11.6	1.05	2.40	0.075
LXT0032	12/15/1999	10.2	7.48	1.82	0.185
LXT0032	1/13/2000	11.1	1.25	2.41	0.069
LXT0032	2/24/2000	11.3	1.74	3.20	0.060
LXT0032	3/1/2000	11.0	3.49	2.15	0.072
LXT0032	3/27/2000	9.8	2.24	2.28	0.063
LXT0032	3/27/2000	9.8	1.50	2.28	0.063
LXT0032	5/16/2000	8.5	1.31	2.22	0.076
LXT0032	5/16/2000	8.5	1.31	2.21	0.080
LXT0032	5/25/2000	7.9	2.74	2.14	0.091
LXT0032	6/21/2000	8.1	0.75	2.24	0.123
LXT0032	7/18/2000	7.5	1.07	1.83	0.083
LXT0032	7/18/2000	7.5	1.28	1.82	0.083
LXT0032	8/15/2000	7.8		2.53	0.177
LXT0032	8/15/2000	7.8	0.50	2.56	0.178
LXT0032	9/19/2000	7.7	1.74	2.73	0.223
LXT0032	9/19/2000	7.7	1.74	2.77	0.220
LXT0032	1/23/2007	11.7	1.25	2.77	0.078
LXT0032	2/21/2007	11.7	5.48	4.08	0.151
LXT0032	3/27/2007	8.6	1.25	2.32	0.038
LXT0032	4/17/2007	9.7	4.49	1.83	0.082
LXT0032	5/22/2007	7.9	1.25	2.66	0.059
LXT0032	6/19/2007	6.7	0.75	2.45	0.068
LXT0032	7/24/2007	6.6	2.35	2.73	0.071
LXT0032	8/21/2007	6.8	13.46	2.48	0.279
LXT0032	9/18/2007	7.8	2.14	3.00	0.147
LXT0032	10/16/2007	7.7	0.75	3.70	0.159
LXT0032	11/6/2007	8.4		3.16	0.122
LXT0032	12/18/2007	11.0	2.99	1.85	0.067
LXT0068	3/27/2000	10.0	1.00	2.23	0.069
LXT0068	5/16/2000	7.5	2.24	2.66	0.091
LXT0068	7/18/2000	7.2	0.75	2.46	0.091
LXT0068	8/15/2000	7.6	0.25	3.07	0.142
LXT0068	9/19/2000	7.8	1.05	3.30	0.145
LXT0068	1/23/2007	12.0	1.25	3.07	0.133
LXT0068	2/21/2007	12.7	6.48	4.22	0.195
LXT0068	3/27/2007	7.3	1.25	2.33	0.055
LXT0068	4/17/2007	9.8	3.99	1.97	0.096
LXT0068	5/22/2007	8.0	1.50	3.24	0.088
LXT0068	6/19/2007	7.4	0.75	2.71	0.084
LXT0068	7/24/2007	6.8	3.63	2.95	0.074
LXT0068	8/21/2007	7.0	14.45	2.25	0.296
LXT0068	9/18/2007	7.6	4.19	2.85	0.243

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
LXT0068	10/16/2007	7.1	0.90	4.01	0.281
LXT0068	11/6/2007	8.7		3.06	0.158
LXT0068	12/18/2007	11.3	2.99	2.15	0.063
LXT0116	3/27/2000	10.3	1.25	1.86	0.044
LXT0116	5/16/2000	8.7	1.74	1.68	0.094
LXT0116	7/18/2000	7.6	1.00	1.46	0.107
LXT0116	8/15/2000	8.0	0.75	1.98	0.118
LXT0116	9/19/2000	8.7	0.50	1.76	0.101
LXT0173	10/14/1999	10.4	0.50	1.88	0.018
LXT0173	10/27/1999	11.4	0.75	1.86	0.012
LXT0173	11/17/1999	13.5	1.00	1.66	0.011
LXT0173	12/1/1999	13.4	0.85	1.92	0.018
LXT0173	12/15/1999	11.7	6.73	1.78	0.146
LXT0173	1/13/2000	13.6	1.64	2.14	0.017
LXT0173	2/24/2000	12.9	2.14	2.42	0.016
LXT0173	3/1/2000	12.3	3.49	2.10	0.022
LXT0173	3/27/2000	10.7	2.49	2.11	0.020
LXT0173	5/16/2000	9.0	1.74	1.97	0.027
LXT0173	5/25/2000	8.9	4.06	1.90	0.036
LXT0173	6/21/2000	9.0	1.71	2.06	0.039
LXT0173	7/18/2000	8.4	1.74	1.66	0.038
LXT0173	8/15/2000	8.7	0.75	2.09	0.028
LXT0173	9/19/2000	9.0	2.24	1.89	0.044
LXT0173	1/23/2007	11.6	1.99	2.75	0.008
LXT0173	2/21/2007	14.4	1.99	3.44	0.020
LXT0173	3/27/2007	11.5	3.74	2.17	0.009
LXT0173	4/17/2007	10.9	3.99	1.99	0.044
LXT0173	5/22/2007	9.1	0.50	2.50	0.016
LXT0173	6/19/2007	8.8	0.75	1.91	0.018
LXT0173	7/24/2007	8.1	0.68	1.67	0.025
LXT0173	8/21/2007	8.2	17.94	1.67	0.130
LXT0173	9/18/2007	10.6	1.10	1.27	0.010
LXT0173	10/16/2007	9.5	0.37	0.82	0.016
LXT0173	11/6/2007	11.2		1.59	0.018
LXT0173	12/18/2007	14.0	2.74	1.72	0.029
LXT0200	10/14/1999	9.0	1.25	1.67	0.027
LXT0200	10/27/1999	10.2	1.25	1.57	0.018
LXT0200	11/17/1999	13.1	3.16	1.22	0.016
LXT0200	12/1/1999	12.2	1.50	1.66	0.026
LXT0200	12/15/1999	10.3	5.23	1.48	0.083
LXT0200	1/13/2000	12.6	2.45	1.80	0.021
LXT0200	2/24/2000	12.1	2.35	2.16	0.022
LXT0200	3/1/2000	11.1	3.74	2.00	0.031
LXT0200	3/20/2000	11.5	3.20	2.01	0.045
LXT0200	4/24/2000	10.2	1.99	1.73	0.030
LXT0200	5/15/2000	8.2	3.99	1.37	0.044
LXT0200	5/25/2000	7.8	7.97	1.67	0.073
LXT0200	6/21/2000	7.6	4.27	1.54	0.044
LXT0200	7/17/2000	7.8	4.98	1.40	0.074
LXT0200	8/14/2000	9.1	0.25	1.50	0.040
LXT0200	9/18/2000	8.7	0.50	1.54	0.028
LXT0200	1/9/2003	12.4			

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
LXT0200	1/15/2003	12.9			
LXT0200	2/6/2003	13.6			
LXT0200	2/24/2003	13.0			
LXT0200	3/6/2003	11.9			
LXT0200	3/6/2003	11.9			
LXT0200	3/20/2003	11.3			
LXT0200	4/29/2003	8.3			
LXT0200	5/8/2003	9.2			
LXT0200	5/21/2003	9.0			
LXT0200	6/4/2003	9.2			
LXT0200	6/19/2003	8.9			
LXT0200	6/19/2003	8.9			
LXT0200	7/10/2003	7.2			
LXT0200	7/24/2003	7.4			
LXT0200	8/7/2003	7.3			
LXT0200	8/21/2003	7.3			
LXT0200	9/9/2003	8.2			
LXT0200	9/25/2003	8.0			
LXT0200	10/9/2003	8.8			
LXT0200	10/23/2003	10.4			
LXT0200	11/6/2003	8.5			
LXT0200	11/13/2003	9.6			
LXT0200	11/20/2003	9.9			
LXT0200	11/20/2003	9.9			
LXT0200	12/4/2003	13.0			
LXT0200	12/11/2003	12.0			
LXT0200	12/11/2003	12.0			
LXT0200	12/18/2003	11.9			
LXT0200	1/8/2004	13.6			
LXT0200	1/23/2004	14.0			
LXT0200	1/29/2004	13.8			
LXT0200	2/10/2004	12.2			
LXT0200	2/20/2004	13.0			
LXT0200	2/25/2004	13.9			
LXT0200	3/4/2004	11.0			
LXT0200	3/8/2004	10.7			
LXT0200	3/18/2004	12.2			
LXT0200	4/8/2004	10.2			
LXT0200	4/13/2004	10.8			
LXT0200	4/13/2004	10.8			
LXT0200	4/22/2004	8.6			
LXT0200	5/13/2004	8.5			
LXT0200	5/19/2004	7.2			
LXT0200	5/27/2004	5.6			
LXT0200	6/10/2004	7.7			
LXT0200	6/24/2004	7.9			
LXT0200	6/28/2004	8.3			
LXT0200	7/8/2004	7.3			
LXT0200	7/22/2004	7.3			
LXT0200	7/27/2004	7.5			
LXT0200	8/12/2004	7.5			
LXT0200	8/17/2004	8.1			

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
LXT0200	8/26/2004	7.4			
LXT0200	9/10/2004	6.4			
LXT0200	9/23/2004	8.2			
LXT0200	9/29/2004	7.8			
LXT0200	9/29/2004	7.8			
LXT0200	10/7/2004	9.4			
LXT0200	10/21/2004	9.8			
LXT0200	10/26/2004	8.8			
LXT0200	11/10/2004	11.0			
LXT0200	11/22/2004	10.3			
LXT0200	12/8/2004	10.9			
LXT0200	12/15/2004	13.0			
LXT0200	12/20/2004	15.1			
LXT0200	1/5/2005	10.7			
LXT0200	1/13/2005	12.0			
LXT0200	1/20/2005	13.5			
LXT0200	2/2/2005	13.7			
LXT0200	2/14/2005	12.2			
LXT0200	2/22/2005	12.4			
LXT0200	3/16/2005	12.7			
LXT0200	4/14/2005	10.7			
LXT0200	5/5/2005	10.7			
LXT0200	5/19/2005	9.1			
LXT0200	6/8/2005	7.5			
LXT0200	6/23/2005	8.0			
LXT0200	7/13/2005	7.5			
LXT0200	7/26/2005	7.0			
LXT0200	8/4/2005	7.2			
LXT0200	8/18/2005	7.2			
LXT0200	9/15/2005	7.0			
LXT0200	9/22/2005	7.8			
LXT0200	10/18/2005	9.2			
LXT0200	10/28/2005	10.8			
LXT0200	11/2/2005	10.3			
LXT0200	11/18/2005	11.2			
LXT0200	12/1/2005	10.9			
LXT0200	12/15/2005	13.4			
LXT0240	1/23/2007	12.6	2.24	2.44	0.018
LXT0240	2/21/2007	13.8	2.99	2.83	0.022
LXT0240	3/27/2007	11.1	3.99	2.02	0.025
LXT0240	4/17/2007	10.7	3.99	1.88	0.052
LXT0240	5/22/2007	8.1	1.25	2.10	0.032
LXT0240	6/19/2007	7.1	0.75	1.70	0.036
LXT0240	7/24/2007	7.0	0.54	1.25	0.039
LXT0240	8/21/2007	7.2	18.69	1.87	0.235
LXT0240	9/18/2007	8.0	3.59	0.94	0.038
LXT0240	10/16/2007	7.7	5.05	0.65	0.039
LXT0240	11/6/2007	10.0		1.42	0.028
LXT0240	12/18/2007	12.8	3.84	1.59	0.039
LXT0248	3/20/2000	11.8	3.20	2.27	0.025
LXT0248	4/24/2000	9.1	2.49	2.00	0.032
LXT0248	5/15/2000	7.8	3.74	1.65	0.049

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
LXT0248	7/17/2000	7.3	7.48	1.37	0.067
LXT0248	8/14/2000	7.5	1.07	1.77	0.043
LXT0248	9/18/2000	8.5	2.24	1.87	0.033
LXT0248	1/23/2007	12.6	2.49	2.51	0.024
LXT0248	2/21/2007	13.4	3.49	3.45	0.025
LXT0248	3/27/2007	9.9	3.99	2.04	0.026
LXT0248	4/17/2007	10.5	4.24	1.95	0.057
LXT0248	5/22/2007	7.3	1.00	2.13	0.036
LXT0248	6/19/2007	6.4	0.75	1.81	0.041
LXT0248	7/24/2007	7.3	0.68	1.49	0.037
LXT0248	8/21/2007	7.1	19.44	1.92	0.218
LXT0248	9/18/2007	7.1	0.70	1.13	0.039
LXT0248	10/16/2007	7.5	4.19	0.84	0.046
LXT0248	11/6/2007	9.5		1.41	0.028
LXT0248	12/18/2007	12.8	3.84	1.69	0.041
LXT0277	3/20/2000	11.5	1.07	2.63	0.022
LXT0277	4/24/2000	8.9	0.75	2.27	0.034
LXT0277	5/15/2000	8.1	1.25	1.96	0.049
LXT0277	7/17/2000	7.6	1.00	1.78	0.069
LXT0277	8/14/2000	7.2	1.07	2.09	0.047
LXT0277	9/18/2000	8.8		2.14	0.038
LXT0301	1/23/2007	11.6	0.50	2.30	0.009
LXT0301	2/21/2007	13.9	1.74	2.51	0.039
LXT0301	3/27/2007	11.3	1.74	1.83	0.010
LXT0301	4/17/2007	10.7		1.76	0.033
LXT0301	5/22/2007	8.3	0.75	2.18	0.019
LXT0301	6/19/2007	7.2	0.25	1.75	0.027
LXT0301	7/24/2007	7.8	0.54	1.55	0.021
LXT0301	8/21/2007	7.7	4.98	1.71	0.214
LXT0301	9/18/2007	9.3	0.50	1.63	0.029
LXT0301	10/16/2007	7.3	0.56	1.37	0.014
LXT0301	11/6/2007	10.2		1.77	0.017
LXT0301	12/18/2007	13.3	2.06	1.75	0.023
RHL0002	1/23/2007	13.1	0.75	2.23	0.028
RHL0002	2/21/2007	12.8	3.24	2.52	0.060
RHL0002	3/27/2007	10.0	1.99	1.82	0.030
RHL0002	4/17/2007	10.5		1.93	0.037
RHL0002	5/22/2007	7.7	0.75	1.71	0.046
RHL0002	6/19/2007	6.8	0.50	1.45	0.067
RHL0002	7/24/2007	6.2	1.12	0.84	0.066
RHL0002	8/21/2007	6.8	2.99	1.27	0.192
RHL0002	9/18/2007	6.3	0.45	0.75	0.044
RHL0002	10/16/2007	5.4	0.37	0.60	0.034
RHL0002	11/6/2007	8.9		1.43	0.034
RHL0002	12/18/2007	12.3	2.35	1.67	0.055
ROG0001	1/23/2007	12.6	1.74	1.00	0.010
ROG0001	2/21/2007	11.9	3.49	1.54	0.031
ROG0001	3/27/2007	8.9	0.50	0.87	0.010
ROG0001	4/17/2007	10.3	1.99	0.95	0.040
ROG0001	5/22/2007	8.2	0.25	0.76	0.015
ROG0001	6/19/2007	6.8	0.50	0.64	0.019
ROG0001	7/24/2007	5.8		0.54	0.013

Station	Sampling Date	DO (mg/l)	Chlorophyll *a* (µg/l)	TN (mg/l)	TP (mg/l)
ROG0001	8/21/2007	7.6	1.87	0.80	0.070
ROG0001	11/6/2007	8.8		0.81	0.021
ROG0001	12/18/2007	12.3	3.74	0.78	0.020
TOS0004	1/23/2007	11.6		1.35	0.005
TOS0004	2/21/2007	12.1		3.04	0.438
TOS0004	3/27/2007	11.5	0.50	1.18	0.029
TOS0004	4/17/2007	9.9		1.34	0.050
TOS0004	5/22/2007	9.5	0.25	1.19	0.012
TOS0004	6/19/2007	7.9	0.50	0.79	0.010
TOS0004	7/24/2007	8.5	0.25	0.83	0.009
TOS0004	8/21/2007	8.2	7.48	2.68	0.396
TOS0004	9/18/2007	9.6	0.25	0.88	0.008
TOS0004	10/16/2007	9.3	0.30	0.70	0.007
TOS0004	11/6/2007	9.4		0.99	0.024
TOS0004	12/18/2007	11.8		1.11	0.035
UVC0003	3/27/2000	10.6	2.74	0.50	0.014
UVC0003	5/16/2000	8.3	4.24	0.72	0.022
UVC0003	7/18/2000	7.7	0.75	0.52	0.010
UVC0003	8/15/2000	8.0	0.50	0.60	0.015

Table A-2: USGS Water Quality Data

Station	Sampling Date	DO (mg/l)	TN (mg/l)	TP (mg/l)
01594000	1/13/1998			0.010
01594000	1/23/1998		3.10	0.530
01594000	1/23/1998		3.10	0.587
01594000	1/23/1998		3.40	0.664
01594000	1/24/1998			
01594000	1/28/1998			
01594000	1/28/1998			
01594000	1/28/1998			
01594000	2/4/1998		1.60	0.251
01594000	2/5/1998			
01594000	2/5/1998		1.40	0.195
01594000	2/5/1998		1.40	0.178
01594000	2/18/1998		2.60	0.399
01594000	2/18/1998		4.00	1.300
01594000	2/23/1998		2.30	0.026
01594000	2/23/1998		1.90	0.258
01594000	2/24/1998		1.60	0.214
01594000	2/24/1998		1.60	0.178
01594000	3/17/1998			0.048
01594000	3/19/1998		2.10	0.435
01594000	4/9/1998			
01594000	4/10/1998			
01594000	4/14/1998		1.70	0.009
01594000	4/19/1998		2.60	0.250
01594000	4/20/1998		2.30	0.246
01594000	5/20/1998		2.10	0.001
01594000	6/14/1998		4.80	1.200
01594000	6/14/1998		2.80	0.410
01594000	6/20/1998			
01594000	6/24/1998		2.60	0.135
01594000	6/26/1998		2.10	0.027
01594000	7/8/1998		2.50	0.224
01594000	7/8/1998		2.90	0.392
01594000	7/8/1998		2.40	0.160
01594000	7/15/1998		2.20	0.009
01594000	8/25/1998	8.4	1.90	0.010
01594000	9/16/1998		1.80	0.007
01594000	10/8/1998			
01594000	10/9/1998			
01594000	10/29/1998	11.2	2.00	0.014
01594000	11/17/1998	12.7	1.70	0.008
01594000	12/16/1998	13.9	1.80	0.006
01594000	1/13/1999	14.3	3.00	0.065
01594000	1/15/1999			
01594000	1/15/1999			
01594000	1/15/1999			
01594000	1/24/1999			
01594000	1/24/1999		2.30	0.265
01594000	2/10/1999		2.60	0.004
01594000	2/18/1999		1.90	0.008

Station	Sampling Date	DO (mg/l)	TN (mg/l)	TP (mg/l)
01594000	2/18/1999		2.20	0.125
01594000	3/21/1999		2.60	0.143
01594000	3/22/1999		2.80	0.356
01594000	3/22/1999		2.50	0.281
01594000	3/23/1999	12.1	1.80	0.035
01594000	4/7/1999	11.4	1.60	0.009
01594000	5/5/1999	10.4	1.90	0.017
01594000	5/24/1999			
01594000	6/3/1999	9.2	1.60	0.025
01594000	7/7/1999	8.9	0.86	0.033
01594000	8/18/1999	8.4	0.44	0.023
01594000	8/21/1999			
01594000	8/24/1999		2.00	0.252
01594000	8/25/1999			
01594000	8/26/1999			
01594000	8/26/1999			
01594000	8/27/1999			
01594000	9/5/1999			
01594000	9/5/1999		2.40	0.530
01594000	9/6/1999		2.20	0.371
01594000	9/7/1999		1.70	0.203
01594000	9/9/1999	6.9	1.30	0.057
01594000	9/9/1999		2.90	0.368
01594000	9/9/1999		3.30	0.697
01594000	9/10/1999		2.40	0.499
01594000	9/16/1999		2.10	0.260
01594000	9/16/1999		2.40	0.570
01594000	9/16/1999		3.00	0.870
01594000	9/30/1999		2.00	0.390
01594000	10/4/1999		1.90	0.132
01594000	10/5/1999		1.70	0.140
01594000	10/20/1999		1.60	0.004
01594000	10/28/1999	11.9	2.00	0.020
01594000	11/18/1999	13.8	1.30	0.020
01594000	12/9/1999	13.2	1.90	0.020
01594000	1/4/2000		2.00	0.100
01594000	1/5/2000		2.20	0.040
01594000	1/10/2000		2.20	0.060
01594000	1/11/2000		2.50	0.120
01594000	1/13/2000	13.1	1.80	0.020
01594000	2/17/2000	14.0	1.50	0.011
01594000	3/21/2000		2.40	0.200
01594000	3/21/2000		3.10	0.512
01594000	3/29/2000	10.8	1.70	0.040
01594000	4/20/2000	9.8	1.70	0.032
01594000	5/4/2000	9.2	1.80	0.020
01594000	6/28/2000		1.70	0.048
01594000	7/12/2000	9.0	1.80	0.031
01594000	9/28/2000	10.1	1.60	0.043

Table A-3: MBSS Water Quality Data

Station	Stream	Date	DO (mg/l)	TN (mg/l)	TP (mg/l)
LPAX-109-R-2000	Little Patuxent River	3/13/2000		5.07	0.007
LPAX-115-R-2000	Little Patuxent River	3/13/2000		2.41	0.010
LPAX-217-R-2000	Little Patuxent River	3/13/2000		1.47	0.023
LPAX-112-R-2000	Hammond Branch	3/15/2000		2.62	0.021
LPAX-113-R-2000	Hammond Branch	3/15/2000		3.41	0.682
LPAX-204-R-2000	Little Patuxent River	3/15/2000		2.52	0.017
LPAX-203-R-2000	Towsers Branch	3/16/2000		1.12	0.009
LPAX-206-R-2000	Towsers Branch	3/16/2000		1.03	0.011
LPAX-311-R-2000	Little Patuxent River	3/16/2000		1.95	0.017
LPAX-401-R-2000	Little Patuxent River	3/16/2000		2.08	0.041
LPAX-116-R-2000	Little Patuxent River UT5	3/20/2000		1.70	0.008
LPAX-118-R-2000	Little Patuxent River UT6	4/3/2000		0.83	0.017
LPAX-408-R-2000	Little Patuxent River	4/3/2000		2.08	0.115
LPAX-113-R-2000	Hammond Branch	7/5/2000	9.6		
LPAX-204-R-2000	Little Patuxent River	7/5/2000	7.7		
LPAX-217-R-2000	Little Patuxent River	7/5/2000	7.2		
LPAX-109-R-2000	Little Patuxent River	7/7/2000	9.1		
LPAX-115-R-2000	Little Patuxent River	7/7/2000	7.4		
LPAX-116-R-2000	Little Patuxent River UT5	7/10/2000	7.5		
LPAX-118-R-2000	Little Patuxent River UT6	7/11/2000	6.2		
LPAX-203-R-2000	Towsers Branch	7/11/2000	7.5		
LPAX-311-R-2000	Little Patuxent River	7/11/2000	6.5		
LPAX-206-R-2000	Towsers Branch	7/12/2000	6.8		
LPAX-112-R-2000	Hammond Branch	7/18/2000	8.3		
LPAX-401-R-2000	Little Patuxent River	9/18/2000	9.6		
LPAX-408-R-2000	Little Patuxent River	9/18/2000	7.6		