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**Water Quality Analysis of Eutrophication
for the Little Gunpowder Falls Basin
in Baltimore and Harford Counties, Maryland**

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List of Abbreviations

BOD	Biochemical Oxygen Demand
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
DNR	Department of Natural Resources
DO	Dissolved Oxygen
EPA	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
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
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. This list of impaired waters is commonly referred to as the "303(d) List." For each WQLS, 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.

Little Gunpowder Falls (basin code 02130804) was identified on the State's list of WQLSs as impaired by nutrients (1996), heavy metals (1996) and impacts to biological communities (2006). The listings for metals and impacts to biological communities were addressed in 2003 and 2008 respectively. In MDE's 2008 "Integrated Report of Surface Water Quality in Maryland," the waters of Little Gunpowder Falls were assessed as meeting biological standards. Upon EPA approval, this document addresses the nutrients listing in the Little Gunpowder Falls watershed.

An analysis of recent monitoring data shows that the dissolved oxygen criterion and designated uses associated with nutrients are being met in the Little Gunpowder Falls watershed. This analysis supports the conclusion that a TMDL for nutrients is not necessary to achieve water quality standards in this case. Barring the receipt of contradictory data, this report will be used to support a nutrients listing change for the Little Gunpowder Falls watershed from Category 5 ("water body is impaired, does not attain the water quality standard, and a TMDL is required") to Category 1 ("water bodies that meet all water quality standards and no use is threatened"), when the Maryland Department of the Environment (MDE) proposes the revision of Maryland's 303(d) List for public review in the future. Although the waters of the Little Gunpowder Falls watershed do not display signs of eutrophication, the State reserves the right to require future controls in the watershed if evidence suggests nutrients from the basin are contributing to downstream water quality problems.

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. This list of impaired waters is commonly referred to as the "303(d) list." For each WQLS, 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.

In addition to the successful implementation of a TMDL, there are four other scenarios that may be used to address an impaired waterbody: 1) more recent data indicating that the impairment no longer exists (*i.e.*, water quality standards are being met); 2) more recent and updated water quality modeling which demonstrates that the segment is now attaining standards; 3) refinements to water quality standards, or the interpretation of those standards, which result in standards being met; or 4) correction to errors made in the initial listing.

The Little Gunpowder Falls watershed (basin code 02130804) was first identified on the 1996 303(d) List, submitted to EPA by the Maryland Department of the Environment (MDE), as impaired by nutrients and heavy metals. It was identified on the 2006 303(d) list for impacts to biological communities. The listings for metals and impacts to biological communities were addressed in 2003 and 2008 respectively. In MDE's 2008 "Integrated Report of Surface Water Quality in Maryland," the waters of Little Gunpowder Falls were assessed as meeting biological standards. This report provides more recent information that supports the removal of the nutrients listing for the Little Gunpowder Falls watershed when the 303(d) List is revised; therefore, the aforementioned first scenario most closely applies, with the qualification that the initial listing for nutrients was suspect, due to the lack of data.

The remainder of this report lays out the general setting of the area of the Little Gunpowder Falls watershed, presents a discussion of the water quality characteristics in the basin, and provides conclusions with regard to the current water quality characteristics and the current standards. The data will demonstrate that the Little Gunpowder Falls watershed is achieving water quality standards in relation to nutrients.

2.0 GENERAL SETTING

The Little Gunpowder Falls watershed is located in Maryland in the Upper Western Shore Region of the Chesapeake Bay watershed (Figure 1). The watershed covers portions of Baltimore and Harford counties with Little Gunpowder Falls defining the county boundary. Little Gunpowder Falls joins the Gunpowder Falls near Joppatowne before reaching the Gunpowder River. The watershed drains from northwest to southeast and has a drainage area of 37,339 acres.

The Little Gunpowder Falls flows through mostly agricultural and forested lands with some urbanization (Figure 2). The land use distribution is approximately 33% agricultural, 33% forest, 25% urban and 9% pasture, based on 2002 Maryland Department of Planning (MDP) land use/land cover data.

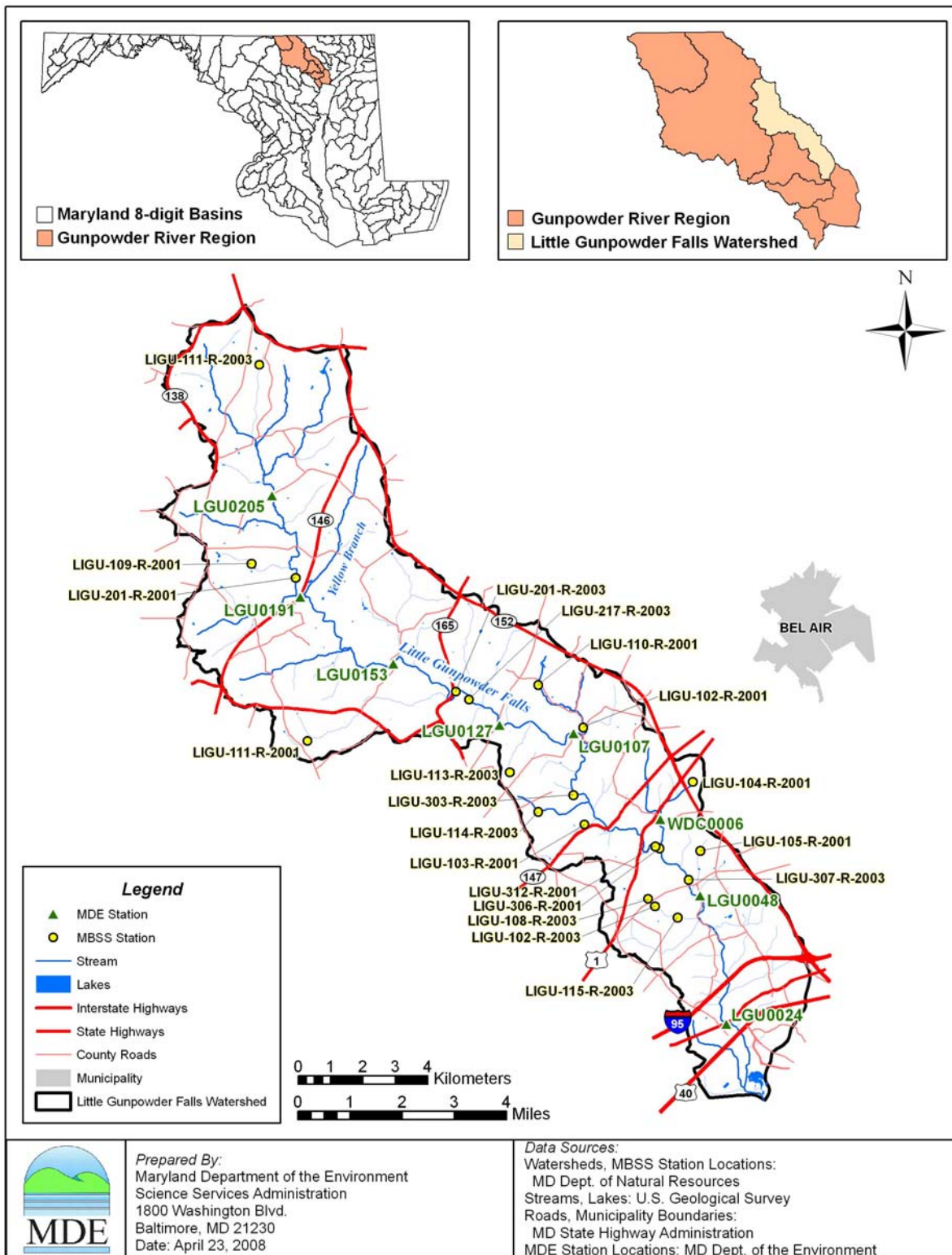


Figure 1: Location Map and Monitoring Stations of the Little Gunpowder Falls Watershed

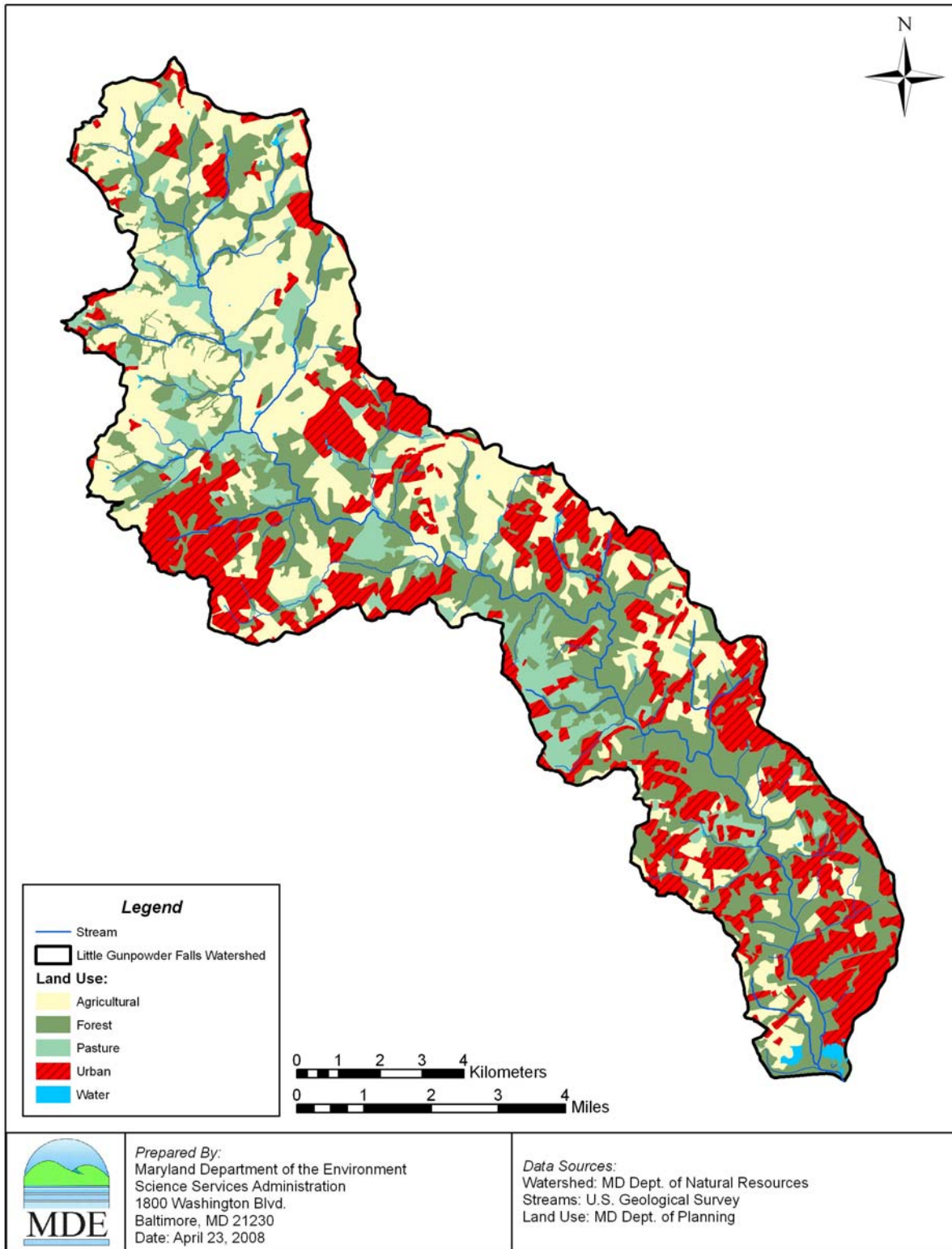


Figure 2: Land Use of the Little Gunpowder Falls Watershed

3.0 WATER QUALITY CHARACTERIZATION

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 activities such as swimming, drinking water supply, and shellfish propagation and harvest. Water quality criteria consist of narrative statements and numeric values designed to protect the designated uses. Criteria may differ among waters with different designated uses.

The Maryland Surface Water Use Designation for Little Gunpowder Falls and its tributaries is Use III, nontidal cold water, water contact recreation, and protection of aquatic life (COMAR 26.08.02.08J). The dissolved oxygen (DO) criteria to protect Use III water require a concentration no less than 5 mg/l at any time, and a daily average concentration no less than 6 mg/l (COMAR 26.08.02.03-3D(2)). The water quality data presented in this section will show DO concentrations meet the appropriate criteria.

Maryland's general water quality criteria prohibit pollution of waters of the State by any material in amounts sufficient to create nuisance or interfere with designated uses (COMAR 26.08.02.03B(2)). Excessive eutrophication, indicated by elevated levels of chlorophyll *a*, can produce nuisance levels of algae and interfere with designated uses such as fishing, swimming and protection of aquatic life. The analysis demonstrates no excessive algal growth, as indicated by low chlorophyll *a* concentrations and satisfactory biological assessment.

Maryland's water quality standards presently do not impose a limit on the concentration of nutrients in the water column. Rather, Maryland manages nutrients indirectly by limiting their negative effects on recreation and aquatic life expressed in terms of excess algal growth and low dissolved oxygen. Because biochemical oxygen demand (BOD) also consumes DO, this potentially confounding factor must be considered in the analysis if low DO is observed.

A data solicitation was conducted in January 2005. All available resources (Department of Natural Resources (DNR), U.S. Geological Survey (USGS), Chesapeake Bay Program) were also investigated to determine if there were other available data in the Little Gunpowder Falls watershed. All readily available water quality data were considered for this analysis. Water quality data from MDE surveys conducted along the Little Gunpowder Falls from October 1999 through August 2000, November 2003 through December 2005, and January 2007 through December 2007, were used. Data from Maryland Biological Stream Survey (MBSS) sampling conducted in March 2001 and March 2003 were also used. Table 1 lists the MDE and MBSS stations in the Little Gunpowder Falls watershed with their geographical coordinates and descriptive locations. Figures 3 and 4 provide graphical representation of the collected data for the parameters discussed below.

Table 1: Water Quality Stations in the Little Gunpowder Falls Watershed Monitored During 1999-2007

Station ID	Agency/Program	Latitude (Decimal-Degrees)	Longitude (Decimal-Degrees)
LGU0024	MDE	39.4237	-76.3785
LGU0048	MDE	39.4596	-76.3876
LGU0107	MDE	39.5051	-76.4327
LGU0127	MDE	39.5075	-76.4594
LGU0153	MDE	39.5248	-76.4974
LGU0191	MDE	39.5436	-76.5308
LGU0205	MDE	39.5719	-76.5408
WDC0006	MDE	39.4810	-76.4018
LIGU-102-R-2001	MBSS	39.5067	-76.4293
LIGU-103-R-2001	MBSS	39.4797	-76.4290
LIGU-104-R-2001	MBSS	39.4913	-76.3901
LIGU-105-R-2001	MBSS	39.4721	-76.3874
LIGU-109-R-2001	MBSS	39.5529	-76.5485
LIGU-110-R-2001	MBSS	39.5186	-76.4453
LIGU-111-R-2001	MBSS	39.5034	-76.5285
LIGU-201-R-2001	MBSS	39.5489	-76.5325
LIGU-306-R-2001	MBSS	39.4729	-76.4021
LIGU-312-R-2001	MBSS	39.4735	-76.4037
LIGU-102-R-2003	MBSS	39.4566	-76.4039
LIGU-108-R-2003	MBSS	39.4588	-76.4063
LIGU-111-R-2003	MBSS	39.6083	-76.5452
LIGU-113-R-2003	MBSS	39.4943	-76.4558
LIGU-114-R-2003	MBSS	39.4832	-76.4456
LIGU-115-R-2003	MBSS	39.4535	-76.3958
LIGU-201-R-2003	MBSS	39.5169	-76.4751
LIGU-217-R-2003	MBSS	39.5147	-76.4702
LIGU-303-R-2003	MBSS	39.4878	-76.4329
LIGU-307-R-2003	MBSS	39.4641	-76.3916

3.1 Dissolved Oxygen

MDE samples taken during October 1999 through August 2000, November 2003 through December 2005, and January 2007 through December 2007, have DO concentrations ranging from 7.0 to 14.6 mg/l, all well above the criteria. MBSS samples taken in March 2001 and March 2003 have DO concentrations ranging from 5.8 to 10.1 mg/l, also all above the criterion. These data are presented graphically in Figure 3 and in tabular form in Appendix A.

3.2 Chlorophyll *a*

Chlorophyll *a* data were collected during October 1999 through August 2000 and January 2007 through December 2007, covering the algal growing season when concentrations are at their peak. Observed chlorophyll *a* concentrations range from 0.5 to 28.4 µg/l, with only two samples greater than 9 µg/l.

In MDE's 2008 "Integrated Report of Surface Water Quality in Maryland," the waters of Little Gunpowder Falls were assessed as meeting biological standards. This assessment of the Little Gunpowder Falls watershed as being protective and supportive of aquatic life suggests that the algal growth in Little Gunpowder Falls is not enough to have any negative impact to biological communities. The chlorophyll *a* data are presented graphically in Figure 3 and in tabular form in Appendix A.

3.3 Nutrients

During the October 1999 through August 2000, March 2001, March 2003 and January 2007 through December 2007 sampling periods, total phosphorus (TP) concentrations ranged from 0.006 to 0.574 mg/l. Total nitrogen (TN) concentrations ranged from 0.62 to 13.95 mg/l. These data are presented graphically in Figure 4 and in tabular form in Appendix A.

As stated previously, Maryland's water quality standards presently do not impose a limit on the concentration of nutrients in the water column. Rather, Maryland manages nutrients indirectly by limiting their negative effects on recreation and aquatic life, expressed in terms of excess algal growth and low dissolved oxygen.

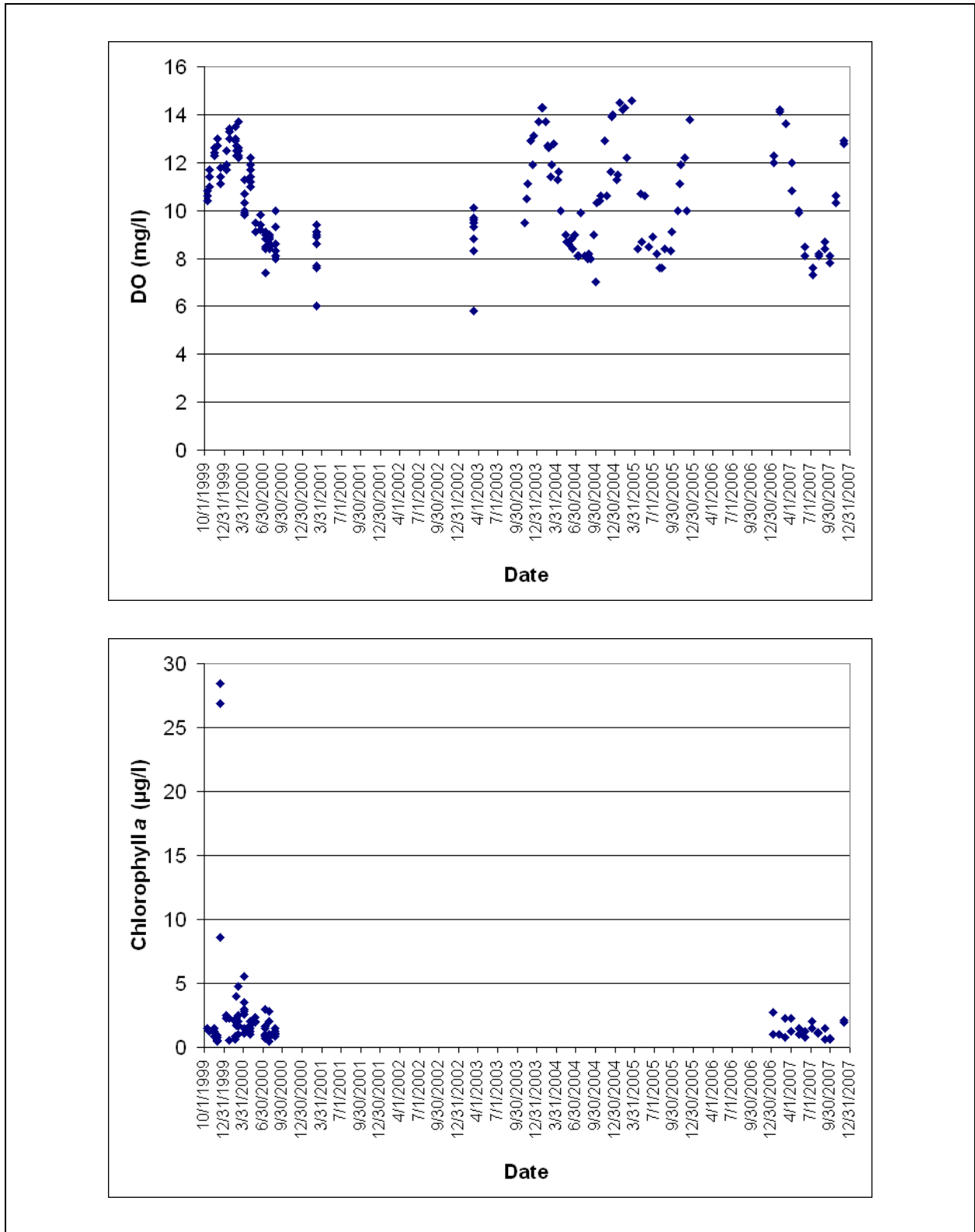


Figure 3: Little Gunpowder Falls Watershed Water Quality Data from October 1999 through December 2007

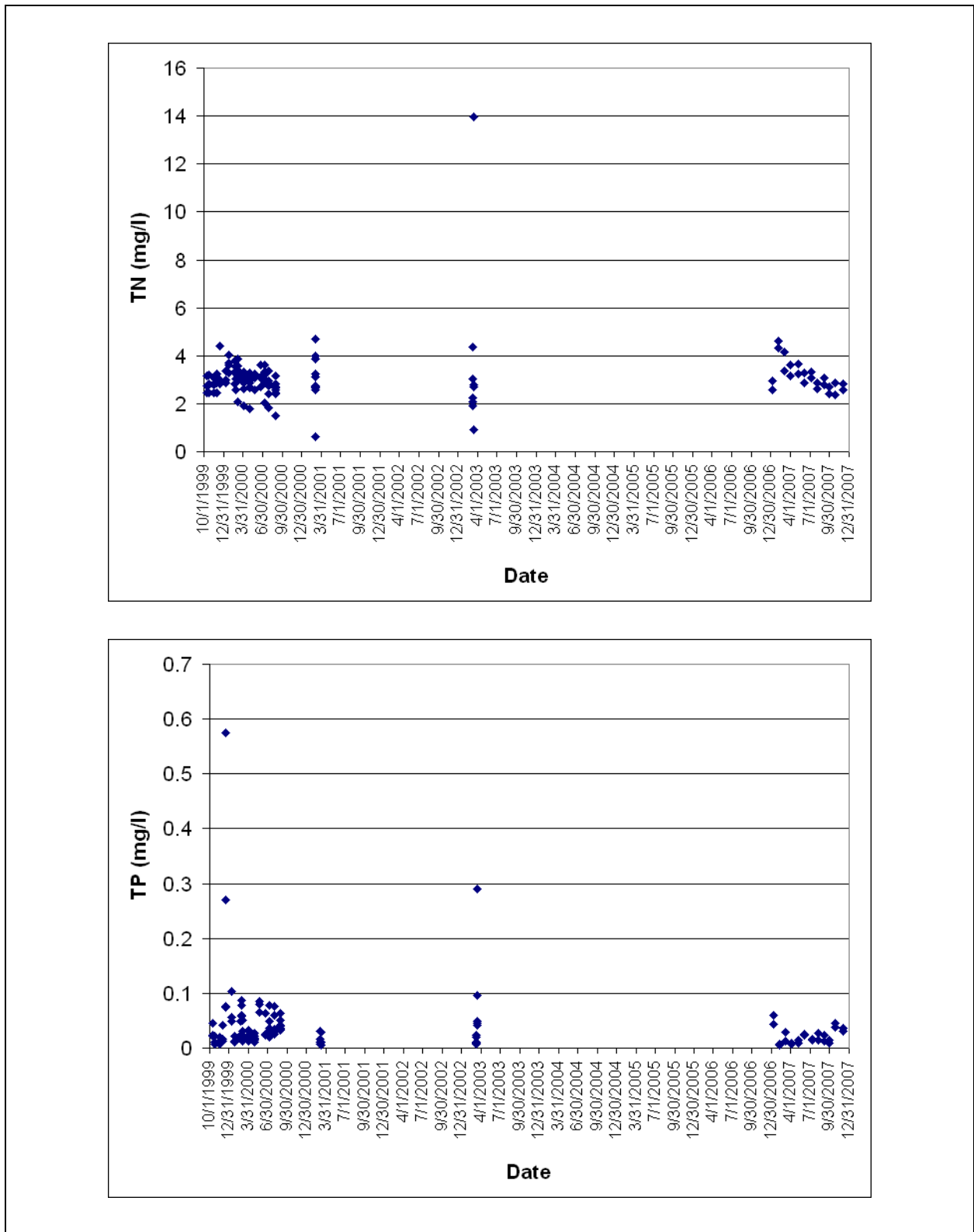


Figure 4: Little Gunpowder Falls Watershed Water Quality Data from October 1999 through December 2007

4.0 CONCLUSION

The data presented above clearly demonstrate that excessive algal growth does not exist in Little Gunpowder Falls, as indicated by low chlorophyll *a* levels and high DO concentrations. Barring the receipt of contradictory data, this report will be used to support a nutrients listing change for the Little Gunpowder Falls watershed from Category 5 (“water body is impaired, does not attain the water quality standard, and a TMDL is required”) to Category 1 (“water bodies that meet all water quality standards and no use is threatened”), when MDE proposes the revision of Maryland’s 303(d) List for public review in the future. Although the waters of Little Gunpowder Falls do not display signs of eutrophication, the State reserves the right to require future controls if evidence suggests nutrients from the basin are contributing to downstream water quality problems.

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REFERENCES

Code of Maryland Regulations, 26.08.02.03-3, and 26.08.02.08. Website
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———. 2008. Integrated Report of Surface Water Quality in Maryland.

Appendix A – Tabular Water Quality Data

Table 2: MDE Water Quality Data

Station	Sampling Date	DO (mg/l)	Chlorophyll <i>a</i> (µg/l)	TN (mg/l)	TP (mg/l)
LGU0024	10/13/1999	10.8		2.46	0.0214
LGU0024	10/26/1999	11.4		2.45	0.0079
LGU0024	11/16/1999	12.6	0.90	2.43	0.0079
LGU0024	11/30/1999	13.0	0.75	2.44	0.0135
LGU0024	12/14/1999	11.8	26.91	2.98	0.2697
LGU0024	1/11/2000	12.5	2.24	2.87	0.0568
LGU0024	1/24/2000	13.4		3.30	0.0100
LGU0024	2/23/2000	13.5	0.64	2.82	0.0185
LGU0024	2/29/2000	12.7	2.24	2.57	0.0771
LGU0024	3/6/2000	12.5	1.64	2.95	0.0126
LGU0024	4/3/2000	10.7	3.49	2.61	0.0121
LGU0024	5/1/2000	11.4	2.06	2.64	0.0221
LGU0024	5/24/2000	9.5	1.99	2.60	0.0645
LGU0024	6/20/2000	9.4		2.71	0.0235
LGU0024	7/10/2000	8.8	1.50	3.20	0.0200
LGU0024	7/31/2000	8.6	1.00	2.41	0.0246
LGU0024	8/29/2000	9.3	1.00	2.41	0.0344
LGU0024	1/9/2007	12.0	2.74	2.56	0.0602
LGU0024	2/6/2007	14.2	1.00	4.34	0.0060
LGU0024	3/6/2007	13.6	0.75	3.38	0.0120
LGU0024	4/3/2007	10.8	2.24	3.17	0.0077
LGU0024	5/8/2007	9.9	1.00	3.23	0.0098
LGU0024	6/5/2007	8.5	0.75	2.87	0.0253
LGU0024	7/10/2007	7.3	1.99	3.06	0.0137
LGU0024	8/7/2007	8.2	1.20	2.60	0.0139
LGU0024	9/5/2007	8.4	1.50	2.77	0.0119
LGU0024	10/1/2007	7.8	0.70	2.41	0.0087
LGU0024	10/29/2007	10.6		2.36	0.0453
LGU0024	12/4/2007	12.9	1.92	2.56	0.0364
LGU0048	3/6/2000	13.7	1.99	3.07	0.0169
LGU0048	4/3/2000	11.3	2.99	2.85	0.0240
LGU0048	5/1/2000	12.2	1.50	2.71	0.0148
LGU0048	7/10/2000	7.4	1.66	2.86	0.0291
LGU0048	7/31/2000	8.8	0.85	2.74	0.0327
LGU0048	8/29/2000	8.0	1.50	2.46	0.0330
LGU0107	10/13/1999	10.4		2.75	0.0234
LGU0107	10/13/1999	10.4		2.72	0.0243
LGU0107	10/26/1999	11.0		2.84	0.0106
LGU0107	10/26/1999	11.0		2.77	0.0111
LGU0107	11/16/1999	12.3	1.50	2.81	0.0113

Station	Sampling Date	DO (mg/l)	Chlorophyll <i>a</i> (µg/l)	TN (mg/l)	TP (mg/l)
LGU0107	11/16/1999	12.3	1.50	2.79	0.0103
LGU0107	11/30/1999	12.7	0.95	2.89	0.0169
LGU0107	11/30/1999	12.7	0.54	2.90	0.0169
LGU0107	12/14/1999	11.4	8.60	2.81	0.0742
LGU0107	12/14/1999	11.4	8.60	2.83	0.0764
LGU0107	1/11/2000	11.7	2.49	2.98	0.0494
LGU0107	1/11/2000	11.7	2.49	2.98	0.0497
LGU0107	1/24/2000	13.0	0.56	3.62	0.0133
LGU0107	1/24/2000	13.0		3.69	0.0117
LGU0107	2/23/2000	13.0	0.60	3.27	0.0235
LGU0107	2/23/2000	13.0	0.90	3.31	0.0236
LGU0107	2/29/2000	12.3	1.99	3.04	0.0584
LGU0107	2/29/2000	12.3	1.74	3.05	0.0601
LGU0107	3/6/2000	12.3	1.74	3.38	0.0214
LGU0107	4/3/2000	9.8	1.50	3.03	0.0173
LGU0107	5/1/2000	11.0	1.25	2.95	0.0151
LGU0107	5/24/2000	9.1	1.92	3.22	0.0861
LGU0107	5/24/2000	9.1	2.35	3.16	0.0852
LGU0107	6/20/2000	9.2		3.12	0.0262
LGU0107	6/20/2000	9.2		3.08	0.0253
LGU0107	7/10/2000	8.4	0.68	3.18	0.0355
LGU0107	7/31/2000	8.4	0.50	2.84	0.0250
LGU0107	8/29/2000	8.6	1.50	2.65	0.0366
LGU0107	11/6/2003	9.5			
LGU0107	11/13/2003	10.5			
LGU0107	11/20/2003	11.1			
LGU0107	12/4/2003	12.9			
LGU0107	12/11/2003	11.9			
LGU0107	12/11/2003	11.9			
LGU0107	12/18/2003	13.1			
LGU0107	1/8/2004	13.7			
LGU0107	1/23/2004	14.3			
LGU0107	1/29/2004	14.3			
LGU0107	2/9/2004	13.7			
LGU0107	2/20/2004	12.7			
LGU0107	2/25/2004	12.6			
LGU0107	3/4/2004	11.4			
LGU0107	3/8/2004	11.9			
LGU0107	3/18/2004	12.8			
LGU0107	4/8/2004	11.3			
LGU0107	4/13/2004	11.6			
LGU0107	4/22/2004	10.0			
LGU0107	5/13/2004	9.0			

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Station	Sampling Date	DO (mg/l)	Chlorophyll <i>a</i> (µg/l)	TN (mg/l)	TP (mg/l)
LGU0107	5/19/2004	8.7			
LGU0107	5/27/2004	8.6			
LGU0107	6/10/2004	8.8			
LGU0107	6/15/2004	8.4			
LGU0107	6/15/2004	8.4			
LGU0107	6/24/2004	9.0			
LGU0107	7/9/2004	8.1			
LGU0107	7/13/2004	8.1			
LGU0107	7/22/2004	9.9			
LGU0107	8/12/2004	8.1			
LGU0107	8/26/2004	8.0			
LGU0107	8/31/2004	8.2			
LGU0107	9/10/2004	8.0			
LGU0107	9/23/2004	9.0			
LGU0107	9/29/2004	7.0			
LGU0107	9/29/2004	7.0			
LGU0107	10/7/2004	10.3			
LGU0107	10/21/2004	10.4			
LGU0107	10/26/2004	10.6			
LGU0107	11/10/2004	12.9			
LGU0107	11/22/2004	10.6			
LGU0107	12/8/2004	11.6			
LGU0107	12/15/2004	13.9			
LGU0107	12/21/2004	14.0			
LGU0107	1/5/2005	11.3			
LGU0107	1/13/2005	11.5			
LGU0107	1/20/2005	14.5			
LGU0107	2/2/2005	14.2			
LGU0107	2/14/2005	14.3			
LGU0107	2/22/2005	12.2			
LGU0107	3/16/2005	14.6			
LGU0107	4/14/2005	8.4			
LGU0107	4/28/2005	10.7			
LGU0107	5/5/2005	8.7			
LGU0107	5/19/2005	10.6			
LGU0107	6/8/2005	8.5			
LGU0107	6/23/2005	8.9			
LGU0107	7/13/2005	8.2			
LGU0107	7/27/2005	7.6			
LGU0107	8/4/2005	7.6			
LGU0107	8/18/2005	8.4			
LGU0107	9/15/2005	8.3			
LGU0107	9/22/2005	9.1			

Station	Sampling Date	DO (mg/l)	Chlorophyll <i>a</i> (µg/l)	TN (mg/l)	TP (mg/l)
LGU0107	10/19/2005	10.0			
LGU0107	10/27/2005	11.1			
LGU0107	10/31/2005	11.9			
LGU0107	11/21/2005	12.2			
LGU0107	11/30/2005	10.0			
LGU0107	12/15/2005	13.8			
LGU0127	3/6/2000	12.2	1.63	3.41	0.0221
LGU0127	4/3/2000	9.9	1.07	3.12	0.0185
LGU0127	5/1/2000	11.2	1.25	3.01	0.0167
LGU0127	7/10/2000	8.5	0.90	3.21	0.0335
LGU0127	7/31/2000	8.6	1.00	3.39	0.0337
LGU0127	8/29/2000	8.6	1.28	2.71	0.0396
LGU0153	3/6/2000	12.6	2.04	3.29	0.0219
LGU0153	4/3/2000	9.8	1.50	2.90	0.0165
LGU0153	5/1/2000	11.4	1.50	2.86	0.0168
LGU0153	7/10/2000	8.5	1.05	3.01	0.0310
LGU0153	7/31/2000				
LGU0153	8/29/2000	10.0	0.85	2.57	0.0417
LGU0153	1/9/2007	12.3	1.00	2.97	0.0440
LGU0153	2/6/2007	14.1	1.00	4.60	0.0069
LGU0153	3/6/2007	13.6	2.24	4.17	0.0288
LGU0153	4/3/2007	12.0	1.25	3.61	0.0084
LGU0153	5/8/2007	10.0	1.50	3.66	0.0138
LGU0153	6/5/2007	8.1	1.25	3.29	0.0233
LGU0153	7/10/2007	7.6	1.50	3.34	0.0159
LGU0153	8/7/2007	8.1	1.12	2.87	0.0267
LGU0153	9/5/2007	8.7	0.60	3.08	0.0227
LGU0153	10/1/2007	8.1	0.60	2.68	0.0138
LGU0153	10/29/2007	10.3		2.87	0.0375
LGU0153	12/4/2007	12.8	2.09	2.84	0.0315
LGU0191	3/6/2000	12.3	2.49	3.59	0.0303
LGU0191	4/3/2000	9.9	2.56	3.21	0.0243
LGU0191	5/1/2000	11.7	1.74	3.12	0.0180
LGU0191	7/10/2000	9.1	2.99	3.31	0.0497
LGU0191	7/31/2000	9.0	2.78	2.81	0.0595
LGU0191	8/29/2000	8.3	1.28	2.83	0.0509
LGU0205	10/13/1999	10.6	1.50	3.15	0.0449
LGU0205	10/26/1999	11.7	1.25	3.20	0.0215
LGU0205	11/16/1999	12.4	1.25	3.07	0.0205
LGU0205	11/30/1999	12.7	0.50	3.24	0.0414
LGU0205	12/14/1999	11.1	28.41	4.41	0.5743
LGU0205	1/11/2000	11.9	2.24	3.35	0.1041
LGU0205	1/24/2000	13.3	2.24	4.03	0.0211

Station	Sampling Date	DO (mg/l)	Chlorophyll <i>a</i> (µg/l)	TN (mg/l)	TP (mg/l)
LGU0205	2/23/2000	12.9	1.99	3.76	0.0494
LGU0205	2/29/2000	12.5	3.99	3.52	0.0868
LGU0205	3/6/2000	12.2	4.73	3.87	0.0504
LGU0205	4/3/2000	10.0	2.78	3.34	0.0325
LGU0205	5/1/2000	11.9	1.99	3.27	0.0266
LGU0205	5/24/2000	9.5	1.92	3.08	0.0799
LGU0205	6/20/2000	9.8		3.63	0.0638
LGU0205	7/10/2000	9.0	2.99	3.62	0.0788
LGU0205	7/31/2000	8.9	1.99	2.93	0.0759
LGU0205	8/29/2000	8.6	1.28	3.17	0.0628
WDC0006	3/6/2000	13.7	1.00	2.08	0.0186
WDC0006	4/3/2000	10.3	5.55	1.92	0.0153
WDC0006	5/1/2000	11.4	1.00	1.81	0.0114
WDC0006	7/10/2000	8.4	0.95	2.03	0.0229
WDC0006	7/31/2000	8.5	0.75	1.84	0.0295
WDC0006	8/29/2000	8.1	1.07	1.49	0.0418

Table 3: MBSS Water Quality Data

Station	Stream	Date	DO (mg/l)	TN (mg/l)	TP (mg/l)
LIGU-102-R-2001	Overshot Branch	3/6/2001	9.4	3.22	0.008
LIGU-103-R-2001	Little Gunpowder Falls UT3	3/6/2001	8.9	2.58	0.011
LIGU-105-R-2001	Little Gunpowder Falls UT2	3/6/2001	6.0	3.13	0.008
LIGU-110-R-2001	Overshot Branch	3/6/2001	8.6	2.72	0.016
LIGU-306-R-2001	Little Gunpowder Falls	3/6/2001	9.0	2.64	0.030
LIGU-312-R-2001	Little Gunpowder Falls	3/6/2001	8.9	2.74	0.031
LIGU-104-R-2001	Wild Cat Branch	3/7/2001	7.6	0.62	0.006
LIGU-109-R-2001	Little Gunpowder Falls UT4	3/7/2001	9.1	4.01	0.029
LIGU-111-R-2001	Little Gunpowder Falls UT1	3/7/2001	7.7	4.69	0.010
LIGU-201-R-2001	Little Gunpowder Falls	3/7/2001	8.9	3.88	0.029
LIGU-102-R-2003	Little Gunpowder Falls UT5	3/12/2003	9.5	2.07	0.011
LIGU-108-R-2003	Little Gunpowder Falls UT5	3/12/2003	9.3	1.93	0.007
LIGU-114-R-2003	Dick Branch	3/12/2003	9.7	4.36	0.020
LIGU-115-R-2003	Little Gunpowder Falls UT5	3/12/2003	10.1	2.23	0.009
LIGU-307-R-2003	Little Gunpowder Falls	3/12/2003	8.3	3.02	0.024
LIGU-111-R-2003	Little Gunpowder Falls UT7	3/13/2003		13.95	0.290
LIGU-113-R-2003	Little Gunpowder Falls UT6	3/13/2003	5.8	0.91	0.097
LIGU-201-R-2003	Little Gunpowder Falls	3/13/2003	8.8	2.70	0.049
LIGU-217-R-2003	Little Gunpowder Falls	3/13/2003	9.6	2.71	0.045
LIGU-303-R-2003	Little Gunpowder Falls	3/13/2003	8.3	2.80	0.042