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

APR 02 2014

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

Dear Mr. Mandirola:

The United States Environmental Protection Agency (EPA), Region III, is pleased to approve the Total Maximum Daily Loads (TMDLs) developed for metals (total iron, dissolved aluminum, total manganese, and selenium), pH, chloride, fecal coliform, and dissolved oxygen in the selected streams of the Monongahela River watershed. The TMDLs were established to address impairments of water quality, as identified on West Virginia's 2012 Section 303(d) List. The West Virginia Department of Environmental Protection submitted the report, *Total Maximum Daily Loads for Selected Streams in the Monongahela River Watershed, West Virginia*, to EPA for review and approval on February 14, 2013. The TMDLs were established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act.

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. The TMDLs for the selected streams of the Monongahela River watershed satisfy each of these requirements. In addition, the TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. A rationale of our approval is enclosed.

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 per EPA's letters dated October 1, 1998, and July 7, 2009.

If you have any questions regarding these TMDLs, please contact Ms. Helene Drago, TMDL Program Manager, at 215-814-5796.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Mr. John Wirts (WVDEP)
Mr. David Montali (WVDEP)

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

# Decision Rationale
# Total Maximum Daily Loads for Selected Streams in the Monongahela River Watershed West Virginia

Jon M. Capacasa, Director
Water Protection Division

Date: 4/2/14

**Decision Rationale**
**Total Maximum Daily Loads for Selected Streams in the Monongahela River Watershed, West Virginia**

## I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those waterbodies identified as impaired by a state where technology-based and other controls do not provide for the 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's) rationale for approving the TMDLs for metals (dissolved aluminum, total iron, manganese, and selenium), pH, chloride, and fecal coliform bacteria in selected streams of the Monongahela River watershed. The TMDLs were developed to address impairments of water quality as identified in West Virginia's 2012 Section 303(d) list of impaired waters. The West Virginia Department of Environmental Protection (WVDEP) submitted the report, *Total Maximum Daily Loads for Selected Streams in the Monongahela River Watershed, West Virginia*, to EPA on February 14, 2014. EPA's rationale is based on the determination that the TMDLs meet the following seven regulatory conditions pursuant to 40 CFR§130.

1) The TMDLs are designed to implement applicable water quality standards.
2) The TMDLs include a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3) The TMDLs consider the impacts of background pollutant contributions.
4) The TMDLs consider critical environmental conditions.
5) The TMDLs consider seasonal environmental variations.
6) The TMDLs include a margin of safety.
7) The TMDLs have been subject to public participation.

In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

From this point forward, all references in this rationale can be found in West Virginia's TMDL Report, *Total Maximum Daily Loads for Selected Streams in the Monongahela Watershed, West Virginia*, unless otherwise noted.

## II. Summary

Table 3-3 of the final TMDL document presents the waterbodies and impairments for which TMDLs have been developed in the Monongahela River watershed. West Virginia identified 153 streams in the Monongahela River watershed as impaired due to exceedances of some combination of the numeric water quality criteria for fecal coliform bacteria, metals (iron dissolved aluminum, manganese, and selenium), pH, chloride, and dissolved oxygen. In addition, certain waters in the Monongahela River watershed were listed as biologically impaired based on the narrative water quality criteria of 47 CSR §2-3.2.i, which 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. Attachment 1 of this Decision Rationale presents the impaired waterbodies of the Monongahela River watershed.

A stressor identification process was used to determine the pollutants for which TMDLs must be developed in the Monongahela River watershed. Stressor identification entails reviewing available information, forming and analyzing possible stressor scenarios and implicating causative stressors. The primary data set used for the stressor identification was generated through pre-TMDL monitoring (Technical Report, Appendix K). In the Monongahela River watershed, the stressor identification confirmed the presence of metals (iron, dissolved aluminum, manganese and selenium), chloride, fecal coliform bacteria, low dissolved oxygen, pH, and biological impairments within the watershed. The stressor identification also identified organic enrichment, ionic toxicity, and sedimentation as sources of impairment in the Monongahela River watershed. TMDLs were established for the pollutants that would reduce the sources of impairment within the watershed.

Section 11 presents the TMDLs developed for the Monongahela River watershed on a daily load basis. The TMDLs are also represented in Microsoft Excel spreadsheets (submitted by West Virginia via compact disc) which provide detailed source allocations and successful TMDL scenarios. These TMDLs were presented as average annual loads because they were developed to meet TMDL endpoints under a range of conditions observed throughout the year. The loads are expressed in pounds per year, or counts per year, which may be divided by 365 days per year to express the TMDLs in pounds per day or counts per day. The TMDLs for selenium are presented as a flow based formula. A technical report was included by West Virginia to describe the detailed technical approaches that were used during TMDL development and to display the data upon which the TMDLs were based. West Virginia also provided an ArcView Geographic Information System (GIS) project (and shapefiles) that explores the spatial relationships among the pollutant sources in the watershed.

## III. Background

The Monongahela River watershed is located in northern West Virginia (Figure 3-1) and encompasses nearly 464 square miles. It extends from the City of Fairmount north to southern Pennsylvania, and lies in portions of Monongalia, Marion, Preston, and Taylor Counties in West Virginia, and a small portion of Greene County in Pennsylvania. Major tributaries within West Virginia are Buffalo Creek, Deckers Creek, Paw Paw Creek, and Scotts Run. The dominant land use in the Monongahela River watershed is forest, which constitutes 72.2 percent of the total land use area. Other important modeled land use types are urban/residential (9.77%), grassland (6.7%), and agriculture (6.7%) as shown in Table 3-1. The total population living in the watershed is estimated to be 75,000 people.

West Virginia utilized a stressor identification process to determine the primary causes of impairment in the Monongahela River watershed. Stressor identification was followed by stream-specific determinations of the pollutants for which TMDLs must be developed. Metals, pH, chloride, and fecal coliform bacteria stressors were identified in waters that had violations of iron, dissolved aluminum, manganese, selenium, pH, dissolved oxygen, chloride or the fecal coliform bacteria numeric water quality criteria. When the stressor identification process identified that a specific pollutant was a causative stressor, TMDLs were developed for that pollutant. For the organic enrichment impairment identified in the watershed, it was determined that the implementation of fecal coliform TMDLs would require the elimination of the majority of existing fecal coliform sources and thereby reduce the organic loading causing the biological impairment in the Monongahela River watershed. Therefore, fecal coliform TMDLs will serve as a surrogate where organic enrichment was identified as a stressor. Additionally, fecal coliform TMDLs will also serve as a surrogate to the dissolved oxygen impairments. For the sediment impairment identified in the watershed, it was determined that the sediment reductions necessary to ensure the attainment of iron water-quality criteria exceed those that would be needed to address the biological impairment in the Monongahela River watershed. As such, iron TMDLs are acceptable surrogates for the sediment impairment in the watershed.

Sections 5, 6, 7, 8 and 9 discuss the metals, pH, chloride, fecal coliform bacteria and dissolved oxygen source assessments in the Monongahela River watershed. The sources of metals and sediment in the watershed include: mining permits, bond forfeiture sites, municipal separate storm sewers (MS4s), non-mining permits for construction stormwater and unpermitted sources of mine drainage from abandoned mine lands (AMLs); as well as sediment sources including forestry, oil and gas, roads, agriculture, streambank erosion, and other land disturbance activities. The pH impairments in the watershed have been attributed to discharges from AML. The sources of chloride include: mining permits, MS4s, non-mining stormwater point sources, and nonpoint source urban/residential impervious land runoff. The fecal coliform bacteria sources in the watershed include: wastewater treatment plants, combined sewer overflows (CSOs), MS4s, general sewage permits, unpermitted sources, including on-site treatment systems, stormwater runoff, agriculture, and natural background (wildlife). The dissolved oxygen impairment was attributed organic enrichment from failing septic systems and altered hydrology. The technical report has expanded details of the source assessment in the Monongahela River watershed.

*Computational Procedures*

The Mining Data Analysis System (MDAS) was used to represent the source-response linkage in the Monongahela River watershed TMDL for dissolved aluminum, total iron, manganese, selenium, pH, chloride, and fecal coliform bacteria. MDAS was developed to facilitate large scale, data intensive watershed modeling applications. The model is used to simulate watershed hydrology and pollutant transport as well as stream hydraulics and instream water quality. MDAS is capable of simulating different flow regimes and pollutant variations. A key advantage of the MDAS development framework is that it has no inherent limitations in terms of modeling size or upper limit model operations. In addition, the MDAS model allows for seamless integration with modern-day, widely available software such as Microsoft Access and Excel.

Configuration of the MDAS model involved subdividing the TMDL watershed into subwatershed modeling units connected by stream reaches (Figure 10-1). The TMDL watershed was divided to allow for the evaluation of water quality and flow at pre-TMDL monitoring stations. The subdivision process also ensures a proper stream network configuration within the basin. The physical characteristics of the subwatersheds, weather data, land use information, continuous discharges, and stream data were used as input for the MDAS model. Flow and water quality were continuously simulated into the model on an hourly time-step. Model setup consisted of configuring the MDAS model four times to simulate loading conditions for the following pollutant groups in the Monongahela River watershed: iron/sediment, aluminum/pH/manganese, chloride, and fecal coliform bacteria.

The calibrated model provides the basis for performing the allocation analysis. The first step is to simulate baseline conditions, which represent existing nonpoint source loadings and point sources loadings at permit limits. Baseline conditions allow for an evaluation of instream water quality under the highest expected loading conditions. The MDAS model was run for baseline conditions using hourly precipitation data for a representative six year simulation period (January 1, 2004 through December 31, 2009). The precipitation experienced over this period was applied to the land uses and pollutant sources as they existed at the time of TMDL development. Predicted instream concentrations were compared directly with the TMDL endpoints. This comparison allowed for the evaluation of the magnitude and frequency of exceedances under a range of hydrologic and environmental conditions.

The MDAS model provided allocations for metals (iron, dissolved aluminum, manganese, and selenium), pH, chloride, and fecal coliform bacteria in the 153 impaired streams of the Monongahela River watershed. The TMDLs are shown in Section 11 and are presented as average daily loads, in pounds per day, or counts per day. 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 for iron, dissolved aluminum, manganese, selenium, dissolved oxygen, pH and fecal coliform bacteria are shown in Table 2-1 of the final TMDL document. The applicable designated uses in the watershed include: propagation and maintenance of aquatic life in warm water fisheries and troutwaters, water contact recreation, and public water supply. In various streams of the Monongahela River watershed, warmwater fishery aquatic life use impairments have been determined pursuant to exceedances of iron, dissolved aluminum, dissolved oxygen, selenium, chloride and/or pH numeric water quality criteria. Water contact recreation and/or public water supply use impairments have also been determined in various waters pursuant to exceedances of numeric water quality criteria for fecal coliform bacteria, dissolved oxygen, pH, chloride, manganese, and total iron.

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 TMDLs presented in Section 11 are based upon the water quality criteria that are currently effective. If the West Virginia Legislature adopts Water Quality Standard revisions that alter the basis upon which the TMDLs are developed, then the TMDLs and allocations may be modified as warranted. Any future Water Quality Standard revision and/or TMDL modification must receive EPA approval prior to implementation.

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

A TMDL is the total amount of a pollutant that can be assimilated by receiving waters 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 non-point sources, and natural background levels. In addition, TMDLs 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.

*Total Iron TMDLs*

WLAs were developed for all point sources permitted to discharge iron under a NPDES permit. Because of the established relationship between iron and Total Suspended Solids (TSS) in the watershed, iron WLAs were provided for facilities with stormwater discharges, MS4 facilities, and facilities registered under the General NPDES permit for construction stormwater. WLAs were also developed for all existing outlets of NPDES permits for mining activities, except for those where reclamation has progressed to the point where existing limitations are based upon the *Post-Mining Area provisions of Subpart E of 40 CFR §434*. There are 34 mining related NPDES permits with 177 associated outlets in the metals impaired waters of the Monongahela River watershed. WVDEP and the Division of Water and Waste Management (DWWM) personnel used information contained in the Surface Mining Control and Reclamation Act (SMCRA), Article 3, and NPDES permits to characterize the mining point sources. Information gathered included type of discharge, pump capacities, and drainage areas (including total and disturbed areas). Using this information, the mining point sources were represented in MDAS and assigned individual WLAs.

The discharges from construction activities that disturb more than one acre of land are legally defined as point sources and the sediment introduced from such sources can contribute iron loadings. WVDEP issues a General NPDES Permit (WV0115924) to regulate stormwater discharges associated with construction activities with a land disturbance greater than one acre. Subwatershed-specific future growth allowances have been provided for site registrations under the Construction Stormwater General Permit. The TMDL allocation provides 0.5 to 2.5 percent of the modeled subwatershed area to be registered under the general permit at any point in time.

There are 58 modeled non-mining NPDES permitted outlets in the Monongahela River watershed. Fifty-five of the non-mining permits regulate stormwater associated with industrial activity or the West Virginia Division of Highways (WVDOH) and implement benchmark values of 100 mg/L TSS, and/or 1.0 mg/L total iron. One outlet in the watershed is associated with groundwater remediation and is subject to a 1.2 mg/L monthly average total iron limitation. Baseline iron conditions for bond forfeiture sites were established at the technology based effluent limits of 40 CFR 434 and reduced as needed to attain the TMDL endpoints. Of the remaining permits, one is an individual stormwater permit and one is a water treatment permit. The WLAs for all non-mining NPDES outlets allow for continued discharge under existing permit requirements. A complete list of the permits and outlets in the Monongahela River watershed is provided in Appendix F of the Technical Report.

Total iron LAs were allocated to the predominant nonpoint sources of iron in the watershed, including: sediment contributions from barren lands, harvested forest, oil and gas operations, agricultural land uses, urban land uses and streambank erosion. Streambank erosion has been determined to be a significant sediment source in the watershed. The sediment loading from bank erosion loadings are most strongly influenced by upland impervious area and bank stability. The streambank erosion modeling process is discussed in Section 9.2.2. The oil and gas data incorporated into the TMDL model were obtained from the WVDEP GIS coverage. There are 419 conventional active oil and gas wells (comprising 578.22 acres), 5 vertical Marcellus wells (11.06 acres), and 56 horizontal Marcellus wells (448.71 acres) represented in the metals impaired TMDL watersheds addressed in this report. Runoff from unpaved access roads to these wells and disturbed areas around the wells contribute sediment to adjacent streams (Figure 5-5).

The Office of Abandoned Mine Lands and Reclamation (AML&R) identified locations of AML in the Monongahela River watershed. In addition, source tracking efforts were conducted by WVDEP and DWWM to identify AML sources in the watershed (discharges, seeps, portals, and refuse piles). Field data, such as GPS locations, water samples, and flow measurements were collected to represent AML sources and characterize their impact on water quality. In the TMDL watershed, a total of 29.3 miles (233 acres) of AML highwall and 168 AML seeps were incorporated into the TMDL model (Figure 5-4).

*Dissolved Aluminum and pH TMDLs*

Source allocations were developed for the dissolved aluminum and pH impaired streams of the Monongahela River watershed. Substantive sources of total iron were reduced prior to total aluminum reduction because existing instream dissolved iron concentrations can significantly reduce pH and consequentially increase dissolved aluminum concentrations. In 24 subwatersheds of the Monongahela River watershed, the dissolved aluminum and/or pH TMDL endpoints were not attained after source reductions to iron. Therefore, the total aluminum loading from AML was reduced in combination with acidity reduction (via alkalinity addition) to the extent necessary to attain water quality criteria for both pH and dissolved aluminum. WLAs were developed for active mining point source discharges regulated by NPDES permits, including: five bond forfeiture sites, active mining operations, Multi-sector stormwater, MS4, and Construction Stormwater General Permits. LAs were assigned to: AMLs, barren land, harvested forest, oil and gas well operations, agriculture, undisturbed forest and grasslands, and residential/urban/road land uses.

*Total Manganese TMDL*

WLAs were developed for bond forfeiture sites and non-mining permits and LAs were developed for all other sources of manganese. In the watershed of manganese impaired Brand Run, only sources within the AML nonpoint source category contribute significant loadings. Reductions of those sources allowed the manganese water quality endpoint to be met.

*Fecal Coliform Bacteria TMDLs*

WLAs were developed for all facilities permitted to discharge fecal coliform bacteria, including: sewage treatment plants, MS4s and CSOs. In the Monongahela River watershed, there are three publicly owned treatment works (POTW) that discharge treated effluent at 3 outlets. Four mining bathhouse facilities discharge to TMDL streams in the Monongahela River TMDL watersheds. There are also 3 stormwater industrial permitted outlets with fecal coliform limits. These sources are regulated by NPDES permits that require effluent disinfection and compliance with strict fecal coliform effluent limitations (200 counts/100 ml).

The MS4s in the watershed are presented in Figure 5-3. The City of Fairmount, Fairmount State University, Town of Star City, City of Westover, Morgantown Utility Board, Federal Correctional Institution – Morgantown, West Virginia University, as well as WVDOH are MS4 entities in the subject watersheds. MS4 source representation was based upon precipitation and runoff from land uses determined from the modified National Land Cover Database 2006 land use data, the jurisdictional boundary of the cities, and the transportation-related drainage area for which WVDOH has MS4 responsibility. The MS4s in the watershed will be registered under, and subject to the requirements of general permit, WV0110625, which is based upon national guidance and proposes best management practices to be implemented.

There are 55 CSO outlets in the Monongahela River watershed that are associated with POTWs operated by Morgantown, Fairmount, Westover, Barrackville, or Greater Paw Paw. These systems have Long Term Control Plans, but currently experience frequent stormwater-related CSO discharges and do not have systems in place to store or treat CSO discharges. All fecal coliform bacteria WLAs for CSO discharges have been established at 200 counts/100 ml. Implementation can be accomplished by CSO elimination or by disinfection treatment and discharge in compliance with the operable concentration-based allocations.

Fecal coliform LAs were assigned to: pasture/cropland and on-site sewage systems; including, failing septic systems and straight pipes, residential loadings associated with urban/residential runoff from non-MS4 areas, and loadings associated with wildlife sources. Failing on-site sewage systems are a significant source of fecal coliform bacteria in the Monongahela River watershed. There are approximately 8,800 homes in the watershed that are not served by a centralized collection and treatment system and are within 100 meters of a stream. To calculate failing sewage systems, the TMDL watershed was divided into four septic failure zones, and septic failure zones were delineated by soil characteristics.

*Chloride TMDLs*

Source allocations were developed for all modeled subwatersheds contributing to the chloride impaired streams in the watershed. Permitted, high-volume, pumped discharges associated with mining activities are the prevalent sources in six of the eight chloride impaired streams in the watershed. WLAs were developed for MS4 sources and facilities registered under the Multi-Sector Stormwater General Permit. The WLAs prescribe chloride reductions for impervious areas. Road and impervious surface de-icing activities contribute non-negligible chloride loads to receiving waters and LAs are presented for the non-MS4 urban residential impervious land use. Chloride reduction is not associated with the urban residential impervious LAs except in UNT/West Run RM 0.91 where reductions are consistent with those prescribed for MS4 areas in that watershed. Road and impervious surface de-icing activities contribute non-negligible chloride loads to receiving waters and LAs are presented for the non-MS4 urban residential impervious land use.

*Selenium TMDLs*

The TMDL approach simply calculates the assimilative capacity for selenium available at the mouth of Arnett Run at 7Q10 flow, and prescribes WLAs for contributing point sources that are based upon the achievement of the chronic aquatic life protection criterion in the discharge. The upper half of the Arnett Run watershed has been mined and an instream pond remains. The pond discharge was previously regulated under closed WV/NPDES Permit No.WV1017489 (outlet 001). The pond transmits drainage from the entire upstream watershed area. Monitoring conducted during source tracking activities measured a 0.0046 mg/l selenium concentration at this location. As such, there is little assimilative capacity available for downstream discharges. Selenium concentrations higher than the criterion were measured in the active downstream discharges. The achievement of WLAs will result in criterion attainment at critical low flow conditions and also during higher flow regimes.

***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 forest and wildlife. MDAS 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.

Both high-flow and low-flow periods were taken into account during TMDL development for the Monongahela River watershed by using a long period of weather data, (January 1, 2004 -- December 31, 2009) that represented wet, dry, and average flow periods. Figure 10-4 presents the range of precipitation conditions that were used for TMDL development.

*5. The TMDLs consider seasonal environmental variations.*

Seasonal variations were considered in the formulation of the MDAS modeling analysis. Continuous simulation (modeling over a period of several years that captured precipitation extremes) inherently considered seasonal hydrological and source loading variability. The metals, chloride, and fecal coliform concentrations simulated on a daily time-step by MDAS and were compared with TMDL endpoints. Allocations that met these endpoints throughout the modeling period were developed.

*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 be allocating a portion of the allowable load to the MOS. In the TMDLs developed for the Monongahela River watershed, an explicit MOS of five percent was included to counter uncertainty in the modeling process. An implicit MOS was included in selenium TMDLs because little modeling uncertainty exists. Similarly, an implicit MOS was applied for total iron and chloride TMDLs in certain subwatersheds where mining point sources create an effluent dominated scenario and/or the regulated mining activity encompasses a large percentage of the watershed area.

*7. The TMDLs have been subject to public participation.*

West Virginia held public meetings for the draft TMDLs in the Monongahela River watershed on June 30, 2009 and August 20, 2013 at West Virginia University and Fairmount State University, respectively. The June 30th meeting included a general TMDL overview and a presentation of planned monitoring and data gathering activities. The August 20th meeting provided information to stakeholders intended to facilitate comments on the draft TMDLs. The availability of the draft TMDLs were advertised in local newspapers beginning on August 2, 2013. Interested parties were invited to submit comments on the draft TMDLs during the public comment period, which began on August 2, 2013 and ended on September 16, 2013.

West Virginia received written comments from Appalachian Mountain Advocates, Arch Coal, Inc., City of Bridgeport, CONSOL Energy, Inc., City of Fairmont Sanitary Sewer Board, Greer Industries, Inc., MEPCO, Morgantown Utility Board, John M. and Petra B. Wood, WV Coal Association, and WV Municipal Water Quality Association. EPA believes that WVDEP appropriately addressed all comments.

## IV. Discussion of Reasonable Assurance

Reasonable assurance for maintenance and improvement of water quality in the Monongahela River watershed rests primarily with two programs: the NPDES permitting program and the West Virginia Watershed Network. The NPDES permitting program is implemented by WVDEP to control point source discharges. The West Virginia Watershed Network is a cooperative nonpoint source control effort involving many state and federal agencies, whose task is the protection and/or restoration of water quality.

WVDEP's DWWM is responsible for issuing non-mining permits with the State. WVDEP's Division of Mining and Reclamation developed NPDES permits for mining activities. As part of the permit review process, permit writers have the responsibility to incorporate the required TMDL WLAs into new or reissued permits. The permits will contain self-monitoring and reporting requirements that are periodically reviewed by WVDEP. WVDEP also inspects treatment facilities and independently monitors NPDES discharges. The combination of these efforts will ensure implementation of the TMDL WLAs. New facilities will be permitted in accordance with future growth provisions described in Section 12.

The Watershed Management Framework is a tool used to identify priority watersheds and coordinate efforts of state and federal agencies with the goal of developing and implementing watershed management strategies through a cooperative, long-range planning effort. The principal area of focus of watershed management through the Framework process is correcting problems related to nonpoint source pollution. Network partners have placed a greater emphasis on identification and correction of nonpoint source pollution. The combined resources of the partners are used to address all different types of nonpoint source pollution through both public education and on-the-ground projects. All nonpoint source restoration projects should include a monitoring component specifically designed to document resultant local improvements in water quality. These data may also be used to predict expected pollutant reductions from similar future projects.

*<u>Public Sewer Projects</u>*

Within WVDEP DWWM, the Engineering and Permitting Branch's Engineering Section will be charged with the responsibility of evaluating sewer projects and providing funding. For information on upcoming projects, a list of funded and pending water and wastewater projects in West Virginia can be found at http://www.wvinfrastructure.com/projects/index.php.

*AML Projects*

Within WVDEP, the AML&R manages the reclamation of lands and waters affected by mining prior to the passage of the SMCRA in 1977. Funding for reclamation activities is derived from fees placed on coal mines, which are placed in a fund to distribute to state and federal agencies. In AML impacted areas, funds will be used to maximize restoration in fisheries.

Attachment 1

**Impaired Waterbodies Addressed in the Monongahela River Watershed TMDL**

| STREAM NAME | WEST VIRGINA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| UNT/West Run RM 0.91 | M-7-A | WVM-3-A |
| UNT/Flaggy Meadow Run RM 2.15 | M-30-D | WVM-14-D |
| Paw Paw Creek | M-49 | WVM-22 |
| Flat Run | M-54-X-3 | WVM-23-O-3 |
| Llewellyn Run | M-54-X-3-A | WVM-23-O-3-A |
| Reuben Run | M-44-I | WVM-19-B |
| UNT/Dillan Creek RM 1.02 | M-14-S-2 | |
| UNT/Laurel Run RM 1.62 | M-14-T-1 | |
| UNT/Dents Run RM 7.26 | M-12-K | |
| UNT/Flaggy Meadow Run RM 1.07 | M-30-B | |
| Chunk Run | M-49-D-4 | WVM-22-A-2 |
| Laurel Run | M-49-O | WVM-22-F |
| Ministers Run | M-49-D-2 | WVM-22-A-1 |
| Panther Lick Run | M-49-I | WVM-22-B |
| Rush Run | M-49-Q | WVM-22-G |
| Tarney Run | M-49-H | WVM-22-A.7 |
| Long Run | M-44-N | WVM-19-F |
| UNT/Dillan Creek RM 0.30 | M-14-S-1 | |
| Piney Run | M-44-K | WVM-19-C |
| Cherry Run | M-32-W | WVM-16-F |
| UNT/Robinson Run RM 2.91 | M-8-E | |

| STREAM NAME | WEST VIRGINIA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| UNT/Scotts Run RM 1.36 | M-10-A | WVM-6-0.5A |
| UNT/Scotts Run RM 3.23 | M-10-E | WVM-6-E |
| UNT/Wades Run RM 0.49 | M-10-C-1 | |
| UNT/Wades Run RM 1.34 | M-10-C-2 | |
| UNT/West Run RM 4.84 | M-7-F | |
| UNT/West Run RM 5.19 | M-7-G | |
| Laurel Run | M-32-H | WVM-16-B |
| Maple Run | M-32-U | WVM-16-E |
| UNT/Whiteday Creek RM 3.49 | M-32-E | |
| UNT/Deckers Creek RM 20.48 | M-14-Y | |
| UNT/Deckers Creek RM 20.63 | M-14-Z | |
| Mudlick Run | M-44-P | WVM-19-H |
| Price Run | M-54-AD | WVM-23-S |
| UNT/Deckers Creek RM 3.63 | M-14-D | |
| Swamp Run | M-14-S-3 | WVM-8-G-1 |
| Falls Run | M-14-O | WVM-8-C |
| UNT/Deckers Creek RM 17.28 | M-14-U | |
| Dry Run | M-14-N | WVM-8-B.5 |
| UNT/Deckers Creek RM 18.48 | M-14-W | WVM-8-J |
| UNT/Crooked Run RM 2.42 | M-2-C | |
| Lick Run | M-32-M | WVM-16-C |
| Salt Lick Run | M-54-V | WVM-23-M |
| Messer Run | M-54-X-9-A | WVM-23-O-7-A |
| Long Drain | M-54-AE | WVM-23-T |
| Little Mod Run | M-54-T-1 | WVM-23-K-1 |
| Left Fork/Campbell Run | M-54-X-9-B | |
| Jolliet Run | M-17-B | WVM-10-B |
| UNT/Deckers Creek RM 21.95 | M-14-AB | |
| UNT/Plum Run RM 3.81 | M-54-R-4 | WVM-23-I-3 |
| Bloody Run | M-17-C | WVM-10-C |
| Laurel Run | M-54-AI-3 | WVM-23-W-1 |
| UNT/Owl Creek RM 1.66 | M-17-G-2 | WVM-10-D-2 |
| UNT/Brand Run RM 0.72 | M-20-A | WVM-11-A |

| STREAM NAME | WEST VIRGINA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| Beechlick Run | M-54-X-14 | WVM-23-O-9 |
| Camp Run | M-54-AI-4 | WVM-23-W-2 |
| Carberry Run | M-54-R-1 | WVM-23-I-1 |
| Ices Run | M-54-C | WVM-23-A |
| East Run | M-54-O | WVM-23-H |
| Huey Run | M-54-AH | WVM-23-V |
| Big Run | M-54-X-10 | WVM-23-O-8 |
| UNT/Robinson Run RM 4.09 | M-8-F | WVM-4-F |
| UNT/Dents Run RM 5.82 | M-12-H | WVM-7-G |
| Aaron Creek | M-14-B | WVM-8-A |
| Tibbs Run | M-14-G | WVM-8-B |
| UNT/Booths Creek RM 7.43 | M-17-L | WVM-10-I |
| UNT/Whiteday Creek RM 1.68 | M-32-C | WVM-16-0.8A |
| Laurel Run/Whiteday Creek | M-32-P | WVM-16-D |
| Little Creek | M-42 | WVM-18 |
| Prickett Creek | M-44 | WVM-19 |
| Scratchers Run | M-44-H | WVM-19-A |
| Little Paw Paw Creek | M-49-D | WVM-22-A |
| Bennefield Prong | M-49-R | WVM-22-H |
| Harvey Run | M-49-X | WVM-22-L |
| Finchs Run | M-54-D | WVM-23-B |
| Bethel Run | M-54-I-1 | WVM-23-E-0.5 |
| Mahan Run | M-54-U | WVM-23-L |
| Flaggy Meadow Run | M-54-W | WVM-23-N |
| Pyles Fork | M-54-X | WVM-23-O |
| State Road Fork | M-54-X-7 | WVM-23-O-5 |
| Campbell Run | M-54-X-9 | WVM-23-O-7 |
| Owen Davy Fork | M-54-AI | WVM-23-W |
| Bartholomew Fork | M-54-AK | WVM-23-X |
| Warrior Fork | M-54-AM | WVM-23-Y |
| Evans Run | M-54-AM-2 | WVM-23-Y-1 |
| UNT/Monongahela River RM 99.49 | M-11 | WVM-6.2 |

| STREAM NAME | WEST VIRGINA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| UNT/Buffalo Creek RM 23.53 | M-54-AF | WVM-23-T.3 |
| Flaggy Meadow Run | M-12-A | WVM-7-A |
| Falling Run | M-13 | WVM-7.7 |
| Knocking Run | M-14-C | WVM-8-A.5 |
| Cobun Creek | M-15 | WVM-9 |
| Indian Creek | M-33 | WVM-17 |
| Little Indian Creek | M-33-E | WVM-17-A |
| UNT/Indian Creek RM 7.23 | M-33-P | WVM-17-E |
| Grassy Run | M-44-M | WVM-19-E |
| Moody Run | M-54-E | WVM-23-C |
| UNT/Bethel Run RM 0.80 | M-54-I-1-A | WVM-23-E-0.5-A |
| Coal Run | M-56 | WVM-25 |
| Laurel Run | M-5 | WVM-2.7 |
| Dents Run | M-12 | WVM-7 |
| Hartman Run | M-14-A | WVM-8-0.5A |
| UNT/Deckers Creek RM 5.70 | M-14-E | WVM-8-A.7 |
| Mays Run | M-17-H | WVM-10-E |
| UNT/Booths Creek RM 6.27 | M-17-I | WVM-10-F |
| Robinson Run | M-49-K | WVM-22-C |
| Sugar Run | M-49-W | WVM-22-K |
| Fleming Fork | M-54-W-2 | WVM-23-N-1 |
| Whetstone Run | M-54-AA | WVM-23-Q |
| Joes Run | M-54-AC | WVM-23-R |
| Camp Run | M-1 | WVM-2.1 |
| UNT/Camp Run RM 0.79 | M-1-A | WVM-2.1-A |
| Crooked Run | M-2 | WVM-2.5 |
| UNT/Crooked Run RM 2.27 | M-2-B | WVM-2.5-B |
| UNT/Monongahela River RM 93.07 | M-3 | WVM-2.6 |
| West Run | M-7 | WVM-3 |
| UNT/West Run RM 3.79 | M-7-D | WVM-3-D |
| Robinson Run | M-8 | WVM-4 |
| Crafts Run | M-8-A | WVM-4-A |
| UNT/Robinson Run RM 1.09 | M-8-B | WVM-4-B |

| STREAM NAME | WEST VIRGINA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| Scotts Run | M-10 | WVM-6 |
| Wades Run | M-10-C | WVM-6-A |
| Guston Run | M-10-D | WVM-6-B |
| UNT/Scotts Run RM 3.58 | M-10-F | WVM-6-F |
| UNT/Scotts Run RM 4.17 | M-10-G | WVM-6-G |
| UNT/Scotts Run RM 4.79 | M-10-H | WVM-6-H |
| UNT/Dents Run RM 3.60 | M-12-C | WVM-7-C |
| Deckers Creek | M-14 | WVM-8 |
| Glady Run | M-14-P | WVM-8-D |
| Slabcamp Run | M-14-R | WVM-8-F |
| Dillan Creek | M-14-S | WVM-8-G |
| Laurel Run/Deckers Creek | M-14-T | WVM-8-H |
| Kanes Creek | M-14-V | WVM-8-I |
| UNT/Kanes Creek RM 2.36 | M-14-V-0.9 | WVM-8-I-0.9 |
| UNT/Kanes Creek RM 2.49 | M-14-V-1 | WVM-8-I-1 |
| Booths Creek | M-17 | WVM-10 |
| Owl Creek | M-17-G | WVM-10-D |
| Brand Run | M-20 | WVM-11 |
| Flaggy Meadow Run | M-30 | WVM-14 |
| Birchfield Run | M-31 | WVM-15 |
| Whiteday Creek | M-32 | WVM-16 |
| Parker Run | M-45 | WVM-20 |
| UNT/Monongahela River RM 123.45 | M-46 | WVM-20.2 |
| Pharaoh Run | M-47 | WVM-21 |
| Arnett Run | M-49-G | WVM-22-A.5 |
| Buffalo Creek | M-54 | WVM-23 |
| UNT/Finchs Run RM 1.15 | M-54-D-2 | WVM-23-B-1 |
| Dunkard Mill Run | M-54-I | WVM-23-E |
| Little Laurel Run | M-54-J | WVM-23-F |
| Plum Run | M-54-R | WVM-23-I |
| Mod Run | M-54-T | WVM-23-K |
| Dents Run | M-54-Z | WVM-23-P |
| Hickman Run | M-55 | WVM-24 |

| STREAM NAME | WEST VIRGINA NATIONAL HYDROLOGY DATASET CODE | WEST VIRGINIA 2012 SECTION 303(d) LIST CODE |
|---|---|---|
| UNT/Monongahela River RM 128.55 | M-57 | WVM-25.9 |