

*ESCHERICHIA COLI (E. coli)* ADDENDUM TO THE FECAL COLIFORM BACTERIA  
TOTAL MAXIMUM DAILY LOAD (TMDL) FOR WILLOW CREEK SEGMENT 01, DEUEL  
AND CODINGTON COUNTIES, SOUTH DAKOTA



Watershed Protection Program  
Division of Resource Conservation and Forestry  
South Dakota Department of Agriculture and Natural Resources

December 2024

## Contents

LIST OF TABLES.....	ii
INTRODUCTION.....	3
JURISDICTION .....	3
WATER QUALITY STANDARDS AND TMDL TARGETS.....	3
SOURCE ASSESSMENT.....	4
POINT SOURCES .....	4
NONPOINT SOURCES .....	5
TMDL AND ALLOCATIONS .....	6
SUMMARY.....	7
PUBLIC COMMENT.....	7
LITERATURE CITED .....	8
APPENDIX A: PERMITS .....	9
APPENDIX B: <i>E. COLI</i> DATA.....	10

## LIST OF TABLES

Table 1. Designated recreation uses and associated bacteria criteria designated Willow Creek.....	4
Table 2. Applicable bacteria criteria and ratio for the limited contact recreation use.....	6
Table 3. Existing fecal coliform TMDL and allocations for Willow Creek segment 01 based on the applicable bacteria criteria for limited contact recreation from the 2005 fecal coliform TMDL.....	6
Table 4. <i>E. coli</i> TMDL and Load allocations for Willow Creek segment 01 based on the applicable bacteria criteria for limited contact recreation.....	7

## 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) November 8, 2020, reissued following the correction of a minor clerical error on June 6, 2022 (SD DANR A, 2022).

Willow Creek segment 01 (Big Sioux River to S7, T117N, R50W) or **SD-BS-R-WILLOW\_01** is considered impaired for the designated limited contact recreation use due to *E. coli* in South Dakota's most recent 303(d) list documented in the 2024 Integrated Report (IR) and is considered high priority for TMDL development (SD DANR, 2024). The purpose of this addendum is to convert the previous fecal coliform TMDL (North Central Big Sioux TMDL; SD DANR, 2005), to the *E. coli* standard.

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, and
- The 2005 North Central Big Sioux fecal coliform TMDL assumptions (e.g., source contributions, loading capacity, etc.) are still valid.

This addendum demonstrates the factors are met and it is appropriate to apply the process and rationale described in the 2020 bacteria translation TMDL (SD DANR, 2022). Appendix B of the 2005 North Central Big Sioux River TMDL document contains the bacteria sample data used for analysis. Appendix B of this addendum also contains *E. coli* data that has been sampled for Willow Creek segment 01 since 2015, confirming the waterbody is still consistently demonstrating impairment for *E. coli*. Willow Creek segment 01 was listed as impaired for *E. coli* in 2018. The intent of this document is to convert the existing fecal coliform TMDL and allocations for Willow 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 Willow Creek fecal coliform TMDL (TMDL ID# 34507; approved by EPA in June 2008) by incorporating an *E. coli* TMDL and allocations for Willow Creek segment 01 (SD DANR, 2005).

## JURISDICTION

Willow Creek segment 01 originates in South Dakota where it is the outlet of Round Lake extending 25.2 miles meeting the Big Sioux River (SD-BS-R-BIG\_SIOUX\_02) about 1 mile south of the City of Watertown. SD-BS-R-Willow\_01 falls entirely within state jurisdiction (Figure 1 pg. 335 North Central Big Sioux TMDL; SD DANR, 2005). The HUC 12 (101702010702) has an area of 79,931 acres.

## 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 fecal coliform TMDL for Willow Creek 01 used the SSM as the TMDL target for Limited Contact Recreation (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 segment identified in the 2005 Willow Creek 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 uses and associated bacteria criteria designated Willow Creek.

Impaired Stream Segment AUID	Designated Recreation Use	Fecal Coliform Geomean CFU/100mL	Fecal Coliform SSM CFU/100mL	<i>E. coli</i> Geomean CFU/100 mL	<i>E. coli</i> SSM CFU/ 100mL
SD-BS-R-WILLOW_01	Limited Contact Recreation	≤1,000	*≤2,000	≤630	*≤1,178

\*Refers to numeric criteria used for TMDL development

## SOURCE ASSESSMENT

### POINT SOURCES

All active permits within Willow Creek segment 01 drainage basin can be found in Appendix A. The permits do not contribute to any violations of surface water quality criteria. Any Stormwater Permits (SWP) located in this watershed are not contributors to bacteria loading. The only point source that was identified within the original TMDL document, Benchmark Foam, Inc. (SD0025895), no longer is a permitted facility. At the time the original TMDL was written the facility did not discharge and was not a source of bacteria contribution. The Watertown MS4 does not apply to this specific segment since none of the outfalls drain into Willow Creek. All outfalls drain into the Big Sioux River segment 2 (SD-BS-R-BIG\_SIOUX\_02). A Waste Load Allocation (WLA) was not assigned since these permits are not expected to be a source of bacteria loading pollution within the stream.

### **Concentrated Animal Feeding Operations (CAFOs)**

A recent search found that there is one facility located in the Willow Creek segment 01. Modak Dairy (SDG-100416) is a dairy cattle facility that is in a housed lot. All CAFO's are required to maintain compliance with provisions of the Water Pollution Control Act (SDCL 34A-2). SDCL 34A-2-36.2 requires each concentrated animals feeding operations, as defined by Title 40 Codified Federal Regulations Part 122.23 Dated January 1, 2007, to operate under a general or individual water pollution control permit issued pursuant to 34A-2-36. The general permit ensures that all CAFO's in SD have permit coverage regardless of if they meet conditions for coverage a NPDES permit.

All facilities with a general permit number that starts with SDG-1\* are covered under the 2017 General Water Pollution Control Permit for Concentrated Animal Feeding Operations. The 2017 general permit allows no discharge of manure or process wastewater from operations with state permit coverage or NPDES permit coverage for new source swine, poultry, and veal operations, and other housed lots with covered manure containment systems. Operations also have the option to apply for a state issued NPDES permit. Operations covered by the 2017 general permit or NPDES permit for open or housed lots with uncovered manure containment systems can only discharge manure or process wastewater from properly designed, constructed, operated and maintained manure management systems in the event of 25-year, 24-hour storm event if they meet the permit conditions. Both the 2003 and 2017 general permits have nutrient management planning requirements based on EPA's regulations and the South Dakota Natural Resources Conservation Services 590 Nutrient Management Technical Standard to ensure the nutrients are applied at agronomic rates with management practices to minimize the runoff of nutrients. Additionally, the general permits include design standards, operation, maintenance, inspection, record keeping, and reporting requirements.

(<https://danr.sd.gov/Agriculture/Livestock/FeedlotPermit/default.aspx>)

As long as a CAFO complies with the general permit requirements ensuring their dischargers are unlikely and indirect loading events, the TMDL assumes their *E.coli* contribution is minimal, and unless found otherwise, no additional permit conditions are required by this TMDL.

## NONPOINT SOURCES

The nonpoint source assessment for Willow Creek segment 01 is documented in the 2005 Willow Creek fecal coliform TMDL and the conclusions of that 2005 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.

The 2005 TMDL breaks down Willow Creek's Watershed as follows, with 62% (49,319 acres) of land being used for cropland, 33% (26,511 acres) being used for range/grassland, 4% (2887 acres) being occupied by water, and 1% (1214 acres) claimed as building/ farmstead. This land use data is derived using the AnnAGNPS Model (<https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/docs/annagnps-pollutant-loading-model/>) . Today, we use Earth Resources Observation and Science (EROS) Center, National Land Cover Database (NLCD) to assess land use in South Dakota. Using the EROS's NLCD layer for 2004 we find the land use distribution similar to the AnnAGNPS estimates, but with forest and urban being added used as designation classes. Using the 2004 NLCD layer the Willow Creek Watershed breaks down as follows, with 57.18% of land being used as cropland, 34.12% as pasture/grass, 6.38% for urban areas, 1.15% for non-use such as water and barren land and finally 0.57% of land covered in some sort of forested vegetation. The 2021 NLCD layer showed similar percentages with 57.05% cropland, 33.86% pasture, 7.26% urban, 1.21% non-use, and 0.61% forest. The NLCD layer shows insignificant changes between the years 2004 and 2021. Land use and bacteria production characteristics in the impaired watersheds are expected to be similar to that documented during the respective Fecal Coliform TMDL assessment.

## TMDL AND ALLOCATIONS

A Load Duration Curve method was used to develop the fecal coliform bacteria loading, (concentration) x (flow), using zones based on hydrologic conditions to develop the fecal coliform TMDL for the 2005 Willow Creek segment. The criteria approach was used to convert the existing fecal coliform TMDL and allocations to *E.coli* for each flow zone. The *E.coli* TMDL, WLA, load allocation (LA), and margin of safety (MOS) were calculated by multiplying the existing fecal coliform values by the ratio (EC:FC) for the SSM (Table 2). 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 Willow Creek 01 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 (Table 4). This calculation results in percent reductions identical to the Willow Creek 01 fecal coliform TMDL ( Table 3).

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

Fecal coliform criteria	<i>E. coli</i> criteria	EC:FC ratio
GM 1000	GM 630	0.63
SSM 2000	SSM 1178	0.589

The *E. coli* TMDL is protective of applicable criteria assigned to the limited contact recreation use designated to Willow Creek segment 01. The 2005 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 Willow 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.

Table 3. Existing fecal coliform TMDL and allocations for Willow Creek segment 01 based on the applicable bacteria criteria for limited contact recreation from the 2005 fecal coliform TMDL.

Flow Zone	Fecal TMDL (CFU/day)	WLA (CFU/day)	LA (CFU/day)	MOS (CFU/day)	Current Load (CFU/day)	% Reduction
High	5.33E+12	0.00E+00	4.80E+12	5.33E+11	2.23E+13	76.10%*
Moist	4.89E+11	0.00E+00	4.40E+11	4.89E+10	1.74E+11	0.00%
Mid-Range	9.79E+10	0.00E+00	8.81E+10	9.79E+09	1.44E+10	0.00%
Dry	1.86E+10	0.00E+00	1.67E+10	1.86E+09	1.78E+10	0.00%*
Low	2.45E+09	0.00E+00	2.21E+09	2.45E+08	0.00E+00	0.00%

\*Minor rounding errors corrected from original Fecal Coliform TMDL.

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

Flow Zone	<i>E. coli</i> TMDL (CFU/day)	WLA (CFU/day)	LA (CFU/day)	MOS (CFU/day)	<i>E. coli</i> Current Load (CFU/day)	% Reduction
High	3.13E+12	0.00E+00	2.82E+12	3.13E+11	1.31E+13	76.10%
Moist	2.87E+11	0.00E+00	2.59E+11	2.87E+10	1.02E+11	0.00%
Mid-Range	5.75E+10	0.00E+00	5.18E+10	5.75E+09	8.46E+09	0.00%
Dry	1.09E+10	0.00E+00	9.83E+09	1.09E+09	1.05E+10	0.00%
Low	1.44E+09	0.00E+00	1.30E+09	1.44E+08	0.00E+00	0.00%

## 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 2005 fecal coliform TMDL for Willow Creek segment 01 (**SD-BS-R-WILLOW\_01**) to *E. coli*. Therefore, this document serves as an *E. coli* TMDL addendum to the 2005 fecal coliform TMDL for Willow Creek segment 01 (TMDL # 34507). The addended *E. coli* TMDL and allocations follow the assumptions of the 2005 fecal coliform TMDL. The fecal coliform and *E. coli* TMDLs for Willow Creek segment 01 were developed in accordance with Section 303(d) of the federal Clean Water Act and guidance provided by the US EPA.

The South Dakota DNR partners with Day County Conservation District, helping implement the Prairie Couteau Project with section 319 funds to help landowners with Best Management Practices (BMP) within the Big Sioux River Watershed. Willow Creek Segment 01 is located in this watershed, and the project is working to reduce *E. coli* numbers within the watershed.

## 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 Watertown Public Opinion, Brookings Register, and the Sioux Falls Argus Leader newspapers 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 October 29, 2024 and ended November 29, 2024. No comments were received during the public comment period.

## LITERATURE CITED

Earth Resources Observation and Science (EROS) Center, 2023. National Land Cover Database (NLCD) 2021: Conterminous U.S. Land Cover. <https://www.usgs.gov/media/images/national-land-cover-database-nlcd-2021-conterminous-us-land-cover>

Earth Resources Observation and Science (EROS) Center, 2023. National Land Cover Database (NLCD) 2004: Conterminous U.S. Land Cover. <https://www.mrlc.gov/data?f%5B0%5D=category%3ALand%20Cover&f%5B1%5D=year%3A2004>

SD DANR, 2005. PHASE 1 WATERSHED ASSESSMENT FINAL REPORT AND TMDL NORTH-CENTRAL BIG SIOUX RIVER. South Dakota Department of Agriculture and Natural Resources, Pierre, SD. [https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl\\_bigsiouxnorthcentral.pdf](https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_bigsiouxnorthcentral.pdf)

SD DANR, 2022. *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](https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidetranslation_ecoli.pdf)

SD DANR, 2024. The 2024 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/waterqualitystandards/docs/DANR\\_2024\\_IR\\_final.pdf](https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/waterqualitystandards/docs/DANR_2024_IR_final.pdf)



## APPENDIX A: PERMITS

segment	#	CWPName	Watertown Permits	SourceID	RegistryID	DFR URL
willow	1	10TH AVE SE EXTENSION	General Permit Covered Facility	SDR10K037	110071322679	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10K037&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10K037&amp;sys=ICP</a>
willow	2	LOTS 1 & 2 MORRIS FIRST ADDITION	General Permit Covered Facility	SDR10K266	110071323012	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10K266&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10K266&amp;sys=ICP</a>
willow	3	LOTS 1-2 BLOCK MORRIS ADDITION	General Permit Covered Facility	SDR10I190	110071323938	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10I190&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10I190&amp;sys=ICP</a>
willow	4	NORTH AMERICAN TRUCK & TRAILER	General Permit Covered Facility	SDR10K734	110071320920	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10K734&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10K734&amp;sys=ICP</a>
willow	5	THE LAKES OF WILLOW CREEK FIRST ADDITION	General Permit Covered Facility	SDR10J730	110071279104	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10J730&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10J730&amp;sys=ICP</a>
willow	6	WQCV PROJECT	General Permit Covered Facility	SDR10J536	110071275546	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10J536&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10J536&amp;sys=ICP</a>
willow	7	CO-HO REGIONAL POND	General Permit Covered Facility	SDR10I327	110071324437	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10I327&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10I327&amp;sys=ICP</a>
willow	8	CROWNED RIDGE II TRANSMISSION LINE	General Permit Covered Facility	SDR10J564	110071280140	<a href="https://echo.epa.gov/detailed-facility-report?fid=SDR10J564&amp;sys=ICP">https://echo.epa.gov/detailed-facility-report?fid=SDR10J564&amp;sys=ICP</a>

## APPENDIX B: *E. COLI* DATA

<b>SampleDate</b>	<b><i>E.coli</i> (CFU/100mL)</b>	<b>SampleDate</b>	<b><i>E.coli</i> (CFU/100mL)</b>
08/08/2019	365	07/19/2021	1120
08/21/2019	435	08/02/2021	2760
09/04/2019	323	08/16/2021	23
09/16/2019	770	08/17/2021	51
09/23/2019	727	09/09/2021	24
10/07/2019	260	09/14/2021	261
05/07/2020	1260	09/20/2021	122
06/02/2020	231	09/20/2021	<1
06/08/2020	365	10/18/2021	1730
06/22/2020	727	05/11/2022	26
07/06/2020	435	05/23/2022	30
07/08/2020	107	06/01/2022	14100
07/20/2020	228	06/13/2022	488
08/03/2020	109	07/06/2022	167
08/06/2020	39	07/11/2022	435
08/17/2020	37	08/10/2022	65
09/01/2020	110	08/15/2022	99
09/08/2020	299	08/15/2022	150
09/21/2020	270	08/15/2022	<1
10/19/2020	143	09/14/2022	7
04/19/2021	13	09/19/2022	161
04/19/2021	19	05/08/2023	1720
04/19/2021	<1	05/22/2023	46
05/03/2021	25	06/05/2023	219
05/10/2021	11	06/26/2023	548
05/24/2021	20	07/10/2023	1410
06/07/2021	199	07/17/2023	62
06/08/2021	272	08/07/2023	23
06/23/2021	1550	08/09/2023	33
07/08/2021	145	09/06/2023	293
07/12/2021	1120	09/11/2023	35



**REGION 8**

DENVER, CO 80202

SENT VIA EMAIL

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

Re: Approval of *Escherichia coli* (*E. coli*) Addendum to the Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Willow Creek Segment 01, Deuel and Codington Counties, South Dakota

Dear Secretary Roberts:

The U.S. Environmental Protection Agency (EPA) has completed review of the *E. coli* addendum to the fecal coliform bacteria total maximum daily load (TMDL) submitted by your office on January 6, 2025. 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 01 of Willow Creek in the Big Sioux basin, with the exception of waters within lands of exclusive federal jurisdiction. 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 includes a margin of safety. The EPA's rationale for this action is contained in the enclosure.

We appreciate the South Dakota Department of Agriculture & Natural Resources efforts to complete this TMDL. If you have any questions, please contact Amy King on my staff at (303) 312-6708.

Sincerely,

Stephanie DeJong, Manager  
Clean Water Branch

Enclosure

cc: Paul Lorenzen, Watershed Protection Program Administrator, South Dakota DANR  
Alan Wittmuss, TMDL Team Leader, South Dakota DANR

## EPA'S TOTAL MAXIMUM DAILY LOAD (TMDL) DECISION RATIONALE

**TMDL:** *Escherichia coli* (*E. coli*) Addendum to the Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Willow Creek Segment 01, Deuel and Codington Counties, South Dakota

**ATTAINS TMDL ID:** R8-SD-2025-02

**LOCATION:** Deuel and Codington 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/POLLUTANTS ADDRESSED IN THIS TMDL ACTION

Assessment Unit ID	Waterbody Description	Pollutants Addressed
SD-BS-R-WILLOW_01	Willow Creek (Big Sioux River to S7, T117N, R50W)	<i>E. coli</i>

**BACKGROUND:** The South Dakota Department of Agriculture and Natural Resources (DANR) submitted to the EPA the final *E. coli* TMDL for segment 01 of Willow Creek, with a letter requesting review and approval dated January 6, 2025.

The TMDL submittal included:

- Letter requesting the EPA's review and approval of the TMDL
- Final TMDL report for *Escherichia coli* (*E. coli*) Addendum to the Fecal Coliform Bacteria Total Maximum Daily Load (TMDL) for Willow Creek Segment 01, Deuel and Codington Counties, South Dakota

This river segment is subject to an existing fecal coliform TMDL approved by the EPA on June 4, 2008 (SD DANR, 2005; ATTAINS Action ID #34507). Appendix FF contains the fecal coliform TMDL for Willow Creek. Since that time the EPA has recommended states establish *E. coli* criteria after scientific advancements demonstrated *E. coli* was a better indicator of fecal contamination and recreational harm than fecal coliform (EPA, 2012). South Dakota 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 initial set of converted *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 TMDL submittal is to revisit the existing fecal coliform TMDL for Willow 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. This serves as an addendum to the fecal coliform TMDL which remains effective and is not withdrawn. Most of the data, maps, figures, assumptions, and analyses discussed in this TMDL submittal are contained in Appendix FF of the original fecal coliform TMDL (SD DANR, 2005; ATTAINS Action ID #34507) and are not repeated in the

*E. coli* report. Page number and section references to the original fecal coliform TMDL are associated with Appendix FF specifically.

**ACTION:** Based on the EPA’s review of South Dakota’s TMDL submittal and other relevant information in the administrative record, the EPA approves the final *E. coli* TMDL for Willow Creek segment 01.

<b>TMDL Approval Summary</b>	
Number of TMDLs Approved:	1
Number of Parameters Addressed by	1

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

This TMDL decision rationale sets forth the EPA’s reasoning for approving South Dakota’s *E. coli* Addendum to the Fecal Coliform Bacteria TMDL for Willow Creek Segment 01. The EPA has conducted a complete review of the state’s TMDL and supporting documentation and information. This document tracks the EPA’s guidelines (EPA, 2002a) that summarize the effective statutory and regulatory requirements relating to TMDLs (CWA Section 303(d) and 40 C.F.R. Part 130).

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

Willow Creek (Big Sioux River to S7, T117N, R50W) or SD-BS-R-WILLOW\_01 is a 32.89-mile tributary to the Big Sioux River in eastern South Dakota. The creek itself runs through Deuel and Codington counties, while the nearly 80,000 acre watershed also includes portions of Grant County. This segment begins at the outlet of Round Lake and ends at the confluence with segment 02 of the Big Sioux River, just south of the city of Watertown (see *Jurisdiction* as well as Figures 1 and 2 and the *Introduction and Problem Identification* sections in SD DANR, 2005).

Willow Creek segment 01 was first listed as impaired for *E. coli* and placed on South Dakota’s 303(d) list in 2018. It was assigned a high priority (i.e., 1) for TMDL development on the 2024 EPA-approved 303(d) list (SD DANR, 2024). DANR documented this priority ranking information on page 3 of the submittal. Other than the earlier fecal coliform impairment, no other known impairments currently exist for segment 01 of Willow Creek. Segment 02 of the Big Sioux River, downstream of Willow Creek, is not attaining its limited contact recreation use because *E. coli* is exceeding the numeric criteria (scheduled for TMDL development in 2036; SD DANR, 2024).

In 2020 DANR adopted 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 this Willow 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 Willow Creek segment 01; therefore, the conversion process can be applied to calculate *E. coli* TMDLs and allocations.

The *Nonpoint Sources* section (p. 5) of the *E. coli* addendum confirms that the nonpoint source assessment presented in the fecal coliform TMDL remains applicable. Watershed runoff is the primary source of bacteria in the watershed. In both 2004 and 2021 land use layers (EROS, 2023a, 2023b), the land use distribution is cropland (57 percent) and pasture/grazing (34 percent), followed by smaller areas of urban (6-7 percent), water (1 percent), and forest (less than 1 percent). Two percent of the nonpoint source load was attributed to natural background sources associated with wildlife. The remainder of the nonpoint source loading is from agriculture (cropland and pastureland), and residential areas including septic systems. Small portions of the cities of Watertown, Kranzburg, and Goodwin are in the southern part of the drainage (Figures 2 and 4 in SD DANR, 2005).

The fecal coliform TMDL included an analysis using the Agricultural Non-Point Source Pollution (AGNPS) model to estimate runoff potential from feedlots and other land-based sources (note: this tool was also used to estimate the land use areas in the fecal coliform TMDL). This analysis showed that the Willow Creek monitoring station near Watertown is downstream of most of the feedlots that had the greatest potential to cause water quality problems, so any loading associated with these sources should be reflected in the monitoring data and accounted for in the existing conditions estimates. Except for the one permitted facility described below, DANR concluded that none of the other feedlots meet the conditions that require a permit, so they are a nonpoint source of *E. coli* pollution in this TMDL.

The *Point Sources* section (p. 4-5) and Appendix A of the *E. coli* addendum identifies all NPDES facilities in the Willow Creek segment 01 watershed. This comprehensive discussion provides a watershed-scale accounting of potential point sources. DANR identified each permittee by facility name, permit number, and permit type and also described a rationale for wasteload allocations (WLA) (p. 4-5, Appendix A). One traditional non-stormwater NPDES permitted facility, one municipal separate storm sewer system (MS4), eight general construction stormwater sites and one Concentrated Animal Feeding Operation (CAFO) are documented as they may directly contribute *E. coli* to the impaired segment.

The fecal coliform TMDL included one traditional non-stormwater NPDES permitted facility (Benchmark Foam, Inc., SD0025895) with a WLA of zero as the facility did not discharge. DANR reviewed the permit documentation and found that the permit was terminated in 2012; therefore, EPA agrees with the conclusion that no WLA was assigned in the *E. coli* TMDL.

The City of Watertown has a population in excess of 10,000 and, therefore, is subject to Phase II requirements of the MS4 regulations. Phase II MS4s are covered by a general permit. DANR discussed the City of Watertown's MS4 on page 4 (Permit # SDR41A010). DANR reviewed permit information

including outfall locations. None of the MS4 outfalls drain to segment 01 of Willow Creek and are not sources of *E. coli* to the creek. Therefore, the MS4 does not receive a WLA in the *E. coli* TMDL for Willow Creek but will be considered in any future TMDLs for downstream waters, including the Big Sioux River segment 02.

Currently there are eight non-major construction sites covered by DANR's construction stormwater general permit that have ongoing operations in the watershed (Appendix A). The status of these construction projects is currently unknown; however, they are considered active by DANR until the permitted party opts to terminate the permit coverage. The permit authorizes discharge of stormwater but does not authorize discharge if the discharge will cause or have the reasonable potential to cause or contribute to violations of surface water quality. Stormwater construction activities must have coverage and comply with South Dakota's General Permit Authorizing Stormwater Discharges Associated with Construction Activities ensuring that discharges are minimal. The permit requires permittees to implement best management practices to secure portable toilets so they are not tipped over and ensure proper removal and disposal of waste. Construction activities are not expected to discharge bacteria. These permittees are therefore not a source of *E. coli* pollution and a WLA was not assigned in the TMDL.

One CAFO, Modak Dairy (SDG-100416), is located in the Willow Creek segment 1 watershed. This is a dairy cattle facility in a housed lot (p. 4-5). All CAFOs are required to maintain compliance with provisions of the South Dakota Water Pollution Control Act (SDCL 34A-2). SDCL 34A-2-36.2 requires each CAFO, as defined by Title 40 Code of Federal Regulations Part 122.23 dated January 1<sup>st</sup>, 2007, to operate under a general or individual water pollution control permit issued pursuant to 34A-2-36. The general control permit ensures that all CAFOs in South Dakota have permit coverage regardless of if they meet conditions for coverage under a NPDES permit. DANR notes that as long as these facilities comply with the general CAFO permit requirements ensuring their discharges are unlikely and indirect loading events, the TMDL assumes their *E. coli* contribution is minimal, and unless found otherwise, no additional permit conditions are required by this TMDL (p. 4-5).

The magnitude of pollutant sources is quantified in the original fecal coliform TMDL using information and assumptions that vary depending on the source type. For example, the process and assumptions used to estimate septic system contribution was adequately explained and involved applying an assumed failure rate consistent with primary literature and local information (EPA, 2002b). Nonpoint source loads were calculated using the AGNPS model, which included runoff from agricultural lands and feedlots (page 9 and Appendix T in SD DANR, 2005). The U.S. Department of Agriculture and National Resources Conservation Service jointly designed the AGNPS tool specifically "to assist with determining [best management practices (BMPs)], *the setting of TMDLs*, [emphasis added] and for risk & cost/benefit analyses" (USDA, 2023). Other data sources and information used are routinely cited and appropriate for the study. Overall, storm event samples had higher loads (including the four highest observed loads), suggesting that runoff from storm events was the primary cause of bacteria loading (*Linkage Analysis* section of SD DANR, 2005).

**Assessment:** The 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 *Water Quality Standards and TMDL Targets* section (p. 3-4) describes the water quality standards applicable to the impaired segment with citations to the relevant South Dakota regulations. SD-BS-R-WILLOW\_01 is designated the following beneficial uses:

- warmwater marginal fish life propagation,
- limited contact recreation,
- fish and wildlife propagation, recreation, and stock watering, and
- irrigation waters.

DANR determined that *E. coli* is preventing the creek's limited contact recreation use from being fully supported. Numeric criteria are provided for the most sensitive use, which is limited contact recreation, in Table 1. Numeric *E. coli* criteria established to protect this recreation use are comprised of a 30-day mean criterion ( $\leq 630$  colony forming units per 100 milliliters [CFU/100mL]) and a single sample maximum criterion ( $\leq 1,178$  CFU/100mL) (Table 1). These criteria are seasonally applicable from May 1 to September 30.

The numeric *E. coli* criteria for limited contact recreation waters are applied directly as water quality targets for this TMDL. DANR reasonably 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 limited contact recreation single sample maximum criterion (1,178 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 TMDL is consistent with South Dakota antidegradation policies because it provides recommendations and establishes pollutant limits at water quality levels necessary to meet criteria and fully support existing beneficial uses, including downstream uses.

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

## 3. Loading Capacity - Linking Water Quality and Pollutant Sources

The original fecal coliform TMDL relied on the load duration curve approach to define the fecal coliform loading capacity of Willow Creek segment 01. 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. The EPA has published guidance on the use of duration curves for TMDL development (EPA, 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), WLA, and margin of safety (MOS), and expressed the TMDL in CFUs per day. Data analyses illustrate the loading capacity and existing loads in different flow zones (i.e., high, moist, mid-range, dry and low; see Figure 3 of the fecal coliform TMDL). 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 (EPA, 2001).

DANR calculated the *E. coli* TMDL by multiplying the existing fecal coliform TMDL by the ratio associated with the applicable bacteria standards (Table 1). The fecal coliform TMDL was established using a target of 2,000 CFU/100mL. The applicable *E. coli* criterion is 1,178 CFU/100mL. Thus, the *E. coli* TMDL for Willow Creek segment 01 was established by multiplying the original fecal coliform TMDL by 0.589, 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 WLA, LA and MOS were all calculated with the same approach and ratio. In this TMDL 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 for Willow Creek segment 01 are provided in Table 4.

The full water quality dataset is included in Appendix B of the original fecal coliform TMDL (SD DANR, 2005). Existing conditions and percent reductions in the fecal coliform TMDL were based on the median loads. Figure 3 of the fecal coliform TMDL illustrates that the allowable loads are met in all flow zones except the high flow zone when evaluating the median loads; however, individual exceedances were also observed in the moist and dry flow zones. No data were available to assess current conditions in the low flow zone. These data analysis suggests runoff from the land surface is the primary source (i.e., cropland and pastureland) along with some in-channel loading.

In addition, Appendix B of this TMDL submittal includes recent *E. coli* data collected for Willow Creek segment 01, which demonstrated ongoing impairment. Out of 62 *E. coli* samples collected between 2019 and 2023, seven (or 11 percent) exceeded the limited contact recreation single sample maximum criteria.

Current fecal coliform conditions based on the median loads in each flow regime (Table 3) were converted to *E. coli* loads using a ratio of 0.589 (Table 2). In addition, 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 TMDL requires a 76.1 percent reduction in the high flow zone and no reductions in the other flow zones (Table 4). These reductions are consistent

between the fecal coliform and *E. coli* TMDLs; however, on page 6 DANR noted there were errors in the percent reduction calculations of the original fecal coliform TMDL.

DANR adequately took critical conditions into account by reviewing the variability of water quality across various stream flows, rainfall events, and runoff characteristics, and then establishing the TMDL and directing future implementation activities consistent with those identified critical conditions. The fecal coliform TMDL identified critical conditions as runoff conditions during the recreation season. This is the time of high-intensity rainstorm events that can wash off pollutants from the watershed.

**Assessment:** The EPA concludes that DANR's loading capacity was calculated using an acceptable approach or water quality model, used observed concentration data and a water quality target consistent with numeric water quality criteria, and has been appropriately set at a level necessary to attain and maintain the applicable water quality standards. The pollutant caps 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 *E. coli* LA was based on the conversion from the fecal coliform LA using the ratio in Table 2 (see *TMDL and Allocations* section, p. 6-7). Table 4 presents the LA, separated by flow zone. The LA represents all nonpoint source contributions, both human and natural. Natural background was estimated at two percent of the loading and the remainder of the LA is associated with bacteria contribution from land uses, including cropland, pastureland, and residential areas (p. 11 in SD DANR, 2005).

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

#### 5. Wasteload Allocations

All NPDES permitted facilities within the Willow Creek watershed were identified and reviewed for WLA consideration in the *Point Sources* section on p. 4-5. Ultimately, no WLAs are included in this TMDL submittal. There are no permitted point source facilities that discharge bacteria to Willow Creek segment 1; therefore, there are no point source contributors of *E. coli*. This is supported by the rationale for each permittee below.

The Willow Creek segment 01 fecal coliform TMDL established a WLA of zero for Benchmark Foam, Inc. (Permit #SD0025895). This permit was terminated in 2012 and a WLA was not assigned in the *E. coli* TMDL. DANR also discussed the City of Watertown's MS4 (Permit # SDR41A010) on page 4. The MS4 outfalls all drain to segment 02 of the Big Sioux River and are not sources of *E. coli* to Willow Creek. Therefore, a WLA was not assigned to the City of Watertown MS4 (Permit # SDR41A010) in this TMDL.

Other permits were discussed in the *Point Sources* section (p. 4-5). These include eight general construction stormwater sites (Appendix A) and one CAFO. Given that construction permits must have coverage and comply with South Dakota's General Permit Authorizing Stormwater Discharges Associated with Construction Activities and compliance with permit requirements for portable toilets is expected to result in no discharge of bacteria, the TMDL assumes the permittees will not contribute *E. coli*. Therefore, WLAs were not assigned to the construction stormwater permittees in the Willow Creek watershed.

Modak Dairy (SDG-100416) is the sole CAFO in the Willow Creek segment 01 watershed. The CAFO permittee was not assigned a WLA in the TMDL given it is not permitted to discharge waste in accordance with provisions of its NPDES permit (p. 4-5). The TMDL assumes its *E. coli* contribution is minimal, and unless found otherwise, no additional permit conditions are required by this TMDL. Therefore, the WLA assigned to CAFOs was set at zero in all five flow zones.

**Assessment:** The EPA concludes that the WLA provided in the TMDL is 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

This TMDL submittal incorporates an explicit MOS approach. The MOS was calculated by translating the MOS in the fecal coliform TMDL to an *E. coli* load using a ratio of 0.589 associated with the single sample maximum (Table 2). DANR describes this in the *TMDL and Allocations* section (p. 6). The MOS in the fecal coliform TMDL was calculated as 10 percent of the loading capacity (SD DANR, 2005), which is reasonable given the technical approach followed (e.g., no quantified modeled uncertainty) and accounts for uncertainties encountered throughout the development process like those associated with a limited water quality dataset, among others. The explicit MOS for the *E. coli* TMDL is included in Table 4.

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

## 7. Seasonal Variation

The load duration curve method used to evaluate water quality conditions 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 evaluated the data at different flow zones as shown in Figure 3 and Table 5 of the fecal coliform TMDL (SD DANR, 2005). The data analyses demonstrated the largest exceedances during the high flow zone, associated with watershed-wide snowmelt or runoff events, and 57 percent of the fecal coliform exceedances were associated with a rainfall event (Figure 3 of the fecal coliform TMDL). In addition to these flow and water quality patterns, the limited contact recreation water quality numeric criteria have a seasonal component as they apply during the

recreation season (May through September). Restoration efforts should account for seasonal patterns to achieve TMDL goals.

**Assessment:** The 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

The *E. coli* TMDL for Willow Creek segment 01 is for a nonpoint source-only impaired water. Still, nonregulatory, voluntary-based reasonable assurances are provided for the LA where the submittal discusses DANR's collaboration with the Day County Conservation District (*Summary* section) which has a goal to reduce bacteria loading. Details on load reduction strategies are provided in the fecal coliform TMDL including a section on BMP recommendations by flow regime (p. 113-121 in SD DANR, 2005) and monitoring recommendations that will be used to gage BMP effectiveness (*Follow-up Monitoring* in SD DANR, 2005). Implementation has already been ongoing for several decades. The TMDL presents percent reductions converted from the median existing fecal coliform loads; however, it is important to note that the more recent 2019-2023 *E. coli* data demonstrate a lower percent exceedance (11 percent; Appendix B) compared to the 2001-2002 fecal coliform data (37 percent [Table 1 in SD DANR, 2005]).

**Assessment:** The EPA concludes that reasonable assurances are not required for this nonpoint source-only TMDL. Nonpoint source load reductions are expected to occur through the implementation of best management practices as described in the incentive and voluntary program plans in place, in progress or planned to begin in the near future.

## 9. Monitoring Plan

DANR recognizes that during and after implementation of BMPs, 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 monitoring recommendations in the *Follow-Up Monitoring* section, including post-implementation sampling at BMP sites and recurring ambient monitoring (SD DANR, 2005). This submittal is not considered a phased TMDL.

**Assessment:** The TMDL submittal includes a long-term monitoring commitment. The EPA supports these future monitoring plans and recommends the state consider additional monitoring to track overall progress of TMDL implementation.

## 10. Implementation

In the *Implementation Plan* section of the fecal coliform TMDL, DANR describes implementation considerations for Willow Creek segment 01. DANR identified the need to identify and install

agricultural BMPs to reduce loads during runoff events and during dry periods (SD DANR, 2005). In particular, the fecal coliform TMDL identifies BMPs useful to reduce bacteria loading under different flow regimes (p. 113-121 in SD DANR, 2025). For high flow zones, pertinent BMPs include riparian buffers and feedlot runoff containment. Fertilizer management (i.e., manure application), alternative livestock watering and fencing/grazing management may also be useful given the sources and conditions contributing to impairment in the TMDL watershed.

The *E. coli* addendum recognizes DANR's collaboration with the Day County Conservation District (see *Summary* section). This collaboration helps to implement the Prairie Couteau Project by providing CWA Section 319 funds and other assistance to landowners implementing BMPs that reduce bacteria loads.

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

## 11. Public Participation

The TMDL 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 October 29, 2024 to November 29, 2024. The opportunity for public review and comment was posted on DANR's website and announced in three local newspapers: the Brookings Register, Watertown Public Opinion, and the Sioux Falls Argus Leader. No public comments were submitted.

**Assessment:** The EPA has reviewed DANR's public participation process. The EPA concludes that the state involved the public during the development of the TMDL and provided adequate opportunities for the public to comment on draft documents. No comments were submitted.

## 12. Submittal Letter

A transmittal letter with the appropriate information was included with the final TMDL report submission from DANR, dated January 6, 2025 and signed by Alan Wittmuss, Environmental Scientist Manager – TMDL Team Leader, Watershed Protection Program.

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

## References

Earth Resources Observation and Science (EROS) Center. 2023a. National Land Cover Database (NLCD) 2004: Conterminous U.S. Land Cover.

<https://www.mrlc.gov/data?f%5B0%5D=category%3ALand%20Cover&f%5B1%5D=year%3A2004>

EROS Center. 2023b. NLCD 2021: Conterminous U.S. Land Cover. <https://www.usgs.gov/media/images/national-land-cover-database-nlcd-2021-conterminous-us-land-cover>

EPA. 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.

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

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

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

EPA. 2002a. *Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992*. Office of Water, U.S. Environmental Protection Agency, Washington, DC.

EPA. 2002b. *Onsite Wastewater Treatment Systems Manual*. EPA/625/R-00/008. Office of Water and Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC.

EPA. 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.

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

EPA. 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.

EPA. 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.

EPA. 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, U.S. Environmental Protection Agency, Washington, DC.

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

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

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

SD DANR (South Dakota Department of Agriculture and Natural Resources; formerly DENR). 2005. Phase 1 Watershed Assessment Final Report and TMDLs, North-Central Big Sioux River, Brookings, Hamlin, Deuel, and Codington Counties, South Dakota.

[https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl\\_bigsiouxnorthcentral.pdf](https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_bigsiouxnorthcentral.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](https://danr.sd.gov/Conservation/WatershedProtection/TMDL/docs/TableDocs/tmdl_statewidetranslation_ecoli.pdf)

SD DANR. 2024. *The 2024 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/waterqualitystandards/docs/DANR\\_2024\\_IR\\_final.pdf](https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/waterqualitystandards/docs/DANR_2024_IR_final.pdf)

USDA. 2023. *AGNPS*. U.S. Department of Agriculture, Agricultural Research Service, Oxford, Mississippi. Accessed 7/15/2024. <https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/docs/agnps/>