THE 2016 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT

Protecting South Dakota's Tomorrow…Today

Prepared By
SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

STEVEN M. PIRNER, SECRETARY

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

JOE FOSS BUILDING
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PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

August 25, 2016

Shaun L. McGrath, Regional Administrator
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, CO. 80202-1129

Re: Final 2016 South Dakota Integrated Report

Dear Mr. McGrath:

I am pleased to submit to you the 2016 South Dakota Integrated Report, with supporting documentation, as required under Sections 305(b) and 303(d) of the Clean Water Act.

This submittal represents a major effort by this department as well as interested members of the South Dakota public. The 2016 report is one of the most comprehensive reviews of water quality data completed in South Dakota to date.

The report and supporting electronic files have been submitted to Elizabeth Rogers with EPA Region 8. An electronic copy of the report is also available via our homepage at: http://denr.sd.gov/documents/16irfinal.pdf

We look forward to your agency's full approval of our 2016 Integrated Report. We also want to thank you and your staff for assistance during the development process.

Sincerely,

Steven M. Pirner, PE
Secretary

Cc: Martin Hestmark
Elizabeth Rogers

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 30 2016

Ref: 8EPR-EP

Steven M. Pirner, Secretary
Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Re: Clean Water Act Section 303(d) Total Maximum Daily Load (TMDL) Waterbody List

Dear Mr. Pirner:

Thank you for your submittal of the South Dakota Department of Environment & Natural Resources (DENR) 2016 Water Quality Integrated Report received August 26, 2016. The Environmental Protection Agency Region 8 has conducted a complete review of the Clean Water Act Section 303(d) waterbody list (Section 303(d) list) and supporting documentation and information. The EPA has determined that South Dakota's 2016 Section 303(d) list meets the requirements of Section 303(d) of the Clean Water Act (CWA) and the EPA's implementing regulations found at 40 C.F.R. Part 130 and approves South Dakota's 2016 Section 303(d) list.

The EPA's approval of South Dakota's 2016 Section 303(d) list extends to waterbodies on the list with the exception of those waters that are within Indian country, as defined at 18 U.S.C. § 1151, which includes lands within the exterior boundaries of the following Indian reservations located within the State of South Dakota: Cheyenne River Indian Reservation, Crow Creek Indian Reservation, Flandreau Indian Reservation, Lower Brule Indian Reservation, Pine Ridge Indian Reservation, Rosebud Indian Reservation, Standing Rock Indian Reservation, Yankton Indian Reservation; any land held in trust by the United States for an Indian tribe; and any other areas which are "Indian country" within the meaning of 18 U.S.C. § 1151. EPA is taking no action with respect to the Indian country area at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities for Indian country lands.

The attachment describes the statutory and regulatory requirements of the CWA Section 303(d) list and a summary of the EPA's review of South Dakota's compliance with each requirement. The EPA appreciates your work to produce South Dakota's 2016 Section 303(d) list. If you have questions, the most knowledgeable EPA staff person is Liz Rogers and she may be reached at (303) 312-6974.

Sincerely,

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation

Attachment

cc: Shannon Minerich, SDDENR
Paul Lorenzen, SDDENR

Liz Rogers, EPA, 8-EPR-EP

Review of South Dakota's 2016 Section 303(d) Waterbody List

Attachment to letter from Martin Hestmark, Acting Assistant Regional Administrator, Office of Ecosystems Protection and Remediation, US EPA, Region VIII to Steven M. Pirner, Secretary South Dakota Department of Environment & Natural Resources

Date of Transmittal Letter from State:	August 25, 2016
Date of Receipt by EPA:	August 26, 2016

I. Introduction

South Dakota Department of Environment & Natural Resources (DENR) submitted their final 2016 Integrated Report (IR) to the Environmental Protection Agency (EPA) on August 26, 2016. Based on our review of the State's CWA Section 303(d) water body list ("Section 303(d) list"), EPA is approving South Dakota's 2016 list. The purpose of this review document is to describe the rationale for EPA's approval. The EPA's approval of South Dakota's 2016 Section 303(d) list extends to waterbodies on the list with the exception of those waters that are within Indian country, as defined at 18 U.S.C. § 1151, which includes lands within the exterior boundaries of the following Indian reservations located within the State of South Dakota: Cheyenne River Indian Reservation, Crow Creek Indian Reservation, Flandreau Indian Reservation, Lower Brule Indian Reservation, Pine Ridge Indian Reservation, Rosebud Indian Reservation, Standing Rock Indian Reservation, Yankton Indian Reservation; any land held in trust by the United States for an Indian tribe; and any other areas which are "Indian country" within the meaning of 18 U.S.C. § 1151. EPA is taking no action with respect to the Indian country area at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities for Indian country lands.

In March 2011, EPA issued guidance for integrating the development and submission of 2012 Section 305(b) water quality reports and Section 303(d) lists of impaired waters. This guidance, and previous EPA guidance, recommends that states develop an Integrated Report of the quality of their waters by placing all waters into one of five assessment categories. By following this guidance, Category 5 of the Integrated Report is the State's Section 303(d) list. EPA's action in review and approval of this document is only on Category 5 that comprises the Section 303(d) list within the Integrated Report.

EPA reviewed the methodology used by the State in developing the Section 303(d) list and the State's description of the data and information it considered. EPA's review of South Dakota's 2016 Section 303(d) list is based on EPA's analysis of whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

South Dakota's 2016 list is considered an update of the State's 2014 list, and as such, the Section 303(d) list EPA is approving today is comprised of 143 assessment units (208 waterbody/pollutant combinations), compared with 168 assessment units included on the 2014 list. States may add and take waters off their Section 303(d) lists based on several factors. For the 2016 cycle, South Dakota removed 48 waterbody/pollutant combinations from its year 2014 list.

II. Statutory and Regulatory Background

A. Identification of Water Quality Limited Segments (WQLSs) for

Inclusion on Section 303(d) List

Section 303(d)(1) of the CWA directs states to identify those waters within its jurisdiction for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

EPA regulations implementing Section 303(d) require states to identify water quality limited segments (WQLSs) that need TMDLs. 40 C.F.R. § 130.7(b). WQLSs[1] are defined in regulation as segments "where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by sections 301(b) and 306 of the Act." 40 C.F.R. § 130.2(j). Thus, states do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the CWA; (2) more stringent effluent limitations required by state or local authority; and (3) other pollution control requirements required by state, local, or federal authority. (40 C.F.R. §130.7(b)(1).)

B. Consideration of Existing and Readily Available Water Quality-Related Data and Information

In developing Section 303(d) lists, states are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as not meeting designated uses, or as threatened, in the State's most recent CWA Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to EPA. (40 C.F.R. §130.7(b)(5)). In addition to these minimum categories, states are required to consider any other data and information that is existing and readily available. EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available. (See Guidance for Water Quality-Based Decisions: The TMDL Process, EPA Office of Water, April 1991.) While states are required to evaluate all existing and readily available water quality-related data and information, states may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring states to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 C.F.R. §130.7(b)(6) require States to include, as part of their submissions to EPA, documentation to support decisions using or excluding particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; (3) a rationale for any decision not to use any existing and readily available data and information 40 C.F.R. §130.7(b)(5), and (4) any other reasonable information requested by the Region.

[1] WQLSs may also be referred to as "impaired waterbodies" or "impairments" throughout this document.

C. Priority Ranking

EPA regulations also codify and interpret the requirement in Section 303(d)(1)(A) of the CWA that states establish a priority ranking for listed waters. The regulations at 40 C.F.R. §130.7(b)(4) require states to prioritize waters on their Section 303(d) lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, states must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. (CWA Section 303(d)(1)(A). As long as these factors are taken into account, the CWA provides that states establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs such as wasteload allocations for permits, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. (See 57 Fed. Reg. 33040, 33045 (July 24, 1992), and EPA's 1991 Guidance).

D. Applicable Water Quality Standards

For purposes of identifying waters for the Section 303(d) list, the terms "water quality standard applicable to such waters" and "applicable water quality standards" refer to those water quality standards established under Section 303 of the Act. On April 27, 2000, EPA promulgated a rule under which the "applicable standard" for Clean Water Act purposes depends on when the relevant States or authorized Tribes promulgated that standard. Standards that States or authorized Tribes have promulgated before May 30, 2000 are effective upon promulgation by the States or authorized Tribes. Standards that States or authorized Tribes promulgated on or after May 30, 2000 become effective only upon EPA approval. 40 C.F.R §131.21(c). EPA interprets CWA Section 303(d) to require EPA establishment or approval of section 303(d) lists only for impairments of waters with Federally-approved water quality standards.

III. Analysis of South Dakota's Submission

A. Background

In reviewing South Dakota's submittal, EPA first reviewed the methodology used by the State to develop their 2016 Section 303(d) list in light of South Dakota's approved water quality standards, and then reviewed the actual list of waters. The State's Assessment Methodology starts on Page 27 of the Integrated Report. EPA has reviewed the State's submission, and has concluded that the State developed its Section 303(d) list in compliance with Section 303(d) of the CWA and 40 C.F.R. §130.7. EPA's review is based on its analysis of whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed. South Dakota considered all data and information pertaining to the categories under 40 C.F.R. §130.7(b)(5), and properly listed WQLSs under 40 C.F.R. §130.7(b)(1).

In previous guidance, EPA recommended that states develop an Integrated Report of the quality of their waters by placing all waters into one of five assessment categories. (See EPA's Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, July 21, 2005.) By following this guidance, Category 5 of the Integrated Report is the State's Section 303(d) list. EPA's action in review and approval of this document is only on Category 5 that comprises the Section 303(d) list within the Integrated Report.

The State's list was submitted to EPA Region 8 enclosed with correspondence dated August 25, 2016 from Steven M. Pirner, Secretary, Department of Environment & Natural Resources, in a document entitled *"Final 2016 South Dakota Integrated Report."*

The year 2016 Integrated Report submitted to the EPA from the South Dakota DENR consisted of the following portions that are necessary for the Section 303(d) waterbody list:

- **Waterbodies and corresponding pollutants that make up the State's Section 303(d) list** (See Appendix D, Pages 195-204: 303(d) List of South Dakota's Impaired Waters Requiring TMDL studies).
- **Prioritization of waterbodies for TMDL development** (See Appendix D, Pages 195-204: 303(d) List of South Dakota's Impaired Waters Requiring TMDL studies).
- **Identification of waters targeted for TMDL development over the next biennium** (See Appendix D, Pages 195-204: 303(d) List of South Dakota's Impaired Waters Requiring TMDL studies).

EPA's approval action of South Dakota's year 2016 Section 303(d) list extends only to the items listed immediately above.

The 2016 Section 303(d) waters are found in the State's Integrated Report, Appendix D (303(d) List of South Dakota's Impaired Waters Requiring TMDL studies). Appendix D contains the following information for each waterbody: assessment unit identifier, waterbody name and location, cause of impairment ("pollutant"), cycle first listed, TMDL Priority, and TMDL Schedule.

B. Identification of Waters and Consideration of Existing and Readily Available Water Quality-Related Data and Information

EPA has reviewed South Dakota's description of the data and information it considered for identifying waters on the Section 303(d) list. EPA concludes that the State properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 C.F.R. §130.7(b)(5) and properly identified and listed WQLSs as required by 40 C.F.R. §130.7(b)(1). In particular, the State relied on information from the 2016 Section 305(b) water quality assessments, assessments performed under the CWA Section 319 non-point source program, as well as data and information obtained through an extensive process to solicit information from state, federal and citizen sources. The State's evaluation of data and information in each of these categories is described below.

- *Waters identified by the state in its most recent section 305(b) report as "partially meeting" or "not meeting" designated uses or as "threatened"* (40 C.F.R. §130.7(b)(5)(i)): South Dakota produced a 2016 Integrated Report consistent with EPA's guidance regarding combined CWA 305(b) reports and 303(d) lists. EPA concludes that South Dakota made listing decisions using all existing and readily available data and information, in development of its 2016 Section 303(d) waterbody list.

- *Waters for which dilution calculations or predictive models indicate non-attainment of applicable water quality standards* (40 C.F.R. §130.7(b)(5)(ii)): South Dakota assembled and evaluated information from past and anticipated dilution calculations and predictive modeling. EPA concludes that South Dakota properly considered waters for which dilution calculations or predictive models indicate nonattainment of applicable water quality standards in development of its 2016 Section 303(d) waterbody list.

• *Waters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions* (40 C.F.R. §130.7(b)(5)(iii)): The State solicited data and information in preparation for the 2016 Section 303(d) list. Data and information obtained as a result of this effort were evaluated and considered. The State's submittal identified several entities that contributed data or information and responded to public comments related to assessments for individual waterbodies.

• *Waters identified by the State as impaired or threatened in a nonpoint assessment submitted to EPA under Section 319 of the CWA or in any updates of the assessment* (40 C.F.R. §130.7(b)(5)(iv)): The State's 2016 Section 303(d) list includes all waters that have data to support nonpoint source pollution impairment. South Dakota's listing approach and methodologies direct CWA Section 319 activities and resources to the highest priorities. Watershed assessments are often conducted for waterbodies that are already listed in order to collect current data to support TMDL development.

Based upon its review, EPA concludes that, with regard to the waters identified in the State's 2016 Section 303(d) list, the State's process for developing that list substantially meets the requirements of 40 C.F.R. §130.7(b)(i-iv) regarding the consideration of all existing and readily available water quality-related data and information, as well as the requirements of 40 C.F.R. Part 130.7(b)(1).

C. Waters Removed from the Section 303(d) List

In addition to adding WQLSs that require TMDLs to its 303(d) list, a state may also remove waters from its list when such removal is justified. EPA has identified four reasons that justify the removal of a water from a state's 303(d) list. These are:

1. The state has prepared and EPA has approved a TMDL for the listed water.
2. The original basis for listing the water was incorrect.
3. New data or information indicates that the applicable water quality standard for the water is being met and its designated uses are fully supported.
4. The state has adopted and EPA has approved a site-specific water quality standard for the water, and the new water quality standard is being met.

A full accounting of waters removed from the State's 2014 303(d) list is provided on Page 25 and in Appendix B, Pages 185-188 of the Integrated Report. The states removal decisions and stated justifications are summarized below:

Number of Waterbody-Pollutant Combinations Removed from List	
Reason	**2016**
TMDL completed and approved by EPA	20
Original basis for listing was incorrect	2
New data or information indicate applicable WQS is being met	26
Total	48

In reviewing the State's 2016 Section 303(d) waterbody list, EPA carefully considered South Dakota's decision to remove certain waterbody-pollutant combinations from the State's 2014 303(d) list, its justification from those removals, and the methodology it used in making those decisions. EPA concludes that the removal decisions identified in the Integrated Report are based on all existing and readily available water quality-related data and information, and that the removal decisions are properly justified.

D. Priority Ranking and Schedule for Development of TMDLS for Listed Waters and Pollutants

Pursuant to the listing methodology set out in the State's submittal, South Dakota prioritized WQLSs for TMDL development into two Priority Areas: Priority 1 (Documented health problems or a threat to human health; Waters listed as impaired because of bacteria, TSS, temperature in waters assigned coldwater fisheries, or mercury in fish flesh; Waters where TMDL development is expected during the next two years; or Waters with documented local support for water quality improvement) and Priority 2 (Waters where local support for TMDL development is expected but not documented; Waters having impairments not listed as Priority 1; Waters with no evident local support for water quality improvements; or Waters where impairments are believed to be due largely to natural causes). South Dakota's TMDL prioritization strategy is fully described starting on Page 17 of South Dakota's Integrated Report.

EPA reviewed the State's priority ranking of listed waters for TMDL development, and concluded that the State properly took into account the severity of pollution and the uses to be made of such waters, as required by 40 C.F.R. 130.7(b)(4), as well as other relevant factors such as imminent human health problems or local support for water quality improvement. In addition, EPA concluded that the State listed WQLS targeted for TMDL development in the next two years, as required by 40 C.F.R. 130.7(d).

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IV. Final Recommendation on South Dakota's 2016 Section 303(d) List Submittal

After careful review of South Dakota's final Section 303(d) list submittal package, EPA has determined that South Dakota's 2016 Section 303(d) list meets the requirements of Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations and approves South Dakota's 2016 Section 303(d) list.

V. References

The following list includes documents that were used directly or indirectly as a basis for EPA's review and approval of the State's Section 303(d) waterbody list. This list is not meant to be an exhaustive list of all records, but to provide the primary documents the Region relied upon in making its decisions to approve the State's list.

40 C.F.R. Part 130 Water Quality Planning and Management

40 C.F.R. Part 131 Water Quality Standards

July 29, 2005, Memorandum from Diane Regas, Director, Office of Wetlands, Oceans, and Watersheds, US EPA to Water Division Directors transmitting EPA's "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act"

October 12, 2006, Memorandum from Diane Regas, Director, Office of Oceans, Wetlands, and Watersheds entitled *Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

May 5, 2009, Memorandum from Suzanne Schwartz, Acting Director, Office of Wetlands, Oceans, and Watersheds, entitled *Information Concerning 2010 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

March 21, 2011, Memorandum from Denise Keehner, Director, Office of Wetlands, Oceans, and Watersheds, entitled *Information Concerning 2012 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

April 1991, "Guidance for Water Quality-Based Decisions: The TMDL Process," EPA 440/4-91-001.

July 24, 1992 Federal Register Notice, *40 C.F.R. Parts 122, 123, 130, Revision of Regulation*, 57 FR 33040.

August 8, 1997, Memorandum from Robert Perciasepe, Assistant Administrator for Water, US EPA, regarding "New Policies for Establishing and Implementing TMDLs."

September, 1997, Guidance from Office of Water, Headquarters, US EPA regarding "Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates" Supplement, EPA-841-B-97-002B.

November 5, 1997, Memorandum from Tudor Davies, Director, Office of Science and Technology to Water Management Division Directors entitled "Establishing Site Specific Aquatic Life Criteria Equal to Natural Background."

August 23, 1999, Federal Register Notice. *Proposed Revisions to the Water Quality Management and Planning Regulations,* 64 FR 46012.

April 27, 2000, Federal Register Notice, *EPA Review and Approval of State and Tribal Water Quality Standards*, 65 FR 24641

February 28, 2012, letter from Elizabeth Rogers, Monitoring and Assessment Team, Water Quality Unit, Ecosystems Protection Program, US EPA Region VIII, to Shannon Minerich, Surface Water Quality Program, South Dakota Department of Environment and Natural Resources.

September 3, 2013, US EPA Memorandum, Information Concerning 2014 Clean Water Act 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions

September 3, 2013, US EPA Memorandum, Information Concerning 2014 Clean Water Act 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions

March 27, 2014, South Dakota Department of Environment & Natural Resources response regarding EPA's comments on South Dakota's 2014 draft Integrated Report.

August 13, 2015, US EPA Memorandum, Information Concerning 2016 Clean Water Act Sections 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions

June 7, 2016, letter from Elizabeth Rogers, Monitoring and Assessment Team, Water Quality Unit, Ecosystems Protection Program, US EPA Region VIII, to Shannon Minerich, Surface Water Quality Program, South Dakota Department of Environment and Natural Resources.

August 25, 2016, South Dakota Department of Environment & Natural Resources response regarding EPA's comments on South Dakota's 2016 draft Integrated Report.

SOUTH DAKOTA WATER QUALITY
WATER YEARS 2010-2015 (streams)
and
WATER YEARS 2006-2015
(lakes and mercury in fish tissue)

The 2016 South Dakota Integrated Report
Surface Water Quality Assessment

By the State of South Dakota

Pursuant to
Sections 305(b), 303(d), and 314 of the
Federal Water Pollution Control Act

South Dakota Department of Environment and
Natural Resources

Steven M. Pirner, Secretary

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I. INTRODUCTION

This integrated 305(b) and 303(d) report (Integrated Report) was prepared by the South Dakota Department of Environment and Natural Resources (DENR) pursuant to Sections 305(b), 303(d), and 314 of the Federal Water Pollution Control Act (P.L. 95-217), also known as the Clean Water Act (CWA).

The 305(b) report in previous years provided an assessment of the quality of South Dakota's water resources and summarized state programs established to prevent and control water pollution. The 303(d) report identified impaired waterbodies within South Dakota that require the development of Total Maximum Daily Loads (TMDLs). DENR routinely used the 305(b) report to create the 303(d) impaired waterbody list.

This document combines the 305(b) report and 303(d) list into one Integrated Report, which provides an assessment of the quality of South Dakota's surface water resources and identifies the impaired waterbodies that need TMDLs. It is the intent of this report to inform the citizens of South Dakota and the United States Environmental Protection Agency (EPA) of the condition of state surface water resources and to serve as the basis for management decisions by government and other entities for the protection of surface water quality.

EPA will use the information from the Integrated Report to document the State's progress in meeting and maintaining CWA goals for the ecological health of the nation's surface waters and their domestic, commercial, and recreations uses. DENR will use the information in this report along with population data, economic analyses, program capability assessments, and other appropriate information to plan and prioritize water pollution control activities.

DENR will also use the Integrated Report as a tool to continue to stimulate development of nonpoint source (NPS) projects and to produce a priority waterbody list for the department. The Integrated Report will be available to all state conservation districts and water development districts. Each district can review watershed information for its geographical area of interest. This helps the districts focus on the location, nature, and discussions, which start the long process toward nonpoint source pollution control implementation.

This report is shared with the Nonpoint Source Task Force to provide information and provide guidance. The Nonpoint Source program also uses this document to supplement news articles released through the DENR Information and Education program.

The surface water quality assessments listed in this report rely primarily on the analyses of data generated by the DENR, outside organizations, and DENR project sponsors. Those groups include the United States Geological Survey (USGS), United States Army Corp of Engineers (USACE), United States Bureau of Reclamation (USBOR), Minnesota Pollution Control Agency (MPCA), Nebraska Department of Environmental Quality (NE DEQ), Wharf Resources, the cities of Watertown and Sioux Falls, East Dakota Water Development District (EDWDD), Pennington County, Belle Fourche River Watershed Partnership, Day County Conservation District, Moody County Conservation District, Pennington County, Black Hills Resource Conservation & Development, RESPEC Consultants, and South Dakota State University (SDSU). DENR greatly appreciates data submissions from outside organizations and project sponsors. These submissions provide DENR with increased monitoring data which will improve the confidence of support determinations. Outside organizations may also monitor waterbodies that are not currently monitored by DENR, therefore increasing the extent of waterbodies included in the Integrated Report.

While this assessment is as comprehensive as resources permit, some of the state's surface water quality problems may not be identified or documented in this report.

II. EXECUTIVE SUMMARY

The purpose of this report is to assess the water quality of South Dakota's water resources and to identify the impaired waterbodies that require TMDL development. This report meets the requirements of Sections 305(b), 303(d), and 314 of the CWA which mandates a biennial report on state water quality to Congress. This report is also intended to inform the citizens of South Dakota on the status of the quality of their water resources and to serve as the basis for management decisions by government staff and local officials for the protection of water quality. DENR will use the information in this report, along with population data, economic analyses, program capability assessments, and other appropriate sources to plan and prioritize water pollution control activities.

Surface Water Quality

South Dakota has about 9,726 miles of perennial rivers and streams (Table 1) and about 87,780 miles of intermittent streams. About 5,858 stream miles have been assessed in the past five years (October 2010 to September 2015). During this 5-year interval, 21.3% of assessed stream miles were found to support the assigned beneficial use; 78.7% did not support one or more beneficial uses. 53.2% percent of stream miles designated for immersion recreation supported that beneficial use. DENR has listed a total of 88 different streams or stream segments as impaired and require TMDL development.

Similar to previous reporting periods, nonsupport for fishery/aquatic life uses was caused primarily by total suspended solids (TSS) from agricultural nonpoint sources and natural origin. Nonsupport for recreational uses was primarily caused by *Escherichia coli* (*E. coli*) contamination from livestock and wildlife contributions.

DENR continues to conduct chemical, physical, and biological stream surveys and ambient monitoring to assess the quality of receiving streams and to document water quality problem sources and improvements.

In addition to rivers and streams, South Dakota has 576 lakes and reservoirs with specific aquatic life and recreational beneficial use classifications. The four Missouri River mainstem reservoirs are not included in the total lake acres but are included in the monitored river mileage.

DENR assessed 172 of the 576 lakes and reservoirs assigned recreation and/or warmwater or coldwater fish life beneficial uses. The assessed lakes account for 67% of the total classified lake acreage. An estimated 21% of the assessed lake acreage was considered to support all assigned beneficial uses. DENR has listed a total of 55 lakes as impaired and require TMDL development. Excessive algae due to nutrients conveyed in surface water runoff and mercury in fish tissue are the main causes of nonpoint source pollution contributing to nonsupport of beneficial uses in South Dakota lakes and reservoirs. DENR completed and received final EPA approval for a statewide mercury TMDL, which included 75 waters not supporting the mercury in fish tissue standard. The TMDL documented that the primary source of mercury in South Dakota comes from global atmospheric deposition.

Seventy-three percent of lake acres assessed were considered to fully support the limited contact and immersion recreation uses. In addition, 100% of the assessed lake acreage complied with bacteria standards in accordance with the listing methodology. The majority of lake acreage assessed for warmwater and coldwater fish life uses complied with water quality standard parameters. Over 90% of the assessed lake acreage complied with standards for specific conductance, pH, dissolved oxygen, water temperature and total dissolved solids. In addition, 100% of the lakes acres assessed for total suspended solids, nitrates, total ammonia, and total alkalinity complied with standards for warmwater and coldwater beneficial uses in accordance with the listing methodology.

Table 1: Atlas

State Population 2010 Census	814,180
State Surface Area (sq. mi.)	77,047
Number of water basins (according to state subdivision)	14
Total number of river/stream miles	98,009*
Number of perennial river miles (subset)	9,726*
Number of intermittent stream miles (subset)	87,780*
Number of border river miles of shared river/streams (subset)	337*
Miles of ditches and canals (man-made waterways)	503*
Number of classified lakes/reservoirs/ponds	576
Acres of classified lakes/reservoirs/ponds	213,265
Acres of freshwater wetlands	1,870,790**
Name of border rivers: Missouri River, Big Sioux River, Bois de Sioux River.	

* Estimated from the National Hydrography Dataset (1:100,000 scale)
** National Wetlands Inventory

South Dakota has an estimated 1.87 million acres of wetlands habitats according to the latest National Wetland Inventory based study (Dahl 2014). The total number of wetlands in South Dakota declined 2.8% from 1997 to 2009 (Dahl, 2014). Small temporary wetlands comprised the primary type of emergent wetland loss. South Dakota did exhibit gains in all other emergent wetland classes especially larger seasonal and semi-permanent classes between 1997 and 2009. The overall wetland area in South Dakota increased from the early to middle 1990s to 2009 (Johnson and Higgins 1997, and Dahl 2014). South Dakota Surface Water Quality Standards contain provisions to include wetlands as “waters of the state” and are assigned the beneficial use (9) Fish and wildlife propagation, recreation, and stock watering, which provides protection under existing narrative and numeric water quality standards.

Water Pollution Control Programs

The water quality goals of the state are to: identify water quality problems, set forth effective management programs for water pollution control, alleviate water quality problems, and achieve and preserve water quality for all intended uses.

Point Source Pollution Control (Surface Water Discharge System):
DENR continues to administer the National Pollutant Discharge Elimination System (NPDES) program in South Dakota, referred to as the Surface Water Discharge permitting program. The Surface Water Quality Program issues Surface Water Discharge permits and develops water quality-based effluent limits for point sources of pollution to ensure water quality standards are maintained.

Nonpoint Source Pollution Control:
Nonpoint Source (NPS) pollution originates from diverse and diffuse sources. Nonpoint pollution controls must reflect this by wisely using resources available from various state, federal, and local organizations, plus have landowner support and participation. South Dakota primarily uses voluntary measures for the implementation of Best Management Practices (BMPs) to control NPS pollution. The CWA Section 319 program is the focal point for a majority of the existing NPS control programs. For more than 25 years, the 319 program has been developing and implementing watershed restoration projects throughout the state.

Public information and education efforts have increased awareness of NPS pollution issues. State and federal programs provide technical assistance and financial incentives to landowners to address NPS pollution problems. Landowners have the capability to accomplish much if they understand the problems and the methods to solve them. Many of the solutions involve land management changes that benefit the landowner by making their lands more productive and sustainable.

Bordering State's 303(d) and 305(b) Lists

North Dakota, Minnesota, Iowa, Nebraska, Wyoming, and Montana possess interstate or border waterbodies that are shared with South Dakota. Under the authority of the CWA, states are granted the right to prevent, reduce, and eliminate pollution, and to plan the development and use of land and water resources. Under this right, states may adopt federal water quality regulations or promulgate their own. States that promulgate their own water quality standards, at minimum, must be as stringent as federal standards. States that border South Dakota often have differences in water quality criteria and/or waterbody beneficial use designations. Due to these possible differences, 305(b) and 303(d) list support determination may differ on waterbodies that border South Dakota and another state. For more specific information on an interstate or border waterbody, interested parties should contact each state.

Comparison of Beneficial Use Support between Integrated Reporting Cycles

South Dakota's Integrated Report describes the percentage of stream miles that support beneficial uses. This general statistic is intended to characterize use support for a given reporting cycle and does not provide for a balanced comparison or trend analysis between reporting cycles. The number of stream miles assessed changes between reporting cycles (i.e. 2014-2016), assessment methodologies evolve, and datasets can change considerably. In addition, new assessment units are continually being added and removed between reporting cycles. Due to these factors, it is not feasible to determine trends between reporting cycles as the appearance of a trend may have nothing to do with actual water quality.

III. SURFACE WATER QUALITY ASSESSMENT

SURFACE WATER QUALITY MONITORING PROGRAM

General Discussion

South Dakota DENR monitors surface waters in the state through an established ambient water quality monitoring program, water quality surveys, fish surveys, TMDL assessments, Surface Water Discharge permits, and state nonpoint source implementation projects. The USGS also conducts routine monitoring throughout the state and that data is available on their website. DENR maintains an internal water quality database (NR92) and submits water quality data through EPA's Water Quality Exchange to EPA's data storage and retrieval (STORET) system.

Water samples are analyzed for physical, chemical, biological, and bacteriological parameters to provide baseline data for the determination of potential effects of point and nonpoint sources of pollution. Baseline data are also used as a management tool to determine the effectiveness of control programs on existing point and nonpoint sources and for directing future activities. Water samples can show whether or not a waterbody is meeting its assigned beneficial uses.

Water quality standards were first established for all surface waters by the state's Committee on Water Pollution in 1967. The Water Management Board completed the final steps of its most recent triennial review and revisions on December 3, 2014. The Interim Legislative Rules Review Committee approved these revisions on December 16, 2014. DENR received EPA approval on June 17, 2016. The water quality standards consist of water quality criteria necessary to protect those beneficial uses and an antidegradation policy that protects existing uses and high quality water.

Major changes to these water quality standards that affect this Integrated Report cycle include: 1) the adoption of the mercury in fish tissue water quality criterion, and 2) site-specific temperature standards for Black Hills streams. The mercury in fish tissue criterion has resulted in a large acreage of South Dakota lakes not supporting their designated uses. However, due to the approval of the mercury TMDL, most of these lakes are not on the 303(d) list. The Black Hills temperature standard has resulted in delisting many Black Hills streams due to a change in water quality standards. This standards change better represents natural conditions and protects aquatic life uses. Many of these streams now fully support all designated uses.

DENR designates all surface waters in the state for one or more of the following beneficial uses:

(1) Domestic water supply waters;
(2) Coldwater permanent fish life propagation waters;
(3) Coldwater marginal fish life propagation waters;
(4) Warmwater permanent fish life propagation waters;
(5) Warmwater semipermanent fish life propagation waters;
(6) Warmwater marginal fish life propagation waters;
(7) Immersion recreation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters;
(10) Irrigation waters; and
(11) Commerce and industry waters.

All streams in South Dakota are assigned the beneficial uses (9) and (10) unless otherwise stated in the Administrative Rules of South Dakota (ARSD) Chapter 74:51:03. Lakes listed in ARSD Chapter 74:51:02 are assigned the beneficial uses of (7), (8), and (9) unless otherwise specified. Table 2 contains a summary of the established beneficial uses and a listing of numeric water quality criteria. State toxic pollutant standards for human health and aquatic life are presented in Table 3. Site specific standards are available in ARSD Chapters 74:51:01:45.01, 74:51:01:46.01, 74:51:01:48.01, 74:51:01:48.02, 74:51:01:53.01, and 74:51:01:56.

Fixed Station Ambient Monitoring

The DENR water quality monitoring network is currently made up of 132 stations located on various rivers and creeks within the state. Sampling stations are located within high quality beneficial use classifications, above and below municipal/industrial discharges, or within watersheds of concern. Currently, the department collects these samples on a monthly, quarterly, or seasonal basis. This data collected is invaluable for evaluating historical water quality, establishing natural background conditions, and monitoring possible runoff events, and acute or chronic water quality problems.

Typically, grab samples are collected mid-stream, either from a bridge or by wading into the stream. Some stations may have to be sampled from the bank depending on conditions. Every station is sampled in the same manner and location each time. When the sample has been collected, the sampler immediately obtains water and air temperatures, specific conductance, pH, and dissolved oxygen measurements. Time of sample, water depth, channel width, and other visual observations are also recorded. The samples are properly preserved and transported to the laboratory for analysis. Data is uploaded into DENR’s internal water quality database.

The most commonly sampled parameters include *E. coli*, hardness, TSS, total dissolved solids, pH, ammonia, nitrates, and total phosphorous. Several stations are sampled for sodium, calcium, and magnesium during the irrigation season. Stations located along streams that receive flows from historic Black Hills mining areas are also analyzed for cyanide, cadmium, lead, copper, zinc, chromium, mercury, nickel, selenium, silver, and arsenic. Stations along streams that receive flows from historic uranium mining or current exploration are analyzed for arsenic, barium, molybdenum, uranium, radium 226, and radium 228. Six sampling stations were added in 2009 to the area surrounding the proposed Hyperion oil refinery location near Elk Point. These sites were sampled to determine background levels of contaminants prior to construction. In 2013, after Hyperion allowed land options to expire and environmental permit construction deadlines were not met, DENR decided to discontinue monitoring at five of the six sampling stations and reduce parameters on the remaining site. DENR will reassess the need to monitor the area if Hyperion resumes the pursuit of building the oil refinery.

Ambient station locations, descriptions, and schedules are included in Appendix C. More detailed descriptions of individual stream sites are available online at http://denr.sd.gov/des/sw/wqmonitoring.aspx or from DENR upon request.

Intensive Water Quality Monitoring (Point Sources or Special Studies)

Some of South Dakota's wastewater treatment facilities are required to meet limits beyond the federal technology-based effluent limits. For many of these permits, DENR conducts an intensive water quality survey of the waterbody receiving the discharge. These surveys provide additional information to assist in the development of water quality-based effluent limits for the Surface Water Discharge permits. Point source special studies have recently been conducted on Whitewood Creek, Box Elder Creek, and South Fork Whetstone River. Information was used in the development of Surface Water Discharge permits for Lead - Deadwood Sanitary District, Ellsworth Development Authority, and Valley Queen Cheese and the city of Milbank. An intensive water quality survey is scheduled for Moccasin Creek to aid in the development of effluent limits for the cities of Aberdeen and Warner.

Intensive water quality monitoring is sometimes initiated to investigate and identify quality control issues, collect data for use in compliance, enforcement, or site-specific criteria development, or to provide updated information for a waterbody. In 2011, DENR conducted a special study on Annie Creek to investigate cyanide levels. The investigation concluded that cyanide levels did not exceed water quality standards and identified quality control issues with a laboratory and an analytical method.

Use Attainability Analysis

DENR conducts a Use Attainability Analysis (UAA) on waterbodies only assigned the beneficial use designation (9) Fish and wildlife propagation, recreation, and stock watering waters that receive or are proposed to receive a permitted surface water discharge under the Surface Water Discharge Permitting Program. DENR may also conduct a UAA under certain circumstances to determine if the waterbody is assigned the appropriate beneficial uses. During the UAA, physical characteristics of the stream and surrounding land use are documented, physical and chemical properties of the surface water are analyzed, and fish species presence/absence determinations are made. The waterbody reach is visited various times to include different seasons and years. Based on the information collected, the existing beneficial use designation may remain or be assigned a more appropriate fish life propagation and recreational use designation.

Recreation Use Study

During the summer months of 2008 through 2016, DENR has been assessing and will continue to assess the recreation beneficial use of waters that are assigned the (8) Limited contact recreation waters beneficial use. The purpose of the study is to determine if the existing beneficial use is appropriate or if the waterbody should also be assigned the (7) Immersion recreation waters beneficial use. During the study, field personnel measure channel depth and width, stream flow, dissolved oxygen, and pH. A surface water quality sample is collected and analyzed for fecal coliform and *E. coli* bacteria. In addition, public access, land use, channel morphology, and other physical characteristics of the waterbody are documented and photographed. Area residents are interviewed and asked questions regarding stream flow and recreational use in the waterbody.

General Biological Monitoring and Assessment

Biological samples are often included as part of a use attainability assessment, watershed assessment study or special project. DENR's Watershed Protection Program incorporates aquatic plant/algae surveys and chlorophyll-*a* testing into lake studies. Stream studies incorporate bioassessment surveys using fish, aquatic macroinvertebrates, periphyton and mussels as biological indicators of water quality.

Perennial Stream Bioassessment

DENR and research partners from SDSU identified stream reference sites and developed bioassessment tools for perennial wadeable streams in the Northern Glaciated Plains (NGP) ecoregion of eastern South Dakota (map in Appendix E). The project focused on reference site validation, Index of Biological Integrity (IBI) development, and generation of a biomonitoring toolkit to increase the state's biological monitoring and assessment capacity. Final deliverables of the project included identification of validated reference sites, core metrics and an IBI process-quantification tool. The project also yielded biological, habitat and water quality datasets, Kriging (IBI interpolation tool) maps, habitat entry and analysis templates, two Master of Science theses, and several peer-reviewed journal publications. Results of this effort will be used for a variety of water resource management applications including evaluating nutrient-related narrative standards. Future work will be focused on expanding the reference site network and gaining reference site data.

Efforts are currently underway through DENR's partnership with SDSU to expand reference site and bioassessment development to the Northwestern Great Plains ecoregion which encompasses most of the landscape west of the Missouri River outside the Black Hills. Reference site and IBI development will be stratified by level IV ecoregions (maps in Appendix E). Project design, site selection and landowner permissions were completed in 2013. The field portion of the project was completed over the field seasons of 2014 and 2015. Data processing and data analysis is ongoing in 2016.

Intermittent Stream Bioassessment

A large majority of the stream miles (90%) in South Dakota are characterized as intermittent. These streams were once thought to be less significant than perennial streams due to the lack of constant flow. Intermittent streams have gained recognition nationwide with respect to their ecological importance as many contribute greatly to downstream water quality, habitat condition, and biotic integrity.

DENR was awarded an EPA R-EMAP research grant (2006-2010) to develop a reference site network for intermittent streams in the NGP ecoregion of eastern South Dakota (map in Appendix E). The intermittent stream reference site project was conducted through a collaborative effort between DENR and the principal investigator Dr. Nels H. Troelstrup, Jr. from the Natural Resource Management Department at SDSU. The project provided the state with the tools necessary to identify "reference quality" stream reaches, and the framework for developing bioassessment tools required to make determinations about habitat and biotic integrity of potentially impacted streams. Aquatic macroinvertebrates (bugs) represented the primary biological indicator for determining health of these systems. The project provided a habitat and macroinvertebrate sampling protocol and further insight into macroinvertebrate community characteristics (index period) of intermittent streams. Final deliverables associated with the intermittent stream reference site project included a detailed project summary, two Master of Science theses, and several peer-reviewed publications.

Biological Reference Collection and Database

DENR and Game, Fish, and Parks (GF&P) are providing financial and technical support for the development of a statewide biological reference collection and database. Development and maintenance of the collection and database are being conducted by research personnel from the Natural Resource Management Department at SDSU. Aquatic macroinvertebrate, fish and mussel voucher specimens from statewide collection efforts are being processed and stored at various campus facilities. All information associated with each individual specimen including geo location is being documented in the SPECIFY database developed and maintained by the National Science Foundation. South Dakota GF&P in conjunction with SDSU recently began implementing a statewide stream mussel, macroinvertebrate and fish survey. The stream site locations selected for the survey were based on areas of the state considered to be poorly represented according to site distributions identified in SPECIFY. The long term goal of the project is to make biological information available to a variety of users.

Fish Contaminants Sampling

In a collaborative effort among the Department of Game, Fish, & Parks, the Department of Health, and the Department of Environment and Natural Resources, fish tissue from lakes and rivers are sampled and analyzed for contaminants including mercury, cadmium, selenium, pesticides, and PCBs. The data are used to monitor and assess the levels of these contaminants present in fish flesh.

The river and lake fish flesh sampling locations and schedule are determined in a joint effort by Game, Fish, & Parks and Department of Environment and Natural Resources personnel. The rivers and lakes are typically sampled in conjunction with Game, Fish, & Parks' survey sampling and occur between early spring and late fall. Waterbodies are selected based on GF&P fishery management objectives, public access, and fishing pressure. Waterbodies are resampled based on contaminant concentrations in fish tissue.

The Department of Health will issue a fish consumption advisory when sampling results indicate the one part per million Food and Drug Administration mercury threshold may be exceeded in edible fish tissue. DENR also uses mercury in fish tissue results to assess the mercury in fish tissue water quality criterion and determine waterbody support. Fish tissue sampling design and procedures are addressed in the SWQP document *South Dakota Fish Contaminants Sampling Protocol*, January 2013.

Lake Survey Design

DENR uses a Generalized Random Tessellation Stratified lake survey design. This sampling design allows DENR to select a subset of the most important water resources in the state, while the random component provides statistically valid results to make general determinations about the entire target population. The target population for the 2014-2015 survey included all lakes designated coldwater and warmwater fish life beneficial uses (575). Three waterbodies deemed publicly important were also sampled. Fifty-eight classified lakes were randomly selected and sampled during the 2014-2015 field season. Additional information pertaining to the probabilistic sampling design and results from the 2014-2015 survey is documented in the Statewide Surface Water Quality Summary section.

Toxicity Testing Program

Priority toxic pollutants are expensive to analyze and are not routinely monitored except for special situations. Whole effluent toxicity tests are included as permit limits in some municipal and industrial Surface Water Discharge permits.

Table 2: Numeric Criteria Assigned to Beneficial Uses of Surface Waters of the State ARSD 74:51:01

Parameters (mg/L) except where noted	(1) Domestic water supply	(2) Coldwater permanent fish life propagation	(3) Coldwater marginal fish life propagation	(4) Warmwater permanent fish life propagation	(5) Warmwater semipermanent fish life propagation	(6) Warmwater marginal fish life propagation	(7) Immersion recreation	(8) Limited-contact recreation	(9) Fish, wildlife, propagation, recreation & stock watering	(10) Irrigation	(11) Commerce and industry
Alkalinity ($CaCO_3$)									750[1]/1,313[2]		
Barium	1.0										
Chloride	250[1]/438[2]	100[1]/175[2]									
Coliform, total (per 100 mL)	5,000 (mean): 20,000 (single Sample)										
Coliform, fecal[4] (per 100mL)							200[6] / 400[2]	1,000[6]/ 2,000[2]			
Escherichia coli[4] (per 100mL)							126[6]/ 235[2]	630[6] / 1,178[2]			
Conductivity (umhos/cm @ 25ºC)									4,000[1]/ 7,000[2]	2,500[1]/ 4,375[2]	
Fluoride	4.0										
Hydrogen sulfide undisassociated		0.002	0.002	0.002	0.002	0.002					
Nitrogen, total ammonia as N		[5]Equation-based standard[,2]	[5]Equation-based standard[,2]	[5]Equation-based standard[,2]	[5]Equation-based standard[,2]	[5]Equation-based standard[,2]					
Nitrogen, nitrates as N	10.0								50[1]/88[2]		
Oxygen, dissolved[3]		≥6.0; ≥7.0 (during spawning season)	≥5.0	≥5.0; ≥6.0 (in Big Stone & Traverse during Apr and May)	≥5.0	≥4.0 Oct-Apr; ≥5.0 May-Sep	≥5.0	≥5.0			
pH (standard units)	6.5-9.0	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0	6.0 - 9.0			6.0 - 9.5		6.0 - 9.5
Sodium Adsorption Ratio										10	
Solids, suspended[7]		30[1]/53[2]	90[1]/158[2]	90[1]/158[2]	90[1]/158[2]	150[1]/263[2]					
Solids, total dissolved	1,000[1]/1,750[2]								2,500[1]/ 4,375[2]		2,000[1]/ 3,500[2]
Sulfate	500[1]/875[2]										
Temperature (ºF)[7]		65	75	80	90	90					
Total Petroleum Hydrocarbons	≤1.0								≤10		
Oil and Grease									≤10		

[1] 30-day average as defined in ARSD 74:51:01:01(60);[2] daily maximum;[3]DO as measured anywhere in the water column of a non-stratified waterbody, or in the epilimnion of a stratified waterbody;
[4] May 1 through September 30; [5]See Table 4; [6] Geometric mean as defined in ARSD 74:51:01:01(24) and 74:51:01:50-51; [7] Site specific standards exist .

Table 3: Surface Water Quality Standards for Toxic Pollutants

Pollutant	Human Health Value Concentration in ug/L		Freshwater Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6-9		Pollutant	Human Health Value Concentrations in ug/L		Freshwater Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6-9	
	Use 1[2]	Uses 2-3-4-5-6-9[3]	Acute (CMC)	Chronic (CCC)		Use 1[2]	Uses 2-3-4-5-6-9[3]	Acute (CMC)	Chronic (CCC)
Acenaphthene	670	990			2,4-Dimethylphenol	380	850		
Acenaphthylene (PAH)[6]					Dimethyl Phthalate	270,000	1,100,000		
Acrolein	6	9	3	3	Di-n-Butyl-Phthalate	2,000	4,500		
Acrylonitrile[4]	0.051	0.25			2-Methyl-4,6-Dinitrophenol	13	280		
Aldrin[4]	0.000049	0.000050	3.0		2,4-Dinitrophenol	69	5,300		
Anthracene (PAH)[5]	8,300	40,000			Dioxin (2,3,7,8- TCDD) [4]	5.0E-9	5.1E-9		
Antimony	5.6	640			2,4-Dinitrotoluene[4]	0.11	3.4		
Arsenic [4]	0.018[4][11]	0.14[4][13]	340	150	1,2-Diphenylhydrazine[4]	0.036	0.020		
Asbestos[4]	7,000,000 fibers/L				alpha-Endosulfan	62	89	0.22	0.056
alpha-BHC[4]	0.0026	0.0049			beta-Endosulfan	62	89	0.22	0.056
beta-BHC[4]	0.0091	0.017			Endosulfan Sulfate	62	89		
gamma-BHC (Lindane) [4]	0.98	1.8	0.95		Endrin	0.059	0.060	0.086	0.036
Benzene[4]	2.2	51			Endrin Aldehyde	0.29	0.30		
Benzidine[4]	0.000086	0.00020			Ethylbenzene	530	2,100		
Benzo(a)Anthracene[4]	0.0038	0.018			Fluoranthene	130	140		
Benzo(a)Pyrene[4]	0.0038	0.018			Fluorene[5]	1,100	5,300		
Benzo(b) Fluoroanthene[4]	0.0038	0.018			Heptachlor[4]	0.000079	0.00079	0.52	0.0038
Benzo(k) Fluoroanthene[4]	0.0038	0.018			Heptachlor epoxide[4]	0.000039	0.000039	0.52	0.0038
Beryllium[4]	4				Hexachlorobenzene[4]	0.00028	0.00029		
Bis(2-Chloroethyl) Ether[4]	0.030	0.53			Hexachlorobutadiene[4]	0.44	18		
Bis(2-Chloroisopropyl) Ether	1,400	65,000			Hexachlorocyclo-pentadiene	40	1,100		
Bis(2-Ethylhexyl) Phthalate[4]	1.2	2.2			Hexachloroethane[4]	1.4	3.3		
Bromoform[5]	4.3	140			Ideno(1,2,3-cd) Pyrene	0.0038	0.018		
Butylbenzyl Phthalate	1,500	1,900			Isophorone[4]	35	960		
Cadmium			2.0[7]	0.25[7]	Lead			65[7]	2.5[7]
Carbon Tetrachloride[4]	0.23	1.6			Mercury	0.050	0.051	1.4	0.77[8]
Chlordane[4]	0.00080	0.00081	2.4	0.0043	Methyl Bromide	47	1,500		
Chlorine			19	11	Methyl Chloride[5]				
Chlorobenzene	130	1,600			Methylene Chloride[4]	4.6	590		
					Methylmercury		0.3 mg/kg		
Chlorodibromomethane [4]	0.40	13			N-Nitrosodimethylamine[4]	0.00069	3.0		
Chloroform[4]	5.7	470			N-Nitrosodi-n-Propylamine[4]	0.0050	0.51		
2-Chloronaphthalene	1,000	1,600			N-Nitrosodi-phenylamine[4]	3.3	6.0		
2-Chlorophenol	81	150			Nickel	610	4,600	470[7]	52[7]
Chromium(III)			570[7]	74[7]	Nitrobenzene	17	690		
					Nonylphenol			28	6.6
Chromium(VI)			16	11	Polychlorinated Biphenyls, PCBs[4][9]	0.000064	0.000064		0.014

Pollutant	Human Health Value Concentration in ug/L		Freshwater Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6-9		Pollutant	Human Health Value Concentrations in ug/L		Freshwater Aquatic Life Value Concentrations in ug/L Uses 2-3-4-5-6-9	
	Use 1[2]	Uses 2-3-4-5-6-9[3]	Acute (CMC)	Chronic (CCC)		Use 1[2]	Uses 2-3-4-5-6-9[3]	Acute (CMC)	Chronic (CCC)
Chrysene[4]	0.0038	0.018			Pentachlorophenol	0.27	3.0	19[6]	15[6]
Copper	1,300		13[7]	9.0[7]	Phenanthrene[5]				
Cyanide (weak acid dissociable)	140	140	22	5.2	Phenol	10,000	860,000		
4,4'-DDD[4]	0.00031	0.00031			Pyrene[5]	830	4,000		
4,4'-DDE[4]	0.00022	0.00022			Selenium	170	4,200	[10]	5.0[8]
4,4'-DDT[4]	0.00022	0.00022	1.1	0.001	Silver			3.2[7]	
Dibenzo(a,h)Anthracene[4]	0.0038	0.018			1,2,4-Trichlorbenzene	35	70		
1,2-Dichlorobenzene	420	1,300			1,1,2,2-Tetrachloroethane[4]	0.17	4.0		
1,3-Dichlorobenzene	320	960			Tetrachloroethylene[5]	0.69	3.3		
1,4-Dichlorobenzene	63	190			Thallium	0.24	0.47		
3,3-Dichlorobenzidine[4]	0.021	0.028			Toluene	1,300	15,000		
Dichlorobromomethane[5]	0.55	17			Toxaphene[4]	0.00028	0.00028	0.73	0.0002
1,2-Dichloroethane[4]	0.38	37			1,2-Trans-Dichloroethylene	140	10,000		
1,1-Dichloroethylene[4]	330	7,100			1,1,1-Trichloroethane				
2,4-Dichlorophenol	77	290			1,1,2-Trichloroethane[4]	0.59	16		
1,2-Dichloropropane[4]	0.50	15			Trichloroethylene[4]	2.5	30		
1,3-Dichloropropene	0.34	21			2,4,6-Trichlorophenol[4]	1.4	2.4		
Dieldrin[4]	0.000052	0.000054	0.24	0.056	Vinyl Chloride[4]	0.025	2.4		
Diethyl Phthalate	17,000	44,000			Zinc	7,400	26,000	120[7]	120[7]

SOUTH DAKOTA
Surface Water Quality Standards (1)
for Toxic Pollutants

(1) The aquatic life values for arsenic, cadmium, chromium (III), chromium (VI), copper, lead, mercury (acute), nickel, selenium, silver and zinc given in this document refer to the dissolved amount of each substance unless otherwise noted. All surface water discharge permit effluent limits for metals shall be expressed and measured in accordance with § 74:52:03:16.

(2) Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

(3) Based on one route of exposure - ingestion of contaminated aquatic organisms only.

(4) Substance classified as a carcinogen with the value based on an incremental risk of one additional instance of cancer in one million persons (10^{-6}).

(5) Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals with carcinogenicity as the basis for the criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending.

(6) pH-dependent criteria. Value given is an example only and is based on a pH of 7.8. Criteria for each case must be calculated using the following equation taken from National Recommended Water Quality Criteria: 2002 (EPA-822-R-02-047, November 2002):

Pentachlorophenol (PCP), ug/L

Chronic = $\mathbf{e}[1.005(pH) - 5.134]$ Acute = $\mathbf{e}[1.005(pH) - 4.869]$

(7) Hardness-dependent criteria in ug/L. Value given is an example only and is based on a $CaCO_3$ hardness of 100 mg/L. Criteria for each case must be calculated using the following equations taken from National

Recommended Water Quality Criteria:
http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#hhtable, June 2013:

Cadmium, ug/L
Chronic = (*0.909)$e^{(0.7409[\ln(hardness)]-4.719)}$ Acute = (*0.944)$e^{(1.0166[\ln(hardness)]-3.924)}$

*Conversion factors are hardness-dependent. The values shown are with a hardness of 100 mg/L as calcium carbonate ($CaCO_3$). Conversion factors (CF) for any hardness can be calculated using the following equations:

Chronic: CF = 1.101672 - [(ln hardness)(0.041838)]
Acute: CF = 1.136672 - [(ln hardness)(0.041838)]

Chromium (III), ug/L
Chronic = (0.860)$e^{(0.8190[\ln(hardness)]+0.6848)}$ Acute = (0.316)$e^{(0.8190[\ln(hardness)]+3.7256)}$

Copper, ug/L
Chronic = (0.960)$e^{(0.8545[1n(hardness)]-1.702)}$ Acute = (0.960)$e^{(0.9422[\ln(hardness)]-1.700)}$

Lead, ug/L
Chronic = (*0.791)$e^{(1.273[\ln(hardness)]-4.705)}$ Acute = (*0.791)$e^{(1.273[\ln(hardness)]-1.460)}$

*Conversion factors are hardness-dependent. The values shown are with a hardness of 100 mg/L as calcium carbonate ($CaCO_3$). Conversion factors (CF) for any hardness can be calculated using the following equations:

Acute and Chronic: CF = 1.46203 - [(ln hardness)(0.145712)]

Nickel, ug/L
Chronic = (0.997)$e^{(0.8460[\ln(hardness)]+0.0584)}$ Acute = (0.998)$e^{(0.8460[\ln(hardness)]+2.255)}$

Silver, ug/L
Acute = (0.85)$e^{(1.72[\ln(hardness)]-6.59)}$

Zinc, ug/L
Chronic = (0.986)$e^{(0.8473[\ln(hardness)]+0.884)}$ Acute = (0.978)$e^{(0.8473[\ln(hardness)]+0.884)}$

(8) These criteria are based on the total-recoverable fraction of the metal.

(9) This criterion applies to total pcbs, (e.g. the sum of congener or all isomer or homolog or Aroclor analyses).

(10) The (0.996)CMC = 1/[fl/CMC1) + (f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 ug/L and 12.82 ug/L, respectively.

(11) This criterion for arsenic refers to the inorganic form only.

Table 4: South Dakota Surface Water Quality Standards for Total Ammonia as N

Equation 1: For Waters where salmonid fish are present.
$(0.275/(1+10^{7.204-pH})) + (39.0/(1+10^{pH-7.204}))$
Equation 2: For Waters where salmonid fish are not present.
$(0.411/(1+10^{7.204-pH})) + (58.4/(1+10^{pH-7.204}))$
Equation 3: For waters where early life stages are present
$(((0.0577/(1+10^{7.688-pH})) + (2.487/(1+10^{pH-7.688}))) * MIN(2.85, 1.45 * 10^{0.028 * (25-T)}))$
Equation 4: For waters where early life stages are absent.
$(((0.0577/(1 + 10^{7.688-pH})) + (2.487/(1 + 10^{pH-7.688}))) * 1.45 * 10^{0.028 * (25-MAX(T,7))})$
T = *the water temperature of the sample in degrees Centigrade* pH - *the pH of the water quality sample in standard units* MIN = *use either 2.85 or the value of* $1.45^{0.028 * (25-T)}$, *whichever is the smaller value* MAX = *use either the water temperature (T) for the sample or 7, whichever is the greater value*

Total Maximum Daily Loads (TMDLs) and Section 303(d)

Overview of TMDLs

TMDLs are an important tool for the management and protection of South Dakota's surface water quality. The goal of TMDLs is to ensure that waters of the state attain and maintain water quality standards that support their designated beneficial uses. EPA defines a TMDL as "the sum of the individual waste load allocations for point sources and load allocations for both nonpoint sources and natural background sources established at a level necessary to achieve compliance with applicable surface water quality standards." In simple terms, a TMDL is the amount of pollution a waterbody can receive and still support its designated beneficial uses. TMDLs must be developed for impaired waters, should address a specific waterbody or watershed, and should specify quantifiable targets and associated actions that will enable the waterbody to support its designated beneficial uses.

Section 303(d) of the CWA requires states to develop and submit a biennial list of impaired waters that will be targeted for TMDL development. This is referred to as the 303(d) list. Pollutant causes, TMDL priority, and a schedule for TMDL development must be included. It is recommended that states develop TMDLs at a pace necessary to complete TMDLs within a 13-year period after being listed. TMDLs must allow for seasonal variations and a margin of safety that accounts for any lack of knowledge concerning the relationship between pollutant loadings and water quality. Appendix A provides a list of waterbodies with EPA approved TMDLs.

Types of Waters Listed

The following information and data sources were used to determine which waterbodies require TMDLs based on the requirements of section 303(d) of the CWA:

- Waters included in the Integrated Report that are identified as "not supporting" or also known as "impaired" waters;
- Waters for which modeling indicates nonattainment of water quality standards; and
- Waters for which documented water quality problems have been reported by local, state, or federal agencies, the general public, or academic institutions.

Appendix D provides a summary of DENR's 2016 303(d) list.

Impaired Waters

Waterbodies that are identified as "NON" (nonsupporting) or "TH" (threatened) under the "Support" column in the basin tables are placed in EPA Category 5 which identifies the waterbody as impaired and requires a TMDL. This is the basis for the 303(d) list. If a waterbody is identified as "NON" or "TH" but has an approved TMDL for the pollutant cause, the waterbody is placed in EPA Category 4a.

Waters with Surface Water Discharge-Related Wasteload Allocations

In 1993, DENR was delegated the authority to administer the National Pollutant Discharge Elimination System (NPDES) permitting program. As stated earlier, South Dakota's NPDES permitting program is referred to as the Surface Water Discharge (SWD) permitting program. SWD permits are used to control the discharge of pollutants from point sources. At a minimum, most SWD permits contain technology-based effluent limits which are attained using the best available technology that is economically achievable. However, in some cases the application of technology-based effluent limits is not sufficient to ensure the surface water quality standards are maintained. For these permits, DENR develops water quality-based effluent limits for the permit.

If a SWD permittee discharges a pollutant to an impaired waterbody, the TMDL for that pollutant will include a "wasteload allocation" for the permittee. The wasteload allocation is implemented through the SWD permit.

SWD permits are issued for a maximum of five years, after which time the effluent limits and existing in-stream water quality are reevaluated. Ammonia, biochemical oxygen demand (BOD), and dissolved oxygen are the primary parameters targeted for modeling to develop water quality-based effluent limits.

Waters Reported by Government Agencies, Members of the General Public, or Academic Institutions
DENR did not receive recommendations to list specific water resources on the 2016 303(d) list from outside government agencies, members of the general public, environmental organizations, or academic institutions.

TMDL Prioritization of 303(d) Listed Waters

USEPA regulations codify and interpret the requirement in Section 303(d)(1)(A) of the CWA such that states establish a priority ranking for waters listed as impaired (or threatened) in their Integrated Reports. The regulations of 40 C.F.R. Part 130.7(b)(4) require states to prioritize waters in their Section 303(d) lists for TMDL development and to identify those water quality limited segments targeted for TMDL development in the next two years. States may consider other factors relevant to prioritizing waters for TMDL development, including programmatic needs such as wasteload allocations for permits, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. DENR has a two-tiered priority scheme that has been modified from past reporting cycles.

Priority 1

- Documented health problems or a threat to human health;
- Waters listed as impaired because of bacteria, TSS, temperature in waters assigned coldwater fisheries, or mercury in fish flesh;
- Waters where TMDL development is expected during the next two years; or
- Waters with documented local support for water quality improvement.

Priority 2

- Water where local support for TMDL development is expected but not documented;
- Waters having impairments not listed as a Priority 1;
- Waters with no evident local support for water quality improvements; or
- Waters where impairments are believed to be due to largely to natural causes.

For the 2016 Integrated Report cycle, DENR changed from “Imminent human health problems” to “Documented health problems or a threat to human health” because an imminent human health problem was not well defined and could be misinterpreted as an “immediate” health problem which would likely require swift action instead of TMDL development. Adding a requirement of documentation strengthens the selection but still leaves some leeway for interpretation. Adding a “threat to human health” makes sense because there could be some threats to human health that are documented but still allow enough time for TMDL development.

Mercury in fish flesh is a cause that falls under this reasoning. South Dakota is blessed with waters containing much sought-after game fish such as walleye, perch and northern pike, and the economic importance of these game fish impels action to deal with the mercury issue. It is important for South Dakota to begin the arduous task of addressing this problem and TMDL development is the first step.

The change from a “water having four or more causes” to a more selective process was made because waters having four or more causes of impairment often had causes that were naturally occurring (e.g. salinity, conductivity, or dissolved solids). This allows DENR to review water quality standards to determine if they are appropriate for the waterbody prior to developing a TMDL.

The causes due to bacteria and TSS were selected because DENR knows how to efficiently develop TMDLs for these causes and because there are well-known solutions to deal with these. Most of the current NPS Implementation projects in South Dakota are targeting bacteria and TSS. Controlling TSS may also impact nutrients entering lakes which may, in turn, help control lake problems due to algae, high pH, and low dissolved oxygen. It is also noteworthy that bacteria and TSS make up the bulk of the impairment causes in streams and by concentrating on these two types of causes, significant progress will be made in restoring or improving our streams.

Temperature in waters assigned coldwater fish life propagation was included after the state successfully modified the water quality standards for temperature in certain streams in the Black Hills region. Although some waters were removed from the 303(d) list because of this change, other waters still need a temperature based TMDL.

The attribute of documented local support is retained under Priority 1. This is important because implementation activities will be most successful where local support is present and so TMDL development should be focused where there is local support.

Priority 2 contains the attribute of having lesser or no local support. TMDL development in areas with little or no local support would likely not result in relatively swift implementation of remedial measures but TMDL development itself may generate enough local interest to inspire planning for implementation activities.

For more information on nonpoint source TMDL development and implementation refer to the "South Dakota Nonpoint Source Program Management Plan." This document is located at the following website: http://denr.sd.gov/dfta/wp/documents/NPSMgmtPlan14.pdf.

South Dakota's Long-Term Vision Strategy

Section 303(d) of the CWA provides for an opportunity to more effectively restore and protect South Dakota's waters by using a systematic process of prioritizing TMDL development and implementing alternative approaches and protection activities. A Long-Term Vision (hereafter referred to as the Vision) has been developed by the EPA and six actions have been identified as being important to this process. South Dakota's strategy includes the six actions discussed below.

Engagement

The Vision for the CWA 303(d) Program asks EPA and the states to actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documented, inclusive, transparent, and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives.

South Dakota uses multiple means to engage the public and stakeholders and these will be used as part of the Vision. The Nonpoint Source Task Force will be a primary means of getting information about the Vision to the stakeholders. The NPS Task Force is a citizen's advisory group containing approximately twenty-five agencies, organizations, and tribal representatives. The NPS Task Force meetings are open to the general public. The NPS Task Force provides a forum for the exchange of information and activities about NPS related activities as well as providing recommendations for projects applying for CWA Section 319 funds. A presentation about the Vision was given by DENR to the NPS Task Force on December 9, 2014. The EPA also participated in the meeting and responded to questions during the presentation. There was much discussion of the Vision, the TMDL Prioritization Scheme, and how the Vision would impact NPS Implementation Projects. A presentation was also given during the NPS Coordinators meeting on April 22, 2015. Additional presentations about the Vision will occur as needed.

A September 2015 EPA/State joint Nonpoint Source Pollution and Water Quality Meeting was held in Rapid City, South Dakota and brought together the states in EPA Region VIII as well as other regional interests. The Vision plans for each state were presented and each state responded to questions/comments about their Vision plan.

The public notice process used to announce the availability of the Integrated Report is the primary forum used to engage the public regarding the Vision Strategy. The public notice process allows the public and stakeholders the opportunity to formally comment on contents of the IR and the Vision Strategy. Additional efforts to inform the public and stakeholders about the Vision will occur in response to requests by stakeholders and the public.

Some elements of the Vision, such as Alternative or Protection activities, may be incorporated into NPS Implementation projects. If these projects request CWA Section 319 funds, these projects will be presented to the NPS Task Force as well as the South Dakota Board of Water and Natural Resources for review and approval of funding. This provides additional opportunities for public comment. The Vision Strategy will also be included in the South Dakota NPS Management Plan.

Prioritization

The Vision prioritization process used is a subset of the TMDL prioritization of 303(d) listed waters (described on page 17).

The Vision priority waters are those not supporting their designated beneficial uses for bacteria, TSS, chlorophyll *a*, temperature (in waters assigned coldwater fisheries), or mercury in fish tissue. South Dakota's Vision currently contains the waters and causes presented in Table 5.

Table 5: South Dakota Vision Priority Waters

Assessment Unit ID	Assessment Unit Name	Cause Name
SD-BA-L-WAGGONER_01	Waggoner Lake	Chlorophyll-a
SD-BF-L-NEWELL_01	Newell Lake	Mercury In Fish Tissue
SD-BF-R-BEAR_BUTTE_01	Bear Butte Creek	Temperature
SD-BF-R-BEAR_BUTTE_02	Bear Butte Creek	Temperature
SD-BF-R-BELLE_FOURCHE_01	Belle Fourche River	*Escherichia Coli*
SD-BF-R-DEADWOOD_01	Deadwood Creek	*Escherichia Coli*
SD-BF-R-WHITEWOOD_01	Whitewood Creek	Temperature
SD-BF-R-WHITEWOOD_04	Whitewood Creek	*Escherichia Coli*
SD-BF-R-WHITEWOOD_06	Whitewood Creek	*Escherichia Coli*
SD-BS-L-BITTER_01	Bitter Lake	Mercury In Fish Tissue
SD-BS-L-BULLHEAD_01	Bullhead Lake	Chlorophyll-a
SD-BS-L-ISLAND_N_01	North Island Lake	Mercury In Fish Tissue
SD-BS-L-LONG_COD_01	Long Lake	Mercury In Fish Tissue
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Mercury In Fish Tissue
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Chlorophyll-a
SD-BS-L-REID_01	Reid Lake	Mercury In Fish Tissue
SD-BS-L-SWAN_01	Swan Lake	Mercury In Fish Tissue
SD-BS-L-TWIN_01	Twin Lakes/W. Hwy 81	Mercury In Fish Tissue
SD-BS-L-TWIN_02	Twin Lakes	Mercury In Fish Tissue
SD-BS-R-BEAVER_02	Beaver Creek	*Escherichia Coli*
SD-BS-R-BIG_SIOUX_01	Big Sioux River	*Escherichia Coli*

Assessment Unit ID	Assessment Unit Name	Cause Name
SD-BS-R-BIG_SIOUX_05	Big Sioux River	Total Suspended Solids
SD-BS-R-BIG_SIOUX_06	Big Sioux River	Total Suspended Solids
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Total Suspended Solids
SD-BS-R-BIG_SIOUX_14	Big Sioux River	Total Suspended Solids
SD-BS-R-BRULE_01	Brule Creek	*Escherichia Coli*
SD-BS-R-BRULE_01	Brule Creek	Total Suspended Solids
SD-BS-R-EAST_BRULE_01	East Brule Creek	Total Suspended Solids
SD-BS-R-SIXMILE_01	Six Mile Creek	*Escherichia Coli*
SD-BS-R-SKUNK_01	Skunk Creek	*Escherichia Coli*
SD-BS-R-UNION_01	Union Creek	Total Suspended Solids
SD-CH-R-BATTLE_01_USGS	Battle Creek	Total Suspended Solids
SD-CH-R-BATTLE_02	Battle Creek	Temperature
SD-CH-R-CHEYENNE_02	Cheyenne River	*Escherichia Coli*
SD-CH-R-CHEYENNE_02	Cheyenne River	Total Suspended Solids
SD-CH-R-GRACE_COOLIDGE_01	Grace Coolidge Creek	Temperature
SD-CH-R-GRIZZLY_BEAR_01_USGS	Grizzly Bear Creek	Temperature
SD-CH-R-RAPID_04	Rapid Creek	*Escherichia Coli*
SD-CH-R-SPRING_01	Spring Creek	*Escherichia Coli*
SD-CH-R-SPRING_01	Spring Creek	Total Suspended Solids
SD-JA-L-BIERMAN_01	Bierman Dam	Chlorophyll-a
SD-JA-L-CARTHAGE_01	Lake Carthage	Chlorophyll-a
SD-JA-L-ELM_01	Elm Lake	Mercury In Fish Tissue
SD-JA-L-LARDY_01	Lardy Lake	Mercury In Fish Tissue
SD-JA-L-MID_LYNN_01	Middle Lynn Lake	Mercury In Fish Tissue
SD-JA-L-OPITZ_01	Opitz Lake	Mercury In Fish Tissue
SD-JA-L-ROSETTE_01	Rosette Lake	Chlorophyll-a
SD-JA-L-TWIN_01	Twin Lakes	Chlorophyll-a
SD-JA-R-FIRESTEEL_01	Firesteel Creek	*Escherichia Coli*
SD-JA-R-JAMES_08	James River	Total Suspended Solids
SD-JA-R-JAMES_09	James River	Total Suspended Solids
SD-JA-R-JAMES_10	James River	Total Suspended Solids
SD-JA-R-JAMES_11	James River	Total Suspended Solids
SD-JA-R-WOLF_01	Wolf Creek	*Escherichia Coli*
SD-JA-R-WOLF_02	Wolf Creek	*Escherichia Coli*
SD-MI-L-HURLEY_01	Lake Hurley	Mercury In Fish Tissue
SD-MI-L-POCASSE_01	Lake Pocasse	Chlorophyll-a
SD-MI-L-ROOSEVELT_01	Roosevelt Lake	Mercury In Fish Tissue
SD-MN-R-WHETSTONE_S_FORK_01	South Fork Whetstone River	*Escherichia Coli*
SD-MN-R-WHETSTONE_S_FORK_02	South Fork Whetstone River	*Escherichia Coli*
SD-MN-R-YELLOW_BANK_N_FORK_01	North Fork Yellow Bank River	*Escherichia Coli*
SD-MN-R-YELLOW_BANK_S_FORK_01	South Fork Yellow Bank River	*Escherichia Coli*
SD-MU-L-COAL_SPRINGS_01	Coal Springs Reservoir	Mercury In Fish Tissue

Assessment Unit ID	Assessment Unit Name	Cause Name
SD-NI-L-RAHN_01	Rahn Lake	Chlorophyll-a
SD-VM-L-THOMPSON_01	Lake Thompson	Chlorophyll-a
SD-VM-R-LONG_01	Long Creek	*Escherichia Coli*
SD-VM-R-VERMILLION_03	Vermillion River	*Escherichia Coli*
SD-VM-R-VERMILLION_E_FORK_01	East Fork Vermillion River	*Escherichia Coli*
SD-VM-R-VERMILLION_E_FORK_02	East Fork Vermillion River	*Escherichia Coli*
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	*Escherichia Coli*

Protection

This element is intended to encourage management actions that prevent impairments to waters not currently impaired. South Dakota is receptive to this concept and will consider providing technical or financial assistance to these types of projects. There is no anticipation of a large number of requests for "protection" activities and DENR will consider each as they become known. Requests for funding for CWA Section 319 funds will follow the same protocols as other projects requesting these funds and the "protection" activities must be identified as such. Protection activities within an existing implementation project must also identify those activities as "protection" activities.

Integration

DENR has very good working relationships with other programs, and regional, state and federal agencies. The NPS Task Force is a major forum for interaction between the various federal, state, regional, and local agencies as well as the general public. The Natural Resources Conservation Service (NRCS) is the primary federal agency that DENR interacts with on NPS implementation projects. CWA Section 319 funds are often used in concert with NRCS funds to more efficiently use both funding sources to combat NPS pollution. The U.S. Forest Service, USBOR, or Bureau of Land Management may also be involved in DENR's NPS control effort if activities will occur or impact lands managed by these agencies. In addition, the USGS provides much needed data about water flow and water quality in certain rivers and streams in South Dakota and has been a partner in various water quality assessment activities.

Regional or local agencies are often project sponsors for NPS assessment or implementation projects. Water development districts, conservation districts, cities, and locally based partnerships have all interacted with DENR and have integrated into NPS assessment and implementation projects. Universities have been involved in South Dakota's NPS control effort through research studies that help the state assess water or biological quality of our streams (e.g. the Intermittent Stream Study or the Northern Great Plains Reference Site Development Project). It is anticipated that this effort will expand to include a Northwestern Great Plains Reference Site Development Project.

Alternatives

Alternative approaches that incorporate adaptive management or are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions to restoration may be used in addition to TMDLs. Generally, DENR currently requires a TMDL to be developed before funds are allocated towards a NPS 319 Implementation Project. Henceforth, consideration will be given to projects or cases where a relatively simple or straight-forward solution can be reached without going through the TMDL development process. Requests for funding for CWA Section 319 funds will follow the same protocols as other projects requesting these funds and the "alternative" activities must be identified as such. DENR also supports an Information and Education Program that may be useful in circumstances where public outreach and education can help to identify alternative approaches to resolving water quality issues.

Assessment

The goal of this element is to identify the extent of healthy and CWA Section 303(d) impaired waters in each State's priority watersheds or waters through site-specific assessments. South Dakota uses a number of methods and data sources to assess waters included in the Vision and they are highlighted below.

- Fixed ambient monitoring of rivers and streams. The major rivers in the state are sampled and analyzed for a select suite of parameters;
- Data are also obtained from regional sources or federal agencies (e.g. the USGS or the volunteer lake monitoring program);
- Lakes are sampled as part of a statistically based Statewide Lakes Assessment (SWLA) each year. Usually 50 lakes are randomly selected and sampled for a standard suite of parameters;
- Intensive water monitoring is sometimes conducted to assess specific point or nonpoint source problems;
- Site-specific assessments are often used during TMDL studies if more general data methods/surveys do not provide adequate data. NPS implementation projects may also use site-specific studies to document water quality improvements due to NPS implementation project activities.

South Dakota's Vision and its list of waters needing TMDLs are primarily based on data gathered (listed in the first three bullets above). Stream data are usually available for the major streams but other streams may not have any data. Lakes are sampled randomly as part of the state's SWLA so individual lakes may or may not have enough data to develop a TMDL. So intensive monitoring and site-specific assessments are initiated when data are lacking for a particular waterbody or if specific information is needed when cause/effect relationships are sought. DENR has scheduled ten lakes for TMDL development that are impaired by chlorophyll-a as part of the Vision and intensive water quality sampling will likely be scheduled in the upcoming years.

In addition, DENR is working with EPA to develop scientifically defensible thresholds for chlorophyll-a and/or nutrients (nitrogen and phosphorus) in lakes. Thresholds for lakes in ecoregions 17 and 43 will be developed first and thresholds for lakes in the remaining ecoregions will be completed at a later date. Numeric targets for nutrients in streams may also be developed in the future.

South Dakota has a well-documented history of doing site-specific assessments and will continue to develop and schedule assessment projects where data are deemed lacking for waters needing a TMDL. Site-specific assessments are either done by DENR personnel if the waterbody is within reasonable travel distance or by a regional entity/contractor if funds are available and direct DENR involvement is not the best option. Computer modelling, scientific literature, and reference conditions may also be used to assess waters.

Vision Summary

The South Dakota strategy for the Long-Term Vision under the CWA Section 303(d) Program contains the six elements stressed by EPA. The primary goal is to prioritize TMDL development for the Vision where implementation activities can be focused to provide a better chance of improving water quality. However, much time, effort, and funds have been spent assessing and working on other TMDLs, so those TMDLs will also be considered and prioritized as part of South Dakota's broader TMDL development effort. The complete Vision document entitled "South Dakota Clean Water Act Section 303(d) Program Long-Term Vision Strategy March, 2016" can be accessed at the following address: http://denr.sd.gov/dfta/wp/tmdl/tmdlvision.pdf.

Summary of the State TMDL Waterbodies

Using the methodologies, data, information, and public input described for the surface water quality assessments, DENR included the waterbodies that require TMDLs in Tables 32 – 45. These tables include waterbody names, pollutants of concern, and other information. A total of 143 different waterbodies require TMDLs (Table 7). Each waterbody may contain several different pollutants and thereby may constitute several TMDLs. This results in 206 required TMDLs due to multiple impairment causes. In addition, some streams are listed more than once due to TMDLs identified for different segments of the same stream (even for the same pollutant).

Ideally, if a waterbody required a TMDL for several different pollutants, all pollutants were grouped into one watershed assessment for that waterbody. In reality, it may not be possible to incorporate each pollutant into a single study for each waterbody segment, but this assumption was made for planning purposes. It is also common to find impairments for additional pollutants during or after the completion of the TMDL assessment work and/or report. There may be other cases where widespread support for water quality improvements, large single entity landholders (federal lands, state lands, etc.), or other factors allow several waterbodies to be targeted for improvement under a single study. Possible scenarios such as these make TMDL numbers difficult to project. An enormous work effort is required to complete the number of TMDLs in the recommended time frame.

Resource Implications

TMDL issues span a wide range of activities within DENR. Nonpoint source assessments, clean lakes assessments, discharge permitting, storm water discharge permitting, erosion control, water quality monitoring, water quality standards, water rights, feedlot regulations, and other areas are involved in or affect TMDL development and implementation. Because of this, the development and implementation of TMDLs will rely on existing programs, resources, and activities. Effective TMDL development requires effective and continuous coordination within all DENR water programs. In addition, the development and implementation of effective TMDLs that will result in improving the quality of South Dakota’s waters must have the support, input, and coordination of affected government agencies, local groups, and citizens. As such, the TMDL effort will involve the coordination of many diverse groups and the public with the common goal of improving water quality.

Status of 2014 Integrated Report TMDLs

South Dakota's 2014 303(d) list contained 166 waterbodies or waterbody reaches for a total of 221 waterbody/impairment causes that required TMDL development. Forty-nine TMDLs have been completed or determined to be unnecessary by DENR since April 1, 2014.

Table 6 and Figure 1 show the status of waters that required TMDLs in the 2014 Integrated Report. The following definitions further describe status categories:

- TMDL Complete - a watershed assessment has been completed, and a TMDL has been completed and approved by EPA;
- TMDL in Progress - a watershed assessment is currently underway. The results of the assessment will lead to a TMDL document, a revision of the waterbody beneficial use, a site specific water quality standard, or a determination that the cause is natural;
- In Discussions with EPA -TMDL development is being discussed with EPA;
- Delisted based on new information - A TMDL is no longer necessary, the cause was delisted based on information such as additional data, change in assessment method, change in water quality standard, listed in error, etc.;
- Future TMDL - A watershed assessment has not been initiated but is planned for future development.

Table 6: Status of TMDLs from 2014 Integrated Report

TMDL Status	Number and Percentage of TMDLs
TMDL Complete	20 (9%)
TMDL In Progress	33 (15%)
In Discussions with EPA	36 (16%)
Delisted based on new information	29 (13%)
Future TMDL	103 (47%)
Total reach/impairment causes:	221 (100%)

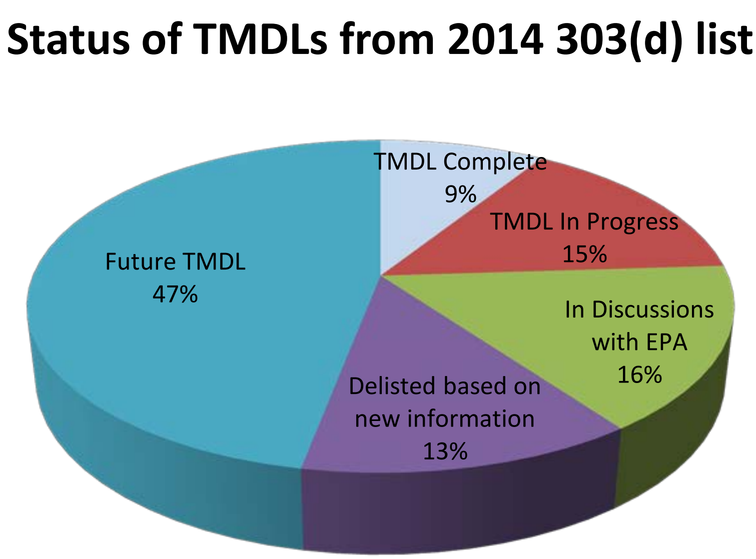


Figure 1: Status of TMDLs from the 2014 Integrated Report

Delisting Reasons

Delisting of Waterbodies

Waters may be delisted using the following EPA delisting reasons:

- EPA approved TMDL(s) in place for all pollutants of concern;
- Water quality standard (WQS) attained:
    - Due to restoration activities; or
    - Due to changes in WQS; or
    - According to new assessment method; or
    - Original basis for listing was incorrect; or
    - Threatened water no longer threatened;
        - This delisting reason means the waterbody meets WQS, however was previously listed as threatened. The threatened flag may be used when waterbody support is borderline, trends toward nonsupport, or a decision based on best professional judgment.
    - Reason for recovery unspecified;
        - This delisting reason means the waterbody meets WQS but the reason for the recovery is unclear. Recovery may be due to a variety of reasons including a greater quantity of water samples collected, changes in the hydrologic cycle, and others.
- Flaws in original listing;
- Additional state effluent controls address water quality problems;
- Reservoir has been breached and is no longer a viable waterbody; or
- Data and/or information lacking to determine water quality status; original basis for listing was incorrect.

Appendix B provides a list of waterbodies, causes, and delisting reasons used for the 2016 reporting cycle.

TMDLs Required by the 2016 Integrated Report

Table 7 is a list of the projected number of TMDLs required in each basin and the associated pollutants of concern. Watershed assessments are currently underway in several basins. Several of these assessment efforts may have identified additional impaired reaches that were not previously recognized in the 2014 Integrated Report. The total number of required TMDLs has decreased from 2014 to 2016 mostly due to the approval of the mercury TMDL and site-specific temperature criterion for some Black Hills streams. Many of these impaired watersheds have TMDL development and/or implementation projects already in progress.

Table 7: 2016 Summary of TMDLs by Basin

Basin	Number of Waterbodies Requiring TMDLs	Pollutants of Concern
Bad River Basin	4	chlorophyll-*a*, dissolved oxygen, specific conductance, *E. coli*
Belle Fourche River Basin	12	*E. coli,* fecal coliform, pH (high), temperature, TSS
Big Sioux River Basin	20	chlorophyll-*a*, *E. coli,* fecal coliform, pH (high), TSS, dissolved oxygen
Cheyenne River Basin	20	*E. coli,* dissolved oxygen, pH (high), salinity (SAR), specific conductance, temperature, total dissolved solids, TSS
Grand River Basin	11	chlorophyll-*a*, *E. coli,* fecal coliform, mercury in fish tissue, salinity (SAR) , specific conductance, temperature, TSS
James River Basin	33	chlorophyll-*a*, *E. coli,* fecal coliform, dissolved oxygen, pH (high), temperature, total dissolved solids, TSS
Little Missouri River Basin	1	TSS
Minnesota River Basin	10	*E. coli,* dissolved oxygen, pH (high), temperature
Missouri River Basin	13	chlorophyll-*a*, mercury in fish tissue, dissolved oxygen, pH (high), temperature, TSS, *E. coli,* specific conductance
Moreau River Basin	5	E*. coli,* fecal coliform, pH (high), salinity (SAR) , specific conductance, total dissolved solids, TSS
Niobrara River Basin	1	chlorophyll-*a*
Red River Basin	0	
Vermillion River Basin	7	chlorophyll-*a*, *E. coli,* fecal coliform, pH (high), temperature
White River Basin	6	*E. coli,* fecal coliform, pH (high), salinity (SAR), specific conductance, TSS
TOTALS	**143**	

METHODOLOGY

Two major types of assessments were used to determine use support status of waterbodies: one based on monitoring, and the other based on qualitative evaluations. Monitoring data were primarily obtained from DENR, outside organizations, and DENR project sponsors.

DENR maintains a Quality Management System to ensure that all environmental water quality data generated or processed meet standard accepted requirements for precision, accuracy, completeness, representativeness, and comparability. This entails the preparation and periodic review and revision of the DENR Quality Management System, Quality Assurance Project Plans, and Standard Operating Procedures. It also includes the preparation of periodic reports to DENR management and EPA; the review of contracts, grants, agreements, etc., for consistency with quality assurance/quality control (QA/QC) requirements; and the administration of QA/QC systems and performance audits. This requires the establishment of schedules for the collection of duplicate and blank samples, laboratory split samples, review of field sampling techniques, and liaison with contracted labs to ensure compliance with QA/QC objectives.

DENR maintains an EPA approved *Quality Management Plan* (Revision IV, October 2011). The Surface Water Quality Program operates under the *Quality Assurance Project Plan for the Surface Water Quality Program and Feedlot Permit Program,* Revision VII, January 2016, and *Surface Water Quality Program and Feedlot Permit Program Standard Operating Procedures, Field Water Quality Sampling,* Revision III, January 2016. The Watershed Protection Program operates under the *Water Resources Assistance Program Quality Assurance Project Plan for the Assessment Team and Implementation Team,* Revision IV, August 2013, and *Standard Operating Procedures for Field Samplers, Volume I & II*, February 2005. DENR requires that all outside organizations that submit outside data or qualitative evaluations for this Integrated Report operate under a quality management system and be willing to provide quality documentation upon request.

Rivers and streams were assessed by dividing the waterbodies into segments that contain the same designated beneficial uses, water quality standards criteria, and environmental and physical influences. When section, township, and range are used in ARSD Chapter 74:51:03 to describe the beginning or end point of a stream segment, the boundary of the segment is that point where the most downstream portion of the stream crosses the boundary of that section. For lakes, the entire waterbody is assessed as a whole unit; lake acreage is determined using the National Hydrography Database. Monitoring data obtained during the current reporting period were analyzed by using DENR's NR92 Database system. The data for each monitored waterbody were compared to numeric water quality standards applicable to the beneficial uses assigned to the segment (Tables 2 and 3) and nutrient-related narrative standards. Monitored stream course mileages and lake acreages were measured using the Hydrography Event Management Tool.

Table 8: Criteria for Determining Support Status

Description	Minimum Sample Size	Impairment Determination Approach
FOR CONVENTIONAL PARAMETERS (such as dissolved oxygen, TSS, fecal coliform bacteria, *E. coli* bacteria, pH, water temperature, etc.)	STREAMS: a minimum of 10 samples for any one parameter are required within a waterbody reach. A minimum of two chronic (calculated) results are required for chronic criteria (30-day averages and geomeans). LAKES: at least two independent years of sample data and at least two sampling events per year.	STREAMS: >10% exceedance for daily maximum criteria (or 3 or more exceedances between 10 and 19 samples) or >10% exceedance for chronic criteria (or 2 or more exceedances between 2 and 19 samples) LAKES: >10% exceedance when 20 or more samples were available. If < 20 samples were available, 3 exceedances were considered impaired. See lakes listing methodology section for specifics on parameters associated with a vertical profile (i.e., dissolved oxygen, water temperature, pH, and specific conductance).
FOR TOXIC PARAMETERS (such as metals, total ammonia, etc.)	All Lakes and Streams: Minimum of 2 samples within a consecutive 3 year period within the data age date range.	All Lakes and Streams: More than one exceedance of toxic criteria within a consecutive 3 year period (within the data age date range) for the acute and/or chronic standard.
FOR MERCURY IN FISH TISSUE	ALL Lakes and Streams: A minimum of 10 samples are required. All available data from January 2006 through September 2015 was used.	ALL Lakes and Streams: 95th percentile of data exceeds 0.3mg/kg mercury OR when a fish consumption advisory has been issued.
DATA AGE (for both conventional and toxic parameters)	STREAMS: Data collected from October 1, 2010, to September 30, 2015. LAKES: All available data collected from January 2006 through September 2015. Although the reporting cycle spans two years, that data age does not allow for sufficient temporal variability. Therefore, the above data ages will be used unless there is justification that the data are not representative of current conditions.	

Assessment Methodology for Numeric Water Quality Standards

Table 8 outlines data age and the required number of samples used by DENR to determine waterbody support. Deviations from the above criteria were allowed in specific cases and are generally discussed in the proceeding tables listing the surface water quality summaries. Use support assessment for all assigned uses was based on the number of exceedances of water quality standards for the following parameters: TSS, total dissolved solids, pH, water temperature, dissolved oxygen, fecal coliform, *E. coli*, and others. Exceedances of more than one parameter were not considered additive in determining overall support status for any given waterbody. A waterbody with less than 10% exceedances with respect to the total number of samples for one or more parameters is considered fully supporting. However, toxic parameters including those in Table 3 are only allowed one violation in a three-year period to be considered fully supporting. The weekly average temperature is calculated on a rolling seven day period. Chronic standards, including geometric means and 30-day averages, are applied to a calendar month. For hardness-based metals, the hardness and metal concentrations were averaged for the calendar month. For mercury in fish tissue, the reach is considered nonsupporting if the 95^{th} percentile of mercury fish tissue concentration exceeds the water quality criterion or if the state has issued a mercury fish consumption advisory. Complete listings of relevant parameters appear in Tables 2 and 3.

To ensure a sufficient number of samples were available for each stream segment (usually a minimum of 10) the period of record considered for this report was from October 1, 2010, to September 30, 2015, (5 years) for streams, and January 1, 2006, to September 30, 2015, (10 years) for lakes. The ten-year timeframe in lakes was designated to account for climatic variability (wet and dry cycles) and increase the chance of covering multiple sampling events. The ten-year timeframe was thought to provide a more recent description of a lake’s support status between reporting cycles in comparison to using all available data.

Waterbody support determinations are heavily influenced by the numbers of samples obtained based on the criteria in Table 8. DENR acknowledges that differences in the number of samples obtained for a waterbody reach between reporting cycles may influence the support determination and EPA reporting category. As a protective measure, DENR may designate a reach as “threatened waters.” A “threatened water” designation may be assigned if the reach demonstrates: a declining trend that may result in water quality standard exceedances by the next reporting cycle, the reach has previously been listed as nonsupporting and the current number of samples obtained change the determination to full support but the percent of exceedances is near the listing threshold, or, there are proposed activities in the waterbody reach that may cause exceedances. A “threatened waters” designation may also be used when water quality monitoring does not indicate impairment of WQS; however, the waterbody is considered impaired for other reasons, including waterbodies with fish consumption advisories. Regardless of support determination, waterbodies designated as “threatened waters” are automatically placed in category 5 and added to the 303(d) list. If a TMDL has already been completed for a waterbody designated as “threatened waters,” the waterbody will be placed in category 4a. Much of the waterbody impairment information is summarized in Tables 14 through 31. More detailed information on the lakes and streams in each river basin is presented in Tables 32 through 45.

In addition to the stream and lake listing methodologies, waterbodies were also evaluated based on reported beach closures, fish kills, fish consumption advisories, applicable public complaints, and best professional judgment.

Stream Assessment Methodology for Nutrient-Related Narrative Standards

EPA considers nutrient pollution of the nation's waters a top priority. The agency is calling upon states to increase efforts to address nutrient pollution. Item #3 in EPA's 2014 Integrated Report Memo to States, describes considerations for "Identifying nutrient-impacted waters for the Section 303(d) list for States without formal numeric nutrient water quality criteria." This section identifies potential approaches for developing nutrient-related criteria to address applicable narrative standards to make beneficial use support determinations and impairment decisions. If states fail to evaluate existing and readily available data and information relevant to applicable narrative criteria and designated uses, EPA "will take appropriate actions consistent with the Clean Water Act." EPA's 2016 Integrated Report Memo reiterates the need for states to continue to identify waters impacted by nutrients for the Section 303(d) list.

South Dakota has a number of narrative water quality standards ARSD Chapters (74:51:01:05, 74:51:01:06, 74:51:01:08, 74:51:01:09, and 74:51:01:12) designed to protect surface waters from nutrient-related impacts. DENR developed a decision tree based assessment method using multiple lines of evidence to evaluate potential nutrient impairment for streams based on applicable nutrient-related narrative standards (Table 9).

The assessment method is structured to identify streams which exceed regional reference based nutrient (nitrogen and phosphorus) thresholds as an initial screening mechanism. Further evaluation of those waters is conducted using measures of ecological integrity and associated thresholds to make final support decisions with regards to support of applicable beneficial uses. The assessment tools required to provide a quantified measure of stream habitat and biological integrity were developed with partners from the Natural Resource Management department at SDSU as part of the NGP Reference Site and Biological Assessment Project.

Stream biological and habitat assessment tools were developed on a regional basis and are only applicable to the area where they were developed. As a result, the assessment methodology applies only to perennial, wadeable stream assessment units located in level III ecoregion 46, with the exception of those in level IV ecoregion 46c (Figure 2). In addition, this does not include the major mainstem rivers (exception, SD-BS-R-BIG_SIOUX_01) within level III ecoregion 46. Limitations associated with evaluating all assessment units statewide are based on the availability of regional and/or site-specific bioassessment tools.

Building bioassessment capacity at the statewide level is a long-term goal of DENR and its research partners from SDSU. Efforts are currently underway to develop bioassessment tools for wadeable streams in western South Dakota, excluding the Black Hills. As regional bioassessment tools become available, the assessment methodology will evolve to incorporate additional assessment units in subsequent reporting cycles.

Table 9: Assessment Methodology for Nutrient-Related Narrative Standards Applicable to Wadeable Streams in Ecoregion 46

Are there at least 20 total phosphorus-nitrogen sample results in the assessment unit?	No	End assessment
Yes		
Is the assessment unit located in Level III Ecoregion 46?	No	End Assessment
Yes		
Is the assessment unit located in Level IV Ecoregion 46c?	Yes	End Assessment
No		
Is the assessment unit considered wadeable?	No	End Assessment
Yes		
Is the average total phosphorous concentration above 0.18 mg/L or is the average total nitrogen concentration above 2.5 mg/L.	No	End Assessment
Yes		
Is an Invertebrate IBI and Fish IBI score calculated for the assessment unit?	No	Assign assessment unit to category 2N
Yes		
Are both IBI scores > 50? If one IBI score is <50 and one IBI score is >50, and a Habitat Condition Score is not available see special note: If two IBI scores (>50) and one Habitat Condition score is calculated: Are 2-of-3 scores meeting the impairment thresholds? Invert and Fish IBI score >50 Habitat Condition score >60	No	List as Impaired/Threatened Special Note: If one IBI score is > 50 and the other IBI score is <50 for then assign to category 2N. * Category 2N Implies the Assessment unit requires the necessary Invertebrate IBI, Fish IBI and Habitat Condition scores to make a final support/impairment determination. It also implies reassessment is necessary to make determination.
Yes	No	List as Impaired/Threatened
Assessment unit is not impaired.		

Figure 2: Location of Ecoregion 46 excluding 46c within South Dakota.

Total nitrogen and total phosphorus thresholds were not derived from data obtained during the NGP reference site and bioassessment project. Only seven (n=7) reference sites were validated across the region of which most were clustered in the Coteau des Prairies region of northeastern South Dakota. Poor reference site distribution and lack of reference site data (low replication) provided little statistical confidence to establish reference based nutrient thresholds. DENR plans to continue assessment efforts in ecoregion 46 in the future to build the reference site network and increase data replication.

DENR relied on results from EPA's National Wadeable Streams Assessment to establish total nitrogen and total phosphorus thresholds. The nitrogen (2.50 mg/L) and phosphorus (0.18 mg/L) thresholds were based on the 75th percentile of the reference site data from the Temperate Plains nutrient region which corresponds to ecoregion 46 in eastern South Dakota (Herlihy and Sifneos 2008). These nutrient thresholds are considered course values due to the larger regional component and will be subject to reevaluation and possible change in subsequent reporting cycles.

Macroinvertebrate and fish community health provide the primary basis for determining whether a stream assessment unit is attaining applicable narrative standards and supporting designated uses. Quantifying the health of macroinvertebrates and fish provide a more holistic representation of overall biotic health. Both communities integrate the effects of multiple stressors overtime at different trophic levels. An Index of Biotic Integrity

(IBI) was developed for wadeable streams in ecoregion 46 following processes described in Whittier et al. (2007). An IBI integrates sensitive measures of community structure and function that are capable of discriminating between good (reference) and poor biological health. Core metrics scores are summed and scaled to provide a single IBI score that ranges from 100 to 0, with 100 being best condition. IBI thresholds were based on quartile deviations; 100 to 75 was considered good, 75 to 50 fair, 50 to 25 poor and less than 25 very poor biological integrity. An IBI score of less than 50 provides a benchmark in which to make support and impairment decisions.

A quantified measure of habitat condition was also used as a line of evidence especially if the fish and macroinvertebrate IBI scores display conflicting status. Habitat condition can provide an indication of a stream's physical potential to support a healthy biological community. It can also identify factors that may be impacting narrative standards and designated uses. A Habitat Condition Index (HCI) was developed using the same processes used for IBI development (Whittier et al. 2007). The HCI integrates a core set of habitat variables capable of discriminating between good and poor physical stream condition. The HCI uses the same scoring convention (i.e. 100 to 0) to quantify overall habitat condition. An HCI score of less than 60 provides a benchmark in which to make support and impairment decisions.

The current assessment methodology provides South Dakota with a process to identify streams impaired by nutrients or nutrient related impacts. During the 2014 reporting cycle, EPA expressed concerns with the nutrient thresholds used in the initial screening process as not protective to make full support determinations. The assessment method was designed to use the best available nutrient thresholds strictly as a screening tool to identify stream assessment units for further evaluation with quantified measures of biological and habitat health. Stream assessment units that meet IBI and HCI thresholds in accordance with the assessment method provide a direct link to aquatic life use support. A full support determination implies that the aquatic community and habitat is in good to fair condition and clearly not impaired by nutrients or nutrient related impacts. A use support determination was not made for assessment units solely on meeting the nutrient thresholds.

DENR recognizes that the current assessment method requires refinement. Formal plans are in place to increase stream reference site capacity in ecoregion 46. Future efforts will focus on increasing reference site distribution and associated datasets, building stressor/response linkages and developing protective nutrients thresholds appropriate for the region. DENR will consult with EPA throughout the process to ensure future assessment methods and associated thresholds are based on appropriate indicators and analysis techniques. In the interim, DENR will continue to address narrative nutrient related standards with the current assessment methodology under the premise that healthy aquatic community is not impacted by nutrients or nutrient related stressors. When data is not readily available to assess use support for nutrient related standards the use assessment will be based on numeric standards in accordance with the stream listing methodology (Table 8). Numeric standards include nutrient related stressors and therefore can address nutrient impacts in the interim until data requirements are met to assess with the more formal nutrient based assessment method.

A total of 20 total phosphorus (TP) and/or total nitrogen (TN) samples collected within the most recent 5-year period (2010-2015) were required to generate an average to begin the screening portion of the support assessment. If a single macroinvertebrate and fish IBI score was not available within the most recent 10-year period, the assessment unit was placed in user-defined subcategory 2N, indicating further assessment is required. An assessment unit was also placed in subcategory 2N if macroinvertebrate and fish IBI scores conflicted and a HCI score was not available. When IBI and/or HCI values were borderline (IBI-45-49; HCI 50-59) the water was also assigned to subcategory 2N to imply that a reassessment will be conducted prior to a support determination. If results of the reassessment indicate IBI and/or HCI scores under the target thresholds, the assessment unit will be considered impaired. A use support determination was not made for assessment units based solely on meeting the nutrient thresholds. DENR will consider assessment units in subcategory 2N a top priority for collection of adequate IBI and habitat information within a reasonable timeframe.

Twenty-one assessment units met the criteria to be assessed for nutrient-related narrative standards described in Table 9. Nineteen of the twenty one assessment units had average nitrogen or phosphorus concentrations above the respective thresholds. Nine assessment units were placed in user defined subcategory 2N. Six assessment units require IBI and/or HCI values and two require a reassessment. SD-BS-R-SKUNK_01 (an assessment unit on Skunk Creek) was also placed in category 2N. This segment is being monitored as part of a National Water Quality Initiative project. This project provides a unique situation to gain nutrient, biology and habitat data over a spatial and temporal scale. Therefore, a nutrient based use support determination for SD-BS-R-SKUNK_01 will be conducted during a subsequent reporting cycle. Seven assessment units were considered fully supporting and three assessment units met the nutrient thresholds. Data used to list SD-JA-R-FIRESTEEL_01 during the 2014 reporting cycle was determined to be outside the defined reach. As a result, the segment was delisted (listed in error) and placed in subcategory 2N for future bioassessment.

When an assessment unit is considered impaired for not meeting the applicable narrative standard it will be placed on the 303(d) list with a cause of “unknown” until a stressor analysis or TMDL analysis determines the pollutant or pollutants impacting biotic integrity of the community of concern. The impairment is associated with the designated aquatic life uses.

Table 10: Nutrient-related assessment status of stream assessment units in ecoregion 46 in eastern, South Dakota

Assessment Unit Identifier (AUID)	Minimum # TN or TP	TN or TP meet thresholds	IBI/HCI Available	Assessment Status
SD-BS-R-SKUNK_01	YES	NO	YES	Category 2N
SD-BS-R-BIG_SIOUX_01	YES	YES	NO	Track Assessment Unit
SD-JA-R-ELM_01	YES	NO	NO	Category 2N
SD-JA-R-FIRESTEEL_01	YES	NO	NO	Category 2N
SD-JA-R-FOOT_01_USGS	NO	-	-	Track Assessment Unit
SD-JA-R-MUD_01	NO	-	-	Track Assessment Unit
SD-JA-R-SNAKE_01	YES	NO	NO	Category 2N
SD-JA-R-TURTLE_01	YES	NO	NO	Category 2N
SD-JA-R-WOLF_01	YES	NO	YES	Full Support
SD-JA-R-WOLF_02	YES	NO	YES	Full Support
SD-JA-R-WOLF_SP_01	YES	NO	YES	*Category 2N-reasses
SD-MN-R-LAC_QUI_PARLE_W_BR_01	YES	YES	NO	Track Assessment Unit
SD-MN-R-LITTLE_MINNESOTA_01	YES	YES	NO	Track Assessment Unit
SD-MN-R-LITTLE_MINNESOTA_02	YES	NO	NO	Category 2N
SD-MN-R-WHETSTONE_01	YES	NO	YES	Full Support
SD-MN-R-WHETSTONE_S_FORK_01	YES	NO	YES	Full Support
SD-MN-R-WHETSTONE_S_FORK_02	YES	NO	YES	Full Support
SD-MN-R-YELLOW_BANK_N_FORK_01	YES	NO	YES	Full Support
SD-MN-R-YELLOW_BANK_S_FORK_01	YES	NO	NO	Category 2N
SD-VM-R-VERMILLION_E_FORK_01	YES	NO	YES	*Category 2N-reasses
SD-VM-R-VERMILLION_E_FORK_02	YES	NO	NO	Full Support

* Category 2N-suggests IBI and/or HCI values were borderline (IBI 45-49; HCI 55-60). A second assessment is warranted to confirm support and/or impairment status.

"Track assessment unit" refers to those stream segments that met nutrient thresholds or have insufficient nutrient information to perform an assessment. DENR will continue to track these assessment units for evaluation of nutrient-related narrative standards.

Lakes Assessment Methodology for Numeric Standards

Support determinations and impairment determinations were made for those lakes considered assessed. The minimum assessment requirements include two criteria; 1) at least two independent years of sample data and; 2) at least two sampling events per year. All available data from the most recent 10-year period (2006-2015) was used in the individual assessments. Older data was considered in the impairment analysis if deemed pertinent to the assessment. For example, if the exceedance rate for a particular water quality standard parameter was borderline (10%) older data were examined to determine if a trend exists in historic data.

The primary water quality data used to make impairment decisions were acquired from the following sources: the statewide lakes assessment project, individual lake assessment projects, outside entities, and when appropriate, citizens' monitoring efforts.

Statewide Lakes Assessment (SWLA) Project
Lakes were historically targeted and sampled on a four-year rotation twice during the growing season (May through September). In 2008, DENR adopted a random lake survey design. This sampling design allows DENR to select a subset of the most important water resources in the state, while the random component provides statistically valid results to make general determinations about the entire target population. A minimum of 50 lakes are sampled between reporting periods to achieve statistical confidence in the results. The number of lakes sampled (greater than 50) between reporting periods varies depending on available resources. Lake sampling stations consist of one to three predetermined site locations within the basin of each lake. The number of site locations assigned to each lake is dependent on basin size. Field measurements are collected at each site and water samples are composited from each site.

Individual Lake Assessment Projects
Project specific data are usually collected monthly throughout the growing season and during winter months with safe ice conditions from site locations consistent with those established during the SWLA project. Field measurements and water samples are usually collected at each site.

Data from outside entities and citizens' monitoring efforts are used when sampling efforts follow similar protocol to the SWLA project or individual lake assessments.

DENR's current lake sampling efforts are based on a random survey design. The target population for the 2014-2015 survey included all lakes designated with coldwater or warmwater fish life, or recreation beneficial uses (576). Three waterbodies deemed publicly important were also sampled. The number of lakes sampled annually is dependent on available resources and statistical requirements of the random sampling component. A total of 54 lakes were sampled during the 2014-2015 growing season.

A suite of water quality parameters is collected during standard assessment efforts. Water temperature, dissolved oxygen, conductivity, specific conductance, pH, and secchi disk transparency are measured on site. Chlorophyll-*a* is extracted from 50-1000 ml of lake sample and analyzed by spectrophotometer as described by APHA (1998). Nitrate, TP, total Kjeldahl nitrogen, ammonia, alkalinity, TSS, total dissolved solids, and *E. coli* samples are processed and shipped to the State Health Laboratory in Pierre, South Dakota, for analysis.

Water sample data generally constitute parameters collected in a water sample approximately 0.5 meters from the surface and in some instances 0.5 meters from the bottom, at a particular monitoring station or composited from multiple stations or depths throughout the water column. All available water sample data for a particular lake were used to analyze percent exceedances and ultimately make listing decisions.

Lakes are considered impaired if cumulative water quality standard data exhibit greater than 10% exceedances when 20 or more samples are available. If less than 20 samples are available, three exceedances are considered impaired. Impairment is assigned to toxic parameters (i.e., Total Ammonia Nitrogen) if more than one violation occurred in the last three years.

Water column profiles are generally collected during lake sampling visits. Profile data is collected at different depth increments from the surface to the bottom at multiple stations (2-3) throughout a lake to provide spatial coverage. The number of individual measurements is dependent on the depth of the respective water column. Profile measurements are generally recorded at 1.0 meter increments throughout the water column. Water quality standard parameters associated with vertical profiles include: dissolved oxygen, temperature, pH and specific conductance.

Lakes are considered impaired specifically for temperature, pH and specific conductance if greater than 10% exceedances (greater than 20 samples) occurred within the entire collection of profile measurements available for the specified 10-year period. When less than 20 samples were available, 3 exceedances were considered an impairment. The initial surface temperature and pH values for each station were not included in the profile data to avoid anomalous values associated with environmental conditions at the air-water interface.

Shallow, well-mixed lakes were also considered impaired for dissolved oxygen if greater than 10% exceedances (greater than 20 samples) occurred within the entire collection of profile measurements available for the specified 10-year period. When less than 20 samples were available, 3 exceedances were considered an impairment. Bottom dissolved oxygen readings were excluded from the datasets to avoid anomalous values associated with the sediment-water interface. For deeper, thermally stratified lakes, dissolved oxygen measurements were evaluated exclusively within the epilimnion and metalimnion.

The epilimnion, metalimnion and hypolimnion are defined in the Surface Water Quality Standards ARSD Chapter (74:51:01:01) as follows:

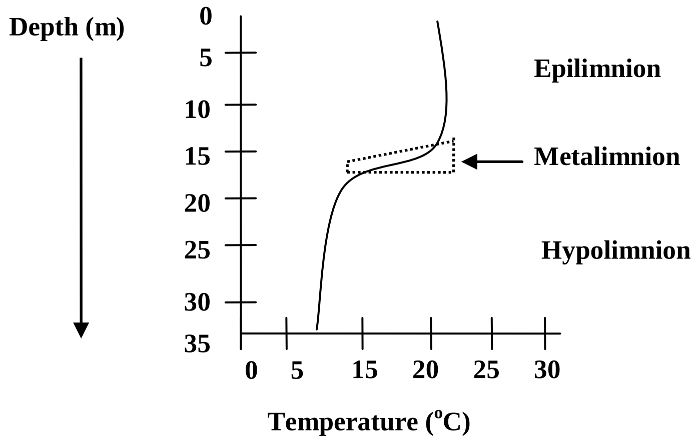
“Epilimnion,” in a thermally-stratified waterbody, the upper stratum of the water column. This layer is generally above the thermocline and is typically uniformly warm, circulating, and well mixed.

“Metalimnion,” in a thermally-stratified waterbody, the middle layer of a water column generally encompassing the thermocline, is typically somewhat mixed and influenced by the epilimnion.

“Hypolimnion,” in a thermally-stratified waterbody, the bottom layer of water column. This layer is generally below the thermocline and is typically less well mixed (at times, stagnant), colder than the epilimnion, and often of essentially uniform temperature.

Wetzel (2001) defines the thermocline as the plane of maximum rate of decrease of temperature with respect to depth. When thermal stratification was graphically evident and a well-defined epilimnion, metalimnion, and hypolimnion were present, only the dissolved oxygen data associated with the epilimnion and metalimnion were included in the collective dataset to calculate percent exceedances (Figure 3).

Figure 3: Diagram Depicting Classic Thermal Stratification and Associated Limnetic Zones



If thermal stratification was not well defined an alternate process was used to evaluate whether an epilimnetic zone was present. In such instances, the epilimnion was determined by identifying the depth of the water column above the greatest thermal variation as defined by a change of greater than 1°C per meter (Wetzel 2001). The water column above this zone of temperature deviation was considered representative of the epilimnion.

Some lakes have various depths and degrees of stratification among sites and sampling events. All representative dissolved oxygen values based on previously described criteria were collectively pooled and evaluated based on a percent exceedance. Again, if greater than 10% exceedances (greater than 20 samples) of the dissolved oxygen standard were observed within the collective profile measurements, the lake was considered impaired for dissolved oxygen and non-supporting the corresponding beneficial uses. If less than 20 samples were available, three exceedances were considered impaired.

Lake Assessment Methodology for Nutrient-Related Narrative Standards

South Dakota has several narrative water quality standards ARSD Chapters (74:51:01:05, 74:51:01:06, 74:51:01:08, 74:51:01:09, and 74:51:01:012) designed to protect beneficial uses of surface waters from nutrient-related impacts. The following nutrient-related assessment methodology was used to make support and impairment decisions for lakes during the 2016 reporting cycle.

Lake nutrient-related assessments were conducted using the same rationale and processes used for the 2014 Integrated Report. Lakes were evaluated with a multiple lines of evidence approach using region specific impairment thresholds based on the 75th percentile of reference lake data established by Herlihy et al. (2013). The nutrient regions of significance for the respective level III ecoregions in South Dakota and the associated thresholds are depicted in Table 11.

Table 11: Nutrient Ecoregion Specific Targets

Nutrient ecoregion		Level III ecoregion in SD	Chlorophyll-*a* ug/L	Total Phosphorus ug/L	Total Nitrogen ug/L
IV	Grass Plains (Manmade)	43	13.9	37	513
V	Cultivated Great Plains	42	49.9	117	1110
VI	Temperate Plains	46,47	37.8	108	1240

Chlorophyll-*a* concentrations were evaluated during the initial screening process. Waterbodies were considered impaired if the median chlorophyll-*a* concentration and 25% of individual samples exceeded the ecoregion specific threshold. When only one of the chlorophyll thresholds were exceeded, four additional indicators were evaluated and impairment was based on two additional indicators exceeding established thresholds. Table 12 depicts the different indicators and provides examples for different combinations used in the impairment determination process. A lake was considered assessed if ten indicator values were available during the growing season (May – September) over the data record from 2000 to 2015.

Table 12: Nutrient indicator thresholds and examples of the impairment determination process

Median. Chl-*a* > threshold	25% Chl-*a* > threshold	TP > threshold	TN > threshold	Ave. Secchi <0.7 m	large # rough fish	Status
yes	yes	–	–	–	–	impaired
no	no	–	–	–	–	not impaired
no	yes	no	yes	no	yes	impaired
yes	no	no	yes	no	no	not impaired
no	yes	yes	yes	no	no	impaired

A chlorophyll-*a* threshold of 10 µg/L was used for waterbodies with the beneficial use of Domestic Water Supply waters. When available, DENR reviewed GF&P fish survey reports to evaluate the significance of rough fish (i.e. carp and bullheads). The Secchi depth threshold (less than 0.7 m) was based on user perception survey conducted in the Northern Glaciated Plains ecoregion of Minnesota. (Heiskary and Walker 1988).

Based on the comprehensive assessment of applicable waterbodies, ninety-seven lake assessment units were evaluated with nutrient-related narrative criteria. Thirty-five lakes were considered to fully support designated uses and twenty-nine lakes did not support those uses. Thirty-three lakes did not have sufficient data to make support determinations based on minimum data requirements. Waterbodies designated with the beneficial use of warmwater marginal fish life propagation were excluded from the nutrient-related assessment for the 2016 reporting cycle.

The nutrient-related narrative standards being evaluated ARSD Chapters (74:51:01:05, 74:51:01:06, 74:51:01:08, 74:51:01:09, and 74:51:01:012) for lakes have implications to both aquatic life and recreation uses. Therefore, support determinations for lakes evaluated for nutrient-related narrative standards were applied to the domestic water supply designated use (1), fish life uses (2, 3, 4, 5), and both (7, 8) recreation uses.

The current assessment methodology provides South Dakota with a process to identify waterbodies "clearly" impaired by nutrients or nutrient related impacts. However, EPA has expressed concerns that the reference based chlorophyll and nutrient thresholds adopted as part of a larger regional effort are not "protective" of the uses. As a result, DENR is working internally and collaboratively with EPA Region 8 staff to develop a refined assessment method with protective thresholds that best represent waterbodies in South Dakota. The timeline goal is to have a new nutrient-related assessment methodology for the 2018 reporting cycle. DENR worked in conjunction with EPA Region 8 staff to develop a nutrient-related assessment method with protective thresholds to assess waterbodies in the Black Hills region (ecoregion 17). The methodology and rationale is documented below.

Ecoregion 17 Black Hills

Waterbodies in the Black Hills were excluded from the nutrient-related impairment assessment during the 2014 reporting cycle. For the 2016 reporting cycle, an independent assessment methodology was developed to evaluate nutrient-related impairment and beneficial use support for waterbodies in the Black Hills. A comprehensive data analysis using all available data was conducted to explore the best practical indicator(s) and impairment threshold(s) protective of the assigned beneficial uses.

The data analysis supported a reference approach to set protective chlorophyll-*a* targets for two classes of waterbodies. Assessed waterbodies in the Black Hills were classified into two groups based on physical characteristics (size, depth, and retention time) (Table 13). The initial reference lake identification process used a traditional watershed disturbance approach to locate lakes least impacted by human activity. Unfortunately, many waterbodies with relatively undisturbed watersheds did not always correlate with actual water quality condition. Reference lakes were selected based on DENR's knowledge of exceptional water quality and no prior history of impairment with respect to nutrients and productivity (i.e. algae), as well as having a watershed that is relatively undisturbed.

Table 13: Assessment units in ecoregion 17 of the Black Hills

Large Reservoirs (AUID)	Small Reservoirs/Lakes (AUID)
SD-CH-L-PACTOLA_01*	SD-CH-L-BISMARK_01
SD-CH-L-DEERFIELD_01*	SD-CH-L-CANYON_01
SD-CH-L-SHERIDAN_01	SD-CH-L-CENTER_01
	SD-CH-L-COLD_BROOK_01*
	SD-CH-L-COTTONWOOD_SPRINGS_01*
	SD-CH-L-HORSETHIEF_01
	SD-BF-L-IRON_CREEK_01
	SD-CH-L-LAKOTA_01
	SD-CH-L-LEGION_01
	SD-BF-L-MIRROR_EAST_01*
	SD-BF-L-MIRROR_WEST_01*
	SD-CH-L-STOCKADE_01
	SD-CH-L-SYLVAN_01

*Indicates a reference waterbody

Pactola and Deerfield reservoirs were selected to represent reference condition for the large reservoir category. Cold Brook, Cottonwood Springs, and Mirror Lakes 1 and 2 were considered reference for the small waterbody category. Numeric chlorophyll-*a* targets for each size class were based on the 90th percentile [log-back transformed] of the annual growing season median values for each reference group. Table 14 describes the chlorophyll-*a* thresholds used to make nutrient related listing decisions for waterbodies in ecoregion 17 of the Black Hills.

Table 14: Chlorophyll-*a* impairment thresholds for large and small waterbodies in the Black Hills

Large Waterbodies	Small Waterbodies
Median growing season chlorophyll-*a* (corrected for pheophyton) ≤ 7 µg/L	Median growing season chlorophyll-*a* (corrected for pheophyton) ≤ 8 µg/L

Reference based chlorophyll-*a* thresholds for both waterbody size classes are below 10 µg/L. Chlorophyll-*a* concentrations of less than 10 µg/L in lake environments have been associated with low cyanobacteria dominance and corresponding risk of cyanotoxin, generally considered protective of recreation and domestic water supply uses (Downing et al. 2001). South Dakota Game and Fish surveyed anglers at several popular Black Hills reservoirs to gain information on angling satisfaction at varying levels of chlorophyll-*a* concentration. Results of the survey showed anglers had enjoyable angling experiences in waterbodies with mean growing season chlorophyll-*a* concentrations at or below 10 µg/L.

A waterbody was considered impaired if a minimum five growing season median values were available and two values exceeded the class specific chlorophyll-*a* threshold in the most recent ten year period. Waterbodies with less than five annual growing season median values were placed in user defined subcategory 2N. DENR considers assessment units in subcategory 2N a high priority for sampling. All assessment units (n=16) had insufficient chlorophyll-*a* data to be assessed during the 2016 reporting cycle. DENR intends to sample waterbodies in the Black Hills during the 2016 and 2017 field seasons to obtain sufficient information to make assessment determinations for the 2018 reporting cycle, resources permitting. This assessment methodology provides a means to evaluate nutrient related narrative standards and is applicable to the assigned beneficial uses of waterbodies in ecoregion 17 of the Black Hills.

Assessment Categories

South Dakota has chosen to use the assessment categories that EPA recommends in its guidance that was issued in July 2005. DENR also added a user-defined sub category (2N). South Dakota's assessment categories are as follows:

Category 1:	All designated uses are met;
Category 2:	Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met;
Subcategory 2N:	Additional data is required to determine if nutrient-related narrative standards are met;
Category 3:	Insufficient data to determine whether any designated uses are met;
Category 4A :	Water is impaired but has an EPA approved TMDL;
Category 4B:	An impairment caused by a pollutant is being addressed by the state through other pollution control requirements;
Category 4C:	Water is impaired by a parameter that is not considered a "pollutant;" and
Category 5:	Water is impaired or threatened and a TMDL is needed.

Support assessment for fish and aquatic life propagation use primarily involves monitoring the following major parameters: dissolved oxygen, total ammonia, water temperature, pH, chlorophyll-*a* (lakes), and TSS.

Support assessment for immersion recreation and limited contact recreation involves monitoring dissolved oxygen and *E. coli* bacteria. Water is monitored for *E. coli* bacteria from May 1 through September 30 of each year (Table 2).

Support assessment for domestic water supply uses involves monitoring total dissolved solids, nitrates, pH, chlorides, and sulfates.

Support assessment for nutrient-related narrative standards involves monitoring total phosphorus and total nitrogen, followed by biological and habitat assessments.

South Dakota adopted numeric surface water quality criteria with the 1967 "Water Quality Standards for the Surface Waters for the State of South Dakota." The main intent of numeric water quality criteria is to protect designated beneficial uses. Numeric criteria are needed to develop numeric effluent limits for facilities that discharge wastes to surface water. Because South Dakota has numeric water quality criteria, a strict interpretation of the water quality standards could imply that a waterbody could potentially be listed as "impaired" or "nonsupporting" even if only one exceedance occurred within a five-year period. South Dakota and EPA have traditionally viewed the 10% approach (as stated in the criteria for determining support status in Table 8) as an appropriate measuring tool to determine waters that require further in-depth study and TMDL development. Factors such as drought, high precipitation events, and other environmental factors can cause significant variation in water quality. One exceedance of a conventional parameter, such as pH or water temperature, does not indicate a waterbody is not supporting its beneficial use. For Integrated Report purposes, DENR defines "impairment" or "nonsupport" of a beneficial use of a waterbody by the criteria found in Tables 8, 9, 11, and 12.

Beneficial use support determinations made by South Dakota for border waters may differ from determinations made by bordering states. Each state may have different beneficial uses assigned for the waterbody with different applicable water quality standards. In addition, differences in monitoring strategy, assessment methodology, and other factors may affect the support determination. However, DENR coordinates with border states to address water quality concerns.

STATEWIDE SURFACE WATER QUALITY SUMMARY

South Dakota has a total of about 9,726 miles of perennial rivers and streams (Table 1). Major or significant streams in this context are waters that have been assigned a specific fish life use in addition to the beneficial uses of (9) Fish and wildlife propagation, recreation, and stock watering; and (10) Irrigation waters. This definition includes primary tributaries and, less frequently, subtributaries of most state rivers and larger perennial streams. In a few cases, lower order tributaries may be included, for example in the Black Hills area, which has a relatively large number of permanent streams.

Approximately 5,858 miles of rivers and streams have been assessed to determine water quality status for a period covering the last five years (October 2010 through September 2015). The five-year time span is necessary to ensure enough data points are available for each stream segment to properly characterize existing stream conditions and adequately portray the natural variability in water quality.

Currently, 21.3% of the assessed stream miles fully support all assigned beneficial uses; a decrease from 30.6% in the 2014 Integrated Report. 78.7% do not presently support one or more uses. The high percentage of impairment can be attributed largely to high levels of TSS, *E. coli*, and fecal coliform bacteria.

During this reporting cycle, 5,409 designated stream miles were assessed for fishery/aquatic life beneficial use attainment. 43.4% percent of assessed stream miles fully supported the fishery/aquatic life uses, a decrease from 48% in the 2014 Integrated Report. For immersion recreation waters, 1,539 stream miles were assessed to determine attainment; 53.2% fully supported immersion recreation criteria, unchanged from the 2014 Integrated Report.

Nonsupport in assessed streams was caused primarily by *E. coli* bacterial from agricultural nonpoint sources and wildlife. In approximate order of stream miles affected, causes of impairment this reporting cycle include: *E. coli,* TSS, fecal coliform, sodium adsorption ratio (salinity), mercury in fish tissue, dissolved oxygen, specific conductance, total dissolved solids, water temperature, pH, and cadmium. Natural pollutant sources of dissolved and suspended solids are exemplified by erosive soils that occur in western South Dakota badlands and within the Missouri River basin (including considerable exposed marine shale formations) and in extreme southeastern South Dakota (including large areas of highly erodible loess soils). Storm events that produce moderate to significant amounts of precipitation contribute to suspended sediment problems over large areas of the state, particularly in the west and southeast. Fecal coliform and *E. coli* concentrations also increase significantly during times of precipitation and runoff events. Appropriate best management practices should be applied to treat the sources of these and other parameters whose effects are likely to be masked during periods of low precipitation.

In addition to rivers and streams, South Dakota has 576 classified lakes and reservoirs totaling approximately 213,265 acres. These lakes are listed in ARSD Chapter 74:51:02

and classified for aquatic life and recreation beneficial uses. GF&P presently manages approximately 500 lakes for recreational fishing.

Excluding the four Missouri River reservoirs, an estimated 30% of the lakes and reservoirs have been assessed, accounting for 67% of the total lake acreage. An estimated 21% (41 lakes) of the lake acreage was considered to support all assessed beneficial uses. This is a decrease from 44% in the 2014 Integrated Report. Seventy-nine percent of the assessed lake acreage (120 lakes) did not support beneficial uses this cycle. This sharp decline of waterbody support is attributed to adopting the water quality criterion of 0.3 mg/kg mercury in fish tissue. Based on lake acreage, the primary causes of non-support are mercury in fish tissue, chlorophyll-*a*, dissolved oxygen, temperature, pH, and sodium adsorption ratio (salinity). While many factors influence mercury methylation and bioaccumulation rates, the sources of mercury in fish tissue are mostly atmospheric deposition from sources outside of South Dakota. DENR completed and received final EPA approval for a statewide mercury TMDL, which included 75 waters not supporting the mercury in fish tissue standard. In general, chlorophyll-*a* is attributed to nonpoint source pollution while temperature and sodium adsorption ratio are attributed to natural sources.

Seventy-three percent of lake acres assessed were considered to fully support the limited contact and immersion recreation uses. In addition, 100% of the assessed lake acreage complied with bacteria standards in accordance with the listing methodology. The majority of lake acreage assessed for warmwater and coldwater fish life uses complied with water quality standard parameters. Over 90% of the assessed lake acreage complied with standards for specific conductance, pH, dissolved oxygen, water temperature and total dissolved solids. In addition, 100% of the lakes acres assessed for total suspended solids, nitrates, total ammonia, and total alkalinity complied with standards for warmwater and coldwater beneficial uses in accordance with the listing methodology.

Most lakes and reservoirs in the state are characterized as eutrophic to hypereutrophic. They tend to be shallow, turbid, and are well supplied with dissolved salts, nutrients, and organic matter from often sizeable watersheds of nutrient rich glacial soils that are extensively developed for agriculture. Runoff carrying sediment and nutrients from agricultural land is the major nonpoint pollution source.

Category status comparisons between 2016 and 2014 for streams and lakes are summarized in Tables 15 and 16. The mileage/acreage of use support, causes, and potential sources of impairment for assessed surface waters in South Dakota are summarized in Tables 17 through 22.

The general statistics reported are intended to characterize use support, causes, and potential sources for the 2016 reporting cycle. Due to multiple factors (page 4), it is not feasible to determine trends between reporting cycles.

Table 15: 2016 Category Status for Rivers and Streams in South Dakota vs 2014

2016			2014		
EPA Category	Total Size (miles)	Number of Assessment Units	EPA Category	Total Size (miles)	Number of Assessment Units
1	876.86	45	1	1,183.22	44
2	371.18	8	2	704.16	13
3	677.88	25	3	293.84	17
4A	996.09	32	4A	856.05	33
4B	0	0	4B	0	0
4C	0	0	4C	0	0
5	3,614.2	88	5	3,415.72	94

Table 16: 2016 Category Status for Lakes in South Dakota vs 2014

2016			2014		
EPA Category	Total Size (acres)	Number of Assessment Units	EPA Category	Total Size (acres)	Number of Assessment Units
1	26,661.25	32	1	61,367.56	46
2	1,948.66	9	2	2,418.34	12
3	6,670.44	11	3	8,790.1	13
4A	60,533.37	65	4A	6,592.12	13
4B	0	0	4B	0	0
4C	0	0	4C	0	0
5	48,698.81	55	5	73,887.62	72

Table 17: Designated Overall Use Support Status for Rivers and Streams in South Dakota

Type of Waterbody: Rivers and Streams (miles)			
Degree of Use Support	Assessment Basis		Total Assessed
	Evaluated	Monitored	
Miles Fully Supporting	-	1,248.04	1,248.04
Miles Insufficient Data but Threatened	-	-	-
Miles Not Supporting	-	4,610.29	4,610.29
TOTAL	-	5,858.33	5,858.33

Table 18: Designated Overall Use Support Status for Lakes and Reservoirs in South Dakota

Type of Waterbody: Lakes and Reservoirs (acres)			
Degree of Use Support	Assessment Basis		Total Assessed
	Evaluated	Monitored	
Acres Fully Supporting	-	28,609.91	28,609.91
Acres Insufficient Data but Threatened	-	-	-
Acres not Supporting	-	109,232.18	109,232.18
TOTAL	-	137,842.09	137,842.09

Table 19: Individual Use Support Summary for Rivers and Streams

Beneficial Use	Miles Fully Supporting	Miles Not Supporting	Miles Threatened	Miles Insufficient Info Or Not Assessed	Miles Assessed
Overall Use Support	1,248	4,610	-	678	5,858
Domestic Water Supply	852	60	-	7	912
Coldwater Permanent Fish Life	238	377	-	99	615
Coldwater Marginal Fish Life	128	24	-	6	152
Warmwater Permanent Fish Life	155	660	-	80	816
Warmwater Semipermanent Fish Life	821	1,815	-	321	2,636
Warmwater Marginal Fish Life	1,005	186	-	417	1,190
Immersion Recreation	819	720	-	110	1,539
Limited Contact Recreation	2,158	3,150	-	1017	5,308
Fish/Wildlife Prop., Rec., and Stock Watering	4,824	727	-	986	5,551
Irrigation	4,407	1,213	-	916	5,620
Commerce and Industry	612	-	-	-	612

Mileage values generated by ADB are carried out to the 100th decimal place. The table reflects mileage values rounded to the nearest whole number and may not add up correctly due to rounding error.

Table 20: Individual Use Summary for Lakes and Reservoirs

Beneficial Use	Acres Fully Supporting	Acres Not Supporting	Acres Threatened	Acres with Insuff. Info. Or Not Assessed	Acres Assessed
Overall Use Support	28,610	109,232	-	6,670	137,842
Domestic Water Supply	7,277	701	-	-	7,979
Coldwater Permanent Fish Life	853	813	-	17	1,666
Coldwater Marginal Fish Life	-	159	-	31	159
Warmwater Permanent Fish Life	15,031	44,393	-	54	59,424
Warmwater Semipermanent Fish Life	5,326	31,559	-	205	36,885
Warmwater Marginal Fish Life	6,884	24,174	-	6,880	31,058
Immersion Recreation	85,129	31,150	-	20,164	116,279
Limited Contact Recreation	85,129	31,150	-	20,164	116,279
Fish/Wildlife, Prop., Rec., and Stock Watering	53,684	83,758	-	7,071	137,442
Irrigation	24,513	5,070	-	-	29,583

Acreage values generated by ADB are carried out to the 100th decimal place. The table reflects mileage values rounded to the nearest whole number and may not add up correctly due to rounding error.

Table 21: Total Sizes of Water Impaired by Various Cause Categories in South Dakota

River/Streams	
Causes/Stressor Category	**Miles**
Cadmium	2
Fecal Coliform	1,921
Dissolved Oxygen	544
pH (high)	27
Salinity/SAR	957
Specific Conductance	437
Temperature	174
Total Dissolved Solids	221
Total Suspended Solids	2,045
Mercury in fish tissue	564
E. coli	2,803
Lakes/Reservoirs	
Cause/Stressor Category	**Acres**
Dissolved Oxygen	12,177
Chlorophyll-*a*	25,678
Mercury in fish tissue	83,416
Nitrates	50
pH (high)	7,256
Selenium	50
Specific Conductance	50
Temperature	8,129
Total Dissolved Solids	50
Salinity/SAR	5,070

Mileage/acreage values generated by ADB are carried out to the 100th decimal place. The table reflects mileage values rounded to the nearest whole number.

Table 22: Total Sizes of Waters Impaired by Various Source Categories in South Dakota

Rivers/Streams	
Source Category (Summarized from ADB*)	**Miles**
Impacts from Abandoned Mines	2
On-site Treatment Systems (septic and similar decentralized systems)	28
Streambank Modifications/destabilization	77
Municipal Area or Urban Runoff	95
Unknown Sources	127
Wildlife	515
Agricultural Crop Production	868
Natural Sources	1,096
Livestock -Grazing or Feeding	1,890
Lakes/Reservoirs	
Source Category	**Acres**
Unknown Sources	2,867
Nonpoint Sources	663
Natural Sources	5,120

Mileage values generated by ADB are carried out to the 100th decimal place. The table reflects mileage values rounded to the nearest whole number. *The source categories are defined more specifically in ADB and the basin report tables. For this table, sources for rivers and streams are summarized into more general source categories.

Not all sources of impairment have been identified for this reporting cycle. Unidentified sources of impairment have been left blank in Tables 32 - 45 and are not included in the above summary table. Sources of impairment are identified during watershed assessments and TMDL development. In the basin tables, sources are not listed in any particular order and the reader should not assume the source list order lends greater significance.

The most common impairment source for lakes in South Dakota is a combination of natural and agricultural nonpoint source pollution. To avoid redundancy, these sources were not added to the source description in Tables 32 - 45. Lake impairment sources were only added to the basin tables if identified as something other than natural and agricultural nonpoint source pollution. The lake acreage associated with other identified impairment sources are reflected in Table 22. All other impaired lake acres in South Dakota assume a combination of natural and agricultural nonpoint source pollution.

STATEWIDE PROBABILISTIC LAKE ASSESSMENT

South Dakota's lake monitoring program used a random probabilistic survey design during the 2014-2015 field seasons. Lake data collected during this period yielded statistically valid results to make inferences about the entire population of lakes designated fishery and/or recreation beneficial uses for the 2016 reporting period.

The total lake population consisted of 576 lakes designated the beneficial use of recreation and/or warmwater or coldwater fish life (Surface Water Quality Standards 74:51:02) accounting for 213,265 lake acres in South Dakota. The survey design utilized three strata; targeted lakes, managed fisheries and unmanaged fisheries. Fifty-eight lakes were initially selected for sampling during the 2014-2015 field seasons. Four waterbodies were not assessed during the effort and those waterbodies were not replaced with oversamples. The final weightings were adjusted based on the lakes that were assessed. A total of 54 individual waterbodies were assessed for the 2016 reporting cycle. The lake data from 2014 and 2015 was combined to generate a single analysis of lake condition for 2016 reporting. The 2010 Integrated Report included results from the first statistical survey for lakes in South Dakota. Statistical survey results from the 2010, 2012, and 2014 Integrated Reports were included with the 2016 Integrated Report results to provide a framework for future trend analysis. Climate variability cannot be adequately explained with the limited number of reporting cycles and although some indicators show significant increases or decreases, caution should be used when implying a trend.

Population Description

South Dakota currently has 576 lakes designated with the beneficial use of recreation and/or coldwater or warmwater fish life uses. The Missouri River main stem reservoirs are excluded from this dataset. Lakes were designated a particular fish life use classification based on characteristics such as depth, size, permanency and geographic location. There are numerous water bodies in the state which have not been assigned a fishery beneficial use. Figure 4 depicts the size distribution of the fishery classified lakes in the state. Confidence intervals (margin of error) varied from 5% to 10% dependent on number of measurements collected. Results that fall within the confidence interval are statistically similar.

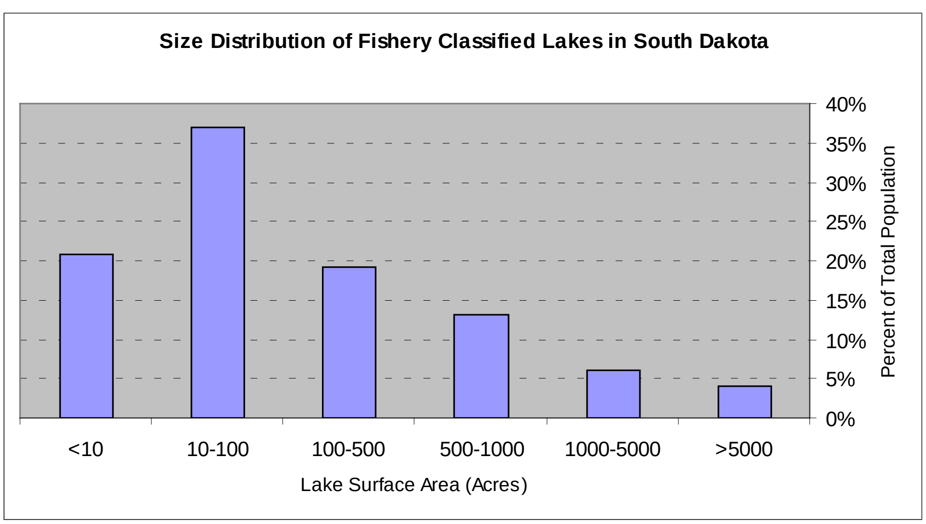


Figure 4: Size Distribution of Fishery Classified Lakes in South Dakota

All lakes are designated the use of fish and wildlife propagation, recreation and stock watering. Water quality standards have been defined in South Dakota state statutes in support of these uses. The standards consist of suites of numeric criteria that provide physical and chemical benchmarks from which management decisions may be developed.

Lakes are assigned a fishery beneficial use based on the type of fish and survival rates that are expected in that water body. Warmwater fisheries can support expected communities at greater temperatures and with lower dissolved oxygen concentrations than coldwater fisheries. Warmwater marginal fisheries are typically shallow systems (3 meters or less) prone to winter kill while warmwater permanent fisheries are expected to support a reproductive fishery during most years.

Coldwater permanent fisheries are expected to have little chance of winter kill and sustain a coldwater reproductive fishery. Coldwater marginal fisheries are more reflective of the species desired in the water body than its ability to support a reproductive community. These waterbodies are frequently managed as “put and take” fisheries where catchable size fish are released for public consumption with limited expectations on survival from year to year or reproduction potential.

E. coli

The bacterium *E. coli* was targeted as the primary indicator to determine recreation use support for the total population of classified lakes. *E. coli* sampling was conducted in early June at each of the randomly selected waterbodies. Sample location was determined upon arrival at each waterbody. Sites were selected based on their likelihood of human use and contact. Boat launches and developed recreation areas were used as a first choice. In the absence of any sort of developed access or visible access point, samples were collected by wading in at the most convenient access point available.

The acute water quality criterion for *E. coli* bacteria (maximum of 235 and 1178 colonies/ 100mL for immersion and limited contact, respectively) was used to evaluate beneficial use support. Data from the current and previous statistical surveys indicate that nonsupport of the recreation uses due to *E. coli* concentrations continues to remain low for the total classified lake population (Table 23).

Table 23: Number and Percentage of Lakes in the Total Population Not Supporting Recreation Uses Due to Bacteria

E. coli								
Beneficial Use	2010		2012		2014		2016	
	%	Lakes	%	Lakes	%	Lakes	%	Lakes
Limited Contact	1.3%	7	0.0%	-	0.5%	3	2.1%	12
Immersion	9.0%	51	6.2%	35	0.7%	4	2.1%	12

Dissolved Oxygen

Dissolved oxygen concentrations are a critical standard for aquatic life survival. South Dakota Water Quality Standards require minimum dissolved oxygen concentrations based on the specific fishery classification of the water body. Recreation standards are set at a minimum of 5.0 mg/L for both immersion and limited contact. Dissolved oxygen standards apply anywhere in the water column of a non-stratified water body, or in the epilimnion and metalimnion of a stratified water body. Standards are listed in Table 24.

Table 24: Dissolved Oxygen Standards for Fishery Beneficial Uses

Fishery		Condition	Min DO
Coldwater	Permanent	Daily Minimum	6.0
		In spawning areas during spawning season.	7.0
	Marginal	Daily Minimum	5.0
Warmwater	Permanent	Daily Minimum	5.0
	Semi-Permanent	Daily Minimum	5.0
	Marginal	Oct 1 to April 30	4.0
		May 1 to Sept 30	5.0

Measurements recorded near the bottom of lakes tended to be lower in dissolved oxygen than those measured at or near the surface. This condition is expected in lakes that have sufficient depth to prevent mixing, resulting in stratification. Mixing depth is variable between lakes, but most frequently appears between 1 and 3 meters of depth. Dissolved oxygen concentrations were evaluated by two separate methods. Water column maximums were compared to the waterbodies fishery and recreation standards. Water column medians were also evaluated to determine the number of lakes that are at risk of not supporting. Variations in the depth of the epilimnion and metalimnion in stratified lakes may result in full support of the beneficial uses when the lower half of the water column falls below the standard. In the past four reporting cycles, less than five percent of waterbodies in the total population were considered nonsupporting the fishery use for exhibiting maximum dissolved oxygen concentrations below water quality standards. In addition, ten percent or less of the waterbodies in the total population were considered at risk for nonsupporting the fishery use for exhibiting median dissolved oxygen concentrations below the water quality standards, exception 2010 (Table 25).

Table 25: Number and Percentage of Lakes in the Total Population Not Supporting Beneficial Uses Due to Low Dissolved Oxygen

Dissolved Oxygen								
Criteria Evaluated	2010		2012		2014		2016	
	%	Lakes	%	Lakes	%	Lakes	%	Lakes
Water Column Maximum	4.0%	23	2.3%	13	3.9%	22	2.6%	15
Water Column Median	17.0%	97	10.0%	57	5.7%	32	8.3%	47

pH

The maximum pH standard for all lakes assigned a fishery beneficial use in South Dakota is 9.0 standard units. Historically, South Dakota lakes and reservoirs have not experienced acidity problems resulting in pH values below the water quality standard minimum of 6.0 standard units. References to impairment risk are limited to lakes that exhibited pH values in excess of 9.0 standard units. Elevated pH values are frequently linked to high productivity as a result of photosynthetic activity from plants and algae within the water column. Lakes in the plains portion of the state have higher alkalinity levels than those in the Black Hills resulting in a greater ability to buffer against shifts in pH. Some reservoirs in the Black Hills have considerably lower alkalinity levels than the plains lakes, and are more susceptible to large variations in pH over shorter periods of time.

Because pH measurements can vary within the water column of lakes, three different evaluations were conducted to describe beneficial use support based on the pH criterion of >9.0 standard units (Table 26). The water column minimums represent those lakes in the population in which minimum pH measurements in the water column all exceeded 9.0 su. Water column medians indicate lakes in the population for which greater than half the pH measurements in the water column exceeded 9.0 su. The water column maximum indicates lakes in the population where a single pH measurement in the water column exceeded 9.0 su. The number and percentage of lakes in the total population that experience pH exceedances has been variable between reporting cycles. A considerable increase in pH exceedance was evident during the 2014 reporting cycle in comparison to all reporting cycles. The number of lakes within the total population that exceeded the pH criterion for the 2016 reporting cycle decreased by 10% from the 2014 reporting cycle in all three evaluation categories (Table 26).

Table 26: Number and Percentage of Lakes in the Total Population Not Supporting Beneficial Uses Due to High pH

pH								
Criteria Evaluated	2010		2012		2014		2016	
	%	Lakes	%	Lakes	%	Lakes	%	Lakes
Water Column Minimum	NA		NA		20.3%	116	10.4%	60
Water Column Median	4.0%	23	3.8%	22	23.6%	135	13.2%	75
Water Column Maximum	15.0%	86	6.9%	39	24.8%	141	15.6%	89

Temperature

Water column temperatures affect the amount of dissolved oxygen available for aquatic life. Coldwater species are less tolerant of low dissolved oxygen and warm temperatures, particularly during spawn. Table 27 indicates the maximum allowable temperatures for the intended beneficial uses while Figure 5 depicts the distribution of temperatures throughout the water columns of lakes for the various fish life propagation beneficial uses.

Table 27: Temperature Standards for Fishery Uses

Beneficial Use	Temp F	Temp C
Warmwater Marginal and Semipermanent	90	32.2
Warmwater Permanent	80	26.6
Coldwater Marginal	75	23.9
Coldwater Permanent	65	18.3

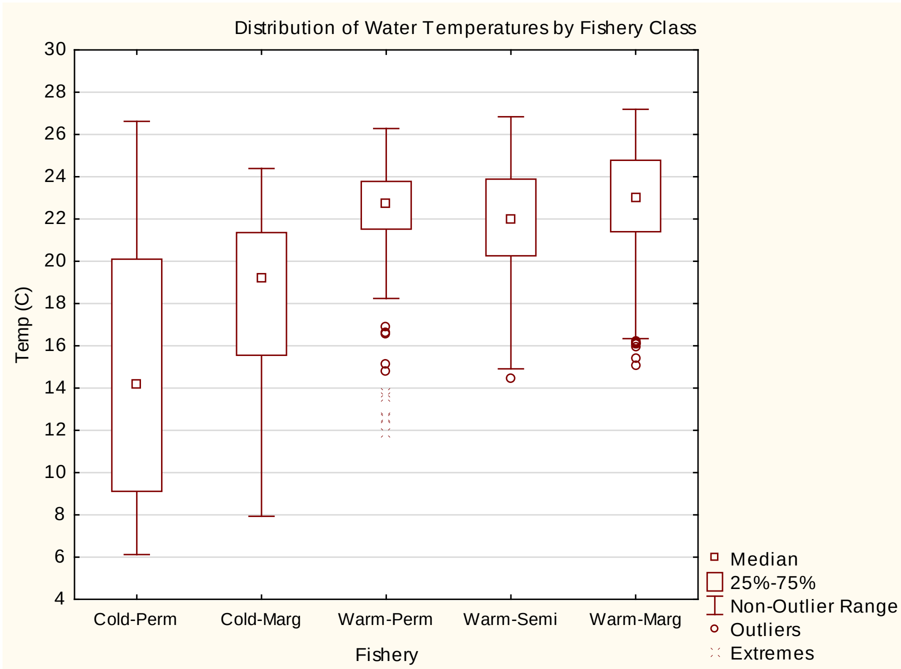


Figure 5: Temperature Distributions by Fishery Beneficial Use

The number of lakes with temperatures above the standard remained low at under 5% (Table 28). Similar to previous reports, coldwater permanent fisheries were more likely to have portions of the water column above the standard than other fishery classes. None of the warmwater fisheries had measurements greater than their respective standards.

Table 28: Number and Percentage of Lakes in the Total Population Not Supporting Beneficial Uses Due to Elevated Temperature

Temperature								
Criteria Evaluated	2010		2012		2014		2016	
	%	Lakes	%	Lakes	%	Lakes	%	Lakes
Water Column Maximum	4.0%	23	15.5%	88	5.0%	29	3.4%	19
Water Column Median	1.0%	6	9.0%	51	2.2%	13	1.4%	8

LAKE WATER QUALITY ASSESSMENT

A total of 576 lakes and reservoirs are currently designated with the beneficial uses of recreation and/or warmwater or coldwater fish life in South Dakota. Thirty-nine assessed lakes in South Dakota have a surface area greater than 1,000 acres and have a combined surface area of 112,729 acres. Lake monitoring and assessment efforts have been conducted routinely since 1989 as part of the DENR's SWLA project. Additional lake data have also been acquired from individual assessment projects and citizens monitoring efforts. Approximately 19% of the 576 classified lakes have been assessed accounting for 67% of the total lake acreage.

Water quality standards designed to protect designated beneficial uses were evaluated for each lake. Based on numeric water quality standards and nutrient-related narrative standards, 41 lakes fully supported beneficial uses and 120 failed to support one or more beneficial uses (Table 16). Eleven did not meet the requirements for sufficient data or were not assessed.

A Trophic State Index approach was used to determine the trophic status of assessed lakes (Carlson 1977). The primary trophic state indicators are phosphorus, Secchi depth transparency and chlorophyll-*a*. Carlson (1991) suggests the chlorophyll index provides the best measure of lake productivity and trophic state. The average chlorophyll TSI was used to classify the trophic status of assessed lakes and reservoirs in South Dakota (Table 29).

Table 29: Trophic Status of Assessed Lakes

Trophic Status	Number of Lakes	Acreage of Lakes
Total with Beneficial Use Criteria	576	213,265
Total Assessed	172	144,513
Oligotrophic	1	822
Mesotrophic	24	23,944
Eutrophic	75	76,999
Hypereutrophic	44	27,794
Unknown	28	14,954

The major problems of South Dakota lakes continue to be excessive nutrients, algae, and siltation due to nonpoint source pollution (primarily agricultural). Although land use practices have improved in many agricultural watersheds, internal phosphorus recycling continues to negatively impact the trophic state of many lakes. Aging reservoirs have also become more eutrophic as many are now approaching their expected life spans. Water quality degradation due to acid precipitation, acid mine drainage, or toxic pollutants, is presently not a problem in South Dakota lakes.

Watershed Protection Program

The approach used by the South Dakota Watershed Protection Program for addressing NPS pollution is to first identify and target sources of pollution and determine alternative restoration methods, and second, to control the sources of pollution and restore the quality of impacted waterbodies. Most phases of the program are state and local efforts with supplemental technical and financial assistance from EPA and other federal agencies used whenever possible.

The watershed assessment phase encompasses a series of procedures to assess the current condition of selected waterbodies. Included in this phase are water quality, water quantity, and watershed data collection. The state provides the local sponsor with technical assistance, training and equipment to conduct the assessment portion of the project. Generally, the local project sponsor is responsible for collecting the data using federal funding, state grant funding, and existing local resources. Following the collection of sufficient data, the state evaluates the data and prepares a report which details baseline information, identifies sources of pollution, describes alternative pollution control methodologies and outlines implementation costs. A TMDL is then developed using this information. Prior to the implementation of specific pollution control and restoration alternatives, the project sponsor is responsible for the preparation of a watershed/lake restoration plan based on recommendations from the assessment. Technical assistance for this process is provided by DENR. If the plan is approved, the project sponsors are eligible to apply for appropriate state and federal funding.

The majority of the pollution sources that have affected the lakes in South Dakota are agricultural nonpoint sources. DENR Surface Water Quality Program generally prohibits point source discharges to lakes. The methods used to control nonpoint pollution sources are selected on a case-by-case basis. The selection of methods is based on the evaluation of individual watersheds using the USDA Annualized Agricultural Nonpoint Source Model (AnnAGNPS) or a manual inventory of land use, soil type, and nonpoint sources. The AnnAGNPS model delineates critical sub-watersheds within the entire watershed and is then used to predict which control methods would be the most effective. The AnnAGNPS model is also used to track success of best management practices (BMPs).

Following this evaluation, coordination with state and federal agricultural agencies is solicited to verify the critical nature of the identified sub-watersheds and the selected control methods. For those areas targeted as critical, the owners/operators are contacted to request their voluntary participation in the control program. The state does have in effect the Sediment and Erosion Control Act of 1976 which is implemented by individual state conservation districts. However, any action under the Act is based strictly in response to complaints. There are no provisions for forcing compliance on identified problem areas. Specific practices currently recommended for NPS pollution control include large and small sediment control structures, stream bank erosion control, grazing management systems, and the installation of manure management systems.

Lake management in South Dakota is dependent upon many resource management programs and agencies. The South Dakota Department of Agriculture, the NRCS, GF&P, DENR, and many local agencies and special purpose districts are all crucial to the protection or restoration of lakes in the state. These groups provide financial and/or technical assistance essential for accomplishing lake water quality goals. Local and county land use zoning ordinances exist in South Dakota and are considered local responsibilities.

In conjunction with the development of recommended pollution control alternatives, the watershed assessment study is also designed to provide recommendations for in-lake restoration alternatives. The primary recommendations provided for lake restoration include, but are not limited to, natural flushing, reducing or eliminating sources of pollution, in-lake alum treatments, and shoreline stabilization. Restoration methods employed in the past also include aeration, sediment removal, weed harvesting, and chemical weed control.

A list of current assessment and implementation projects can be found on the DENR website: http://denr.sd.gov/dfta/wp/tmdl.aspx

Acid Effects on Lakes

During Lake Water Quality Assessments, each lake is measured for field pH. Monitoring efforts from 1989 to 2015 suggest none of the assessed lakes (n=140) had acidic pH conditions (Table 30). DENR is not aware of any lakes in South Dakota that are currently impacted by acid deposition. This is attributed to a lack of industrialization and a natural buffering capacity of the soils.

Table 30: Acid Effects on Lakes

	Number of Lakes	Acreage of Lakes
Assessed for pH	140	127,885
Impacted by Acidity (<6.5)	0	0
Vulnerable to Acidity (<6.5)	0	0

Trends in Lake Water Quality

The trophic state of a lake can be monitored over time to track changes in water quality for prioritizing management decisions. Long term trends were determined for South Dakota lakes using all available growing season (May-September) data collected during DENR's annual SWLA efforts, individual lake water quality assessments projects, and when appropriate, citizens monitoring efforts. The TSI values for chlorophyll-*a*, were calculated for each individual sample. The slope of a regression line was calculated for each TSI measurement over time. If a lake had less than two independent years of data, it was not included due to insufficient data.

A total of 172 waterbody assessment units were included in the trend assessment. The chlorophyll TSI trend analysis yielded slopes of less than 5% in nearly all assessed waterbodies indicating stable or non-significant change (Table 31). One lake displayed a borderline positive slope above 5% (5.3%) suggesting increasing algae biomass overtime equating to degrading condition. A total of 50 lakes were considered to have an unknown trend due to insufficient chlorophyll data.

Due to the limited timeframe it is difficult to describe the significance of these conditions. However, it is likely due to natural and seasonal variability natural hydrologic conditions associated with wet and dry cycles. In general, all assessed lakes display relatively stable trophic conditions. A significant amount of TSI data is required to cause a change in trend overtime.

Table 31: Long Term Trends in Assessed Lakes (1989-2015)

	Number of Lakes	Lake Acreage
Assessed for Trends	167	142,174
Improving	0	0
Stable	117	113,834
Degrading	1	80
Unknown	50	28,324
Fluctuating	0	0

RIVER BASIN WATER QUALITY ASSESSMENTS

South Dakota has fourteen major river basins, most of which drain into the Missouri River (Figure 6). The following sections contain brief narratives that discuss noteworthy waterbodies and pollution problems. A detailed state map showing assessed lakes and streams provides general use support information (Figure 7). More specific information is provided in the accompanying river basin tables for the monitored waterbodies in each river basin that is identified in Figure 6 and shown in Figure 7.

Most water quality data used to evaluate waterbody reaches derives from the DENR ambient water quality monitoring program and individual watershed assessment projects. Additionally, data submissions from outside organizations and DENR project sponsors increase the extent of waters analyzed and the amount of data used to make support determinations. Those groups include the USGS, USACE, USBOR, MPCA, NE DEQ, Wharf Resources, the cities of Watertown and Sioux Falls, EDWDD, Pennington County, Belle Fourche River Watershed Partnership, Day County Conservation District, Moody County Conservation District, Black Hills Resource Conservation & Development, Pennington County, RESPEC Consulting and SDSU.

The fixed ambient monitoring network presently consists of 132 active in-stream stations. The collected data are evaluated to define water quality in the state, identify pollution, and report changes in the state's water quality. Stream sampling station locations are determined by assessing areas located within high quality beneficial use classifications, located above and below municipal/industrial discharges, or within problem watersheds. Currently, DENR collects samples at those locations on either a monthly, quarterly, or seasonal basis for nutrient, bacterial, or general physical and chemical parameters. Stations that are located near historic hard rock mines are also analyzed for cyanide and metals, including arsenic. Stations that are located near historic uranium mining sites or current uranium exploratory sites are sampled for metals including uranium and two forms of radium radionuclides. Several stations are sampled for sodium, calcium, and magnesium during the irrigation season. This type of water sampling is used to track historical sampling information, natural background conditions, and runoff events, and can indicate possible acute or chronic water quality problems.

Water quality samples are handled in accordance with DENR's Quality Management Plan and Surface Water Quality Program Quality Assurance Project Plan. Sample test results are entered into DENR's internal water quality database and EPA's STORET via the Water Quality Exchange Network.

Lake monitoring within each river basin is conducted in conjunction with the Watershed Protection Program's SWLA project. Many of the standard parameters measured in streams are also evaluated for state lakes with the addition of Secchi disk transparency, chlorophyll-*a* level, oxygen/water and temperature profiles. Similarly, in the course of sampling lakes and streams, any pollution sources or environmental conditions that may affect water quality are noted by field personnel.

DENR relied on a decision tree utilizing multiple lines of evidence to evaluate nutrient-related narrative standards for streams. Twenty-one assessment units met the criteria to be assessed for nutrient-related narrative standards. Nineteen of the twenty-one assessment units had average nitrogen or phosphorus concentrations above the respective thresholds. Nine assessment units were placed in user defined subcategory 2N implying the need for bioassessment information. Seven assessment units were considered fully supporting and three assessment units met the nutrient thresholds. Data used to list SD-JA-R-FIRESTEEL_01 during the 2014 reporting cycle was determined to be outside the defined reach. As a result, the segment was delisted (listed in error) and placed in subcategory 2N for future bioassessment.

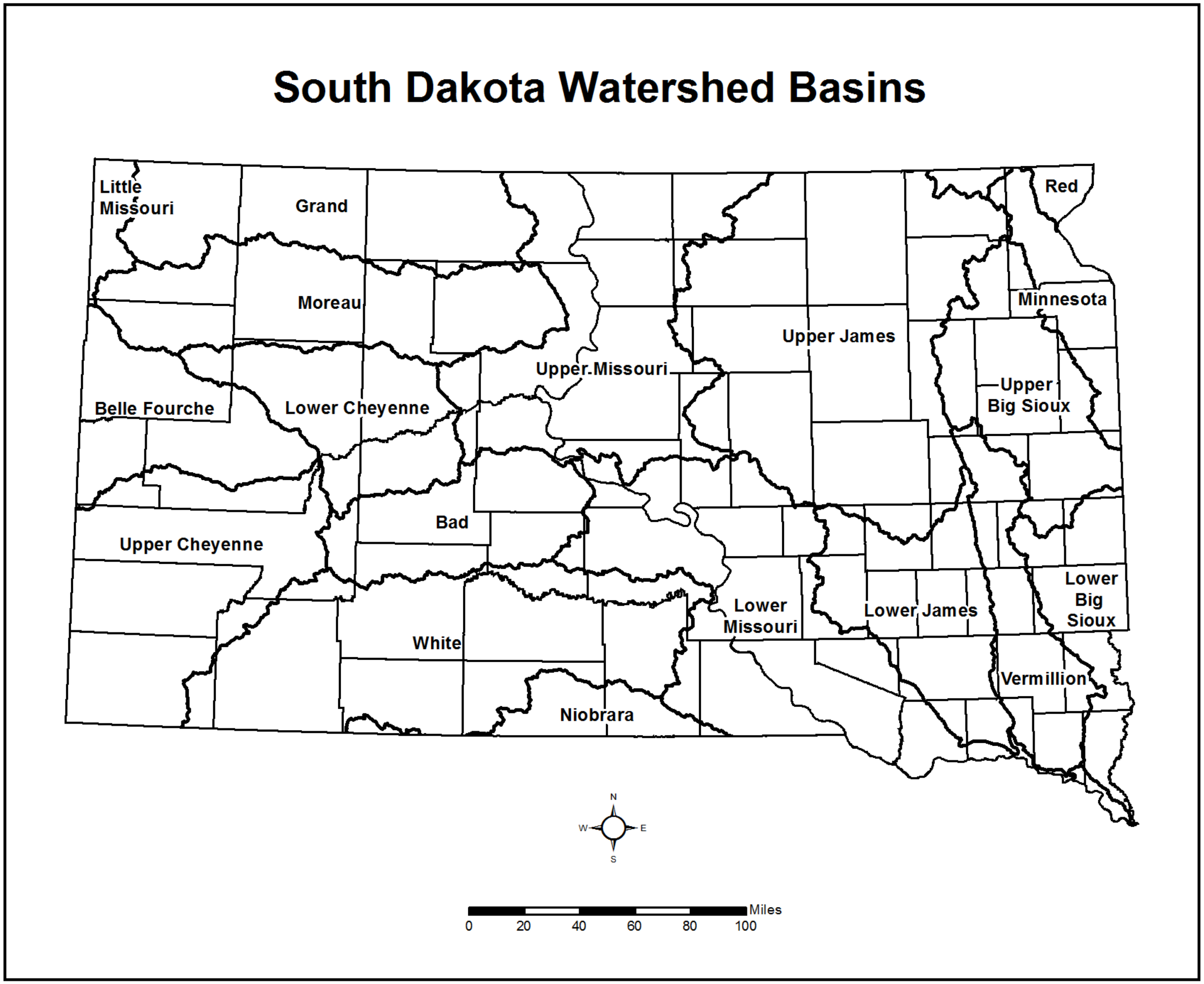


Figure 6: Major River Basins in South Dakota

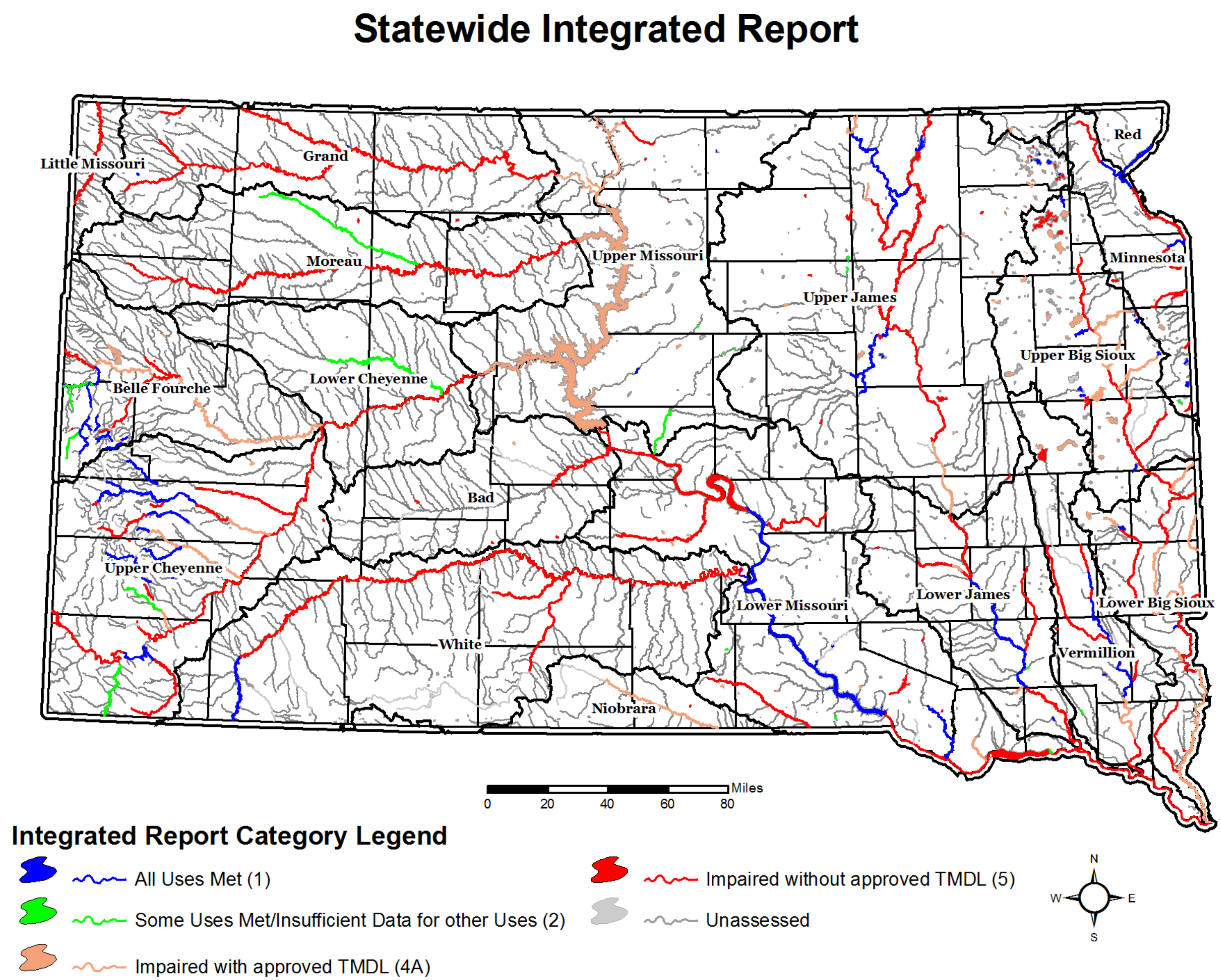


Figure 7: 2016 South Dakota Waterbody Status

KEY FOR RIVER BASIN INFORMATION TABLES

Waterbody-	Name of Waterbody
Location-	Best available description or reach segment
Map ID-	Map identification
Use-	Beneficial use assigned to waterbody

EPA Category-	EPA Support Category
Category 1:	All designated uses are met;
Category 2:	Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met;
Category3:	Insufficient data to determine whether any designated uses are met;
Category 4A:	Water is impaired but has an EPA approved TMDL;
Category 4B:	An impairment caused by a pollutant is being addressed by the state through other pollution control requirements;
Category 4C:	Water is impaired by a parameter that is not considered a "pollutant;"
Category 5:	Water is impaired or threatened and a TMDL is needed.

Support Status (Lakes and Streams):

Full =	Full Support
Non =	Nonsupport
INS =	Insufficient sampling information (limited sample data)
NA =	No sample data for the given beneficial use (not assessed)
TH =	Threatened
* =	Waterbody has an EPA approved TMDL
** =	TMDL development is in discussions with EPA

Source Categories and Specific Sources in ADB

- Agricultural Crop Production
  - Crop Production (Crop Land or Dry Land)
  - Irrigated Crop Production
  - Non-irrigated Crop Production
- Drought-related Impacts
- Impacts from Abandoned Mines
  - Acid Mine Drainage
  - Impacts from Abandoned Mine Lands (Inactive)
- Livestock – Grazing or Feeding
  - Grazing in Riparian or Shoreline Zones
  - Livestock (Grazing or Feeding Operations)
  - Rangeland Grazing
- Municipal Area or Urban Runoff
  - Combined Sewer Overflows
  - Municipal (Urbanized High Density Area)
  - On-site Treatment Systems (Septic Systems and Similar)
  - Residential Districts
  - Urban Runoff/Storm Sewers
- Natural Sources
- Nonpoint Sources
- Streambank Modifications/destabilization
- Unknown Sources
- Wildlife

Bad River Basin (Figure 8, Table 32)

The Bad River basin lies in west-central South Dakota between the Cheyenne and White River basins and drains approximately 3,175 square miles. Historically, a main characteristic of the basin has been a general lack of constant river flow. The upper portion of the Bad River receives water from the Badlands and artesian wells in the Philip area. These wells contribute minimal flow to the upper portion of the Bad River. There are prolonged periods of low or no flow in the Bad River reach from Midland to the Missouri River.

DENR has assessed five lakes within the basin and also has one water quality monitoring site located on the Bad River.

The USGS has water quality monitoring sites on the Bad River, Plum Creek, and the South Fork Bad River. However, the data are limited, and for most sites, the only parameters that were measured were specific conductance and water temperature.

The Bad River, from the Stanley County line to the mouth, is currently not supporting its warmwater marginal fish life designated use due to exceedances of TSS. A TMDL was approved for TSS in 2001. This reach is also not supporting its irrigation designated use due to exceedances of specific conductance or its limited contact recreation use due to *E. coli* exceedances. The Bad River, from its north and south forks to the Stanley County line, has not been assessed. There are no current watershed assessment or implementation projects ongoing in the Bad River Basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 32: Bad River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Freeman Lake SD-BA-L-FREEMAN_01	Jackson County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Nitrates	Natural Sources	5*	YES - 2
					Specific Conductance			
					Total Dissolved Solids			
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			
					Oxygen, Dissolved			
					Selenium	Natural Sources		
Hayes Lake SD-BA-L-HAYES_01	Stanley County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
					Mercury in Fish Tissue			
Murdo Dam SD-BA-L-MURDO_01	Jones County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
					Oxygen, Dissolved			
Sheriff Dam SD-BA-L-SHERIFF_01	Jones County (Grasslands)	L4	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Waggoner Lake SD-BA-L-WAGGONER_01	Haakon County	L5	Domestic Water Supply	FULL			5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Bad River SD-BA-R-BAD_01	Stanley County line to mouth	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	NON	Specific Conductance			
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	NON	Total Suspended Solids			
Plum Creek SD-BA-R-PLUM_01_USGS	Near and below Hayes, SD	R2	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
South Fork Bad River SD-BA-R-S_FORK_BAD_01_USGS	Near Cottonwood, SD	R3	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Unnamed tributary of Cottonwood Creek SD-BA-R-UNNAMED_TRIB_COTTONWOOD_01_USGS	Near Quinn, SD	R4	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				

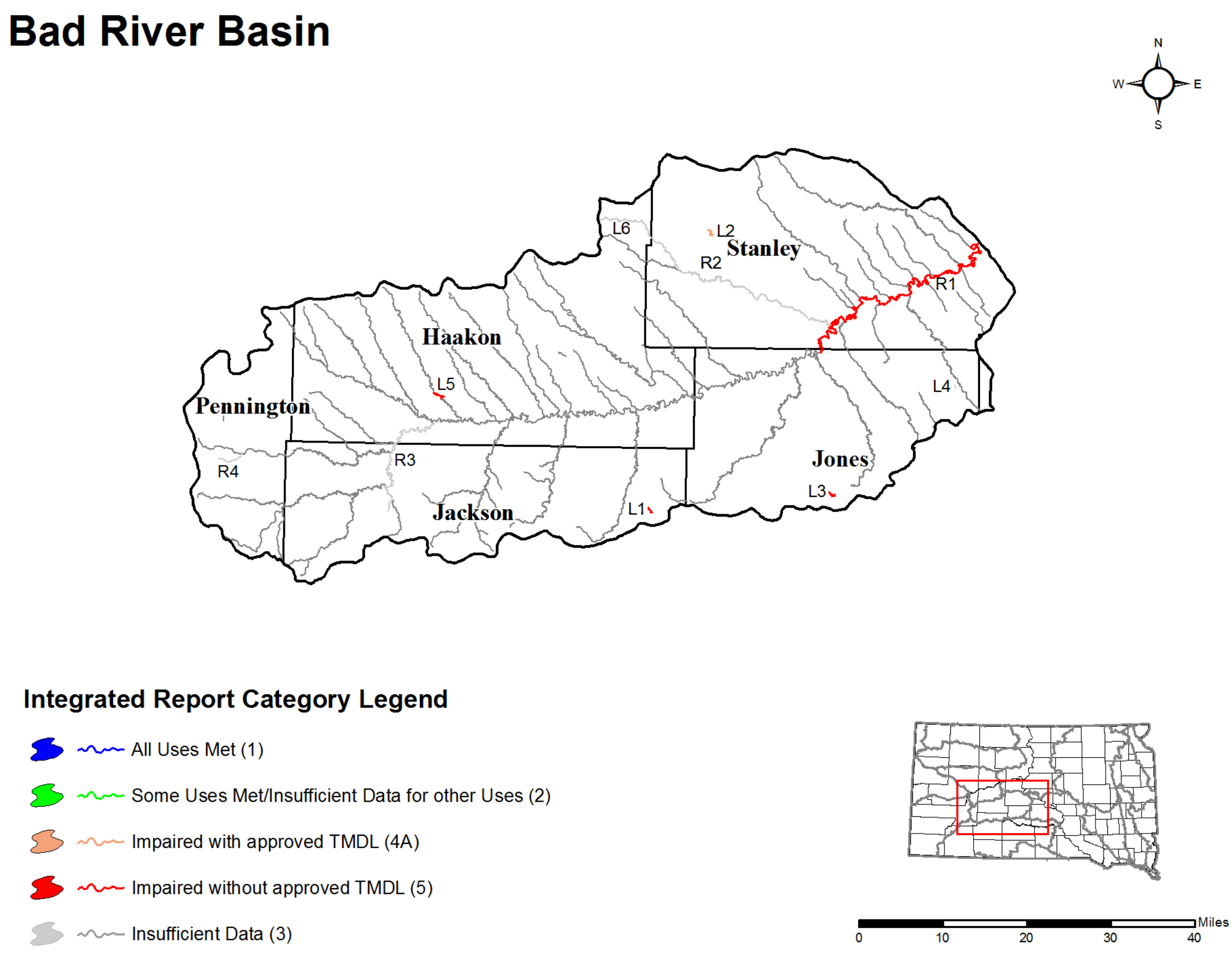


Figure 8: Bad River Basin

Belle Fourche River Basin (Figure 9, Table 33)

The Belle Fourche River basin lies in western South Dakota between the Cheyenne and Moreau River basins and drains approximately 3,271 square miles in South Dakota. The upper portion of the basin contains one active and several historic hard-rock mining operations, several small placer mines, and several large decorative stone and bentonite mines. The middle and lower portions of the basin are mainly used for livestock watering and irrigation.

DENR has assessed six lakes and maintains 21 water quality monitoring sites on several streams within the Belle Fourche basin. Three water quality monitoring sites are located on the Belle Fourche River, five are located on Spearfish Creek, and six are located on Whitewood Creek. The rest are located on various other streams. Most of the streams are routinely monitored for toxic pollutants, such as heavy metals, because a number of hardrock mining operations are or were located in this basin. Available data from DENR watershed assessment projects and sponsors were used to determine waterbody support. Wharf Resources also supplied data for multiple streams in the basin.

The USGS has water quality monitoring sites on the Belle Fourche River, Crow Creek, Horse Creek, Little Spearfish Creek, Spearfish Creek, and other waterbodies within the basin. The data on some streams are fairly extensive and include information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites were analyzed for this report.

Strawberry Creek is impacted by historic mining activity and acid mine drainage. One of the contributing sources of impairment was from Brohm Mining Corporation's Gilt Edge Mine. In July 1999, Brohm Mining Corporation's parent corporation, Dakota Mining, declared bankruptcy, and the state of South Dakota took over water treatment. On December 1, 2000, the site was listed on the National Priorities List as a Superfund Site. Remediation activities at Gilt Edge Mine are contracted by EPA to Camp Dresser McGee Consulting. Due to remediation activities, copper, low pH, and zinc were delisted as impairment causes in the 2010 cycle. Strawberry Creek continues to be nonsupporting for exceeding chronic cadmium levels. A cadmium TMDL was approved for Strawberry Creek in April 2010.

Two segments of Whitewood Creek near Lead are nonsupporting for *E. coli*. Sources of the high bacteria numbers in the stream's middle reach may be due to aging septic and sewer systems, the combined sewer overflow in Lead, and wildlife and livestock. A SWD permit has been issued to the city of Lead for the combined sewer overflow, requiring compliance with EPA's nine minimum controls for the combined sewer overflow. The city of Lead continues to make progress to separate their sewer systems and ultimately eliminate the combined sewer overflow.

An implementation project is currently on-going to address water quality of the Belle Fourche River and tributaries. Implementation efforts have primarily focused on irrigation practices to reduce TSS. Recent emphasis is being placed on grazing management practices to reduce bacteria. The Belle Fourche River continues to remain nonsupporting for TSS; however, a TMDL was approved in 2005. Fecal coliform and *E. coli* TMDLs were approved for two segments in 2011.

The *Black Hills Regional Stream Temperature Assessment*, a water temperature study, was conducted by RESPEC Consulting and Engineering of Rapid City, South Dakota. As a result, DENR made changes to the temperature water quality standards for coldwater rivers and streams in the Black Hills Trout Management Area (ARSD Chapter 74:51:01:01(09)). Rivers and streams in the Belle Fourche River and Cheyenne River basins were affected by this standards change which resulted in many streams being delisted due to a change in water quality standards.

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Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 33: Belle Fourche River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Iron Creek Lake SD-BF-L-IRON_CREEK_01	Lawrence County	L1	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES -
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Mirror Lake East SD-BF-L-MIRROR_EAST_01	Lawrence County	L2	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
Mirror Lake West SD-BF-L-MIRROR_WEST_01	Lawrence County	L3	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
Newell Lake SD-BF-L-NEWELL_01	Butte County	L5	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Newell City Pond SD-BF-L-NEWELL_CITY_01	Butte County	L4	Coldwater Marginal Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Orman Dam (Belle Fourche Reservoir) SD-BF-L-ORMAN_01	Butte County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Annie Creek SD-BF-R-ANNIE_01	Spearfish Creek to S3, T4N, R2E	R1	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Bear Butte Creek SD-BF-R-BEAR_BUTTE_01	Headwaters to Strawberry Creek	R2	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Bear Butte Creek SD-BF-R-BEAR_BUTTE_02	Strawberry Creek to S2, T4N, R4E	R3	Coldwater Permanent Fish Life	FULL			1*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Belle Fourche River	Wyoming border to Redwater		Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
SD-BF-R-BELLE_FOURCHE_01	River	R4	Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Wildlife Other than Waterfowl Urban Runoff/Storm Sewers Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Belle Fourche River	Redwater River to Whitewood		Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BF-R-BELLE_FOURCHE_02	Creek	R5	Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Total Suspended Solids	Irrigated Crop Production		
Belle Fourche River	Whitewood Creek to Willow		Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
SD-BF-R-BELLE_FOURCHE_03	Creek	R6						
			Immersion Recreation	NON	*Escherichia coli*			
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Belle Fourche River	Willow Creek to Alkali Creek		Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BF-R-BELLE_FOURCHE_04		R7	Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Belle Fourche River	Alkali Creek to mouth	R8	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BF-R-BELLE_FOURCHE_05			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Cleopatra Creek	Confluence with East Branch		Coldwater Permanent Fish Life	FULL			1	NO
	Cleopatra Creek to mouth		Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
SD-BF-R-CLEOPATRA_01		R9	Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Crow Creek	S22, T6N, R1E to Redwater River		Coldwater Permanent Fish Life	INS			2	NO
SD-BF-R-CROW_01_USGS		R10	Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NA				
Deadwood Creek	Rutabaga Gulch to Whitewood		Coldwater Marginal Fish Life	FULL			5	YES - 1
SD-BF-R-DEADWOOD_01	Creek	R11	Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli*			
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
False Bottom Creek SD-BF-R-FALSE_BOTTOM_01	S26, T5N, R2E to Burno Gulch Creek	R12	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Fantail Creek SD-BF-R-FANTAIL_01	Headwaters to Nevada Gulch	R13	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Horse Creek SD-BF-R-HORSE_01_USGS	Indian Creek to mouth	R14	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Little Spearfish Creek SD-BF-R-LITTLE_SPEARFISH_01_USGS	S16, T4N, R1E to Spearfish Creek	R15	Coldwater Permanent Fish Life	INS			2	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NA				
Murray Ditch SD-BF-R-MURRAY_DITCH_01_USGS	Above headgate at WY-SD state Line	R16	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
Redwater River SD-BF-R-REDWATER_01	US HWY 85 to mouth	R17	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Redwater River SD-BF-R-REDWATER_01_USGS	WY border to Hwy 85	R18	Coldwater Permanent Fish Life	INS			2	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NA				
Spearfish Creek SD-BF-R-SPEARFISH_01	Intake Gulch to Annie Creek	R19	Coldwater Permanent Fish Life	FULL			1	NO
			Commerce & Industry	FULL				
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Spearfish Creek SD-BF-R-SPEARFISH_02	Annie Creek to McKinley Gulch	R20	Coldwater Permanent Fish Life	FULL			1	NO
			Commerce & Industry	FULL				
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Spearfish Creek SD-BF-R-SPEARFISH_03	McKinley Gulch to Cleopatra Creek	R21	Coldwater Permanent Fish Life	FULL			1	NO
			Commerce & Industry	FULL				
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Spearfish Creek SD-BF-R-SPEARFISH_04	Cleopatra Creek to Spearfish City Intake dam in S33, T6N, R2E	R22	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Spearfish Creek SD-BF-R-SPEARFISH_05	Homestake Hydroelectric Plant at Spearfish in S15, T6N, R2E to Higgins Gulch	R23	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Spearfish Creek SD-BF-R-SPEARFISH_06	Higgens Gulch to mouth	R24	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Stewart Gulch SD-BF-R-STEWART_01	Whitetail Creek to NW1/4, NW1/4, S7, T4N, R3E	R25	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Strawberry Creek SD-BF-R-STRAWBERRY_01	Bear Butte Creek to S5, T4N, R4E	R26	Coldwater Marginal Fish Life	FULL			4A*	NO
			Fish/Wildlife Prop, Rec, Stock	NON	Cadmium	Impacts from Abandoned Mine Lands (Inactive) Acid Mine Drainage		
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
West Strawberry Creek SD-BF-R-W_STRAWBERRY_01	Headwaters to mouth	R27	Coldwater Permanent Fish Life	FULL			1*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitetail Creek SD-BF-R-WHITETAIL_01	Whitewood Creek to S18, T4N, R3E	R28	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Whitewood Creek SD-BF-R-WHITEWOOD_01	Whitetail Summit to Gold Run Creek	R29	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitewood Creek SD-BF-R-WHITEWOOD_02	Gold Run Creek to Deadwood Creek	R30	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitewood Creek SD-BF-R-WHITEWOOD_03	Deadwood Creek to Spruce Gulch	R31	Coldwater Permanent Fish Life	FULL			4A*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli*	Municipal (aging sewer lines) Combined Sewer Overflows		
					Fecal Coliform			
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitewood Creek SD-BF-R-WHITEWOOD_04	Spruce Gulch to Sandy Creek	R32	Coldwater Permanent Fish Life	FULL			5	YES -1
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli* Fecal Coliform			
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitewood Creek SD-BF-R-WHITEWOOD_05	Sandy Creek to I-90	R33	Coldwater Marginal Fish Life	NON	pH	Natural Sources	5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Whitewood Creek SD-BF-R-WHITEWOOD_06	I-90 to Crow Creek	R34	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	NON	pH			
Whitewood Creek SD-BF-R-WHITEWOOD_07	Crow Creek to mouth	R35	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES -1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			

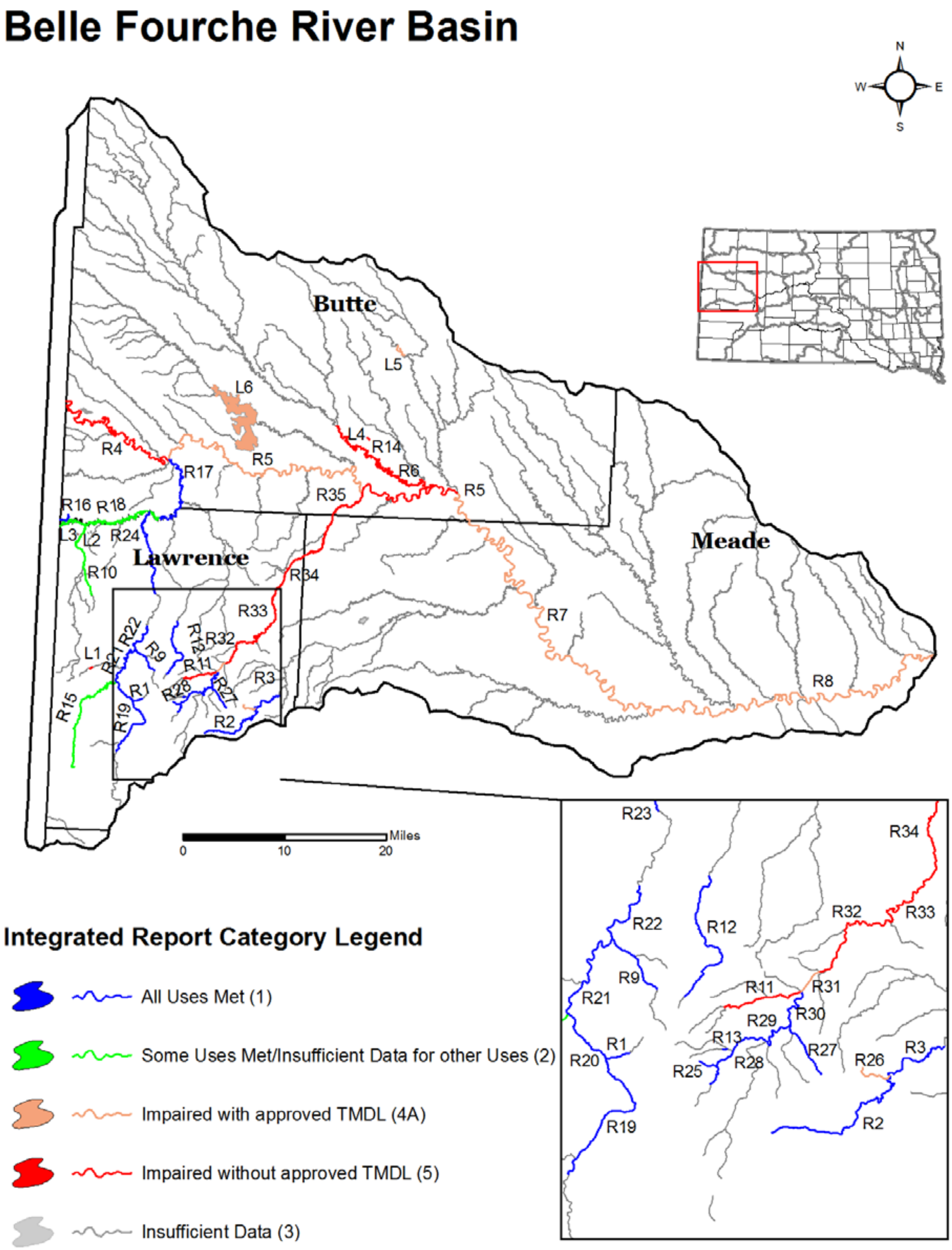

Figure 9: Belle Fourche River Basin

Big Sioux River Basin (Figure 10 and 11, Table 34)

The Big Sioux River basin is located in eastern South Dakota. The lower portion of the river forms the Iowa-South Dakota border. The basin drains an approximate 5,382 square miles in South Dakota and an additional 3,000 square miles in Minnesota and Iowa. The basin's primary source of income is agriculture, but it also contains a majority of the state's light manufacturing, food processing, and wholesale industries. Four state educational institutions, several vocational schools, and Sioux Falls, the state's largest city, are located within this basin, making this the heaviest populated basin in the state.

DENR has assessed 41 lakes and maintains 19 water quality monitoring sites within the Big Sioux basin. Seventeen water quality monitoring sites are located on the Big Sioux River. In addition, available data from DENR watershed assessment projects and project sponsors were used to determine waterbody support. The cites of Watertown and Sioux Falls, the NE DEQ, the MPCA, and East EDWDD also supplied data for waterbodies within the Big Sioux Basin.

The USGS has water quality monitoring sites on the Big Sioux River, Beaver Creek, Flandreau Creek, Skunk Creek, Willow Creek, Hidewood Creek, and Split Rock Creek within the basin. USGS data on the Big Sioux River are fairly extensive and includes information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites were analyzed for this report. The cities of Watertown and Sioux Falls and EDWDD supplied water quality data for the Big Sioux River. The city of Sioux Falls and EDWDD also supplied water quality data for Skunk Creek. The MPCA provided water quality data for Beaver Creek, Flandreau Creek, and Pipestone Creek.

SD-BS-R-BIG_DITCH_01 and SD-BS-R-BIG_DITCH_TRIB_01 are reach segments that have been removed from this Integrated Report. These reaches were added in 2010 when DENR was monitoring in Union County to gain background data due to the proposed construction of an oil refinery. The oil refinery was not constructed and DENR discontinued monitoring along these waterbodies. Reporting for these reaches is being discontinued because no additional monitoring is planned and data is not being supplied from outside organizations. Therefore, DENR does not have sufficient information and is not able to make a support determination. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

A long-term water quality monitoring project is being conducted within the Jensen Creek-Skunk Creek 12 digit hydrologic unit on Skunk Creek (SD-BS-R-SKUNK_01). The project is sponsored by NRCS through the National Water Quality Monitoring Initiative Partnership program. Monitoring efforts are focused on determining the effectiveness of Seasonal Riparian Area Management (SRAM) implemented at different locations along the stream riparian corridor. The purpose of SRAM is to remove the ability of livestock to access the riparian zone during the recreation season (May 1-September 30). Monitoring sites were established above, below and within the SRAM implementation area. Results of the monitoring effort will be used to examine trends in *Escherichia coli* bacteria, TSS, nutrients, biological integrity and habitat of the stream in the presence of SRAM. Funding for the project was provided by NRCS, DENR, and the City of Sioux Falls, SD. Information gained from this project will also be used to address nutrient-related narrative standards for SD-BS-R-SKUNK_01 (category 2N) in subsequent reporting cycles.

The upper most segment of the Big Sioux River (SD-BS-R-BIG_SIOUX_01) met regional criteria to be assessed for nutrient-related narrative standards. Average nitrogen and phosphorus concentrations were below the established thresholds. A nutrient-related support determination was not provided solely on meeting the thresholds. This segment of the Big Sioux River will be tracked in subsequent reporting cycles.

The main causes of nonsupport within the Big Sioux River basin in streams are due to fecal coliform, *E. coli*, and TSS. The presence of bacteria in the Big Sioux basin is mainly due to runoff from livestock operations, and wet weather discharges and storm sewers within municipal areas. Sediment sources are overland runoff from nearby croplands, inflow from tributaries, and streambank erosion.

Lakes in the Big Sioux River basin are highly productive due to nutrient enrichment and siltation. Approximately 40% of the monitored lakes are considered hypereutrophic. The moderate size and shallow depth of most lakes contributes to the hypereutrophic conditions. Lakes are susceptible to rapid changes produced by large nutrient and sediment loads from sizeable agricultural watersheds comprised of glacial soils.

Mercury in fish tissue affects many lakes in the Big Sioux River basin. While there are many factors that influence mercury accumulation in fish, a significant factor in this basin is the expansion of water. In the early 1980's and again in the late 1990's, increased precipitation and snowmelt turned small wetlands into larger lakes. Without natural outlets, many lakes in the northeast continue to gain surface area inundating wetlands and surrounding landscape. Water depth, substrate, and increased organic decay influence the rate that elemental mercury is methylated and converted to the biologically available form of methylmercury. The concentration of mercury in the water column is typically very low and similar to other lakes in the basin. However, the methylation rate is typically higher and results in a greater bioavailability of mercury. This mercury then moves up the food chain and results in excessive mercury in larger, older predator fish. DENR recently adopted EPA's water quality standard of 0.3 mg/kg for methylmercury in fish tissue. As a result, seventeen new waterbodies in the Big Sioux Basin were considered nonsupporting the aquatic life uses for mercury in fish tissue. A statewide mercury TMDL has been approved by EPA.

Lardy Lake, Middle Lynn Lake, and Optitz Lake were incorrectly placed in the Big Sioux Basin during the 2014 reporting cycle. All three assessment units were correctly placed in the James River Basin with the appropriate assessment unit identifications (AUID) for the 2016 reporting cycle.

Blue Dog Lake is not supporting the warmwater permanent fish life use and is on the 303(d) list for pH. There is currently insufficient pH data to make an appropriate assessment for Blue Dog Lake. A change in support and impairment status cannot be made until additional pH data is obtained. The most recent pH data available for Blue Dog was collected in 2004 and no exceedances of the standard were observed.

Watershed implementation projects within the basin are focused on reducing bacteria, sediment and nutrient loads from both manmade and natural sources. Current implementation projects include the Upper Big Sioux River Implementation project and the Big Sioux River Watershed Implementation project which encompasses the entire Big Sioux River watershed from northern Brookings County to the confluence with the Missouri River. Implementation efforts are also being conducted in the upper portion of the basin under the Northeast Glacial Lakes Implementation project. Part of the focus of this project is to protect high quality lakes in the region.

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Table 34: Big Sioux River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lake Albert SD-BS-L-ALBERT_01	Kingsbury County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue Oxygen, Dissolved		5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved			
Lake Alvin SD-BS-L-ALVIN_01	Lincoln County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Antelope Lake SD-BS-L-ANTELOPE_01	Clark County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Bitter Lake SD-BS-L-BITTER_01	Day County	L4	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Blue Dog Lake SD-BS-L-BLUE_DOG_01	Day County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	pH (high)			
Brant Lake SD-BS-L-BRANT_01	Lake County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Brush Lake SD-BS-L-BRUSH_01	Brookings County	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Bullhead Lake SD-BS-L-BULLHEAD_01	Deuel County	L8	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
Lake Campbell SD-BS-L-CAMPBELL_01	Brookings County	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Clear Lake SD-BS-L-CLEAR_D_01	Deuel County	L10	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Clear Lake (Hamlin) SD-BS-L-CLEAR_H_01	Hamlin County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			

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WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Covell Lake SD-BS-L-COVELL_01	Minnehaha County	L12	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Diamond Lake SD-BS-L-DIAMOND_01	Minnehaha County	L13	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Dry Lake #2 SD-BS-L-DRY_NO2_01	Hamlin	L15	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Dry Lake SD-BS-L-DRY_01	Codington County	L14	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
East Oakwood Lake SD-BS-L-E_OAKWOOD_01	Brookings County	L16	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a pH (high)			
Enemy Swim Lake SD-BS-L-ENEMY_SWIM_01	Day County	L17	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Goldsmith Lake SD-BS-L-GOLDSMITH_01	Brookings County	L18	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Goose Lake SD-BS-L-GOOSE_01	Codington County	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Lake Herman SD-BS-L-HERMAN_01	Lake County	L20	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			
North Island Lake SD-BS-L-ISLAND_N_01	Minnehaha/McCook counties (formerly SD-VM-L-ISLAND_N_01)	L21	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Lake Kampeska SD-BS-L-KAMPESKA_01	Codington County	L22	Domestic Water Supply	FULL			4A*	NO
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			

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WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Long Lake SD-BS-L-LONG_COD_01	Codington County	L23	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Lake Madison SD-BS-L-MADISON_01	Lake County	L24	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			
Lake Marsh SD-BS-L-MARSH_01	Hamlin County	L25	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Minnewasta Lake SD-BS-L-MINNEWASTA_01	Day County	L26	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			
Lake Norden SD-BS-L-NORDEN_01	Hamlin County	L27	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Pelican Lake SD-BS-L-PELICAN_01	Codington County	L28	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Pickerel Lake SD-BS-L-PICKEREL_01	Day County	L29	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Lake Poinsett SD-BS-L-POINSETT_01	Hamlin County	L30	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Reid Lake SD-BS-L-REID_01	Clark County	L31	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			

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WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Rush Lake SD-BS-L-RUSH_01	Day County	L32	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
School Lake SD-BS-L-SCHOOL_01	Deuel County	L33	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Lake Sinai SD-BS-L-SINAI_01	Brookings County	L34	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Lake St. John SD-BS-L-ST_JOHN_01	Hamlin County	L35	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Swan Lake SD-BS-L-SWAN_01	Clark County	L36	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Twin Lakes/W. Hwy 81 SD-BS-L-TWIN_01	Kingsbury County	L37	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue	Non-Point Source	4A*	NO
Twin Lakes SD-BS-L-TWIN_02	Minnehaha County	L38	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue	Non-Point Source	4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue	Non-Point Source		
West Oakwood Lake SD-BS-L-W_OAKWOOD_01	Brookings County	L39	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
Wall Lake SD-BS-L-WALL_01	Minnehaha County	L40	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Waubay Lake SD-BS-L-WAUBAY_01	Day County	L41	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Beaver Creek	Big Sioux River to S9, T98N, R49W	R1	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
SD-BS-R-BEAVER_01			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
SD-BS-R-BEAVER_02			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	NON	Total Suspended Solids			
Big Sioux River	S28, T121N, R52W to Lake Kampeska	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
SD-BS-R-BIG_SIOUX_01			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
Big Sioux River	Lake Kampeska to Willow Creek	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
SD-BS-R-BIG_SIOUX_02			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
Big Sioux River	Willow Creek to Stray Horse Creek	R5	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BS-R-BIG_SIOUX_03			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*	Livestock (Grazing or Feeding Operations)		
			Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Stray Horse Creek to near Volga	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
SD-BS-R-BIG_SIOUX_04			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Near Volga to Brookings	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
SD-BS-R-BIG_SIOUX_05			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Big Sioux River	Brookings to Brookings/Moody County Line	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
SD-BS-R-BIG_SIOUX_06			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Big Sioux River	Brookings/Moody County Line		Domestic Water Supply	FULL			5*	YES - 1
SD-BS-R-BIG_SIOUX_07	to S2, T104N, R49W	R9	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
					Total Suspended Solids			
Big Sioux River	S2, T104N, R49W to I-90	R10	Domestic Water Supply	FULL			4A*	NO
SD-BS-R-BIG_SIOUX_08			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
Big Sioux River	I-90 to diversion return	R11	Domestic Water Supply	FULL			4A*	NO
SD-BS-R-BIG_SIOUX_10			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli*	Municipal (Urbanized High Density Area)		
					Fecal Coliform	Residential Districts		
						Municipal (Urbanized High Density Area)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Big Sioux River	Diversion return to SF WWTF		Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	*Escherichia coli*			
SD-BS-R-BIG_SIOUX_11		R12						
					Fecal Coliform	Municipal (Urbanized High Density Area)		
						Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Big Sioux River	SF WWTF to above Brandon		Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	*Escherichia coli*			
SD-BS-R-BIG_SIOUX_12		R13						
					Fecal Coliform			
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Big Sioux River	Above Brandon to Nine Mile		Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
	Creek	R14	Immersion Recreation	NON	*Escherichia coli*			
SD-BS-R-BIG_SIOUX_13								
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
						Grazing in Riparian or Shoreline Zones		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Big Sioux River	Nine Mile Creek to near Fairview		Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Immersion Recreation	NON	*Escherichia coli*			
SD-BS-R-BIG_SIOUX_14		R15						
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Big Sioux River	Fairview to near Alcester	R16	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BS-R-BIG_SIOUX_15			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Grazing in Riparian or Shoreline Zones		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Grazing in Riparian or Shoreline Zones		
						Crop Production (Crop Land or Dry Land)		
Big Sioux River	Near Alcester to Indian Creek		Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	*Escherichia coli*			
SD-BS-R-BIG_SIOUX_16		R17						
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
						Grazing in Riparian or Shoreline Zones		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
						Grazing in Riparian or Shoreline Zones		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Streambank Modifications/destabilization		
						Non-irrigated Crop Production		
						Crop Production (Crop Land or Dry Land)		
Big Sioux River	Indian Creek to mouth	R18	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
SD-BS-R-BIG_SIOUX_17			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
						Grazing in Riparian or Shoreline Zones		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Grazing in Riparian or Shoreline Zones		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Streambank Modifications/destabilization		
						Grazing in Riparian or Shoreline Zones		
						Crop Production (Crop Land or Dry Land)		
Brule Creek	Big Sioux River to confluence of		Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
	its east and west forks	R19	Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
SD-BS-R-BRULE_01								
			Warmwater Marginal Fish Life	FULL				
East Brule Creek	confluence with Brule Creek to		Fish/Wildlife Prop, Rec, Stock	INS			5*	YES - 1
	S3, T95N, R49W	R20	Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
SD-BS-R-EAST_BRULE_01								
			Warmwater Marginal Fish Life	NON	Total Suspended Solids			

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Flandreau Creek SD-BS-R-FLANDREAU_01	Big Sioux River to Minnesota Border	R21	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	FULL FULL			5*	YES - 1
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
Hidewood Creek SD-BS-R-HIDEWOOD_01	Big Sioux River to U.S. Highway 15	R22	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS INS			4A*	NO
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Jack Moore Creek SD-BS-R-JACK_MOORE_01	Big Sioux River to S33, T107N, R49W	R23	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS INS			3*	NO
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	INS				
North Deer Creek SD-BS-R-NORTH_DEER_01	Six Mile Creek to U.S. Highway 15	R24	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS INS			3*	NO
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	INS				
Peg Munky Run SD-BS-R-PEG_MUNKY_RUN_01	Big Sioux River to S17, T113N, R50W	R25	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS INS			4A*	NO
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Pipestone Creek SD-BS-R-PIPESTONE_01	Split Rock Creek to Minnesota Border	R26	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Six Mile Creek SD-BS-R-SIXMILE_01	Big Sioux River to S30, T112N, R48W	R27	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS INS			5	YES - 1
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
Skunk Creek SD-BS-R-SKUNK_01	Brandt Lake to Big Sioux River	R28	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	FULL FULL			5*	YES - 1
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
Split Rock Creek SD-BS-R-SPLIT_ROCK_01_USGS	At Corson, SD	R29	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Spring Creek	Big Sioux River to S22, T109, R47W	R30	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
SD-BS-R-SPRING_01			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Stray Horse Creek	Big Sioux River to S26, T116N, R51W	R31	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
SD-BS-R-STRAYHORSE_01			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Union Creek	Big Sioux River to confluence with East and West Forks	R32	Fish/Wildlife Prop, Rec, Stock	INS			5*	YES - 1
SD-BS-R-UNION_01			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	NON	Total Suspended Solids			
Willow Creek	Big Sioux River to S7, T117N, R50W	R33	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
SD-BS-R-WILLOW_01			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				

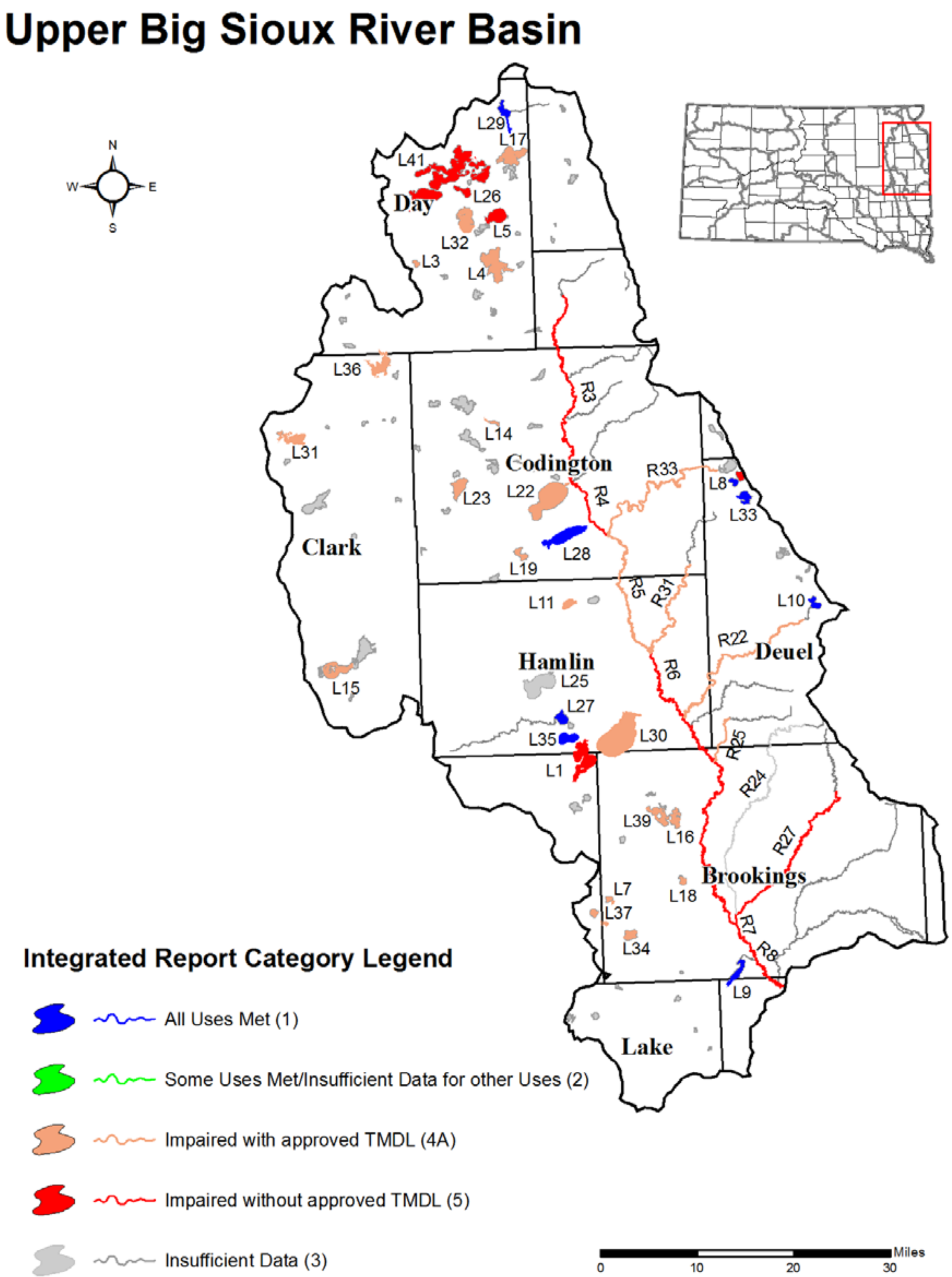

Figure 10: Upper Big Sioux River Basin

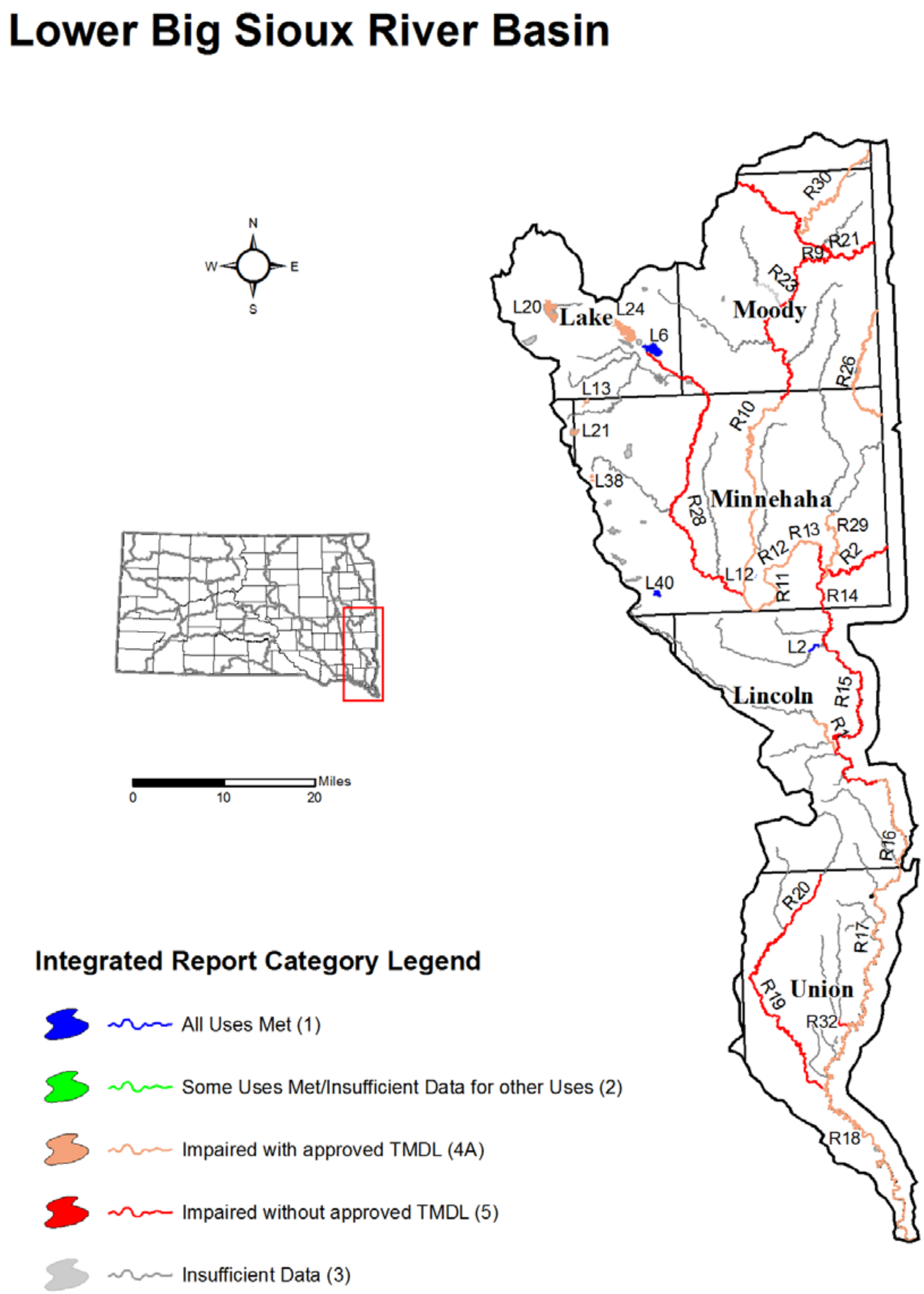

Figure 11: Lower Big Sioux River Basin

Cheyenne River Basin (Figures 12 and 13, Table 35)

The portion of the Cheyenne River basin that lies in southwestern South Dakota drains about 9,732 square miles within the boundaries of the state. The area in this basin is very diverse. It includes part of the Black Hills and Badlands, rangeland, irrigated cropland, and some mining areas. The Cheyenne River originates in Wyoming, flows through the southern Black Hills, and enters Lake Oahe near the center of the state.

DENR has assessed 17 lakes and maintains 28 water quality monitoring sites within the Cheyenne basin. Seven monitoring sites are located on the Cheyenne River, three are located on French Creek, and six are located on Rapid Creek. The other sites are located on various other streams in the basin. In addition, available data from DENR watershed assessment projects and sponsors were also used to determine waterbody support.

Temperature is the primary cause of impairment for lakes in the Cheyenne River basin. All temperature impairments on these lakes are due to exceedances to the temperature criterion for the coldwater permanent fish life beneficial use. TMDL development has not been initiated for any of these lakes; therefore, sources of the temperature impairments have not been identified. In general, ambient air temperature and solar radiation affect water temperature during the peak summer months.

The USGS also maintains a number of water quality monitoring sites located along streams in the Cheyenne River Basin including: Battle Creek, Hat Creek, Highland Creek, Rapid Creek, Sunday Gulch, Cheyenne River, and others. The USGS data are limited for most sites and mostly includes specific conductance and water temperature information. Data collected on all USGS sites were analyzed for this report.

Segment SD-CH-R-ELM_01_USGS is a reach that is being removed from this 2016 Integrated Report. This reach is monitored by USGS but sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

The Cheyenne River basin is home to deposits of natural uranium, historic uranium mining, and current exploration drilling. DENR maintains five water quality monitoring locations within the basin to monitor for uranium and other associated parameters. For this 2016 reporting cycle, there are no exceedances to surface water quality standards for any parameters associated with past uranium mining or current explorations.

The Cheyenne River water quality continues to be generally poor due to both natural and agricultural sources. Most of the Cheyenne River drainage basin contains highly erodible soils. The landscape contributes considerable amounts of eroded sediment during periods of heavy rainfall. During normal or lower flow periods, the upper Cheyenne often exceeds irrigation water quality standards for specific conductance and sodium adsorption ratio. All segments downstream of the Fall River remain nonsupporting for fecal coliform, *E. coli* bacteria, and TSS. These segments have approved TMDLs for bacteria.

Water quality in Rapid Creek for reaches above Rapid City meets water quality standards for designated beneficial uses. Rapid Creek segments in Rapid City to the Cheyenne River continue to display poor water quality due to excessive fecal coliform and/or *E. coli* bacteria levels. Bacteria TMDLs for these lower reaches were approved in 2010.

A sediment removal project was implemented at Horsethief Lake (SD-CH-L-HORSETHIEF_01), Lakota Lake (SD-CH-L-LAKOTA_01) and Bismark Lake (SD-CH-L-BISMARK_01) under direction of the Black Hills National Forest Service in the fall of 2014. The waterbodies were dewatered and the lakebeds were allowed to dry prior to excavation. Sediment removal was completed by the summer of 2015 and the waterbodies were allowed to recharge. Preliminary results of this effort suggest approximately 20,000 cubic yards of fine sediment was removed from each waterbody, respectively. The purpose of the project was to improve overall ecosystem health and enhance angling opportunities at each waterbody. Historic water quality data was not used to determine beneficial use support for each waterbody during the 2016 reporting cycle. All three assessment units were assigned to category 3 (insufficient data/not assessed) until new water quality information is available to make beneficial use support determinations. DENR is planning to collect water quality information at Horsethief, Lakota and Bismark Lakes in the interim of the 2018 reporting cycle.

The Black Hills region traditionally has some of the best surface water quality in the state. This is due in a large part to a cooler climate and higher precipitation than the surrounding plains as a result of greater elevation and forest cover. Also contributing to the water quality in this region are the local bedrock formations which are much less erodible than the highly erosive and leachable marine shales and badlands on the surrounding plains. However, the Black Hills streams are vulnerable to losses of flow exacerbated by periodic droughts. In addition, high summer ambient air temperature causes elevated water temperature and results in temperature impairments for some coldwater fisheries. Grazing of streamside vegetation, which increases stream bank erosion, water temperature, and nutrient loading, also continues to be a problem in some streams in this area. However, due to the change in the temperature water quality standard for some Black Hills streams, many streams have been delisted and are now meeting the new water quality standard.

No assessment projects are currently ongoing in the Cheyenne River basin. The Spring Creek Implementation Project is the only implementation project being conducted in the Cheyenne River basin.

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Table 35: Cheyenne River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Angostura Reservoir SD-CH-L-ANGOSTURA_01	Fall River County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Bismark Lake SD-CH-L-BISMARK_01	Custer County	L2	Coldwater Marginal Fish Life	NA			3	NO
			Fish/Wildlife Prop, Rec, Stock	NA				
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
Canyon Lake SD-CH-L-CANYON_01	Pennington County	L3	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Center Lake SD-CH-L-CENTER_01	Custer County	L4	Coldwater Permanent Fish Life	NON	pH (high)		5*	YES - 2
					Temperature, water			
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Cold Brook Reservoir SD-CH-L-COLD_BROOK_01	Fall River County	L5	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
Cottonwood Springs Lake SD-CH-L-COTTONWOOD_SPRINGS_01	Fall River County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Crow Reservoir SD-CH-L-CROW_01	Fall River County	L7	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Semipermanent Fish Life	INS				
Curlew Lake SD-CH-L-CURLEW_01	Meade County	L8	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Deerfield Lake SD-CH-L-DEERFIELD_01	Pennington County	L9	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
Horsethief Lake SD-CH-L-HORSETHIEF_01	Pennington County	L10	Coldwater Permanent Fish Life	INS			3*	NO
			Fish/Wildlife Prop, Rec, Stock	NA				
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
Lakota Lake SD-CH-L-LAKOTA_01	Custer County	L11	Coldwater Marginal Fish Life	NA			3	NO
			Fish/Wildlife Prop, Rec, Stock	NA				
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Legion Lake SD-CH-L-LEGION_01	Custer County	L12	Coldwater Marginal Fish Life	NON	pH (high)		4A*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
New Wall Lake SD-CH-L-NEW_WALL_01	Pennington County	L13	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	pH (high)			
Pactola Reservoir SD-CH-L-PACTOLA_01	Pennington County	L14	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Sheridan Lake SD-CH-L-SHERIDAN_01	Pennington County	L15	Coldwater Permanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved Temperature, water		5*	YES - 2
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Stockade Lake SD-CH-L-STOCKADE_01	Custer County	L16	Coldwater Marginal Fish Life	NON	Mercury in Fish Tissue		4A*	NO
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
Sylvan Lake SD-CH-L-SYLVAN_01	Custer County	L17	Coldwater Permanent Fish Life	NON	pH (high) Temperature, water		5*	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Battle Creek SD-CH-R-BATTLE_01	Near Horsethief Lake to Teepee Gulch Creek	R1	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Battle Creek SD-CH-R-BATTLE_01_USGS	Hwy 79 to mouth	R2	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
Battle Creek SD-CH-R-BATTLE_02	Teepee Gulch Creek to SD HWY 79	R3	Coldwater Permanent Fish Life	FULL			4A*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Beaver Creek SD-CH-R-BEAVER_01	WY border to Cheyenne River	R4	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance Total Dissolved Solids		5*	YES - 2
			Irrigation Waters	NON	Salinity (SAR) Specific Conductance			
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Beaver Creek SD-CH-R-BEAVER_01_USGS	Near Buffalo Gap	R5	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NON	Fecal Coliform			
			Warmwater Permanent Fish Life	INS				
Beaver Creek SD-CH-R-BEAVER_02_USGS	S13, T5S, R4E to SD Hwy 79	R6	Coldwater Permanent Fish Life	FULL			2	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NA				
Box Elder Creek SD-CH-R-BOX_ELDER_01	Cheyenne River to S22, T2N, R8E	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
Box Elder Creek SD-CH-R-BOX_ELDER_02	S16, T2N, R6E to S14, T3N, R4E	R8	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Castle Creek SD-CH-R-CASTLE_01	Deerfield Reservoir to Rapid Creek	R9	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Cherry Creek SD-CH-R-CHERRY_01	Cheyenne River to Sulphur Creek	R10	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				
Cheyenne River SD-CH-R-CHEYENNE_01	WY border to Beaver Creek	R11	Fish/Wildlife Prop, Rec, Stock	NON	Total Dissolved Solids		5	YES - 2
			Irrigation Waters	NON	Sodium Adsorption Ratio (SAR) Specific Conductance			
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Cheyenne River SD-CH-R-CHEYENNE_02	Beaver Creek to Cascade Creek	R12	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance		5	YES - 1
					Total Dissolved Solids	Crop Production (Crop Land r Dry Land) Livestock (Grazing or Feeding Operations) Natural Sources		
			Irrigation Waters	NON	Salinity (SAR)			
					Specific Conductance	Crop Production (Crop Land or Dry Land) Livestock (Grazing or Feeding Operations) Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Cheyenne River SD-CH-R-CHEYENNE_02B	Cascade Creek to Angostura Reservoir	R13	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL FULL FULL			1	NO
Cheyenne River SD-CH-R-CHEYENNE_03	Fall River to Cedar Creek	R14	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON FULL FULL NON	 *Escherichia coli* Fecal Coliform Total Suspended Solids	Natural Sources Irrigated Crop Production Grazing in Riparian or Shoreline Zones	5*	YES - 1
Cheyenne River SD-CH-R-CHEYENNE_04	Cedar Creek to Belle Fourche River	R15	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON FULL NON NON	 *Escherichia coli* Fecal Coliform *Escherichia coli* Fecal Coliform Total Suspended Solids	Fecal Coliform: Wildlife Other than Waterfowl Natural Sources Livestock (Grazing or Feeding Operations) Crop Production (Crop Land or Dry Land) Total Suspended Solids: Rangeland Grazing Natural Sources Crop Production (Crop Land or Dry Land)	5*	YES - 1
Cheyenne River SD-CH-R-CHEYENNE_05	Belle Fourche River to Bull Creek	R16	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	FULL NON FULL NON NON	 *Escherichia coli* Fecal Coliform *Escherichia coli* Fecal Coliform Total Suspended Solids	Fecal Coliform: Wildlife Other than Waterfowl Livestock (Grazing or Feeding Operations) Total Suspended Solids: Irrigated Crop Production	5*	YES -
Cheyenne River SD-CH-R-CHEYENNE_06	Bull Creek to Lake Oahe	R17	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	FULL NON FULL NON NON	 *Escherichia coli* Fecal Coliform *Escherichia coli* Fecal Coliform Total Suspended Solids	Fecal Coliform (Immersion): Wildlife Other than Waterfowl Livestock (Grazing or Feeding Operations) Fecal Coliform (Limited Contact): Wildlife Other than Waterfowl	5*	YES - 1
Elk Creek SD-CH-R-ELK_01_USGS	S9, T3N, R7E to S27, T4N, R3E	R18	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation	INS INS NA INS NA			3	NO

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Fall River SD-CH-R-FALL_01	Hot Springs to mouth	R19	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Temperature, water			
Flynn Creek SD-CH-R-FLYNN_01	SF Lame Johnny Creek to S23, T4S, R5E	R20	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
French Creek SD-CH-R-FRENCH_01	S23, T3S, R3E to Custer	R21	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
French Creek SD-CH-R-FRENCH_02	Custer to Stockade Lake	R22	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
French Creek SD-CH-R-FRENCH_03	Stockade Lake to SD HWY 79	R23	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Grace Coolidge Creek SD-CH-R-GRACE_COOLIDGE_01	S12, T3S, R5E to Battle Creek	R24	Coldwater Permanent Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Grizzly Bear Creek SD-CH-R-GRIZZLY_BEAR_01_USGS	Near Keystone, SD	R25	Coldwater Permanent Fish Life	INS			3	NO
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
Hat Creek SD-CH-R-HAT_01_USGS	Near Edgemont, SD	R26	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	INS				
			Warmwater Semipermanent Fish Life	INS				
Highland Creek SD-CH-R-HIGHLAND_01_USGS	Wind Cave Natl Park and near Pringle, SD	R27	Coldwater Permanent Fish Life	NON	pH (high) Temperature, water	Natural Sources	5	YES - 1
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	INS				
			Limited Contact Recreation	INS				
Horsehead Creek SD-CH-R-HORSEHEAD_01_USGS	At Oelrichs	R28	Fish/Wildlife Prop, Rec, Stock	INS			5	YES - 2
			Irrigation Waters	NON	Specific Conductance			
			Limited Contact Recreation	INS				
			Warmwater Semipermanent Fish Life	INS				
Hot Brook Creek SD-CH-R-HOT_BROOK_01	Fall River to S19, T7S, R5E	R29	Domestic Water Supply	NA			3	NO
			Fish/Wildlife Prop, Rec, Stock	NA				
			Irrigation Waters	NA				
			Warmwater Permanent Fish Life	INS				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Rapid Creek SD-CH-R-RAPID_01	Headwaters to Pactola Reservoir	R30	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Rapid Creek SD-CH-R-RAPID_02	Pactola Reservoir to Canyon Lake	R31	Coldwater Permanent Fish Life	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Rapid Creek SD-CH-R-RAPID_03	Canyon Lake to S15, T1N, R8E	R32	Coldwater Permanent Fish Life	FULL			1*	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Rapid Creek SD-CH-R-RAPID_04	S15, T1N, R8E to above Farmingdale	R33	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Rapid Creek SD-CH-R-RAPID_05	Above Farmingdale to Cheyenne River	R34	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			
North Fork Rapid Creek SD-CH-R-RAPID_N_FORK_01	From confluence with Rapid Creek to S8, T3N, R3E	R35	Coldwater Permanent Fish Life	INS			3	NO
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	NA				
			Limited Contact Recreation	INS				
Reno Gulch SD-CH-R-RENO_GULCH_01_USGS	Near Hill City, SD	R36	Coldwater Marginal Fish Life	INS			3	NO
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
Rhoads Fork SD-CH-R-RHOADS_FORK_01_USGS	Near Rochford, SD	R37	Coldwater Permanent Fish Life	INS			3	NO
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Spring Creek SD-CH-R-SPRING_01	S5, T2S, R3E to Sheridan Lake	R38	Coldwater Permanent Fish Life	NON	Total Suspended Solids		5*	YES - 1
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Wildlife Other than Waterfowl Urban Runoff/Storm Sewers On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) Livestock (Grazing or Feeding Operations)		
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
Spring Creek SD-CH-R-SPRING_02	Sheridan Lake to SD HWY 79	R39	Coldwater Marginal Fish Life	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Sunday Gulch SD-CH-R-SUNDAY_GULCH_01_USGS	S18, T2S, T5E to headwaters	R40	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
Victoria Creek SD-CH-R-VICTORIA_01_USGS	Rapid Creek to S19, T1N, R6E	R41	Coldwater Permanent Fish Life	NON	Temperature, water		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	INS				
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				

Upper Cheyenne River Basin

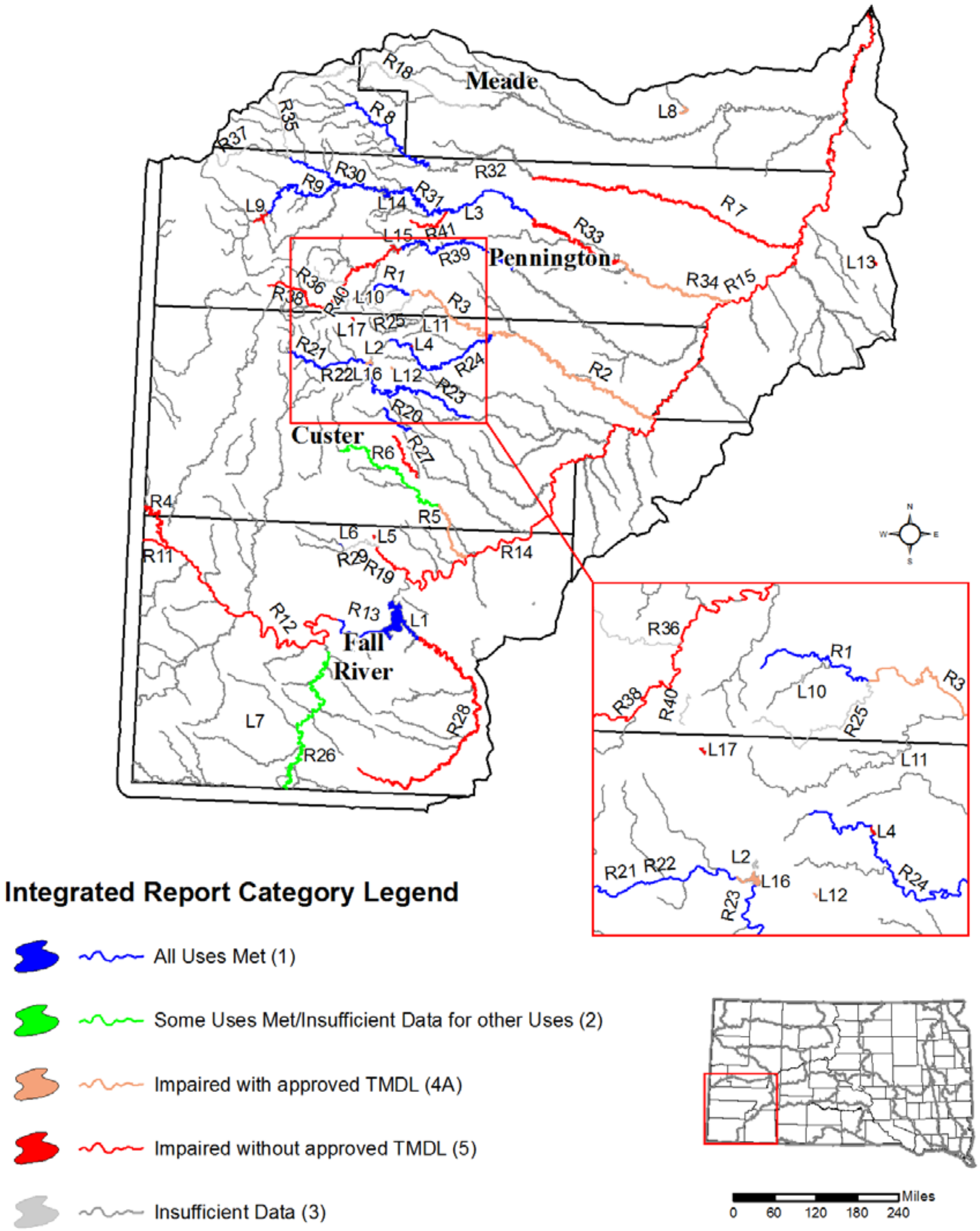

Figure 12: Upper Cheyenne River Basin

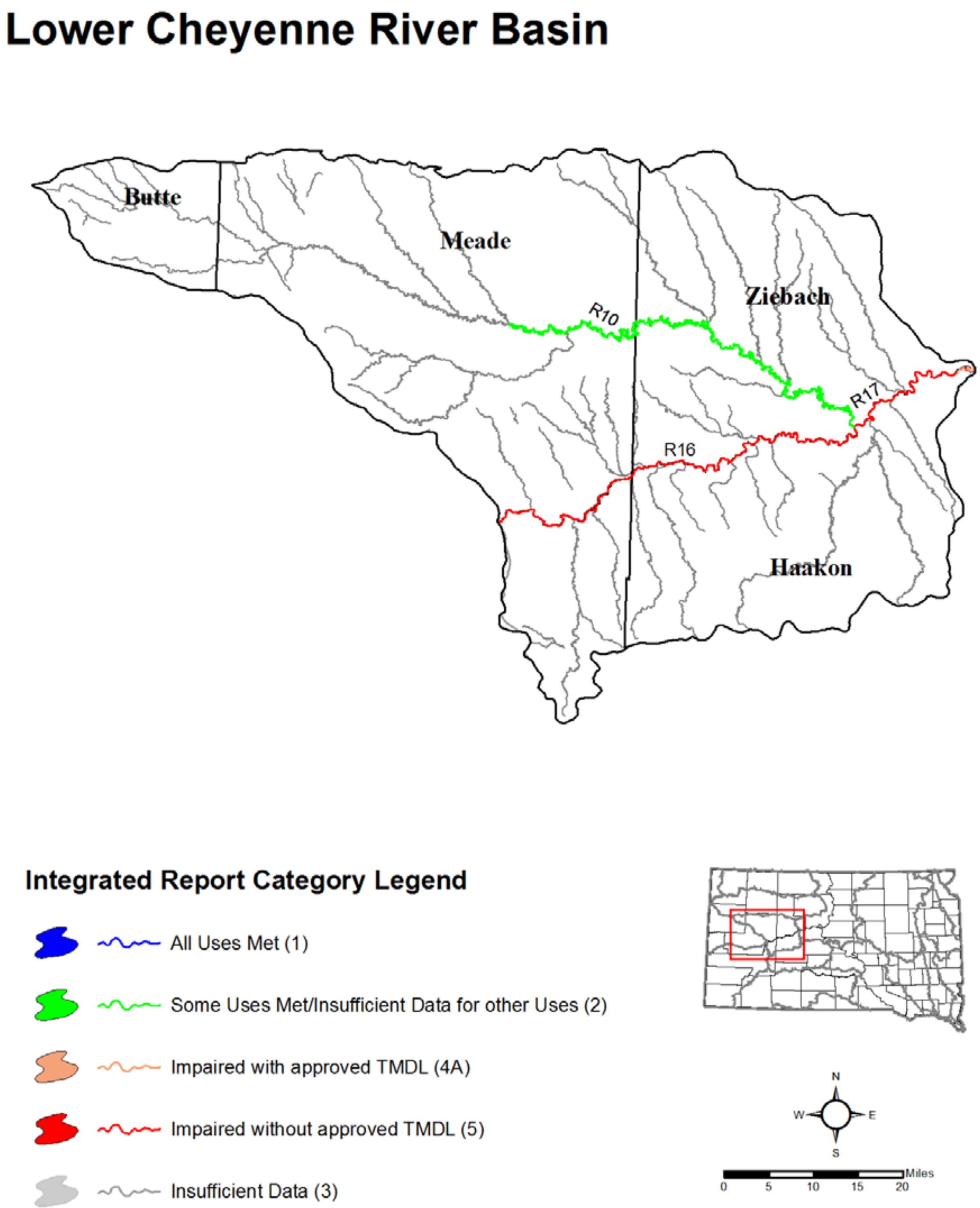

Figure 13: Lower Cheyenne River Basin

Grand River Basin (Figure 14, Table 36)

The Grand River basin covers 4,596 square miles in northwest South Dakota and southwest North Dakota. This is a sparsely populated region with a population density of approximately one person per square mile. The major income is derived from agriculture; however, this basin possesses energy resources in commercial quantities.

DENR has assessed five lakes and maintains nine water quality monitoring sites within the Grand River basin.

The USGS provided data for the Grand River and the North and South Fork Grand Rivers.

Due to historic uranium mining in the Grand River basin, DENR maintains four water quality monitoring sites that are monitored for uranium and other associated parameters. For this reporting cycle, there are no surface water quality exceedances for uranium or other parameters associated with uranium mining.

Elevated specific conductance, TSS, and sodium adsorption ratios (SAR) are typical of the entire basin. The North Fork watershed drains the southern periphery of the North Dakota badlands which may be a major source of high levels of specific conductance and SAR. The South Fork drainage contains erosive soils, which contribute sediment and suspended solids that often produce high TSS and SAR levels in the South Fork.

Shadehill Reservoir and the Grand River are considered impaired for irrigation use due to elevated sodium adsorption ratio (SAR). High sodium concentration, combined with the clay characteristics of most soils in this region, significantly reduce the acres suitable for continuous irrigation. This condition is measured by the SAR. A SAR value of 10 or greater indicates that a buildup of sodium will break down soil structure and cause serious problems for plant growth.

There are no on-going assessment or implementation projects occurring within the basin at this time.

DENR continues discussions with EPA to determine next steps regarding TMDL development and prioritization for the Grand River Basin, since these waters are affected by unique jurisdictional issues. Therefore, TMDL priority and schedule have not been populated in the basin table or Appendix D.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 36: Grand River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Flat Creek Dam SD-GR-L-FLAT_CREEK_01	Perkins County	L4	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Lake Gardner SD-GR-L-GARDNER_01	Harding County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Lake Isabel SD-GR-L-ISABEL_01	Dewey County	L1	Domestic Water Supply	FULL			5	YES – D**
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			
Pudwell Dam SD-GR-L-PUDWELL_01	Corson County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5	YES - D**
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Shadehill Reservoir SD-GR-L-SHADEHILL_01	Perkins County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - D**
			Immersion Recreation	FULL				
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Bull Creek SD-GR-R-BULL_01	SF Grand River to S15, T21N, R5E	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
Crooked Creek SD-GR-R-CROOKED_01	ND border to S34, T23N, R5E	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR) Specific Conductance	Natural Sources		
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				
Grand River SD-GR-R-GRAND_01	Shadehill Reservoir to Corson County line	R3	Coldwater Marginal Fish Life	NON	Temperature, water	Natural Sources	5	YES - D**
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	FULL				
Grand River SD-GR-R-GRAND_02	Corson County line to Bullhead	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Grand River SD-GR-R-GRAND_03	Bullhead to mouth	R5	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids	Natural Sources		
						Grazing in Riparian or Shoreline Zones		
Grand River, North Fork SD-GR-R-GRAND_N_FORK_01	North Dakota border to Shadehill Reservoir	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Immersion Recreation	NA				
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Grand River, South Fork SD-GR-R-GRAND_S_FORK_01	S13, T18N, R3E to SD Hwy 79	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources		
						Grazing in Riparian or Shoreline Zones		
						Crop Production (Crop Land or Dry Land)		
Grand River, South Fork SD-GR-R-GRAND_S_FORK_02	SD Hwy 79 to Shadehill Reservoir	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Immersion Recreation	NON	*Escherichia coli*			
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources		
						Grazing in Riparian or Shoreline Zones		
						Crop Production (Crop Land or Dry Land)		

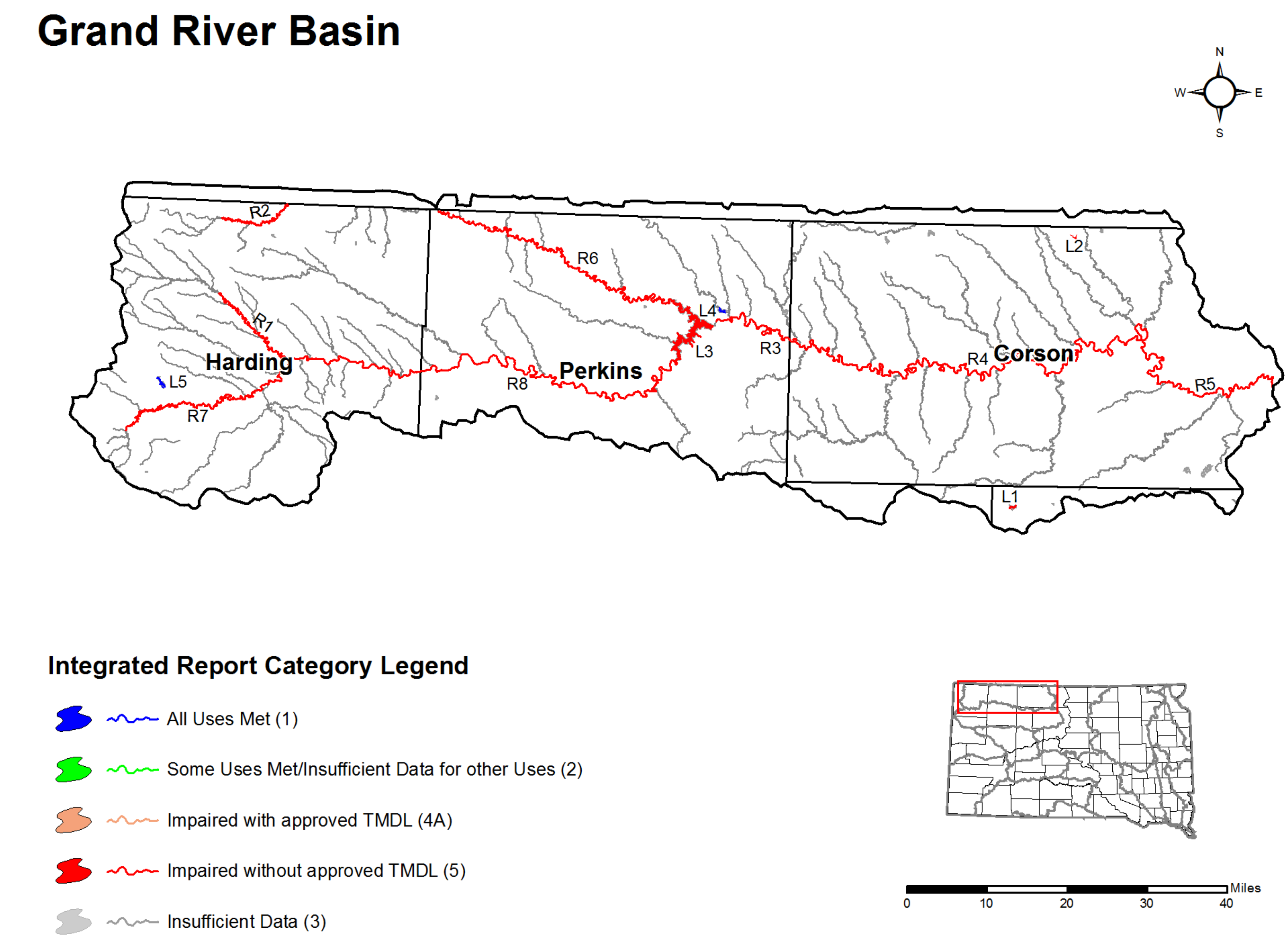

Figure 14: Grand River Basin

James River Basin (Figures 15 and 16, Table 37)

The James River drainage is the second largest river basin in the state. It drains approximately 14,729 square miles, stretching from the North Dakota border to the Missouri River near the Nebraska border. It is located in east-central South Dakota. Agriculture and related businesses are the predominant sources of income.

DENR has assessed 50 lakes and maintains 19 water quality monitoring sites within the James River basin. Eleven monitoring sites are located on the James River. The other sites are located on various other streams in the basin. In addition, available data from DENR watershed assessment projects and sponsors were used to determine waterbody support.

The USGS has several water quality monitoring sites on the James River and other streams in the James River basin including: Elm River, Firesteel Creek, Moccasin Creek, Turtle Creek, Wolf Creek, Foot Creek, and several unnamed tributaries in the basin. However, the data are very limited, and for most sites the only parameters that were measured were specific conductance and water temperature.

Dissolved oxygen, TSS, and bacteria were the main impairments observed within the James River basin during this reporting cycle. Past reporting cycles have also identified these causes of impairment within the James River basin. Substantial organic loading from nonpoint sources throughout the watershed occurs during run-off events. Decay of this organic matter results in low dissolved oxygen in the water, especially during low or base flow conditions. Additionally, low DO is also measured after flood events. Decaying organic material reduces dissolved oxygen concentration of flood water inundating the flood plain. As water drains back into the river channel, the DO is greatly reduced. Agricultural activities such as livestock operations, grazing in riparian zones, lack of riparian vegetation, and row crop production heavily contribute to the amount of suspended sediments and bacteria in the James River basin.

Firesteel Creek (SD-JA-R-FIRESTEEL_01) was listed as impaired for not meeting nutrient-related narrative standards during the 2014 reporting cycle. During the 2016 Integrated Report assessment process it was discovered that the fish and macroinvertebrate data used to calculate the IBI scores and initiate the listing was collected from a site location that fell outside the segment boundary. Firesteel Creek was delisted (listed in error) and placed in user defined category 2N to indicate bioassessment information is required to make an impairment determination.

DENR conducted habitat and bioassessments on two segments (SD-JA-R-WOLF_01- SD-JA-R-WOLF_SP_01) of Wolf Creek identified as subcategory 2N in the 2014 Integrated Report. Results generated from field assessments in 2014 and 2015 were used to determine support for nutrient-related narrative standards. SD-JA-R-WOLF_01 was considered fully supporting and a support determination was not given for SD-JA-R-WOLF_SP_01 due to borderline IBI/HCI scores, which warranted further assessment according to the listing methodology. The lower segment of Wolf Creek (SD-JA-R-WOLF_02) remained fully supporting.

Five additional assessment units located in the James River basin were evaluated for nutrient-related narrative standards. SD-JA-R-ELM_01, SD-JA-R-SNAKE_01, and SD-JA-R-TURTLE_01 exceeded the nitrogen and/or phosphorus thresholds though were placed in subcategory 2N requiring bioassessment data. SD-JA-R-FOOT_01_USGS and SD-JA-R-MUD_01 did not meet the minimum nitrogen or phosphorus data requirements (i.e. less than 20 samples). DENR will continue to track these assessment units in subsequent reporting cycles.

Mercury in fish tissue affects many lakes in the James River basin. While there are many factors that influence mercury accumulation in fish, a significant factor in this basin is the expansion of water. In the early 1980's and again in the late 1990's, increased precipitation and snowmelt turned small wetlands into larger lakes. Without natural outlets, many lakes in the northeast continue to gain surface area inundating wetlands and surrounding landscape. Water depth, substrate, and increased organic decay influence the rate that elemental mercury is methylated and converted to the biologically available form of methylmercury. The concentration of mercury in the water column is typically very low and similar to other lakes in the basin. However, the methylation rate is typically higher and results in a greater bioavailability of mercury. This mercury then moves up the food chain and results in excessive mercury in larger, older predator fish. DENR recently adopted EPA's water quality standard of 0.3 mg/kg for methylmercury in fish tissue. As a result, twenty-two new waterbodies in the James River Basin were considered nonsupporting the aquatic life uses for mercury in fish tissue. A statewide mercury TMDL has be approved by EPA.

Lardy Lake, Middle Lynn Lake, and Optitz Lake were incorrectly placed in the Big Sioux Basin during the 2014 reporting cycle. All three assessment units were correctly placed in the James River Basin with the appropriate assessment unit identifications (AUID) for the 2016 reporting cycle.

The South Central Watershed Implementation Project is the only major ongoing project in the James River Basin. This project encompasses the Lower James River watershed south of Huron to the Missouri River, including Lake Mitchell and Firesteel Creek. In addition, the Lewis and Clark Reservoir Watershed (Missouri River Basin) has also been included to the project area of the South Central Watershed Implementation Project.

A special water quality assessment was conducted by DENR on Firesteel Creek during the growing season of 2015. The goal of the project was to collect baseline bacteria and TSS data at multiple sites along the lower segment (SD-JA-R-FIRESTEEL_01) to address impairment of the designated beneficial uses. Sampling efforts are scheduled to continue during the 2016 field season.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 37: James River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Amsden Dam	Day County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-AMSDEN_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Beaver Lake	Yankton County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-JA-L-BEAVER_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Bierman Dam	Spink County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
SD-JA-L-BIERMAN_01			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			
Bullhead Lake	Marshall County (formerly SD-BS-L-BULLHEAD_02)	L4	Fish/Wildlife Prop, Rec, Stock	NA			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
SD-JA-L-BULLHEAD_02			Warmwater Semipermanent Fish Life	NA				
Lake Byron	Beadle County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
SD-JA-L-BYRON_01			Immersion Recreation	NA				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	NON	pH (high)			
Lake Carthage	Miner County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
SD-JA-L-CARTHAGE_01			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			
Cattail Lake	Marshall County (formerly SD-BS-L-CATTAIL_01)	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
SD-JA-L-CATTAIL_01			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Lake Cavour	Beadle County	L8	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-CAVOUR_01			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Clear Lake	Marshall County (formerly SD-BS-L-CLEAR_M_01)	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
SD-JA-L-CLEAR_M_01			Warmwater Permanent Fish Life	FULL				
Clubhouse Lake SD-JA-L-CLUBHOUSE_01	Marshall County	L10	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Cottonwood Lake	Spink County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-COTTONWOOD_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Cottonwood Lake	Marshall County (formerly SD-BS-L-COTTONWOOD_01)		Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
SD-JA-L-COTTONWOOD_M_01		L12						
			Warmwater Semipermanent Fish Life	FULL				
Cresbard Lake	Faulk County	L13	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
SD-JA-L-CRESBARD_01			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
					pH (high)			
Elm Lake	Brown County	L14	Domestic Water Supply	FULL			4A*	NO
SD-JA-L-ELM_01			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Lake Faulkton	Faulk County	L15	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-FAULKTON_01			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
					Mercury in Fish Tissue			
Four Mile Lake	Marshall County (formerly SD-BS-L-FOUR_MILE_01)	L16	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
SD-JA-L-FOUR_MILE_01								
			Warmwater Marginal Fish Life	NON	pH (high)			
Lake Hanson	Hanson County	L17	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-HANSON_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Hazeldon Lake SD-JA-L-HAZELDON_01	Day County	L18	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Henry Reservoir	Near Scotland, SD	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-HENRY_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Horseshoe Lake	Marshall County	L20	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
SD-JA-L-HORSESHOE_01			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Jail Pond	Aurora County	L21	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
SD-JA-L-JAIL_POND_01			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				
Jones Lake	Hand County	L22	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
SD-JA-L-JONES_01			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	pH (high)			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lardy Lake SD-JA-L-LARDY_01	Day County (formerly SD-BS-L-LARDY_01)	L23	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Latham Lake SD-JA-L-LATHAM_01	Faulk County	L24	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Oxygen, Dissolved			
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
Lilly Lake SD-JA-L-LILY_01	Day County	L25	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Lake Louise SD-JA-L-LOUISE_01	Hand County	L26	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Oxygen, Dissolved			
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved pH (high)			
Lynn Lake SD-JA-L-LYNN_01	Day County	L27	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Menno Lake SD-JA-L-MENNO_01	Hutchinson County	L28	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Semipermanent Fish Life	INS				
Middle Lynn Lake SD-JA-L-MID_LYNN_01	Day County (formerly SD-BS-L-MID_LYNN_01)	L29	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Mina Lake SD-JA-L-MINA_01	Edmunds County	L30	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Oxygen, Dissolved			
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved			
Lake Mitchell SD-JA-L-MITCHELL_01	Davison County	L31	Domestic Water Supply	NON	Chlorophyll-a		4A*	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	NON	Chlorophyll-a			
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			
North Buffalo Lake SD-JA-L-N_BUFFALO_01	Marshall County (formerly SD-BS-L-N_BUFFALO_01)	L32	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Nine Mile Lake SD-JA-L-NINE_MILE_01	Marshall County (formerly SD-BS-L-NINE_MILE_01)	L33	Fish/Wildlife Prop, Rec, Stock	NON	pH (high)		5	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	pH (high)			
North Scatterwood Lake SD-JA-L-NORTH_SCATTERWOOD_01	Edmunds County	L34	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				

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WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Opitz Lake SD-JA-L-OPITZ_01	Day County (formerly SD-BS-L-OPITZ_01	L35	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Pierpont Lake SD-JA-L-PIERPONT_01	Day County	L36	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Permanent Fish Life	NON	Temperature, water			
Ravine Lake SD-JA-L-RAVINE_01	Beadle County	L37	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Oxygen, Dissolved			
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved			
Lake Redfield SD-JA-L-REDFIELD_01	Spink County	L38	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
Reetz Lake SD-JA-L-REETZ_01	Day County	L39	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
Richmond Lake SD-JA-L-RICHMOND_01	Brown County	L40	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Rosehill Lake SD-JA-L-ROSEHILL_01	Hand County	L41	Fish/Wildlife Prop, Rec, Stock	NA			3*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NA				
Rosette Lake SD-JA-L-ROSETTE_01	Edmunds County	L42	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Marginal Fish Life	NON	Chlorophyll-a			
Roy Lake SD-JA-L-ROY_01	Marshall County (formerly SD-BS-L-ROY_01)	L43	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
South Red Iron Lake SD-JA-L-S_RED_IRON_01	Marshall County (formerly SD-BS-L-S_RED_IRON_01)	L44	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Temperature, water			
South Buffalo Lake SD-JA-L-SOUTH_BUFFALO_01	Marshall County (formerly SD-BS-L-SOUTH_BUFFALO_01)	L45	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved			
Staum Dam SD-JA-L-STAUM_01	Beadle County	L46	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Twin Lakes SD-JA-L-TWIN_01	Sanborn County	L47	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a			
					Oxygen, Dissolved			
Twin Lakes SD-JA-L-TWIN_02	Spink County	L48	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Wilmarth Lake SD-JA-L-WILMARTH_01	Aurora County	L49	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	INS				
			Limited Contact Recreation	INS				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
					pH (high)			
Wylie Lake SD-JA-L-WYLIE_01	Brown County	L50	Fish/Wildlife Prop, Rec, Stock	NA			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	NA				

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Dawson Creek SD-JA-R-DAWSON_01	James River to Lake Henry	R1	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Marginal Fish Life	INS				
Elm River SD-JA-R-ELM_01	Elm Lake to mouth	R2	Domestic Water Supply	FULL			1	NO
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Firesteel Creek SD-JA-R-FIRESTEEL_01	West Fork Firesteel Creek to Mouth	R3	Domestic Water Supply	NON	Total Dissolved Solids		5*	YES - 1
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	NON	Temperature, water			
Foot Creek SD-JA-R-FOOT_01_USGS	Near Aberdeen, SD	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
James River SD-JA-R-JAMES_01	North Dakota border to Mud Lake Reservoir	R5	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River SD-JA-R-JAMES_02	Mud Lake Reservoir	R6	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
James River SD-JA-R-JAMES_03	Columbia Road Reservoir	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved Total Suspended Solids			
James River SD-JA-R-JAMES_04	Columbia Road Reservoir to near US HWY 12	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved Total Suspended Solids			
James River SD-JA-R-JAMES_05	US HWY 12 to Mud Creek	R9	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River SD-JA-R-JAMES_06	Mud Creek to James River Diversion Dam	R10	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River SD-JA-R-JAMES_07	James River Diversion Dam to Huron 3rd Street Dam	R11	Domestic Water Supply	NON	Total Dissolved Solids		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River SD-JA-R-JAMES_08	Huron 3rd Street Dam to Sand Creek	R12	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
James River SD-JA-R-JAMES_09	Sand Creek to I-90	R13	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Livestock (Grazing or Feeding Operations) Crop Production (Crop Land or Dry Land)		
James River SD-JA-R-JAMES_10	I-90 to Yankton County line	R14	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
James River SD-JA-R-JAMES_11	Yankton County line to mouth	R15	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Grazing in Riparian or Shoreline Zones Crop Production (Crop Land or Dry Land)		
Moccasin Creek SD-JA-R-MOCCASIN_01	S24, T123N, R64W to headwaters	R16	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
Moccasin Creek SD-JA-R-MOCCASIN_02	James River to S24, T123N, R64W	R17	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
Mud Creek SD-JA-R-MUD_01	James River to Hwy 37	R18	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
Pierre Creek SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	R19	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Semipermanent Fish Life	INS				
Snake Creek SD-JA-R-SNAKE_01	James River to confluence with SF Snake Creek	R20	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
Stony Run Creek SD-JA-R-STONYRUN_01_H	headwaters to Stony Run Lake	R21	Fish/Wildlife Prop, Rec, Stock	NA			3	NO
			Irrigation Waters	NA				
Turtle Creek SD-JA-R-TURTLE_01	James River to S17, T113N, R65W	R22	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Wolf Creek SD-JA-R-WOLF_01	Wolf Creek Colony to S5, T103N, R56W	R23	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
Wolf Creek SD-JA-R-WOLF_02	Just above Wolf Creek Colony to the mouth.	R24	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
Wolf Creek SD-JA-R-WOLF_SP_01	Turtle Creek to S10, T114N, R66W	R25	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				

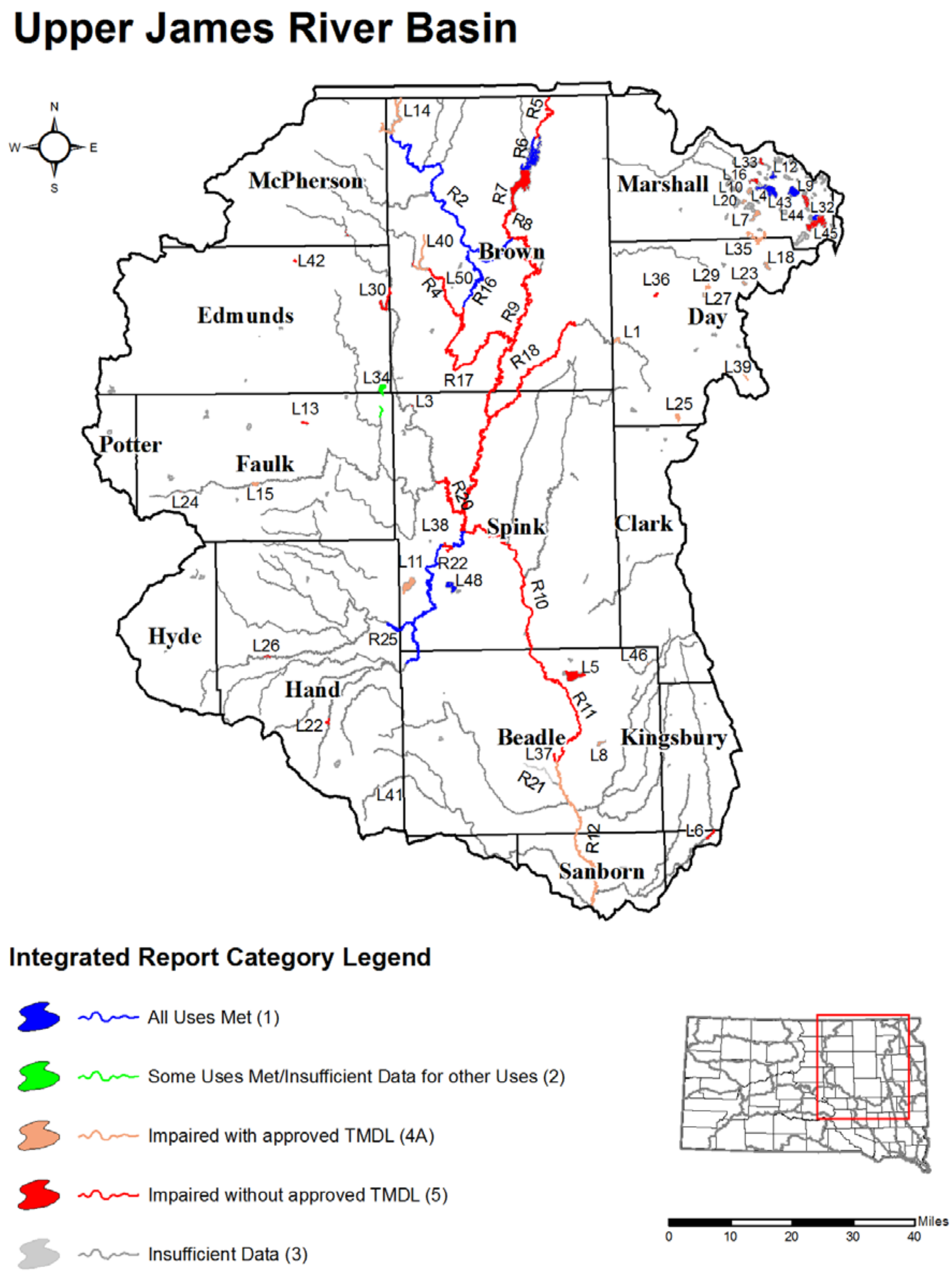

Figure 15: Upper James River Basin

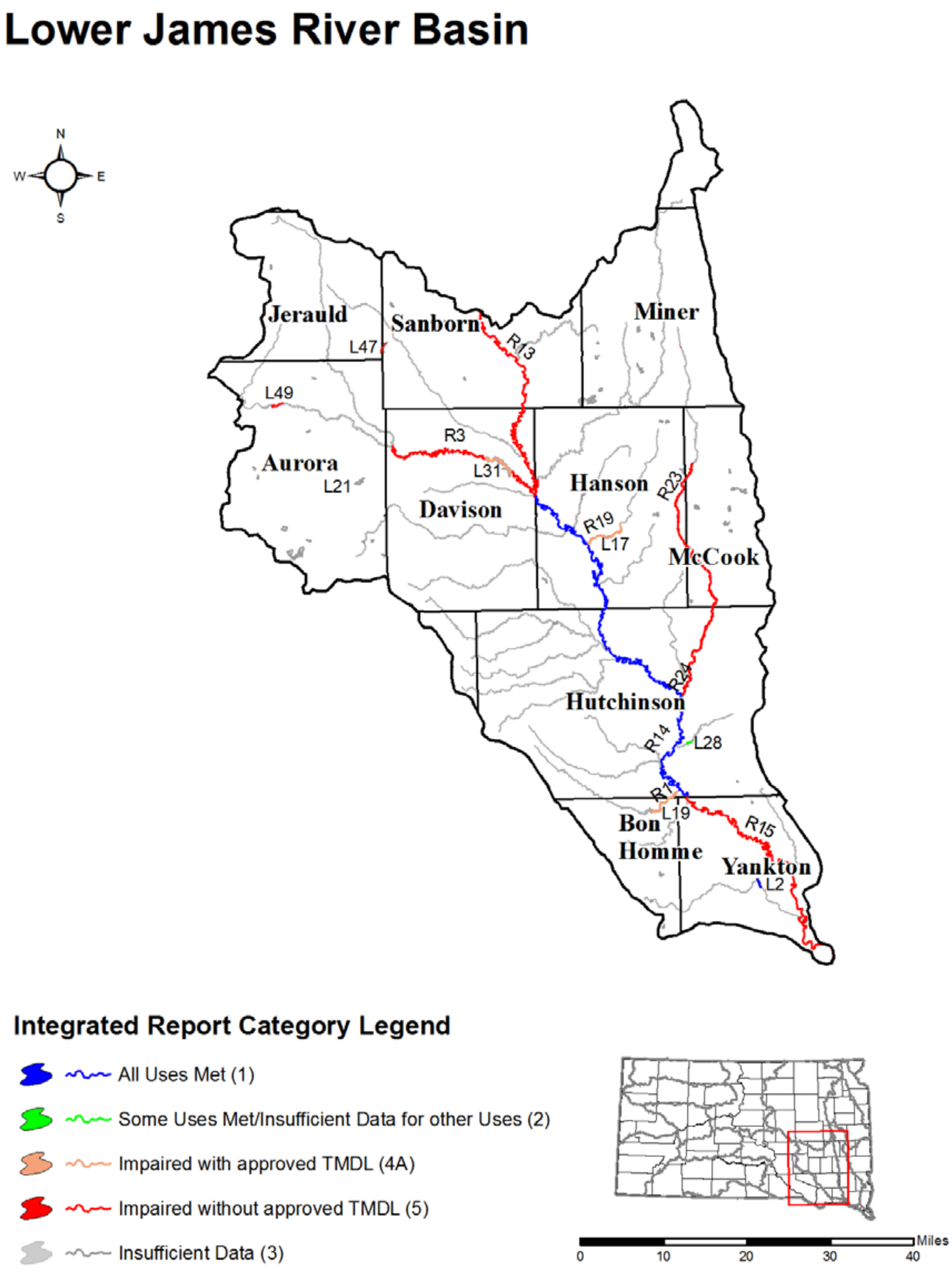

Figure 16: Lower James River Basin

Little Missouri River Basin (Figure 17, Table 38)

The Little Missouri River basin is a small basin located in the northwestern corner of the state. The river enters the state from southeastern Montana and drains 583 square miles before exiting into North Dakota. The basin's economy is dominated by agriculture with approximately 90% of the land being used for agricultural production. The majority of this land is rangeland due to limited rainfall.

There are no monitored lakes within this basin and DENR has one water quality monitoring station located on the Little Missouri River.

The USGS provided water quality data from a station on the Little Missouri River at Camp Crook.

The Little Missouri River is listed as impaired for TSS. The applicable TSS (acute 158 mg/L) standard assigned to protect the designated use of semipermanent fish life was recognized as inappropriate for the Little Missouri River. DENR conducted a comprehensive assessment at 2 sites on the Little Missouri River during the field seasons of 2013 and 2014. The purpose of the assessment was to gain information necessary to verify impairment or provide direction for a site specific TSS standard change. DENR is currently drafting a standards change document with recommendations for increasing the TSS standard on the Little Missouri River. Measures of biotic integrity are an important component of the TSS standard change recommendations. There are currently no formal watershed assessment or implementation projects in the basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 38: Little Missouri River Basin Information

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Little Missouri River SD-LM-R-LITTLE_MISSOURI_01	Montana border to North Dakota border	R1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Total Suspended Solids			

Little Missouri River Basin

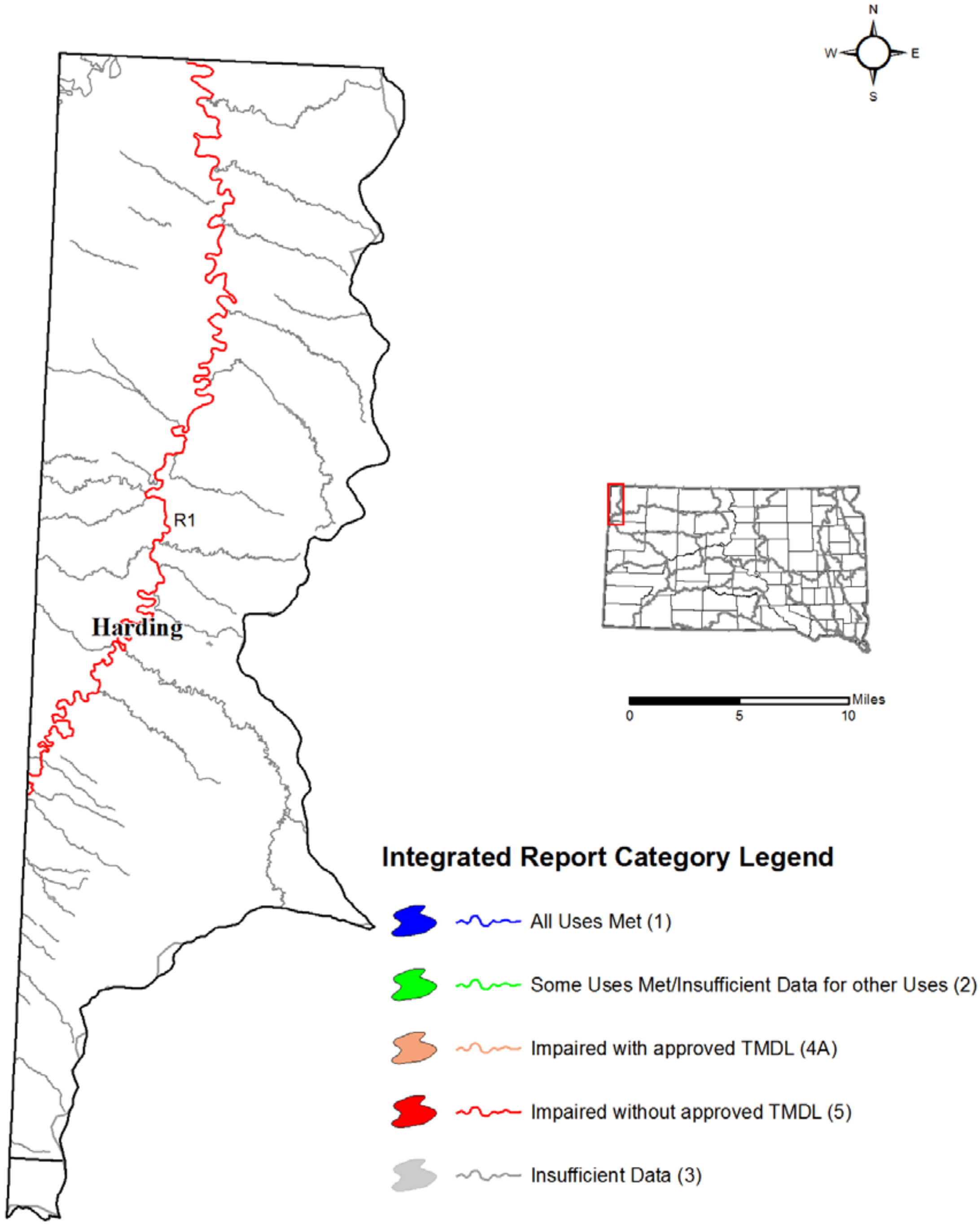

Figure 17: Little Missouri River Basin

Minnesota River Basin (Figure 18, Table 39)

The Minnesota River basin is found in the northeastern corner of the state. The basin is bordered on the north by the Red River tributaries, on the west by the Prairie Coteau Pothole region, on the south by the Big Sioux River, and on the east by the South Dakota/Minnesota border. The basin drains an area of 1,637 square miles within South Dakota.

DENR has assessed ten lakes and maintains nine water quality monitoring sites within the Minnesota basin. EDWDD also submitted data for waterbodies with the Minnesota River basin. Most stream impairments are due to bacteria, while lake impairments were due to mercury in fish tissue, pH and temperature.

DENR identified eight stream assessment units that met criteria for determining use support of nutrient-related narrative standards. DENR conducted biological assessments during the 2014 and 2015 field seasons to address subcategory 2N biological and habitat data requirements on three assessment units identified in the 2014IR. The 2N assessment data resulted in full support determinations for the following assessment units; SD-MN-R-WHETSTONE_01, SD-MN-R-WHETSTONE_S_FORK_02, and SD-MN-R-YELLOW_BANK_N_FORK_01.

Two assessment units (SD-MN-R-LITTLE_MINNESOTA_02 and SD-MN-R-YELLOW_BANK_S_FORK_01) did not meet nitrogen and/or phosphorus thresholds and were placed in category 2N for lacking IBI/HCI scores to complete the assessment. Two assessment units (SD-MN-R-LAC_QUI_PARLE_W_BR_01 and SD-MN-R-LITTLE_MINNESOTA_01) met nitrogen and phosphorus thresholds, but a determination was not made solely on the thresholds. Neither assessment unit had IBI or HCI values.

Implementation efforts are currently ongoing in the Upper Minnesota River basin in Grant and Roberts counties with focus on the Whetstone and Yellow Bank watersheds. Coordination was included as part of the Northeast Glacial Lakes project that currently encompasses Day and Marshall Counties.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 39: Minnesota River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lake Alice SD-MN-L-ALICE_01	Deuel County	L4	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Big Stone Lake SD-MN-L-BIG_STONE_01	Roberts County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Temperature, water			
Lake Cochrane SD-MN-L-COCHRANE_01	Deuel County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Lake Drywood North SD-MN-L-DRYWOOD_NORTH_01	Roberts County (formerly SD-BS-L-DRYWOOD_NORTH_01)	L6	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Fish Lake SD-MN-L-FISH_01	Deuel County	L7	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Lake Hendricks SD-MN-L-HENDRICKS_01	Brookings County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	pH (high)			
Oak Lake SD-MN-L-OAK_01	Brookings County	L8	Fish/Wildlife Prop, Rec, Stock	INS			2	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	INS				
Lake Oliver SD-MN-L-OLIVER_01	Deuel County	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Punished Woman Lake SD-MN-L-PUNISHED_WOMAN_01	Codington County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	pH (high)			
Summit Lake SD-MN-L-SUMMIT_01	Grant County	L10	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue			
Turtle Foot Lake SD-MN-L-TURTLE_FOOT_01	Marshall County	L11	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lac Qui Parle River, West Branch SD-MN-R-LAC_QUI_PARLE_W_BR_01	SD/MN border to S8, T115N, R47W	R1	Coldwater Marginal Fish Life	FULL			5	YES - 1
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
Little Minnesota River SD-MN-R-LITTLE_MINNESOTA_01	Big Stone Lake to S24, T126N, R51W	R8	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Little Minnesota River SD-MN-R-LITTLE_MINNESOTA_02	S24, T126N, R51W to S15, T128N, R52W	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
Mud Creek SD-MN-R-MUD_01	SF Yellowbank River to S22, T118N, R48W	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
Whetstone River SD-MN-R-WHETSTONE_01	SD/MN border to confluence with its north and south forks	R9	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
South Fork Whetstone River SD-MN-R-WHETSTONE_S_FORK_01	Headwaters to Lake Farley	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
South Fork Whetstone River SD-MN-R-WHETSTONE_S_FORK_02	Lake Farley to mouth	R5	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
North Fork Yellow Bank River SD-MN-R-YELLOW_BANK_N_FORK_01	SD/MN border to S27, T120N, R48W	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Permanent Fish Life	FULL				
South Fork Yellow Bank River SD-MN-R-YELLOW_BANK_S_FORK_01	SD/MN border to S33, T118N, R49W	R7	Coldwater Marginal Fish Life	FULL			5	YES - 1
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			

Minnesota River Basin

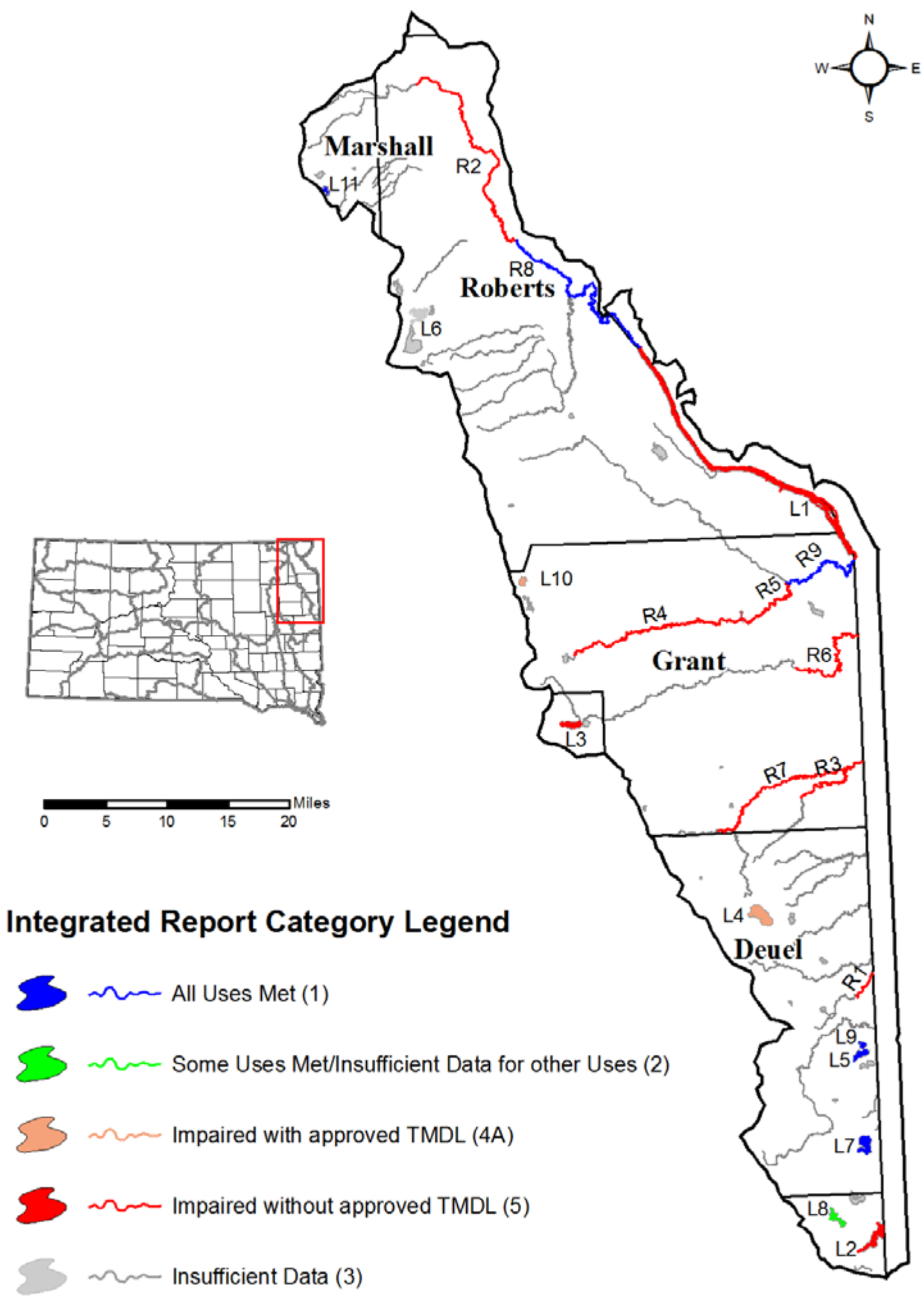

Figure 18: Minnesota River Basin

Missouri River Basin (Figures 19 and 20, Table 40)

The Missouri River is the largest body of water in South Dakota. It flows through the middle of the state to form what is commonly referred to as either "east" or "west" river. The river enters the state on the north from North Dakota and flows south until it reaches the vicinity of Pierre. Along this southern course it receives significant flows from the Grand, Moreau, and Cheyenne River basins. From Pierre, the river flows generally east-southeast until it exits the state on the southeast tip after receiving contributing flows from the Bad, White, James, Vermillion, Niobrara, and Big Sioux River basins. The Missouri River basin is the largest basin in South Dakota and drains approximately 15,865 square miles.

The dominant feature of the Missouri River in South Dakota is the presence of four impoundments: Lake Oahe at Pierre (Oahe Dam), Lake Sharpe at Fort Thompson (Big Bend Dam), Lake Francis Case at Pickstown (Ft. Randall Dam), and Lewis and Clark Lake at Yankton (Gavins Point Dam). The largest of these reservoirs is Lake Oahe with 22,240,000 acre-feet of storage capacity covering 374,000 acres. The impoundments serve for flood control, hydroelectric generation, irrigation, municipal water use, water-related recreation, and downstream navigation. The 70-mile reach from the Gavins Point Dam to Sioux City, Iowa, is the last major free-flowing segment of the Missouri River in the state.

DENR has assessed 23 lakes and maintains ten water quality monitoring stations within the Missouri River basin. USGS also has several water quality sites located on the mainstem of the Missouri River and several tributaries. USGS data on the Missouri River itself are fairly extensive and include data for dissolved oxygen, pH, water temperature, sodium adsorption ratio, alkalinity, sulfate, nitrates, total dissolved solids, ammonia, and chlorides. USACE summary data from the 2013 Report "Water Quality Conditions in the Missouri River Mainstem System" were also used in determining waterbody support on Lake Oahe and Lake Sharpe. Water quality data for Lewis and Clark Lake was provided by NE DEQ and USACE.

Lake Sharpe is listed in the Missouri River basin tables as nonsupporting for the (2) Coldwater permanent fish life propagation beneficial use for not meeting the temperature criterion. USACE profile data summaries and DENR data were used to assess water temperature. During summer months, the temperature criterion is often met in Lake Sharpe immediately downstream of Oahe Dam; however, the water can quickly heat up further downstream. Water in Lake Sharpe is well-mixed due to the short retention time in the reservoir, relative shallowness, and bottom withdrawal from Big Bend Dam. A significant thermocline does not typically develop in Lake Sharpe. By late summer, coldwater habitat is limited to coldwater discharges from Oahe Dam. It is important to note that the temperature of water discharged from Oahe Dam is dependent upon pool elevation and discharge rate. During years with low pool elevation in Lake Oahe, the thermocline is established below the intakes, resulting in warmer water withdrawal from the epilimnion or metalimnion. During years with high pool elevation, the thermocline establishes above the intakes resulting in coldwater withdrawals from the hypolimnion. However, during high pool elevation years, the discharge rate from Oahe Dam also influences the temperature of water discharged. Average or low discharge rates result in cold water drawn horizontally from the hypolimnion. During high discharge rates or when USACE is evacuating water from Lake Oahe, less dense water from the epilimnion or metalimnion is drawn down and results in periods of warmer water discharges. Profile data collected by DENR and USACE profile data summaries indicate periods of time during summer months when no coldwater habitat exists and none of Lake Sharpe meets coldwater temperature criterion.

A significant temperature-depth gradient occurs on Lake Oahe in the near-dam lacustrine area during summer months. This results in the development of a strong thermocline approximately 20 to 25 meters below the surface. The longitudinal extent of the coldwater habitat is dependent upon pool elevation and thermocline depth. The shallower upper reaches of the reservoir are well-mixed by late summer and do not display significant vertical variations in temperature. However, this area may still provide coldwater habitat based on pool elevation.

USACE profile data summaries were used to assess water temperature and resulting coldwater habitat in Lake Oahe. Thermal profile contour plots measured during the months of May, June, July, and August 2013, indicate the temperature criterion was met longitudinally throughout most the length of the reservoir within the state boundary. Thermal profile contour plots measured in August 2013 indicate the temperature criterion was met longitudinally from Oahe Dam to near river mile 1190 (Indian Creek). During this time, pool elevation was high and ranged from 1599 to 1603 feet mean sea level (ft-msl).

DENR recently adopted EPA's water quality standard of 0.3 mg/kg for methylmercury in fish tissue. As a result, seven waterbodies in the Missouri River basin are considered nonsupporting the aquatic life uses for mercury in fish tissue.

Most lakes in the Missouri River Basin are highly eutrophic because of nutrient enrichment and siltation. Agricultural activities are the primary sources of pollution.

There are currently no active assessment projects in the Missouri River Basin. The only active implementation project is in the Lewis and Clark watershed which is incorporated under the South Central Watershed Implementation Project which also encompasses the Lower James River Watershed.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 40: Missouri River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lake Andes SD-MI-L-ANDES_01	Charles Mix County	L1	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Marginal Fish Life	FULL NON NON NON	 Oxygen, Dissolved Oxygen, Dissolved Oxygen, Dissolved		5	YES - 2
Brakke Dam SD-MI-L-BRAKKE_01	Lyman County	L2	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	NON NON NON NON	Mercury in Fish Tissue Chlorophyll-a Chlorophyll-a Chlorophyll-a Mercury in Fish Tissue		4A*	NO
Burke Lake SD-MI-L-BURKE_01	Gregory County	L3	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON NON NON	 Chlorophyll-a Chlorophyll-a Chlorophyll-a Oxygen, Dissolved		4A*	NO
Byre Lake SD-MI-L-BYRE_01	Lyman County	L4	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	FULL NON NON NON	 Chlorophyll-a Chlorophyll-a Chlorophyll-a		4A*	NO
Lake Campbell SD-MI-L-CAMPBELL_01	Campbell County	L5	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	NON INS INS NON	pH (high) pH (high)		5	YES - 2
Corsica Lake SD-MI-L-CORSICA_01	Douglas County	L6	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON NON NON	 Chlorophyll-a Chlorophyll-a Chlorophyll-a pH (high)		5*	YES - 2
Cottonwood Lake SD-MI-L-COTTONWOOD_01	Sully County	L7	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	NON FULL FULL NON	Mercury in Fish Tissue Mercury in Fish Tissue		4A*	NO
Dante Lake SD-MI-L-DANTE_01	Charles Mix County	L8	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	FULL FULL FULL NON	 Oxygen, Dissolved Temperature, water		5*	YES - 2
Eureka Lake SD-MI-L-EUREKA_01	McPherson County	L9	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL FULL FULL			1	NO
Fairfax Lake SD-MI-L-FAIRFAX_01	Gregory County	L10	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL INS INS FULL			2	NO

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Fate Dam SD-MI-L-FATE_01	Lyman County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Geddes Lake SD-MI-L-GEDDES_01	Charles Mix County	L12	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Oxygen, Dissolved			
Lake Hiddenwood SD-MI-L-HIDDENWOOD_01	Walworth County	L13	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	NON	Chlorophyll-a Oxygen, Dissolved			
			Limited Contact Recreation	NON	Chlorophyll-a Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Oxygen, Dissolved			
Lake Hurley SD-MI-L-HURLEY_01	Potter County	L14	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
McCook Lake SD-MI-L-MCCOOK_01	Union County	L15	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Temperature, water			
Platte Lake SD-MI-L-PLATTE_01	Charles Mix County	L16	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Lake Pocasse SD-MI-L-POCASSE_01	Campbell County	L17	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			
Potts Dam SD-MI-L-POTTS_01	Potter County	L18	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	FULL				
Roosevelt Lake SD-MI-L-ROOSEVELT_01	Tripp County	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Sully Lake SD-MI-L-SULLY_01	Sully County	L20	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Sully Dam SD-MI-L-SULLY_DAM_01	Tripp County	L21	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Swan Lake SD-MI-L-SWAN_01	Walworth County	L22	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Lake Yankton SD-MI-L-YANKTON_01	Yankton County	L23	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	FULL				

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Campbell Creek SD-MI-R-CAMPBELL_01_USGS	Near Lee's Corner	R1	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
Choteau Creek SD-MI-R-CHOTEAU_01	Lewis & Clark Lake to S34, T96N, R63W	R2	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Crow Creek SD-MI-R-CROW_01	Bedashosha Lake to Jerauld County line	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Emanuel Creek SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	R4	Fish/Wildlife Prop, Rec, Stock	INS			4A*	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Missouri River (Lake Francis Case) SD-MI-R-FRANCIS_CASE_01	Big Bend Dam to Fort Randall Dam	R5	Commerce & Industry	FULL			1	NO
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	FULL				
Missouri River (Lewis and Clark Lake) SD-MI-R-LEWIS_AND_CLARK_01	Fort Randall Dam to North Sioux City	R6	Commerce & Industry	FULL			5	YES - 1
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			
Medicine Creek SD-MI-R-MEDICINE_01	Lake Sharpe to US Hwy 83	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	NON	Specific Conductance			
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Marginal Fish Life	FULL				
Medicine Knoll Creek SD-MI-R-MEDICINE_KNOLL_01	Lake Sharpe to confluence with its north and south forks	R8	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Missouri River (Lake Oahe) SD-MI-R-OAHE_01	North Dakota border to Oahe Dam	R9	Coldwater Permanent Fish Life	NON	Mercury in Fish Tissue		4A*	NO
			Commerce & Industry	FULL				
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue			
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Oak Creek SD-MI-R-OAK_01_USGS	S20, T21N, R28E to Oahe	R10	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Platte Creek SD-MI-R-PLATTE_01_USGS	Near Platte, SD	R11	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Ponca Creek SD-MI-R-PONCA_01	SD/NE border to US Hwy 183	R12	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
					Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Missouri River (Lake Sharpe) SD-MI-R-SHARPE_01	Oahe Dam to Big Bend Dam	R13	Coldwater Permanent Fish Life	NON	Oxygen, Dissolved		5*	YES - 1
					Temperature, water			
			Commerce & Industry	FULL				
			Domestic Water Supply	FULL				
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
Slaughter Creek SD-MI-R-SLAUGHTER_01	Missouri River to headwaters	R14	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
Spring Creek SD-MI-R-SPRING_01	Lake Pocasse to US HWY 83	R15	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	Oxygen, Dissolved			
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			

Upper Missouri River Basin

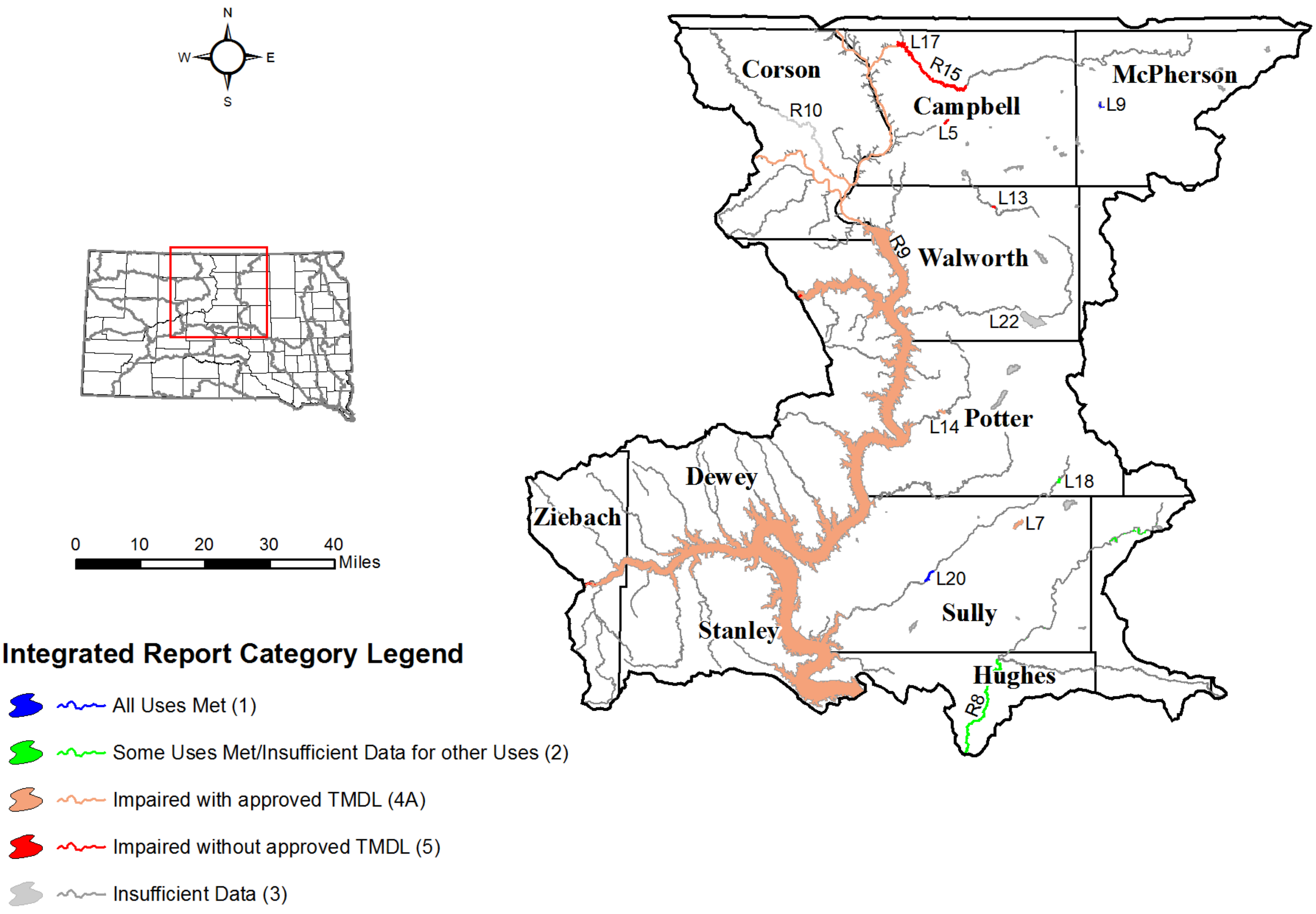

Figure 19: Upper Missouri River Basin

Lower Missouri River Basin

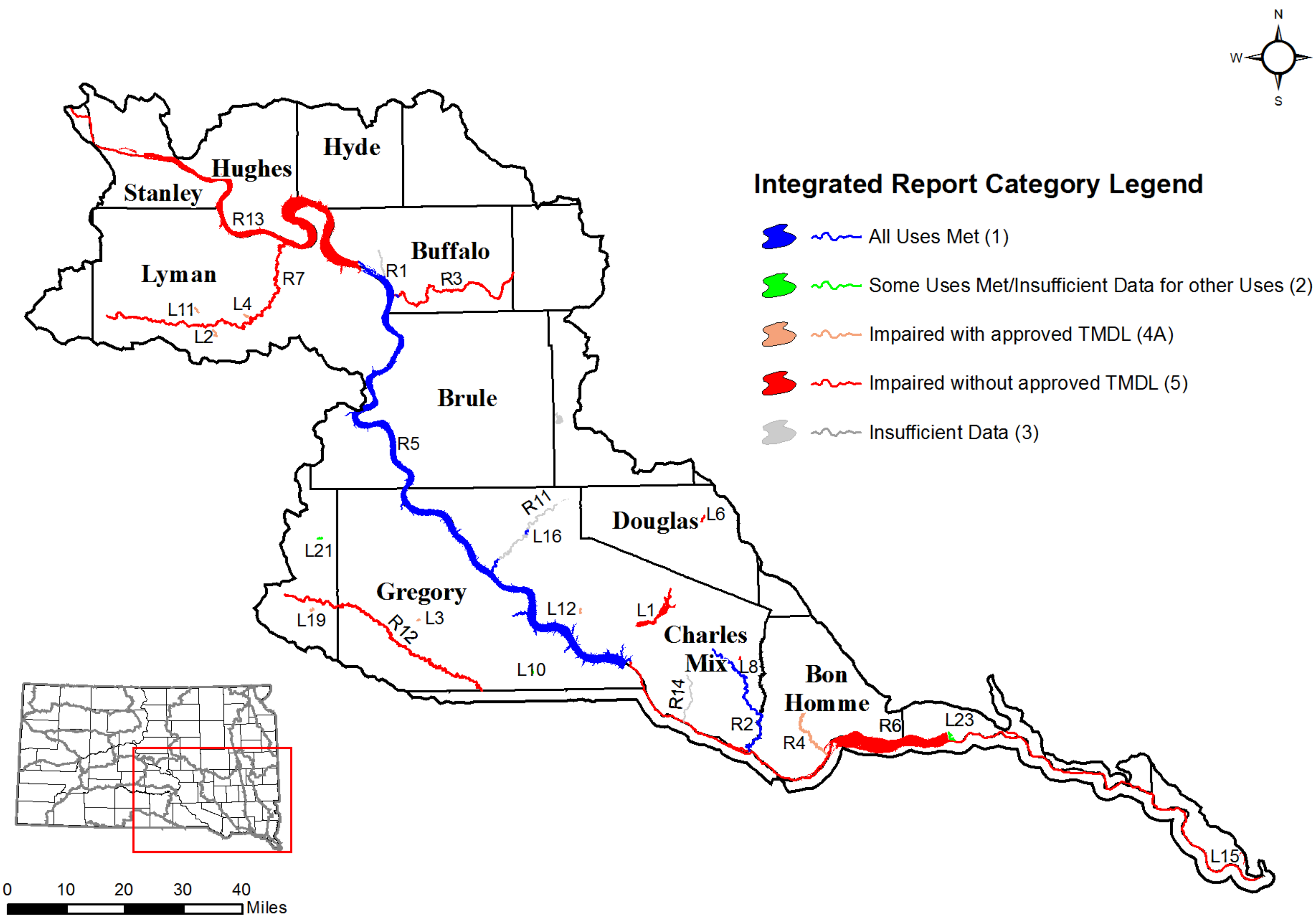

Figure 20: Lower Missouri River Basin

Moreau River Basin (Figure 21, Table 41)

The Moreau River basin is located in the northwest part of South Dakota and drains an area of 4,995 square miles. As with the Grand River basin to the north, agriculture is the mainstay of this sparsely populated basin. Population density is approximately two persons per square mile. A majority of the basin is devoted to ranching operations.

DENR maintains four water quality monitoring sites within this basin. Three monitoring sites are located on the Moreau River and one is located on the South Fork Moreau.

The USGS has water quality monitoring sites on the Moreau River. The data are limited, and the only parameters measured were specific conductance and water temperature.

Water quality within the basin is marginal to poor. Much of the sediment in the drainage comes from erosive Cretaceous shales that also mineralize the water. As in the adjoining Grand River basin to the north, this leads to high levels of total dissolved solids in the water of local streams, primarily sulfate, iron, manganese, sodium, and other minerals. Other pollutants in the basin include TSS, SAR, and specific conductance due to natural conditions; and fecal coliform and *E. coli* bacteria.

The Moreau River is located downstream from historic uranium mining operations and is monitored for standard parameters and those associated with historic uranium mining. Waterbody support determination for the upper reach of the Moreau River was based on all measured parameters including those associated with uranium mining. This reach is listed as not supporting some beneficial use designations based on exceedances of TSS, *E. coli*, and SAR. There were no exceedances for any parameters associated with uranium mining.

There are no on-going assessment or implementation projects occurring within the Moreau basin at this time.

DENR continues discussions with EPA to determine next steps regarding TMDL development and prioritization for the Moreau River Basin, since these waters are affected by unique jurisdictional issues. Therefore, TMDL priority and schedule have not been populated in the basin table or Appendix D.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 41: Moreau River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Coal Springs Reservoir SD-MU-L-COAL_SPRINGS_01	Perkins County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue pH (high)		5*	YES - D**
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue pH (high)			
Dewberry Dam SD-MU-L-DEWBERRY_01	Dewey County	L2	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	INS				
Little Moreau No. 1 SD-MU-L-LITTLE_MOREAU_NO1_01	Dewey County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Moreau River SD-MU-R-MOREAU_01	North and South Forks to Ziebach/Perkins county line	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Moreau River SD-MU-R-MOREAU_02	Ziebach/Perkins county line to Green Grass	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources		
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Moreau River SD-MU-R-MOREAU_03	Green Grass to mouth	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - D**
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources Livestock (Grazing or Feeding Operations) Crop Production (Crop Land or Dry Land)		
South Fork Moreau River SD-MU-R-MOREAU_S_FORK_01	Alkali Creek to mouth	R4	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance Total Dissolved Solids		5	YES - D**
			Irrigation Waters	NON	Sodium Adsorption Ratio (SAR) Specific Conductance	Natural Sources		
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
Thunder Butte Creek SD-MU-R-THUNDER_BUTTE_01	Headwaters to mouth	R5	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	FULL				

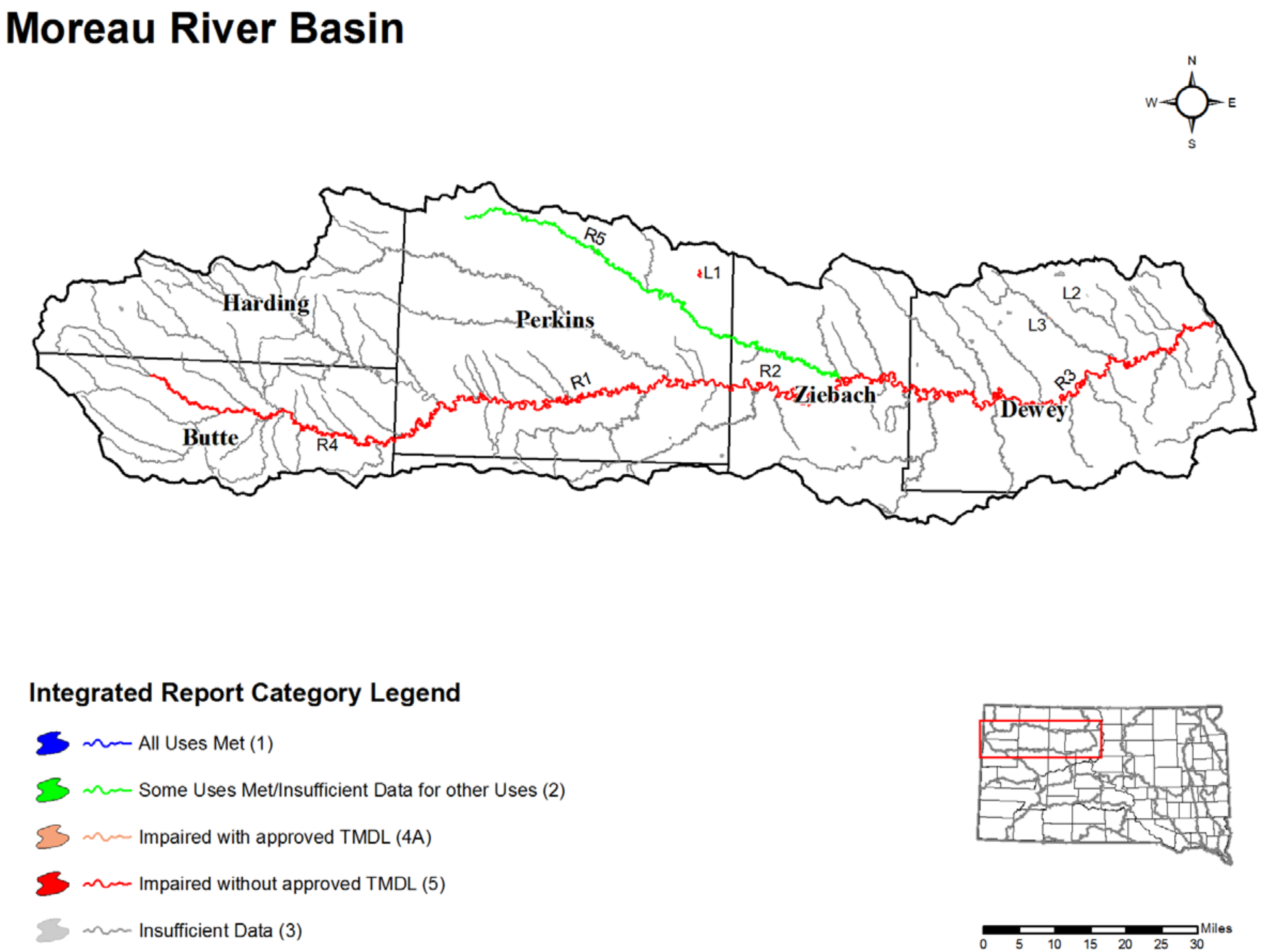

Figure 21: Moreau River Basin

Niobrara River Basin (Figure 22, Table 42)

The tributaries of the Niobrara basin that lie in South Dakota are located in the very south-central part of the state. These tributaries include the Keya Paha River and Minnechaduza Creek. These streams drain approximately 1,742 square miles in South Dakota. Agriculture is the leading source of income to the basin.

DENR has assessed Rahn Dam and maintains one water quality monitoring site on the Keya Paha River. USGS maintains a monitoring site on Antelope Creek, however there is an insufficient amount of data available to determine waterbody support.

The Keya Paha River originates at the confluence with Antelope Creek in the Rosebud Indian Reservation. The river flows in a south-east direction and exits the state east of Wewela, South Dakota. The river is not supporting its designated uses due to TSS, fecal coliform, and *E. coli* bacteria. Land use along the Keya Paha River is primarily agriculture. Livestock grazing in the riparian or shoreline areas has been identified as the primary source of bacteria. There are no point source discharges to the Keya Paha River. A TMDL has been approved for the Keya Paha River to address the contaminants.

A portion of the Lewis and Clark Watershed (Missouri River Basin) is located in the Niobrara basin. Implementation efforts in the Lewis and Clark Watershed are being conducted under the South Central Watershed Implementation Project which also encompasses the Lower James River Watershed.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 42: Niobrara River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Rahn Lake SD-NI-L-RAHN_01	Tripp County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Antelope Creek SD-NI-R-ANTELOPE_01_USGS	Near Mission, SD	R1	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	INS				
Keya Paha River SD-NI-R-KEYA_PAHA_01	SD/NE border to confluence with Antelope Creek	R2	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform	Grazing in Riparian or Shoreline Zones		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			

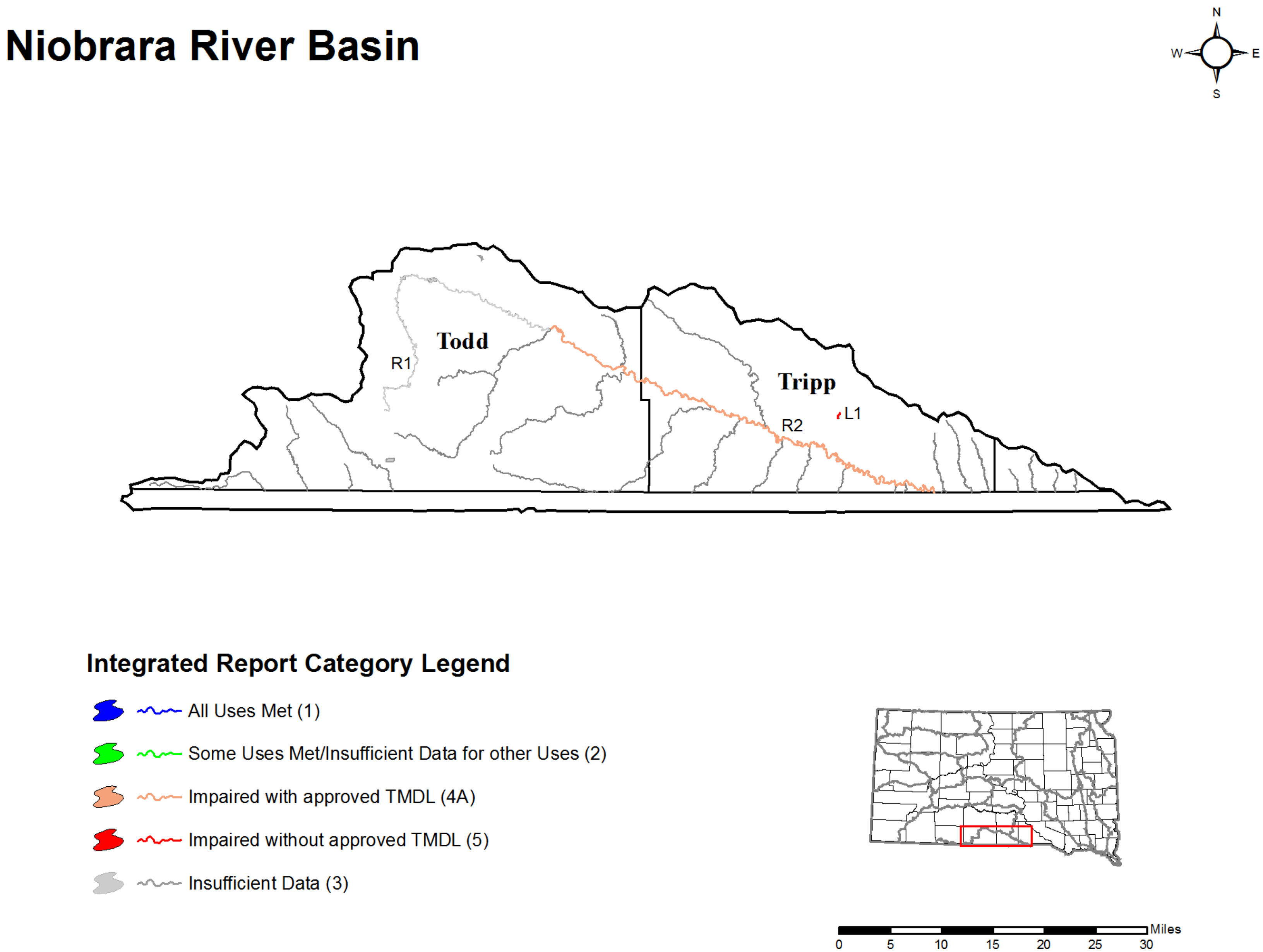

Figure 22: Niobrara River Basin

Red River Basin (Figure 23, Table 43)

The Red River basin covers the extreme northeastern corner of the state. The tributaries of the Red River that are in South Dakota drain a total of 627 square miles. Agriculture is the leading economic industry in the basin.

DENR has assessed two lakes and does not maintain any water quality monitoring sites in the Red River basin.

There are no on-going assessment or implementation projects occurring within the Red River basin at this time.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 43: Red River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Lake Traverse SD-RD-L-TRAVERSE_01	Roberts County	L1	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	FULL FULL FULL FULL FULL			1	NO
White Lake SD-RD-L-WHITE_01	Marshall County	L2	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	FULL NON NON NON	 Chlorophyll-a Chlorophyll-a Chlorophyll-a		4A*	NO

Red River Basin

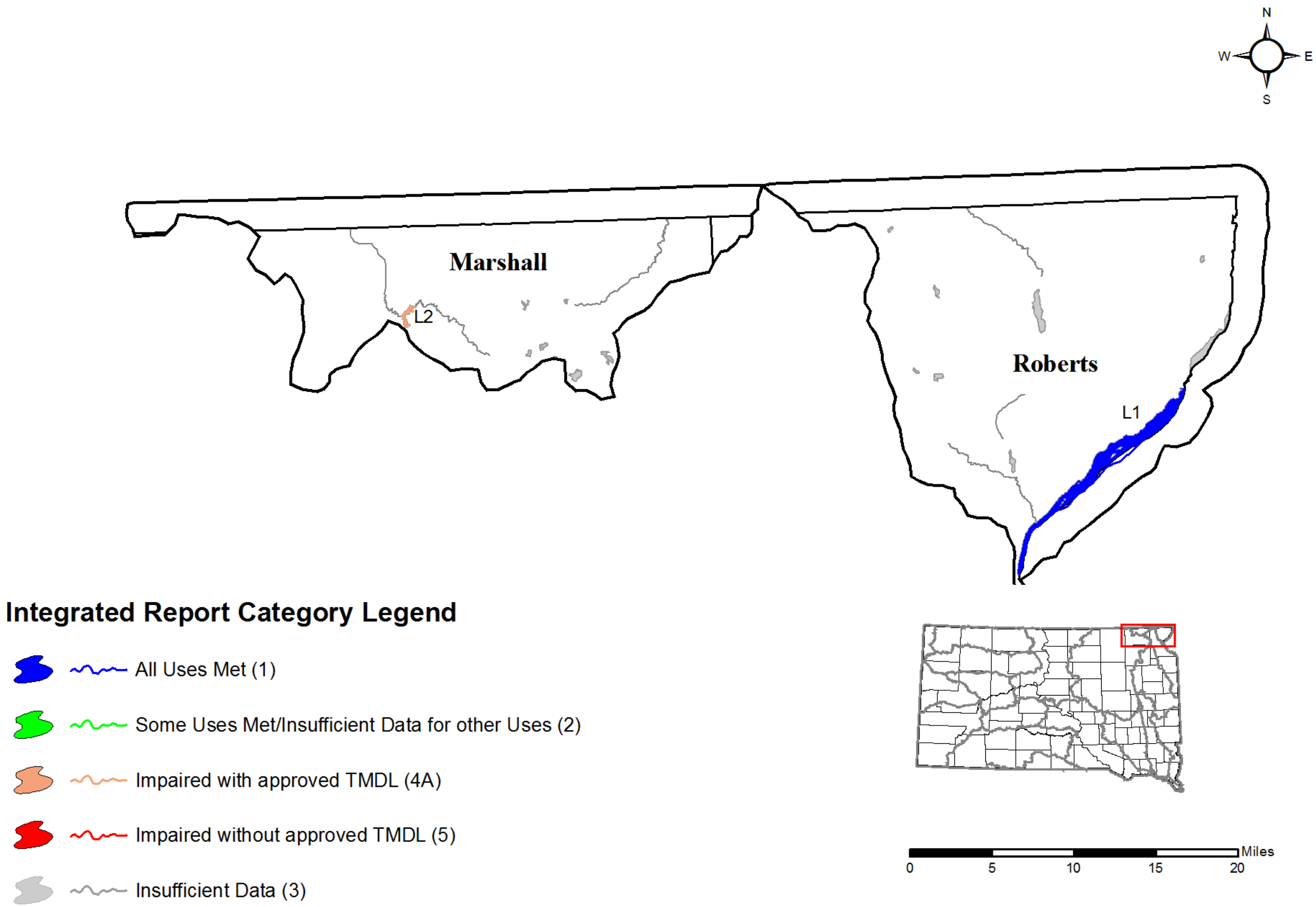

Figure 23: Red River Basin

Vermillion River Basin (Figure 24, Table 44)

The Vermillion River basin covers an area of 2,673 square miles in southeastern South Dakota. The basin is about 150 miles in length and varies in width from 12 miles in the north to 36 miles in the south. Much of the lower 22 miles of the river basin is channelized. Streams in the Vermillion River basin drain to the Vermillion River, which drains to the Missouri River near Vermillion, South Dakota. Agriculture is the leading source of income in the basin. It is estimated that 96% of the total surface area is devoted to agriculture. The remaining areas include municipalities, sand and gravel operations, and other uses.

DENR has assessed seven lakes and maintains five water quality monitoring sites within this basin. Three of the five monitoring sites are located on the Vermillion River and the other two are located on the East Fork Vermillion River.

The USGS has water quality monitoring sites in the basin including sites on the Little Vermillion River, the Vermillion River, East Fork Vermillion River, and West Fork Vermillion River. The data are limited and the only parameters measured were specific conductance and water temperature.

Two assessment units on the East Fork Vermillion River were assessed for nutrient-related narrative standards. The average phosphorus concentration of both assessment units exceeded the threshold. A full support determination was given to the lower segment, (SD-VM-R-VERMILLION_E_FORK_02), because fish and macroinvertebrate IBI scores were above the threshold. The upper segment, (SD-VM-R-VERMILLION_E_FORK_01), was placed in category 2N during the 2014 reporting cycle. DENR conducted a 2N bioassessment during the 2014 field season to obtain fish, macroinvertebrate and habitat data to calculate IBI and HCI scores to complete the use assessment. The IBI and HCI scores were considered borderline to the thresholds and VERMILLION_E_FORK_01 was placed back in category 2N to indicate a reassessment is warranted. Results of the reassessment will be used to make a use support determination in a subsequent reporting cycle.

The upper reach of the Vermillion River is fully supporting all designated beneficial uses. The two lower reaches are nonsupporting due to exceedances of TSS. Row crops account for approximately 73% land use in the lower segments. Sediment sources are overland runoff from nearby croplands and feedlots, inflow from tributaries, and streambank erosion. There are approved TSS TMDLs for the two lower reaches of the Vermillion River.

DENR recently adopted EPA's water quality standard of 0.3 mg/kg for methylmercury in fish tissue. As a result, four waterbodies in the Vermillion River basin are considered nonsupporting the aquatic life uses for mercury in fish tissue.

A water quality improvement project is planned for a 12 digit hydrologic unit watershed within the impaired segment of the West Fork Vermillion River (SD-VM-R-VERMILLION_WEST_FORK_01_USGS). The project is designed to focus implementation efforts at a smaller scale. Baseline bacteria monitoring will be conducted before and during BMP implementation to document bacteria reduction within the 12 digit hydrologic unit watershed.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 44: Vermillion River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
East Vermillion Lake SD-VM-L-E_VERMILLION_01	McCook County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue Temperature, water			
Lake Henry SD-VM-L-HENRY_01	Kingsbury County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			
Marindahl Lake SD-VM-L-MARINDAHL_01	Yankton County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			Immersion Recreation	NA				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	FULL				
Silver Lake SD-VM-L-SILVER_01	Hutchinson County	L4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	pH (high)			
Swan Lake SD-VM-L-SWAN_01	Turner County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			1*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Lake Thompson SD-VM-L-THOMPSON_01	Kingsbury County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*	YES - 2
			Immersion Recreation	NON	Chlorophyll-a			
			Limited Contact Recreation	NON	Chlorophyll-a			
			Warmwater Permanent Fish Life	NON	Chlorophyll-a Mercury in Fish Tissue			
Whitewood Lake SD-VM-L-WHITEWOOD_01	Kingsbury County	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*	NO
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Camp Creek SD-VM-R-CAMP_01	Vermillion River to S6, T99N, R52W	R1	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	INS				
			Warmwater Marginal Fish Life	INS				
Little Vermillion River SD-VM-R-LITTLE_VERMILLION_01_USGS	Near Salem, SD	R2	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
Long Creek SD-VM-R-LONG_01	Vermillion River to Hwy 34	R3	Fish/Wildlife Prop, Rec, Stock	INS			5	YES - 1
			Irrigation Waters	INS				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform	Livestock (Grazing or Feeding Operations)		
			Warmwater Semipermanent Fish Life	INS				

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Vermillion River SD-VM-R-VERMILLION_01	Headwaters to Turkey Ridge Creek	R4	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
Vermillion River SD-VM-R-VERMILLION_02	Turkey Ridge Creek to Baptist Creek	R5	Fish/Wildlife Prop, Rec, Stock	FULL			4A*	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Vermillion River SD-VM-R-VERMILLION_03	Baptist Creek to mouth	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Livestock (Grazing or Feeding Operations) Grazing in Riparian or Shoreline Zones Crop Production (Crop Land or Dry Land)		
East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_01	McCook/Lake County line to Little Vermillion River	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5*	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	FULL				
East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_02	Little Vermillion River to mouth	R8	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Marginal Fish Life	FULL				
West Fork Vermillion River SD-VM-R-VERMILLION_WEST_FORK_01_USGS	Vermillion River to McCook-Miner County Line	R9	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Marginal Fish Life	INS				

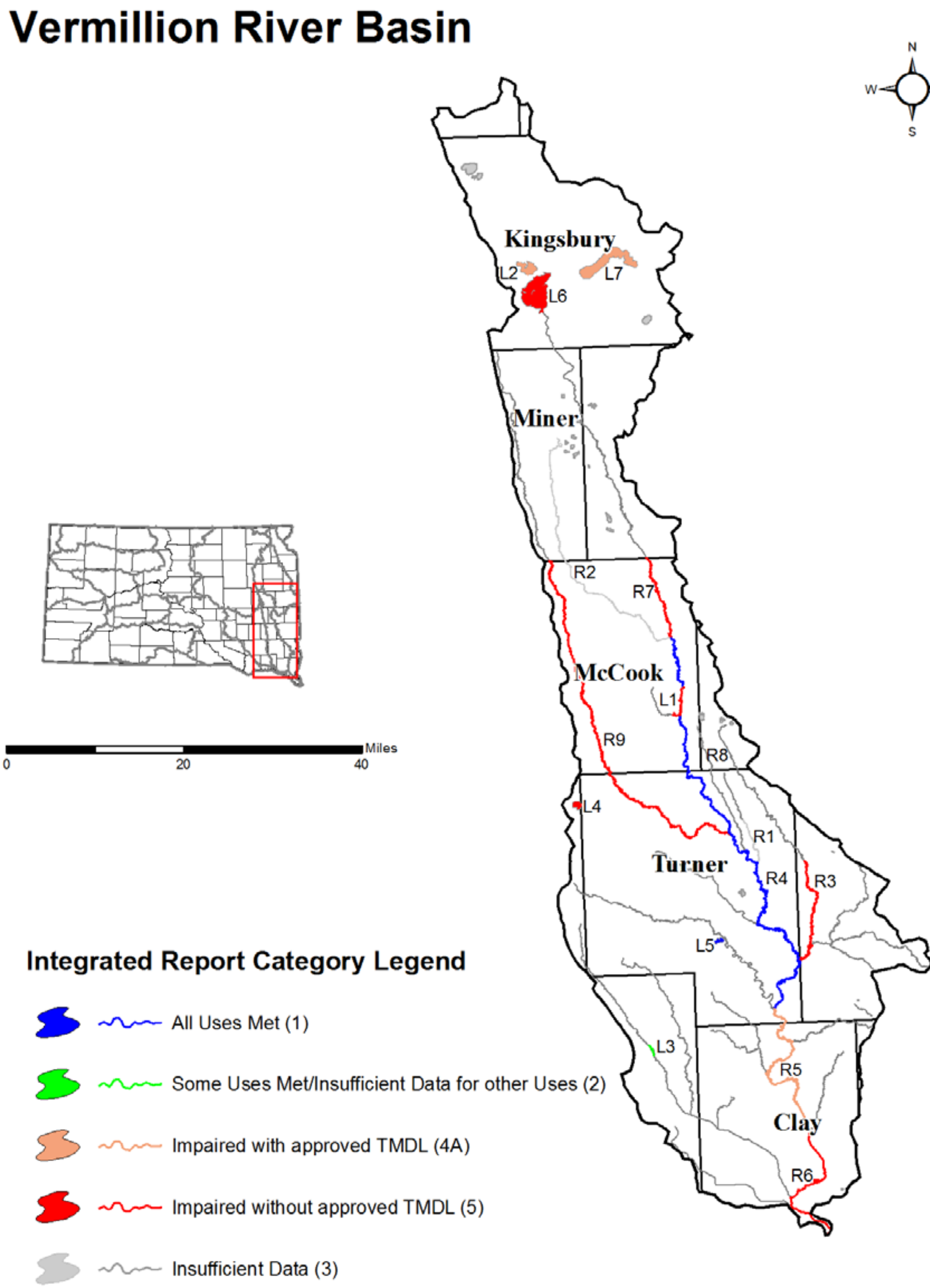

Figure 24: Vermillion River Basin

White River Basin (Figure 25, Table 45)

The White River basin is the most southern of the five major drainages in South Dakota that enters the Missouri River from the west. The total drainage area of the basin in the state is 8,246 square miles. Agriculture dominates the basin's economy, with the majority of the land used as rangeland or cropland.

DENR has assessed one lake in the White River basin and maintains five water quality monitoring sites within this basin. Four monitoring sites are located on the White River and the other is located on the Little White River.

The USGS has water quality monitoring sites in the basin, including sites on the White River, Little White River, Black Pipe Creek, Lake Creek and others. The data are limited, and the only parameters that were measured were specific conductance and water temperature.

DENR continues to sample uranium, and other parameters associated with uranium mining, at an ambient monitoring location on the White River near Oglala. This location was selected due to in-situ uranium mining upstream in Nebraska and the naturally occurring uranium in the highly erodible soils in the White River basin. Support determinations were based on all parameters; however, there were no surface water quality exceedances for uranium or other parameters associated with uranium mining.

The White River basin receives the majority of the runoff and drainage from the western Badlands. The exposed Badlands are a major natural source of both suspended and dissolved solids to the river. Severe erosion and leaching of soils occurs in the Badlands and throughout the entire length of the basin. Site specific water quality standards for TSS were established by DENR in 2009 for the White River and Little White River; however, the reach SD-WH-R-WHITE_03 is not meeting the site specific TSS standard during this 2016 Integrated Report cycle. The White River is listed as impaired for SAR, fecal coliform, and *E. coli*.

Assessment projects have been completed for the White River, Little White River, and Cottonwood Creek watersheds. There are currently no on-going implementation projects in the White River basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

Table 45: White River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
Allan Dam SD-WH-L-ALLAN_DAM_01	Bennett County	L1	Coldwater Marginal Fish Life	NON	pH (high)		5	YES - 2
			Fish/Wildlife Prop, Rec, Stock	FULL				
			Immersion Recreation	FULL				
			Limited Contact Recreation	FULL				
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA Category**	**ON 303(d) & Priority**
Black Pipe Creek SD-WH-R-BLACKPIPE_01_USGS	S25, T42N, R33W to White River	R1	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				
Cottonwood Creek SD-WH-R-COTTONWOOD_01	Headwaters to White River	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	NON	Specific Conductance			
Lake Creek SD-WH-R-LAKE_01_USGS	Above and below refuge near Tuthill, SD	R3	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	INS				
Little White River SD-WH-R-LITTLE_WHITE_01	Rosebud Creek to mouth	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Semipermanent Fish Life	FULL				
Little White River SD-WH-R-LITTLE_WHITE_02_USGS	S6, T36N, R39W to Rosebud Creek	R5	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Semipermanent Fish Life	INS				
White River SD-WH-R-WHITE_01	NE/SD border to Willow Creek	R6	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			Irrigation Waters	FULL				
			Limited Contact Recreation	FULL				
			Warmwater Semipermanent Fish Life	FULL				
White River SD-WH-R-WHITE_02	Willow Creek to Pass Creek	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	NON	Salinity (SAR)			
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform	Wildlife Other than Waterfowl Livestock (Grazing or Feeding Operations)		
			Warmwater Semipermanent Fish Life	FULL				
White River SD-WH-R-WHITE_03	Pass Creek to Little White River	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 2
			Irrigation Waters	NON	Salinity (SAR)			
			Limited Contact Recreation	NON	*Escherichia coli* Fecal Coliform			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A. D**- TMDL development in Discussions with EPA.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category	ON 303(d) & Priority
White River	Little White River to confluence with Missouri River	R9	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES - 1
			Irrigation Waters	FULL				
			Limited Contact Recreation	NON	*Escherichia coli*			
SD-WH-R-WHITE_04					Fecal Coliform	Wildlife Other than Waterfowl Natural Sources Livestock (Grazing or Feeding Operations) Crop Production (Crop Land or Dry Land)		
			Warmwater Semipermanent Fish Life	FULL				
White Clay Creek	White Clay Lake to Oglala Lake	R10	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-WH-R-WHITECLAY_01_USGS			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Permanent Fish Life	INS				
Wounded Knee Creek	Spring Creek to White River	R11	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-WH-R-WOUNDEDKNEE_01_USGS			Irrigation Waters	INS				
			Limited Contact Recreation	NA				
			Warmwater Marginal Fish Life	INS				

White River Basin

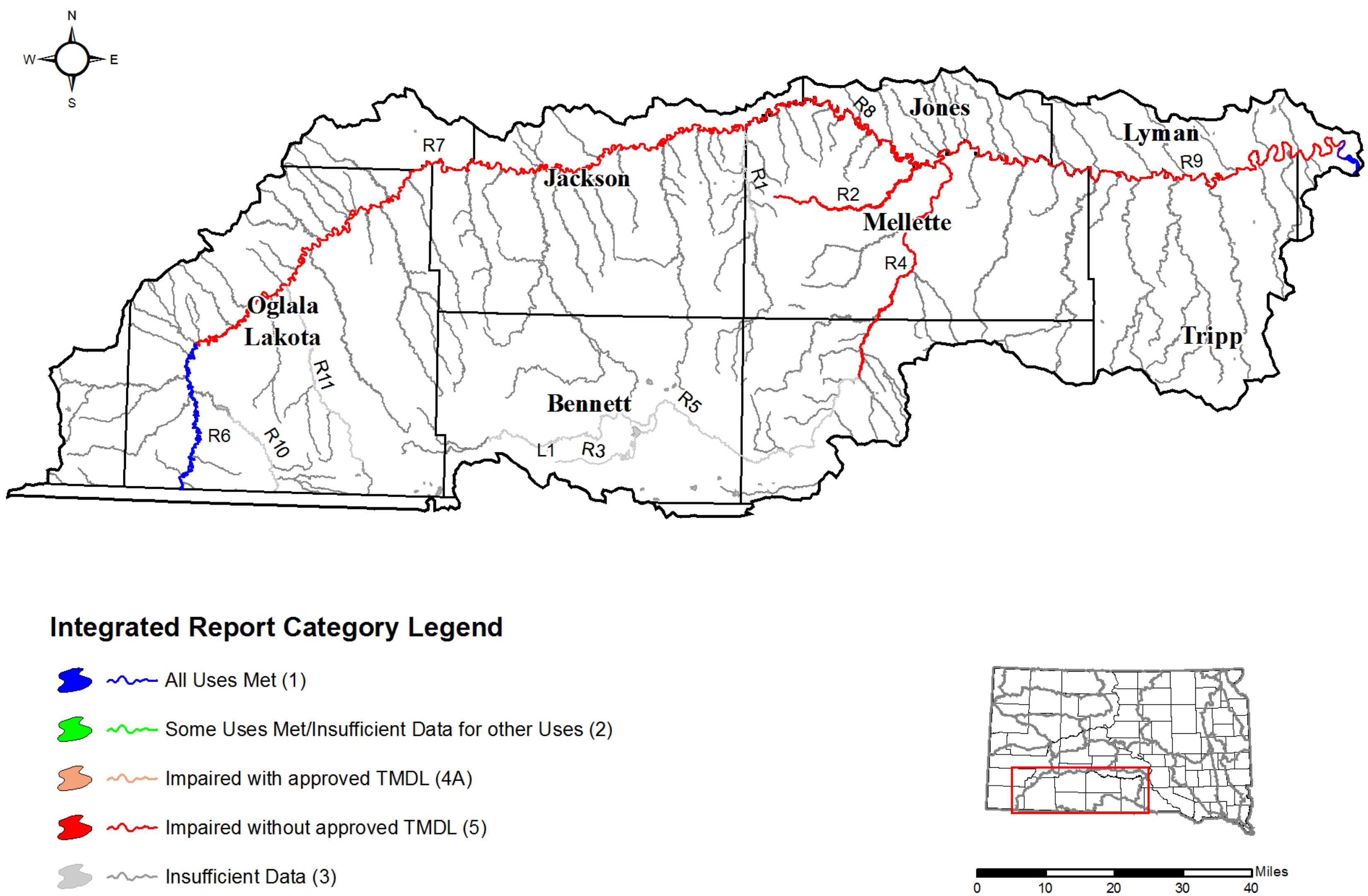

Figure 25: White River Basin

WETLANDS

Wetlands are a common feature in the glaciated prairie pothole region of eastern South Dakota (Figure 26). These systems are commonly considered a nuisance with regards to agricultural production and travel (Johnson and Higgins 1997). Upon settlement (1800s), wetland drainage became a common practice across the glaciated plains of eastern South Dakota. Considerable advances were made in the 1940s and 1950s to drain wetlands for increased agricultural production. Several government agencies, including the USDA, once promoted wetland drainage as a responsible land use practice (Johnson and Higgins 1997). As a result, an estimated 35% of the natural wetland area in South Dakota prior to European settlement has been destroyed by human modification (Dahl 1990). Today, federal legislation and other programs have since decreased the rate of natural wetland destruction in South Dakota (Johnson and Higgins 1997).

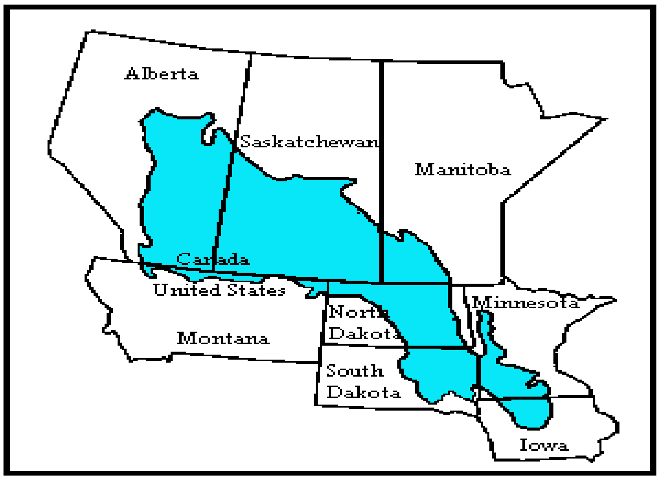

Figure 26: Map Depicting Prairie Pothole Region

Wetland resources across the Prairie Pothole Region (PPR) of eastern South Dakota provide many ecological services (Rickerl et al. 2000). Wetlands provide hydrologic services such as water and nutrient storage and flood relief. They also enhance waterfowl production and promote biodiversity. Growing awareness of the importance of wetlands prompted the U.S. Fish and Wildlife Service (USFWS) in 1974 to conduct an inventory of U.S. wetlands, also known as the National Wetlands Inventory. The Cowardin et al. (1979), classification system was adopted by the USFWS to classify wetlands based on hydrologic, geomorphologic, biologic, and chemical characteristics. The National Wetlands Inventory provides valuable documentation regarding identity, extent, characteristics and distribution of wetland resources in the PPR.

The PPR of eastern South Dakota had an estimated 1,780,859 acres of wetlands with shallow water habitat in the early to middle 1990's (Johnson and Higgins 1997). By 2009, South Dakota had an estimated 1,870,790 acres of shallow water wetlands (Dahl 2014). The total number of wetlands in South Dakota declined by 2.8% from 1997 to 2009 (Dahl, 2014). Small temporary wetlands comprised the primary type of emergent wetland loss. South Dakota did exhibit gains in all other emergent wetland classes especially larger seasonal and semipermant classes between 1997 and 2009. This implies that the overall wetland area in South Dakota increased from the early to middle 1990s to 2009, which is consistent with the wetland area estimates provided by Johnson and Higgins (1997) and

Dahl (2014). The wetland acreage estimates provided by Dahl (2014) represent the most recent documentation of wetland extent available for South Dakota.

The general loss of small temporary wetlands and gain in larger seasonal and semipermanent wetlands can be attributed to agricultural drainage practices. Portions of eastern South Dakota lack open channel ditch networks to convey water from wetland depressions in agricultural fields to riverine systems. Drainage from small temporary wetlands is often conveyed by drain tile networks to downstream basins contributing to the increase in seasonal or semipermanent wetland habitats. The general loss of temporary wetlands and overall increase in acreage of seasonal and semi-permanent is likely the present trend.

DENR defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (ARSD Chapter 74:51:01:01(68)). Wetlands are designated the beneficial use of fish and wildlife propagation, recreation and stock watering, which provides protection under existing narrative and numeric water quality standards. The USACE is responsible for the control of activities that place fill in wetlands. The USACE authority stems from Section 404 of the CWA. For purposes of Federal 404 identification and delineation, wetlands must have each of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly hydric soil, and (3) the substrate is saturated with water or covered by shallow water at some time during the growing season of each year. Before exercising its authority on a particular action, the USACE issues a public notice, taking into consideration the comments of the EPA, GF&P, DENR, and other resource agencies. Construction projects involving wetlands must receive certification from DENR under Section 401 of the CWA to certify the action will not violate South Dakota Surface Water Quality Standards. DENR regulates the discharge of pollutants to wetlands under the Surface Water Discharge permitting program.

The USFWS and private entities, such as Ducks Unlimited, work to protect and preserve wetland resources in South Dakota. An estimated 700 US Fish and Wildlife Service Waterfowl Production Areas (WPAs) covering about 183,000 acres of uplands and wetlands were purchased in South Dakota by 1994 (Johnson and Higgins 1997). The USFWS has also obtained easements on an estimated 613,000 acres of eastern South Dakota wetlands through 1994. Approximately 51,000 acres of wetlands are currently owned by GF&P and managed as State Game Production Areas and Public Shooting Areas. Many of these aforementioned entities continue to purchase, obtain easements and manage wetland habitats for the purpose of preservation.

Despite regulatory programs and other protective measures, human impacts on wetland environments (i.e. agriculture) can limit a wetland's ability to provide ecological services. EPA is encouraging states to develop monitoring and assessment tools to determine the ecological integrity of wetland environments. EPA currently promotes three approaches to wetland assessment. A Level-1 assessment is a landscape level screening process using GIS technology and other geo-database information systems to evaluate potential impacts to wetland environments. Level-2 assessments incorporate Level-1 information and rapid, on-site evaluations of wetland attributes for comparison among wetlands. Level-3 assessments require a more rigorous and comprehensive physiochemical and biological assessment of wetland resources.

The Natural Resource Management Department at SDSU, in cooperation with GF&P, developed a Level-1 and Level-2 wetland rapid assessment protocol for prairie pothole wetlands in eastern South Dakota. The assessment method was modified from a protocol developed by the South Florida Water Management District (Miller and Gunsalus 1999) for evaluating wetland condition. The South Dakota wetland rapid assessment protocol was developed for the state's Natural Heritage and Wildlife Habitat Programs (GF&P) for identifying reference wetlands, monitoring randomly selected sites, and evaluating wetland restoration efforts.

A Level-3 wetland assessment was developed within the Prairie Pothole Region of South Dakota. This Level-3 assessment focused on development of an Index of Plant Community Integrity (IPCI) originally developed to assess seasonal wetlands in the Prairie Pothole Region (DeKeyser et al. 2003). The IPCI was modified to evaluate the vegetative composition of wetlands across classification (temporary and semipermanent) and disturbance (native grass to cropland) gradients within the Northern Glaciated Plains and Northwestern Glaciated Plains ecoregions of South Dakota, North Dakota, and Montana. The IPCI method can be used in South Dakota to allow the placement of wetlands into disturbance classes for ecological and mitigation needs (Hargiss et al. 2007). During the course of the IPIC development in South Dakota, researchers noted that the ecological health of eastern South Dakota prairie pothole wetlands decrease from north to south. This was attributed to greater agricultural intensity in southeast South Dakota (Dekeyser, personal communication).

Wetland drainage using subsurface drain tile continues to be a popular agricultural practice in eastern South Dakota. Agricultural producers are motivated to drain small nuisance wetlands or wet pockets in fields to increase tillable acres. Producers enrolled in USDA programs are required to gain approval before engaging in wetland drainage practices. The NRCS conducts criteria-based wetland determinations to determine a wetland's eligibility for drainage. Wetland drainage is most prevalent in in the eastern tier counties of South Dakota.

Potential environmental impacts associated with wetland drainage have become topics of concern within the natural resource management community. The main concern involves the potential for increased nutrient transport and flow to downstream receiving waters. In addition, the loss of wetland habitat may be detrimental to wildlife, especially waterfowl and other birds that rely on these systems during migration. Because drainage activities primarily focus on small, isolated, non-navigable wetlands, most do not fall under CWA jurisdiction or any other federal protection. Drainage issues in South Dakota are extensive and therefore managed at the county or township level.

PUBLIC HEALTH/AQUATIC LIFE CONCERNS

The cost of routinely monitoring most toxic pollutants is prohibitive. At present, priority toxins (CWA Section 307(a) toxic pollutants) are routinely monitored at several WQM stream sites located near historic or current mining activities in the northern Black Hills. Ammonia, a priority toxin, is routinely monitored throughout the DENR ambient monitoring network.

Table 46: Total Size Affected by Toxics

WATERBODY	SIZE MONITORED FOR TOXICS*	SIZE WITH ELEVATED LEVELS OF TOXICS**
Rivers (miles)	5,500	2
Lakes (acres)	135,689	50

* Ammonia, cyanide, chlorine, and/or metals including arsenic.

** Elevated levels are defined as exceedances of state water quality standards, 304(a) criteria, and/or FDA action levels, or levels of concern (where numeric criteria do not exist).

Aquatic Life (Fish Kills)

There were 9 separate aquatic life concern incidents investigated from October 1, 2013, to September 30, 2015. The majority of these kills occurred during the summer of 2014. During that time high ambient air temperatures resulted in high water temperatures which caused stress and death to fish. There were two incidences of bacterial or viral infections causing stress and death to black bullheads and three incidences of decaying organic material causing low dissolved oxygen.

The USFWS *Field Manual for the Investigation of Fish Kills* offers the following guide for reporting fish kills:

Minor Kill:	Less than 100 fish
Moderate Kill:	100 to 1,000 fish in 1.6 km of stream or equivalent lentic area.
Major Kill:	More than 1,000 fish in 1.6 km of stream or equivalent lentic area.

By these standards, from October 1, 2013 to September 30, 2015, there were five minor fish kills, three moderate fish kills, and one major fish kill in South Dakota.

It is extremely important that the initial phases of an investigation be performed at the earliest indication of a fish kill. The need for such urgency is due to the fact that fish degrade rapidly, and the cause of death may become unidentifiable within a very short time. Unfortunately, DENR is often notified days after an incident has occurred. For this reason, the department is occasionally unable to positively identify the event that caused the fish kill.

DENR reviews the cause(s) of a fish kill, the waterbody's designated beneficial uses, and the water quality sample data to determine impairment. Marginal fisheries may experience frequent fish kills, while semipermanent fisheries may experience occasional fish kills due to natural environmental conditions. DENR would consider a waterbody as impaired due to a fish kill if water quality data suggest that the cause of impairment is related to human influence. However, a waterbody that experiences a fish kill due to a single occurrence spill and has been remediated, will not be listed as impaired. For this 2016 Integrated Report cycle, there were no waterbodies listed as impaired due to fish kills (Table 47).

Table 47: Summary of Fish Kill Investigations

Date	Waterbody	County	Species	Fish kill severity	Cause
01/28/2014	Military Dam - Ft Pierre Natl Grasslands	Stanley	all	moderate	winter kill
03/21/2014	Red Lake	Brule	common carp	minor	winterkill
04/24/2014	Pelican Lake	Codington	all	moderate	winterkill
05/27/2014	Lake Louise	Hand	black bullhead	moderate	bacterial or viral
05/27/2014	Flight Lake	Potter	Some birds and fish	minor	unknown
05/27/2014	Ash Creek	Clay	minnows and black bullhead	minor	low DO caused by decaying organic material
05/27/2014	Lake Madison	Lake	Black bullhead and bigmouth buffalo	minor	bacterial or viral
07/06/2015	Bixler Dam	Hughes	all	minor	low DO caused by decaying organic material
07/09/2015	Hayes Lake	Stanley	all	major	low DO caused by decaying organic material

Unsafe Beaches

During the 2010 legislative session, the legislature passed a bill which removed DENR's authority to regulate public beach closures. Additionally, effective April 15, 2013, Public Beach Standards, Chapter 74:04:08, was deleted from ARSD. Bacteria data collection and decisions related to public swimming beach closures became the responsibility of the particular management agency. DENR solicits water quality information including beach closure information from federal, state and local natural resource agencies during the department's request for data process. DENR will list a waterbody as impaired if three beach closures per season occur in a consecutive three-week sampling period. For the 2016 reporting period, there were no public beach closures reported to DENR and no waterbodies were listed as impaired due to beach closures.

Fish Consumption Advisories

During the years 2014 and 2015, the Surface Water Quality Program, in partnership with the South Dakota Department of Game, Fish, and Parks, and the South Dakota Department of Health sampled and analyzed fish from a variety of waterbodies. DENR has been collecting and actively studying fish flesh contaminant data since 1994. The purpose of this work is to determine the concentration of various contaminants in fish to protect public health. Waterbodies are selected for monitoring based on GF&F fishery management objections, public access, and fishing pressure. Subsequently, this data is also used to assess support of the surface water quality criterion of mercury in fish tissue. However not all waterbodies in this report have been assessed for mercury in fish tissue.

The Food and Drug Administration (FDA) has set 1.0 mg/kg total mercury as the action level for commercial fish. In South Dakota, the Department of Health is responsible for issuing fish consumption advisories and uses the FDA action level. For more information refer to the Department of Health website at http://doh.sd.gov/food/fish-advisories.aspx. DENR also assesses mercury in fish tissue but with the purpose of determining if the waterbody is supporting its beneficial uses.

Because fish consumption advisories are issued on waterbodies that exceed 1.0 mg/kg mercury in fish tissue FDA criterion and the DENR assesses waterbody support using the surface water quality criterion of 0.3 mg/kg mercury in fish tissue, there are waterbodies in this Integrated Report that are not meeting their designated uses due to mercury in fish tissue based on a water quality standard but may not have a fish consumption advisory. Although mercury in fish tissue is the common factor, public advice on fish consumption and waterbody beneficial use support are separate issues that are addressed by different state agencies. When determining that a waterbody is not meeting its beneficial uses due to the mercury in fish tissue water quality criterion, DENR does not have the authority to provide advice regarding the consumption of fish from those waterbodies. Waterbodies with fish consumption advisories and/or waterbodies that exceed the surface water quality criterion are considered nonsupporting. On March 1, 2016, the EPA approved a TMDL for mercury in fish tissue for many South Dakota waterbodies. Refer to Table 50 for specific fish consumption guidelines. In 2014 and 2015, fish were collected from a total of 26 different locations (Table 48):

Table 48: Waterbodies Sampled for Contaminants in Fish

Waterbody	County	Years Sampled
Angostura Reservoir	Fall River	2014, 2003, 1994
Clear Lake	Hamlin	2014
Hanson Lake	Hanson	2014
Hayes Lake	Stanley	2014, 2006
Hazeldon Lake	Day	2014
Lake Albert	Kingsbury	2014
Lake Henry	Kingsbury	2014
Lake Hiddenwood	Walworth	2014, 2004
Lake Kampeska	Codington	2014, 2005, 2001, 1994
Lake Oahe	Corson	2014, 2011, 2010, 2007, 2002, 2001, 1997
Lake Poinsett	Hamlin	2014, 2011, 2010, 1997
Lynn Lake	Day	2014, 2005, 2003, 2002, 2001
Richmond Dam	Brown	2014, 2004
Summit Lake	Grant	2014, 2006
Waggoner Lake	Haakon	2014, 2004
Waubay Lake	Day	2014, 2011, 2008, 2001, 2000, 1999, 1998
Whitewood Creek	Lawrence	2014, 2004, 1997
Brush Lake	Brookings	2015, 2011
Clubhouse Slough	Marshall	2015
Cottonwood Lake	Sully	2015, 2012, 1999
Lake Faulkton	Faulk	2015, 2010, 1999
Mina Lake (Lake Parmley)	Edmunds	2015, 2010, 1998
Richland Dam	Jones	2015
Sheriff Dam	Jones	2015
South Red Iron Lake	Marshall	2015, 2005
Stockade Lake	Custer	2015, 2010, 1998

Most mercury results are samples collected from individual fish using a nonlethal biopsy punch. PCB and pesticide results are composites of tissue from five fish. Initial fish analysis for each waterbody typically includes the parameters listed below. Following receipt and study of initial data, intensive sampling for specific parameters may be performed. A complete list of all lakes analyzed for fish contaminants is available at: http://denr.sd.gov/des/sw/fish.aspx. The parameters sampled are listed below (Table 49).

Table 49: Contaminants Analyzed in Fish Flesh

PCBs	Pesticides		
Total PCBs	DDT	Chlordane	Heptachlor Epoxide
	DDE	Dieldrin	Terbufos
Metals	DDD	Endosulfan I	Toxaphene
Total Cadmium	BHC-alpha	Endosulfan II	
Total Selenium	BHC-beta	Endrin	
Total Mercury	BHC-gamma	Hexachlorobenzene	

Table 50: Waterbodies Affected by Fish and Shellfish Consumption Advisories

Waterbody	Pollutant	Size Affected (acres)	Type of Consumption Advisory			
			Non Consumption		Limited Consumption	
			General Population	Sub-Population	General Population	Sub-Population
Bitter Lake (Day)	mercury	3,142	-	-	1	1
Lake Hurley (Potter)	mercury	106	-	-	1	1
Lake Isabel (Dewey)	mercury	113	-	-	1	1
Roosevelt Lake (Tripp)	mercury	94	-	-	1	1
Twin Lakes (Kingsbury/Brookings)	mercury	513	-	-	1	1
Elm Lake (Brown)	mercury	1,220	-	-	1	1
Swan Lake (Clark)	mercury	1,928	-	-	1	1
Long Lake (Codington)	mercury	1,226	-	-	1	1
Lardy Lake (Day)	mercury	479	-	-	1	1
Lake Minnewasta (Day)	mercury	585	-	-	1	1
Middle Lynn Lake (Day)	mercury	435	-	-	1	1
Reid Lake (Clark)	mercury	1,660	-	-	1	1
Opitz Lake (Day)	mercury	1,799	-	-	1	1
Coal Springs Reservoir (Perkins)	mercury	91	-	-	1	1
North Island Lake (Minnehaha & McCook)	mercury	282	-	-	1	1
Pudwell Dam (Corson)	mercury	105	-	-	1	1
Newell Lake (Butte)	mercury	154	-	-	1	1
Twin Lakes (Minnehaha)	mercury	150	-	-	1	1
Hazeldon Lake (Day)	mercury	319	-	-	1	1
Lynn Lake (Day)	mercury	57	-	-	1	1
Consumption Guidelines	Adults should eat no more than 7 ounces of fish per week.		Women who plan to become pregnant, are pregnant, or are breast-feeding, should eat no more than 7 ounces per month.			Children under age 7 should eat no more than 4 ounces per month

Domestic Water Supply Restrictions

There are currently no water consumption restrictions on waterbodies with the domestic water supply beneficial use designation. However, the James River (James River Diversion Dam to Huron 3rd Street Dam), Firesteel Creek, and Lake Mitchell are listed as not supporting the domestic water supply beneficial use. The James River reach is no longer used as a public water source; and Firesteel Creek and Lake Mitchell are only used as an emergency backup for the City of Mitchell. The following tables contain information on reach descriptions and pollutant causes.

Table 51: Waterbodies Affected by Domestic Water Supply Restrictions

Name of Waterbody	Waterbody Type	Type of Restriction			Cause(s) (Pollutant(s)) of Concern	Source(s) of Pollutants
		Closure[a] (Y/N)	Advisory[b] (Y/N)	Other (explain)		
None	-	-	-	-	-	-

[a]Closures- restrict all consumption from a domestic water supply.
[b]Advisories- require that consumers disinfect water (through boiling or chemical treatment before ingestions).

Table 52: Summary of Waterbodies Not Fully Supporting Domestic Water Supply Use

Waterbodies	AUID	Location	Characterization	Cause(s)
River and Streams				
James River	SD-JA-R-JAMES_07	James River Diversion Dam to Huron 3rd Street Dam	Not Supporting	Total Dissolved Solids
Firesteel Creek	SD-JA-R-FIRESTEEL_01	West Fork Firesteel Creek to mouth	Not Supporting	Total Dissolved Solids
Lakes and Reservoirs				
None	Lake Mitchell	Davison County	Not Supporting	Chlorophyll-*a*

Table 53: Summary of Domestic Water Supply Use Assessments for Streams

Total Miles Designated for Domestic Water Supply Use_1,824_

Total Miles Assessed for Domestic Water Supply Use_912_

				Cause
Miles Fully Supporting Domestic Water Supply Use	852	% Fully Supporting Domestic Water Supply Use	93%	
Miles Fully Supporting but Vulnerable For Domestic Water Supply Use	-	% Fully Supporting but Vulnerable for Domestic Water Supply Use	-	
Miles Not Supporting Domestic Water Supply Use	60	% Not Supporting Domestic Water Supply Use	7%	Total Dissolved Solids
Total Miles Assessed for Domestic Water Supply Use	912			

Table 54: Summary of Domestic Water Supply Use Assessment for Lakes

Total Waterbody Acreage designated for Domestic Water Supply Use_8,410_

Total Waterbody Acreage Assessed for Domestic Water Supply Use_7,979_

				Cause
Acres Fully Supporting Domestic Water Supply Use	7,227	% Fully Supporting Domestic Water Supply Use	91%	
Acres Fully Supporting but Vulnerable For Domestic Water Supply Use	-	% Fully Supporting but Vulnerable for Domestic Water Supply Use	-	
Acres Not Supporting Domestic Water Supply Use	701	% Not Supporting Domestic Water Supply Use	9%	-
Total Acres Assessed for Domestic Water Supply Use	7,928			

IV. POLLUTION CONTROL PROGRAMS

POINT SOURCE POLLUTION CONTROL PROGRAM

The state received delegation of the federal National Pollutant Discharge Elimination System (NPDES) program from the United States Environmental Protection Agency (EPA) on December 30, 1993. The NPDES permits issued by the state are referred to as Surface Water Discharge (SWD) permits. EPA continues to issue NPDES permits in South Dakota for facilities over which they retained jurisdiction. As of September 30, 2015, the state has issued a total of 268 individual SWD permits in South Dakota. In addition, DENR has issued coverage to 2,811 facilities under General Storm Water permits, 112 facilities under Multi-Media General permits (Storm Water & Air Quality), and 872 facilities under other General permits. DENR has also issued 25 biosolids-only permits.

Technology-based controls are placed in most SWD and NPDES permits. However, technology-based controls alone do not necessarily protect waters of the state from toxic pollutants. Therefore, water quality-based limits and toxicity testing requirements are also placed in many of the permits.

Water quality-based limits are developed when technology-based limits alone are not adequate to protect the beneficial uses of the receiving stream. In these cases, the state develops water quality-based effluent limits to ensure the surface water quality standards are met and maintained.

The state continues to require whole effluent toxicity testing for all major SWD permitees and certain significant minors. The goal of the whole effluent toxicity approach is to ensure that point source discharges do not contain toxics in toxic amounts. If toxicity is found, the discharger is required to conduct an evaluation of the discharge to determine the source of the toxicity and eliminate the toxicity.

The South Dakota Surface Water Quality Standards contain the following provision concerning discharges to lakes:

> ***ARSD 74:51:01:27. Lakes not allowed a zone of mixing.*** *No zone of mixing is allowed for lakes. Discharges to lakes must meet the water quality standards at the point of discharge. No discharge of pollutants is allowed which reaches a lake classified for the beneficial use of coldwater permanent, coldwater marginal, warmwater permanent, warmwater semipermanent, or warmwater marginal fish life propagation or causes impairment of an assigned beneficial use.*

DENR's Surface Water Discharge permitting program regulates the discharge of pollutants from point sources. In most cases, DENR has not allowed discharges to lakes classified for the fish life propagation uses outlined in ARSD Chapter 74:51:01:27. There have been only limited exceptions to this provision.

Many of South Dakota's streams eventually drain into classified lakes. If a point source discharges into a tributary of a lake, DENR takes into account the distance from the lake and the natural attenuation of any pollutants present before the discharge is permitted. During the reissuance of each of these permits, DENR re-evaluates these discharges. If DENR determines that a discharge has a potential to impact a classified lake, DENR has required the point source to cease its discharge to the classified lake. DENR has permitted discharges of uncontaminated water to lakes (i.e. non-contact cooling water).

To date, this approach has protected South Dakota's lakes and has not caused or contributed to a violation of the surface water quality standards from a point source discharge.

To help ensure that wastewater collection and treatment systems in the state are in compliance, the department provides cost share funding for their planning, design, and construction. The department administers the Clean Water State Revolving Fund (CWSRF) Loan Program which provides low interest loans to publicly owned wastewater facilities. The department's CWSRF Intended Use Plan establishes the criteria the department uses for fund awards. The Intended Use Plan can be accessed at:

http://denr.sd.gov/dfta/wwf/cwsrf/16cwsrfiup.pdf

Between October 1, 2013, and September 30, 2015, the department's Board of Water and Natural Resources awarded 43 CWSRF loans totaling $80,313,857. Portions of five of the awards were provided as additional subsidy in the form of principal forgiveness. The principal forgiveness totaled $3,007,500. These funds were used for the design and construction of sanitary sewer collection systems, wastewater treatment facilities, storm sewers, and landfill construction associated with the protection of groundwater.

The current CWSRF interest rates are 2.25% for loans with a term of 10 years or less, 3.0% for loans with a term greater than 10 years up to 20 years, and 3.25% for loans with a term greater than 20 years up to a maximum of 30 years. There is also a nonpoint source incentive loan rate for communities that are sponsoring a nonpoint source implementation project. The loan rate for these projects ranges from 1.25% for up to 10 years and 2.0% for up to 20 years.

CWSRF administrative surcharge fees have been used to provide grant assistance for various clean water activities. To encourage responsible and proactive engineering planning, the Board uses CWSRF administrative surcharge funds to cost share engineering planning studies for small communities (2,500 population and below). Between October 1, 2013, and September 30, 2015, the department awarded a total of $170,080 for 18 engineering studies. The Board awarded $1,507,000 for the construction of three wastewater improvement projects and $462,453 for six nonpoint source implementation projects.

South Dakota has a state water planning process that was established in 1972. This establishes an orderly planning process for water development. In addition, the state established a dedicated water funding program in 1993. The dedicated funding sources provide approximately $9.5 million annually. Between October 1, 2013, and September 30, 2015, $13,903,876 in state grants were awarded to 23 wastewater collection or treatment and storm water projects. Additionally, $275,000 in state grants were awarded to provide nonfederal cost share for two Section 319 nonpoint source implementation projects.

COST/BENEFIT ASSESSMENT

DENR provides the Governor and Legislature with annual reports summarizing water and wastewater development activities for the preceding calendar year. The 2014 and 2015 annual reports can be accessed at:

http://denr.sd.gov/documents.aspx#Funding

Information on operation and maintenance costs for local units of government is not readily available. Not all benefit data are readily available, but some information has been included in the Statewide Surface Water Quality Summary section of this report.

NONPOINT SOURCE POLLUTION CONTROL PROGRAM

South Dakota's nonpoint source pollution management activities are implemented through the South Dakota Nonpoint Source Pollution Management Program. The primary focus of the program is the control of nonpoint source pollution through the use of voluntary implementation of best management practices (BMPs) and holistic resource management plans. The major sources of NPS pollution in South Dakota are summarized in Table 55.

The program coordinates its NPS control activities with local, state, and federal agencies and stakeholder organizations. These agencies and organizations provide BMPs and financial and technical assistance that increase the program's capacity to develop and implement NPS management projects.

The remainder of this section provides a summary that describes the South Dakota Nonpoint Source Pollution Management Program and the types of NPS projects that are being developed and implemented. Additional information concerning the program and projects may be obtained by consulting the South Dakota Nonpoint Source Management Program Plan and annual reports. Copies of these documents are available from the DENR, the South Dakota State Library, or by visiting:

http://denr.sd.gov/dfta/wp/wp.aspx

South Dakota Nonpoint Source Management Program

The South Dakota Nonpoint Source Pollution Management Program is housed in the DENR Watershed Protection Program (WPP). NPS pollution activities completed by program staff are selected to improve, restore, and maintain the water quality of the state's lakes, streams wetlands, and ground water in partnership with other agencies, organizations, and citizen groups.

Implementation of the NPS Pollution Management Program is guided by the South Dakota Nonpoint Source Management Plan. The most recent revision of South Dakota's NPS Management Plan was submitted to EPA in September 2014.

The NPS Management Plan:

- addresses the nine mandated elements required to access Section 319 funds;
- expands on activities included in previous editions of the plan; and

- continues to achieve improved water quality through voluntary actions developed in partnership with the landowners and managers.

The primary tools selected to accomplish the tasks outlined in the plan include:
- technical and financial assistance delivered through program staff and project partnerships; and
- a comprehensive information and education effort.

A copy of the management plan is available upon request or by visiting:

http://denr.sd.gov/dfta/wp/documents/NPSMgmtPlan14.pdf

A key element in implementing the South Dakota NPS Management Plan is the South Dakota Nonpoint Source Task Force. The task force is a citizen's advisory group composed of approximately 25 agencies, organizations, and tribal representatives. The task force:
- provides a forum for the exchange of information on activities that impact nonpoint source pollution control;
- prioritizes waterbodies for NPS control activities;
- provides guidance and application procedures for funding NPS control projects;
- reviews project applications;
- recommends projects to the South Dakota Board of Water and Natural Resources for funding approval;
- serves as the coordinating body for the review and direction of federal, state, and local government programs to ensure that the programs will achieve NPS pollution control efficiently;
- serves as a focal point for the information, education, and public awareness regarding NPS pollution control;
- provides oversight of NPS control activities and prioritize the activities; and
- provides a forum for discussion and resolution of program conflicts.

For additional information about the task force visit:

http://denr.sd.gov/dfta/wp/npstf.aspx

South Dakota Nonpoint Source Projects

Since the reauthorization of the CWA in 1987, the South Dakota NPS Pollution Management Program has used Section 319, 104(b)(3), 106, 604(b), Pollution Prevention, and state and local funding to support more than 266 NPS projects. During 2015, there were 14 active NPS projects. The total includes ten watershed/TMDL implementations, two statewide BMP planning technical assistance projects, one BMP research project, and one information and education project. The technical assistance projects provide watershed and TMDL development project sponsors with technical assistance for planning and arranging funding for livestock feeding and riparian management and other sediment and nutrient reduction BMP installation. In addition, TMDL development efforts not specifically associated with the aforementioned NPS sponsored projects are conducted by DENR program staff.

A list of the projects funded is contained in the South Dakota Nonpoint Source Management Program Annual Report. A copy of the report may be obtained from the South Dakota Department of Environment and Natural Resources, the South Dakota State Library, or by visiting:

http://denr.sd.gov/dfta/wp/npsannualreports.aspx

Project implementation plans, reports of project progress/results, and final reports for completed projects are available on the EPA Grants Reporting and Tracking System. Copies of final reports are also available by contacting DENR or the South Dakota State Library. Electronic copies of the final report for many of the more recently completed projects are available on the DENR web site or by visiting:

http://denr.sd.gov/dfta/wp/wqinfo.aspx

While the size, target audience, and structure of the projects vary; all share common elements:

- increase awareness of NPS pollution issues;
- identify, quantify, and locate sources of nonpoint source impairment;
- reduce or prevent the delivery of NPS pollutants to waters of the state with emphasis on meeting targets established through total maximum daily loads (TMDLs), and disseminate information about effective solutions to NPS pollution.

Although most of the projects fit into one of the following three categories: assessment/development, information and education, watershed implementation, most include components of each category.

Historically, the majority of the projects developed and implemented focused on reducing NPS pollution originating from agricultural operations. More recently, increased resources have been directed toward local initiatives that:

- evaluate water quality conditions;
- determine sources and causes of NPS pollution within priority watersheds; and
- develop and implement total maximum daily loads (TMDLs) for impaired waterbodies.

Waterbodies assessed are selected from those on the 303(d) list of impaired waterbodies. Activities included in implementation project work plans are selected to reach the TMDLs developed as part of the assessment process.

TMDLs are prepared as a part of an assessment project. Activities completed during an assessment project include an inventory of existing data and information and supplemental monitoring, as needed, to allow an accurate assessment of the watershed. Through these efforts, local project sponsors are able to:

- determine the extent to which beneficial uses are impaired;
- identify specific sources and causes of the impairments;
- establish preliminary pollutant reduction goals or TMDL endpoints; and
- identify management practices and alternatives that will reduce the pollution at its source(s) and restore or maintain the beneficial uses of the waterbody.

The project period for assessment/development projects generally ranges from one to three years.

Information and education projects are designed to provide information about NPS pollution issues and solutions. Information transfer tools typically used by the department and its project partners include brochures, print and electronic media, workshops, BMP implementation manuals, tours, exhibits, and demonstrations. Information and education projects usually range from one to five years in length. During recent years the NPS Program has:

- focused a portion of its information and education efforts on the development of BMPs to improve management of nutrients originating from livestock operations through a partnership with the academic community; and
- formed a partnership with the South Dakota Discovery Center for the implementation of the statewide information and education efforts that target a wider cross section of the state's population.

Watershed projects are the most comprehensive type of project implemented through the South Dakota NPS Pollution Management Program. Watershed projects are typically long term in duration and designed to implement TMDLs that address NPS pollution sources and beneficial use impairments identified during the completion of an assessment project. Common watershed project objectives include:

- protect/restore impaired beneficial uses through the promotion and voluntary implementation of best management practices (BMPs) that prevent/reduce NPS pollution;
- disseminate information about NPS pollution and effective solutions; and
- evaluate project progress toward use attainment or NPS pollutant reduction goals.

Watershed projects typically range from four to ten years in length with the duration being dependent on the size of the watershed and extent of the NPS pollution impacts that must be addressed.

Nonpoint Source Pollution Control Program Funding Strategy

DENR receives approximately $2.5 million Section 319 funds annually from EPA. Administrative costs total about $600,000. The remaining $1.9 million is made available for project awards. DENR attempts to package the funding for TMDL assessment and implementation projects using a variety of other department, state, federal, or private funding.

Other department funds used for cost share include department fee funds, 604(b) funds, 106 funds, Clean Water SRF administrative surcharge funds, and Clean Water SRF conventional loan funds.

State financial resources from other programs commonly used in implementing NPS projects include the Department of Agriculture's Soil and Water Conservation Grant funds, Game, Fish & Parks funds, and Water Development District funds. Private funds include wildlife groups and conservation organizations.

Other federal funding sources commonly used in completing NPS projects include U.S. Department of Agriculture's Environmental Quality Incentive Program, Conservation

Stewardship Program, Agricultural Conservation Easement Program, and Conservation Reserve Programs.

The implementation projects can be expensive. To ensure that timely progress is made, DENR typically awards funds for an initial two to three year implementation project. Subsequent segment are funded only if sufficient progress is made during the previous phase.

Implementation projects funded are typically designed to implement multiple TMDLs in a geographic or river basin area. This practice increases efficiency in the use of limited financial resources and provides the local sponsor and its partners with the opportunity to hire a more highly skilled project staff.

TMDL assessments in eastern South Dakota indicate bacteria and TSS reductions may be achieved through the implementation of a suite of BMPs. DENR limits Section 319 funding primarily to riparian area restoration, livestock exclusion, and installation of animal waste systems for small animal feeding operations. The department's project partners are urged to seek funding for other BMPs from the Environmental Quality Incentive Program and other state and federal programs.

Implementation projects typically begin at about $200,000 and can run as high as several million dollars. The cost depends on the size of the watershed and the estimated number and types of BMPs needed to attain the project TMDL goal(s).

For information about specific South Dakota NPS projects funded using CWA Section 319 funds, contact DENR, or access EPA's Nonpoint Source Grants Reporting and Tracking System database.

Table 55: South Dakota Categories and Subcategories of NPS Pollution Sources

Agriculture	Resource Extraction/Exploration/Development
Crop Production	Surface Mining (historic)
Pasture grazing-riparian and upland	Subsurface Mining
Animal feeding operations	Petroleum activities
Rangeland – riparian and upland	Acid mine drainage
Silviculture	**Habitat Modification**
Harvesting, restoration, residue management	Removal of riparian vegetation
Forest management	Drainage/filling of wetlands
Logging road construction/maintenance	Streambank modification/destabilization
Bank or shoreline modification/destabilization	
Construction Runoff	**Urban Runoff**
<1 acre highway/road/bridge construction projects	Surface Runoff
Land development	Highway/road/bridge runoff
Channelization	
Other	
Dam construction	
Golf courses	
Atmospheric deposition	
Waste storage/storage tank leaks	
Spills	
Erosion and sedimentation	
Drought-related impacts	
Natural Sources	

Future Nonpoint Source Program Directions

NPS pollution originates from diverse sources. Nonpoint source pollution controls must reflect this by using all of the resources available from the various state, federal, and local organizations and in addition, have landowner support and participation. The technical and financial assistance currently available is not sufficient to solve all of the NPS pollution problems in the state. Additional solutions must be attempted. Landowners have the capability to accomplish much if they understand the problems and the ways to solve them. Educating the public about NPS pollution issues may prompt landowners to voluntarily implement activities to control NPS pollution. New federal programs must also be developed to supplement existing programs. The continuation of existing activities coupled with the addition of innovative new programs will ensure that South Dakota remains a leader in nonpoint source pollution control. Figure 27 depicts the status of TMDL assessment and implementation projects within South Dakota.

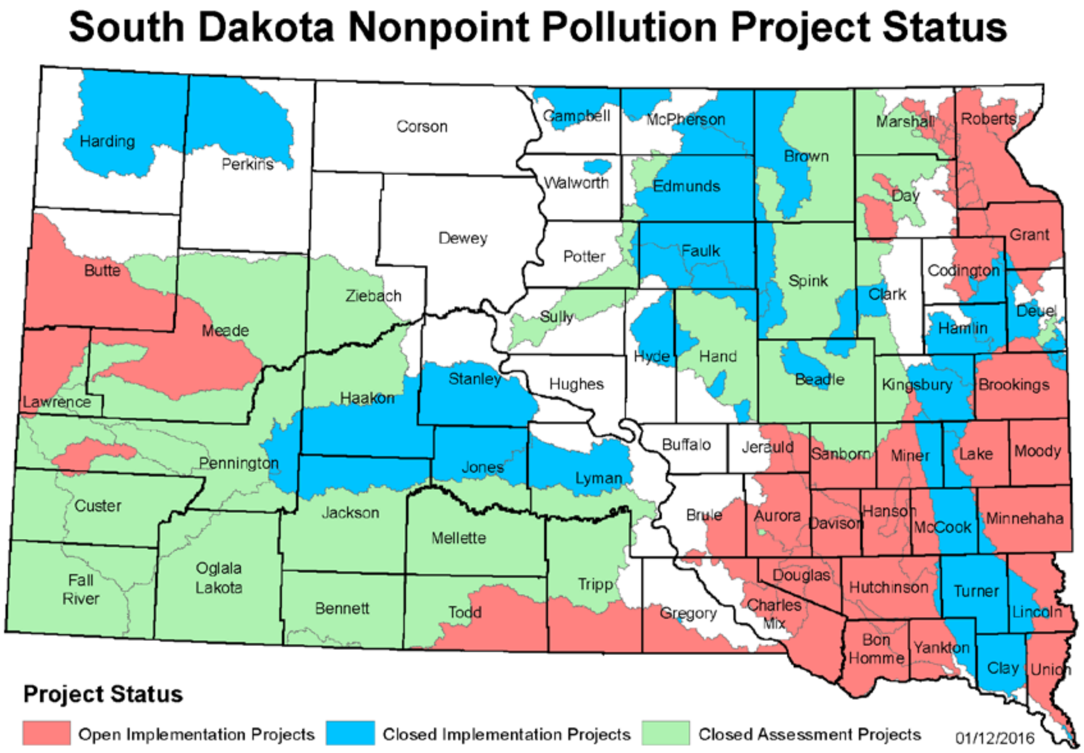

Figure 27: Status of TMDL Assessment/Implementation Projects

V. PUBLIC PARTICIPATION PROCESS

To fulfill the requirements of the CWA and involve the affected community and stakeholders in the water quality improvement process, a public participation process is implemented. Summarized below are the procedures employed by DENR to involve the public and affected parties.

Process Description

First Public Review/Input Period
An ad is published in ten statewide daily newspapers, announcing DENR is developing the Integrated Report and requesting water quality data that will aid in the assessment of South Dakota's waters. This announcement is also sent to approximately 120 individuals and organizations.

Second Public Review Period
Data received after the first public review period and additional data gathered by DENR are reviewed and a draft Integrated Report is developed. The draft report is released for a 30-day public review and comment period. The announcement on the availability of the draft report is again published in the ten daily newspapers. The draft report is also made available on DENR's web page at: http://denr.sd.gov/documents/16irdraft.pdf. At this time, the draft report is also provided to EPA Region VIII for review and comment.

Personnel from DENR respond to inquiries and are available to meet with interested groups about the list and listing process. Copies of public participation documents and responses to oral and written comments received during the comment period are included in Appendix F.

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VII. KEY TO ABBREVIATIONS

ADB – EPA's Assessment Database (used for Integrated Report development)
AnnAGNPS – agricultural nonpoint source computer model
ARSD – Administrative Rules of South Dakota
AUID – Assessment Unit Identifier
BMP – best management practice
CWSRF – Clean Water State Revolving Fund
DENR – South Dakota Department of Environment and Natural Resources
DO – dissolved oxygen
EDWDD – East Dakota Water Development District
EPA – Environmental Protection Agency
E. coli -*Escherichia coli*
GF&P – South Dakota Department of Game, Fish and Parks
HCI – Habitat Condition Index
IBI - Index of Biotic Integrity
IPCI – Index of Plant Community Integrity
MPCA – Minnesota Pollution Control Agency
NE DEQ – Nebraska Department of Environmental Quality
NLA - National Lake Assessment
NGP - Northern Glaciated Plains
NPDES – National Pollutant Discharge Elimination System
NPS – Nonpoint Source
NRCS – Natural Resources Conservation Service
PPR-Prairie Pothole Region
QA/QC – quality assurance/quality control
SAR – Sodium adsorption ratio
SDSU – South Dakota State University
STORET – EPA computer data storage and retrieval system
SWD – Surface Water Discharge
SWLA – Statewide Lakes Assessments
SRAM – seasonal riparian area management
TMDL – Total Maximum Daily Load
TN – Total Nitrogen
TP – Total Phosphorus
TSI – Carlson's (1997) Trophic State Indices
TSS – total suspended solids
USACE – United States Army Corp of Engineers
USBOR – United States Bureau of Reclamation
USDA – United States Department of Agriculture
USGS – United States Geological Survey
WQM – ambient water quality monitoring
WQS – South Dakota Surface Water Quality Standards
USFWS – United States Fish and Wildlife Service

APPENDICES

APPENDIX A

WATERBODIES WITH EPA APPROVED TMDLS

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Bad	Freeman Lake	SD-BA-L-FREEMAN_01	Jackson County	Nitrates/Selenium	2/7/2001	1507
Bad	Freeman Lake	SD-BA-L-FREEMAN_01	Jackson County	Total dissolved solids	9/26/2012	42516
Bad	Hayes Lake	SD-BA-L-HAYES_01	Stanley County	TSI	9/29/2004	10976
Bad	Hayes Lake	SD-BA-L-HAYES_01	Stanley County	Mercury in Fish Tissue	03/01/2016	65381
Bad	Murdo Dam	SD-BA-L-MURDO_01	Jones County	Mercury in Fish Tissue	03/01/2016	65382
Bad	Sheriff Dam	SD-BA-L-SHERIFF_01	Jones County (FPNG)	Mercury in Fish Tissue	8/18/2016	65867
Bad	Bad River	SD-BA-R-BAD_01	Stanley County line to mouth	TSS	2/7/2001	1537
Belle Fourche	Belle Fourche River		Wyoming to near Fruitdale	TSS	2/2/2005	11383
Belle Fourche	Belle Fourche River		Near Fruitdale to Whitewood Creek	TSS	2/2/2005	11384
Belle Fourche	Newell Lake	SD-BF-L-NEWELL_01	Butte County	Mercury in Fish Tissue	03/01/2016	64500
Belle Fourche	Orman Dam (Belle Fourche Reservoir)	SD-BF-L-ORMAN_01	Butte County	Mercury in Fish Tissue	03/01/2016	65384
Belle Fourche	Bear Butte Cr.	SD-BF-R-BEAR_BUTTE_02	Strawberry Cr. To near Bear Den Mountain	TSS	8/8/2007	33703
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_01	Wyoming to Redwater River	Fecal coliform	10/17/2011	41417
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_03	Whitewood Creek to Willow Creek	TSS	2/2/2005	11385
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_04	Willow Creek to Alkali Creek	TSS	2/2/2005	11386
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_05	Alkali Creek to mouth	*E. coli*/fecal coliform	10/17/2011	41418/ 41419
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_05	Alkali Creek to mouth	TSS	2/2/2005	11387

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Belle Fourche	Horse Creek	SD-BF-R-HORSE_01_USGS	Indian Creek to mouth	TSS	2/2/2005	11382
Belle Fourche	Strawberry Creek	SD-BF-R-STRAWBERRY_01	Bear Butte Creek to S5, T4N, R4E	Cadmium	4/19/2010	38462
Belle Fourche	West Strawberry Creek	SD-BF-R-W_STRAWBERRY_01	Headwaters to mouth	Fecal coliform	4/6/2011	40169
Belle Fourche	Whitewood Creek	SD-BF-R-WHITEWOOD_03	Deadwood Creek to Spruce Gulch	*E. coli*/fecal coliform	7/28/2011	41059
Big Sioux	Big Sioux River		I-29 to near Dell Rapids	TSS	5/28/2008	34495
Big Sioux	Big Sioux River		Near Dell Rapids to Below Baltic	Fecal coliform	5/28/2008	34494
Big Sioux	Big Sioux River		SD/IA border to Nine Mile Creek	*E. coli*	1/23/2008	34093
Big Sioux	Lake Albert	SD-BS-L-ALBERT_01	Kingsbury County	Mercury in Fish Tissue	03/01/2016	65387
Big Sioux	Lake Alvin	SD-BS-L-ALVIN_01	Lincoln County	TSI/fecal coliform	11/9/2001	2193/ 2194
Big Sioux	Antelope Lake	SD-BS-L-ANTELOPE_01	Day County	Mercury in Fish Tissue	03/01/2016	65388
Big Sioux	Bitter Lake	SD-BS-L-BITTER_01	Day County	Mercury in Fish Tissue	03/01/2016	64501
Big Sioux	Blue Dog Lake	SD-BS-L-BLUE_DOG_01	Day County	TSI/fecal coliform	2/7/2001	1436
Big Sioux	Brant Lake	SD-BS-L-BRANT_01	Lake County	TSI	4/12/1999	169
Big Sioux	Brush Lake	SD-BS-L-BRUSH_01	Brookings County	Mercury in Fish Tissue	03/01/2016	65389
Big Sioux	Clear Lake	SD-BS-L-CLEAR_01	Deuel County	TSI/Sediment	2/7/2001	1467
Big Sioux	Clear Lake (Hamlin)	SD-BS-L-CLEAR_H_01	Hamlin County	Mercury in Fish Tissue	03/01/2016	65390
Big Sioux	Diamond Lake	SD-BS-L-DIAMOND_01	Minnehaha County	Mercury in Fish Tissue	03/01/2016	65391
Big Sioux	Dry Lake	SD-BS-L-DRY_01	Codington County	Mercury in Fish Tissue	03/01/2016	65396

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Dry Lake Number 2	SD-BS-L-DRY_NO2_01	Clark County	Mercury in Fish Tissue	03/01/2016	65392
Big Sioux	East Oakwood Lake	SD-BS-L-E_OAKWOOD_01	Brookings County	TSI/pH	6/13/2008	34521
Big Sioux	Enemy Swim Lake	SD-BS-L-ENEMY_SWIM_01	Day County	Mercury in Fish Tissue	03/01/2016	65397
Big Sioux	Goldsmith Lake	SD-BS-L-GOLDSMITH_01	Brookings County	Mercury in Fish Tissue	03/01/2016	65398
Big Sioux	Goose Lake	SD-BS-L-GOOSE_01	Codington County	Mercury in Fish Tissue	03/01/2016	65399
Big Sioux	Lake Herman	SD-BS-L-HERMAN_01	Lake County	TSI	9/29/2004	10978
Big Sioux	Lake Herman	SD-BS-L-HERMAN_01	Lake County	Mercury in Fish Tissue	03/01/2016	65400
Big Sioux	North Island Lake	SD-BS-L-ISLAND_N_01	Minnehaha/McCook counties (formerly SD-VM-L-ISLAND_N_01)	Mercury in Fish Tissue	03/01/2016	64502
Big Sioux	Lake Kampeska	SD-BS-L-KAMPESKA_01	Codington County	Nutrients/Sediment - special approval	12/26/1996	635
Big Sioux	Lake Kampeska	SD-BS-L-KAMPESKA_01	Codington County	Mercury in Fish Tissue	03/01/2016	65401
Big Sioux	Long Lake	SD-BS-L-LONG_COD_01	Codington County	Mercury in Fish Tissue	03/01/2016	64504
Big Sioux	Lake Madison	SD-BS-L-MADISON_01	Lake County	TSI/fish kill	4/12/1999	639
Big Sioux	Minnewasta Lake	SD-BS-L-MINNEWASTA_01	Day County	Mercury in Fish Tissue	03/01/2016	64506
Big Sioux	Pelican Lake	SD-BS-L-PELICAN_01	Codington County	Nutrients/Sediment-special approval	12/26/1996	918
Big Sioux	Lake Poinsett	SD-BS-L-POINSETT_01	Hamlin County	Nutrients-special approval	11/26/1996	643
Big Sioux	Lake Poinsett	SD-BS-L-POINSETT_01	Hamlin County	Mercury in Fish Tissue	03/01/2016	65402
Big Sioux	Reid Lake	SD-BS-L-REID_01	Clark County	Mercury in Fish Tissue	03/01/2016	64508

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Rush Lake	SD-BS-L-RUSH_01	Day County	Mercury in Fish Tissue	03/01/2016	65403
Big Sioux	School Lake	SD-BS-L-SCHOOL_01	Deuel County	TSI	9/2/2008	35132
Big Sioux	Lake Sinai	SD-BS-L-SINAI_01	Brookings County	Mercury in Fish Tissue	03/01/2016	65417
Big Sioux	Swan Lake	SD-BS-L-SWAN_01	Clark County	Mercury in Fish Tissue	03/01/2016	64509
Big Sioux	Twin Lakes/W. Hwy 81	SD-BS-L-TWIN_01	Kingsbury County	Mercury in Fish Tissue	03/01/2016	64510
Big Sioux	Twin Lakes	SD-BS-L-TWIN_02	Minnehaha County	Mercury in Fish Tissue	03/01/2016	64511
Big Sioux	West Oakwood Lake	SD-BS-L-W_OAKWOOD_01	Brookings County	TSI	6/13/2008	34522
Big Sioux	Waubay Lake	SD-BS-L-WAUBAY_01	Day County	Mercury in Fish Tissue	03/01/2016	65418
Big Sioux	Beaver Creek	SD-BS-R-BEAVER_01	Big Sioux River to S9, T98N, R49W	Fecal coliform	8/10/2011	41067
Big Sioux	Beaver Creek	SD-BS-R-BEAVER_02	Split Rock Creek to SD-MN border	Fecal coliform/TSS	5/28/2008	34499
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_03	Willow Creek to Stray Horse Creek	Fecal coliform	6/4/2008	34506
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_03	Willow Creek to Stray Horse Creek	*E. coli*	8/8/2011	41060
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_07	Brookings/Moody County Line to S2, T104N, R49W	Mercury in Fish Tissue	03/01/2016	65405
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_08	S2, T104N, R49W to I-90	*E. coli*/fecal coliform	9/26/2012	42519
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_08	S2, T104N, R49W to I-90	TSS	12/6/2012	53280
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_10	I-90 to diversion return	*E. coli*/fecal coliform	9/26/2012	42520
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_10	I-90 to diversion return	TSS	12/6/2012	53281

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_11	Diversion return to SF WWTF	*E. coli*/fecal coliform	9/26/2012	42522
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_11	Diversion return to SF WWTF	TSS	12/6/2012	53282
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_12	SF WWTF to above Brandon	*E. coli*/fecal coliform	9/26/2012	42523
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_12	SF WWTF to above Brandon	TSS	12/6/2012	53283
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_13	Above Brandon to Nine Mile Creek	fecal coliform	1/23/2008	34093
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_14	Nine Mile Creek to near Fairview	*E. coli*/fecal coliform	1/23/2008	34094
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_15	Fairview to near Alcester	*E. coli*/fecal coliform	1/23/2008	34095
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_15	Fairview to near Alcester	TSS	2/1/2010	38211
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_16	Near Alcester to Indian Creek	*E. coli*/fecal coliform	1/23/2008	34096
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_16	Near Alcester to Indian Creek	TSS	2/1/2010	38213
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_17	Indian Creek to Mouth	*E. coli*/fecal coliform	1/23/2008	34098
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_17	Indian Creek to Mouth	TSS	1/23/2008	38212
Big Sioux	Brule Creek	SD-BS-R-BRULE_01	Big Sioux River to confluence with its east and west forks	Fecal coliform	6/2/2011	40438
Big Sioux	East Brule Creek	SD-BS-R-EAST_BRULE_01	Confluence with Brule Creek to S3, T95N, R49W	Fecal coliform	3/24/2011	40025
Big Sioux	Flandreau Creek	SD-BS-R-FLANDREAU_01	Big Sioux River to MN border	Fecal coliform	5/28/2008	34496
Big Sioux	Hidewood Creek	SD-BS-R-HIDEWOOD_01	Big Sioux River to US Hwy 77	Fecal coliform	6/4/2008	34509

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Jack Moore Creek	SD-BS-R-JACK_MOORE-01	Big Sioux River to S33, T 107N, R 49W	Fecal coliform	5/28/2008	34500
Big Sioux	North Deer Creek	SD-BS-R-NORTH_DEER_01	Six Mile Creek to US Hwy 77	Fecal coliform	5/28/2008	34501
Big Sioux	Peg Munky Run	SD-BS-R-PEG_MUNKY_RUN_01	Big Sioux River to S17, T113N, R50W	Fecal coliform	8/10/2011	41071
Big Sioux	Pipestone Creek	SD-BS-R-PIPESTONE_01	Split Rock Creek to MN border	Fecal coliform	5/28/2008	34502
Big Sioux	Pipestone Creek	SD-BS-R-PIPESTONE_01	Split Rock Creek to MN border	*E. coli*	9/26/2012	42524
Big Sioux	Skunk Creek	SD-BS-R-SKUNK_01	Brandt Lake to mouth	Fecal coliform	5/28/2008	34503
Big Sioux	Split Rock Creek	SD-BS-R-SPLIT_ROCK_01_USGS	At Corson, SD	TSS/fecal coliform	5/28/2008	34504
Big Sioux	Spring Creek	SD-BS-R-SPRING_01	Big Sioux River to S22, T109N, R47W	Fecal coliform	5/28/2008	34505
Big Sioux	Stray Horse Creek	SD-BS-R-STRAYHORSE_01	Big Sioux River to S26, T116N, R51W	Fecal coliform	6/4/2008	34508
Big Sioux	Union Creek	SD-BS-R-UNION_01	Big Sioux River to confluence with east and west forks	Fecal coliform	8/8/2011	41062
Big Sioux	Willow Creek	SD-BS-R-WILLOW_01	Big Sioux River to S7, T117N, R50W	Fecal coliform	6/4/2008	34507
Cheyenne	Center Lake	SD-CH-L-CENTER_01	Custer County	pH	3/24/2011	33707
Cheyenne	Center Lake	SD-CH-L-CENTER_01	Custer County	TSI	8/8/2007	33707
Cheyenne	Curlew Lake	SD-CH-L-CURLEW_01	Meade County	Mercury in Fish Tissue	03/01/2016	65406
Cheyenne	Horsethief Lake	SD-CH-L-HORSETHIEF_01	Pennington	pH	3/24/2011	40026
Cheyenne	Legion Lake	SD-CH-L-LEGION_01	Custer County	pH	3/24/2011	35136
Cheyenne	Legion Lake	SD-CH-L-LEGION_01	Custer County	TSI	9/2/2008	35136
Cheyenne	Sheridan Lake	SD-CH-L-SHERIDAN_01	Pennington County	TSI	8/30/2006	31136

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Cheyenne	Sheridan Lake	SD-CH-L-SHERIDAN_01	Pennington County	Mercury in Fish Tissue	8/18/2016	65871
Cheyenne	Stockade Lake	SD-CH-L-STOCKADE_01	Custer County	Mercury in Fish Tissue	8/18/2016	65870
Cheyenne	Sylvan Lake	SD-CH-L-SYLVAN_01	Custer County	TSI	9/1/2005	12351
Cheyenne	Sylvan Lake	SD-CH-L-SYLVAN_01	Custer County	pH (high)	8/18/2016	65861
Cheyenne	Battle Creek	SD-CH-R-BATTLE_01_USGS	Hwy 79 to mouth	*E. coli*/fecal coliform	2/18/2014	56640
Cheyenne	Battle Creek	SD-CH-R-BATTLE_02	Teepee Gulch Creek to SD HWY 79	*E. coli*/fecal coliform	2/18/2014	56641
Cheyenne	Beaver Creek	SD-CH-R-BEAVER_01	Wyoming border to Cheyenne River	Fecal coliform	3/12/2010	38253
Cheyenne	Beaver Creek	SD-CH-R-BEAVER_01_USGS	Near Buffalo Gap	Fecal coliform	9/26/2012	42518
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_03	Fall River to Cedar Creek	*E. coli*/fecal coliform	9/28/2010	39434/ 39429
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_04	Cedar Creek to Belle Fourche River	*E. coli*/fecal coliform	9/28/2010	39435/ 39430
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_05	Belle Fourche River to Bull Creek	*E. coli*/fecal coliform	9/28/2010	39436/ 39431
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_06	Bull Creek to Lake Oahe	*E. coli*/fecal coliform	9/28/2010	39437/ 39432
Cheyenne	Rapid Creek	SD-CH-R-RAPID_03	Canyon Lake to S15, T1N, R8E	Fecal coliform	9/28/2010	39426
Cheyenne	Rapid Creek	SD-CH-R-RAPID_04	S15, T1N, R8E to above Farmingdale	Fecal coliform	9/28/2010	39427
Cheyenne	Rapid Creek	SD-CH-R-RAPID_05	Above Farmingdale to Cheyenne River	*E. coli*/fecal coliform	9/28/2010	39433/ 39428
Cheyenne	Rapid Creek	SD-CH-R-RAPID_05	Above Farmingdale to Cheyenne River	TSS	9/27/2011	41087
Cheyenne	Spring Creek	SD-CH-R-SPRING_01	Headwaters to Sheridan Lake	Fecal coliform	12/11/2008	35790

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Grand	Shadehill Reservoir	SD-GR-L-SHADEHILL_01	Perkins County	Mercury in Fish Tissue	03/01/2016	65407
James	Moccasin Creek		Aberdeen to Warner	Ammonia	3/19/2001	1581
James	Amsden Dam	SD-JA-L-AMSDEN_01	Day County	Mercury in Fish Tissue	03/01/2016	65408
James	Lake Byron	SD-JA-L-BYRON_01	Beadle County	Nutrients/Sediment-special approval	4/12/1999	618
James	Lake Carthage	SD-JA-L-CARTHAGE_01	Miner County	Mercury in Fish Tissue	03/01/2016	65409
James	Cattail Lake	SD-JA-L-CATTAIL_01	Marshall County (formerly SD-BS-L-CATTAIL_01)	Mercury in Fish Tissue	03/01/2016	65410
James	Lake Cavour	SD-JA-L-CAVOUR_01	Beadle County	Mercury in Fish Tissue	03/01/2016	65411
James	Clubhouse Lake	SD-JA-L-CLUBHOUSE_01	Marshall County	Mercury in Fish Tissue	8/18/2016	65868
James	Cottonwood Lake	SD-JA-L-COTTONWOOD_	Spink County	TSI	11/9/2001	2195
James	Cottonwood Lake	SD-JA-L-COTTONWOOD_01	Spink County	Mercury in Fish Tissue	03/01/2016	65413
James	Cresbard Lake	SD-JA-L-CRESBARD_01	Faulk County	TSI	12/3/2003	9745
James	Elm Lake	SD-JA-L-ELM_01	Brown County	TSI	4/12/1999	420
James	Elm Lake	SD-JA-L-ELM_01	Brown County	Mercury in Fish Tissue	03/01/2016	64512
James	Lake Faulkton	SD-JA-L-FAULKTON_01	Faulk County	TSI/Sediment	4/12/1999	623
James	Lake Faulkton	SD-JA-L-FAULKTON_01	Faulk County	Mercury in Fish Tissue	03/01/2016	65414
James	Lake Hanson	SD-JA-L-HANSON_01	Hanson County	TSI	6/3/2004	10623
James	Lake Hanson	SD-JA-L-HANSON_01	Hanson County	Mercury in Fish Tissue	03/01/2016	65415
James	Hazeldon Lake	SD-JA-L-HAZELDON_01	Day County	Mercury in Fish Tissue	03/01/2016	65420

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
James	Henry Reservoir	SD-JA-L-HENRY_01	Near Scotland, SD	Mercury in Fish Tissue	03/01/2016	65419
James	Horseshoe Lake	SD-JA-L-HORSESHOE_01	Marshall County	Mercury in Fish Tissue	03/01/2016	65421
James	Jones Lake	SD-JA-L-JONES_01	Hand County	TSI	4/2/2003	9747
James	Lardy Lake	SD-JA-L-LARDY_01	Day County (Formerly SD-BS-L-LARDY_01)	Mercury in Fish Tissue	03/01/2016	64503
James	Lilly Lake	SD-JA-L-LILY_01	Day County	Mercury in Fish Tissue	03/01/2016	65422
James	Lake Louise	SD-JA-L-LOUISE_01	Hand County	TSI	11/9/2001	2196
James	Lake Louise	SD-JA-L-LOUISE_01	Hand County	Mercury in Fish Tissue	03/01/2016	65423
James	Loyalton Dam	SD-JA-L-LOYALTON_01	Edmunds County	TSI	4/2/2003	9748
James	Lynn Lake	SD-JA-L-LYNN_01	Day County	Mercury in Fish Tissue	03/01/2016	65424
James	Middle Lynn Lake	SD-JA-L-MID_LYNN_01	Day County (formerly SD-BS-L-MID_LYNN_01)	Mercury in Fish Tissue	03/01/2016	64505
James	Mina Lake	SD-JA-L-MINA_01	Edmunds County	TSI	4/2/2003	9749
James	Mina Lake	SD-JA-L-MINA_01	Edmunds County	Mercury in Fish Tissue	03/01/2016	65425
James	Lake Mitchell	SD-JA-L-MITCHELL_01	Davison County	Nutrients-special approval	4/22/1997	2254
James	Opitz Lake	SD-JA-L-OPITZ_01	Day County (Formerly SD-BS-L-OPITZ_01)	Mercury in Fish Tissue	03/01/2016	64507
James	Ravine Lake	SD-JA-L-RAVINE_01	Beadle County	TSI/fecal coliform	4/12/1999	976
James	Ravine Lake	SD-JA-L-RAVINE_01	Beadle County	Mercury in Fish Tissue	03/01/2016	65426
James	Lake Redfield	SD-JA-L-REDFIELD_01	Spink County	Nutrients/Sediment-special approval	4/12/1999	645
James	Reetz Lake	SD-JA-L-REETZ_01	Day County	Mercury in Fish Tissue	03/01/2016	65427

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
James	Richmond Lake	SD-JA-L-RICHMOND_01	Brown County	TSI	8/8/2007	33708
James	Richmond Lake	SD-JA-L-RICHMOND_01	Brown County	Mercury in Fish Tissue	03/01/2016	65428
James	Rosehill Lake	SD-JA-L-ROSEHILL_01	Hand County	TSI	4/2/2003	9750
James	South Buffalo Lake	SD-JA-L-SOUTH_BUFFALO_01	Marshall County (formerly SD-BS-L-SOUTH_BUFFALO_01)	Mercury in Fish Tissue	03/01/2016	65429
James	Staum Dam	SD-JA-L-STAUM_01	Beadle County	Mercury in Fish Tissue	03/01/2016	65430
James	Wilmarth Lake	SD-JA-L-WILMARTH_01	Aurora County	Mercury in Fish Tissue	03/01/2016	65431
James	Dawson Creek	SD-JA-R-DAWSON_01	James River to Lake Henry	*E. coli*/fecal coliform	6/2/2011	40437
James	Firesteel Creek	SD-JA-R-FIRESTEEL_01	West Fork Firesteel to mouth	Nutrients-special approval	4/22/1997	641
James	James River	SD-JA-R-JAMES_08	Huron 3rd Street Dam to Sand Creek	Mercury in Fish Tissue	8/18/2016	65869
James	James River	SD-JA-R-JAMES_11	Yankton County line to mouth	Fecal coliform	3/24/2011	40029
James	Pierre Creek	SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	Fecal coliform	9/29/2009	37333
James	Pierre Creek	SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	*E. coli*	12/5/2011	41443
James	Wolf Creek	SD-JA-R-WOLF_02	Just above Wolf Creek Colony to mouth	TSS	8/8/2011	41061
Little Missouri	Little Missouri River	SD-LM-R-LITTLE_MISSOURI_01	Montana border to North Dakota border	Mercury in Fish Tissue	03/01/2016	65433
Minnesota	Lake Alice	SD-MN-L-ALICE_01	Deuel County	TSI	6/3/2004	10622
Minnesota	Lake Alice	SD-MN-L-ALICE_01	Deuel County	Mercury in Fish Tissue	03/01/2016	65440
Minnesota	Big Stone Lake	SD-MN-L-BIG_STONE_01	Roberts County	Nutrients-special approval	12/26/1996	123

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Minnesota	Fish Lake	SD-MN-L-FISH_01	Deuel County	TSI	9/29/2004	10971
Minnesota	Lake Hendricks	SD-MN-L-HENDRICKS_01	Brookings County	TSI/Sediment	4/12/1999	631
Minnesota	Lake Oliver	SD-MN-L-OLIVER_01	Deuel County	TSI	11/9/2001	2197
Minnesota	Punished Woman Lake	SD-MN-L-PUNISHED_WOMAN_01	Codington County	TSI/Sediment	2/7/2001	1621
Minnesota	Summit Lake	SD-MN-L-SUMMIT_01	Grant County	Mercury in Fish Tissue	03/01/2016	65441
Missouri	Brakke Dam	SD-MI-L-BRAKKE_01	Lyman County	TSI	9/29/2004	10967
Missouri	Brakke Dam	SD-MI-L-BRAKKE_01	Lyman County	Mercury in Fish Tissue	03/01/2016	65434
Missouri	Burke Lake	SD-MI-L-BURKE_01	Gregory County	DO/pH/TSI	8/8/2007	10983/ 33706/ 33706
Missouri	Byre Lake	SD-MI-L-BYRE_01	Lyman County	TSI	6/3/2004	10983
Missouri	Corsica Lake	SD-MI-L-CORSICA_01	Douglas County	TSI	8/30/2006	31143
Missouri	Cottonwood Lake	SD-MI-L-COTTONWOOD_01	Sully County	Mercury in Fish Tissue	03/01/2016	65435
Missouri	Dante Lake	SD-MI-L-DANTE_01	Charles Mix County	TSI/DO	9/27/2006	31192
Missouri	Fate Dam	SD-MI-L-FATE_01	Lyman County	TSI	1/14/2005	11380
Missouri	Fate Dam	SD-MI-L-FATE_01	Lyman County	Mercury in Fish Tissue	03/01/2016	65436
Missouri	Geddes Lake	SD-MI-L-GEDDES_01	Charles Mix County	TSI/DO	5/6/2008	34513
Missouri	Hiddenwood Lake	SD-MI-L-HIDDENWOOD_01	Walworth County	TSI/Sediment	4/12/1999	632
Missouri	Lake Hurley	SD-MI-L-HURLEY_01	Potter County	Mercury in Fish Tissue	03/01/2016	64513
Missouri	McCook Lake	SD-MI-L-MCCOOK_01	Union County	TSI	4/12/1999	770
Missouri	Roosevelt Lake	SD-MI-L-ROOSEVELT_01	Tripp County	Mercury in Fish Tissue	03/01/2016	64514
Missouri	Choteau Creek	SD-MI-R-CHOTEAU_01	Lewis & Clark Lake to S34, T96N, R63W	TSS	5/3/2010	38613

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Missouri	Emanuel Creek	SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	*E. coli*	8/10/2011	41068
Missouri	Emanuel Creek	SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	Fecal coliform/TSS	9/29/2009	37330/ 37331
Missouri	Medicine Creek	SD-MI-R-MEDICINE_01	Lake Sharpe to US Hwy 83	Fecal coliform/TSS	8/30/2006	31146
Missouri	Missouri River (Lake Oahe)	SD-MI-R-OAHE_01	North Dakota border to Oahe Dam	Mercury in Fish Tissue	03/01/2016	65439
Missouri	Ponca Creek	SD-MI-R-PONCA_01	SD/NE border to US Hwy 183	Fecal coliform	8/2/2010	39029
Missouri	Ponca Creek	SD-MI-R-PONCA_01	SD/NE border to US Hwy 183	TSS	4/27/2010	38463
Missouri	Missouri River (Sharpe)	SD-MI-R-SHARPE_01	Oahe Dam to Big Bend Dam	Sediment	2/7/2001	1537
Moreau	Coal Springs Reservoir	SD-MU-L-COAL_SPRINGS_01	Perkins County	Mercury in Fish Tissue	03/01/2016	64515
Moreau	Little Moreau No. 1	SD-MU-L-LITTLE_MOREAU_NO1_01	Dewey County	Mercury in Fish Tissue	03/01/2016	65442
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	*E. coli*	9/22/2011	41085
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	TSS	9/29/2009	37332
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	Fecal coliform	2/1/2010	38214
Red River	White Lake	SD-RD-L-WHITE_01	Marshall County	DO/TSI	8/20/2006	31133
Vermillion	Turkey Ridge Creek		Vermillion River to S31, T98N, R53W	Fecal coliform	9/27/2006	31212
Vermillion	East Vermillion Lake	SD-VM-L-E_VERMILLION_01	McCook County	Mercury in Fish Tissue	03/01/2016	65443
Vermillion	Lake Henry	SD-VM-L-HENRY_01	Kingsbury County	Mercury in Fish Tissue	03/01/2016	65444
Vermillion	Swan Lake	SD-VM-L-SWAN_01	Turner County	TSI/Sediment	4/12/1999	1169/ 1168
Vermillion	Lake Thompson	SD-VM-L-THOMPSON_01	Kingsbury County	Mercury in Fish Tissue	03/01/2016	65445

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Vermillion	Whitewood Lake	SD-VM-L-WHITEWOOD_01	Kingsbury County	Mercury in Fish Tissue	03/01/2016	65446
Vermillion	Vermillion River	SD-VM-R-VERMILLION_02	Turkey Ridge Creek to Baptist Creek	TSS	9/27/2010	39404
Vermillion	Vermillion River	SD-VM-R-VERMILLION_03	Baptist Creek to mouth	TSS	7/5/2011	40439
Vermillion	East Fork Vermillion River	SD-VM-R-VERMILLION_EAST_FORK_01	McCook/Lake County to Little Vermillion River	Fecal coliform	9/26/2012	42525

APPENDIX B

DENR 2016 WATERBODY DELISTING REPORT

AUID	Name	Location	2016 Category	Cause	Delisting Reason
SD-BF-L-NEWELL_01	Newell Lake	Butte County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BF-R-BEAR_BUTTE_01	Bear Butte Creek	Headwaters to Strawberry Creek	1	Temperature	Applicable WQS attained; due to change in WQS
SD-BF-R-BEAR_BUTTE_02	Bear Butte Creek	Strawberry Creek to S2, T4N, R4E	1	Temperature	Applicable WQS attained; due to change in WQS
SD-BF-R-REDWATER_01_USGS	Redwater River	WY border to Hwy 85	2	Temperature	Applicable WQS attained; due to change in WQS
SD-BF-R-WHITEWOOD_01	Whitewood Creek	Whitetail Summit to Gold Run Creek	1	Temperature	Applicable WQS attained; due to change in WQS
SD-BS-L-ALVIN_01	Lake Alvin	Lincoln County	1	Temperature	Applicable WQS attained; reason for recovery unspecified
SD-BS-L-BITTER_01	Bitter Lake	Day County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-ISLAND_N_01	North Island Lake	Minnehaha/McCook counties (formerly SD-VM-L-ISLAND_N_01)	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-LONG_COD_01	Long Lake	Codington County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Day County	5	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-PELICAN_01	Pelican Lake	Codington County	1	pH	Applicable WQS attained; reason for recovery unspecified
SD-BS-L-REID_01	Reid Lake	Clark County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-SWAN_01	Swan Lake	Clark County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-TWIN_01	Twin Lakes/W. Hwy 81	Kingsbury County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-L-TWIN_02	Twin Lakes	Minnehaha County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-BS-R-SIXMILE_01	Six Mile Creek	Big Sioux River to S30, T112N, R48W	5	Total Suspended Solids	Applicable WQS attained; reason for recovery unspecified
SD-BS-R-SKUNK_01	Skunk Creek	Brandt Lake to Big Sioux River	5	Total Suspended Solids	Applicable WQS attained; reason for recovery unspecified
SD-CH-L-HORSETHIEF_01	Horsethief Lake	Pennington County	3	Temperature	Data and/or information lacking to determine water quality status; original basis for listing was incorrect (Category 3)

AUID	Name	Location	2016 Category	Cause	Delisting Reason
SD-CH-R-BATTLE_01	Battle Creek	Near Horsethief Lake to Teepee Gulch Creek	1	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-BATTLE_01_USGS	Battle Creek	Hwy 79 to mouth	4a	*Escherichia coli*	TMDL approved or established by EPA (4A)
SD-CH-R-BATTLE_01_USGS	Battle Creek	Hwy 79 to mouth	4a	Fecal Coliform	TMDL approved or established by EPA (4A)
SD-CH-R-BATTLE_02	Battle Creek	Teepee Gulch Creek to SD HWY 79	4a	*Escherichia coli*	TMDL approved or established by EPA (4A)
SD-CH-R-BATTLE_02	Battle Creek	Teepee Gulch Creek to SD HWY 79	4a	Fecal Coliform	TMDL approved or established by EPA (4A)
SD-CH-R-BATTLE_02	Battle Creek	Teepee Gulch Creek to SD HWY 79	4a	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-BEAVER_02_USGS	Beaver Creek	S13, T5S, R4E to SD Hwy 79	2	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-CASTLE_01	Castle Creek	Deerfield Reservoir to Rapid Creek	1	Total Suspended Solids	Applicable WQS attained; reason for recovery unspecified
SD-CH-R-CHEYENNE_04	Cheyenne River	Cedar Creek to Belle Fourche River	5	Total Dissolved Solids	Applicable WQS attained; reason for recovery unspecified
SD-CH-R-ELK_01_USGS	Elk Creek	S9, T3N, R7E to S27, T4N, R3E	3	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-GRACE_COOLIDGE_01	Grace Coolidge Creek	S12, T3S, R5E to Battle Creek	1	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-GRIZZLY_BEAR_01_USGS	Grizzly Bear Creek	Near Keystone, SD	3	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-HOT_BROOK_01	Hot Brook Creek	Fall River to S19, T7S, R5E	3	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-RAPID_N_FORK_01	North Fork Rapid Creek	From confluence with Rapid Creek to S8, T3N, R3E	3	Temperature	Applicable WQS attained; due to change in WQS
SD-CH-R-SPRING_01	Spring Creek	S5, T2S, R3E to Sheridan Lake	5	Temperature	Applicable WQS attained; due to change in WQS
SD-GR-L-PUDWELL_01	Pudwell Dam	Corson County	5	Mercury	Data and/or information lacking to determine water quality status; original basis for listing was incorrect (Category 3)
SD-JA-L-ELM_01	Elm Lake	Brown County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-JA-L-LARDY_01	Lardy Lake	Day County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)

AUID	Name	Location	2016 Category	Cause	Delisting Reason
SD-JA-L-MID_LYNN_01	Middle Lynn Lake	Day County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-JA-L-MITCHELL_01	Lake Mitchell	Davison County	4a	pH	Applicable WQS attained; reason for recovery unspecified
SD-JA-L-OPITZ_01	Opitz Lake	Day County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-JA-R-JAMES_08	James River	Huron 3rd Street Dam to Sand Creek	4a	Total Suspended Solids	Applicable WQS attained; reason for recovery unspecified
SD-JA-R-JAMES_10	James River	I-90 to Yankton County line	1	Total Suspended Solids	Applicable WQS attained; reason for recovery unspecified
SD-JA-R-TURTLE_01	Turtle Creek	James River to S17, T113N, R65W	1	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
SD-MI-L-HURLEY_01	Lake Hurley	Potter County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-MI-L-ROOSEVELT_01	Roosevelt Lake	Tripp County	4a	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-MU-L-COAL_SPRINGS_01	Coal Springs Reservoir	Perkins County	5	Mercury in Fish Tissue	TMDL approved or established by EPA (4A)
SD-VM-R-VERMILLION_E_FORK_02	East Fork Vermillion River	Little Vermillion River to mouth	1	*Escherichia coli*	Applicable WQS attained; reason for recovery unspecified
SD-WH-R-WHITE_01	White River	NE/SD border to Willow Creek	1	*Escherichia coli*	Applicable WQS attained; reason for recovery unspecified
SD-WH-R-WHITE_01	White River	NE/SD border to Willow Creek	1	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified

APPENDIX C

SURFACE WATER QUALITY MONITORING SCHEDULE

AND SAMPLING SITE DESCRIPTION

Analysis Groups	1	2	3	4	5	6	7	8	9	10	11
Field Analysis Parameters											
Water Temperature	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Air Temperature	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Dissolved Oxygen	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Conductivity	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
pH	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Waterbody Depth	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Waterbody Width	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Laboratory Analysis Parameters											
Hardness					**X**	**X**					
Dissolved Solids	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Suspended Solids	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Total Phosphorous	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Ammonia	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Nitrate-Nitrite	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
TKN	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
BOD				**X**				**X**	**X**		
CBOD									**X**		
E-Coli	**M/S**	**M/S**	**M/S**	**M/S**	**M/S**	**M/S**	**M/S**	**X**	**M/S**	**M/S**	**M/S**
Total Calcium	**M/A**	**M/A**		**M/A**		**M/A**	**X**	**M/A**	**M/A**	**M/A**	**X**
Chloride	**X**						**X**	**M/A**			**X**
Total Magnesium	**M/A**	**M/A**		**M/A**		**M/A**	**X**	**M/A**	**M/A**	**M/A**	**X**
Total Sodium	**M/A**	**M/A**		**M/A**		**M/A**	**X**	**X**	**M/A**	**M/A**	**X**
Sulfates	**X**						**X**				**X**
WAD Cyanide					**X**	**X**					
Dissolved Arsenic					**X**	**X**				**X**	**X**
Dissolved Cadmium					**X**	**X**					
Dissolved Chromium					**X**	**X**					
Dissolved Copper					**X**	**X**					
Dissolved Lead					**X**	**X**					
Total and Dissolved Mercury					**X**	**X**					
Dissolved Nickel					**X**	**X**					
Dissolved Selenium					**X**	**X**					
Dissolved Silver					**X**	**X**					
Dissolved Zinc					**X**	**X**					
Dissolved Barium										**X**	**X**
Dissolved Molybdenum										**X**	**X**
Total and Dissolved Uranium										**X**	**X**
Radium 226										**X**	**X**
Radium 228										**X**	**X**
Dissolved Organic Carbon					**X**	**X**					

M/A = May through August   M/S = May through September   X = Every visit

January 12, 2016

Ambient WQM Stations - By WQM Number

WQM #	Waterbody	Storet Number	County	Sampling Frequency	Beneficial Uses	Analysis Group	Region
1	Big Sioux River	460740	CODINGTON	Monthly	5,8,9,10	Group 1	Northeast
2	Big Sioux River	460702	BROOKINGS	Monthly	5,8,9,10	Group 1	Southeast
3	Big Sioux River	460703	MINNEHAHA	Monthly	1,5,7,8,9,10	Group 1	Southeast
4	Vermillion River	460755	CLAY	Monthly	5,8,9,10	Group 2	Southeast
5	Vermillion River	460745	CLAY	Monthly	5,8,9,10	Group 2	Southeast
6	James River	460805	BROWN	Monthly	5,8,9,10	Group 2	Northeast
7	James River	460707	HANSON	Quarterly	5,8,9,10	Group 2	Southeast
8	James River	460761	YANKTON	Monthly	5,8,9,10	Group 2	Southeast
10	Keya Paha River	460815	TRIPP	Quarterly	5,8,9,10	Group 1	Central
11	White River	460835	JACKSON	Monthly	5,8,9,10	Group 2	Central
12	White River	460825	LYMAN	Monthly	5,8,9,10	Group 2	Central
13	Little White River	460840	MELLETTE	Monthly	5,8,9,10	Group 2	Central
14	Cheyenne River	460875	FALL RIVER	Quarterly	5,8,9,10	Group 11	Black Hills
15	Cheyenne River	460865	PENNINGTON	Monthly	5,7,8,9,10	Group 2	Central
16	Cheyenne River	468860	ZIEBACH	Monthly	4,7,8,9,10	Group 2	Central
17	Battle Creek	460905	PENNINGTON	Monthly	2,8,9,10	Group 3	Black Hills
19	Rapid Creek	460910	PENNINGTON	Monthly	4,7,8,9,10	Group 2	Black Hills
21	Belle Fourche River	460880	MEADE	Quarterly	4,7,8,9,10	Group 2	Central
22	Spearfish Creek	460900	LAWRENCE	Monthly	1,2,7,8,9,10	Group 3	Black Hills
23	Redwater River	460895	BUTTE	Monthly	3,8,9,10	Group 2	Central
24	Moreau River	460935	DEWEY	Monthly	5,8,9,10	Group 2	Central
25	Grand River	460945	CORSON	Monthly	4,8,9,10	Group 2	Central
26	Little Missouri River	460955	HARDING	Quarterly	5,8,9,10	Group 2	Central
27	Little Minnesota River	460710	ROBERTS	Quarterly	5,8,9,10	Group 3	Northeast
28	Whetstone River	460700	GRANT	Quarterly	5,8,9,10	Group 3	Northeast
29	Bad River	460850	STANLEY	Quarterly	6,8,9,10	Group 2	Central
30	Box Elder Creek	460925	LAWRENCE	Monthly	2,8,9,10	Group 3	Black Hills
31	Big Sioux River	460831	MINNEHAHA	Monthly	5,7,8,9,10	Group 2	Southeast
32	Big Sioux River	460832	UNION	Monthly	5,7,8,9,10	Group 3	Southeast
33	James River	460733	BROWN	Monthly	5,8,9,10	Group 2	Northeast
34	James River	460734	BROWN	Quarterly	5,8,9,10	Group 2	Northeast
35	James River	460735	BEADLE	Quarterly	1,5,8,9,10	Group 9	Southeast
36	James River	460736	BEADLE	Quarterly	5,8,9,10	Group 9	Southeast
37	James River	460737	DAVISON	Quarterly	5,8,9,10	Group 2	Southeast
39	Moreau River	460039	PERKINS	Quarterly	5,8,9,10	Group 10	Central
40	Grand River	460640	PERKINS	Quarterly	3,8,9,10	Group 10	Central
42	White River	460842	SHANNON	Quarterly	5,8,9,10	Group 10	Black Hills
45	Lac Qui Parle River, W Branch	460645	DEUEL	Quarterly	3,8,9,10	Group 3	Northeast
46	Castle Creek	460646	PENNINGTON	Monthly	2,8,9,10	Group 3	Black Hills
47	Rapid Creek	460647	PENNINGTON	Monthly	1,2,7,8,9,10	Group 1	Black Hills
49	Spring Creek	460649	PENNINGTON	Quarterly	3,7,8,9,10	Group 3	Black Hills
50	Grace Coolidge Creek	460650	CUSTER	Quarterly	2,8,9,10	Group 3	Black Hills
51	French Creek	460651	CUSTER	Quarterly	3,8,9,10	Group 3	Black Hills
52	Whitewood Creek	460652	LAWRENCE	Monthly	4,8,9,10	Group 3	Black Hills
53	French Creek	460653	CUSTER	Quarterly	3,8,9,10	Group 3	Black Hills
54	Spring Creek	460654	PENNINGTON	Monthly	3,7,8,9,10	Group 3	Black Hills
55	Big Sioux River	460655	CODINGTON	Monthly	5,8,9,10	Group 2	Northeast
57	Fall River	460657	FALL RIVER	Quarterly	3,8,9,10	Group 1	Black Hills
61	Vermillion River	460661	TURNER	Monthly	5,8,9,10	Group 2	Southeast
62	Big Sioux River	460662	BROOKINGS	Monthly	5,8,9,10	Group 1	Southeast
64	Big Sioux River	460664	MINNEHAHA	Monthly	1,5,7,8,9,10	Group 4	Southeast

WQM #	Waterbody	Storet Number	County	Sampling Frequency	Beneficial Uses	Analysis Group	Region
65	Big Sioux River	460665	LINCOLN	Monthly	5,7,8,9,10	Group 2	Southeast
66	Big Sioux River	460666	LINCOLN	Monthly	5,7,8,9,10	Group 2	Southeast
67	Big Sioux River	460667	UNION	Monthly	5,7,8,9,10	Group 2	Southeast
69	Rapid Creek	460669	PENNINGTON	Monthly	1,2,7,8,9,10	Group 7	Black Hills
70	Ponca Creek	460670	GREGORY	Quarterly	5,8,9,10	Group 1	Central
71	Missouri River	460671	HUGHES	Quarterly	1,2,7,8,9,10,11	Group 2	Central
72	Missouri River	460672	LYMAN	Quarterly	1,2,7,8,9,10,11	Group 2	Central
73	Missouri River	460673	CHARLES MIX	Quarterly	1,4,7,8,9,10,11	Group 2	Southeast
74	Missouri River	460674	YANKTON	Quarterly	1,4,7,8,9,10,11	Group 2	Southeast
76	Belle Fourche River	460676	MEADE	Monthly	4,7,8,9,10	Group 2	Central
77	Grand River, N Fork	460677	PERKINS	Quarterly	6,8,9,10	Group 2	Central
78	Grand River, S Fork	460678	PERKINS	Quarterly	5,8,9,10	Group 2	Central
79	Box Elder Creek	460679	PENNINGTON	Quarterly	6,8,9,10	Group 2	Black Hills
81	Belle Fourche River	460681	BUTTE	Quarterly	4,7,8,9,10	Group 6	Central
82	Whitewood Creek	460682	BUTTE	Monthly	4,8,9,10	Group 5	Central
84	Whitewood Creek	460684	LAWRENCE	Monthly	3,7,8,9,10	Group 5	Black Hills
85	Whitewood Creek	460685	LAWRENCE	Monthly	3,7,8,9,10	Group 6	Black Hills
87	Yellow Bank River, S Fork	460687	GRANT	Quarterly	3,8,9,10	Group 3	Northeast
88	Yellow Bank River, N Fork	460688	GRANT	Quarterly	4,8,9,10	Group 3	Northeast
89	Spearfish Creek	460689	LAWRENCE	Monthly	1,2,7,8,9,10	Group 3	Black Hills
90	Whetstone River, S Fork	460690	GRANT	Quarterly	6,8,9,10	Group 3	Northeast
91	Whetstone River, S Fork	460691	GRANT	Quarterly	6,8,9,10	Group 3	Northeast
92	Rapid Creek	460692	PENNINGTON	Monthly	4,7,8,9,10	Group 2	Black Hills
95	Moccasin Creek	460695	BROWN	Monthly	6,8,9,10	Group 3	Northeast
102	French Creek	460102	CUSTER	Monthly	3,8,9,10	Group 2	Black Hills
103	Battle Creek	460103	PENNINGTON	Seasonal	2,8,9,10	Group 3	Black Hills
110	Rapid Creek	460110	PENNINGTON	Monthly	4,7,8,9,10	Group 7	Black Hills
111	Flynn Creek	460111	CUSTER	Quarterly	3,8,9,10	Group 3	Black Hills
112	James River	460112	BROWN	Monthly	5,8,9,10	Group 2	Northeast
113	James River	460113	BROWN	Monthly	5,8,9,10	Group 2	Northeast
117	Big Sioux River	460117	MINNEHAHA	Monthly	5,7,8,9,10	Group 4	Southeast
118	Whitetail Creek	460118	LAWRENCE	Monthly	2,7,8,9,10	Group 5	Black Hills
120A	Stewart Gulch	460124	LAWRENCE	Quarterly	2,8,9,10	Group 5	Black Hills
121	Skunk Creek	460121	MINNEHAHA	Quarterly	6,8,9,10	Group 4	Southeast
122	Whitewood Creek	460122	LAWRENCE	Monthly	3,7,8,9,10	Group 6	Black Hills
123	Whitewood Creek	460123	LAWRENCE	Monthly	3,7,8,9,10	Group 5	Black Hills
127	Deadwood Creek	460127	LAWRENCE	Monthly	3,7,8,9,10	Group 5	Black Hills
128	Beaver Creek	460128	FALL RIVER	Quarterly	3,8,9,10	Group 11	Black Hills
131	Cherry Creek	460131	MEADE	Quarterly	6,8,9,10	Group 2	Central
132	Cheyenne River	460132	CUSTER	Monthly	5,7,8,9,10	Group 2	Black Hills
133	Cheyenne River	460133	HAAKON	Monthly	4,7,8,9,10	Group 2	Central
134	Choteau Creek	460134	BON HOMME	Quarterly	5,8,9,10	Group 2	Southeast
135	Crow Creek	460135	BUFFALO	Quarterly	5,8,9,10	Group 2	Central
136	Elm River	460136	BROWN	Monthly	1,5,8,9,10	Group 2	Northeast
137	Firesteel Creek	460137	DAVISON	Quarterly	1,4,8,9,10	Group 2	Southeast
138	Grand River	460138	CORSON	Quarterly	4,8,9,10	Group 2	Central
139	Grand River, S Fork	460139	HARDING	Quarterly	5,8,9,10	Group 2	Central
140	James River	460140	SPINK	Monthly	5,8,9,10	Group 2	Northeast
141	Medicine Creek	460141	LYMAN	Monthly	6,8,9,10	Group 2	Central
142	Medicine Knoll Creek	460142	HUGHES	Quarterly	6,8,9,10	Group 2	Central
143	Moreau River	460143	ZIEBACH	Quarterly	5,8,9,10	Group 2	Central
144	Moreau River, S Fork	460144	PERKINS	Quarterly	6,8,9,10	Group 2	Central
145	Mud Creek	460145	BROWN	Quarterly	6,8,9,10	Group 2	Northeast
146	Snake Creek	460146	SPINK	Quarterly	5,8,9,10	Group 2	Northeast
150	Vermillion River, E Fork	460150	MCCOOK	Quarterly	6,8,9,10	Group 2	Southeast
151	Wolf Creek	460151	SPINK	Quarterly	6,8,9,10	Group 2	Northeast

WQM #	Waterbody	Storet Number	County	Sampling Frequency	Beneficial Uses	Analysis Group	Region
152	White River	460152	MELLETTE	Monthly	5,8,9,10	Group 2	Central
154	Vermillion River, E Fork	460154	MCCOOK	Quarterly	6,8,9,10	Group 2	Southeast
155	Spring Creek	460155	CAMPBELL	Monthly	5,8,9,10	Group 2	Central
157	Wolf Creek above Wolf Creek Colony	460157	HUTCHINSON	Monthly	6,8,9,10	Group 8	Southeast
160	Crooked Creek	460160	Harding	Quarterly	6,8,9,10	Group 10	Central
161	Bull Creek	460161	Harding	Quarterly	6,8,9,10	Group 10	Central
162	Grand River, S Fork	460162	Perkins	Quarterly	5,8,9,10	Group 10	Central
163	Cheyenne River	460163	Fall River	Quarterly	5,8,9,10	Group 11	Black Hills
164	Cheyenne River	460164	Fall River	Quarterly	5,8,9,10	Group 11	Black Hills
170	Little Minnesota River	460170	Roberts	Monthly	9,10	Group 8	Northeast
171	Little Minnesota River	460171	Roberts	Monthly	5,8,9,10	Group 8	Northeast
172	Turtle Creek	460172	Spink	Quarterly	6,8,9,10	Group 2	Northeast
173	Rapid Creek	460173	Pennington	Monthly	1,2,7,8,9,10	Group 7	Black Hills
BSA1	Big Sioux River	46BSA1	GRANT	Monthly	5,8,9,10	Group 1	Northeast
BS08	Big Sioux River	46BS08	HAMLIN	Monthly	5,8,9,10	Group 1	Northeast
BS18	Big Sioux River	46BS18	MOODY	Monthly	1,5,8,9,10	Group 1	Southeast
BS23	Big Sioux River	46BS23	MINNEHAHA	Monthly	1,5,7,8,9,10	Group 1	Southeast
BS29	Big Sioux River	46BS29	MINNEHAHA	Monthly	5,7,8,9,10	Group 4	Southeast
BS49	Brule Creek	46BS49	UNION	Quarterly	6,8,9,1	Group 2	Southeast
MN31	Annie Creek	46MN31	LAWRENCE	Quarterly	3,8,9,10	Group 5	Black Hills
MN32	Spearfish Creek	46MN32	LAWRENCE	Quarterly	1,2,7,8,9,10,11	Group 5	Black Hills
MN33	Spearfish Creek	46MN33	LAWRENCE	Quarterly	1,2,7,8,9,10,11	Group 5	Black Hills
MN35	Spearfish Creek	46MN35	LAWRENCE	Quarterly	2,8,9,10	Group 5	Black Hills
MN38	False Bottom Creek	46MN38	LAWRENCE	Quarterly	3,8,9,10	Group 5	Black Hills
MN39	Cleopatra Creek (former Squaw Creek)	46MN39	LAWRENCE	Quarterly	2,7,8,9,10	Group 5	Black Hills

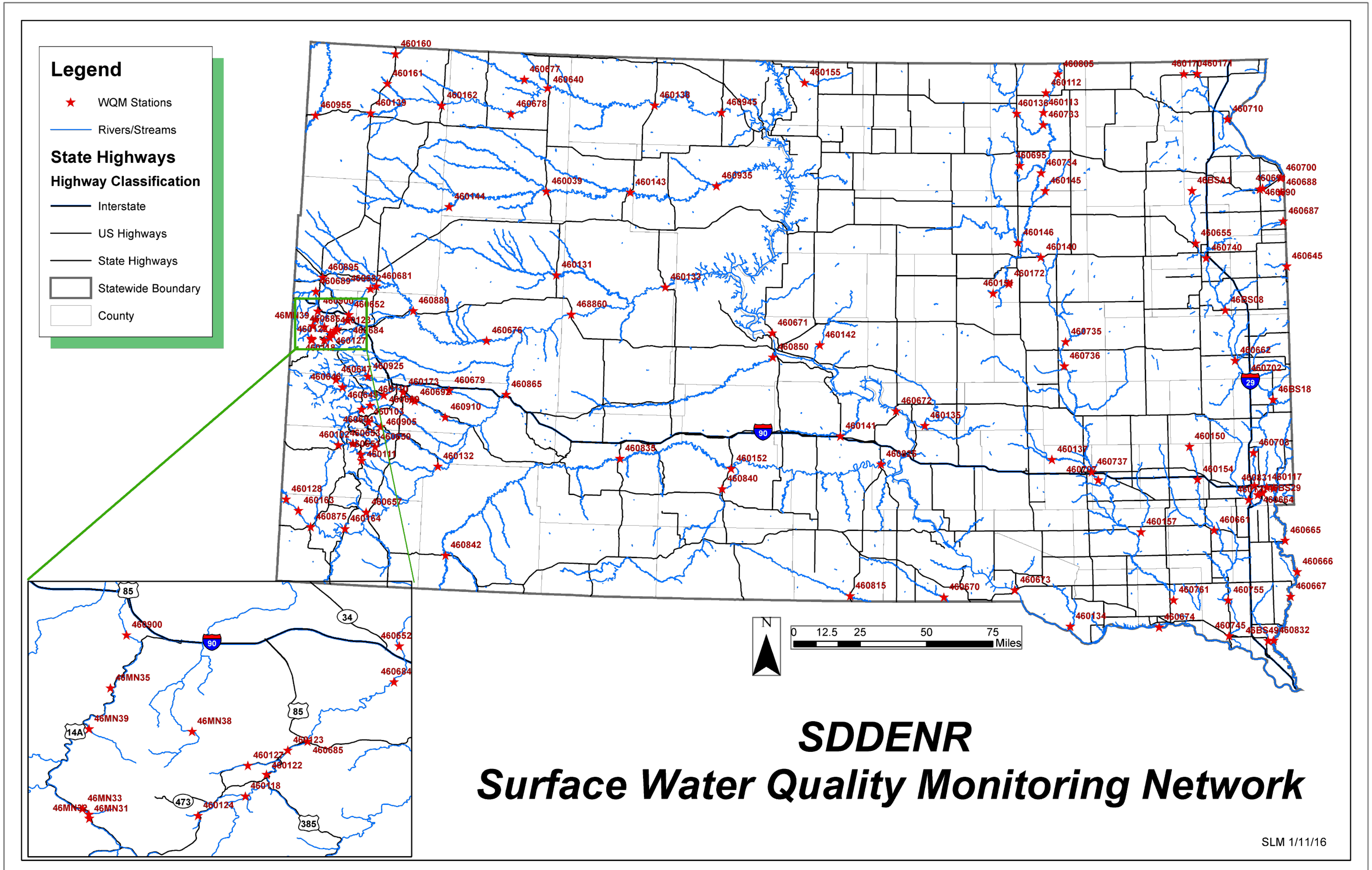

Figure 28: South Dakota DENR Water Quality Monitoring Sites

APPENDIX D

303(D) SUMMARY

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Chlorophyll-a	2014	2029	2	
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Oxygen, Dissolved	2010	2029	2	
SD-BA-L-MURDO_01	Murdo Dam	Jones County	Oxygen, Dissolved	2012	2029	2	
SD-BA-L-WAGGONER_01	Waggoner Lake	Haakon County	Chlorophyll-a	2010	2020	2	YES
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	*Escherichia coli*	2016	2029	1	
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	Specific Conductance	2004	2029	2	
SD-BF-L-IRON_CREEK_01	Iron Creek Lake	Lawrence County	Temperature, water	2010	2029	2	
SD-BF-L-MIRROR_EAST_01	Mirror Lake East	Lawrence County	Temperature, water	2006	2029	2	
SD-BF-L-MIRROR_WEST_01	Mirror Lake West	Lawrence County	Temperature, water	2008	2029	2	
SD-BF-L-NEWELL_CITY_01	Newell City Pond	Butte County	Temperature, water	2010	2029	2	
SD-BF-R-BELLE_FOURCHE_01	Belle Fourche River	Wyoming border to Redwater River	*Escherichia coli*	2012	2016	1	YES
SD-BF-R-BELLE_FOURCHE_03	Belle Fourche River	Whitewood Creek to Willow Creek	*Escherichia coli*	2016	2029	1	
SD-BF-R-DEADWOOD_01	Deadwood Creek	Rutabaga Gulch to Whitewood Creek	*Escherichia coli*	2014	2018	1	YES
SD-BF-R-HORSE_01_USGS	Horse Creek	Indian Creek to mouth	*Escherichia coli*	2016	2029	1	
SD-BF-R-HORSE_01_USGS	Horse Creek	Indian Creek to mouth	TSS	2006	2029	1	
SD-BF-R-WHITEWOOD_04	Whitewood Creek	Spruce Gulch to Sandy Creek	*Escherichia coli*	2012	2019	1	YES
SD-BF-R-WHITEWOOD_04	Whitewood Creek	Spruce Gulch to Sandy Creek	Fecal Coliform	2004	2029	1	
SD-BF-R-WHITEWOOD_05	Whitewood Creek	Sandy Creek to I-90	pH (high)	2006	2029	2	
SD-BF-R-WHITEWOOD_06	Whitewood Creek	I-90 to Crow Creek	*Escherichia coli*	2014	2019	1	YES
SD-BF-R-WHITEWOOD_06	Whitewood Creek	I-90 to Crow Creek	pH (high)	2008	2029	2	
SD-BF-R-WHITEWOOD_07	Whitewood Creek	Crow Creek to mouth	*Escherichia coli*	2016	2029	1	
SD-BF-R-WHITEWOOD_07	Whitewood Creek	Crow Creek to mouth	TSS	2010	2029	1	
SD-BS-L-ALBERT_01	Lake Albert	Kingsbury County	Oxygen, Dissolved	2014	2029	2	
SD-BS-L-BLUE_DOG_01	Blue Dog Lake	Day County	pH (high)		2029	2	
SD-BS-L-BULLHEAD_01	Bullhead Lake	Deuel County	Chlorophyll-a	2010	2021	2	YES
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Day County	Chlorophyll-a	2014	2021	2	YES
SD-BS-L-WAUBAY_01	Waubay Lake	Day County	Chlorophyll-a	2014	2029	2	
SD-BS-R-BEAVER_02	Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	*Escherichia coli*	2014	2021	1	YES

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-BS-R-BIG_SIOUX_01	Big Sioux River	S28, T121N, R52W to Lake Kampeska	*Escherichia coli*	2010	2016	1	YES
SD-BS-R-BIG_SIOUX_01	Big Sioux River	S28, T121N, R52W to Lake Kampeska	Oxygen, Dissolved	2004	2029	2	
SD-BS-R-BIG_SIOUX_02	Big Sioux River	Lake Kampeska to Willow Creek	*Escherichia coli*	2016	2029	1	
SD-BS-R-BIG_SIOUX_02	Big Sioux River	Lake Kampeska to Willow Creek	Oxygen, Dissolved	2014	2029	2	
SD-BS-R-BIG_SIOUX_04	Big Sioux River	Stray Horse Creek to near Volga	*Escherichia coli*	2016	2029	1	
SD-BS-R-BIG_SIOUX_05	Big Sioux River	Near Volga to Brookings	TSS	2004	2022	1	YES
SD-BS-R-BIG_SIOUX_06	Big Sioux River	Brookings to Brookings/Moody County Line	TSS	2004	2022	1	YES
SD-BS-R-BIG_SIOUX_07	Big Sioux River	Brookings/Moody County Line to S2, T104N, R49W	*Escherichia coli*	2016	2029	1	
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Above Brandon to Nine Mile Creek	*Escherichia coli*	2012	2029	1	
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Above Brandon to Nine Mile Creek	TSS	2004	2020	1	YES
SD-BS-R-BIG_SIOUX_14	Big Sioux River	Nine Mile Creek to near Fairview	TSS	2004	2020	1	YES
SD-BS-R-BRULE_01	Brule Creek	Big Sioux River to confluence of its east and west forks	*Escherichia coli*	2014	2018	1	YES
SD-BS-R-EAST_BRULE_01	East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	TSS	2008	2018	1	YES
SD-BS-R-FLANDREAU_01	Flandreau Creek	Big Sioux River to Minnesota Border	*Escherichia coli*	2014	2029	1	
SD-BS-R-SIXMILE_01	Six Mile Creek	Big Sioux River to S30, T112N, R48W	*Escherichia coli*	2014	2020	1	YES
SD-BS-R-SIXMILE_01	Six Mile Creek	Big Sioux River to S30, T112N, R48W	Fecal Coliform	2010	2029	1	
SD-BS-R-SKUNK_01	Skunk Creek	Brandt Lake to Big Sioux River	*Escherichia coli*	2014	2018	1	YES
SD-BS-R-UNION_01	Union Creek	Big Sioux River to confluence with East and West Forks	TSS	2008	2019	1	YES
SD-CH-L-CENTER_01	Center Lake	Custer County	Temperature, water	2008	2029	2	
SD-CH-L-COLD_BROOK_01	Cold Brook Reservoir	Fall River County	Temperature, water	2006	2029	2	
SD-CH-L-DEERFIELD_01	Deerfield Lake	Pennington County	Temperature, water	2010	2029	2	

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-CH-L-NEW_WALL_01	New Wall Lake	Pennington County	pH (high)	2010	2029	2	
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	Oxygen, Dissolved	2006	2029	2	
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	Temperature, water	2006	2029	2	
SD-CH-L-SYLVAN_01	Sylvan Lake	Custer County	Temperature, water	2008	2029	2	
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	Salinity (SAR)	2006	2029	2	
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	Specific Conductance	2004	2029	2	
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	Total Dissolved Solids	2004	2029	2	
SD-CH-R-BOX_ELDER_01	Box Elder Creek	Cheyenne River to S22, T2N, R8E	*Escherichia coli*	2016	2029	1	
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Salinity (SAR)	2014	2029	2	
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Specific Conductance	2004	2029	2	
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Total Dissolved Solids	2004	2029	2	
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	TSS	2012	2029	1	
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	*Escherichia coli*	2014	2022	1	YES
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	Salinity (SAR)	2008	2029	2	
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	Specific Conductance	2004	2029	2	
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	Total Dissolved Solids	2004	2029	2	
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	TSS	2004	2022	1	YES
SD-CH-R-CHEYENNE_03	Cheyenne River	Fall River to Cedar Creek	TSS	2004	2029	1	
SD-CH-R-CHEYENNE_04	Cheyenne River	Cedar Creek to Belle Fourche River	TSS	2004	2029	1	
SD-CH-R-CHEYENNE_05	Cheyenne River	Belle Fourche River to Bull Creek	TSS	2004	2029	1	
SD-CH-R-CHEYENNE_06	Cheyenne River	Bull Creek to Lake Oahe	TSS	2004	2029	1	
SD-CH-R-FALL_01	Fall River	Hot Springs to mouth	Temperature, water	2004	2029	2	
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	pH (high)	2006	2029	2	
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	Temperature, water	2006	2029	1	
SD-CH-R-HORSEHEAD_01_USGS	Horsehead Creek	At Oelrichs	Specific Conductance	2004	2029	2	

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-CH-R-RAPID_04	Rapid Creek	S15, T1N, R8E to above Farmingdale	*Escherichia coli*	2014	2022	1	YES
SD-CH-R-SPRING_01	Spring Creek	S5, T2S, R3E to Sheridan Lake	*Escherichia coli*	2014	2021	1	YES
SD-CH-R-SPRING_01	Spring Creek	S5, T2S, R3E to Sheridan Lake	TSS	2014	2021	1	YES
SD-CH-R-VICTORIA_01_USGS	Victoria Creek	Rapid Creek to S19, T1N, R6E	Temperature, water		2029	2	
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	Chlorophyll-a	2010	2029	2	
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	Mercury in Fish Tissue	2004	2029	2	
SD-GR-L-PUDWELL_01	Pudwell Dam	Corson County	Mercury in Fish Tissue	2016	2029	2	
SD-GR-L-SHADEHILL_01	Shadehill Reservoir	Perkins County	Salinity (SAR)	2004	2029	2	
SD-GR-R-BULL_01	Bull Creek	SF Grand River to S15, T21N, R5E	*Escherichia coli*	2016	2029	2	
SD-GR-R-BULL_01	Bull Creek	SF Grand River to S15, T21N, R5E	Salinity (SAR)	2012	2029	2	
SD-GR-R-CROOKED_01	Crooked Creek	ND border to S34, T23N, R5E	Salinity (SAR)	2012	2029	2	
SD-GR-R-CROOKED_01	Crooked Creek	ND border to S34, T23N, R5E	Specific Conductance	2014	2029	2	
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	Salinity (SAR)		2029	2	
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	Temperature, water	2004	2029	2	
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	*Escherichia coli*	2014	2029	2	
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	Salinity (SAR)	2004	2029	2	
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	TSS	2004	2029	2	
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	*Escherichia coli*	2010	2029	2	
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Fecal Coliform	2004	2029	2	
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	TSS	2004	2029	2	
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	Salinity (SAR)	2004	2029	2	
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	*Escherichia coli*	2016	2029	2	
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	Fecal Coliform	2016	2029	2	

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	Salinity (SAR)	2006	2029	2	
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	TSS	2004	2029	2	
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	*Escherichia coli*	2016	2029	2	
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	Salinity (SAR)	2004	2029	2	
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	TSS	2004	2029	2	
SD-JA-L-BIERMAN_01	Bierman Dam	Spink County	Chlorophyll-a	2010	2022	2	YES
SD-JA-L-BYRON_01	Lake Byron	Beadle County	pH (high)	2010	2029	2	
SD-JA-L-CARTHAGE_01	Lake Carthage	Miner County	Chlorophyll-a	2010	2021	2	YES
SD-JA-L-CRESBARD_01	Cresbard Lake	Faulk County	pH (high)	2010	2029	2	
SD-JA-L-FOUR_MILE_01	Four Mile Lake	Marshall County (formerly SD-BS-L-FOUR_MILE_01)	pH (high)	2012	2029	2	
SD-JA-L-JONES_01	Jones Lake	Hand County	pH (high)	2006	2029	2	
SD-JA-L-LATHAM_01	Latham	Faulk County	Oxygen, Dissolved	2012	2029	2	
SD-JA-L-LOUISE_01	Lake Louise	Hand County	Oxygen, Dissolved	2014	2029	2	
SD-JA-L-LOUISE_01	Lake Louise	Hand County	pH (high)	2008	2029	2	
SD-JA-L-MINA_01	Mina Lake	Edmunds County	Oxygen, Dissolved	2012	2029	2	
SD-JA-L-NINE_MILE_01	Nine Mile Lake	Marshall County (formerly SD-BS-L-NINE_MILE_01)	pH (high)	2010	2029	2	
SD-JA-L-PIERPONT_01	Pierpont Lake	Day County	Temperature, water	2012	2029	2	
SD-JA-L-RAVINE_01	Ravine Lake	Beadle County	Oxygen, Dissolved	2012	2029	2	
SD-JA-L-REDFIELD_01	Lake Redfield	Spink County	Oxygen, Dissolved	2010	2029	2	
SD-JA-L-ROSETTE_01	Rosette Lake	Edmunds County	Chlorophyll-a	2014	2021	2	YES
SD-JA-L-S_RED_IRON_01	South Red Iron Lake	Marshall County (formerly SD-BS-L-S_RED_IRON_01)	Temperature, water	2014	2029	2	
SD-JA-L-SOUTH_BUFFALO_01	South Buffalo Lake	Marshall County (formerly SD-BS-L-SOUTH_BUFFALO_01)	Oxygen, Dissolved	2010	2029	2	
SD-JA-L-TWIN_01	Twin Lakes	Sanborn County	Chlorophyll-a	2010	2021	2	YES
SD-JA-L-TWIN_01	Twin Lakes	Sanborn County	Oxygen, Dissolved	2016	2029	2	
SD-JA-L-WILMARTH_01	Wilmarth Lake	Aurora County	pH (high)	2012	2029	2	

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	*Escherichia coli*	2010	2018	1	YES
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	TDS	2016	2029	1	
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	*Temperature*	2016	2029	1	
SD-JA-R-FOOT_01_USGS	Foot Creek	Near Aberdeen, SD	Oxygen, Dissolved	2012	2029	2	
SD-JA-R-JAMES_01	James River	North Dakota border to Mud Lake Reservoir	Oxygen, Dissolved	2012	2029	2	
SD-JA-R-JAMES_03	James River	Columbia Road Reservoir	Oxygen, Dissolved	2008	2029	2	
SD-JA-R-JAMES_03	James River	Columbia Road Reservoir	TSS	2016	2029	1	
SD-JA-R-JAMES_04	James River	Columbia Road Reservoir to near US HWY 12	Oxygen, Dissolved	2012	2029	2	
SD-JA-R-JAMES_04	James River	Columbia Road Reservoir to near US HWY 12	TSS	2016	2029	1	
SD-JA-R-JAMES_05	James River	US HWY 12 to Mud Creek	Oxygen, Dissolved	2006	2029	2	
SD-JA-R-JAMES_06	James River	Mud Creek to James River Diversion Dam	Oxygen, Dissolved	2010	2029	2	
SD-JA-R-JAMES_07	James River	James River Diversion Dam to Huron 3rd Street Dam	Oxygen, Dissolved	2012	2029	2	
SD-JA-R-JAMES_07	James River	James River Diversion Dam to Huron 3rd Street Dam	Total Dissolved Solids	2014	2029	2	
SD-JA-R-JAMES_09	James River	Sand Creek to I-90	TSS	2004	2019	1	YES
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	*Escherichia coli*	2016	2029	1	
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	TSS	2004	2019	1	YES
SD-JA-R-MOCCASIN_02	Moccasin Creek	James River to S24, T123N, R64W	Oxygen, Dissolved	2008	2029	2	
SD-JA-R-MUD_01	Mud Creek	James River to Hwy 37	Oxygen, Dissolved	2006	2029	2	
SD-JA-R-SNAKE_01	Snake Creek	James River to confluence with SF Snake Creek	Oxygen, Dissolved	2006	2029	2	
SD-JA-R-WOLF_01	Wolf Creek	Wolf Creek Colony to S5, T103N, R56W	*Escherichia coli*	2012	2017	1	YES
SD-JA-R-WOLF_01	Wolf Creek	Wolf Creek Colony to S5, T103N, R56W	Fecal Coliform	2016	2029	1	
SD-JA-R-WOLF_02	Wolf Creek	Just above Wolf Creek Colony to the mouth.	*Escherichia coli*	2012	2017	1	YES

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-JA-R-WOLF_02	Wolf Creek	Just above Wolf Creek Colony to the mouth.	Fecal Coliform	2014	2029	1	
SD-LM-R-LITTLE_MISSOURI_01	Little Missouri River	Montana border to North Dakota border	TSS	2010	2029	1	
SD-MI-L-ANDES_01	Lake Andes	Charles Mix County	Oxygen, Dissolved	2006	2029	2	
SD-MI-L-CAMPBELL_01	Lake Campbell	Campbell County	pH (high)	2010	2029	2	
SD-MI-L-CORSICA_01	Corsica Lake	Douglas County	pH (high)	2008	2029	2	
SD-MI-L-DANTE_01	Dante Lake	Charles Mix County	Temperature, water	2014	2029	2	
SD-MI-L-HIDDENWOOD_01	Lake Hiddenwood	Walworth County	Oxygen, Dissolved	2012	2029	2	
SD-MI-L-MCCOOK_01	McCook Lake	Union County	Temperature, water	2010	2029	2	
SD-MI-L-POCASSE_01	Lake Pocasse	Campbell County	Chlorophyll-a	2010	2022	2	YES
SD-MI-R-CROW_01	Crow Creek	Bedashosha Lake to Jerauld County line	*Escherichia coli*	2016	2029	1	
SD-MI-R-CROW_01	Crow Creek	Bedashosha Lake to Jerauld County line	TSS	2016	2029	1	
SD-MI-R-LEWIS_AND_CLARK_01	Missouri River (Lewis and Clark Lake)	Fort Randall Dam to North Sioux City	Mercury in Fish Tissue	2016	2029	1	
SD-MI-R-MEDICINE_01	Medicine Creek	Lake Sharpe to US Hwy 83	*Escherichia coli*	2016	2029	1	
SD-MI-R-MEDICINE_01	Medicine Creek	Lake Sharpe to US Hwy 83	Specific Conductance	2004	2029	2	
SD-MI-R-PONCA_01	Ponca Creek	SD/NE border to US Hwy 183	*Escherichia coli*	2016	2029	1	
SD-MI-R-SHARPE_01	Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam	Oxygen, Dissolved	2016	2029	2	
SD-MI-R-SHARPE_01	Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam	Temperature, water	2010	2029	1	
SD-MI-R-SPRING_01	Spring Creek	Lake Pocasse to US HWY 83	Oxygen, Dissolved	2006	2029	2	
SD-MN-L-BIG_STONE_01	Big Stone Lake	Roberts County	Temperature, water	2012	2029	2	
SD-MN-L-HENDRICKS_01	Lake Hendricks	Brookings County	pH (high)	2010	2029	2	
SD-MN-L-PUNISHED_WOMAN_01	Punished Woman Lake	Codington County	pH (high)	2012	2029	2	
SD-MN-R-LAC_QUI_PARLE_W_BR_01	Lac Qui Parle River, West Branch	SD/MN border to S8, T115N, R47W	*Escherichia coli*	2016	2029	1	
SD-MN-R-LITTLE_MINNESOTA_02	Little Minnesota River	S24, T126N, R51W to S15, T128N, R52W	Oxygen, Dissolved	2012	2029	2	

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-MN-R-MUD_01	Mud Creek	SF Yellowbank River to S22, T118N, R48W	Oxygen, Dissolved	2012	2029	2	
SD-MN-R-WHETSTONE_S_FORK_01	South Fork Whetstone River	Headwaters to Lake Farley	*Escherichia coli*	2012	2017	1	YES
SD-MN-R-WHETSTONE_S_FORK_02	South Fork Whetstone River	Lake Farley to mouth	*Escherichia coli*	2012	2017	1	YES
SD-MN-R-YELLOW_BANK_N_FORK_01	North Fork Yellow Bank River	SD/MN border to S27, T120N, R48W	*Escherichia coli*	2012	2016	1	YES
SD-MN-R-YELLOW_BANK_S_FORK_01	South Fork Yellow Bank River	SD/MN border to S33, T118N, R49W	*Escherichia coli*	2012	2016	1	YES
SD-MU-L-COAL_SPRINGS_01	Coal Springs Reservoir	Perkins County	pH (high)	2012	2029	2	
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	*Escherichia coli*	2016	2029	2	
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	Salinity (SAR)		2029	2	
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	TSS	2006	2029	2	
SD-MU-R-MOREAU_02	Moreau River	Ziebach/Perkins county line to Green Grass	Salinity (SAR)		2029	2	
SD-MU-R-MOREAU_02	Moreau River	Ziebach/Perkins county line to Green Grass	TSS		2029	2	
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	*Escherichia coli*	2010	2029	2	
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	Fecal Coliform	2006	2029	2	
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	TSS	2004	2029	2	
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	Salinity (SAR)	2014	2029	2	
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	Specific Conductance		2029	2	
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	Total Dissolved Solids	2004	2029	2	
SD-NI-L-RAHN_01	Rahn Lake	Tripp County	Chlorophyll-a	2010	2021	2	YES

AUID	Name	Location	Cause	Cycle First Listed	TMDL Schedule	TMDL Priority	Vision Priority
SD-VM-L-E_VERMILLION_01	East Vermillion Lake	McCook County	Chlorophyll-a	2010	2029	2	
SD-VM-L-E_VERMILLION_01	East Vermillion Lake	McCook County	Temperature, water	2012	2029	2	
SD-VM-L-SILVER_01	Silver Lake	Hutchinson County	pH (high)	2010	2029	2	
SD-VM-L-THOMPSON_01	Lake Thompson	Kingsbury County	Chlorophyll-a	2014	2022	2	YES
SD-VM-R-LONG_01	Long Creek	Vermillion River to Highway 44	*Escherichia coli*	2010	2016	1	YES
SD-VM-R-LONG_01	Long Creek	Vermillion River to Highway 44	Fecal Coliform	2008	2029	1	
SD-VM-R-VERMILLION_03	Vermillion River	Baptist Creek to mouth	*Escherichia coli*	2014	2019	1	YES
SD-VM-R-VERMILLION_E_FORK_01	East Fork Vermillion River	McCook/Lake County line to Little Vermillion River	*Escherichia coli*	2016	2019	1	YES
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	Vermillion River to McCook-Miner County Line	*Escherichia coli*	2010	2017	1	YES
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	Vermillion River to McCook-Miner County Line	Fecal Coliform	2010	2029	1	
SD-WH-L-ALLAN_DAM_01	Allan Dam	Bennett County	pH (high)	2014	2029	2	
SD-WH-R-COTTONWOOD_01	Cottonwood Creek	Headwaters to White River	Specific Conductance	2004	2029	2	
SD-WH-R-LITTLE_WHITE_01	Little White River	Rosebud Creek to mouth	*Escherichia coli*	2012	2029	2	
SD-WH-R-LITTLE_WHITE_01	Little White River	Rosebud Creek to mouth	Fecal Coliform	2010	2029	2	
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	*Escherichia coli*	2010	2029	2	
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	Fecal Coliform	2004	2029	2	
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	Salinity (SAR)	2010	2029	2	
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	*Escherichia coli*	2012	2029	2	
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	Fecal Coliform	2004	2029	2	
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	Salinity (SAR)	2010	2029	2	
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	TSS	2004	2029	2	
SD-WH-R-WHITE_04	White River	Little White River to confluence with Missouri River	*Escherichia coli*	2010	2029	1	
SD-WH-R-WHITE_04	White River	Little White River to confluence with Missouri River	Fecal Coliform	2004	2029	1	

APPENDIX E

ECOREGION MAPS

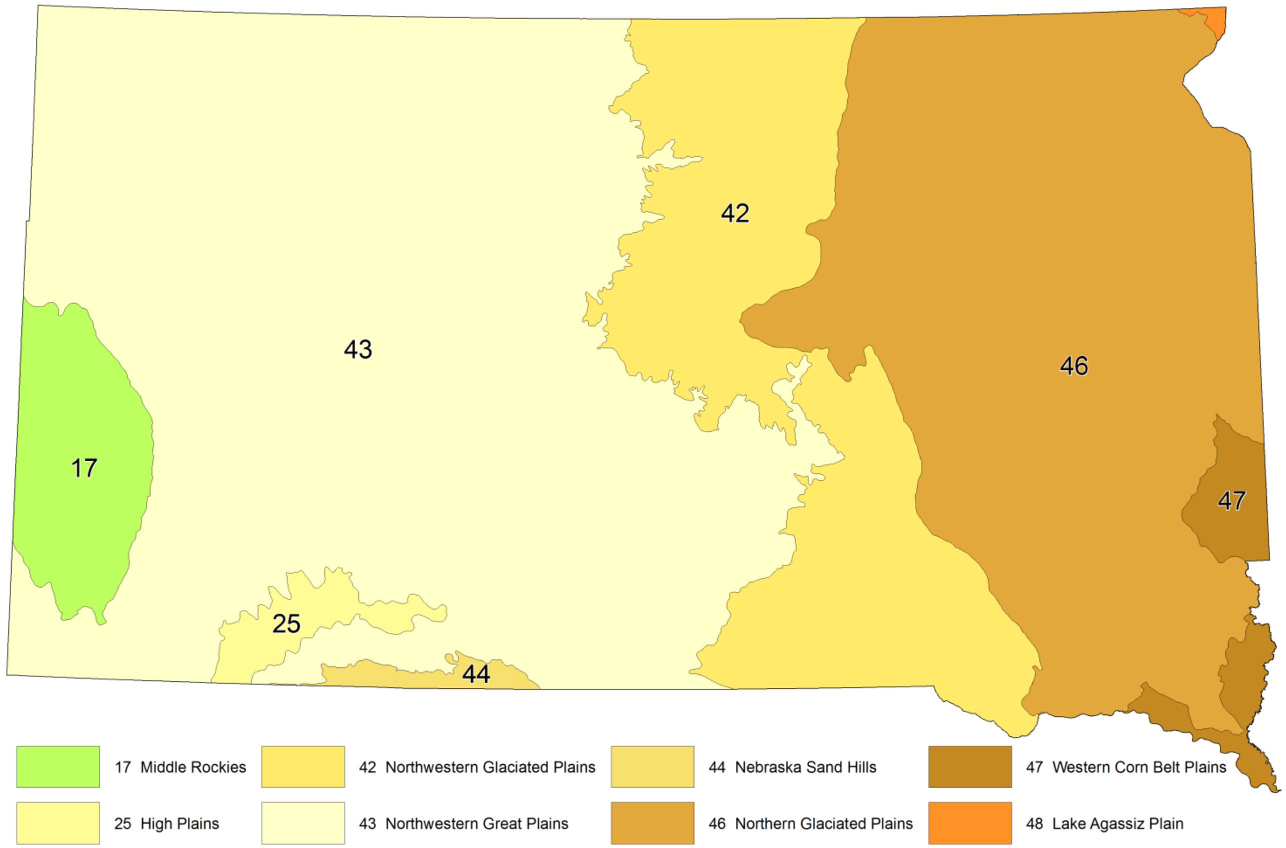

Figure 29: Level 3 Ecoregions in South Dakota

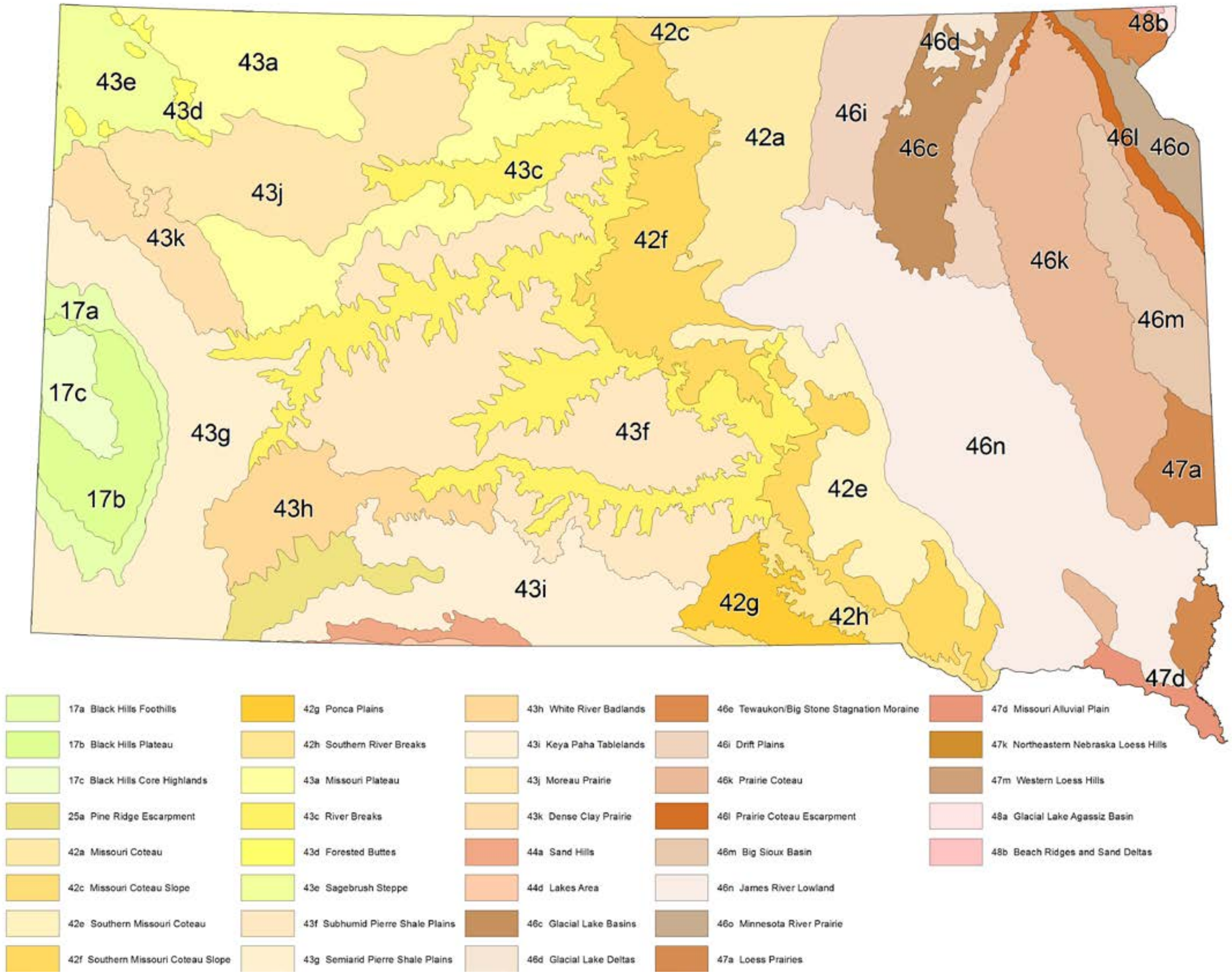

Figure 30: Level 4 Ecoregions in South Dakota

APPENDIX F

PUBLIC COMMENTS

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

Ref: 8EPR-EP

JUN 7 2016

Shannon Minerich
Surface Water Quality Program
Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501-3181

Re: 2016 South Dakota Integrated Report

Dear Ms. Minerich:

We have reviewed the Department's draft 2016 Integrated Report (IR) for Surface Water Quality Assessment and appreciate the opportunity to provide feedback. The Department's draft IR is well organized, and we commend your efforts to utilize common sense language when possible. We also want to recognize The Department's continued efforts to refine an assessment methodology for nutrient-related narrative standards. We look forward to continuing efforts with The Department in this endeavor. We found that information in the Report, the Assessment Database (ADB), and GIS files are consistent.

We have some additional comments that should be addressed prior to finalizing the document, these can be found in the Attachment. We look forward to receiving your final 2016 IR, and continuing our cooperative efforts. If you have any questions or wish to discuss these comments further please contact me at (303) 312-6974. Again, thank you for your commitment and hard work on the 2016 Integrated Report.

Sincerely,

Elizabeth Rogers
Monitoring and Assessment Team
Water Quality Unit
Ecosystems Protection Program

Attachment

Attachment

Comments on South Dakota's 2016 Draft Integrated Report

Page 3	Does DENR plan to obtain more recent wetland inventory data for the state? This information is outdated (as 1997), and as stated in the Integrated Report, national estimates suggest a decline in wetlands. It would be very helpful to understand the current status of wetlands in South Dakota.

DENR Response:

DENR incorporated more recent wetland inventory information in the wetland section. In addition, the freshwater wetland acreage was updated in Table 1. The new information was obtained from a USFWS publication entitled "Status and Trends of Prairie Wetlands in the United States 1997 to 2009." A citation (Dahl 2014) was provided in the wetland text and reference list section. In general, the number of small temporary wetlands declined (2.8%), while the overall wetland acreage increased in Prairie Pothole Region of eastern South Dakota from 1997 to 2009.

Page 6	The number of ambient monitoring stations in South Dakota has decreased between 2014 (146 stations) and 2016 (132 stations). Is the loss of 14 stations attributable to USGS stations being removed or are there other reasons for this reduction in stations?

DENR Response:

DENR has discontinued some WQM stations since the 2014 IR cycle. Stations were discontinued mainly due to persistent low flow conditions on ephemeral streams or because the basis for monitoring was redundant or no longer existed. The department made changes to the WQM network to maximize the monitoring effort while applying cost savings measures to the increasing demand put upon states by EPA. While not reflected in this 2016 IR document, DENR has recently added WQM sites to the network to increase statewide coverage and began sampling in May 2016. Applicable information pertaining to these new sites will be included in the 2018 IR.

Page 10	In Table 2, units for bacteria (Coliform, Escherichia coli) currently read "per 100ml" but should read "CFU per 100ml", please correct.

DENR Response:

ARSD Article 74:51:01:50-51 displays the unit of measure for bacteria as "per 100mL." DENR used this unit measure to maintain consistency with water quality standards defined in state law. The unit description "per 100 ml" was not changed according to EPA's recommendation.

Page 21	Please include a title and link to refer the reader to the actual Vision document(s) within the Vision Discussion section: (example: "A Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program, 2013) https://www.epa.gov/sites/production/files/2015-07/documents/vision_303d_program_dec_2013.pdf)

DENR Response:
DENR inserted the requested information at the end of the Vision discussion section (Vision Summary) on page 22.

Page 27	Table 8. The Conventional Parameters minimum sample size description is somewhat confusing. It currently reads: "The sample threshold is reduced to 10 samples if 3 or more samples exceed daily maximum water quality standards. A minimum of two chronic results are required for chronic criteria including 30-day averages and geomeans." Does this mean that the minimum sample size is reduced to 10 if 3 exceed the maximum criteria or 2 exceed chronic criteria, or does DENR mean that 2 samples are needed to calculate average/geomeans? Or does DENR mean that 2 samples are needed to determine chronic attainment. Please clarify.

DENR Response:
Table 8 has been updated to provide clarification. To determine nonsupport, more than one violation of a toxic criterion is required within a continuous 3-year period within the IR data range. This is consistent with EPA's 2004 IR guidance. Acute and chronic toxics are assessed separately because they have different criteria.

	For the Toxic Parameters minimum sample size, a minimum of 2 samples is needed within a 3 year period. The Data Age row describes a 5 year time period for streams and a 10 year period for lakes. Please explain the difference, and use of 3 years for Toxic Parameters.

DENR Response:
Table 8 has been updated to provide clarification.

	For the Toxic Parameters assessment method, it specifies "More than one exceedance of toxic criteria within the past 3 years for both the acute and chronic standard." Does DENR assess acute and chronic separately? Please provide further explanation/clarification on how this method is applied.

DENR Response:
Table 8 has been updated to provide clarification.

	For the Mercury in Fish Tissue minimum sample size, a data range is specified from January 2006 through September 2015. Does this mean that streams were assessed for mercury with a dataset older than conventional and toxic parameters, using the lake data range? Please clarify.

DENR Response:
Yes. All waterbodies assessed for mercury in fish tissue use a data range from January 2006 through September 2015. Some waterbodies have single sampling events during that time and others may have multiple visits. By using a ten year data frame, we are able to assess more waterbodies that have mercury in fish tissue data. The fish collection effort uses a different sampling frequency than conventional parameters for lakes and streams. Follow up fish tissue collection is based on many factors including the concentration of mercury in fish tissue.

Page 34	Table 10 (Nutrient-related assessment status of stream assessment units in ecoregion 46 in eastern, South Dakota) lists the 21 stream segments assessed for nutrient-related impairments. Three of them do not indicate an Assessment Status (SD-BS-R-BIG_SIOUX_01, SD-MN-R-LAC_QUI_PARLE_W_BR_01, SD-MN-R-LITTLE_MINNESOTA_01) in the far right column. Please provide this status to readers. Also, please define what "Track Assessment Unit" means so the reader understands this assessment status.

DENR Response:
The lack of assessment status for the three stream segments in question was due to an oversight by DENR. All three stream segments were meeting the nutrient thresholds described in Table 9. Therefore, further ecological assessment was not warranted. A "Track Assessment Unit" label was placed in the Assessment Status column for the three stream segments. Language defining the assessment status "Track Assessment Unit" was placed under Table 10 to provide clarification.

Page 37	Does DENR plan to include their natural lakes paleolimnological study results (within the Lake Assessment Methodology for Nutrient-Related Narrative Standards section) in either the 2016 or 2018 Integrated Reports?

DENR Response:
DENR encountered several challenges with the paleolimnological study being conducted on natural lakes in eastern South Dakota. In particular, several sediment cores extracted during the winter of 2013 were not deep enough to pre-date human settlement. The study was ultimately delayed until resources become available to acquire appropriate coring equipment and revisit lakes to extract sediment cores. The process will also entail identifying a contract lab for sediment dating, diatom identification and nutrient model development. The timeline to complete the process and incorporate results into future nutrient-related lake assessment methodology is uncertain.

Page 77	The Dry Lake AUID currently reads: SD-BS-L-DRY_#2_01, this is incorrect. It should read SD-BS-L-DRY_NO2_01, please correct.

DENR Response:
This has been corrected.

Page 105	Horseshoe Lake (SD-JA-L-HORSESHOE_01) is a new AUID for 2016, as part of the statewide Mercury TMDL assessment effort. Table 3 in the TMDL indicates that this lake is located in Day County, but in the draft 2016 IR, it is listed in Marshall County. Please verify and correct.

DENR Response:
The 2016 IR is correct: Horseshoe Lake is located in Marshall County.

Page 151	Table 48, Waterbodies Sampled for Contaminants in Fish. For the 2016 IR, 26 different locations were sampled and analyzed for contaminants during 2014 and 2015. In the 2014 IR, 45 different locations were sampled during 2012 and 2013. Please explain the overall sampling approach for fish flesh, and describe why the number of sites can vary so much from year to year.

DENR Response:

The sampling approach for fish contaminants is affected by many variables which can cause variations in the number of waterbodies sampled on an annual basis. Some of these factors include: 1) Other fieldwork activities scheduled by GF&P; 2) GF&P lake survey schedule; 3) angling pressure on waterbodies; 4) waterbody sampling rotation based on existing mercury data; 5) the type and cost of analyses conducted in relation to the budget (pesticide and PCB analyses cost a lot more than just mercury); and others.

Page 153	Domestic Water Supply Restrictions. The number of waterbodies not supporting the designated use of domestic water supply sources has increased (was 1 in 2014 IR, now 3 in 2016 IR). The James River is no longer used as a public water source, but Firesteel Creek (impaired for TDS) and Lake Mitchell (impaired for chlorophyll-a) are designated as emergency backup sources of domestic water for the City of Mitchell. Since these two waterbodies are currently impaired, are not supporting this designated use, and could be used in an emergency situation, please explain how DENR plans to address these impairments to return these two water bodies to fully supporting the domestic water supply use.

DENR Response:

Lake Mitchell and Firesteel Creek have had an EPA approved TMDL for nutrients (phosphorus) since 1997. Continuous nonpoint source implementation projects have been ongoing in the Lake Mitchell watershed since 1998. DENR and other water resource partners (NRCS, James River Water Development District and the City of Mitchell) continue to provide funding and technical assistance to address impairments in Firesteel Creek and Lake Mitchell. The ultimate goal of the implementation effort is to bring Firesteel Creek and Lake Mitchell into compliance with nutrient goals and water quality standards assigned to protect the beneficial uses, including the Domestic Water Supply use. The process is expected to take considerable time and resources considering that Lake Mitchell is a relatively small impoundment with a large agricultural watershed.

Appendix A:	Waterbodies with EPA Approved TMDLs
Page 169-177	Please add and list out all individual waters identified as impaired and placed in Category 4A (as described in the Basin Tables), as part of the EPA approved state-wide Mercury TMDL to this section.

DENR Response:

While not a required reporting element, DENR has included Appendix A to assist and provide additional TMDL information to the public. All waterbodies with approved TMDLs for mercury in fish tissue have been added to Appendix A.

Sylvan Lake (SD-CH-L-SYLVAN_01) Appendix A indicates a TMDL has been approved to address Sylvan Lake's pH impairment and the basin information tables refer to a number of mercury impairments as Category 4a (i.e, SD-BA-L-SHERIFF_01, SD-JA-L-CLUBHOUSE_01, SD-JA-R-JAMES_08, SD-CH-L-STOCKADE_01, and SD-CH-L-SHERIDAN_01). EPA understands that TMDLs for these impairments had not been approved by EPA when this Integrated Report was released for public review. Since that time however, DENR has submitted the TMDLs to EPA for review and approval. If for some reason these TMDLs are not approved by the time DENR finalizes the 2016 Integrated Report, EPA expects the report to represent the status of those waterbodies accurately in Appendix A and the Basin Tables (e.g., Category 5, no approved TMDL).

DENR Response:

DENR received final EPA approval for the TMDLs associated with the assessment units (SD-CH-L-SYLVAN_01, SD-BA-L-SHERIFF_01, SD-JA-L-CLUBHOUSE_01, SD-JA-R-JAMES_08, SD-CH-L-STOCKADE_01, and SD-CH-L-SHERIDAN_01) in question. The status of these waterbodies is accurate in Appendix A and the respective basin tables.

Additionally, EPA understands DENR is addressing the Sylvan Lake pH impairment through an addendum to the 'TMDL Evaluation of pH for Reservoirs in the Black Hills Plateau Ecoregion of Custer and Pennington Counties, SD' document which had an original TMDL approval date of March 24, 2011, not September 1, 2005 as indicated in Appendix A."

DENR Response:

DENR changed the TMDL approval date in Appendix A.

Appendix D:	303(d) Summary
Page 192	Lake Isabel (SD-GR-L-ISABEL_01) currently has two causes for impairment (Chlorophyll-a and mercury in fish tissue). Lake Isabel is currently only listed for Mercury in Fish Tissue on the 303(d) Table (Appendix D), please also add Chlorophyll-a as an impairment cause. Also, the Mercury in Fish Tissue cause state cycle first listed as 2016, I believe it was first listed for mercury in 2010, please correct.

DENR Response:

DENR added the impairment cause Chlorophyll-a to the 303(d) Table in Appendix D for Lake Isabel. In addition, the date of the reporting cycle first listed for the cause mercury in fish tissue was changed to 2004.

Page 194	It appears that Firesteel Creek (SD-JA-R-FIRESTEEL_01) has two new impairment causes in 2016 (TDS and temperature, water) according to the basin tables on page 108. Firesteel Creek is also impaired due to E.coli. The 303(d) Summary (Appendix D) only has Firesteel Creek listed for E.coli, please add the other two causes.

DENR Response:

DENR added the two new impairment causes (TDS and temperature, water) for Firesteel Creek (SD-JA-R-FIRESTEEL_01) in the 303(d) summary table in Appendix D.

Commenter Info:
Jerry Wilson
Vermillion SD, 57069

Comments :
The new report on impaired waters in South Dakota is unfortunately not news. It is business as usual in South Dakota. We know very well what the causes of pollution are--mostly agricultural runoff--and we know how to reduce that pollution. But as usual, allowing and even encouraging actions that pollute are the top priority for state government, especially for Gov. Daugaard. This year the Legislature passed a bill to give limited tax relief to land owners who choose to do the right thing, to establish filter strips along waterways to reduce polluting runoff, but the governor vetoed the bill! That is outrageous. But the reason is clear. A key thrust of the administration is to promote mega dairies in eastern South Dakota, the region with the greatest number of impaired waters. Gov. Daugaard's drive to promote huge dairies flies in the face of all logic and public good. He would like to attract out of state and out of country investors who will not live in South Dakota, and who will take most of the profits out of state. Mega dairies are primarily operated by low-paid immigrant labor, so they provide very few well-paying jobs for South Dakotans. So, with that sort of "leadership" we get very few jobs for South Dakotans, profits leaving the state, and more polluted waters. The governor is happy to enrich foreign investors at our expense, but he vetoes a bill that would ease the burden on land owners who want to protect waters from pollution. Give us a break!

DENR Response:

With regards to SB 136, please refer to Governor Daugaard's veto letter at the website address below. The letter conveys the governor's concerns with SB 136 and the veto was sustained by the Senate. A bill of this magnitude will require significant planning and coordination considering South Dakota has thousands of miles of streams of various sizes. In addition, elements like funding and landowner participation will always present challenges. DENR and other state, federal and local entities provide financial incentives and/or technical assistance to encourage landowners to implement nonpoint source pollution control activities including vegetative buffers. For more information about South Dakota's Nonpoint Source Pollution Control program refer to page 159 of the final 2016 IR report.

http://sdlegislature.gov/Legislative_Session/Bill_Reports/Vetoed.aspx?Filename=veto136.htm&Session=2016

DENR does not regulate dairy ownership, but requires all large concentrated animal feeding operations to obtain a water pollution control permit that contains requirements to protect surface and ground water quality, containment structure design standards, nutrient management planning requirements, and inspection and reporting requirements.

Commenter Info:
Bill Powers
White South Dakota, 57276

Comments :
I'm glad that the SD DENR is looking at the condition of SD lakes and streams. A recent report by Minnesota Pollution Control Agency (MPCA) found many areas of concern particularly with regard to nitrogen and phosphorus levels. They have made specific recommendations for trying to reduce these levels. This report says nothing about the possible sources of the pollution. The MPCA report particularly focuses on agriculture as a source of much of the pollutants. The situation would likely be similar in SD. As the number of CAFOs in SD increases, I am particularly concerned about their impact on lakes, streams, and ground water. Present regulation of manure management has never been fully vetted with regards to their long term effects. We already know that agricultural and landscaping applications of fertilizers has had long term affects upon blooming in the Mississippi Delta. It is likely that there are local affects as well. This kind of historical monitoring is essential if we are to understand human impact upon the environment.

DENR Response:
South Dakota's 2016 IR identifies sources of pollution in several locations throughout the document. For instance, an impairment source description is provided in the basin tables (Tables 32-45) for specific lake or stream segments if the sources are well documented. Sources of impairment are identified during watershed assessment studies or Total Maximum Daily Load development. A summary of waterbodies impaired by various source categories are provided in Table 22. The Executive Summary and Statewide Surface Water Quality Summary sections attribute much of the lake and stream impairment to agricultural nonpoint source pollution and natural origin.

The Nonpoint Source Pollution Control Program section documents South Dakota's management strategies for controlling NPS through Best Management Practices that focus on agriculture derived pollution, including nutrients. DENR requires all large concentrated animal feeding operations to obtain a water pollution control permit that contains requirements to protect surface and ground water quality, containment structure design standards, nutrient management planning requirements, and inspection and reporting requirements.

Commenter Info:
Sylvia Lambert
Interior SD, 57750

Comments :
The State DENR has done its job——Reporting that 79 percent of rivers and streams, and 81 percent of lakes are too polluted to support one or more of their intended uses! It seems South Dakota, which entices others to come to our state, is becoming a health hazard which would certainly affect our economy. Our land owners, legislators and other decision-makers need to re-consider the suggested "buffer-strip" bill, SB 136. It would result in a modest reduction in tax revenues for the state, but the long term health, recreation and tourism benefits for all South Dakotans will compensate. There's no price adequate enough for the most precious of all fluids in the world today——safe water.

DENR Response:

South Dakota DENR follows federal EPA guidance for reporting beneficial use support and impairment status of assessed waterbodies for the Integrated Report (IR) process. There are many water quality parameters assigned to protect the beneficial uses designated to waterbodies in South Dakota. If only one of those parameters is not in compliance with the IR's listing methodology, the water is considered impaired and/or not supporting the beneficial use or uses. DENR inserted language into the Executive Summary and the Statewide Surface Water Quality Summary section (page 43) to better demonstrate how South Dakota's assessed lake acreage complies with many of the assessed water quality parameters assigned to fish life and recreation beneficial uses.

Please refer to DENR's response in a previous comment (Jerry Wilson, Vermillion, SD) with regards to the Governor's veto of SB 136.

Commenter Info:
Nancy Gregory
Hot Springs SD, 57747

Comments :
Lowering the standards is incomprehensible! The Governor's veto is reprehensible! So basically you are doing nothing to try and correct problems. I live in Hot Springs and use the Cheyenne frequently - why on earth is there ecoli? Where were the samples taken? Is is cattle or people? You need to protect every water source!

DENR Response:

The commenter does not specify what standards are being referenced with regards to the first statement. DENR is required by the federal Clean Water Act to use EPA-derived standards if the state does not have comparable scientifically defensible standards in place to protect the assigned beneficial uses. In some instances, DENR has adopted site-specific standards that are based on natural conditions for individual or regionally based water resources. DENR must follow a rigorous process to adopt a water quality standard including a state review board. The federal EPA ultimately approves or disapproves any water quality standard proposed by the state. The water quality standards used for this report have been approved by EPA.

DENR made the assumption that the statement concerning the Governor's veto is in reference to SB 136. Please refer to DENR's response in the previous comment (Jerry Wilson, Vermillion SD) with regards to the Governor's veto for SB 136.

DENR provides sources for the causes of impairment if the sources have been documented in an assessment study or Total Maximum Daily Load (TMDL) report. Table 35 describes the sources of bacteria for several segments of the Cheyenne River. All segments of the Cheyenne River below Fall River have EPA approved TMDLs for both fecal coliform and E. coli bacteria. The primary documented sources of bacteria include wildlife and livestock.

Once the TMDL identifies the sources of bacteria, it provides a framework to correct the impairment. This requires local involvement. If you would like to learn more about the process contact DENR's Watershed Protection Program at (605) 773-4254.

Lead South Dakota

RECEIVED
JUN 2 - 2016
Dept. of Environment and Natural Resources Secretary's Office

Mr. Steve Pirner
Department Secretary
South Dakota Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501
May 27, 2016

RE: Comment on Draft 2016 South Dakota Integrated Report for Surface Water Quality Assessment

Dear Mr. Pirner

A recent article in the Rapid City Journal, on May 22, 2016, took the City of Lead to task for contributing to the "unsafe levels of E. coli in Whitewood Creek". This article was based on the Draft 2016 South Dakota Integrated Report for Surface Water Quality Assessment developed by the South Dakota Department of Environment and Natural Resources.

On review of this draft report I cannot find the language "unsafe levels of E. coli in Whitewood Creek". I did find, on page 66 of the report, language that states that "Two segments of Whitewood Creek near Lead are nonsupporting for *E. coli*", and further along, "high bacteria numbers…may be due to…the combined sewer overflow in Lead". And the report continues to summarize the combined sewer outfall requirements and elimination plans in Lead.

It is clear that the Rapid City reporter, in order to create drama, inserted the "unsafe" characterization without concern for the facts. That is my problem to address.

But, upon reviewing the data from the 2016 Draft Report, I found some conflicting numbers. On page 72, the sample data for the segments of Whitewood Creek is compiled. The segments that would be impacted by Lead, or related to Lead, are R29, R30, R31 and R32.

- Segment R29 samples Whitewood Creek above the confluence of Gold Run Creek near the Pluma area. *E. coli* is not present.
- Segment R30 samples Whitewood Creek below the confluence of Gold Run Creek, down to the confluence with Deadwood Creek (in Deadwood). *E. coli* is not present.
- Segment R31 samples Whitewood Creek below the confluence with Deadwood Creek, down to Spruce Gulch (near the Deadwood Rodeo Grounds). *E. coli* is present.
- Segment R32 samples Whitewood Creek below Spruce Gulch, down to Sandy Creek. *E. coli* is present.

CITY OF LEAD
The City with the ♡ of Gold
801 W. Main Street, Lead, SD 57754-1538 • Phone (605) 584-1401 • Fax (605) 584-1407

If Lead was a contributor to nonsupporting levels of *E. coli* in Whitewood Creek, and the data shows that E. coli is in Segment R31 (below its Deadwood Creek confluence) would not *E. coli* be found in Segment R30 (above the Deadwood Creek confluence), which is where Lead's discharge is initially introduced into Whitewood Creek, via Gold Run Creek?

Further research; looking at Segment R11, page 69, which samples Deadwood Creek, from Rutabaga Gulch (near the Cutting Mine) to the confluence with Whitewood Creek in Deadwood; *E. coli* is present.

The *E. coli* that is in Whitewood Creek, Segment R31, below the Deadwood Creek confluence, appears to have a source in Deadwood Creek, Segment R11, not Gold Run Creek or the City of Lead.

The City of Lead acknowledges that we do have one combined sewer outfall; recently eliminating one as the separation project of sanitary and storm sewers progresses. And we further acknowledge that during high flow events, raw sewerage is discharged into Gold Run Creek, quickly entering Whitewood Creek. But, those high flow events certainly dilute any *E. coli* contamination.

If I have overlooked a portion of the report regarding these circumstances, I apologize and ask for direction. If my comments are accurate, I ask for the consideration that the comment "the combined sewer overflow in Lead" be eliminated as a source for nonsupporting *E. coli*. and that the final report reflects that change.

In advance, I thank you for the opportunity to comment and I appreciate all of the work of the South Dakota Department of Environment and Natural Resources.

With Best Regards,

Mike Stahl | City of Lead
City Administrator
mikes@cityoflead.com

cc: Ron Everett, Mayor, City of Lead
Roger Thomas, Lead Utility Superintendent

Encl. RC Journal Article, 5/22/16, "Lead struggles to keep sewage out of Whitewood Creek"
Draft 2016 South Dakota Integrated Report for Surface Water Quality Assessment, pgs 66-73

DENR Response:

South Dakota
GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

July 15, 2016

Mike Stahl
City Administrator, City of Lead
801 West Main Street
Lead, South Dakota 57754-1538

Dear Mr. Stahl:

Thank you for taking the time to comment on the draft 2016 Integrated Water Quality Report. I would also like to thank you for the work the city of Lead has done to separate storm and sanitary sewer lines and eliminate one of your combined sewer overflow discharges ahead of schedule!

You asked for clarification of the table on page 72. The Department of Environment and Natural Resources (DENR) has established beneficial uses for surface water bodies and has adopted water quality criteria to protect those uses. If an assessment of water quality indicates an impairment of a use, the department will list the reason for the impairment next to the beneficial use.

If the water quality indicates a beneficial use is not supported, the Integrated Report must identify the pollutant responsible and the probable cause(s), if known. For example, here is a little more information about each of the segments you asked about:

- Segment R29 is upstream of the city's combined sewer overflow discharge – *E. coli* are present in this stretch of the stream, although at very low numbers. The levels do not exceed our water quality criteria for *E. coli*.

- Segment R30 is directly downstream of the city's combined sewer overflow discharge – *E. coli* are present in this stretch of the stream. Out of the 26 samples we collected over the last five years, there were two samples that violated the water quality criteria for *E. coli*. If there had been even one more violation, this segment would have been considered impaired under EPA's listing criteria.

- Segment R31 and R32 are further downstream of the city's combined sewer overflow discharge – both segments have higher *E. coli* numbers than segments R29 and R30. In R31, 50% of the samples violated the water quality criteria. In R32, more than 30% of the samples violated the water quality criteria.

DENR monitors for *E. coli* from May through September each year, which is described as the recreation season in the South Dakota Water Quality Standards. As described above, *E. coli* has been found in all segments of Whitewood Creek mentioned in your letter.

Since 2012, the city has reported discharges from its combined sewer overflow throughout the months of May through September, with only two exceptions; there were no combined sewer overflow discharges in September of 2012 and September of 2015. The city's combined sewer overflow discharges have all been well in excess of the water quality criteria for *E. coli* (see the enclosed table showing the city's sampling results). While the press unfortunately may reach a conclusion that is not justified, the Integrated Report's statement is accurate that the city of Lead's combined sewer overflow is one of the sources contributing bacteria to Whitewood Creek.

Thank you again for your comments and the opportunity to provide additional clarification about the *E. coli* levels in Whitewood Creek. We agree the report can be difficult to interpret, but we have to follow EPA's format. It is hoped this additional information helps to better explain the Whitewood Creek issues, but if you have further questions, please feel free to contact Patrick Snyder in DENR at (605) 773-3351. Thanks again.

Sincerely,

Steven M. Pirner, PE
Secretary

enclosure

Outfall 004 - Lower CSO

	Duration of discharge	E. coli	Ammonia (mg/L)	Ammonia (mg/L)	Number of Overflows	Total Suspended Solids (mg/L)	Total Suspended Solids (mg/L)	Rainfall (in)	Rainfall (in)	Rainfall Duration	Rainfall Duration
End Date	Days	Daily Max	30-Day Ave	Daily Max		30-Day Ave	Daily Max	Daily	Monthly Total	Daily Max	Monthly Total
07/31/2012	2	450,000	1.01	1.4	2	89	120	1.5	2	2	3
08/31/2012	1	24,000	1.2	1.2	1	63	63	1	1	2	2
09/30/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
10/31/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
05/31/2013	14	180,000	0.3	1.3	4	425	980	4	8.8	10	12
06/30/2013	6	61,000			3	34	78	3	4.3	6	8
07/31/2013	2	88,000	0.6	1.2	2	82	100	1	1.75	5	8
08/31/2013	12	180,000	0.63	0.65	2	182.5	730	1.5	3	8	12
09/30/2013	6	400,000	0.91	1.1	3	79	100	1	2.05	10	15
10/31/2013	4	92,000	0.41	0.82	2	193	320	2.5	2.5	2	2
11/30/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2014	1	100,000	1.7	1.7	1	420	420	0.25	0.25	1	1
05/31/2014	1.5	380,000	3.03	7.3	4	1524	4000	0.5	1.85	0.02	1.85
06/30/2014	3	210,000	2.16	2.9	4	445	870	1.01	2.41	1.01	2.41
07/31/2014	1.5	200,000	1.7	1.8	0.2	645	820	0.6	0.9	0.6	0.9
08/31/2014	0.5	230,000	1.1	1.1	2	619	619	3	3	2.25	1.5
09/30/2014	2.5	72,000	0.72	0.72	1	53	53	3	3	14	14
10/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge

12/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
05/31/2015	1.5	1,300,00	0.9	0.9	1	913	913	2	9.5	6	50
06/30/2015	2.5	1,090,00	0.95	1.85	4	321.8	668	1.8	4	5	9
07/31/2015	3.5	1,730,00	1.79	2.3	4	495.5	818	1	3.8	2	10.75
08/31/2015	7	1,990,00	1.21	1.9	3	284.33	404	2.25	4.3	4.5	7.5
09/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
10/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2016	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/29/2016	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge

Outfall 005 - Upper CSO

	Duration of discharge	E. coli	Ammonia (mg/L)	Ammonia (mg/L)	Number of Overflows	Total Suspended Solids (mg/L)	Total Suspended Solids (mg/L)	Rainfall (in)	Rainfall (in)	Rainfall Duration	Rainfall Duration
End Date	Days	Daily Max	30-Day Ave	Daily Max		30-Day Ave	Daily Max	Daily	Monthly Total	Daily Max	Monthly Total
07/31/2012	2	120,000	0.96	1.1	2	108	180	1.5	2	2	3
08/31/2012	1	65,000	0	0	1	110	110	1	1	2	2
09/30/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
10/31/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2012	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
05/31/2013	10	160,000	0.19	0.79	4	500	860	4	8.8	10	12
06/30/2013	6	220,000	0.3	0.9	3	156	310	3	4.3	6	8
07/31/2013	1	670,000	0.55	0.55	1	220	220	1	1.75	5	8

08/31/2013	4	180,000	0.44	0.89	2	111	180	1.5	3	8	12
09/30/2013	4	84,000	0	0	3	38	60	1	2.05	10	15
10/31/2013	4	32,000			2	400	570	2.5	2.5	2	2
11/30/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2013	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2014	1	64000			1	87	87	0.25	0.25	1	1
05/31/2014	1.5	65,000	0.9	5.8	3	294.66	650	0.5	1.85	0.5	1.85
06/30/2014	3	330,000	1.82	4.3	3	340	460	1.01	2.41	1.01	2.41
07/31/2014	1.5	200,000	0.96	0.96	2	213	330	0.6	0.9	1	1.5
08/31/2014	1.5	24,000	0.62	0.64	2	107	110	2.25	3	1	1.5
09/30/2014	2.5	2,000			1	116	116	3	3	14	14
10/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2014	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/28/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
03/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
04/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
05/31/2015	2.5	52,000	0.11	0.13	2	376.5	543	2	9.5	6	50
06/30/2015	3.5	1,480,00	0.53	0.81	4	391.2	716	1.8	4	5	9
07/31/2015	3.5	886,000	0.56	1.19	4	354.75	762	0.75	3	2	10.75
08/31/2015	7	488,000	0.78	1.08	3	82.6	130	2.25	4	4	6.5
09/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
10/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
11/30/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
12/31/2015	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
01/31/2016	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
02/29/2016	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge

EAST DAKOTA WATER DEVELOPMENT DISTRICT

June 8, 2016

Paul Lorenzen
SD DENR - Watershed Protection Program
523 East Capitol Avenue
Pierre, South Dakota 57501-3181

Dear Mr. Lorenzen:

I am writing to offer comments on behalf of the East Dakota Water Development District on the DRAFT 2016 South Dakota Integrated Report for Surface Water Quality Assessment. For each I have included a page reference from the DRAFT document.

1. Page 5, fourth paragraph. It states that "The mercury in fish tissue criterion has resulted in a large acreage of South Dakota lakes not supporting their designated beneficial uses. However, due to the approval of the mercury TMDL, most of these lakes are not on the 303(d) list." The mercury TMDL mentioned is a plan to address the identified impairments. While the plan might eventually result in a reduction in the mercury load in these lakes, this change has not happened yet. To the casual reader of this report, the lack of a listing will be read as a lack of impairment. As such, this policy misrepresents actual conditions, and recognized impairments should be listed in the report.

DENR Response:

DENR agrees that interpreting the 303(d) process and terminology can be confusing to the casual reader. DENR is required to follow federal Clean Water Act mandates administered by EPA for reporting impairment status of assessed waterbodies in the Integrated Report. Only waters that are in EPA category 5 may be placed on the 303(d) list. All category 5 waters require an EPA-approved TMDL for the listing cause(s) or pollutant(s). When an EPA-approved TMDL is assigned to a waterbody for a particular pollutant, the pollutant cause for the waterbody is removed from the 303(d) list and placed in EPA category 4a. An EPA category 4a label indicates the waterbody is still impaired, but it has an EPA approved TMDL. Because most of the waters impaired for mercury in fish tissue have an EPA-approved TMDL, category 4a is appropriate.

All waterbodies assigned to the mercury TMDL are considered impaired and not supporting the aquatic life beneficial uses as documented in the basin tables. Until reductions occur and mercury in fish tissue concentrations fall below the water quality criterion, these waterbodies will *remain nonsupporting for mercury in fish tissue and will be identified as nonsupporting in the basin tables.*

2.	Page 7, last paragraph. The paragraph discusses DENR's efforts to assess the recreational beneficial uses of water bodies. It states that, "A surface water quality sample is collected and analyzed for fecal coliform and *E. coli* bacteria." Do I read correctly that only a single water quality sample is collected? I would argue that a single sample is not an adequate sample size in order to make a reasonable assessment.

DENR Response:
DENR will typically conduct one or two site visits on the above referenced project. DENR agrees that a single sample is not an adequate sample size to make a reasonable assessment. The decision on the appropriate beneficial use is based on multiple factors, not a single bacteria sample. The primary factors in determining the appropriate recreation beneficial uses are existing recreation uses, water depth and flow, and public access. The bacteria sample result and other water quality data such as dissolved oxygen are supplemental information.

3.	Page 42, fifth paragraph. The last sentence notes that the percentage of stream miles that support immersion recreation remained essentially unchanged from 2014 (53.2% in 2016; 53.4% in 2014). Looking back at past reports, it appears that the relative percentage of the stream miles that support immersion recreation has remained static since 2010 (53% in 2012;54% in 2010). Given the relative large percentage of watershed restoration resources that are targeted at reducing bacteria loading, I think that it would be appropriate to comment (speculate?) on why there has been no change.

DENR Response:
The main source of bacteria to streams originates from agricultural nonpoint sources. Nonpoint source pollution is not federally regulated like point source discharges such as wastewater treatment facilities. DENR partners with federal, state and local entities to provide livestock producers with financial incentives and technical assistance to implement voluntary best management practices designed to reduce bacteria in impaired waters. Please refer to the Nonpoint Source Pollution Control Program section for more information regarding nonpoint source management activities and planning.

Significant watershed restoration resources have been directed towards reducing bacteria loading in impaired streams and the efforts have resulted in quantifiable bacteria reductions. Unfortunately, the reductions in bacteria loading have not contributed to the increase in full support of streams assigned the immersion recreation use. The relative lack of change is primarily due to the rate of voluntary involvement by livestock producers at the watershed-scale. A change in bacteria loading is not likely to be evident until the majority of livestock producers, especially those in critical areas, adopt conservation practices to eliminate manure transport to impaired streams. The process will require significant time, resources and livestock producer participation.

4.	Page 58, third paragraph. It states that, "The fixed ambient monitoring network consists of 132 active in-stream stations." The relevant DENR web page lists 146 such stations, http://denr.sd.gov/des/sw/wqmonitoring.aspx.

DENR Response:
The website has been updated. See DENR's response to EPAs question about the reason for the change.

5.	Page 58, fifth paragraph. The last sentence should read, "Similarly, in the course of sampling lakes and streams, any pollution sources ~~of~~ **or** environmental conditions that may affect water quality are noted by field personnel."

DENR Response:
This typographical error has been corrected.

6.	Page 67, first paragraph. Reference is made to a number of streams that were de-listed as a result of a standards change. It might be illustrative to identify those streams that benefitted(?) from this change, as opposed to those de-listed as the result of actual water quality improvements.

DENR Response:
Please see the delisting report in Appendix B to identify stream assessment units in the Belle Fourche and Cheyenne River Basins (i.e. Black Hills streams) delisted for temperature with the reason; Applicable WQS attained; due to change in WQS.

7.	Page 75, fourth paragraph. The text states that "seventeen new waterbodies" are now considered impaired for mercury in fish tissue. I could find only 14 "new" listings in Table 34. I also note that three Big Sioux River watershed lakes listed as impaired in this regard in 2014 (Lardy Lake, Middle Lynn Lake and Opitz Lake) are not found in Table 34. They are, however, now found in Table 37 (James River watershed). It would be appropriate to mention/explain the reason for this change in the text.

DENR Response:
The three waterbodies listed above were incorrectly placed in the Big Sioux River basin in the 2014 IR due to an error. This error was corrected in the 2016 cycle and the three waterbodies were correctly placed in the James River basin. If you simply subtract the number of waterbodies that are not supporting their beneficial uses for mercury in fish tissue in the Big Sioux basin between the 2016 and 2014 IR cycles than the difference is fourteen. However, because the three waterbodies were incorrectly included in the Big Sioux River basin during the 2014 reporting cycle and are now in the James River basin, the difference between reporting cycles is seventeen new waterbodies in the Big Sioux River basin.

DENR inserted language into the Big Sioux River and James River basin summaries to explain the basin change of these three lakes between the 2014 and 2016 reporting cycles.

8.	Page 75, last paragraph. The Big Sioux River Watershed Project encompasses the Big Sioux River watershed in South Dakota from northern Brookings County to the confluence with the Missouri River, not "South of Watertown to the Iowa border."

DENR Response:
DENR made the suggested change to describe the accurate boundary description for the Big Sioux River Watershed Implementation Project area.

9. Page 113. There is no mention in the text about the impact of the "new" mercury in fish flesh standard for this watershed. The standard also applies here, even if there is no relevant data.

DENR Response:
DENR added a paragraph to the Surface Water Quality Monitoring Program section.

10. Page 116, second paragraph. The last sentence states that, "Most stream impairments are due to bacteria, while most lake impairments are due to mercury in fish tissue." Only 5 of the 11 lakes on Table 39 show impairments. One lake has a temperature problem, two lakes are impaired because of mercury in fish flesh, and two are impaired due to elevated pH. Attributing "Most" lake impairments to Hg in this case seems a stretch, particularly when a majority of the lakes on Table 39 are unimpaired.

DENR Response:
DENR changed the sentence in quotations to read "Most stream impairments are due to bacteria, while lake impairments were due to mercury in fish tissue, pH and temperature."

11. Pages 120 & 121. There is no mention in the text about the impact of the "new" mercury in fish flesh standard for this watershed. Five lakes (3 new in 2016) are listed as impaired, along with two (new) Missouri River segments. Mention of the impact of the new mercury in fish tissue standard should be part of the text.

DENR Response:
See DENR response to comment #9. Additionally, information has been added to the Missouri River basin summary.

12. Pages 128. There is no mention in the text about the impact of the "new" mercury in fish flesh standard for this watershed. Two lakes (1 new in 2016) are listed as impaired. Mention of the impact of the new mercury in fish tissue standard should be part of the text.

DENR Response:
See DENR response to comment #9.

13. Pages 137. There is no mention in the text about the impact of the "new" mercury in fish flesh standard for this watershed. Four lakes (all new in 2016) are listed as impaired. Mention of the impact of the new mercury in fish tissue standard should be part of the text.

DENR Response:
See DENR response to comment #9. Additionally, information has been added to the Vermillion River basin summary.

Lastly, I would like to offer some general observations about how the impact of mercury in fish tissue results are presented.

- The District supports the decision by DENR to adopt a more stringent standard for mercury in fish tissue (0.3 mg/kg Hg versus 1.0 mg/kg Hg). As an entity that shares a border with Minnesota, it is nice to have a uniform standard that applies to both sides of our numerous border lakes. The previous standards, which resulted in the same fish being both acceptable and unacceptable, were the cause for occasional confusion.

DENR Response:
Prior to the 2016 IR cycle, waterbodies were listed as nonsupporting if a fish consumption advisory had been issued the SD Department of Health using the FDA action level of 1.0 mg/kg. With the adoption of the mercury in fish tissue water quality standard, DENR assesses mercury in fish tissue using the 0.3 mg/kg criterion. DENR is regulated by the EPA and therefore adopted the 0.3 mg/kg standard. However, the SD Department of Health is not regulated by the EPA and continues to make consumption recommendations based on the FDA action level. Therefore, waterbody support determinations in this IR use both standards. A waterbody was listed as not supporting its beneficial uses if it has a fish consumption advisory (which is species and length specific) OR if the 95th percentile of the population of fish exceed the new mercury in fish tissue water quality standard.

- Tables 32 thru 45 list the water bodies (lakes, rivers and streams), by major watershed, for which use attainment information is available. For each water body any assigned beneficial use is listed, along with whether or not each beneficial use is supported or not. The numeric criteria used to determine support of each beneficial use are found in Table 2 (page 10). If there is insufficient data to draw a conclusion, this is so indicated.

  For some water bodies listed in Tables 32 thru 45, impairments are attributed to "Mercury in Fish Tissue." Based on the criteria noted above (support, non-support or insufficient data), the casual reader of this document would presume that for those water bodies for which there is no "Mercury in Fish Tissue"-based impairment that it has been determined that mercury concentration in fish in these water bodies is below 0.3 mg/kg.

  For example, on page 81, Big Sioux River segment SD-BS-R-BIG_SIOUX_07 is listed as so impaired, while the preceding six river segments and the following nine river segments show no such listing. Consequently, while caution should be exercised if eating fish from segment 07, the fish in the other 15 segments are ok.

I am aware that "Mercury in Fish Tissue" data is available for only a limited number of water bodies. In the case of the Big Sioux River, the only sample tested for the entire river was from segment 07. No other samples have been collected, and therefore no other status reports can be made. As such, while it would be appropriate to assume that some water bodies are "safe" with regard to mercury, the truth is that the vast majority would fall under the insufficient data category. The presentation of this critical information needs to be amended in such a way as to reflect what is actually known.

DENR Response:

DENR added a link on page 153 of the document that references all waterbodies sampled for fish contaminants. If a waterbody does not have mercury in fish tissue as a cause of nonsupport, the casual reader may reference the list of sampled lakes to see if the lake has been sampled for mercury. In addition, lakes that are sampled for fish contaminants represent lakes that are managed as fisheries by GF&P, provide public access, and are fished by the public. Language has been added to the document to provide clarification that not all waterbodies have been sampled for mercury in fish tissue. However, the above assertion that "the truth is that a vast majority would fall under the insufficient data category" is false. While DENR collects limited fish tissue data on rivers and streams, the fact is that of the lakes and reservoirs in this document, 84% of lake acreage are actively monitored for mercury in fish tissue.

- Page 150, third paragraph states that SD DENR and SD Department of Health are currently making determination on "Mercury in Fish Tissue" using two different criteria. A sample with 0.6 mg/kg Hg is defined as unacceptable by one state agency, while another says everything is fine. Again, I strongly suspect that this is going to leave the casual reader of this report confused. I would suggest that an explanation of why there are differences, and what they mean to the general public, would be appropriate.

DENR Response:

The referenced paragraph states that the SD DOH issues fish consumption advisories based on the FDA action level of 1.0 mg/kg mercury and that the SD DENR assesses waterbody beneficial use support based on 0.3 mg/kg mercury. Although mercury in fish tissue is the common factor, they are assessing separate issues. A fish consumption advisory is related to the safe amount of fish that the public can consume based on the length and species of fish in a specific waterbody. The DENR water quality criterion of 0.3 mg/kg assesses if the beneficial uses of a particular waterbody are met based on the collective concentration of mercury in fish tissue and is not species or length specific and does not provide the public with advice on consumption of fish. Fish consumption advice and waterbody beneficial use support are separate issues but are both assessed using mercury in fish tissue. Additional language has been added to the document.

Thank you for your consideration of these comments. If you have any questions about the points that I have raised, please do not hesitate to contact me. I applaud the Department's work on what can only be described as a herculean effort.

Sincerely,

Jay P. Gilbertson
Manager/Treasurer