UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Mr. Scott Mandirola, Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, West Virginia 25304-2345

DEC 7 2010

Dear Mr. Mandirola:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve the West Virginia Department of Environmental Protection (WVDEP) report *Total Maximum Daily Loads for Selected Streams in the Cheat River Watershed, West Virginia.* The draft TMDLs were subject to a public comment period from July 26, 2010 to August 23, 2010. The final TMDLs were submitted to EPA on October 12, 2010. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in West Virginia's Section 303(d) List.

In accordance with Federal regulations at 40 CFR §130.7, a TMDL must comply with the following requirements: (1) be designed to attain and maintain applicable water quality standards; (2) include a total allowable loading, and as appropriate, wasteload allocations for point sources and load allocations for nonpoint sources; (3) consider the impacts of background pollutant contributions; (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); (5) consider seasonal variations; (6) include a margin of safety (which accounts for any uncertainties in the relationship between pollutant loads and instream water quality); and (7) be subject to public participation. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. Based on the information provided by WVDEP, the TMDLs for selected streams in the Cheat River watershed satisfy each of these requirements. A copy of EPA's Decision Rationale is enclosed.

As you are aware, based on the EPA recently approved WV revised water quality standards, WV 2008 Integrated Report, and the considerations of implementable wasteload allocations, this revision of TMDLs for the selected streams in the Cheat River Watershed shall supersede those impairments for which TMDLs developed in 2001 are no longer effective.

As you know, any new or revised National Pollutant Discharge Elimination System permits must be consistent with the assumptions and requirements of applicable TMDL wasteload allocations pursuant to 40 CFR §122.44(d)(1)(vii)(B). Please submit all such permits to EPA for review pursuant to our letters dated October 1, 1998 and July 7, 2009.

If you have any questions regarding these TMDLs, please contact Mr. Kuo-Liang Lai at 215-814-5473, or Mrs. Helene Drago at 215-814-5796.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

cc: Mr. Patrick Campbell, WVDEP
Mr. David Montali, WVDEP
Mr. Larry Merrill, EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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1650 Arch Street
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Decision Rationale
Total Maximum Daily Loads for
Selected Streams in the Cheat River Watershed
West Virginia

Jon M. Capacasa, Director
Water Protection Division

Date: 12.7.10

Decision Rationale
Total Maximum Daily Loads
For Selected Streams in the Cheat River Watershed
West Virginia

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be developed for those waterbodies identified as impaired by a State where technology based and other controls did not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a Margin of Safety (MOS), which may be discharged to a water quality limited waterbody.

This document will set forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for manganese, iron, fecal coliform bacteria and/or biological impairments on selected waterbodies in the Cheat River watershed. The TMDLs were developed to address impairment of water quality as identified in West Virginia's current Section 303(d) List of impaired waters. EPA's rationale is based on the determination that the TMDLs meet the following seven regulatory conditions pursuant to 40 CFR §130.

1. The TMDL is designed to implement applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. The TMDL has been subject to public participation.

In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to Nonpoint Sources (NPSs) can be reasonably met.

From this point forward, all references in this approval rationale are found in West Virginia's TMDL Report *Total Maximum Daily Loads for Selected Streams in the Cheat River Watershed, West Virginia* (TMDL Report dated October 2010), unless otherwise noted.

II. Summary

Table 1 of the TMDL Report presents the waterbodies and impairments for which TMDLs have been developed for the Cheat River watershed by the West Virginia Department of Environmental Protection (WVDEP). The 99 impaired streams were mostly identified on West Virginia's current Section 303(d) List and located in the north central portion of West Virginia. TMDLs were developed for total iron, total manganese, dissolved aluminum, pH, and fecal coliform bacteria and/or biological impairments.

Table 1: Waterbodies and Impairments for TMDLs Developed for the Cheat River Watershed

Subwatershed	Stream Name	WVCODE	NHD Code	Trout	pH	Fe	Al	Mn	FC	BIO
Cheat	Cheat River	WVMC	WV-MC			x				
Cheat	UNT/Cheat River RM 7.70	WVMC-2.3	WV-MC-10		x	x	x			
Cheat	UNT/Cheat River RM 8.39	WVMC-2.4	WV-MC-11		x	x	x			
Blackwater River	Blackwater River	WVMC-60-D	WV-MC-124-K	Yes		x	x			
Blackwater River	Tub Run	WVMC-60-D-2	WV-MC-124-K-11		x		x			
Blackwater River	Finley Run	WVMC-60-D-2.7	WV-MC-124-K-14		x	x	x			
Blackwater River	North Fork/Blackwater River	WVMC-60-D-3	WV-MC-124-K-15		x	x	x			
Blackwater River	Long Run	WVMC-60-D-3-A	WV-MC-124-K-15-C		x	x	x			x
Blackwater River	Middle Run	WVMC-60-D-3-B	WV-MC-124-K-15-D		x					
Blackwater River	Snyder Run	WVMC-60-D-3-C	WV-MC-124-K-15-E		x					
Blackwater River	Sand Run	WVMC-60-D-3-E	WV-MC-124-K-15-H	Yes		x	x		x	x
Blackwater River	Beaver Creek	WVMC-60-D-5	WV-MC-124-K-23		x					
Blackwater River	Hawkins Run	WVMC-60-D-5-C	WV-MC-124-K-23-C		x		x			
Blackwater River	UNT/Beaver Creek RM 8.81	WVMC-60-D-5-E	WV-MC-124-K-23-H		x					
Blackwater River	UNT/Beaver Creek RM 11.36	WVMC-60-D-5-G	WV-MC-124-K-23-J	Yes	x	x	x			
Blackwater River	UNT/Beaver Creek RM 11.91	WVMC-60-D-5-H	WV-MC-124-K-23-K		x					
Blackwater River	Big Run	WVMC-60-D-1	WV-MC-124-K-8		x					
Coles Run	Coles Run	WVMC-2.5	WV-MC-13						x	x
Coles Run	Kelly Run	WVMC-2.7	WV-MC-13-A			x			x	x
Coles Run	Birch Hollow	WVMC-2.5-A	WV-MC-13-D						x	
Crammeys Run	Crammeys Run	WVMC-3	WV-MC-14						x	
Whites Run	Whites Run	WVMC-4	WV-MC-15						x	x
Maple Run	Maple Run	WVMC-5	WV-MC-16		x		x			
Cheat	UNT/Cheat River RM 1.85	WVMC-0.1	WV-MC-2		x	x	x			
Bull Run	Bull Run	WVMC-11	WV-MC-25		x	x	x			x
Bull Run	UNT/Bull Run RM 1.64	WVMC-11-0.1A	WV-MC-25-A		x		x			
Bull Run	Middle Run	WVMC-11-A	WV-MC-25-B		x	x	x			
Bull Run	Mountain Run	WVMC-11-B	WV-MC-25-C		x		x			
Bull Run	Lick Run	WVMC-11-B-1	WV-MC-25-C-1		x	x	x			

Subwatershed	Stream Name	WVCODE	NHD Code	Trout	pH	Fe	Al	Mn	FC	BIO
Bull Run	UNT/Bull Run RM 3.73	WVMC-11-C	WV-MC-25-D		x	x	x			
Bull Run	Right Fork Bull Run	WVMC-11-E	WV-MC-25-E		x		x			x
Bull Run	Left Fork Bull Run	WVMC-11-D	WV-MC-25-F		x					
Big Sandy	Big Sandy Creek	WVMC-12	WV-MC-27		x	x	x		x	x
Big Sandy	UNT/Big Sandy Creek RM 2.91	WVMC-12-0.2A	WV-MC-27-B		x	x	x			
Big Sandy	Sovern Run	WVMC-12-0.5A	WV-MC-27-F		x		x		x	x
Big Sandy	Parker Run	WVMC-12-0.7A	WV-MC-27-H			x			x	
Big Sandy	Little Laurel Run	WVMC-12-A-1	WV-MC-27-I-4	Yes	x		x			
Big Sandy	Little Sandy Creek	WVMC-12-B	WV-MC-27-J	Yes		x			x	
Big Sandy	Elk Run	WVMC-12-B-4	WV-MC-27-J-10		x					
Big Sandy	Piney Run	WVMC-12-B-4.5	WV-MC-27-J-11	Yes	x	x			x	
Big Sandy	Cherry Run	WVMC-12-B-5	WV-MC-27-J-12	Yes		x	x		x	
Big Sandy	UNT/Cherry Run RM 1.96	WVMC-12-B-5-C	WV-MC-27-J-12-D		x	x				
Big Sandy	Mill Run	WVMC-12-B-6	WV-MC-27-J-13	Yes		x	x			
Big Sandy	Webster Run	WVMC-12-B-0.5	WV-MC-27-J-2						x	
Big Sandy	UNT/Webster Run RM 1.25	WVMC-12-B-0.5-B	WV-MC-27-J-2-B		x		x			x
Big Sandy	UNT/Little Sandy Creek RM 2.80	WVMC-12-B-0.6	WV-MC-27-J-3						x	
Big Sandy	UNT/Little Sandy Creek RM 5.04	WVMC-12-B-0.8	WV-MC-27-J-5						x	
Big Sandy	Beaver Creek	WVMC-12-B-1	WV-MC-27-J-6	Yes	x	x	x			
Big Sandy	Glade Run	WVMC-12-B-1-A	WV-MC-27-J-6-B						x	
Big Sandy	UNT/Beaver Creek RM 1.25	WVMC-12-B-1-B	WV-MC-27-J-6-C		x					
Big Sandy	UNT/Beaver Creek RM 1.68	WVMC-12-B-1-C	WV-MC-27-J-6-D		x		x			
Big Sandy	Barnes Run	WVMC-12-B-2	WV-MC-27-J-7						x	
Big Sandy	Hog Run	WVMC-12-B-3	WV-MC-27-J-9	Yes		x				
Big Sandy	Hazel Run	WVMC-12-C	WV-MC-27-K	Yes	x	x	x		x	x
Big Sandy	Glade Run	WVMC-12-D	WV-MC-27-M			x			x	
Big Sandy	UNT/Big Sandy Creek RM 10.23	WVMC-12-D.4	WV-MC-27-N						x	
Big Sandy	Glade Run	WVMC-12-E	WV-MC-27-T			x			x	
Conner Run	Conner Run	WVMC-13.5	WV-MC-30		x	x	x			
Greens Run	Greens Run	WVMC-16	WV-MC-38		x	x	x			x
Greens Run	South Fork/Greens Run	WVMC-16-A	WV-MC-38-C		x	x	x			x
Greens Run	UNT/South Fork RM 0.63/Greens Run	WVMC-16-A-1	WV-MC-38-C-1		x	x	x			x
Muddy Creek	Muddy Creek	WVMC-17	WV-MC-39	Yes	x	x	x		x	x
Muddy Creek	Sypolt Run	WVMC-17-0.5A	WV-MC-39-B		x	x				

Subwatershed	Stream Name	WVCODE	NHD Code	Trout	pH	Fe	Al	Mn	FC	BIO
Muddy Creek	Crab Orchard Run	WVMC-17-0.7A	WV-MC-39-D			x				
Muddy Creek	Martin Creek	WVMC-17-A	WV-MC-39-E		x	x	x			x
Muddy Creek	Fickey Run	WVMC-17-A-0.5	WV-MC-39-E-1		x	x	x		x	x
Muddy Creek	Glade Run	WVMC-17-A-1	WV-MC-39-E-2		x	x	x			x
Muddy Creek	UNT/Glade Run RM 1.06	WVMC-17-A-1-A	WV-MC-39-E-2-A		x	x	x			
Muddy Creek	UNT/Glade Run RM 1.36	WVMC-17-A-1-B	WV-MC-39-E-2-B		x	x	x			
Muddy Creek	UNT/Muddy Creek RM 9.80	WVMC-17-A.8	WV-MC-39-I			x			x	
Muddy Creek	UNT/UNT RM 0.12/Muddy Creek RM 9.80	WVMC-17-A.8-1	WV-MC-39-I-1		x		x			
Muddy Creek	Jump Rock Run	WVMC-17-B	WV-MC-39-J	Yes	x	x	x			
Muddy Creek	Sugarcamp Run	WVMC-17-C	WV-MC-39-L	Yes	x		x			
Roaring Creek	Roaring Creek	WVMC-18	WV-MC-40	Yes			x			
Roaring Creek	UNT/Roaring Creek RM 0.34	WVMC-18-0.1A	WV-MC-40-A						x	
Roaring Creek	Lick Run	WVMC-18-A	WV-MC-40-C		x					
Roaring Creek	Little Lick Run	WVMC-18-A-1	WV-MC-40-C-1						x	
Elsey Run	UNT/Ragtavern Run RM 0.81	WVMC-20-A-1	WV-MC-44-A-1						x	
Buffalo Run	Buffalo Run	WVMC-22	WV-MC-47		x		x			
Cheat	UNT/Cheat River RM 4.07	WVMC-0.5	WV-MC-5		x	x	x			
Morgan Run	Morgan Run	WVMC-23	WV-MC-50		x	x	x			x
Morgan Run	UNT/Morgan Run RM 1.03	WVMC-23-0.2A	WV-MC-50-A			x			x	x
Morgan Run	UNT/UNT RM 0.34/Morgan Run RM 1.03	WVMC-23-0.2A-1	WV-MC-50-A-1						x	
Morgan Run	Church Creek	WVMC-23-A	WV-MC-50-B		x	x	x			x
Morgan Run	UNT/Church Creek RM 1.26	WVMC-23-A-1	WV-MC-50-B-1		x	x	x			
Morgan Run	UNT/UNT RM 0.12/Church Creek RM 1.26	WVMC-23-A-1-A	WV-MC-50-B-1-A		x	x	x			
Heather Run	Heather Run	WVMC-24	WV-MC-52		x	x	x	x		x
Heather Run	UNT/Heather Run RM 1.47	WVMC-24-A	WV-MC-52-A						x	
Lick Run	Lick Run	WVMC-25	WV-MC-54		x	x	x	x		x
Lick Run	UNT/Lick Run RM 1.04	WVMC-25-A	WV-MC-54-A		x	x	x	x		
Joes Run	Joes Run	WVMC-26	WV-MC-55		x		x	x		x
Pringle Run	Pringle Run	WVMC-27	WV-MC-56		x	x	x	x		x
Pringle Run	UNT/Pringle Run RM 3.17	WVMC-27-C	WV-MC-56-C		x	x	x			
Pringle Run	UNT/Pringle Run RM 3.33	WVMC-27-D	WV-MC-56-D		x	x	x			
Pringle Run	UNT/Pringle Run RM 3.60	WVMC-27-E	WV-MC-56-E		x	x	x			

Subwatershed	Stream Name	WVCODE	NHD Code	Trout	pH	Fe	Al	Mn	FC	BIO
Buckhorn Run	Buckhorn Run	WVMC-31	WV-MC-61		x					
Saltlick Creek	Spruce Run	WVMC-32-B	WV-MC-67-D	Yes		x				
Saltlick Creek	Bucklick Run	WVMC-32-E	WV-MC-67-J	Yes					x	
Buffalo Creek	Birchroot Run	WVMC-33-C	WV-MC-68-I						x	

Note:
UNT = unnamed tributary
MP = Mile Point
RM = river mile
Fe indicates iron impairment.
Al indicates aluminum impairment.
Mn indicates manganese impairment.
FC indicates fecal coliform bacteria impairment.
BIO indicates a biological impairment.

Due to the recently revised West Virginia water quality standards, Section 303(d) List, and the considerations of implementable wastewater LAs in the West Virginia Cheat River Watershed, these TMDLs were re-developed by West Virginia and approved by EPA to supersede those impairments and TMDLs developed in the selected streams in the Cheat River Watershed in 2001.

West Virginia iron and aluminum aquatic life protection numeric water quality criteria vary with respect to troutwaters and warmwater fisheries. There are 17 troutwaters in these TMDLs. Section 5.3.2 of the Technical Report discussed the reasons why the current WV troutwater iron criterion (0.5 mg/L) would be implemented in a phased approach. Table 2 presents the Iron LA and WLA, and MOS to meet the 0.5 mg/L troutwater iron criterion for the 17 troutwaters in the Cheat River watershed.

Table 2. Cheat River Watershed Iron TMDLs for Troutwaters (0.5 mg/L Troutwater Iron Criterion)

TMDL Watershed	Stream Code	Stream Name	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	Margin of Safety (lbs/day)	TMDL (lbs/day)
Big Sandy	WV-MC-27-I-4	Little Laurel Run	20.7	0.0	1.1	21.8
Big Sandy	WV-MC-27-J	Little Sandy Creek	184.9	4.7	10.0	199.6
Big Sandy	WV-MC-27-J-11	Piney Run	5.7	0.0	0.3	6.0
Big Sandy	WV-MC-27-J-12	Cherry Run	21.3	0.4	1.1	22.8
Big Sandy	WV-MC-27-J-13	Mill Run	16.6	0.4	0.9	17.9
Big Sandy	WV-MC-27-J-6	Beaver Creek	42.7	2.3	2.4	47.4
Big Sandy	WV-MC-27-J-9	Hog Run	14.3	0.3	0.8	15.4
Big Sandy	WV-MC-27-K	Hazel Run	21.4	0.0	1.1	22.5
Muddy Creek	WV-MC-39	Muddy Creek	125.7	6.1	6.9	138.8
Muddy Creek	WV-MC-39-J	Jump Rock Run	3.6	0.0	0.2	3.7
Muddy Creek	WV-MC-39-L	Sugarcamp Run	5.4	0.0	0.3	5.7
Roaring Creek	WV-MC-40	Roaring Creek	52.1	0.5	2.8	55.4
Saltlick Creek	WV-MC-67-D	Spruce Run	8.7	0.0	0.5	9.2

TMDL Watershed	Stream Code	Stream Name	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	Margin of Safety (lbs/day)	TMDL (lbs/day)
Saltlick Creek	WV-MC-67-J	Bucklick Run	6.6	0.0	0.3	6.9
Blackwater River	WV-MC-124-K	Blackwater River	475.8	16.6	25.9	518.3
Blackwater River	WV-MC-124-K-15-H	Sand Run	9.6	0.3	0.5	10.5
Blackwater River	WV-MC-124-K-23-J	UNT/Beaver Creek RM 11.36	2.7	0.0	0.1	2.9

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value explicitly or implicitly. Conditions, available data, and the understanding of the natural processes can change more than anticipated by the MOS. The option is always available to refine the TMDLs for resubmittal to EPA for approval.

A TMDL formula presents the sum of individual WLAs, plus the sum of LAs, plus a MOS. Allocation spreadsheets also provide applicable TMDLs, WLAs to individual point sources, and LAs to categories of NPSs. A Technical Report provides descriptions of the detailed technical approaches used throughout the TMDL development process. West Virginia developed an interactive ArcExplorer Geographic Information System (GIS) project that shows the spatial relationships between source assessment data for streams in the Cheat River watershed.

Biological integrity/impairment is based on a rating of the stream's benthic macroinvertebrate community using the multimetric West Virginia Stream Condition Index (WVSCI). Biological impairments were addressed by developing TMDLs for specific stressors. West Virginia utilized a stressor identification process to determine that metal/pH toxicity, organic enrichment, and/or sedimentation were the causative stressors for biologically impaired streams addressed in this TMDL assessment.

Table 4.1 of the TMDL report identifies the biologically impaired streams and their significant stressors. The significant biological stressors for these streams are identified as sedimentation, organic enrichment, metals toxicity, and pH toxicity.

Where the stressor identification process identified organic enrichment as the cause of biological impairment, data also indicated violations of the fecal coliform water quality criteria. The predominant sources of both organic enrichment and fecal coliform bacteria in the watershed are inadequately treated sewage and runoff from pasture land use. WVDEP determined that implementation of fecal coliform TMDLs would remove untreated sewage and reduce agricultural run-off thereby reducing the organic and nutrient loading causing the biological impairment in these streams. Therefore, fecal coliform TMDLs will serve as a surrogate where organic enrichment was identified as a stressor. Likewise, where metals were identified as the cause of biological impairment, data also indicated violations of metals water quality criteria, and the metals TMDLs will thus serve as a surrogate for the biological impairment.

To address the sedimentation biological stressor, WVDEP initially pursued the development of sediment TMDLs for these streams using a reference watershed approach. However, all of the sediment impaired streams are also impaired pursuant to total iron water quality criteria and TMDL assessment of iron included representation and allocation of iron loadings associated with sediment. In each stream, the sediment loading reduction necessary for the attainment of water quality criteria for iron exceeds that which was determined necessary using the reference watershed approach for sediment. Therefore, the iron TMDLs are acceptable surrogates for biological impairments from sedimentation. The implementation of iron TMDLs will address the biological impairment caused by sedimentation.

III. Background

In 2001, EPA (with WVDEP support) developed the metals and pH TMDLs for the Cheat River watershed (hereafter, the 2001 Cheat TMDLs). EPA was faced with the challenge of using an untested and proprietary model (developed by a third party) to develop TMDL allocations for 55 acid mine drainage impacted streams in the Cheat River watershed. Due to some uncertainties associated with the assumptions of the proprietary model, West Virginia found that the implementation of these TMDLs was inconsistent with WVDEP TMDL program policies and objectives. Moreover, the subsequent West Virginia aluminum and manganese water quality criterion revisions by WVDEP, and approved by EPA, resulted in the need to develop a revised Cheat River TMDL for approximately 100 impaired streams in the watershed. As discussed in the TMDL report, the West Virginia water quality criteria revision from total to dissolved aluminum, and the manganese water quality criterion, is applicable to five-mile zones upstream of known public or private water supply intakes used for human consumption. As a result of these changes, some of the 2001 Cheat TMDLs are no longer effective.

The subject Cheat River watershed is located in West Virginia, and lies mostly within Preston, Monongalia, Tucker, and Randolph Counties in West Virginia, with a portion in Fayette County in Pennsylvania (Figure 3-1 of the TMDL Report). In West Virginia and Pennsylvania, the watershed drainage area encompasses nearly 1,422 square miles. The total population living in the subject watersheds of this TMDL is estimated to be 40,000 people. The Cheat River Watershed is dominated by forest land use (~85%), water (0.9%), wetland (0.8%), with some abandoned mining land (0.3%), mining (~0.6%), barren (0.7%), grassland (~4.8%), pasture (~0.5%) and urban/residential (~4.9%) land uses.

West Virginia conducted extensive water quality monitoring, assessment and various watershed physiographic and regulatory/policy data (Table 3-2 of the TMDL Report) to identify and characterize sources of pollution and to establish water quality response to those sources in the Cheat River watershed. Table 1 presents the 99 impaired waters for which TMDLs are developed. In this TMDL, modeling at baseline conditions demonstrated additional pollutant impairments to those identified via monitoring. For Section 303(d) listing of impaired waterbodies, the prediction of impairment through modeling is validated by applicable Federal guidance.

Computational Procedures

Sections 5, 6, 7, and 8 of the TMDL Report discuss metals, pH, fecal coliform bacteria and sediment source assessment, while Section 4 describes biological impairments and stressor identification (SI) methods. Sources for metals and sediment in the Cheat River watershed include bond-forfeiture sites, AML, mining, non-mining, forestry, oil and gas, roads, agriculture, streambank erosion, and other land disturbance activities.

There is a separate permit from the Multi-Sector Stormwater Permit (WV0111457). The Multi-Sector Permit covers stormwater discharges from industrial facilities, post construction and it includes TSS and/or Iron benchmarks for most facilities. Aluminum is a pollutant of concern only for certain industrial sectors (e.g., salvage yards). Aluminum and manganese benchmarks are not included in any of the existing Multi-Sector General Permit registrations in the watersheds of aluminum or manganese impaired streams.

There are 35 un-reclaimed bond forfeiture sites located in the metals impaired TMDL watersheds. These sites are classified as point sources and provided WLAs in this TMDL due to the 2009 judicial decision (West Virginia Highlands Conservancy, Inc., and West Virginia Rivers Coalition, Inc. v. Randy Huffman, Secretary, West Virginia Department of Environmental Protection (1:07CV87)). The decision to assign WLAs to those sources does not reflect a determination by WVDEP or EPA as to whether they are, in fact, point source discharges. The decision has been appealed and, an alternative conclusion may result, thereby requiring minor TMDL revision to reclassify bond forfeiture sites as load allocations. However, EPA and WVDEP will pursue necessary pollutant reductions regardless of the WLA or LA classification of the bond forfeiture allocations.

The current West Virginia manganese water quality criterion is applicable to five-mile zones upstream of known public or private water supply intakes used for human consumption. WVDEP has delineated the five-mile distances in an upstream direction along waterbodies to determine the applicable zones, based on the known intake locations, to evaluate the compliance of stream monitoring results with the manganese criterion. As per the evaluation results, currently there are five manganese TMDLs that are applicable in Heather Run, Lick Run, UNT Lick Run RM 1.04, Joes Run, and Pringle Run pursuant to the criterion.

Fecal coliform bacteria sources are point sources, including individual sources covered under the NPDES program (wastewater treatment plants and general sewage permits), and unpermitted sources, including onsite treatment systems, agriculture (e.g., pasture/cropland), and natural background (wildlife). Allocations for Pennsylvania contributing lands are presented as gross loads by model subwatershed. Fecal coliform TMDLs were developed in 32 stream segments in the West Virginia portion of Cheat River watershed.

Failing septic systems and straight pipes are significant NPSs of fecal coliform bacteria. According to WVDEP, it is estimated that 3,600 homes are not served by centralized sewage collection and treatment systems. Estimated septic system failure rates across the watershed range from three (3) percent to 28 percent. To calculate loads, values for both failing septic wastewater flow and fecal coliform concentration are needed. To calculate wastewater flows, the TMDL watersheds were divided into four septic failure zones. The initial fecal coliform

concentration was determined at the TMDL watershed scale based on past experience of other WV TMDLs. This concentration was further refined during model calibration. LAs are presented on a subwatershed basis for both baseline and TMDL conditions. Section 7.2.1 of the TMDL report describes the computational procedures. Sections 7.2.2, 7.2.3, and 7.2.4 of the TMDL report describe the computation procedure for Urban/Residential Runoff, Agriculture, and Natural Background (Wildlife) NPSs that contribute to the fecal coliform loads. Generally the extent of source representation was based upon NLCD 2001 landuse data, precipitation and runoff, and source tracking information regarding number of livestock/wildlife, and overall runoff potential. On the basis of the low fecal accumulation rates for forested areas, the stormwater sampling results, and model simulations, wildlife is not considered to be a significant nonpoint source of fecal coliform in the watershed.

Sections 5.2.2 and 8.0 of the TMDL report describe the sediment sources. Runoff from residential and urbanized areas during precipitation events can be a significant sediment source. The stormwater permitting regulations of EPA require public entities to obtain NPDES permit coverage for stormwater discharges from industries in specified urbanized areas. As such, their stormwater discharges are considered as point sources and are prescribed WLAs. Baseline loadings were based upon precipitation and runoff and the assumption that proper installation and maintenance of required Best Management Practices (BMPs) will achieve a TSS benchmark value of 100 mg/L.

EPA determined that Bucklick Run is an appropriate sediment reference stream for the Cheat River watershed. Biological monitoring results of Bucklick Run demonstrated WVSCI scores of 94.6 at Mile Point (MP) 2.6 in 2007, and 93.4 at MP 1.5 in 2008. Though it is not biologically impaired, it is not pristine either. There are some disturbances in its watershed that necessitate the need for fecal coliform and iron TMDLs. Note that Bucklick Run is designated by WVDEP as a trout stream, so the total iron TMDL endpoint is 0.475 mg/L (i.e. 95% of 0.5 mg/L, the four-day average, once per three years exceedance numeric criterion), and the modeling results have demonstrated non-attainment, so a total iron TMDL is presented. Furthermore, the need for fecal coliform and iron TMDLs of this non-biologically impaired stream provides a reasonable assurance for using the iron and fecal-coliform surrogate approaches for biologically impairments caused by organic enrichment and sedimentation in the watershed.

For the purposes of this TMDL, discharges from activities that do not have an associated NPDES permit, such as failing septic systems and straight pipes, are considered NPSs. The decision to assign LAs to those sources does not reflect a determination by EPA or WVDEP as to whether they are, in fact, non-permitted point source discharges. Likewise, by establishing these TMDLs with failing septic systems and straight pipes treated as NPSs, EPA and WVDEP are not determining that such discharges are exempt from NPDES permitting requirements.

This TMDL also presents 66 pH TMDLs as net acidity (as mg/L $CaCO_3$) for acid mine drainage or Abandon Mine Lands (AMLs) remediation. The net acidity is calculated from the daily simulation of chemical concentrations from the Mining Data Analysis System (MDAS) module. The MDAS simulated mass concentrations of H^+, Al^{3+}, Fe^{3+}, Mn^{2+}, NH_4^+, CO_3^{2-}, SO_4^{2-}, and Ca^{2+} are first converted to molar concentration. Then the equilibrium distributions of different species of the chemical components are calculated using the thermodynamic constants

(Stumm and Morgan, 1996). Once all the equilibrium species concentrations are calculated, the net acidity in molar concentration can be calculated as the sum of acidic species minus basic species. Finally, the daily net acidity molar concentration is converted to mg/L $CaCO_3$. The daily load of net acidity in lbs/day is calculated by multiplying to its daily simulated flow rate (ft^3/s) and a unit conversion constant. The annual net acidity load is summarized from the daily net acidity calculation.

Section 9.0 describes the modeling processes employed during TMDL development with further details provided in the Technical Report. The MDAS was used to represent the source-response linkage in the Cheat River watershed TMDL study area for iron, aluminum, manganese, pH and fecal coliform. MDAS is a comprehensive data management and modeling system that is capable of representing loads from nonpoint and point sources in the watershed and simulating instream processes. MDAS is used to simulate watershed hydrology and pollution transport, as well as stream hydraulics and instream water quality. It is capable of simulating different flow regimes and pollutant loading variations. A customized Microsoft Excel spreadsheet tool was used to determine the fecal loading from failing septic systems identified during source tracking efforts by WVDEP. West Virginia's numeric and water quality criteria and an explicit MOS were used to identify the TMDL endpoints.

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA's policy and guidance. EPA's rationale for establishing these TMDLs is set forth according to the regulatory requirements listed below.

1. The TMDLs are designed to implement the applicable water quality standards.

The applicable numeric water quality criteria are shown in Table 2-1 of the TMDL report. The applicable designated uses for all the waters subject to this report include: propagation and maintenance of aquatic life in troutwater and warmwater fisheries, water contact recreation, and public water supply.

All West Virginia waters are subject to the narrative criteria in Section 3 of the Standards. That section, titled *Conditions Not Allowed in State Waters*, contains various provisions relative to water quality. The narrative water quality criterion at 46 CSR1-3.2.i prohibits the presence of wastes in State waters that cause or contribute to significant adverse impacts on the chemical, physical, hydrologic, and biological components of aquatic ecosystems. This provision is the basis for the "biological impairment" determinations. Biological impairment signifies a stressed aquatic community. WVDEP determines the biological integrity of each stream based on a rating of the stream's benthic macroinvertebrate community using the multimetric WVSCI.

2. The TMDLs include a total allowable load as well as individual wasteload allocations and load allocations.

A TMDL is the total amount of a pollutant that can be assimilated by the receiving water while still achieving water quality standards. TMDLs can be expressed in terms of mass per time or by other appropriate measures. TMDLs are comprised of the sum of individual WLAs for point sources, LAs for NPSs, and natural background levels. In addition, the TMDL must include an MOS, either implicitly or explicitly, that accounts for the uncertainty in the

relationship between pollutant loads and the quality of the receiving stream. Conceptually, this definition is denoted by the following equation:

TMDL = Summation of WLAs + Summation of LAs + MOS

For purposes of these TMDLs only, WLAs are given to NPDES permitted discharge points and LAs are given to discharges from activities that do not have an associated NPDES permit, such as AMLs, failing septic systems and straight pipes. Un-reclaimed bond forfeiture sites are classified as point sources and provided WLAs in this TMDL due to the 2009 judicial decision (West Virginia Highlands Conservancy, Inc., and West Virginia Rivers Coalition, Inc. v. Randy Huffman, Secretary, West Virginia Department of Environmental Protection. (1:07CV87)). The decision to assign WLAs to those sources does not reflect a determination by WVDEP or EPA as to whether they are, in fact, point source discharges. The decision has been appealed and an alternative conclusion may result, thereby requiring minor TMDL revision to reclassify bond forfeiture sites as LAs.

In addition, by establishing these TMDLs with failing septic systems and straight pipes treated as LAs, WVDEP and EPA are not determining that these discharges are exempt from NPDES permitting requirements.

The TMDLs for iron, aluminum, and manganese are presented as average daily loads, in pounds per day. The dissolved aluminum TMDLs are based on a dissolved aluminum TMDL endpoint; however, components and allocations are provided in the form of total metal. The TMDLs for pH are presented as average daily acidity or alkalinity loads, in the units of pounds $CaCO_3$ per day. The MDAS simulated pH results under baseline and TMDL conditions are displayed in the allocation spreadsheets included on the CD version of this report. The biological TMDLs are handled using surrogate approaches where metal or fecal loads are presented. The TMDLs for fecal coliform bacteria are presented in average number of colonies per day. All TMDLs were developed to meet TMDL endpoints under a range of conditions observed over the modeling period. The iron, aluminum, and manganese WLAs for active mining operations and bond forfeiture sites are presented both as annual average loads, for comparison with other pollutant sources, and equivalent allocation concentrations. The prescribed concentrations are the operable allocations and are to be implemented by conversion to monthly average and daily maximum effluent limitations using EPA's Technical Support Document for Water Quality-based Toxics Control (USEPA, 1991). The iron WLAs for Construction Stormwater General Permit registrations are presented as both annual average loads, for comparison with other sources, and equivalent area registered under the permit. The registered area is the operable allocation. Iron WLAs for nonmining activities are presented both as annual average loads, for comparison with other pollutant sources, and equivalent allocation concentrations. The prescribed concentrations are operable and are equivalent to existing effluent imitations/benchmark values. For stormwater point sources, the concentration allocations are to be directly implemented as stormwater benchmark values and for other sources; they are to be implemented by conversion to monthly average and daily maximum effluent limitations using EPA's Technical Support Document for Water Quality-based Toxics Control (USEPA, 1991). The fecal coliform bacteria WLAs for sewage treatment plant effluents are presented both as annual average loads, for comparison with other pollutant sources, and

equivalent allocation concentrations. The prescribed concentrations are the operable allocations for NPDES permit implementation.

Section 10 of the TMDL Report presents applicable TMDLs for dissolved aluminum, iron, manganese, pH, and fecal coliform bacteria. Allocation spreadsheets also provide applicable TMDLs, WLAs to individual point sources and LAs to categories of unpermitted sources. The "Metal_pH" Allocation Spreadsheet presents detailed iron, aluminum, manganese, and pH TMDLs, LAs, and WLAs. The Fecal Coliform Bacteria Allocation Spreadsheet presents detailed fecal coliform TMDLs, LAs, and WLAs. The TMDLs are presented as average annual loads in pounds per year, or counts per year, because they were developed to meet TMDL endpoints under a range of conditions observed throughout the year. The TMDLs are also presented as equivalent average daily loads in pounds per day or counts per day.

Sources for sediment, iron, aluminum, and manganese in the Cheat River watershed are: point sources, including mining, non-mining (with permits), bond forfeiture sites, and construction stormwater permits; unpermitted sources of mine drainage from AMLs; and sediment sources including forestry, oil and gas, roads, agriculture, streambank erosion, and other land disturbance activities. A complete list of the permits and outlets is provided in Appendix G of the Technical Report. There are 21 non-mining NPDES permits within the watershed. There are 25 mining-related NPDES permits, with 65 associated outlets in the metals impaired watersheds of the Cheat River watershed. Six of these permits are for quarries. Some permits may include multiple outlets with discharges to more than one TMDL watershed. There are 43 active construction stormwater sites under WV's Construction Stormwater General Permit. The discharges from construction activities that disturb more than one acre of land are legally defined as point sources. Though the sediment introduced from such discharges can contribute metals, they are generally considered to be negligible because of their minimal discharge flows. For these TMDLs, these minor discharges are assumed to operate under their current permit limits and were given WLAs based on their current permit limits. LAs for metals were assigned to AMLs, and sediment sources including forestry, oil and gas, roads, agriculture, and other land disturbance areas. There are 35 bond forfeiture Sites.

Fecal coliform bacteria sources are point sources, including individual sources covered under the NPDES program such as wastewater treatment plants and general sewage permits; and unpermitted sources, including onsite treatment systems, precipitation runoff, agriculture, and natural background (wildlife). Fecal coliform bacteria TMDLs were developed in 32 streams and will affect permits including Preston County Sewer PSD, ten sewage treatment "package plants" (under General Sewage Permit WV0103110), and 26 registered Home Aeration Units (HAUs, under General Permit WV0107000). There are no SSO or CSO outlets in the watershed. The TMDLs allowed fecal coliform NPDES permits to remain at 200 counts/100 ml (monthly geometric mean) and 400 counts/100 ml (daily maximum). LAs were assigned to pasture/cropland, onsite sewer systems including failing septic systems and straight pipes, residential land uses including urban/residential runoff, and background and other NPSs including wildlife sources from forested land and grasslands in non-MS4 areas. Fecal coliform reductions will require elimination of illicit discharges, straight pipes, and leaking septic systems, which would substantially reduce organic and nutrient loadings as well.

WVDEP has re-evaluated and determined that five streams are not meeting the revised manganese water quality criteria. For streams that are impaired by manganese, WVDEP developed manganese TMDLs based on the existing numeric manganese water quality criteria to protect the water supplies and to reduce the ionic impact of manganese on the stream biota. EPA recommends that stressors identified through the stressor identification process conducted as part of these TMDLs be identified on the Section 303(d) List.

The TMDL development methodologies prescribe allocations that achieve water quality criteria throughout the watershed. Various provisions attempt equity between categories of sources and the targeting of pollutant reductions from the most problematic sources.

3. The TMDLs consider the impacts of background pollutant contributions.

The TMDL considers the impact of background pollutant contributions by considering loadings from background sources like wildlife. The Mining Data Analysis System (MDAS) tool also considers background pollutant contributions by modeling all land uses.

4. The TMDLs consider critical environmental conditions.

According to EPA's regulation 40 CFR §130.7 (c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the impaired waterbody is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards. Critical conditions for waters impacted by land based sources generally occur during periods of wet weather and high surface runoff. In contrast, critical conditions for non-land-based point source dominated systems generally occur during low flow and low dilution conditions.

High and low flow stream conditions and all point and nonpoint source loads were included in the development of these TMDLs, by using a long period of weather data that represented wet, dry, and average flow periods. Accordingly, the TMDL considers critical conditions.

5. The TMDLs consider seasonal environmental variations.

Seasonal variations were considered while considering critical conditions, by running the daily simulation model for six years, from January 1, 1998 to December 31, 2003 for MDAS. Continuous simulation (modeling over a period of several years that captures precipitation extremes) inherently considers seasonal hydrologic and source loading variability.

6. The TMDLs include a Margin of Safety.

The CWA and Federal regulations require TMDLs to include an MOS to take into account any lack of knowledge concerning the relationship between effluent limitations and

water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

An explicit MOS of five percent was included to counter uncertainty in the modeling process. West Virginia did not include a discussion regarding an implicit MOS, but did use conservative model assumptions (such as assuming all point sources continually discharge at permit limits) to develop the allocations. An explicit margin of safety of five percent was also included by reducing the applicable West Virginia water quality numeric criteria by five percent as the end points for addressing correspondent pollutants in these TMDLs.

7. The TMDL has been subject to public participation.

Section 12.0 describes the public participation process which included two informational meetings (May 16 – May 17, 2006, at Preston County High School in Kingwood, West Virginia, and the Tucker County Senior Citizens Building in Parsons, West Virginia) prior to allocation of pollutant loads and another public meeting was held at the Tucker County Senior Citizens Building in Parsons, West Virginia, on April 28, 2010. Additional public meetings were held on August 3, 2010, and August 4, 2010, at Camp Dawson in Kingwood, West Virginia, and at Blackwater Falls State Park, respectively. The draft TMDLs were advertised in various local newspapers and subject to a thirty-day public comment period. The thirty-day public comment period was from July 26, 2010 to August 23, 2010, and the public meeting to present the draft TMDLs was held in August 2010, in West Virginia. West Virginia did receive comments from the Tucker County Development Authority and EPA Region 3. WVDEP has responded appropriately to the comments in Section 12.3 of the TMDL report.

IV. Discussion of Reasonable Assurance

When a TMDL is developed for waters impaired by both point and NPSs and the WLA is based on the assumption that nonpoint source load reductions will occur, EPA's guidance states that the TMDL should provide reasonable assurances that NPS control measures will achieve expected load reductions in order for the TMDL to be approvable. West Virginia develops and implements a few primary program policies and strategies (see below) which provide reasonable assurance that the Cheat River TMDLs will be implemented effectively.

Section 13.1 of the TMDL Report discusses NPDES permit reissuance by WVDEP's Division of Water and Waste Management (DWWM for non-mining permits) and Division of Mining and Reclamation (DMR for mining permits). NPDES permitting has been synchronized with TMDL development through West Virginia's Watershed Management Framework. WLAs will be implemented through the NPDES permit process. According to 40 CFR §122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA. Furthermore, EPA has authority to object to the issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

The mining permittees represented in the metal TMDLs received WLAs based on water quality criteria, not technology based limits. Therefore, the metal WLAs are not based on the

assumption that NPS reductions will occur. Therefore, reasonable assurance that the TMDL will be achieved is not necessary for the metal TMDLs.

WVDEP implements the Watershed Management Framework process and utilizes the West Virginia Watershed Network to ensure that the NPS allocations can be reasonably implemented to meet the applicable water quality criteria in the streams for the subject watershed. The Watershed Management Framework includes a management schedule for integration and implementation of TMDLs and identifies a six-step process for developing integrated management strategies and action plans for achieving West Virginia's water quality goals. Step 3 includes development of TMDLs or other source management strategies. Steps 5 and 6 provide for the preparation, finalization and implementation of a watershed-based plan to improve water quality. In addition, the West Virginia Watershed Network is an informal association of state and federal agencies and nonprofit organizations, and coordinates watershed-based plans. The Network evaluates restoration potential of watersheds within specific hydrologic groups, including a review of TMDLs and development of watershed-based plans.

NPS controls to achieve fecal coliform bacteria and sediment LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program.

Section 13.3 discusses ongoing public sewer projects to help assure the bacteria load allocations can be reasonably implemented. Reductions from inadequate onsite sewage treatment systems may be accomplished through the creation or extension of centralized sewer systems. It also discusses project funding and the administrative process, and provides a link to pending projects for reducing the LAs from Fecal Coliform.

The NPSs of concern identified in the metal and sediment TMDLs are forest harvesting, oil and gas, urban roads, and stream bank erosion. There is about 0.3 percent of AML (which is fairly insignificant in 1,422 square miles watershed) in this TMDL. Section 13.4 describes the Abandoned Mine land projects in West Virginia. The West Virginia Office of Abandoned Mine Lands and Reclamation (AML&R) manages the reclamation of lands and waters affected by mining prior to the passage of the Surface Mining Control and Reclamation Act (SMCRA) in 1977. Funding for reclamation activities is derived from fees placed on coal mines which are placed in a fund and annually distributed to state and tribal agencies.

Various AML reclamation activities are addressed by the program as necessary. In December 2006, Congress passed legislation amending SMCRA and the Title IV program and in November 2008, the Office of Surface Mining finalized rules to implement the amendments. After an initial ramp-up period, AML&R will realize significant increases in its annual reclamation funding and the flexibility to direct a larger portion of those funds to address water resource impacts from abandoned mine drainage (AMD). Title IV now contains a "30 percent AMD set-aside" provision that allows a state to use up to 30 percent of its annual grant to address AMD problems. In regard to water resource impacts, project prioritization will consider treatment practicability and sustainability and will be accomplished under a methodology that provides for the efficient application of funds to maximize restoration of fisheries across AML impacted areas of the State.

The West Virginia Bureau of Commerce's Division of Forestry registers logging sites on forest industry sites in the West Virginia portion of the watershed. West Virginia recognizes the water quality issues posed by sediment from logging sites. In 1992, the West Virginia Legislature passed the Logging Sediment Control Act. The act requires the use of BMPs to reduce sediment loads to nearby waterbodies.

The State will use existing programs and authorities to comply with the LA provisions of the TMDL. NPSs will initially be addressed through the implementation of the existing TMDLs for Fecal Coliform, Aluminum, Manganese and Iron throughout the Cheat River watershed. Reductions in sediment from construction sites, roads, and development areas will also be of benefit for reducing the pollutants of concern.