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**Water Quality Analysis of Sediment
in the Conowingo Dam/Susquehanna River Watershed,
Cecil and Harford Counties, Maryland**

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DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard, Suite 540
Baltimore MD 21230-1718

Submitted to:

Water Protection Division
U.S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

September 2011

EPA Submittal Date: Sept. 28, 2011
EPA Approval Date: May 18, 2012

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List of Abbreviations

BIBI	Benthic Index of Biological Integrity
CBP P5.2	Chesapeake Bay Program Model Phase 5.2
CWA	Clean Water Act
DNR	Department of Natural Resources
EPA	United States Environmental Protection Agency
FIBI	Fish Index of Biological Integrity
IBI	Index of Biological Integrity
m	meter
MAL	Minimal Allowable Limit
MBSS	Maryland Biological Stream Survey
MD 8-Digit	Maryland 8-Digit Watershed
MDE	Maryland Department of the Environment
N/A	Not Applicable
PSU	Primary Sampling Unit
SCS	Soil Conservation Service
SRBC	Susquehanna River Basin Commission
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
UT	Unnamed Tributary
WQA	Water Quality Analysis
WQLS	Water Quality Limited Segment

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EXECUTIVE SUMMARY

This document, upon approval by the U.S. Environmental Protection Agency (EPA), presents a Water Quality Analysis (WQA) of sediment in the Maryland 8-Digit (MD 8-Digit) Conowingo Dam/Susquehanna River watershed (basin number 02120204) (2010 *Integrated Report of Surface Water Quality in Maryland* Assessment Unit ID: MD-02120204). Section 303(d) of the federal Clean Water Act (CWA) and the 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 (CFR 2010).

The MD 8-Digit Conowingo Dam/Susquehanna River watershed consists of 1) the mainstem of the Conowingo Dam/Susquehanna River, which is fully occupied by the Conowingo Pool (the impoundment created behind the Conowingo Dam) for the entire length of the mainstem within Maryland, and 2) the nontidal tributaries within Maryland that drain to the pool. Thus, the use of the term "nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed" throughout this report will refer to solely the nontidal tributaries within Maryland draining to the Conowingo Pool. The Maryland Department of the Environment (MDE) has identified the waters of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed on the State's 2010 Integrated Report as impaired by nutrients – phosphorus (1996) and sediments (1996) (MDE 2010a). These impairments are only applicable to the nontidal MD 8-digit watershed. The Conowingo Pool is assessed separately, and therefore, the impoundment is not included as part of the analysis presented herein. The designated use of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is Use I-P (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply) (COMAR 2010a,b).

The WQA presented herein by MDE will address the 1996 sediments listing, for which a data solicitation was conducted, and all readily available data from the past five years have been considered. A WQA for eutrophication to address the nutrients/phosphorus listing is scheduled to be submitted to the EPA in 2011.

The 2010 Integrated Report did not make a determination regarding impairment to aquatic life within the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed due to a limited amount of biological monitoring data (i.e., the watershed was placed on Category 3 of the Integrated Report - "insufficient data to determine if a waterbody is meeting standards for a particular stressor"). The watershed has been reassessed in 2011, using Maryland's biological listing methodology and new biological monitoring data collected by the Susquehanna River Basin Commission (SRBC). This reassessment indicates that aquatic life is not impaired. Since the watershed is now identified as supporting aquatic life, there are no stressors impairing biological communities, including sediment. Therefore, the Integrated Report listing that previously identified sediments as impairing aquatic life in the nontidal MD 8-Digit watershed is no longer applicable, and a TMDL for sediments is not required. The results of this reassessment will be published in the 2011 inter-annual update to the Integrated Report.

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As stated above, the analysis presented in this report supports the conclusion that a TMDL for sediments is not necessary to achieve water quality standards in the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed. Although the waters of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed do not display signs of a sediment impairment, the State reserves the right to require future controls in the watershed if evidence suggests that sediments from the basin are contributing to downstream water quality problems. For example, reductions will be required to meet allocations assigned to the Northern Chesapeake Bay Tidal Fresh Bay Water Quality Segment, as specified by the Chesapeake Bay Nutrient and Sediment TMDLs, established by EPA on December 29, 2010.

Barring the receipt of contradictory data, this report will be used to support a revision of the 2010 Integrated Report sediment listing for the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed from Category 5 (“waterbody is impaired, does not attain the water quality standard, and a TMDL is required”) to Category 2 (“waterbody is meeting some [in this case sediments-related] water quality standards, but with insufficient data to assess all impairments”), when MDE proposes the revision of the Integrated Report in 2012.

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1.0 INTRODUCTION

This document upon approval by the U.S. Environmental Protection Agency (EPA), presents a Water Quality Analysis (WQA) for sediments in the Maryland 8-Digit (MD 8-Digit) Conowingo Dam/Susquehanna River watershed (basin number 02120204) (2010 *Integrated Report of Surface Water Quality in Maryland* Assessment Unit ID: MD-02120204). Section 303(d) of the federal Clean Water Act (CWA) and the 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 required 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 2010).

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 likely scenarios obviating 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 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 MD 8-Digit Conowingo Dam/Susquehanna River watershed consists of 1) the mainstem of the Conowingo Dam/Susquehanna River, which is fully occupied by the Conowingo Pool (the impoundment created behind the Conowingo Dam) for the entire length of the mainstem within Maryland, and 2) the nontidal tributaries within Maryland that drain to the pool. Thus, the use of the term "nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed" throughout this report will refer to solely the nontidal tributaries within Maryland draining to the Conowingo Pool. The Maryland Department of the Environment (MDE) has identified the waters of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed on the State's 2010 Integrated Report as impaired by nutrients – phosphorus (1996) and sediments (1996) (MDE 2010a). These impairments are only applicable to the nontidal MD 8-digit watershed. The Conowingo Pool is assessed separately, and therefore the impoundment is not included as part of the analysis presented herein. The designated use of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is Use I-P (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply) (COMAR 2010a,b).

The WQA presented herein by MDE will address the 1996 sediments listing, for which a data solicitation was conducted, and all readily available data from the past five years have been considered. A WQA for eutrophication to address the nutrients/phosphorus listing is scheduled to be submitted to the EPA in 2011.

The remainder of this report lays out the general setting of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed and presents a discussion of the water quality characteristics in the basin, relative to the established assessment methodology used to interpret the narrative standard for sediment impacts to aquatic life. The 2010 Integrated Report did not make a

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determination regarding impairment to aquatic life within the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed due to a limited amount of biological monitoring data (i.e., the watershed was placed on Category 3 of the Integrated Report - “insufficient data to determine if a waterbody is meeting standards for a particular stressor”). The watershed has been reassessed in 2011, however, using the biological listing methodology and new biological monitoring data collected by the Susquehanna River Basin Commission (SRBC). This reassessment is the primary analysis presented within the remainder of this report.

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2.0 GENERAL SETTING

Location

The Conowingo Dam/Susquehanna River watershed is located in the Lower Susquehanna River sub-basin of the Chesapeake Bay watershed. The Susquehanna River is a free flowing river, at least for the majority of its length (the river becomes tidally influenced a few miles downstream of the Conowingo Dam), that originates in Cooperstown, New York and flows 444 miles in a southern direction until it empties into the Chesapeake Bay in Havre de Grace, Maryland. The River drains approximately 27,504 square miles. The watershed draining to the mainstem Susquehanna River between the Pennsylvania-Maryland border and the Conowingo Dam is referred to as the Conowingo Dam/Susquehanna River watershed, and it covers approximately 125 square miles, of which only 18 square miles are located in Maryland.

The Conowingo Dam/Susquehanna River watershed encompasses areas within both Maryland and Pennsylvania. The Maryland portion of the watershed is specifically referred to as the MD 8-Digit Conowingo Dam/Susquehanna River watershed. The MD 8-Digit Conowingo Dam/Susquehanna River watershed consists of 1) the mainstem of the Conowingo Dam/Susquehanna River, which is fully occupied by the Conowingo Pool (the impoundment created behind the Conowingo Dam) for the entire length of the mainstem within Maryland, and 2) the nontidal tributaries within Maryland that drain to the pool. The assessment unit identified on Maryland's 2010 Integrated Report and therefore addressed by this WQA consists solely of the nontidal tributaries within Maryland draining to the Conowingo Pool, otherwise referred to as the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed.

The MD 8-Digit watershed is located within Harford and Cecil Counties, Maryland (see Figure 1). The two largest tributaries in the watershed are Peddler Run in Harford County and Conowingo Creek in Cecil County. There are no "high quality," or Tier II, stream segments (Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) aquatic life assessment scores > four (scale one to five)) located within the watershed requiring the implementation of Maryland's anti-degradation policy (COMAR 2010c; MDE 2010b). Approximately 19.9% of the watershed area is covered by water, primarily the mainstem Susquehanna River/Conowingo Pool, but this also includes other streams, ponds, smaller waterbodies, etc. The total population in the MD 8-digit Conowingo Dam/Susquehanna River watershed is approximately 9,670 (US Census Bureau 2000).

Geology/Soils

The MD 8-Digit Conowingo Dam/Susquehanna River watershed lies within the upland section of the Piedmont Plateau physiographic province of Maryland. The topography of this upland section varies widely. The terrain ranges from being gently rolling, with low relief, to being very hilly. Valleys can be broad-bottomed, but major streams are generally incised into narrow valleys with steep side-slopes, and they often have extensive cliffs. The surficial geology consists of metamorphic rocks such as schist, gneiss, gabbro, and also includes some igneous rocks likely of volcanic origin (MGS 2010; Reger and Cleaves 2008a,b).

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The soils in the MD 8-Digit Conowingo Dam/Susquehanna River watershed primarily belong to the Neshaminy-Lehigh-Glenelg soil series (65%), which are poorly to moderately well drained. Smaller portions of the watershed, however, consist of soils from the Chrome-Conowingo-Neshaminy soil series (15%), the Chester-Glenelg-Manor series (7%), and the Manor-Glenelg-Chester series (15%). The Chrome-Conowingo-Neshaminy and Chester-Glenelg-Manor soils are relatively well drained, whereas the Manor-Glenelg-Chester soils are poorly drained. All of these associations consist of loamy and moderately deep to deep soils (USDA 2006).

Soil type for the MD 8-Digit Conowingo Dam/Susquehanna River watershed is also categorized by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) into four hydrologic soil groups: Group A soils have high infiltration rates and are typically deep well drained/excessively drained sands or gravels; Group B soils have moderate infiltration rates and consist of moderately deep-to-deep and moderately well-to-well drained soils, with moderately fine/coarse textures; Group C soils have slow infiltration rates with a layer that impedes downward water movement, and they primarily have moderately fine-to-fine textures; Group D soils have very slow infiltration rates consisting of clay soils with a permanently high water table that are often shallow over nearly impervious material. The MD 8-Digit Conowingo Dam/Susquehanna River watershed is comprised primarily of Group C soils (80%), with smaller amounts of Group D (13%) and Group B soils (7%) (USDA 2006).

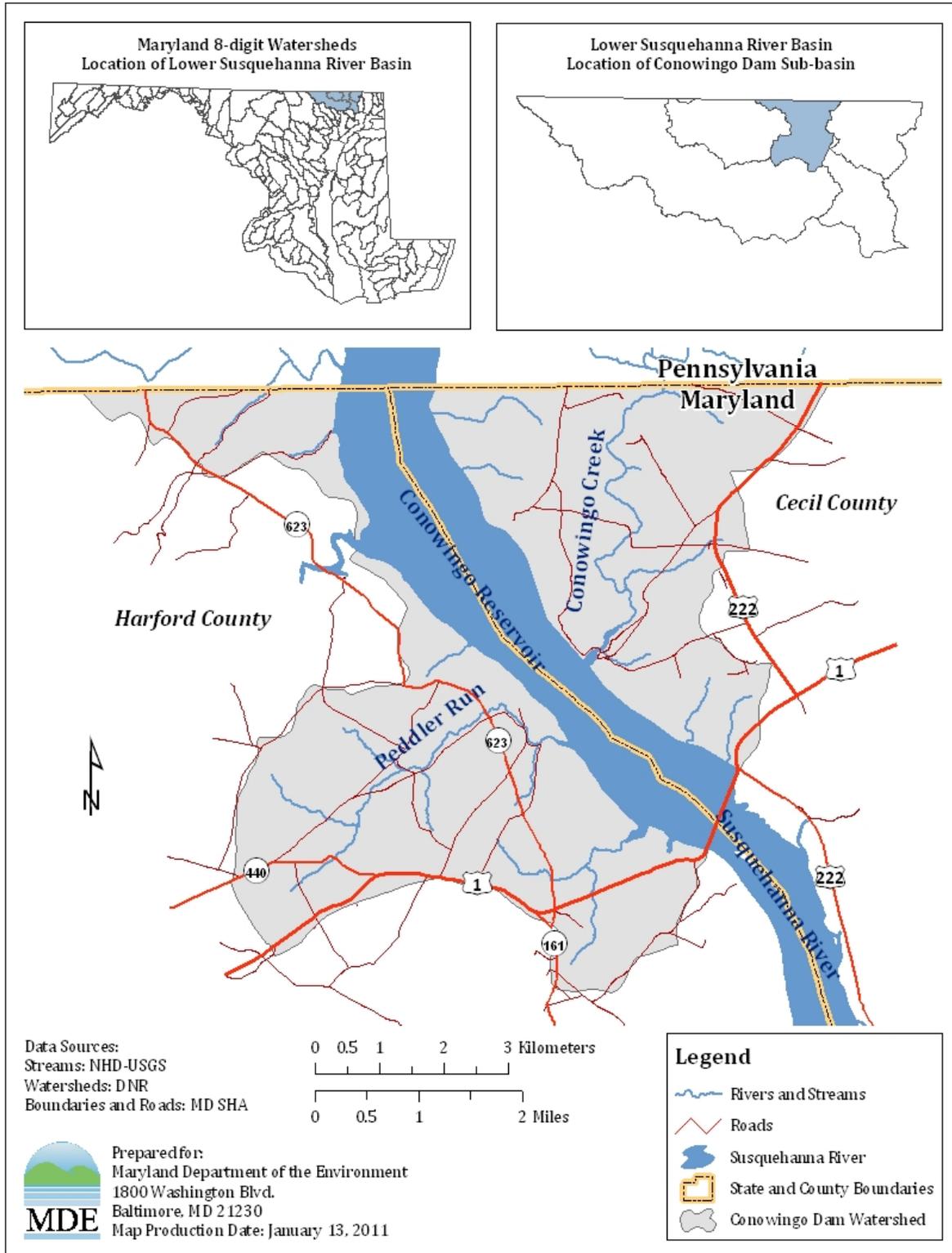


Figure 1: Location Map of the MD 8-Digit Conowingo Dam/Susquehanna River Watershed in Harford and Cecil Counties, Maryland

Land Use

The MD 8-Digit Conowingo Dam/Susquehanna River watershed land use distribution consists primarily of forest (66.3%). There are also smaller amounts of pasture (3.7%), crop land (17.6%), and urban land (12.4%), as per the Chesapeake Bay Program Phase 5.2 (CBP P5.2) watershed model (US EPA 2008). A detailed summary of the watershed land use areas is presented in Table 1, and a land use map is provided in Figure 2.

Table 1: Land Use Percentage Distribution for the MD 8-Digit Conowingo Dam/Susquehanna River Watershed

General Land Use	Detailed Land Use	Area (Acres)	Percent	Grouped Percent of Total
Crop	Animal Feeding Operations	4.5	0.0	17.6
	Hay	473.7	4.1	
	High Till	666.5	5.7	
	Low Till	909.5	7.8	
	Nursery	0.3	0.0	
Extractive	Extractive	0.0	0.0	0.0
Forest	Forest	7662.9	65.6	66.3
	Harvested Forest	77.4	0.7	
Pasture	Pasture	437.6	3.7	3.7
	Trampled Pasture	0.0	0.0	
Urban	Urban: Barren	3.9	0.0	12.4
	Urban: Impervious	110.1	0.9	
	Urban: Pervious	1332.8	11.4	
Total		11,679.3	100.0	100.0

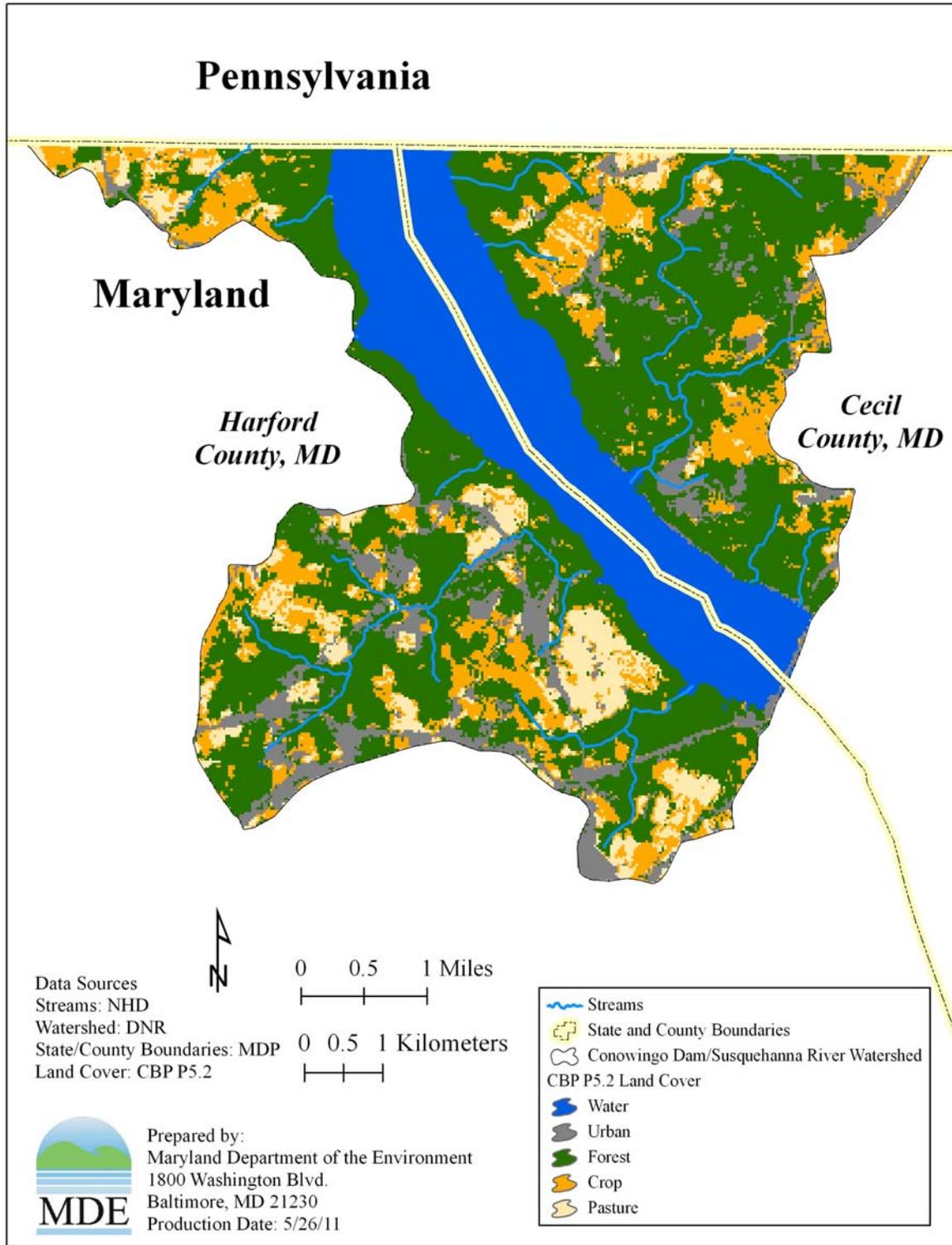


Figure 2: Land Use Map of the MD 8-Digit Conowingo Dam/Susquehanna River Watershed

3.0 WATER QUALITY CHARACTERIZATION

The Maryland water quality standards surface water use designation for the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is Use I-P (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply) (COMAR 2010a,b). 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, 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 nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed was originally identified on Maryland's 1996 303(d) List as impaired by elevated sediments from nonpoint sources, with supporting evidence cited in Maryland's 1996 305(b) report. The 1996 305(b) report did not directly state that elevated sediments were a concern, and it has been determined that the sediment listing was based on best professional judgment (MDE 2004; DNR 1996).

The 2010 Integrated Report did not make a determination regarding impairment to aquatic life within the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed due to a limited amount of biological monitoring data (i.e., the watershed was placed on Category 3 of the Integrated Report). The watershed has been reassessed in 2011, however, using the biological listing methodology and new biological monitoring data collected by SRBC. The results of this reassessment will be published in the 2011 inter-annual update to the Integrated Report and are summarized in regards to how they relate to sediments in Section 3.2 of this report.

MDE's biological assessment of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed in the 2010 Integrated Report was based on the combined results of Maryland Department of Natural Resources' (DNR) Maryland Biological Stream Survey (MBSS) round one (1995-1997) and round two (2000-2004) data, which only includes 5 stations. Due to this limited dataset, a statistically reliable assessment of whether or not the BIBI and/or FIBI scores for the watershed are significantly lower than three (on a scale of 1.0 to 5.0), and therefore different from MBSS reference sites, could not be made (MDE 2010a). Biological monitoring data collected by SRBC in 2008 under contract with MDE, which follows MBSS sampling protocols, is now used in conjunction with the MBSS data to determine if the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is supporting aquatic life.

3.1 MD 8-Digit Conowingo Dam/Susquehanna River Watershed Monitoring Stations

A total of 15 water quality monitoring stations were used to characterize the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed in Maryland's 2011 inter-annual update to the Integrated Report. Five stations were biological/physical habitat monitoring stations from the MBSS program round one and two data collection. Ten stations were biological/physical habitat monitoring stations from SRBC's data collection efforts in 2008. All stations are presented in Figure 3 and listed in Table 2.

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The MBSS is a robust statewide probability-based sampling survey for assessing the biological conditions of 1st through 4th order, non-tidal streams (Klauda et al. 1998; Roth et al. 2005). It uses a fixed length (75 meter (m)) randomly selected stream segment for collecting site level information within a primary sampling unit (PSU), also defined as a watershed. The randomly selected stream segments, from which field data are collected, are selected using either stratified random sampling with proportional allocation, or simple random sampling (Cochran 1977). The random sample design allows for unbiased estimates of overall watershed conditions. Thus, the dataset facilitated case-control analyses because: 1) in-stream biological data are paired with chemical, physical, and land use data variables that could be identified as possible stressors; and 2) it uses a probabilistic statewide monitoring design.

MDE contracted with SRBC in 2006 for work in the Lower Susquehanna River Basin. One task on the scope of work was to propose sampling sites, develop biological sampling protocols, and determine appropriate water chemistry and habitat parameters for macroinvertebrate sampling in the basin. Within the contract negotiations, it was decided that MBSS protocols would be used for the SRBC monitoring, so that they could be used in MDE's biological assessment. Sample locations were determined per agreement with MDE and SRBC. Due to time limitations, however, only benthic samples were collected.

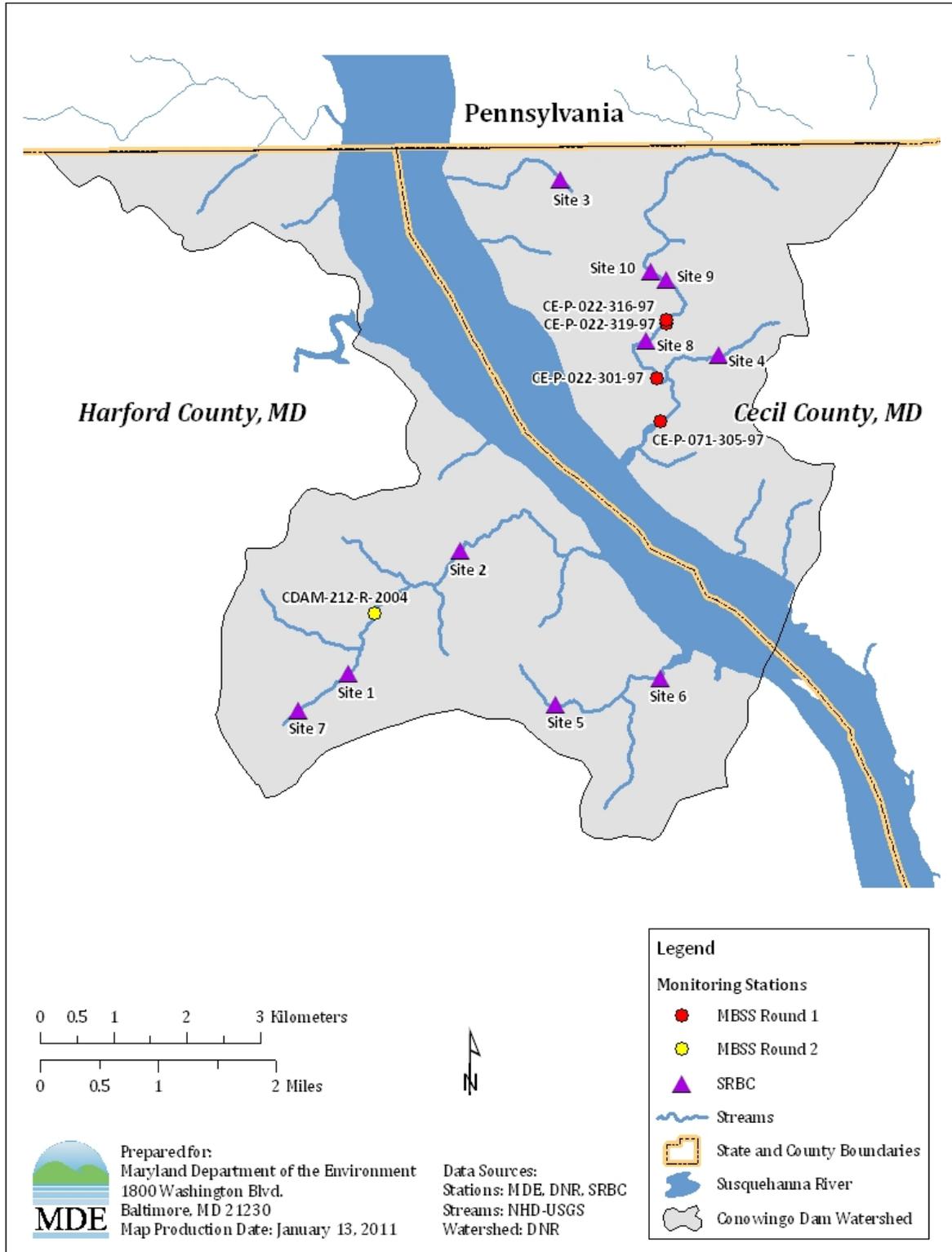


Figure 3: Monitoring Stations in the Nontidal MD 8-Digit Conowingo Dam/Susquehanna River Watershed

Table 2: Monitoring Stations in Nontidal MD 8-Digit Conowingo Dam/Susquehanna River Watershed

Site Number	Sponsor	Location	Latitude (decimal degrees)	Longitude (decimal degrees)
CDAM-212-R-2004	MBSS Round 2	Peddler Run	39.664940	-76.236610
CE-P-022-301-97	MBSS Round 1	Conowingo Creek	39.693000	-76.192000
CE-P-022-316-97	MBSS Round 1	Conowingo Creek	39.705000	-76.193000
CE-P-022-319-97	MBSS Round 1	Conowingo Creek	39.705000	-76.192000
CE-P-071-305-97	MBSS Round 1	Conowingo Creek	39.687000	-76.193000
Site 1	SRBC	Peddler Run	39.657281	-76.240699
Site 2	SRBC	Peddler Run	39.671750	-76.222806
Site 7	SRBC	Peddler Run	39.652778	-76.248806
Site 3	SRBC	UT2 ¹ to Susquehanna River	39.717380	-76.206550
Site 4	SRBC	UT to Conowingo Creek	39.695778	-76.181667
Site 5	SRBC	UT1 to Susquehanna River	39.653220	-76.208013
Site 6	SRBC	UT1 to Susquehanna River	39.656361	-76.191444
Site 8	SRBC	Conowingo Creek	39.697570	-76.193160
Site 9	SRBC	Conowingo Creek	39.704920	-76.189980
Site 10	SRBC	Conowingo Creek	39.706040	-76.192380

Note: ¹UT = Unnamed Tributary

²N/A = Not Applicable

3.2 Biological Assessment

Since the 2010 Integrated Report did not make a determination regarding impairment to aquatic life within the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed due to a limited amount of biological monitoring data (i.e., the watershed was placed on Category 3 of the Integrated Report), the watershed has been reassessed in 2011 using the biological listing methodology and new biological monitoring data collected by SRBC. Maryland's biological listing methodology makes assessments at the 8-digit watershed scale only. This is consistent with both the probabilistic design of the MBSS, which forms the basis of the listing methodology, and the scale of listings for other pollutant impairments. The methodology takes into account both spatial and temporal uncertainty, and it also provides an estimate of biologically impaired stream miles, which is a reporting requirement of the Clean Water Act (US EPA 2005).

The primary metrics used in the biological listing methodology consist of two indices of biological integrity (IBI), one for fish (FIBI scores) and one for benthic macroinvertebrates (BIBI scores), which are both derived from MBSS biological monitoring data (Roth et al. 2000; Stribling et al. 1998). For each sampling site, IBIs are calculated from individual component metrics, whose scores are determined based on a comparison of site conditions to those at reference/non-degraded sites (i.e., sites with minimal human impacts). For a complete list of metrics and criteria for reference sites see Southerland et al. (2005). To calculate the individual component metrics of the IBI, a site receives a score of 1.0 if its metric score is less than the 10th percentile of reference site scores; a 3.0 if its score is between the 10th and 50th percentile of

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reference site scores; and a 5.0 if its score is greater than the 50th percentile of reference site scores. The overall site IBI is then calculated as the average of the individual metric scores.

An overall IBI greater than or equal to 3.0 generally means that the biological community at a site is comparable to reference sites. Given the variability of IBI scores over time, however, even reference sites can have poor IBI scores (Southerland et al. 2005). Year-to-year variability in IBI scores is taken into account by calculating a minimum allowable limit (MAL), based on a comparison of reference site scores with the variation in scores observed at MBSS sentinel sites, which are sampled annually. The 2010 Integrated Report identifies the MAL for the FIBI as 2.5 and the MAL for the BIBI as 2.65. Any site with an IBI score below these thresholds is considered impaired.

A MD 8-digit watershed is considered to be supportive of aquatic life if less than 10% of its stream miles are impaired (i.e., less than 10% of MBSS sampling sites are impaired). If there are a sufficient number of sampling sites within an 8-digit watershed, a confidence interval is constructed around the calculation of the percent of stream miles degraded using the IBI scores for the watershed sampling sites. If the lower bound of the confidence interval is greater than 10%, aquatic life within the watershed is considered to be impaired, and the watershed is placed in Category 5 of the Integrated Report (“waterbody is impaired, does not attain the water quality standard, and a TMDL is required”). If the lower bound of the confidence interval is less than or equal to 10%, and the precision of the estimate is less than 25%, the watershed is considered to be supportive of aquatic life, and it is placed on Category 2 of the Integrated Report (“waterbody is meeting some water quality standards, but with insufficient data to assess all impairments”). If there is an insufficient number of samples, or if the lower bound of the confidence interval is less than or equal to 10% but the precision is greater than 25%, the watershed assessment is considered to be inconclusive, and the watershed is placed in Category 3 of the Integrated Report.

The MBSS program collected biological/physical habitat monitoring data at four sites in the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed during round one of the program’s data collection efforts and at one site during round two of the program’s data collection efforts. The BIBI and FIBI scores for these five sites are shown in Table 3; however, based on the biological listing methodology, five sampling sites is not considered to be a sufficient amount of data to determine whether the watershed is supporting aquatic life.

Table 3: IBI Scores for MBSS Stations in the Nontidal MD 8-Digit Conowingo Dam/Susquehanna River Watershed

Site Number	BIBI	FIBI
CE-P-022-301-1997	2.67	4.00
CE-P-022-316-1997	2.00	4.33
CE-P-022-319-1997	3.00	4.00
CE-P-071-305-1997	3.33	4.00
CDAM-212-R-2004	4.00	3.33

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The biological listing methodology allows for the incorporation of biological data collected outside of the MBSS program as long as it was collected and analyzed using comparable sampling protocols, such that it can be integrated with MBSS data. In 2008, SRBC conducted benthic macroinvertebrate sampling at ten sites in the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed. The study was funded by MDE and meets the biological listing methodology criteria. The sampling results are shown in Table 4. Eight of the ten sites had passing BIBI scores.

With the incorporation of the SRBC monitoring data, the total number of sampling sites in the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is 15. Only three of the sites had BIBI scores less than the 2010 Integrated Report MAL for the BIBI (2.65), and none of the sites had a FIBI score less than the MAL for the FIBI (2.5). According to the biological listing methodology, if there are a total of 15 sampling sites within a MD 8-Digit watershed, and there are no more than three sites with BIBI or FIBI scores significantly less than the MAL, the watershed is considered to be similar to the population of reference sites and therefore supportive of aquatic life. Therefore, the aquatic life designated use is fully supported in the nontidal 1st through 4th order streams in the MD 8-Digit Conowingo Dam/Susquehanna River watershed, indicating that the watershed should be placed on the Category 2 of the Integrated Report. Since the watershed is now identified as supporting aquatic life, there are no stressors impairing biological communities, including sediment. Therefore, the Integrated Report listing that previously identified sediments as impairing aquatic life in the nontidal MD 8-Digit watershed is no longer applicable, and a TMDL for sediments is not required..

Table 4: BIBI Scores for SRBC Stations in the Nontidal MD 8-Digit Conowingo Dam/Susquehanna River Watershed

Site Number	BIBI
Site 1	4.00
Site 2	4.33
Site 7	2.33
Site 3	4.67
Site 4	4.00
Site 5	4.00
Site 6	3.67
Site 8	3.67
Site 9	1.00
Site 10	3.67

4.0 CONCLUSION

Based on the analysis presented in this report, it is concluded that the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed is not impaired by sediment. Reassessment of the watershed via the incorporation of new biological monitoring data collected by SRBC into the biological listing methodology, as published in the 2011 inter-annual update to the Integrated Report, indicates that aquatic life is not impaired. Since the watershed is now identified as supporting aquatic life, there are no stressors impairing biological communities, including sediment. Therefore, the Integrated Report listing that previously identified sediments as impairing aquatic life in the nontidal MD 8-Digit watershed is no longer applicable, and a TMDL for sediments is not required.

Barring the receipt of contradictory data, this report will be used to support a revision of the 2010 Integrated Report sediment listing for the nontidal MD 8-Digit Conowingo Dam/Susquehanna 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 sediment-related] water quality standards, but with insufficient data to assess all impairments”), when MDE proposes the revision of Maryland’s Integrated Report in 2012.

Although the waters of the nontidal MD 8-Digit Conowingo Dam/Susquehanna River watershed do not display signs of a sediment impairment, the State reserves the right to require future controls in the watershed if evidence suggests that sediments from the basin are contributing to downstream water quality problems. For instance, reductions will be required to meet allocations assigned to the Northern Chesapeake Bay Tidal Fresh Bay Water Quality Segment, as specified by the Chesapeake Bay Nutrient and Sediment TMDLs, established by EPA on December 29, 2010.

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