ESCHERICHIA COLI (*E. coli*) ADDENDUM TO THE FECAL COLIFORM BACTERIA TOTAL MAXIMUM DAILY LOAD (TMDL) FOR SPRING CREEK SEGMENT 01, PENNINGTON COUNTY, SOUTH DAKOTA

Watershed Protection Program

Division of Resource Conservation and Forestry

South Dakota Department of Agriculture and Natural Resources

August 2022

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INTRODUCTION

The South Dakota Department of Agriculture and Natural Resources (SDDANR) adopted a conversion process to translate existing fecal coliform TMDLs and allocations to *E. coli* to satisfy Clean Water Act section 303(d) requirements. The 2020 bacteria TMDL translation included *E. coli* TMDLs for four impaired waterbodies. The conversion process and resulting *E. coli* TMDLs were formally approved by the United States Environmental Protection Agency (EPA) in November 8, 2020 (https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidetranslation_ecoli.pdf).

Spring Creek segment 01 (S5, T2S, R3E to Sheridan Lake) or **SD-CH-R-SPRING_01** is considered impaired for the designated immersion recreation use due to *E. coli* in South Dakota's most recent 303(d) list documented in the 2022 Integrated Report (IR) and is considered a high priority for TMDL development (https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/docs/DANR_2022_IR_approved.pdf). The intent of this document is to convert the existing fecal coliform TMDL and allocations for Spring Creek segment 01 to *E. coli* using the conversion process and rationale described in the 2020 bacteria TMDL translation. Hereby, this document serves as an addendum to the 2008 Spring Creek fecal coliform TMDL (TMDL ID# 35790) by incorporating an *E. coli* TMDL and allocations for Spring Creek segment 01 (SD DANR, 2008).

Several factors must be met to determine whether an existing fecal coliform TMDL can be converted to *E. coli* for a given waterbody in accordance with the methods and assumptions established in the 2020 bacteria TMDL translation:

- Waterbody must fall entirely within state jurisdiction,
- If jurisdiction is shared, TMDL only applies to portion of the water under South Dakota's jurisdiction,
- The TMDL will meet applicable water quality standards,
- Wastewater discharges to the stream are expected to meet effluent limits in accordance with an authorized NPDES permit.
- The 2008 Spring Creek fecal coliform TMDL assumptions (e.g., source contributions, loading capacity, etc.) are still valid.

Spring Creek segment 01 falls entirely within state jurisdiction as indicated by EPAs approval of the 2008 Spring Creek fecal coliform TMDL. Furthermore, this addendum demonstrates the remaining factors are met, qualifying Spring Creek segment 01 for a *E. coli* TMDL conversion under coverage of the original bacteria translation TMDL.

Appendix D of the 2008 fecal coliform TMDL contains the bacteria sample data used for analysis. No new data has been analyzed for this addendum.

WATER QUALITY STANDARDS AND TMDL TARGETS

South Dakota *E. coli* criteria for immersion (ARSD 74:51:01:50) and limited contact recreation (ARSD 74:51:01:51) consist of a single sample maximum (SSM) and a monthly geometric mean (GM) both of which include distinct numeric limits. The SSM requires that no single daily sample exceed the associated numeric limit. The monthly GM also must not be exceeded and is calculated based on a minimum of 5 samples collected during separate 24-hr periods over a 30-day period. Former fecal coliform SSM and GM criteria were similar for *E. coli*, however, numeric limits deviate between the bacteria indicators (Table 1).

Impaired waters require TMDL development based on the most protective criteria. Selecting the most protective numeric target for TMDL development ensures attainment with the water quality criteria. The 2008 fecal coliform TMDL for Spring Creek segment 01 used the SSM as the TMDL target (Table 1). Appendix A of the 2020 bacteria TMDL translation outlines that the GM and SSM *E. coli* criteria are equally protective. As a result, the *E. coli* TMDL and allocations can be translated based on the SSM *E. coli* criterion consistent with the 2008 Spring Creek fecal coliform TMDL. In addition to the daily load, the geometric mean criteria must be attained on a longer (i.e., monthly) basis.

Table 1. Designated recreation use and associated bacteria criteria designated to Spring Creek segment 01.

Impaired Stream Segment AUID	Designated Recreation Use	Fecal coliform Geomean CFU/100mL	Fecal coliform SSM CFU/100mL	*E. coli* Geomean CFU/100mL	*E. coli* SSM CFU/100 mL
SD-CH-R-Spring_01	Immersion	≤ 200	*≤ 400	≤ 126	*≤ 235

*Refers to numeric criteria used for TMDL development

NONPOINT SOURCES

The nonpoint source assessment for Spring Creek segment 01 is documented in the 2008 Spring Creek fecal coliform TMDL and the conclusions of that 2008 assessment are still accurate today. Fecal coliform source contributions are considered synonymous with *E. coli* based on the close statewide paired bacteria data relationship documented in the 2020 bacteria TMDL translation. Land use and bacteria production characteristics in the Spring Creek segment 01 watershed are expected to be similar to that documented during the 2008 Spring Creek fecal coliform TMDL assessment. The primary nonpoint sources of fecal coliform within the Spring Creek segment 01 watershed included urban and agricultural runoff, as well as wildlife and human sources. Modeled results conducted as part of the fecal coliform TMDL using the HSPF model within the BASINS platform, suggested 63.5 percent of the fecal coliform contribution to Spring Creek segment 01 originates from livestock in streams and wash off from agricultural lands. Human sources (failing septic systems), urban runoff (Hill City) and background (wildlife) contributions accounted for 14.8%, 13.7% and 7.9%, respectively.

POINT SOURCES

Three permitted National Pollutant Discharge Elimination Systems (NPDES) were identified in the Spring Creek segment 01 watershed. These potential point sources of *E. coli* bacteria are documented here to provide a watershed scale account of the system's operational characteristics (discharge permits etc.), potential impact, and Waste Load Allocation (WLA) consideration.

The City of Hill City Wastewater Treatment Facility

The city of Hill City is authorized to discharge wastewater directly to Spring Creek segment 01 under NPDES permit SD0020885 (https://danr.sd.gov/npdespdf/SD0020885/Hill%20City%20Permit%202022.pdf). The wastewater treatment facility consists of a gravity flow collection system, which flows to a Sequencing Batch Reactor (SBR) advanced activated sludge treatment plant, which began operation in 2006. The facilities average design flow is 0.25 million gallons per day (MGD) with a peak daily design flow of 0.5 MGD (https://danr.sd.gov/npdespdf/SD0020885/Hill%20City%20SOB%202022.pdf).

Discharge from the facility must comply with effluent limits established for various pollutants. *E. coli* concentrations must not exceed the SSM and GM criteria for immersion recreation waters which is consistent with the TMDL target. The *E. coli* TMDL would not add new requirements or implementation expectations to the permit.

The fecal coliform TMDL provided a Waste Load Allocation (WLA) for the City of Hill City. A WLA of 3.78E+9 CFU/day was assigned to the fecal coliform TMDL. The WLA was based on the peak design flow (0.93 cfs) multiplied by the GM fecal coliform criteria (200 CFU/100mL) for immersion recreation waters, times a unit conversion factor (24465715). The peak design flow was used to develop the fecal coliform WLA to avoid revising the allocation at the time of future expansion. To date, the City of Hill City has not implemented an expansion. The *E. coli* WLA was derived by multiplying the fecal coliform WLA by the GM ratio (0.63), resulting in an *E. coli* WLA of 2.38E+9 (Table 2). As long as wastewater discharges from the City of Hill City do not exceed peak design flows and *E. coli* effluent limits, any variable flow rates from this facility are not expected to impact the TMDL.

Horsethief Campground & Resort LLC and Recreational Adventures

Horsethief Campground and Resort LLC., is permitted (NPDES permit# SDF828398) to treat wastewater (pond system) generated at the campground. Recreational Adventures is permitted (NPDES permit# SDG828533) to treat wastewater (pond system) generated at the Mount Rushmore KOA and Palmer Gulch Lodge near Hill City, SD. Neither wastewater treatment facility is permitted to discharge to Spring Creek segment 01.
https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/swdpermitting/wwDBResults.aspx?npid=SDG828398.

https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/swdpermitting/wwDBResults.aspx?npid=SDG828533.

These facilities do not have a permit to discharge, therefore neither facility is allowed to discharge wastewater to Spring Creek segment 01 or its tributaries. As a result, these facilities are not assigned a WLA in the *E. coli* TMDL

Concentrated Animal Feeding Operations (CAFOs)

There were no Concentrated Animal Feeding Operations (CAFOs) identified in the 2008 fecal coliform TMDL for Spring Creek segment 01. A recent search found that there are still no CAFOs within the Spring Creek segment 01 watershed. It is highly unlikely for CAFOs to be established in the Black Hills region to include the Spring Creek watershed due to geology and other factors. All South Dakota CAFOs are required to obtain a general permit, regardless if they require a NPDES permit. For more information about the general permit visit: (https://danr.sd.gov/Agriculture/Livestock/FeedlotPermit/default.aspx). As long as potential future facilities comply with the general CAFO permit requirements ensuring their discharges are unlikely and indirect loading events, the TMDL would assume a minimal *E. coli* contribution requiring no additional permit conditions.

TMDL AND ALLOCATIONS

A load duration curve framework was used to develop the 2008 fecal coliform TMDL for Spring Creek segment 01. The criteria ratio approach was used to convert the existing fecal coliform TMDL and allocations to *E. coli* for each flow zone. The *E. coli* TMDL and MOS were calculated by multiplying the existing fecal coliform values by the ratio (EC:FC) for the SSM, whereas the *E. coli* WLA was calculated by multiplying the existing fecal coliform values by the ratio (EC:FC) for the GM (Table 2). The *E. coli* LA was calculated using the equation LA = TMDL-WLA-MOS, which is identical to the 2008 fecal coliform TMDL. The *E. coli* TMDL allocations (TMDL=WLA+LA+MOS) were based on the same percent contribution as established for the fecal coliform TMDL allocations in each flow zone.

The fecal coliform current load from the 2008 fecal coliform TMDL was converted to *E. coli* using the ratio (EC:FC) for the SSM. The percent reduction was then calculated as the converted *E. coli* current load minus the *E. coli* converted TMDL divided by the converted *E. coli* current load. This calculation results in percent reductions identical to the 2008 fecal coliform TMDL.

Table 2. Applicable bacteria criteria and ratio for the immersion recreation use.

Fecal coliform criteria	*E. coli* criteria	EC:FC ratio
GM 200	GM 126	0.63
SSM 400	SSM 235	0.5875

The *E. coli* TMDL is protective of applicable criteria assigned to the immersion recreation use designated to Spring Creek segment 01. The 2008 fecal coliform TMDL contains supporting information necessary to implement the *E. coli* TMDLs. The original fecal coliform and converted *E. coli* TMDL allocations and reductions are provided for Spring Creek segment 01 in Tables 3 and 4, respectively. In addition to the daily load, the geometric mean criteria must be attained on a longer (i.e., monthly) basis.

SD-CH-R-SPRING_01

Table 3. Existing fecal coliform TMDL and allocations for Spring Creek segment 01 based on the applicable bacteria criteria for immersion recreation from the 2008 fecal coliform TMDL.

Flow Zone	Fecal TMDL (CFU/day)	WLA (CFU/day)	LA (CFU/day)	MOS (CFU/day)	Current Load (CFU/day)*	% Reduction
High	2.81E+12	3.78E+09	2.44E+12	3.62E+11	2.76E+13	90%
Moist	4.21E+11	3.78E+09	3.29E+11	8.81E+10	5.02E+11	16%
Mid-Range	1.27E+11	3.78E+09	9.41E+10	2.94E+10	1.18E+11	0%
Dry	6.07E+10	3.78E+09	4.03E+10	1.66E+10	1.85E+10	0%
Low	2.06E+10	3.78E+09	1.11E+09	1.57E+10	3.30E+10	38%

Table 4. E. coli *TMDL and Load allocations for Spring Creek segment 01 based on the applicable bacteria criteria for immersion recreation.*

Flow Zone	*E. coli* TMDL (CFU/day)	WLA (CFU/day)	LA (CFU/day)	MOS (CFU/day)	*E. coli* Current Load (CFU/day)**	% Reduction
High	1.65E+12	2.38E+09	1.44E+12	2.13E+11	1.62E+13	90%
Moist	2.47E+11	2.38E+09	1.93E+11	5.18E+10	2.95E+11	16%
Mid-Range	7.48E+10	2.38E+09	5.51E+10	1.72E+10	6.96E+10	0%
Dry	3.56E+10	2.38E+09	2.35E+10	9.78E+09	1.08E+10	0%
Low	1.21E+10	2.38E+09	4.91E+08	9.20E+09	1.94E+10	38%

*Current load is the 95th percentile of observed fecal coliform bacteria loads for each flow zone.

**Converted *E. coli* current load using the fecal coliform bacteria 95th percentile of observed loads for each flow zone.

SUMMARY

The 2020 bacteria TMDL translation provided a framework to convert fecal coliform TMDLs and allocations to *E. coli* to address impaired streams designated recreation uses in South Dakota. This framework was used to convert the existing fecal coliform TMDL and allocations set forth in the 2008 fecal coliform TMDL for Spring Creek segment 01 (**SD-CH-R-SPRING_01**) to *E. coli*. Therefore, this document serves as an *E. coli* TMDL addendum to the 2008 fecal coliform TMDL for Spring Creek segment 01 (TMDL # 35790). The addended *E. coli* TMDL and allocations follow the assumptions of the 2008 fecal coliform TMDL. The fecal coliform and *E. coli* TMDLs for Spring Creek segment 01 were developed in accordance with Section 303(d) of the federal Clean Water Act and guidance provided by the US EPA.

PUBLIC COMMENT

This TMDL addendum was made available for public comment in accordance with section 303(d) requirements. A public notice letter was published in the Hill City Prevailer, the Black Hills Pioneer, and Rapid City Journal to announce the availability of the addendum for public comment. The TMDL addendum document and comment process was made available on the South Dakota Department of Agriculture and Natural Resources webpage at https://danr.sd.gov/public/default.aspx. The public comment period began July 6, 2022 and ended August 8, 2022. No comments were received during the public comment period.

LITERATURE CITED

SD DANR, 2022. The 2022 South Dakota Integrated Report for Surface Water Quality Assessment. South Dakota Department of Agriculture and Natural Resources, Pierre, SD. https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/docs/DANR_2022_IR_approved.pdf

SD DANR, 2020. *Escherichia coli* Total Maximum Daily Loads (TMDLs) Conversion with Existing Fecal Coliform TMDLs for Impaired Streams Designated Recreation Uses in South Dakota, Pierre, SD. https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidetranslation_ecoli.pdf

SD DANR, 2008. Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Spring Creek, Pennington County, South Dakota. https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_springcreekfecal1208.pdf

APPENDIX A: EPA APPROVAL LETTER AND DECISION DOCUMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
Denver, CO 80202-1129
Phone 800-227-8917
www.epa.gov/region08

September 5, 2022

Ref: 8WD-CWS

SENT VIA EMAIL

Hunter Roberts, Secretary
South Dakota Department of Agriculture and Natural Resources
Hunter.Roberts@state.sd.us

Re: Approval of *Escherichia coli* Addendum to the Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Spring Creek Segment 01, Pennington County, South Dakota

Dear Mr. Roberts,

The U.S. Environmental Protection Agency (EPA) has completed review of the total maximum daily load (TMDL) submitted by your office on August 11, 2022. In accordance with the Clean Water Act (33 U.S.C. §1251 *et. seq*.) and the EPA's implementing regulations at 40 C.F.R. Part 130, the EPA hereby approves South Dakota's TMDL for segment 1 of Spring Creek. The EPA has determined that the separate elements of the TMDL listed in the enclosure adequately address the pollutant of concern, are designed to attain and maintain applicable water quality standards, consider seasonal variation and include a margin of safety. The EPA's rationale for this action is contained in the enclosure.

Thank you for submitting this TMDL for our review and approval. If you have any questions, please contact Amy King on my staff at (303) 312-6708.

Sincerely,

Judy Bloom, Manager
Clean Water Branch

Enclosure:
EPA Decision Rationale – Spring Creek segment 01 *E. coli* Addendum to Fecal Coliform TMDL

Cc: Barry McLaury, Watershed Protection Program Administrator, South Dakota DANR
Paul Lorenzen, Environmental Scientist Manager – TMDL Team Leader, South Dakota DANR

EPA TOTAL MAXIMUM DAILY LOAD (TMDL) DECISION RATIONALE

TMDL: *Escherichia coli (E. coli)* Addendum to the Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Spring Creek Segment 01, Pennington County, South Dakota

ATTAINS TMDL ID: R8-SD-2022-06

LOCATION: Custer and Pennington Counties, South Dakota

IMPAIRMENTS/POLLUTANTS: The TMDL submittal addresses one river segment with a recreation use that is impaired due to high concentrations of *Escherichia coli (E. coli)* bacteria.

Waterbody/Pollutant Addressed in this TMDL Action

Assessment Unit ID	Waterbody Description	Pollutants Addressed
SD-CH-R-SPRING_01	Spring Creek (S5, T2S, R3E to Sheridan Lake)	*E. coli*

BACKGROUND: The South Dakota Department of Agriculture and Natural Resources (DANR) submitted to EPA the final *E. coli* TMDL for segment 1 of Spring Creek, with a letter requesting review and approval dated August 11, 2022. EPA previously reviewed and provided staff comments on draft versions of the report but did not submit comments during the subsequent public comment period (July 6, 2022 to August 8, 2022).

The submittal included:

- Letter requesting EPA's review and approval of the TMDL
- Final TMDL report

This river segment is subject to an existing fecal coliform TMDL approved by the United States Environmental Protection Agency (EPA) on December 11, 2008 (SD DANR, 2008; ATTAINS Action ID#35790). Since that time, South Dakota adopted and began implementing EPA's 2012 Recreational Water Quality Criteria. These revised criteria recommend states establish *E. coli* criteria after scientific advancements demonstrated *E. coli* was a better indicator of fecal contamination and recreational harm than fecal coliform (USEPA, 2012). South Dakota has since adopted new criteria for *E. coli*, maintaining dual criteria for several years to facilitate the transition and allow for the collection of additional *E. coli* data, and eventually dropped the fecal coliform criteria altogether. They also adopted a conversion process to translate existing fecal coliform TMDLs and allocations to *E. coli* to satisfy Clean Water Act (CWA) section 303(d) requirements. The conversion process and resulting *E. coli* TMDLs were formally approved by the EPA on November 8, 2020 (SD DANR, 2020; ATTAINS Action ID#R8-SD-2021-01).

The intent of this submittal is to revisit the existing fecal coliform TMDL for Spring Creek segment 01, demonstrate that the TMDL is protective of newer *E. coli* criteria, and convert the fecal coliform TMDL to address the current *E. coli* impairment. Most of the data, maps, figures, assumptions, and analyses discussed in this submittal are contained in the original fecal coliform TMDL (SD DANR, 2008; ATTAINS Action ID#35790) and are not repeated in the *E. coli* report.

APPROVAL RECOMMENDATIONS: Based on the review presented below, the reviewer recommends approval of the final *E. coli* TMDL for Spring Creek segment 1. All the required elements of an approvable TMDL have been met.

TMDL Approval Summary	
Number of TMDLs Approved:	1
Number of Causes Addressed by TMDLs:	1

REVIEWERS: Amy King, EPA

The following review summary explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) of the Clean Water Act (CWA), and EPA's implementing regulations in 40 C.F.R. Part 130.

EPA REVIEW OF THE SPRING CREEK SEGMENT 1 *E. COLI* TMDL (CONVERTED FROM THE EXISTING FECAL COLIFORM TMDL)

This TMDL review document includes EPA's guidelines that summarize the currently effective statutory and regulatory requirements relating to TMDLs (CWA Section 303(d) and 40 C.F.R. Part 130). These TMDL review guidelines are not themselves regulations. Any differences between these guidelines and EPA's regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the information generally necessary for EPA to determine if a TMDL submittal fulfills the legal requirements for approval. The sections in regular type reflect EPA's analysis of the state's compliance with these requirements. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal must clearly identify (40 C.F.R. §130.7(c)(1)):

- *the waterbody as it appears on the State's/Tribe's 303(d) list;*
- *the pollutant for which the TMDL is being established; and*
- *the priority ranking of the waterbody.*

The TMDL submittal must include (40 C.F.R. §130.7(c)(1); 40 C.F.R. §130.2):

- *an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading (e.g., lbs. per day);*
- *facility names and NPDES permit numbers for point sources within the watershed; and*
- *a description of the natural background sources, and the magnitude and location of the sources, where it is possible to separate natural background from nonpoint sources.*

This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

- *the spatial extent of the watershed in which the impaired waterbody is located;*
- *the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);*
- *population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;*
- *present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and*
- *an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments; chlorophyll a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.*

Spring Creek is a small, perennial mountain stream located in Pennington and Custer counties in the Black Hills of South Dakota. The entire creek drains 425 square miles before its confluence with the Cheyenne River. Spring Creek segment 1 is identified as the segment from S5, T2S, R3E to Sheridan Lake (SD-CH-R-SPRING_01). Segment 1 of the larger Spring Creek watershed covers the upper 126 square miles of the drainage and includes several tributaries upstream of the Sheridan Lake impoundment (Figure 1 in SD DANR, 2008).

Spring Creek segment 1 was first listed as impaired for *E. coli* and placed on South Dakota's 303(d) list in 2014. It was assigned a high priority (i.e., 1) for TMDL development on the most recent EPA-approved 303(d) list in 2022 (SD DANR, 2022). This priority ranking information is contained on page 3. Other than the earlier fecal coliform impairment addressed by the 2008 TMDL, no other known impairments currently exist for segment 1 of Spring Creek and the downstream segment from Sheridan Lake to Highway 79 is fully supporting all uses.

In 2020 DANR adopted and EPA approved a conversion process to translate existing fecal coliform TMDLs and allocations to *E. coli* values to address *E. coli* impairments in an efficient manner (SD DANR, 2020). The bacteria translation document included assumptions to identify whether a fecal coliform TMDL can be converted to *E. coli*. The *Introduction* section (p. 3) of the Spring Creek *E. coli* addendum lists specific factors to determine the applicability of the bacteria translation process. These factors are used to confirm that the assumptions of original TMDL are still valid (i.e., source contributions, loading capacity, etc.), demonstrate that the assessment unit is within South Dakota's jurisdiction, document that wastewater discharges are managed through effluent limits in National Pollutant Discharge Elimination System (NPDES) permits, and confirm the waterbody will meet water quality standards when numeric targets are met. The addendum demonstrates that all conditions are met for Spring Creek; therefore, the conversion process can be applied to calculate *E. coli* TMDLs and allocations.

The *Watershed Characteristics* section of the fecal coliform TMDL describes the watershed. Segment 1 is approximately 30 miles long and flows through Mitchell Lake, which has a surface area of 10 acres (4 hectares). This segment ends where Spring Creek empties into Sheridan Lake, approximately four miles downstream of Mitchell Lake. The majority of the drainage is in the Black Hills National Forest with an average slope of approximately 20 percent. Land use is predominantly forested (over 80 percent) with ponderosa pine as well as some herbaceous rangeland (over 15 percent). Urban development (2 percent) is largely upstream of Mitchell Lake and includes the city of Hill City (SD DANR, 2008; see figure of monitoring locations in Appendix B).

The *Nonpoint Sources* section (p. 4) of the *E. coli* addendum confirms that the nonpoint source assessment presented in the 2008 fecal coliform TMDL remains applicable. The primary nonpoint sources of bacteria within the Spring Creek segment 1 watershed include urban and agricultural runoff, as well as wildlife and human sources. Modeling conducted for the fecal coliform TMDL using the Hydrologic Simulation Program Fortran (HSPF) model suggested 63.5 percent of the fecal coliform contribution originates from livestock in streams and wash-off from agricultural lands. The fecal coliform TMDL report also notes that over 75 percent of the study area has grazing allotments, but the actual number of cattle grazing is expected to be less than the allowed number. Human sources (failing septic systems), urban runoff (city of Hill City), and background (wildlife) contributions accounted for 14.8%, 13.7% and 7.9%, respectively (SD DANR, 2008). The fecal coliform TMDL also included a bacterial ribotyping analysis. One hundred ninety-five *E. coli* isolates were tested to determine likely sources from two ribotyping libraries for source identification. Results indicate that the largest sources of *E. coli* are livestock, dogs, and humans. Pigs were the most detected livestock source (SD DANR, 2008).

The *Point Sources* section (p. 4-5) of the *E. coli* addendum describes three permitted NPDES facilities in the Spring Creek segment 1 watershed. This comprehensive list provides a watershed-scale accounting of potential point sources. DANR identified each permittee by facility name, permit number, and description and also included a wasteload allocation (WLA) decision rationale for each facility. The city of Hill City operates a wastewater treatment facility (WWTF; permit SD0020885) that discharges *E. coli* directly to Spring Creek, downstream of the city. The WWTF consists of a gravity flow collection system, which flows to a Sequencing Batch Reactor (SBR) advanced activated sludge treatment plant. This permit includes effluent limits for *E. coli* consistent with the single sample maximum and geometric mean criteria for the immersion recreation use. No violations have been reported in the past three years of compliance monitoring data (2019, 2020, and 2021). The WLA in the fecal coliform was calculated using the peak design flow (0.5 million gallons per day [MGD]) to avoid revising the allocation for a future expansion; to date the expansion has not been implemented and current average flow is 0.25 MGD. The *E. coli* TMDL includes the same assumptions as the 2008 fecal coliform TMDL for the city of Hill City WWTF.

DANR also notes two additional permits in the watershed that are not expected to contribute *E. coli* to Spring Creek and are not assigned WLAs in the *E. coli* TMDL. Horsethief Campground and Resort LLC is permitted (permit SDG828398) to treat wastewater (pond system) generated at the campground (note that the *E. coli* addendum incorrectly lists the permit number as SDF828398, but includes a link to the correct permit). Recreational Adventures is permitted (permit SDG828533) to treat wastewater from the Mount Rushmore KOA and Palmer Gulch Lodge near Hill City, SD. Neither wastewater treatment facility is permitted to discharge to Spring Creek segment 1, so WLAs are not assigned. DANR also describes Concentrated Animal Feeding Operations (CAFOs), which are a potential source of bacteria. A recent search confirmed no CAFOs are located in the Spring Creek segment 1 watershed, so a WLA is not assigned.

Assessment: EPA concludes that DANR adequately identified the impaired waterbody, the pollutant of concern, the priority ranking, the identification, location and magnitude of the pollutant sources, and the important assumptions and information used to develop the TMDL.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include:

- *a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy (40 C.F.R. §130.7(c)(1)); and*
- *a numeric water quality target for each TMDL. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal (40 C.F.R. §130.2(i)).*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The *Water Quality Standards and TMDL Targets* section (p. 3-4) describes the water quality standards applicable to the impaired segment with citations to relevant South Dakota regulations. SD-CH-R-SPRING_01 is designated the following beneficial uses:

- coldwater permanent fish life propagation,
- immersion recreation,
- limited contact recreation,
- fish and wildlife propagation, recreation, and stock watering,
- irrigation waters.

DANR determined that *E. coli* is preventing the creek's immersion and limited contact recreation uses from being fully supported. Numeric criteria are provided for the most protective of the criteria, which is immersion recreation, in Table 1. Numeric *E. coli* criteria established to protect this recreation use are comprised of a 30-day mean criterion (≤ 126 colony forming units per 100 milliliters [CFU/100mL]) and a single sample maximum criterion (≤ 235 CFU/100mL) (Table 1). These criteria are seasonally applicable from May 1 to September 30.

The numeric *E. coli* criteria for immersion recreation waters are applied directly as water quality targets for these TMDLs. DANR expects that meeting the numeric *E. coli* criteria will lead to conditions necessary to support any relevant narrative criteria. The TMDL numeric target applicable to the impaired segment is based on the immersion recreation single sample maximum criterion (235 CFU/100mL) as monitoring is not of sufficient frequency to assess compliance with the geometric mean criterion. DANR demonstrates in the 2020 bacteria translation TMDL that attaining the single sample maximum target will also achieve the geometric mean criterion (SD DANR, 2020).

The TMDLs are consistent with South Dakota antidegradation policies because they provide recommendations and establish pollutant limits at water quality levels necessary to meet criteria and fully support existing beneficial uses, including more stringent downstream uses.

Assessment: EPA concludes that DANR adequately described the applicable water quality standards and numeric water quality target for this TMDL.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

The TMDL submittal must include the loading capacity for each waterbody and pollutant of concern. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The TMDL submittal must:

- *describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model;*
- *contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling; and*
- *include a description and summary of the water quality data used for the TMDL analysis.*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation (40 C.F.R. §130.2).

The full water quality dataset should be made available as an appendix to the TMDL or as a separate electronic file. Other datasets used (e.g., land use, flow), if not included within the TMDL submittal, should be

referenced by source and year. The TMDL analysis should make use of all readily available data for the waterbody unless the TMDL writer determines that the data are not relevant or appropriate.

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). Most TMDLs should be expressed as daily loads (USEPA. 2006a). If the TMDL is expressed in terms other than a daily load (e.g., annual load), the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen.

The TMDL submittal must describe the critical conditions and related physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions (e.g., stream flow, temperature, loads) in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. TMDLs should define the applicable critical conditions and describe the approach used to estimate both point and nonpoint source loads under such critical conditions.

The original fecal coliform TMDL relied on the load duration curve approach to define the fecal coliform loading capacity of Spring Creek segment 1. Consequently, this *E. coli* TMDL, which is based on the fecal coliform TMDL analysis, used the same approach to establish the *E. coli* loading capacity. A load duration curve is a graphical representation of pollutant loads across various flows. The approach helps correlate water quality conditions to stream flow and provides insight into the variability of source contributions. EPA has published guidance on the use of duration curves for TMDL development (USEPA, 2007) and the practice is well established.

Using this approach, DANR set the TMDL equivalent to the loading capacity, which is the sum of the load allocations (LA), wasteload allocations, and margin of safety (MOS), and expressed the TMDL in CFUs per day at different flow zones (i.e., high, moist, mid-range, dry, and low). The TMDL is not expressed as a load or mass, but instead as a number of organisms per day due to the nature of the pollutant. This approach is consistent with EPA guidance and the flexibility offered in 40 CFR §130.3(i) to express TMDLs in other appropriate, non-mass-based measures (USEPA, 2001).

DANR calculated *E. coli* TMDLs by multiplying the existing fecal coliform TMDLs by the ratio associated with the applicable bacteria standards (Table 2). The fecal coliform TMDL was established using a target of 400 CFU/100mL. The applicable *E. coli* criterion is 235 CFU/100mL. Thus, the *E. coli* TMDL for Spring Creek segment 1 was established by multiplying the original fecal coliform TMDL by 0.5875, which is the ratio associated with the single sample maximum criterion (Table 2). This approach is equivalent to establishing the *E. coli* TMDL using the *E. coli* criterion as the TMDL target and a stream flow value consistent with the fecal coliform TMDL. The MOS was calculated with the same approach and ratio. The WLA in the fecal coliform TMDL was calculated using the geometric mean criterion. For the *E. coli* TMDL, the fecal coliform WLA was multiplied by the geometric mean ratio of 0.63 (Table 2) to calculate the *E. coli* WLA for the city of Hill City WWTF. The load allocation was calculated as the balance of the remaining allowable load (LA = TMDL-WLA-MOS), and did not use a conversion ratio, which is consistent with the fecal coliform TMDL. In this submittal, DANR verified that the bacterial source assessment and linkage analysis was still accurate. Since conditions had not changed from the previous TMDL submittal, it was acceptable to rely on the fecal coliform loading capacity and allocation schemes for the new *E. coli* TMDL. The *E. coli* loading capacity and allocations by flow regime for Spring Creek segment 1 are provided in Table 4.

The full water quality dataset is included in Appendix D of the original fecal coliform TMDL (SD DANR, 2008). Existing fecal coliform loads based on these data were converted to *E. coli* loads using a ratio of 0.5875 (Table 2) and percent reductions for each flow regime were calculated as the converted *E. coli* current load minus the *E. coli* converted TMDL divided by the converted *E. coli* current load (Table 4). The fecal coliform TMDL identified critical conditions as the summer period when the creek has the greatest use. This is also the time of high-intensity rainstorm events that can wash-off pollutants from the watershed. The high and moist flow zones correspond with the high-intensity rainstorm events and these zones require 90 and 16 percent reductions, respectively. The low flow zone also requires reductions (38 percent), indicating the presence of in-stream sources, such as livestock (SD DANR, 2008).

Assessment: EPA concludes that the loading capacity was calculated using an acceptable approach, used a water quality target consistent with water quality criteria, and has been appropriately set at a level necessary to attain and maintain the applicable water quality standards. The pollutant loads have been expressed as daily limits. The critical conditions were described and factored into the calculations and were based on a reasonable approach to establish the relationship between the target and pollutant sources.

4. Load Allocation

The TMDL submittal must include load allocations (LAs). EPA regulations define LAs as the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution and to natural background sources. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, separate LAs should be provided for natural background and for nonpoint sources.

In the rare instance that a TMDL concludes that there are no nonpoint sources or natural background for a pollutant, the load allocation must be expressed as zero and the TMDL should include a discussion of the reasoning behind this decision.

The *E. coli* LA was based on the equation: LA = TMDL – WLA – MOS. This approach is consistent with the fecal coliform TMDL (see *TMDL and Allocations* section, p. 6-7) and establishes the LA as the allowable load remaining after the WLA and explicit MOS were accounted for. Table 4 presents the LA across various flow zones. This composite LA represents all nonpoint source contributions, both human and natural, as one allocation. Individual nonpoint source categories were characterized in greater depth in the original fecal coliform TMDL (SD DANR, 2008).

Assessment: EPA concludes that the LAs provided in the TMDL are reasonable and will result in attainment of the water quality standards.

5. Wasteload Allocations

The TMDL submittal must include wasteload allocations (WLAs). EPA regulations define WLAs as the portion of a receiving water's loading capacity that is allocated to existing and future point sources (40 C.F.R. §130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to

nonpoint sources and natural background will result in attainment of the applicable water quality standards, and all point sources have no measurable contribution.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. In some cases, WLAs may cover more than one discharger (e.g., if the source is contained within a general permit).

The Spring Creek segment 1 fecal coliform TMDL established a WLA for the city of Hill City WWTF (Permit #SD0020885) based on the facility's peak design flow (0.93 cubic feet per second) multiplied by the geometric mean fecal coliform criterion (200 CFU/100mL) and a unit conversion factor (SD DANR, 2008). As explained on page 5, the *E. coli* WLA was derived by multiplying the fecal coliform WLA by the geometric mean ratio of 0.63 (Table 2), which is protective of the immersion recreation use. The *E. coli* WLA is presented in Table 4 as a constant load across all five flow zones. Average operations to date at the facility would typically result in discharge of half of the allowable daily load. DANR notes that all discharges are required to meet the immersion recreation single sample maximum and geometric mean water quality criteria (*Point Sources* section, p. 4), which is consistent with the TMDL target. The *E. coli* TMDL would not add new requirements or implementation expectations to the permit.

CAFOs were discussed in the *Point Sources* section (p. 5), but no CAFOs were identified in the Spring Creek segment 1 watershed. Therefore, CAFOs were not assigned an allocation and, thus, are given an WLA of zero. DANR also identified two additional NPDES permits in the watershed (NPDES permits SDG828398 and SDG828533), but they are not permitted to discharge to Spring Creek; therefore, these facilities are not assigned a WLA in the *E. coli* TMDL (i.e., WLA = 0).

Assessment: EPA concludes that the WLAs provided in the TMDL are reasonable, will result in the attainment of the water quality standards and will not cause localized impairments. The TMDL accounts for all point sources contributing loads to impaired segments, upstream segments, and tributaries in the watershed.

6. Margin of Safety

*The TMDL submittal must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load allocations, wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). The MOS may be **implicit** or **explicit**.*

*If the MOS is **implicit**, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is **explicit**, the loading set aside for the MOS must be identified.*

The TMDL contained in this submittal incorporates an explicit MOS approach. The MOS was calculated by translating the MOS in the fecal coliform TMDL using a ratio of 0.5875 associated with the single sample maximum (Table 2) to an *E. coli* load. DANR describes this in the *TMDL and Allocations* section (p. 6). The MOS in the fecal coliform TMDL was calculated as the difference between the loading capacity at the mid-point and minimum of each of flow zone (SD DANR, 2008). The explicit MOS for the *E. coli* TMDL varies by flow zone and is included in Table 4.

Assessment: EPA concludes that the TMDL incorporates an adequate explicit margin of safety.

7. Seasonal Variation

The TMDL submittal must be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

The load duration curve method used to establish this TMDL incorporates variations in stream flow, which in turn, is influenced by other climatic and human factors that change throughout the year. To account for these variations, DANR developed the TMDL at different flow zones as listed in Table 4. In addition to these flow and water quality patterns, the immersion recreation water quality criteria have a seasonal component as they apply during the recreation season (May through September). Additional insight into seasonal variations of bacteria concentrations, stream flow, and pollutant sources are provided in the original fecal coliform TMDL (SD DANR, 2008).

DANR noted that bacteria concentrations exceed the TMDL targets during several different flow regimes, suggesting that bacteria contamination can occur throughout much of the recreation season. The greatest *E. coli* loads are observed during the high and moist flow zones and are associated with watershed-wide spring snowmelt or intense rainfall events (SD DANR, 2008). Bacteria contamination is also observed during low flow conditions when sources are likely to be more localized in the riparian zone and direct to the stream channel. Restoration efforts should account for seasonal patterns to achieve TMDL goals.

Assessment: EPA concludes that seasonal variations were adequately described and considered to ensure the TMDL allocations will be protective of the applicable water quality standards throughout any given year.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by both point and nonpoint sources, EPA guidance (USEPA. 1991) and court decisions say that the TMDL must provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement the applicable water quality standards (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

EPA guidance (USEPA. 1997) also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

The TMDL for Spring Creek segment 1 is developed for an assessment unit impaired by both point and nonpoint sources, thus reasonable assurances must be provided (see the *Implementation* section of the fecal coliform TMDL; SD DANR, 2008). Reasonable assurance justifications are provided for both point and nonpoint sources.

For point sources, the WLA established for the city of Hill City WWTF is based on an *E. coli* effluent concentration at the TMDL target, which is consistent with the current effluent limit, and facility discharge rates. Achieving this WLA, which will be implemented through the NPDES permitting

process, is critical to implementation success. DANR noted that the current loading is well below the WLA (average flow rates are half of the peak design flow used to calculate the WLA) and no violations have been observed in the past three years of effluent monitoring data. Ongoing monitoring of *E. coli* will continue to assess permit compliance and quantify water quality conditions (SD DANR, 2008).

Nonregulatory, voluntary-based reasonable assurances are provided for the LA in the fecal coliform TMDL where the submittal discusses DANR's monitoring strategy to gage TMDL effectiveness in the future (*Follow-up Monitoring* section) and the core aspects of a TMDL implementation strategy (*Implementation* section) (SD DANR, 2008). The *Implementation* section of the fecal coliform TMDL includes a list of BMPs that are recommended to meet the TMDL loads. DANR typically works with local conservation districts or other cooperators to implement watershed water quality improvement projects after the TMDL has been developed and approved. Detailed project implementation plans may be developed as part of this process. DANR used the HSPF modeling results and bacteria source tracking to recommend specific control measures and high priority locations for source reduction. In particular, projects for future implementation include a reduction in livestock access to streams, availability of off-stream watering, installation of riparian buffer strips, and treatment of stormwater runoff in and around Hill City, among others (SD DANR, 2008).

Assessment: EPA considered the reasonable assurances contained in the TMDL submittal and concludes that they are adequate to meet the load reductions. Nonpoint source load reductions are expected to occur through the implementation of best management practices ongoing and planned to begin in the future. Point sources with NPDES permits require that effluent limits are consistent with assumptions and requirements of WLAs for the discharges in the TMDL.

9. Monitoring Plan

The TMDL submittal should include a monitoring plan for all:

- *Phased TMDLs; and*
- *TMDLs with both WLA(s) and LA(s) where reasonable assurances are provided.*

Under certain circumstances, a phased TMDL should be developed when there is significant uncertainty associated with the selection of appropriate numeric targets, estimates of source loadings, assimilative capacity, allocations or when limited existing data are relied upon to develop a TMDL. EPA guidance (USEPA. 2006b) recommends that a phased TMDL submittal, or a separate document (e.g., implementation plan), include a monitoring plan, an explanation of how the supplemental data will be used to address any uncertainties that may exist when the phased TMDL is prepared and a scheduled timeframe for revision of the TMDL.

For TMDLs that need to provide reasonable assurances, the monitoring plan should describe the additional data to be collected to determine if the load reductions included in the TMDL are occurring and leading to attainment of water quality standards.

EPA guidance (USEPA. 1991) recommends post-implementation monitoring for all TMDLs to determine the success of the implementation efforts. Monitoring plans are not a required part of the TMDL and are not approved by EPA but may be necessary to support the decision rationale for approval of the TMDL.

DANR recognizes that during and after implementation of best management practices, monitoring will be necessary to measure attainment of water quality standards. This will generally be accomplished through DANR's ambient water quality monitoring program at the same stations where data were collected to develop the fecal coliform TMDL. The fecal coliform TMDL includes stream-specific monitoring recommendations in the *Follow-up Monitoring* section, including monthly sampling at the inlet to Sheridan Lake, which reflects conditions from the entire segment 1 drainage area. Additional sampling is recommended based on the location of BMPs implemented in the watershed (SD DANR, 2008).

Assessment: Monitoring plans are not a required element of EPA's TMDL review and decision-making process. EPA is taking no action on the monitoring strategy included in the TMDL submittal.

10. Implementation

EPA policy (USEPA. 1997) encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

EPA encourages States/Tribes to include restoration recommendations (e.g., framework) in all TMDLs for stakeholder and public use to guide future implementation planning. This could include identification of a range of potential management measures and practices that might be feasible for addressing the main loading sources in the watershed (see USEPA. 2008b, Chapter 10). Implementation plans are not a required part of the TMDL and are not approved by EPA but may be necessary to support the decision rationale for approval of the TMDL.

In the *Implementation* section of the fecal coliform TMDL, DANR describes a range of implementation considerations for Spring Creek segment 1. Based on the results of the HSPF modeling and bacteria source tracking, DANR identified several BMPs to address the highest sources of loading, including livestock and agricultural uses, followed by urban runoff and other human sources. DANR encourages implementation of the following control measures:

- Reducing direct livestock access to streams by increasing alternative watering sources
- Enhancing riparian vegetation to stabilize streambanks and filter runoff
- Installing filter strips along abutting cropland and pastureland
- Properly managing animal waste management systems at confinement facilities
- Developing a sanitary sewer inspection program for septic systems
- Conducting a litter control program, including cleanup of domestic animal waste, in Hill City
- Installing stormwater BMPs in pervious areas including detention, retention, and infiltration

DANR further identifies specific areas to prioritize implementation activities and potential funding opportunities to support control measures (SD DANR, 2008).

Assessment: Although not a required element of the TMDL approval, DANR discussed how information derived from the TMDL analysis process can be used to support implementation of the TMDL. EPA is taking no action on the implementation portion of the TMDL submittal.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. §25.3 and §130.7(c)(1)(ii)).

The final TMDL submittal must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments (40 C.F.R. §25.3 and §25.8). Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

The submittal explains the public engagement process DANR followed during development of the *E. coli* TMDL on page 7. A draft TMDL report was released for public comment from July 6, 2022 to August 8, 2022. The opportunity for public review and comment was posted on DANR's website and announced in three local newspapers: the Hill City Prevailer, the Black Hills Pioneer, and Rapid City Journal. No public comments were submitted.

Assessment: EPA has reviewed DANR's public participation process and concludes that DANR involved the public during the development of the TMDL and provided adequate opportunities for the public to comment on the draft report.

12. Submittal Letter

The final TMDL submittal must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute (40 C.F.R. §130.7(d)(1)). The final submittal letter should contain such identifying information as the waterbody name, location, assessment unit number and the pollutant(s) of concern.

A transmittal letter with the appropriate information was included with the final TMDL report submission from DANR, dated August 11, 2022 and signed by Paul Lorenzen, Environmental Scientist Manager – TMDL Team Leader, Water Protection Program.

Assessment: EPA concludes that the state's submittal package clearly and unambiguously requested EPA to act on the TMDL in accordance with the Clean Water Act and the submittal contained all necessary supporting information.

References

SD DANR (South Dakota Department of Agriculture and Natural Resources; formerly DENR). 2008. Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Spring Creek, Pennington County, South Dakota. https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_springcreekfecal1208.pdf

SD DANR. 2020. *Escherichia coli* Total Maximum Daily Loads (TMDLs) Conversion with Existing Fecal Coliform TMDLs for Impaired Streams Designated Recreation Uses in South Dakota, Pierre, South Dakota. https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidetranslation_ecoli.pdf

SD DANR. 2022. *The 2022 South Dakota Integrated Report for Surface Water Quality Assessment*. South Dakota Department of Agriculture and Natural Resources. Pierre, South Dakota. https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/docs/DANR_2022_IR_approved.pdf

USEPA. 1986. *Ambient Water Quality Criteria for Bacteria*. EPA 440-5-84-002. Office of Water Regulations and Standards Criteria and Standards Division, United States Environmental Protection Agency, Washington D.C.

USEPA. 1991. *Guidance for water quality-based decisions: The TMDL process.* EPA 440-4-91-001. Office of Water, Assessment and Watershed Protection Division and Office of Wetlands, Oceans, and Watersheds, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 1997. *New policies for establishing and implementing Total Maximum Daily Loads (TMDLs)*. Office of Water, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2000. *Bacterial Indicator Tool User's Guide*. EPA-823-B-01-003. Office of Water, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2001. *Protocol for Developing Pathogen TMDLs*. EPA 841-R-00-002. Office of Water, U.S. Environmental Protection Agency, Washington, DC.

US EPA. 2002. *Implementation Guidance for Ambient Water Quality Criteria for Bacteria.* U.S. Environmental Protection Agency, Office of Water, Washington, DC. EPA-823-B-02-003.

USEPA. 2006a. *Establishing TMDL "Daily" Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit.* Office of Water, Office of Wetlands, Oceans, and Watersheds, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2006b. *Clarification Regarding "Phased" Total Maximum Daily Loads.* Office of Water, Office of Wetlands, Oceans, and Watersheds, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2007. *An Approach for Using Load Duration Curves in the Development of TMDLs.* EPA-841-B-07-006. Office of Water, Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency, Washington, DC.

USEPA. 2008. *Handbook for Developing Watershed Plans to Restore and Protect our Waters.* EPA-841-B-08-002. Office of Water, Environmental Protection Agency, Washington, DC.

USEPA. 2010. *National Pollutant Discharge Elimination System (NPDES) Permit Writers' Manual, Chapter 6, Water Quality-Based Effluent Limitations*. EPA-833-K-10-001. Office of Water, Office of Wastewater Management, Water Permits Division, Washington, DC.

USEPA. 2012. *Recreational Water Quality Criteria*. OW-820-F-12-058. EPA Office of Water, Office of Science and Technology, Washington, DC.

USEPA. 2014. *Water Quality Standards Handbook: Chapter 1: General Provisions.* EPA-820-B-14-008. EPA Office of Water, Office of Science and Technology, Washington, DC.

USEPA. 2017. *Water Quality Standards Handbook: Chapter 3: Water Quality Criteria.* EPA-823-B-17-001. EPA Office of Water, Office of Science and Technology, Washington, DC.

US EPA (2019). BASINS 4.5 (Better Assessment Science Integrating point & Non-point Sources) Modeling Framework. National Exposure Research Laboratory, RTP, North Carolina. BASINS Core Manual.