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

NOV 2 3 2016

Dear Mr. Mandirola:

The United States Environmental Protection Agency (EPA), Region III, is pleased to approve the Total Maximum Daily Loads (TMDLs) developed for fecal coliform bacteria in the Rockymarsh Run and Warm Spring Run Watersheds. The TMDLs were established to address impairments of water quality, as identified on West Virginia's 2014 Section 303(d) List. The West Virginia Department of Environmental Protection submitted the report, *Total Maximum Daily Loads for the Rockymarsh Run and Warm Spring Run Watersheds, West Virginia*, to EPA for review and approval on October 26, 2016. 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 Meadow 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. Jennifer Sincock, West Virginia TMDL Coordinator, at 215-814-5766.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Mr. John Wirts (WVDEP)
Mr. James Laine (WVDEP)

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Decision Rationale
Total Maximum Daily Loads for the Rockymarsh Run and Warm Spring Run Watersheds, West Virginia

Jon M. Capacasa, Director
Water Protection Division

Date: 11/23/2016

Decision Rationale
Total Maximum Daily Loads for the
Rockymarsh Run and Warm Spring Run Watersheds, 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 fecal coliform bacteria in the Rockymarsh Run and Warm Spring Run Watersheds. The TMDLs were developed to address impairments of water quality as identified in West Virginia's 2014 Section 303(d) list of impaired waters. The West Virginia Department of Environmental Protection (WVDEP) submitted the report, *Total Maximum Daily Loads for the Rockymarsh Run and Warm Spring Run Watersheds, West Virginia*, to EPA on October 26, 2016, and was received on October 31, 2016. EPA's rationale is based on the determination that the TMDLs meet the seven regulatory requirements 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 the Rockymarsh Run and Warm Spring Run Watersheds, 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 Rockymarsh Run and Warm Spring Run Watersheds. West Virginia identified two streams in the Rockymarsh Run Watershed and four streams in the Warm Spring Run Watershed as impaired due to exceedances of the numeric water quality

criteria for fecal coliform bacteria. Attachment 1 of this Decision Rationale presents the impaired waterbodies of the Rockymarsh Run and Warm Spring Run Watersheds.

Section 6.0 presents the TMDLs developed for the Rockymarsh Run and Warm Spring Run Watersheds on a daily load basis expressed in counts per day. 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 spreadsheets also present TMDLs 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 counts per year, which may be divided by 365 days per year to express the TMDLs in counts per day. 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 Rockymarsh Run and Warm Spring Run Watersheds are located in the eastern panhandle of West Virginia (Figure 3-1) within the Appalachian Ridge and Valley ecoregion. The Rockymarsh Run and Warm Spring Run are Potomac Direct Drains or tributaries of the Potomac River, which flows into the Chesapeake Bay, which discharges to the Atlantic Ocean. The Rockymarsh Run Watershed has limestone karst geology, and its surface water is fed by several large springs. Rockymarsh Run is approximately seven miles long, and its watershed encompasses 16.5 total square miles. The dominant landuse is grassland, which constitutes 38.72 percent of the total landuse area. Other important modeled landuse types are forest (27.16 percent), MS4 background, which encompasses undeveloped portions of Berkeley County covered under their MS4 permit (17.97 percent), pasture (7.67 percent), urban/residential (2.87 percent), cropland (2.64 percent), and paved road (1.05 percent). Individually, all other land cover types each compose less than one percent of the total watershed area.

The Warm Spring Run Watershed features long sandstone ridges and parallel valleys, and receives significant year-round flow from Berkeley Springs located in the state park of the same name. Warm Spring Run is approximately 12 miles long, and its watershed encompasses 15.0 square miles. In the Warm Spring Run watershed the dominant landuse is forest, which constitutes 71.22 percent of the total landuse area. Other important modeled landuse types are grassland (12.30 percent), urban/residential (10.97 percent), cropland (2.09 percent), and paved road (2.08 percent). Individually, all other land cover types each compose less than one percent of the total watershed area. The total population living in the subject watersheds of this report is estimated to be 6,000 people.

The impaired streams that are the subject of this TMDL are included on West Virginia's 2014 Section 303(d) List. Documented impairments are related to numeric water quality criteria for fecal coliform bacteria. EPA notes that West Virginia's 2014 Section 303(d) list includes the following two biologically impaired streams in the Warm Spring Run Watershed: Warm Spring

Run (WV Code: WVP-10; NHD Code: WV-P-63) and UNT/Warm Spring Run RM 7.96 (WV Code: WVP-10-J; NHD Code: WV-P-63-K). WVDEP's review of all data for the biologically impaired streams in the Warm Springs Watershed indicated that implementation of the fecal coliform TMDLs would not resolve all biological stress. EPA's conversations with WVDEP on the initial review of data potentially indicated biological stressors associated with urbanization such as sediment, habitat, and/or temperature. As such, the impairments will be retained on the 303(d) List for future TMDL development.

Section 4.0 discusses the fecal coliform bacteria source assessments in the Rockymarsh Run and Warm Spring Run Watersheds. The technical report has expanded details of the source assessment in the Rockymarsh Run and Warm Spring Run Watersheds. The fecal coliform bacteria sources in the watershed include: wastewater treatment plants (WWTP), general sewage permits, municipal separate storm sewer systems (MS4), and unpermitted sources, including on-site treatment systems, stormwater runoff, agricultural run-off, and natural background (wildlife).

Computational Procedures

The Mining Data Analysis System (MDAS) was used to represent the source-response linkage in the Rockymarsh Run and Warm Spring Run Watersheds TMDL for 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. The two TMDL watersheds were broken into 24 separate subwatershed units, based on the groupings of impaired streams shown in Figure 3-2. 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 a MDAS model for 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 source 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 simulation period (January 1, 2009 through December 31, 2014 for Rockymarsh Run and January 1, 2012 through December 31, 2014 for Warm Spring Run). 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 fecal coliform bacteria in the six impaired streams of the Rockymarsh Run and Warm Spring Run Watersheds. The TMDLs are shown in Section 6.0 and are presented as average number of colonies in counts per day for fecal coliform bacteria. 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 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 warmwater fisheries and troutwaters, water contact recreation, and public water supply. In various streams of the Rockymarsh Run and Warm Spring Run Watersheds, 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.

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 general provisions related to water quality. The TMDLs presented in Section 6.0 are based upon the water quality criteria that are currently developed. Where there is an applicable numeric criterion for a particular pollutant and uses, it is reasonable to use that criterion as the quantitative implementation of the narrative standard and designated uses. 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.

Fecal Coliform Bacteria TMDLs

WLAs were developed for all facilities permitted to discharge fecal coliform bacteria. In the Rockymarsh Run and Warm Spring Run Watersheds, there is one package plant treatment system permitted under the general sewage permit that discharges treated effluent from one outlet. One individually permitted publicly owned treatment works (POTW) called Warm Springs PSD discharges treated effluent via one outlet. There is also one aquaculture facility called Freshwater Institute that discharges treated effluent from two outlets and stormwater from one outlet. These compliant facilities do not cause fecal coliform bacteria impairments because effluent limitations are more stringent than water quality criteria. There is one facility under the package plant general permit (WV0103110) that regulates small, privately owned sewage treatment plants. There is one municipal separate storm sewer system (MS4) for Berkeley County within the Rockymarsh Run Watershed. There are no combined sewer overflows (CSOs) or sanitary sewer overflows (SSOs) within the Rockymarsh Run and Warm Spring Run Watersheds.

Fecal coliform LAs were assigned to: pasture/cropland, 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 septic systems and straight pipes are a significant nonpoint sources of fecal coliform bacteria in the Rockymarsh Run and Warm Spring Run Watersheds. There are approximately 170 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 septic wastewater flows, the TMDL watershed was divided into four septic failure zones, and septic failure zones were delineated by soil characteristics.

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

The Rockymarsh Run and Warm Spring Run Watersheds TMDLs consider the impact of background pollutant contributions by looking at 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 Rockymarsh Run and Warm Spring Run Watersheds by using a long period of weather data, (January 1, 2008 to December 31, 2013) that represented wet, dry, and average flow periods. Figure 5-2 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 considers seasonal hydrological and source loading variability. The pollutant concentrations simulated on a daily time-step by MDAS 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 a 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 Rockymarsh Run and Warm Spring Run Watersheds, an explicit MOS of five percent was included to counter uncertainty in the modeling process.

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

An informational public meeting for the Warm Spring Run TMDL was held near Berkeley Springs, WV at the Cacapon Resort State Park on May 7, 2013. An information public meeting for the Rockymarsh Run TMDL was held in Kearneysville, WV at the Jefferson County Maintenance Department on May 8, 2013. These meetings occurred prior to pre-TMDL stream monitoring and pollutant source tracking and included a general TMDL overview and a presentation of planned monitoring and data gathering activities in both watersheds. Project status update meetings were held on March 8, 2016 for Warm Spring Run and March 9, 2016 for Rockymarsh Run in the same locations as the informational meetings. Public meetings were held to present the draft TMDLs on September 6, 2016 in Shepherdstown, WV at the Freshwater Institute for the Rockymarsh Run TMDL and on September 7, 2016 in Berkeley Springs, WV at the Town of Bath for the Warm Spring Run TMDL These public meetings provided information to stakeholders intended to facilitate comments on the draft TMDLs. Beginning on August 25, 2016, the availability of draft TMDLs was advertised in various local newspapers. Interested parties were invited to submit comments during the public comment period, which began on August 26, 2016 and ends on September 26, 2016. West Virginia received one set of written comments on the Draft TMDLs, which are addressed in Section 8.3.

IV. Discussion of Reasonable Assurance

Reasonable assurance for maintenance and improvement of water quality in the Rockymarsh Run and Warm Spring Run Watersheds 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 within 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. Both the permitting and TMDL development processes have been synchronized with the Watershed Management Framework cycle, such that TMDLs are completed just before the permit expiration/reissuance time frames. Permits for existing nonmining facilities in the Rockymarsh Run and Warm Spring Run Watersheds will be reissued in July 2017. New facilities will be permitted in accordance with future growth provisions in Section 7.0.

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.

The Rockymarsh Run Network and the Warm Spring Run Watershed Association are citizen-based watershed associations representing the Rockymarsh Run and Warm Spring Run Watersheds. Information concerning this association can be found at: http://www.dep.wv.gov/WWE/getinvolved/WSA_Support/Documents/WVWatershedAssoc.PDF

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.

Attachment 1

Waterbodies and Impairments Addressed in the Rockymarsh Run and Warm Spring Run Watersheds TMDLs

Subwatershed	Stream Name	NHD Code	WV Code	FC
Rockymarsh Run	Rockymarsh Run	WV-P-20	WVP-3	X
Rockymarsh Run	UNT/Rockymarsh Run RM 3.99 (West Fork)	WV-P-20-B	WVP-3-B	X
Warm Spring Run	Warm Spring Run	WV-P-63	WVP-10	X
Warm Spring Run	UNT/Warm Spring Run RM 7.96	WV-P-63-K	WVP-10-J	X
Warm Spring Run	UNT/Warm Spring Run RM 8.98	WV-P-63-L	WVP-10-K	X
Warm Spring Run	UNT/Warm Spring Run RM 10.05	WV-P-63-M	WVP-10-L	X

Note:
RM river mile
UNT unnamed tributary
FC fecal coliform bacteria impairment