Water Quality Analysis of Low pH for Evitts Creek in Allegany County, Maryland

FINAL

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List of Abbreviations

AMD	Acid Mine Drainage
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
MBSS	Maryland Biological Stream Survey
MDE	Maryland Department of the Environment
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
pH	Negative Logarithm of Hydrogen Ion Molar Concentration
SAPS	Successive Alkalinity Producing Systems
SSURGO	Soil Survey Geographic
TMDL	Total Maximum Daily Load
WQA	Water Quality Analysis
WQLS	Water Quality Limited Segment

EXECUTIVE SUMMARY

Section 303(d) of the federal Clean Water Act (CWA) and the U.S. Environmental Protection Agency (EPA)'s 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, 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.

Evitts Creek (basin code 02141002), located in portions of Allegany County, Maryland and Bedford County, Pennsylvania, was identified on the State's list of WQLSs as impaired by low pH (1996 listing), nutrients (1996 listing) and sediments (1996 listing). A sub-basin, Lake Habeeb (Rocky Gap Lake) impoundment, was also listed in 1998 for nutrients. The information used for listing the 8-digit basin for low pH was found in the 1996 303(b) report. This report provides an analysis of recent monitoring data to address whether the low pH impairment still remains. A data solicitation for pH was conducted by the Maryland Department of the Environment (MDE) and all readily available data from the past five years was considered

Overall, this analysis demonstrates that the applicable aquatic life criteria for pH and the aquatic life designated uses supported by these criteria are being met in Evitts Creek 8-digit basin. A localized pH impairment has been located at station RKG0023 and RKG0041 on Rocky Gap Run, where 5/12 (42%) and 2/17 (12%) of the samples, respectively, were below the acceptable minimum pH to support aquatic life uses in the basin. A potential pH impairment has been located at station ELL0008 on Elk Lick Run, where 1/6 (17%) of the samples were above the acceptable maximum pH to support aquatic life uses. There is insufficient data to list station ELL0008 as impaired therefore the stream segment represented by this station will be placed in Category 3a of the 303(d) list which includes surface waters that have insufficient quantity (Category 3a) or quality (Category 3b) data and information to determine water body attainment status. For the localized impairment found in Rocky Gap Run, the impairment will remain in Category 5 of the 303(d) list for the stream segment represented by stations RKG0023 and RKG0041.

Based on comments from EPA Region III, MDE has taken a slightly different approach using these analyses from the time this WQA was available for public comment. A smaller stream segments represented by stations RKG0023 and RKG004160 in Rocky Gap Run were stated as being placed in Category 4b of the 303(d) list which has been changed to being placed on Category 5. This reflects a different 303(d) listing action and will be subject to public review through the 303(d) listing process.

Barring the receipt of any contradictory data, this report will be used to support the removal of the 8-digit basin from Maryland's list of WQLSs for low pH when MDE proposes the revision of Maryland's 303(d) list for public review in the future. A TMDL

for nutrients in Lake Habeeb was completed in 1999. The sediment and nutrient impairments will be addressed at a future date.

Although the non-tidal waters of the Evitts Creek watershed do not display signs of impairment due to low pH, the State reserves the right to require additional pollution controls in Evitts Creek watershed if evidence suggests that acidity resulting in low pH from the basin is contributing to downstream water quality problems.

1.0 INTRODUCTION

Section 303(d) of the federal Clean Water Act (CWA) and U.S. Environmental Protection Agency (EPA)'s 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.

A segment identified as a WQLS may not require the development and implementation of a TMDL if current information contradicts the previous finding of an impairment. The most common factual scenarios obviating the need for a TMDL are as follows: 1) more recent data indicating that the impairment no longer exists (i.e., water quality criteria are being met); 2) more recent and updated water quality modeling demonstrates that the segment is now attaining criteria; 3) refinements to water quality criteria, or the interpretation of those standards, which result in standards being met; or 4) correction to errors made in the initial listing.

Evitts Creek (basin code 02141002) was first identified on the 1996 303(d) list submitted to EPA by the Maryland Department of the Environment (MDE) as impaired by low pH, nutrients, and sediments. In 1998, a sub-basin of this watershed, Lake Habeeb (Rocky Gap Lake), was also identified as impaired by nutrients. The information used for listing the 8-digit basin for low pH was found in the 1996 303(b) report. A water quality analysis (WQA) was conducted using recent monitoring data to address whether the low pH impairments in Evitts Creek still remain. A data solicitation for pH was conducted by MDE and all readily available data from the past five years was considered.

This report provides recent information that supports the removal of the Evitts Creek 8-digit basin from Maryland's list of WQLSs for low pH when the 303(d) list is revised: therefore, the aforementioned first and second scenarios most closely apply. Localized low pH impacts are found in Rocky Gap Run and high pH impacts are found in Elk Lick Run. For Elk Lick Run there is insufficient data to list the waterbody as impaired therefore it will be placed in Category 3a of the 303(d) list which includes surface waters that have insufficient quantity (Category 3a) or quality (Category 3b) data and information to determine water body attainment status. For the localized impairment found in Rocky Gap Run, the impairment will remain in Category 5 of the 303(d) list for the stream segment represented by stations RKG0023 and RKG0041. A TMDL for nutrients in Lake Habeeb was completed in 1999. The sediment and nutrient impairments will be addressed at a future date.

The remainder of this report lays out the general setting of the waterbody within the Lower North Branch Potomac River watershed, presents a discussion of the water quality

characteristics of the waterbody, the water quality characterization process, and provides conclusions with regard to the characterization.

2.0 GENERAL SETTING

The Evitts Creek watershed is located in the North Branch Potomac River Sub-basin watershed within Maryland (see Figure 1). The watershed area covers 19,955 acres in Allegany County, Maryland. Evitts Creek watershed drains from northeast in Bedford County, Pennsylvania to southwest in Allegany County, Maryland, just southeast of Cumberland, Maryland. Due to the steep terrain, geologic structure, and rock units, the drainage patterns of the sub-watersheds have headwaters on steep slopes (Allegany County Water and Sewerage Plan, 2002).

Evitts Creek watershed lies within the Ridge and Valley Province of Western Maryland, between South Mountain in Washington County and Dans Mountain in western Allegany County. Two distinct topographic and geologic zones separate the Province: The Great Valley (Hagerstown Valley) is a wide, flat, and open valley formed on Cambrian and Ordovician limestone, dolomite, and Alluvial fan deposits alongside the bordering mountains; and the Allegheny Ridge is described as having erosion-resistant sandstone in the northeast-southwest direction. The surface geology is characterized by folded and faulted sedimentary rocks, layered limestone and shale, and mountainous soils composed of clay, clay loams, and sandy and stony loams (Maryland Department of Environment, 2000; Maryland Geological Survey, 2004; The Maryland Department of Natural Resources, 2005). The soils in the watershed are in the Elliber-Dekalb-Opequon Association. The Elliber soils are on top and sides of the ridges and are deep over cherty limestone, and contain large quantities of chert fragments. The Dekalb soils are moderately deep over sandstone and are mostly very stony. The Opequon soils are generally on the sides of the limestone ridges (Natural Resources Conservation Service (NRCS), Soil Survey of Allegany County, 1977).

The primary land use in Evitts Creek watershed is forest/herbaceous (see Figure 2). The land use distribution in the watershed is approximately 67.0% forest/herbaceous, 18.1% urban, 13.9% agricultural and 1.0% water (Maryland Department of Planning, 2002).

According to the National Pollutant Discharge Elimination System (NPDES) data, there are presently three point sources within the Evitts Creek watershed (see Table 1). There are no coal mining facilities located in the Evitts Creek watershed.

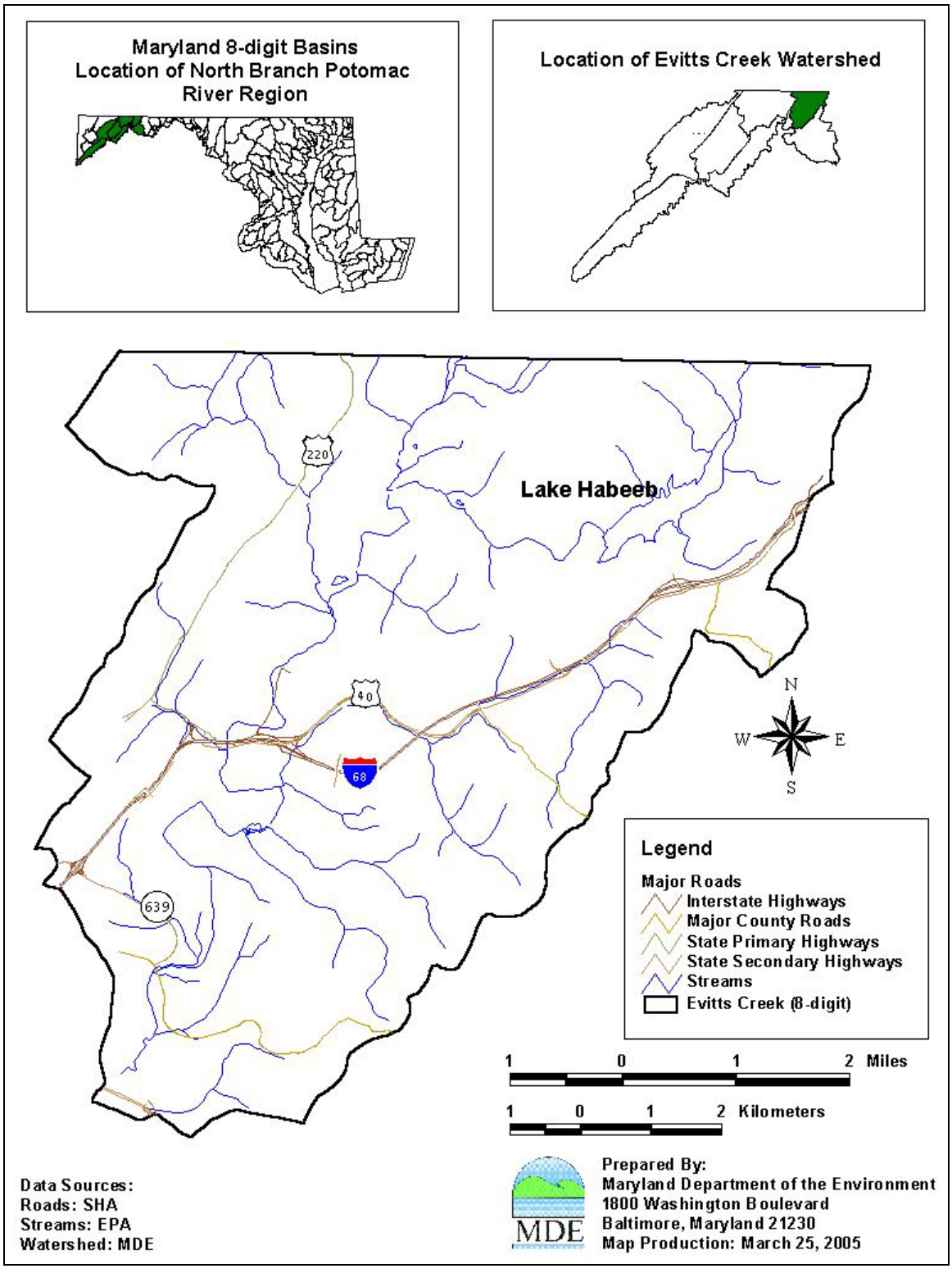

Figure 1: Location Map of Evitts Creek Watershed

Table 1: Evitts Creek Point Source Facilities

Station	NPDES	Facility	Latitude	Longitude
ps-1	MDG344561	WILLISON OIL INC	39.672	-78.725
ps-2	MD0051667	ROCKY GAP STATE PARK	39.695	-78.650
ps-3	MD0067750	ROCKY GAP WATER TREATMENT PLANT	39.702	-78.652

Rocky Gap State Park and Rocky Gap Water Treatment Plant are surface municipal dischargers and are required to regulate pH in their discharge.

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 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. Maryland's water quality standards presently include numeric criteria for low pH based on the need to protect aquatic life, wildlife and human health.

The Maryland Stream Segment Use Designation (Code of Maryland Regulations (COMAR) 26.08.02.08Q) for Evitts Creek is Use IV-P (recreational trout waters and public water supply*)* for the mainstem only and Use I designation (water contact recreation, fishing and protection of aquatic life and wildlife) for remaining streams. The applicable numeric criteria for normal pH values may not be less than 6.5 or greater than 8.5 in standard units (COMAR 26.08.02.03-3A(8)).

A data solicitation for low pH was conducted by MDE and all readily available data from the past 5 years was considered in the WQA. The pH data collected was analyzed for compliance with water quality standards for the water use designations of the Evitts Creek. Based on the 303(d) listing methodologies for pH and mine impacted waters, a waterbody is impaired when greater than 10% of the samples (with a sufficient number of samples to adequately characterize potential diurnal and seasonal variations) exceed the pH numeric criteria (MDE, 2004)

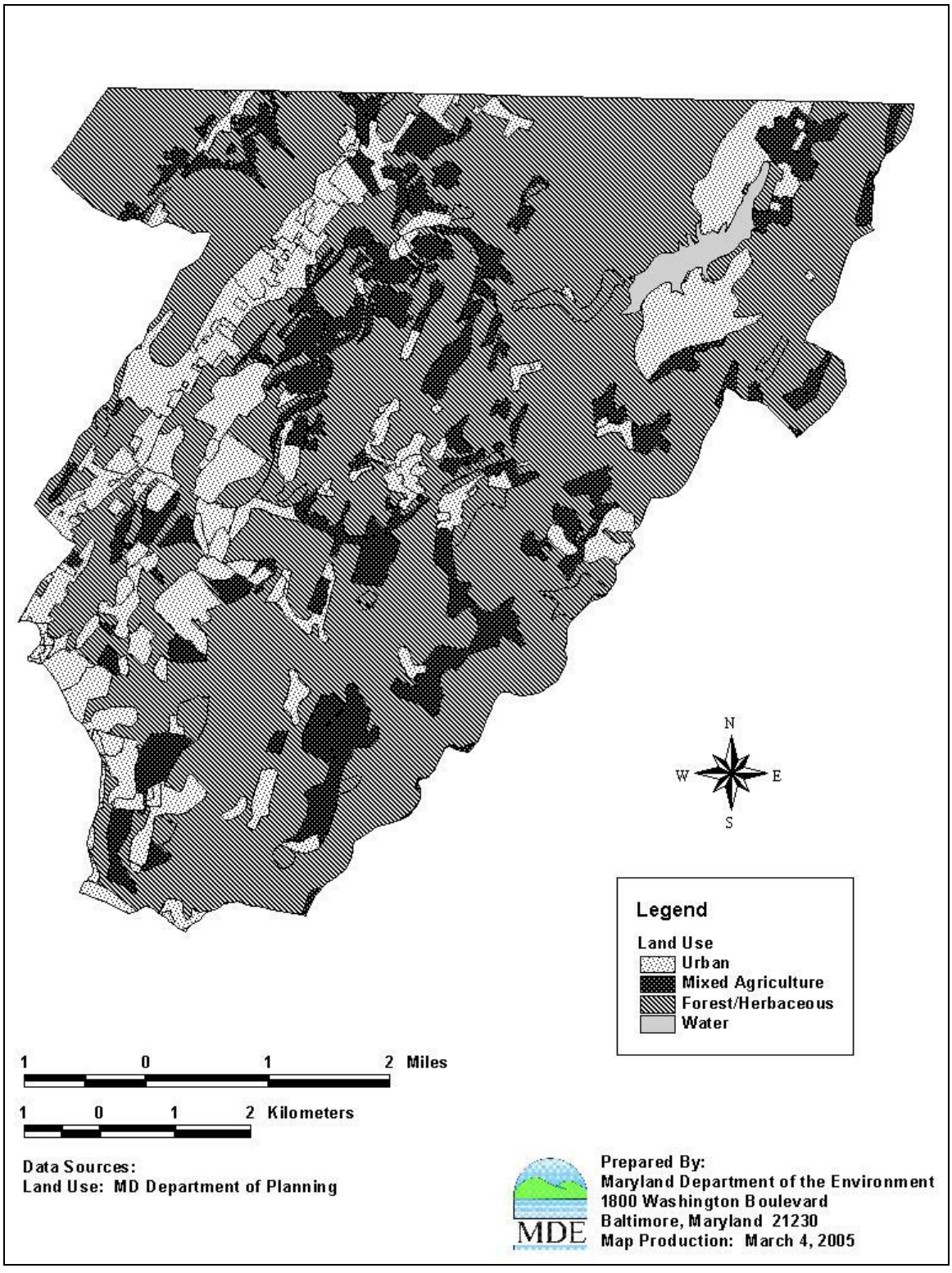

Figure 2: Land Use Map of Evitts Creek Watershed

Field surveys conducted at eighteen monitoring stations in Evitts Creek from 1996 to 2004 were used to support this WQA. Four data sources were considered in this WQA: the Department of Natural Resources (DNR) Stream Acidity Survey, the Maryland Biological Stream Survey (MBSS), MDE Field Survey, and MDE Combined Sewer Overflow (CSO) Survey. Table 2 displays the list of stations with their regional geographical coordinates and descriptive location. Refer to Figure 3 for station locations.

Table 2: Evitts Creek Monitoring Stations

Organization	Data Source	Station I.D.	GPS Coordinates	Station Description	Samples (#)	Date Range (years)
DNR	Stream Acidity Survey	78	39.65 78.71	UNTR Evitts Creek at Christie Rd. (southern trib)	1	1999
DNR	Stream Acidity Survey	98	39.65 78.70	UNTR Evitts Creek at Christie Rd. (Northern trib)	1	1999
DNR	MBSS	AL-A-276-323	39.70 78.69	Evitts Creek	1	1996
DNR	MBSS	AL-A-319-219	39.71 78.71	Pea Vine Run	1	1996
DNR	MBSS	AL-A-425-314	39.67 78.70	Elk Lick Run	1	1996
MDE	CSO Survey	EVI0017	39 38.62 78 44.09	Evitts Creek	14	2002-2004
MDE	CSO Survey	EVI0060	39 40.35 78 43.43	Evitts Creek	14	2002-2004
MDE	CSO Survey	EVI0094	39 41.83 78 42.15	Evitts Creek	14	2002-2004
MDE	Upper Potomac Field Survey	ELL0008	39 40.56 78 42.50	Elk Lick Creek	6	2001
MDE	Upper Potomac Field Survey	EVI0002	39 37.61 78 44.28	Evitts Creek	41	1999-2002
MDE	Upper Potomac Field Survey	EVI0046	39 39.75 78 43.02	Evitts Creek	6	2001
MDE	Upper Potomac Field Survey	EVI0118	39 43.38 78 41.26	Evitts Creek	41	1999-2002
MDE	Upper Potomac Field Survey	PVR0001	39 41.53 78 42.55	Pea Vine Run	6	2001
MDE	Upper Potomac Field Survey	RKG0001	39 42.34 78 41.82	Rocky Gap Run	6	2001
MDE	Upper Potomac Field Survey	RKG0023	39 42.06 78 39.75	Rocky Gap Run	12	1999-2000
MDE	Upper Potomac Field Survey	RKG0025	39 42.02 78 39.66	Rocky Gap Run	19	1999
MDE	Upper Potomac Field Survey	RKG0034	39 42.39 78 38.81	Rocky Gap Run	12	1999
MDE	Upper Potomac Field Survey	RKG0041	39 42.96 78 38.42	Rocky Gap Run	18	1999-2001

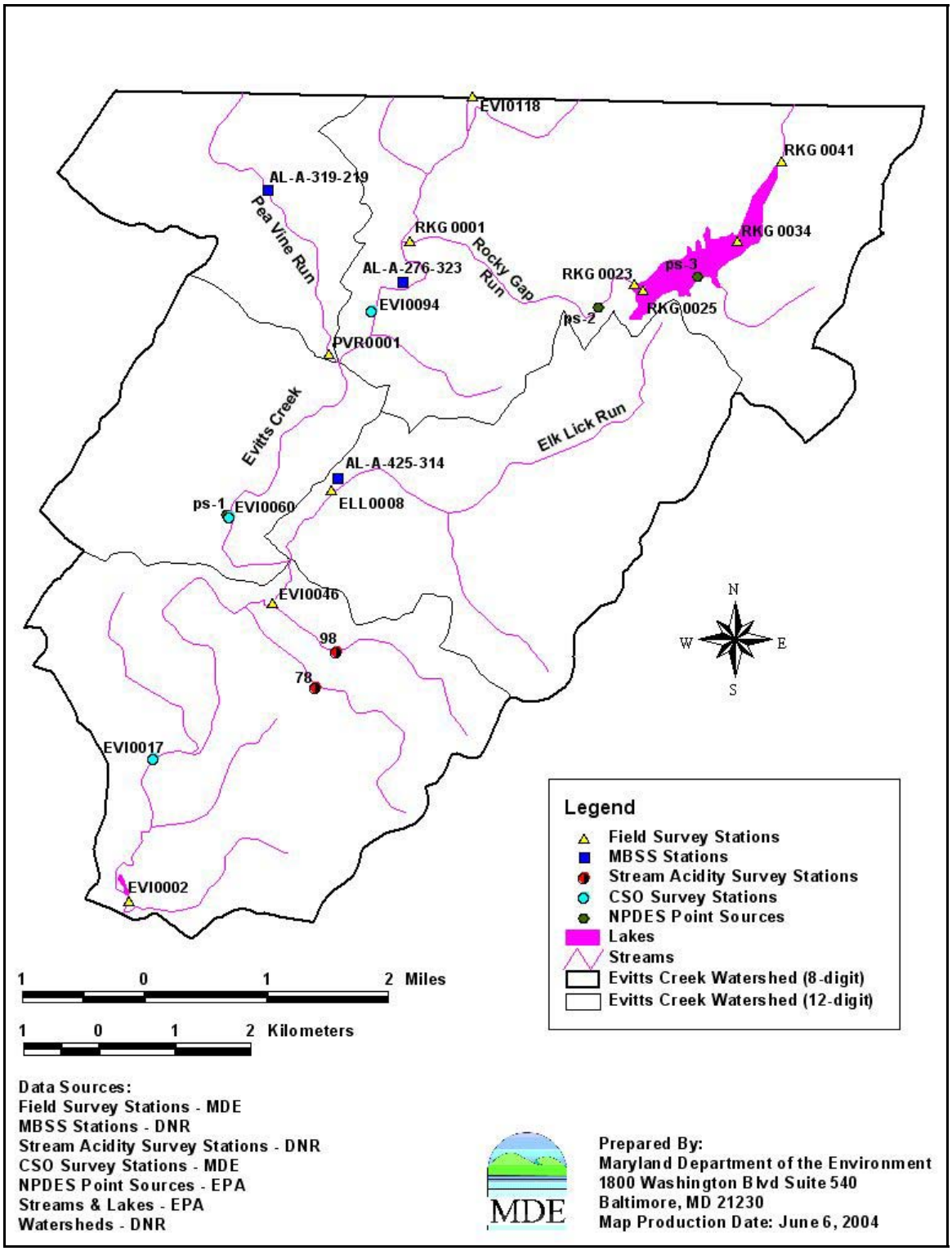

Figure 3: Monitoring Station Location Map of Evitts Creek Watershed

Table 3a summarizes the pH data in the Evitts Creek watershed. The pH data ranges from 6.10 to 9.70. For the 8-digit basin of Evitts Creek, the data shows that 3.8% of the samples exceed the pH criteria lower limit of 6.5 and 2.4% of the samples exceed the pH criteria upper limit of 8.5. Please refer to Appendix A for a complete table of pH data.

Table 3a: Evitts Creek Watershed: 8-digit Basin pH Analysis

		Low pH		High pH	
8-digit Watershed	**Samples (#)**	**Exceedances (#)**	**Exceedances (%)**	**Exceedances (#)**	**Exceedances (%)**
Evitts Creek	213	8	3.8%	5	2.4%

An additional assessment was conducted on a station-by-station basis to determine if localized impacts exist within the watershed. A summary of the pH data by station is displayed in Table 3b.

Table 3b: Evitts Creek Watershed: Station by Station pH Analysis

			Low pH		High pH	
Station	**Stream Segment**	**Samples (#)**	**Exceedances (#)**	**Exceedances (%)**	**Exceedances (#)**	**Exceedances (%)**
ELL0008	Elk Lick Run	6	0	0%	1	16.7%
EVI0002	Evitts Creek	41	0	0%	3	7.3%
EVI0017	Evitts Creek	14	0	0%	0	0%
EVI0046	Unnamed Tributary of Evitts Creek	6	0	0%	0	0%
EVI0060	Evitts Creek	14	0	0%	0	0%
EVI0094	Evitts Creek	14	0	0%	0	0%
EVI0118	Evitts Creek	41	1	2.5%	1	2.4%
PVR0001	Pea Vine Run	6	0	0%	0	0%
RKG0001	Rocky Gap Run	6	0	0%	0	0%
RKG0023	Rocky Gap Run	12	5	41.7%	0	0%
RKG0025	Rocky Gap Run	19	0	0%	0	0%
RKG0034	Rocky Gap Run	12	0	0%	0	0%
RKG0041	Rocky Gap Run	17	2	11.8%	0	0%
1	Evitts Creek	1	0	0%	0	0%
2	Pea Vine Run	1	0	0%	0	0%
3	Elk Lick Run	1	0	0%	0	0%
78	Unnamed Tributary of Evitts Creek	1	0	0%	0	0%
98	Unnamed Tributary of Evitts Creek	1	0	0%	0	0%

For stations RKG0023 and RKG0041, 5/12 samples (41.7%) and 2/17 samples (11.8%), respectively, exceed the lower limit of the pH criteria, therefore they are impacted by low pH. For station ELL0008, 1/6 samples (16.7%) exceed the upper limit of the pH criteria, therefore it is possibly impacted by high pH.

4.0 CONCLUSION

This WQA establishes that the water quality standard for pH is being achieved in Evitts Creek watershed. Overall, for the 8-digit basin of Evitts Creek, 3.8% of the samples exceed the lower limit (6.5 standard pH units) and 2.4% exceed the upper limit (8.5 standard pH units) of the pH criteria range. In addition, the magnitude of the low pH exceedance was typically small (an average of .19 pH units) with a range of 0.1 to 0.4 pH units. Based on 303(d) impairment listing methodologies applied by MDE, and the scale used for both 303(d) listings and TMDL investigations (8-digit basin), a waterbody is impaired when greater than 10% of the samples exceed the criteria, or in the case of pH, are outside the range of the criteria. Analysis of data collected for this WQA indicate that Evitts Creek is not impaired for low pH when assessed using the 8-digit basin scale.

A station-by-station assessment of the data indicates that Rocky Gap Run at stations RKG0023 and RKG0041 is impacted by low pH and Elk Lick Run at station ELL0008 is impacted by high pH (see Table 3b above). The analysis supports the conclusion that a TMDL of low pH is not required, but the low pH impacts at RKG0023 and RKG0041 and high pH impacts at ELL0008 must be addressed. There is insufficient data to list station ELL0008 as impaired therefore the stream segment represented by this station will be placed in Category 3a of the 303(d) list which includes surface waters that have insufficient quantity (Category 3a) or quality (Category 3b) data and information to determine water body attainment status. For stations RKG0023 and RKG0041, the specific stream segments represented by these stations will be listed on Category 5 of the 303(d) List to address these localized high and low pH impairments.

Based on comments from EPA Region III, MDE has taken a slightly different approach using these analyses from the time this WQA was available for public comment. A smaller stream segments represented by stations RKG0023 and RKG004160 in Rocky Gap Run were stated as being placed in Category 4b of the 303(d) list which has been changed to being placed on Category 5. This reflects a different 303(d) listing action and will be subject to public review through the 303(d) listing process.

Barring the receipt of any contradictory data, this information provides sufficient justification to revise Maryland's 303(d) list to remove low pH as an impairment for the 8-digit basin of Evitts Creek.

5.0 REFERENCES

40 CFR 130.7(b)(1)(iii). *Code of Federal Regulations - Water Quality Planning and Management – Total maximum daily loads (TMDL) and individual water quality based effluent limitations.*. July 1, 1998.

COMAR 26.08.02.03-3A(8). *Water Quality Criteria Specific to Designated Uses.*

COMAR 26.08.02.08Q. *Stream Segment Designations***.**

Maryland Department of the Environment. *An Overview of Wetlands and Water Resources of Maryland*. January 2000.

Maryland Department of Natural Resources, Maryland Biological Stream Survey. *Searchable Online MBSS Database*, May 25, 2004. <http://mddnr.chesapeakebay.net/mbss/search.cfm> Last visited: April 15, 2005.

Maryland Department of the Environment. *2004 FINAL List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality in Maryland*.

Maryland Department of the Environment. *Combined Sewer Overflow Data*. October 2002 – March 2004.

Maryland Department of the Environment. *Upper Potomac Field Data*. October 2000 thru September 2002.

Maryland Department of Natural Resources. *Survey of Acidic and Episodically Acidic Streams in Western Maryland*. Prepared by UMCES Appalachian Laboratory, January 2000

Maryland Department of Natural Resources Forest Services, *Physiography of Maryland. 2005*. <http://www.dnr.state.md.us/forests/healthreport/rnv.html> Last visited: April, 15 2005.

Maryland Department of Planning, 2002 Land Use, Land Cover Map Series. 2002.

Maryland Geological Survey (MGS). *A Brief Description of the Geology of Maryland*. Electronic version prepared by Richard Ortt, Division of Coastal and Estuarine Geology, March 19, 2004. <http://www.mgs.md.gov/esic/brochures/mdgeology.html>

The Allegany County Planning Division. *ALLEGANY COUNTY WATER & SEWERAGE PLAN*. March 2002. <http://www.gov.allconet.org/plan/docs/water_sewer/Water and Sewer Plan_ver2.pdf>

Appendix A - Monitoring Station pH Data

Station	Sample Date	pH	Organization	Data Source
78	06/21/05	8.24	DNR	Stream Acidity Survey
98	06/21/05	8.2	DNR	Stream Acidity Survey
EVI0017	02/09/04	7.2	MDE	CSO Survey
EVI0017	02/10/04	7.3	MDE	CSO Survey
EVI0017	02/12/04	7.6	MDE	CSO Survey
EVI0017	11/18/02	7.7	MDE	CSO Survey
EVI0017	12/09/02	7.7	MDE	CSO Survey
EVI0017	03/29/04	7.8	MDE	CSO Survey
EVI0017	12/08/03	7.9	MDE	CSO Survey
EVI0017	10/15/02	8	MDE	CSO Survey
EVI0017	10/17/02	8.1	MDE	CSO Survey
EVI0017	11/15/02	8.1	MDE	CSO Survey
EVI0017	10/21/02	8.3	MDE	CSO Survey
EVI0017	10/23/02	8.3	MDE	CSO Survey
EVI0017	11/13/02	8.3	MDE	CSO Survey
EVI0017	11/12/02	8.4	MDE	CSO Survey
EVI0060	02/09/04	7.1	MDE	CSO Survey
EVI0060	02/10/04	7.1	MDE	CSO Survey
EVI0060	11/18/02	7.5	MDE	CSO Survey
EVI0060	02/12/04	7.5	MDE	CSO Survey
EVI0060	12/09/02	7.6	MDE	CSO Survey
EVI0060	03/29/04	7.6	MDE	CSO Survey
EVI0060	11/15/02	7.7	MDE	CSO Survey
EVI0060	10/17/02	8	MDE	CSO Survey
EVI0060	12/08/03	8	MDE	CSO Survey
EVI0060	10/15/02	8.1	MDE	CSO Survey
EVI0060	10/21/02	8.1	MDE	CSO Survey
EVI0060	10/23/02	8.2	MDE	CSO Survey
EVI0060	11/12/02	8.2	MDE	CSO Survey
EVI0060	11/13/02	8.2	MDE	CSO Survey
EVI0094	02/10/04	7	MDE	CSO Survey
EVI0094	02/09/04	7.1	MDE	CSO Survey
EVI0094	02/12/04	7.4	MDE	CSO Survey
EVI0094	11/18/02	7.6	MDE	CSO Survey
EVI0094	12/08/03	7.7	MDE	CSO Survey
EVI0094	03/29/04	7.7	MDE	CSO Survey
EVI0094	10/15/02	7.9	MDE	CSO Survey
EVI0094	10/17/02	7.9	MDE	CSO Survey
EVI0094	10/21/02	8	MDE	CSO Survey
EVI0094	12/09/02	8	MDE	CSO Survey
EVI0094	10/23/02	8.1	MDE	CSO Survey
EVI0094	11/13/02	8.1	MDE	CSO Survey

EVI0094	11/15/02	8.1	MDE	CSO Survey
EVI0094	11/12/02	8.3	MDE	CSO Survey
1	1996	7.64	DNR	MBSS
2	1996	7.46	DNR	MBSS
3	1996	8.03	DNR	MBSS
ELL0008	03/08/01	7.5	MDE	Upper Potomac Field Survey
ELL0008	08/21/01	7.5	MDE	Upper Potomac Field Survey
ELL0008	09/06/01	7.8	MDE	Upper Potomac Field Survey
ELL0008	08/27/01	7.9	MDE	Upper Potomac Field Survey
ELL0008	03/26/01	8.2	MDE	Upper Potomac Field Survey
ELL0008	04/03/01	**8.7**	MDE	Upper Potomac Field Survey
EVI0002	03/08/01	7.2	MDE	Upper Potomac Field Survey
EVI0002	02/14/00	7.3	MDE	Upper Potomac Field Survey
EVI0002	01/17/01	7.4	MDE	Upper Potomac Field Survey
EVI0002	05/08/01	7.5	MDE	Upper Potomac Field Survey
EVI0002	06/12/01	7.5	MDE	Upper Potomac Field Survey
EVI0002	07/17/01	7.5	MDE	Upper Potomac Field Survey
EVI0002	10/10/01	7.5	MDE	Upper Potomac Field Survey
EVI0002	03/13/01	7.6	MDE	Upper Potomac Field Survey
EVI0002	08/27/01	7.6	MDE	Upper Potomac Field Survey
EVI0002	08/07/00	7.7	MDE	Upper Potomac Field Survey
EVI0002	09/12/00	7.7	MDE	Upper Potomac Field Survey
EVI0002	02/13/01	7.7	MDE	Upper Potomac Field Survey
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EVI0002	11/02/00	8	MDE	Upper Potomac Field Survey
EVI0002	04/11/01	8	MDE	Upper Potomac Field Survey
EVI0002	09/06/01	8	MDE	Upper Potomac Field Survey
EVI0002	02/12/02	8	MDE	Upper Potomac Field Survey
EVI0002	05/07/02	8	MDE	Upper Potomac Field Survey
EVI0002	12/06/99	8.1	MDE	Upper Potomac Field Survey
EVI0002	11/14/01	8.1	MDE	Upper Potomac Field Survey
EVI0002	03/06/00	8.2	MDE	Upper Potomac Field Survey
EVI0002	09/17/02	8.2	MDE	Upper Potomac Field Survey
EVI0002	06/12/00	8.3	MDE	Upper Potomac Field Survey
EVI0002	04/09/02	8.3	MDE	Upper Potomac Field Survey
EVI0002	06/18/02	8.3	MDE	Upper Potomac Field Survey
EVI0002	05/08/00	8.4	MDE	Upper Potomac Field Survey
EVI0002	07/10/00	8.4	MDE	Upper Potomac Field Survey
EVI0002	09/11/01	8.4	MDE	Upper Potomac Field Survey
EVI0002	01/18/00	8.5	MDE	Upper Potomac Field Survey
EVI0002	04/03/01	8.5	MDE	Upper Potomac Field Survey
EVI0002	01/15/02	8.5	MDE	Upper Potomac Field Survey

EVI0002	03/12/02	8.5	MDE	Upper Potomac Field Survey
EVI0002	08/13/02	8.5	MDE	Upper Potomac Field Survey
EVI0002	04/10/00	**8.6**	MDE	Upper Potomac Field Survey
EVI0002	12/11/01	**8.8**	MDE	Upper Potomac Field Survey
EVI0002	11/08/99	**9.7**	MDE	Upper Potomac Field Survey
EVI0046	03/08/01	7.3	MDE	Upper Potomac Field Survey
EVI0046	08/21/01	7.6	MDE	Upper Potomac Field Survey
EVI0046	09/06/01	7.7	MDE	Upper Potomac Field Survey
EVI0046	03/26/01	7.9	MDE	Upper Potomac Field Survey
EVI0046	08/27/01	8.1	MDE	Upper Potomac Field Survey
EVI0046	04/03/01	8.4	MDE	Upper Potomac Field Survey
EVI0118	05/08/01	**6.4**	MDE	Upper Potomac Field Survey
EVI0118	06/12/01	7.3	MDE	Upper Potomac Field Survey
EVI0118	07/10/00	7.4	MDE	Upper Potomac Field Survey
EVI0118	07/16/02	7.4	MDE	Upper Potomac Field Survey
EVI0118	03/08/01	7.5	MDE	Upper Potomac Field Survey
EVI0118	09/06/01	7.5	MDE	Upper Potomac Field Survey
EVI0118	01/18/00	7.6	MDE	Upper Potomac Field Survey
EVI0118	01/17/01	7.6	MDE	Upper Potomac Field Survey
EVI0118	02/13/01	7.6	MDE	Upper Potomac Field Survey
EVI0118	03/13/01	7.6	MDE	Upper Potomac Field Survey
EVI0118	07/17/01	7.6	MDE	Upper Potomac Field Survey
EVI0118	10/10/01	7.6	MDE	Upper Potomac Field Survey
EVI0118	02/14/00	7.7	MDE	Upper Potomac Field Survey
EVI0118	03/06/00	7.7	MDE	Upper Potomac Field Survey
EVI0118	12/11/00	7.7	MDE	Upper Potomac Field Survey
EVI0118	08/21/01	7.7	MDE	Upper Potomac Field Survey
EVI0118	06/18/02	7.7	MDE	Upper Potomac Field Survey
EVI0118	11/08/99	7.8	MDE	Upper Potomac Field Survey
EVI0118	10/11/00	7.8	MDE	Upper Potomac Field Survey
EVI0118	02/12/02	7.8	MDE	Upper Potomac Field Survey
EVI0118	08/07/00	7.9	MDE	Upper Potomac Field Survey
EVI0118	04/11/01	7.9	MDE	Upper Potomac Field Survey
EVI0118	05/07/02	7.9	MDE	Upper Potomac Field Survey
EVI0118	06/12/00	8	MDE	Upper Potomac Field Survey
EVI0118	09/11/00	8	MDE	Upper Potomac Field Survey
EVI0118	11/02/00	8	MDE	Upper Potomac Field Survey
EVI0118	08/14/01	8	MDE	Upper Potomac Field Survey
EVI0118	09/11/01	8	MDE	Upper Potomac Field Survey
EVI0118	04/09/02	8	MDE	Upper Potomac Field Survey
EVI0118	08/27/01	8.1	MDE	Upper Potomac Field Survey
EVI0118	11/14/01	8.1	MDE	Upper Potomac Field Survey
EVI0118	01/15/02	8.1	MDE	Upper Potomac Field Survey
EVI0118	08/13/02	8.1	MDE	Upper Potomac Field Survey
EVI0118	09/17/02	8.1	MDE	Upper Potomac Field Survey
EVI0118	03/26/01	8.2	MDE	Upper Potomac Field Survey
EVI0118	04/03/01	8.2	MDE	Upper Potomac Field Survey

EVI0118	12/11/01	8.3	MDE	Upper Potomac Field Survey
EVI0118	03/12/02	8.3	MDE	Upper Potomac Field Survey
EVI0118	12/06/99	8.4	MDE	Upper Potomac Field Survey
EVI0118	04/10/00	8.5	MDE	Upper Potomac Field Survey
EVI0118	05/08/00	**8.7**	MDE	Upper Potomac Field Survey
PVR0001	08/21/01	6.8	MDE	Upper Potomac Field Survey
PVR0001	03/08/01	7.4	MDE	Upper Potomac Field Survey
PVR0001	09/06/01	7.5	MDE	Upper Potomac Field Survey
PVR0001	03/26/01	7.6	MDE	Upper Potomac Field Survey
PVR0001	08/27/01	7.8	MDE	Upper Potomac Field Survey
PVR0001	04/03/01	8	MDE	Upper Potomac Field Survey
RKG0001	08/21/01	6.9	MDE	Upper Potomac Field Survey
RKG0001	03/08/01	7.7	MDE	Upper Potomac Field Survey
RKG0001	03/26/01	7.8	MDE	Upper Potomac Field Survey
RKG0001	09/06/01	7.9	MDE	Upper Potomac Field Survey
RKG0001	04/03/01	8.2	MDE	Upper Potomac Field Survey
RKG0001	08/27/01	8.2	MDE	Upper Potomac Field Survey
RKG0023	06/02/99	**6.2**	MDE	Upper Potomac Field Survey
RKG0023	10/27/99	**6.3**	MDE	Upper Potomac Field Survey
RKG0023	04/15/99	**6.4**	MDE	Upper Potomac Field Survey
RKG0023	05/19/99	**6.4**	MDE	Upper Potomac Field Survey
RKG0023	09/21/99	**6.4**	MDE	Upper Potomac Field Survey
RKG0023	03/29/99	6.6	MDE	Upper Potomac Field Survey
RKG0023	07/13/99	6.6	MDE	Upper Potomac Field Survey
RKG0023	11/18/99	6.7	MDE	Upper Potomac Field Survey
RKG0023	08/31/99	7.1	MDE	Upper Potomac Field Survey
RKG0023	02/08/00	7.1	MDE	Upper Potomac Field Survey
RKG0023	12/14/99	7.4	MDE	Upper Potomac Field Survey
RKG0023	01/11/00	7.6	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.53	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.53	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.57	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.58	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.61	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.61	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.62	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.66	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.67	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.68	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.75	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	6.97	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	7.75	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	8.09	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	8.14	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	8.14	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	8.15	MDE	Upper Potomac Field Survey
RKG0025	08/31/99	8.15	MDE	Upper Potomac Field Survey

RKG0025	08/31/99	8.16	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	6.76	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	6.8	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.04	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.7	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.73	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.87	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.94	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.98	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	7.98	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	8	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	8	MDE	Upper Potomac Field Survey
RKG0034	08/31/99	8.01	MDE	Upper Potomac Field Survey
RKG0041	04/15/99	**6.1**	MDE	Upper Potomac Field Survey
RKG0041	03/29/99	**6.3**	MDE	Upper Potomac Field Survey
RKG0041	11/18/99	6.8	MDE	Upper Potomac Field Survey
RKG0041	10/27/99	6.9	MDE	Upper Potomac Field Survey
RKG0041	05/19/99	7	MDE	Upper Potomac Field Survey
RKG0041	12/14/99	7	MDE	Upper Potomac Field Survey
RKG0041	02/08/00	7	MDE	Upper Potomac Field Survey
RKG0041	06/02/99	7.2	MDE	Upper Potomac Field Survey
RKG0041	01/11/00	7.3	MDE	Upper Potomac Field Survey
RKG0041	03/08/01	7.3	MDE	Upper Potomac Field Survey
RKG0041	09/21/99	7.4	MDE	Upper Potomac Field Survey
RKG0041	08/21/01	7.5	MDE	Upper Potomac Field Survey
RKG0041	04/03/01	7.6	MDE	Upper Potomac Field Survey
RKG0041	09/06/01	7.7	MDE	Upper Potomac Field Survey
RKG0041	08/31/99	7.8	MDE	Upper Potomac Field Survey
RKG0041	08/27/01	8.2	MDE	Upper Potomac Field Survey
RKG0041	03/26/01	8.4	MDE	Upper Potomac Field Survey