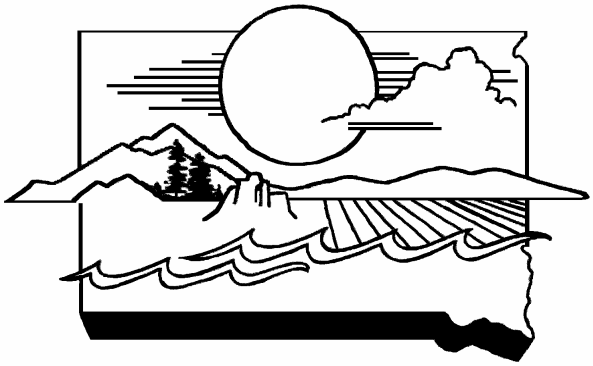
THE 2008 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT



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
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March 31, 2008

Robbie Roberts, Regional Administrator
U.S. Environmental Protection Agency Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Final 2008 South Dakota Integrated Report

Dear Mr. Roberts:

I am pleased to submit to you the 2008 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 large effort by this department as well as interested members of the South Dakota public. The 2008 report is one of the most comprehensive reviews of water quality data completed in South Dakota to date.

We have provided your agency with an electronic copy of the list in addition to this submittal. It will also be available in the near future on our website at http://www.state.sd.us/denr/denr.html.

We look forward to your agency's approval of our 2008 Integrated Report. We also want to thank members of your staff for their assistance and insights during the development process.

Sincerely,

Steven M. Pirner
Secretary

Enclosure

cc: Carol Rushin, USEPA Region 8
Steve Tuber, USEPA Region 8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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APR 30 2008

Ref: 8EPR-EP

Steven M. Pirner, Secretary
Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 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 South Dakota's 2008 Integrated Report for Surface Water Quality Assessment dated March 31, 2008. EPA has conducted a complete review of the Clean Water Act Section 303(d) waterbody list and supporting documentation and information. Based on this review EPA has determined that South Dakota's 2008 list of water quality limited segments (WQLSs) still requiring TMDLs meets the requirements of Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations. Therefore, by this order, EPA hereby APPROVES South Dakota's 2008 Section 303(d) list. Please see the enclosure for a description of the statutory and regulatory requirements and a summary of EPA's review of South Dakota's compliance with each requirement.

EPA's approval of South Dakota's 2008 Section 303(d) list extends to all waterbodies in category 5 of the list with the exception of those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove the State's list with respect to those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under Section 303(d) for those waters.

The public participation process sponsored by South Dakota DENR included publishing ads in newspapers across the state requesting public input in developing the draft list and requesting water quality data, official public notices on the list availability, use of the South Dakota DENR website, and a mailing to many entities asking for both comments and additional data or information on waters. We commend the State for its thorough public participation process.

Under current regulations, the next Section 303(d) list is required to be submitted on April 1, 2010. Although current regulations require lists to be submitted every 2 years, in April of even years, states may submit Section 303(d) lists more frequently as they deem necessary. All additions, deletions and modifications to the list will require EPA approval.

Again, thank you for the efforts related to the development of South Dakota's Section 303(d) waterbody list for the 2008-2008 biennium. If you have questions, the most knowledgeable person on my staff is Tom Johnson and he may be reached at (303) 312-6226.

Sincerely,

Carol L. Campbell

Carol L. Campbell
Acting Assistant Regional Administrator
Office of Ecosystems Protection and
Remediation

Enclosure

cc: Shannon Minerich, SDDENR
Paul Lorenzen, SDDENR

SOUTH DAKOTA WATER QUALITY
WATER YEARS 2002-2007 (streams) and
WATER YEARS 2000-2007 (lakes)

The 2008 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).

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). The 305(b) report was routinely used 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 US 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 Clean Water Act goals for the ecological health of the nation's surface waters and their domestic, commercial, and recreational 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 severity of surface water problems in their areas. This generally leads to public discussions, which start the long process toward nonpoint source pollution control implementation.

This report is shared with the Nonpoint Source Task Force to help focus its efforts and provide information used in the priority waterbody ranking system. The Nonpoint Source program also uses this document to supplement news articles released through the DENR Information and Education (I&E) program.

The surface water quality assessments listed in this report rely primarily on the analyses of data generated by DENR, the United States Geological Survey (USGS), water quality data submitted by the cities of Watertown, Huron, and Sioux Falls, and best professional judgment. While this assessment is as comprehensive as resources permit, some of the state's surface water quality problems may not have been identified nor documented in this report.

South Dakota Law (SDCL 34A-2-4 and 34A-2-6) authorizes the Department's Secretary to provide this assessment of current state surface water quality to the people of the State of South Dakota and the Environmental Protection Agency (EPA).

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 TMDLs. This report meets the requirements of Sections 305(b), 303(d), and 314 of the federal Clean Water Act 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 9,289 miles of perennial rivers and streams (Table 1) and about 85,841 miles of intermittent streams. About 7,904 perennial stream miles have been assessed in the past five years (October 2002 to September 2007). During this 5-year interval, 49% of assessed stream miles were found to support all assigned beneficial uses and 51% were nonsupporting of their designated uses. Seventy-seven percent of stream miles designated for immersion recreation supported that beneficial use; 23% did not meet the criteria. A total of 111 different streams or stream segments are listed 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 (NPS) and natural origin. Nonsupport for recreational uses was primarily caused by fecal coliform contamination from livestock.

In addition to rivers and streams, South Dakota has 570 lakes and reservoirs with specific aquatic life and recreational beneficial use classifications. The four Missouri River mainstem reservoirs were not included in the total lake acres but were included in the monitored river mileage.

An estimated 124 of the 570 classified lakes have been assessed. Eighteen lakes assessed during the 2006 reporting cycle did not have sufficient data to determine support status during this reporting cycle. The assessed lakes account for 65% of the total classified lake acreage. An estimated 49% of the assessed lake acreage was considered to support all assessed beneficial uses and 51% did not support assessed beneficial uses. A total of 57 lakes are listed as impaired and require TMDL development. Sediment and nutrients conveyed in surface water runoff are the main nonpoint source pollutants impacting South Dakota lakes and reservoirs.

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

Table 1. Atlas

State population (2000 census)	754,844
State surface area (sq. mi.)	77,047
Number of water basins (according to state subdivisions)	14
Total number of river/stream miles	95,130*
Number of perennial river miles (subset)	9,289*
Number of intermittent stream miles (subset)	85,841*
Number of border river miles of shared rivers/streams (subset)	360**
Miles of ditches and canals (man-made waterways)	424**
Number of classified lakes/reservoirs/ponds	570
Acres of lakes/reservoirs/ponds	204,987*
Square miles of estuaries/harbors/bays	0
Number of ocean coastal miles	0
Number of Great Lakes shore miles	0
Acres of freshwater wetlands	1,780,859***
Acres of tidal wetlands	0
Name of border rivers: Missouri River, Big Sioux River, Bois de Sioux River.	

* Estimated from the National Hydrography Dataset (1:100,000 scale)
** (EPA, 1991)
*** National Wetlands Inventory

Wetlands

South Dakota has an estimated 1.78 million acres of small depressional wetlands with shallow water habitat. South Dakota Surface Water Quality Standards contain provisions to include wetlands as "waters of the state." Wetlands are assigned the beneficial use of fish and wildlife propagation, recreation, and stock watering, which provides protection under existing narrative and numeric water quality standards.

The 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. South Dakota State University in cooperation with South Dakota Game, Fish, and Parks (GF&P) is in the final stages of developing a Level-1 and Level-2 wetland rapid assessment protocol for prairie pothole wetlands in eastern South Dakota. The South Dakota wetland rapid assessment protocol will be used by 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. An Index of Plant Community Integrity (IPCI) was used 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. 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).

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 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. During the past 20 years, the program has initiated many development and implementation projects throughout the state. The Clean Water Act section 319 program is the focal point for a majority of the existing NPS control programs.

Educating the public about NPS pollution issues has been effective in prompting many landowners to voluntarily implement activities to control NPS pollution. However, the technical and financial assistance currently available is not sufficient to solve all of the NPS pollution problems in the state. Other solutions must be explored. 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.

A total of 111 stream segments and 57 lakes require TMDLs to address impairments. Of the total number of required TMDLs, 66% are for streams and 34% are for lakes.

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 sampling program, water quality surveys, fish surveys, TMDL assessments, Surface Water Discharge permits, and state nonpoint source implementation projects. The United States Geological Survey (USGS) also conducts routine monitoring throughout the state. All data resulting from USGS monitoring efforts are available from the USGS website. Most of the state's data has been entered into the EPA data storage and retrieval (STORET) system. DENR also maintains an internal database and will be submitting data through EPA's Water Quality Exchange (WQX) in the future. WQX will be replacing STORET in 2009.

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 in July 2004, and EPA formally approved South Dakota's water quality standard revisions on March 4, 2005. The water quality standards consist of water quality criteria necessary to protect the assigned beneficial uses of state surface waters.

All surface waters in the state are classified 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) and (8) unless otherwise specified. All lakes in South Dakota are also assigned the beneficial use of (9) unless otherwise stated in the same reference (74:51:02) http://legis.state.sd.us/rules/rules/7451.htm. Table 2 contains a summary of the established beneficial uses and a partial listing of assigned criteria to protect them. Current state toxic pollutant standards for human health and aquatic life are presented in Table 3.

Fixed Station Ambient Monitoring

The DENR water quality monitoring network is currently made up of 142 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 type of water sampling is invaluable for monitoring historical information, natural background conditions, 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 content. 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. Sample test results are entered into DENR's SQL NR92 database and EPA's computer data storage and retrieval system (STORET).

The most commonly sampled parameters include fecal coliform, hardness, alkalinity, residue (total solids, total suspended solids, total dissolved solids), pH, ammonia, nitrates, and phosphorous (total and dissolved). 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.

Ambient station locations, descriptions, and schedules are included in Appendix C. More detailed descriptions of individual stream sites are available from DENR on request.

Intensive Water Quality Monitoring (Point Sources)

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 both above and below the wastewater discharge. These surveys provide additional data to assist in the development of water quality-based effluent limits for the Surface Water Discharge permits.

With increased emphasis on water quality improvements to justify federal expenditures, the intensive monitoring program will also focus on showing water quality improvements from the upgrading of wastewater treatment facilities. After wastewater treatment facilities are upgraded, monitoring is used to verify that Surface Water Discharge permit limits developed through computer modeling maintain or improve surface water quality. Surveys provide an evaluation of whether or not the wastewater treatment is adequate to protect the beneficial use(s) of receiving waters.

Intensive Water Quality Monitoring (Special Studies)

Intensive water quality monitoring is sometimes initiated to assess special problem areas, to obtain data for use in site-specific criteria modification studies, or to provide an updated database for a waterbody. In 2004 and 2005, DENR developed a special water quality monitoring plan for the Missouri River reservoirs. The focus of the plan was to develop a long term monitoring strategy to determine beneficial use support. Intensive sampling of the reservoirs was performed in 2005 and 2006. Data analyses are currently underway and the preliminary results will be included in the 2010 Integrated Report.

Intensive Fish Survey Monitoring

Fish surveys are occasionally conducted by DENR Surface Water Quality Program and GF&P to evaluate the impact of wastewater dischargers on the receiving stream and to evaluate the fishery classification. The fish survey results, although they are qualitative in nature, are used in conjunction with water quality surveys to evaluate the impact of pollutants on stream water quality.

Biological Sampling Program

Biological samples are often included as part of a watershed assessment study or a special study. DENR Water Resource Assistance Program incorporates aquatic plant/algae surveys and chlorophyll-*a* testing into lake studies. Stream studies occasionally incorporate bioassessment surveys using fish and aquatic invertebrates as primary water quality indicators. DENR is in the initial stages of developing a reference network for streams in the Glaciated Plains ecoregion of eastern South Dakota.

Intermittent Streams Project

A large majority of the streams 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 to develop a reference network for intermittent headwater streams in the Glaciated Plains ecoregion of eastern South Dakota. This intermittent stream reference project is being conducted through a collaborative effort with environmental biology researchers at South Dakota State University. An intermittent stream reference network is being developed to provide the state with; 1) the tools necessary to identify "reference quality" stream reaches and; 2) the framework for developing bioassessment tools required to make determinations about habitat and biotic integrity of potentially impacted streams. Aquatic macroinvertebrates (bugs) represent the primary biological indicator for determining health of these systems. Information gained from the intermittent streams project is further being used to develop a reference network for all streams within the Glaciated Plains ecoregion of Eastern South Dakota.

Future Lake Probability Sampling

South Dakota DENR is planning to modify its annual lake survey from a strictly targeted survey, to a Generalized Random Tessellation Stratified (GRTS) survey design. This new design will allow DENR to continue to place emphasis on its most critical water resources in the state, while allowing it to also make some general determinations about the state's entire population of lakes. The target population for the 2008 survey includes all lakes that have fishery beneficial uses, with an emphasis placed on lakes that have historical data. In addition, a small number of the most publicly important waterbodies were maintained as targeted sites on the list. A third tier of lakes will be selected at random. This sampling scheme will be documented in the 2010 Integrated Report.

Toxicity Testing Program

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

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]									
Chlorine, total residual		0.019 acute 0.011chronic	0.019 acute 0.011chronic	0.019 acute 0.011chronic	0.019 acute 0.011chronic	0.019 acute 0.011chronic					
Coliform, total (per 100 mL)	5,000 (mean); 20,000 (single sample)										
Coliform, fecal (per 100 mL)							200 (mean); 400 (single sample)	1,000 (mean); 2,000 (single sample)			
Conductivity (umhos/cm @ 25°C)									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		Equation-based limit [1, 2]	Equation-based limit[1, 2]	Equation-based limit [1, 2]	Equation-based limit[1, 2]	Equation-based limit[1, 2]					
Nitrogen, nitrates as N	10.0								50[1]/88[2]		
Oxygen, dissolved		≥ 6.0; ≥ 7.0 (during spawning season)	≥ 5.0	≥ 5.0; ≥ 6.0 (in Big Stone Lk & Lk Traverse during Apr & May)	≥ 5.0	≥ 4.0	≥ 5.0	≥ 5.0			
pH (standard units)	6.5 – 9.0	6.6 – 8.6	6.5 – 8.8	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		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 (°F)		65	75	80	90	90					
Total Petroleum Hydrocarbons	≤ 1.0								≤ 10		
Oil and Grease									≤ 10		

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

[1] 30-day average [2] daily maximum

Table 3: Surface Water Quality Standards for Toxic Pollutants and Total Ammonia ARSD 74:51:01

Pollutant	Human Health Value Concentrations 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[3]	Uses 2-3-4-5-6-9[4]	Acute (CMC)	Chronic (CCC)		Use 1[3]	Uses 2-3-4-5-6-9[4]	Acute (CMC)	Chronic (CCC)
Acenaphthene	670	990			2,4-Dimethylphenol	380	850		
Acenaphthylene (PAH)[6]					Dimethyl Phthalate	270,000	1,100,000		
Acrolein	190	290			Di-n-Butyl-Phthalate	2,000	4,500		
Acrylonitrile[5]	0.051	0.25			2-Methyl-4,6-Dinitrophenol	13	280		
Aldrin[5]	0.000049	0.000050	1.5		2,4-Dinitrophenol	69	5,300		
Anthracene (PAH)[6]	8,300	40,000			Dioxin (2,3,7,8-TCDD[5]	5.0E-9	5.1E-9		
Antimony	5.6	640			2,4-Dinitrotoluene[5]	0.11	3.4		
Arsenic[5]	0.018[5][13]	0.14[5][13]	340	150	1,2-Diphenylhydrazine[5]	0.036	0.20		
Asbestos[5]	7,000,000 fibers/L				alpha-Endosulfan	62	89	0.11	0.056
alpha-BHC[5]	0.0026	0.0049			beta-Endosulfan	62	89	0.11	0.056
beta-BHC[5]	0.0091	0.017			Endosulfan Sulfate	62	89		
gamma-BHC (Lindane)[5]	0.98	1.8	0.95		Endrin	0.059	0.060	0.086	0.036
Benzene[5]	2.2	51			Endrin Aldehyde	0.29	0.30		
Benzidine[5]	0.000086	0.00020			Ethylbenzene	530	2,100		
Benzo(a)Anthracene[5]	0.0038	0.018			Flouranthene	130	140		
Benzo(a)Pyrene[5]	0.0038	0.018			Fluorene[6]	1,100	5,300		
Benzo(b)Fluoroanthene[5]	0.0038	0.018			Heptachlor[5]	0.000079	0.000079	0.26	0.0038
Benzo(k)Flouroanthene[5]	0.0038	0.018			Heptachlor epoxide[5]	0.000039	0.000039	0.26	0.0038
Beryllium[5]	4[14]				Hexachlorobenzene[5]	0.00028	0.00029		
Bis(2-Chloroethyl)Ether[5]	0.030	0.53			Hexachlorobutadiene[5]	0.44	18		
Bis(2-Chloroisopropyl)Ether	1,400	65,000			Hexachlorocyclopentadiene	40	1,100		
Bis(2-Ethylhexyl)Phthalate[5]	1.2	2.2			Hexachloroethane[5]	1.4	3.3		
Bromoform[6]	4.3	140			Ideno(1,2,3-cd)Pyrene	0.0038	0.018		
Butylbenzyl Phthalate	1,500	1,900			Isophorone[5]	35	960		
Cadmium			2.0[9]	0.25[9]	Lead			65[9]	2.5[9]
Carbon Tetrachloride[5]	0.23	1.6			Mercury	0.050	0.051	1.4	0.012[10]
Chlordane[5]	0.00080	0.00081	1.2	0.0043	Methyl Bromide	47	1,500		
Chlorine			19	11	Methyl Chloride[6]				
Chlorobenzene	130	1,600			Methylene Chloride[5]	4.6	590		
Chlorodibromomethane[5]	0.40	13			N-Nitrosodimethylamine[5]	0.00069	3.0		
Chloroform[5]	5.7	470			N-Nitrosodi-n-Propylamine[5]	0.0050	0.51		
2-Chloronaphthalene	1,000	1,600			N-Nitrosodiphenylamine[5]	3.3	6.0		
2-Chlorophenol	81	150			Nickel	610	4,600	470[9]	52[9]
Chromium(III)			570[9]	74[9]	Nitrobenzene	17	690		
Chromium(VI)			16	11	Polychlorinated Biphenyls, PCBs[2][5][7][11]	0.000064	0.000064		0.014
Chrysene[5]	0.0038	0.018			Pentachlorophenol	0.27	3.0	19[8]	15[8]
Copper	1,300		13[9]	9.0[9]	Phenanthrene[6]				
Cyanide (week acid dissociable)	140	140	22	5.2	Phenol	21,000	1,700,000		
4,4'-DDD[5]	0.00031	0.00031			Pyrene[6]	830	4,000		
4,4'-DDE[5]	0.00022	0.00022			Selenium[7]	170	4,200	[12]	4.6
4,4'-DDT[5][7]	0.00022	0.00022	0.55	0.001	Silver			3.2[9]	
Dibenzo(a,h)Anthracene[5]	0.0038	0.018			1,2,4-Trichlorobenzene	35	70		
1,2-Dichlorobenzene	420	1,300			1,1,2,2-Tetrachloroethane[5]	0.17	4.0		

Pollutant	Human Health Value Concentrations 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[3]	Uses 2-3-4-5-6-9[4]	Acute (CMC)	Chronic (CCC)		Use 1[3]	Uses 2-3-4-5-6-9[4]	Acute (CMC)	Chronic (CCC)
1,3-Dichlorobenzene	320	960			Tetrachloroethylene[6]	0.69	3.3		
1,4-Dichlorobenzene	63	190			Thallium	0.24	0.47		
3,3'-Dichlorobenzidine[5]	0.021	0.028			Toluene	1,300	15,000		
Dichlorobromomethane[6]	0.55	17			Toxaphene[5]	0.00028	0.00028	0.73	0.0002
1,2-Dichloroethane[5]	0.38	37			1,2-Trans-Dichloroethylene	140	10,000		
1,1-Dichloroethylene[5]	330	7,100			1,1,1-Trichloroethane				
2,4-Dichlorophenol	77	290			1,1,2-Trichloroethane[5]	0.59	16		
1,2-Dichloropropane[5]	0.50	15			Trichloroethylene[5]	2.5	30		
1,3-Dichloropropene	0.34	21			2,4,6-Trichlorophenol[5]	1.4	2.4		
Dieldrin[5]	0.000052	0.000054	0.24	0.056	Vinyl Chloride[5]	0.025	2.4		
Diethyl Phthalate	17,000	44,000			Zinc	7,400	26,000	120[9]	120[9]

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) Apply to the beneficial uses as designated but do not supersede those standards for certain toxic pollutants as previously established in §§ 74:51:01:31, 74:51:01:32, 74:51:01:44 to 74:51:01:54, inclusive, and § 74:51:01:56.

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

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

(5) 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}).

(6) 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.

(7) Also applies to all waters of the state.

(8) 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 = $e^{[1.005(pH) - 5.134]}$ Acute = $e^{[1.005(pH) - 4.869]}$

(9) 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: 2002 (EPA-822-R-02-047, November 2002):

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)$e^{(0.8545[ln(hardness)]-1.702)}$

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)

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

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

(12) 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 Φg/L and 12.82 Φg/L, respectively.

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

SOUTH DAKOTA
Surface Water Quality Standards
for Total Ammonia as N

Equation 1: For waters where salmonid fish are present.

$$(0.275/(1+10^{7.204-pH})) + (39.0/(1+10^{pH-7.204}))$$

pH = the pH of the water quality sample in standard units.

Equation 2: For waters where salmonid fish are not present.

$$(0.411/(1+10^{7.204-pH})) + (58.4/(1+10^{pH-7.204}))$$

pH - the pH of the water quality sample in standard units.

Equation 3: For waters where early life stages are present.

$$(((0.0577/(1 + 10^{7.688-pH})) + (2.487/(1+10^{pH-7.688}))) * MIN(2.85, 1.45 * 10^{0.028 * (25-T})$$

MIN = use either 2.85 or the value of $1.45^{0.028 * (25-T)}$, whichever is the smaller value.

T = the water temperature of the sample in degrees Centigrade.

pH - the pH of the water quality sample in standard units.

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 standards units.

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, and support their 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 assigned 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 a given waterbody to support its assigned beneficial uses.

Section 303(d) of the federal Clean Water Act (CWA) requires states to develop and submit for approval a list of waters targeted for TMDL development every two years. This is referred to as the 303(d) list. Items that must accompany this list include targeted pollutants and timeframes for TMDL development.

Once identification of TMDL waters are completed, states are to develop TMDLs at a pace necessary to complete all the TMDLs during a 13 year period. 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.

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 federal Clean Water Act:

- 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.

Impaired Waters

Waters that are considered impaired for the assigned beneficial uses require a TMDL. This includes waters that are identified under the "not supporting" beneficial use categories in this report unless the waterbody has a recent TMDL approved by EPA that addresses the impairments.

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 limit. As can be seen from this report, very few streams have impairments for ammonia or dissolved oxygen. Therefore, South Dakota's point source control program has been effective at maintaining and improving the quality of surface waters in the state.

Waters Reported by Government Agencies, Members of the General Public, or Academic Institutions

SDDENR received a letter from the South Dakota Resources Coalition requesting that Lake Cochrane be placed on the impaired waterbodies list due to nutrient concerns. A description of the request and DENR's response is included in Appendix G.

Prioritization of TMDL Waters

Regulatory Requirements

Section 303(d) of the federal CWA requires that "*each state shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters."* Little other guidance is offered for states to use in the prioritization process.

A system of prioritization has been developed by DENR based on several factors. Included in these factors are the required elements of "*the severity of the pollution and the uses to be made of such waters."* The highest priorities are given to impaired waters meeting the following criteria (Priority 1):

- Imminent human health problems;
- Waters where TMDL development is expected during the next two years;
- Waters listed for four or more listing criteria; or

- Waters with documented widespread local support for water quality improvement.

Priority 2 waters meet the following criteria:

- Waters with an increasing trend towards eutrophy or enrichment, with consideration given to the rapidity of the declining water quality;
- Waters listed for three or less listing criteria;
- Waters where local support for TMDL development is expected but not documented;
- Waters listed for aquatic life impairment;
- Waters with no evident local support for water quality improvements; or
- Waters where impairments are believed to be due largely to natural causes.

These criteria are a guide. If a waterbody met any one criteria in a category that did not necessarily mean the waterbody was prioritized as such, since many waterbodies fit one or more criteria from the lists above.

Section 319 Related Waters

Section 319 TMDL assessments are developed based upon the prioritization criteria listed above. Section 319 TMDLs are developed as part of an assessment project. DENR prefers to develop TMDLs in 12 digit hydrologic units or larger "clusters" that include all nonpoint source TMDLs required for a river basin. For larger basins, such as the Big Sioux, studies are completed by dividing the basin into sub-basins. Watershed implementation projects for completed nonpoint source TMDL assessments also follow the "clustering" format within associated river basins or sub-basins. Implementation projects for completed TMDL assessments hinge upon whether adequate local support exists. 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 web link:

http://www.state.sd.us/denr/DFTA/WatershedProtection/NPSMgmtPlan07.pdf

Surface Water Discharge Related Waters

The priorities for developing water quality-based effluent limits are not based upon the severity of waterbody impairment but upon the importance of maintaining water quality improvements made through the permits.

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 (previously known as the 303(d) list) in Tables 17 - 30. The tables include waterbody names, pollutants of concern, basis for listing, and other information. A total of 168 different waterbodies require TMDLs (Table 5). Each waterbody may contain several

different pollutants and thereby may constitute several TMDLs. 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).

If a specific waterbody required a TMDL for several different pollutants, all pollutants were grouped into one TMDL for that waterbody. In reality, it may not be possible to incorporate each pollutant into a single TMDL for each waterbody segment, but this assumption was made for planning purposes. There may be other cases where widespread support for water quality improvement, large single entity landholders (federal lands, state lands, etc.), or other factors allow several waterbodies to be targeted for improvement under a single TMDL. Possible scenarios such as these make TMDL numbers difficult to project. Notwithstanding this fact, the implications of the list are that a monumental work effort will be required to complete the number of TMDLs in the time frame suggested by the list.

Resource Implications

TMDL issues span a wide range of activities within DENR. Nonpoint source assessments, clean lakes assessments, discharge permitting, 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 good 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.

It is not possible to develop TMDLs for every waterbody within two years. The time frame to develop TMDLs on each biennial list is 13 years in accordance with EPA guidelines.

Status of 2006 Integrated Report TMDLs

South Dakota's 2006 list contained 147 different waterbodies or waterbody segments for TMDL development. A total of 30 TMDLs have been completed or determined to be unnecessary by DENR since April 1, 2006. Table 4 and Figure 1 below show the status of waters that required TMDLs in the 2006 Integrated Report.

Table 4: Status of TMDLs from the 2006 Integrated Report

TMDL Status	Number and Percentage of TMDLs
Completed or determined to be unnecessary	**30 (20%)**
In progress	**78 (53%)**
Planned	**39 (27%)**
Total:	**147**

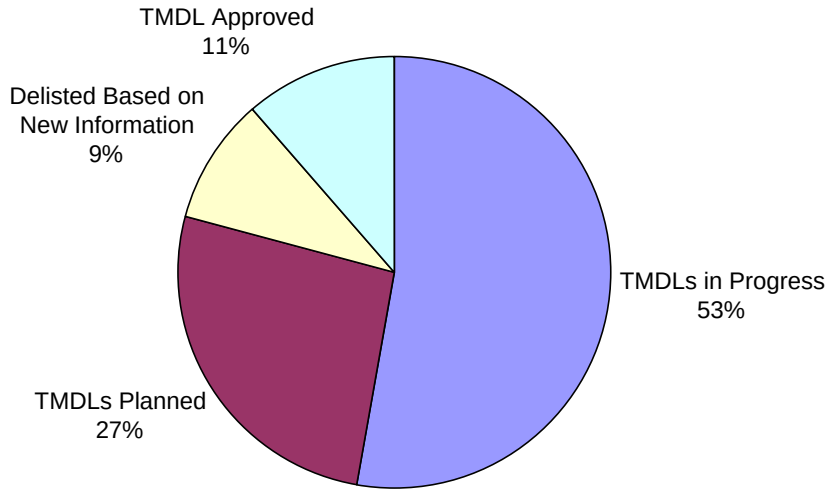

Figure 1: Status of TMDLs from the 2006 Integrated Report

Delisting of Certain 2006 TMDL Waters and Other Exclusions

Delisting of Waterbodies

Waters were delisted using the following criteria:

- EPA approved TMDL(s) in place for all pollutants of concern;
- Water quality standards now being met because:
  - New monitoring data show attainment; or
  - New modeling results show no potential for exceedance of standards.
- Water was listed in error;
- Additional state effluent controls address water quality problems;
- Reservoir has been breached and is no longer a viable waterbody; or
- Data assessment methodologies have been modified.

TMDLs Required by the 2008 Integrated Report

Table 5 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 have identified additional impaired reaches that were not previously recognized in the 2006 Integrated Report. Although there is an increase in TMDLs from 2006 to 2008, many of these reaches have current TMDL development in progress.

Table 5: 2008 Summary of TMDLs by Basin

Basin	Projected Number of TMDLs required	Pollutants of Concern
Bad River Basin	4	Nutrients, bacteria, total dissolved solids, specific conductance
Belle Fourche River Basin	16	Bacteria, metals, pH, temperature, specific conductance
Big Sioux River Basin	44	Bacteria, mercury in fish tissue, dissolved oxygen, nutrients, total suspended solids, pH
Cheyenne River Basin	35	Bacteria, nutrients, pH, temperature, sodium adsorption ratio, total suspended solids, total dissolved solids, sulfates, dissolved oxygen, specific conductance
Grand River Basin	9	Bacteria, mercury in fish tissue, nutrients, sodium adsorption ratio, temperature, total suspended solids, total dissolved solids, specific conductance, pH
James River Basin	23	Ammonia, bacteria, dissolved oxygen, nutrients, pH, total suspended solids, total dissolved solids, temperature
Little Missouri River Basin	0	
Minnesota River Basin	1	Dissolved oxygen
Missouri River Basin	16	Bacteria, mercury in fish tissue, dissolved oxygen, nutrients, total suspended solids, total dissolved solids, specific conductance, pH
Moreau River Basin	5	Bacteria, dissolved oxygen, total suspended solids, sodium adsorption ratio, total dissolved solids, specific conductance
Niobrara River Basin	2	Nutrients, total suspended solids, bacteria
Red River Basin	1	Nutrients
Vermillion River Basin	6	Bacteria, nutrients, total suspended solids, pH, mercury in fish tissue
White River Basin	6	Bacteria, total suspended solids, temperature
Totals	**168**	

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, USGS, the city of Huron, the city of Watertown, and the city of Sioux Falls. Sources of quantitative and qualitative lake assessment data were acquired from the Statewide Lakes Assessment project and individual assessment studies.

DENR maintains a Quality Assurance/Quality Control (QA/QC) Program 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 Assurance Program and individual project plans. It also includes the preparation of periodic reports to DENR management and EPA; the review of contracts, grants, agreements, etc., for consistency with QA/QC requirements; and the administration of QA/QC systems and performance audits. The latter activity requires the establishment of schedules for the collection of the duplicate and blank samples, periodic testing of field sampling techniques and liaison with contracted labs to ensure compliance with QA/QC objectives. In 1998, the Water Resources Assistance Program created a QA/QC document and protocol for its Clean Lakes and NPS programs. An updated Standard Operating Procedure manual was completed and published in February 2005.

The ambient monitoring station assessment network provides useful information on overall stream water quality. Only a brief summary of water quality is included because of the large volume of data and reports. A more detailed description of the stream ambient monitoring program is found in the preceding Surface Water Quality Monitoring Program chapter of this document.

Fixed station monitoring data were assessed by dividing major streams into segments that contain the same or similar designated beneficial uses, water quality standards criteria, and environmental and physical influences. Data obtained during the current reporting period were analyzed by utilizing DENR's NR92 Database system. The data for each monitored segment were compared to state water quality standards applicable to the beneficial uses assigned to the segment in question (Tables 2 and 3). Monitored stream course mileages and lake acreages were measured using EPA Reach Indexing Tool software.

Specific criteria were developed to define how data for streams would be evaluated to determine the status of each stream segment (waterbody). The following criteria were used:

Table 6: Sample Criteria for Determining Support Status

Description	Criteria Used
FOR CONVENTIONAL PARAMETERS (such as dissolved oxygen, total suspended solids, pH, water temperature, fecal coliform bacteria, etc.) Number of observations (samples) required to consider data representative of actual conditions	STREAMS: at least 20 samples for any one parameter are usually required at any site. The sample threshold was reduced to 10 samples if greater than 25% of samples exceed water quality standards since impairment is more likely. In addition, the sample threshold was reduced to five samples if 100% of the samples indicated full or nonsupport for that parameter. LAKES: 2 separate years of samples for conventional and Trophic State Index (TSI) parameters. Must include at least one Secchi disk and chlorophyll-*a* value. Sample dates must be between May 15 and September 15.
FOR CONVENTIONAL PARAMETERS Required percentage of samples exceeding water quality standards in order to consider segment water quality-limited	STREAMS: >10% (>25% if less than 20 samples available). LAKES: >10% of surface samples (>25% if less than 20 samples available). If one surface exceedance was observed for water temperature, dissolved oxygen, or pH; lake profile data was used to make listing determinations. Lakes were considered fully supporting the aquatic life beneficial use if profile data indicate a region within the water column where temperature, pH, and dissolved oxygen were meeting numeric water quality standards. If a region did not exist the lake was listed for the parameter in exceedance.
FOR TOXIC PARAMETERS (such as metals, mercury, total ammonia, etc.) Number of observations (samples) required	STREAMS: At least one water quality sampling event. LAKES: At least one fish flesh sampling event.
FOR TOXIC PARAMETERS Required percentage of samples exceeding water quality standards in order to consider segment water quality-limited	STREAMS: More than one exceedance of toxic criteria within the past 3 years. LAKES: If fish flesh samples are above the Federal Drug Administration's recommended action levels (such as 1 part per million for mercury).
Data age (for both conventional and toxic parameters)	STREAMS: Data must be less than five years old. LAKES: Data collected from 2000-2007 Unless there is justification that data is (or is not) representative of current conditions. While a data age of two years matches the report cycle, it does not allow for enough samples to accurately portray variability.
Quality Assurance/Quality Control (for both conventional and toxic parameters)	STREAMS and LAKES: There must be a consensus that the data meets QA/QC requirements similar to those outlined in DENR protocols. QA/QC data was encouraged to be submitted.

Waterbodies were also considered nonsupporting if beach closures were attributable to pollution related causes. Waterbodies were listed as nonsupporting through beach closures where there were more than three beach closures per season in a consecutive three week sampling period based on fecal coliform concentrations.

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: total suspended solids, total dissolved solids, pH, water temperature, dissolved oxygen, fecal coliform, and others. Exceedances of more than one parameter were not considered additive in determining overall support status for any given waterbody. A stream segment with less than 10% exceedances with respect to the total number of samples for one or more parameters is considered fully supporting. Complete listings of relevant parameters appear in Tables 2 and 3. South Dakota has established the following general criteria for determining use support of monitored streams:

In order to ensure a sufficient number of samples was available for each stream segment (usually a minimum of 20) to arrive at an assessment that would be statistically acceptable, the period of record considered for this report was from October 1, 2002, to September 30, 2007, (5 years) for streams and May 15, 2000, to September 15, 2007, (8 years) for lakes. The lake's date range was changed from that of past reporting cycles. The eight year timeframe covers data from at least two sampling rotations to provide a more recent description of a lake's support status between reporting cycles.

Waterbody support determinations are heavily influenced by the numbers of samples obtained based on the criteria in Table 6. 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 made if the reach demonstrates a declining trend that may result in water quality standard exceedances by the next reporting cycle; if the reach has previously been listed as nonsupporting and the current number of samples obtained change the determination to full support, but with a high percent of exceedances; or, if 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 a 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 are placed on the 303(d) list.

Much of the waterbody impairment information is summarized in Tables 7 through 16. More detailed information on the lakes and streams in each river basin is presented in Tables 17 through 30.

In addition to the use support assessment above, South Dakota has chosen to use the assessment categories that EPA recommends in its guidance that was issued on July 21, 2003. 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;
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: Water is impaired but implementation project (best management practices) is in place;
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 assessment for fish and aquatic life propagation use primarily involves monitoring the following major parameters: dissolved oxygen, total ammonia, water temperature, pH, and total suspended solids.

Support assessment for immersion recreation and limited contact recreation involves monitoring dissolved oxygen and fecal coliform. Fecal coliform is monitored from May 1 through September 30 of each year (Table 2).

Support assessment for irrigation use involves monitoring sodium adsorption ratio (SAR) and specific conductance.

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

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 regulate discharges of wastewater from industries and municipal wastewater treatment facilities. Numeric criteria are needed to develop numeric effluent limits for facilities that discharge wastes to surface water. However, since 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 even EPA have traditionally viewed the 10% approach (as stated in the criteria for determining support status in Table 6) 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. The methodology employed by the department in the interpretation of the data for

the 2008 Integrated Report is consistent with DENR's interpretation of the South Dakota Surface Water Quality Standards. Therefore, for the Integrated Report purposes, DENR defines "impairment" or "nonsupport" of a beneficial use of a waterbody by the criteria found in Table 6.

Lake water quality data is acquired from the DENR's Statewide Lakes Assessment (SWLA) project. Lakes are sampled on a four year rotation (i.e. about 31 lakes annually) twice during the growing season, at one to three predetermined site locations. The number of site locations assigned to each lake is dependent on basin size. Field measurements are collected and water samples are composited from each site. Lake data available from 2000 through the 2007 sampling season were used to make support determinations for this report.

Data collected during the growing season (May 15 - September 15) from individual lake assessment projects is also used to supplement the SWLA data. Project specific data is usually collected monthly throughout the growing season from site locations consistent with those established during the SWLA project. Field measurements and water samples are usually collected at each site. Additional chlorophyll-*a* data is also acquired from citizens' monitoring efforts.

A group of 17 standard water quality parameters are measured or analyzed. 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 (1995). The remaining samples are preserved, iced and shipped to the State Health Laboratory in Pierre, South Dakota, for individual parameter analysis.

For the 2008 reporting cycle, support status of lakes and reservoirs was evaluated based on trophic state indicators and water quality standard limits. The Trophic State Index (TSI) approach (Carlson 1977), represents an impairment targeting criteria, designed to augment narrative criteria for making lake support determinations. All available Secchi transparency and chlorophyll-*a* data from 2000-2007 were used to calculate the median TSI value for each lake based on a minimum of two years data.

The fishery beneficial use designation was used as a classification tool to define the support status of lakes. A document explaining the rationale and methodology of the current TSI approach for Targeting Impaired Lakes in South Dakota is located on the DENR website at:

http://www.state.sd.us/denr/Documents/ImpairedLakes.pdf

Beneficial use support determinations based on the median Secchi-chlorophyll-*a* TSI were derived from statistical analysis and Best Professional Judgment (BPJ). TSI values are based on the median of all available data and not individual data values. If the median TSI value exceeded the support criteria in Table 7, the waterbody was listed as

nonsupporting the fishery beneficial use. Appendix D depicts the calculated median TSI Secchi-chlorophyll-*a* values for assessed lakes categorized by their designated fish life beneficial use.

Table 7: South Dakota Fishery Beneficial Use Support Determination Range for Lakes

Fish Life Support Determination		
TSI Range		
Beneficial Use	Fully Supporting	Not Supporting
Coldwater Permanent Fish Life Propagation	≤ 48.4	≥ 48.5
Coldwater Marginal Fish Life Propagation	≤ 53.4	≥ 53.5
Warmwater Permanent Fish Life Propagation	≤ 58.4	≥ 58.5
Warmwater Semipermanent Fish Life Propagation	≤ 63.4	≥ 63.5
Warmwater Marginal Fish Life Propagation	≤ 68.4	≥ 68.5

In addition to the TSI values, lake support status was evaluated using state water quality standards. State water quality standard numeric criteria provide a benchmark for making listing decisions. However, water quality is variable and dependent on the environmental conditions present during sample collection. To account for variability, all available surface data collected during the growing season from 2000-2007 was used to identify parameter specific impairments for individual assessed lakes.

Fish and other aquatic life are relatively mobile and can move vertically within the water column to escape adverse conditions. If one surface exceedance was observed for water temperature, dissolved oxygen, or pH, lake profile data was used to make listing determinations. Lakes were considered fully supporting the aquatic life beneficial use if profile data indicate a region within the water column where temperature, pH, and dissolved oxygen were meeting numeric water quality standards. If a region did not exist the lake was listed for the parameter in exceedance.

Parameters such as nitrate, ammonia-nitrogen, specific conductance, total dissolved solids, total suspended solids and alkalinity not collected in the profile were listed based on the criteria found in Table 6 depending on the number of data available for a given lake.

Waterbodies were also evaluated based on beach closures, fish kills, and fish consumption advisories. Beach closure information collected during this reporting period (2006-2007) was used to make impairment decisions (Table 32). Lakes were listed if three beach closures per season occurred in a consecutive three week sampling period. A public beach is recommended for closure if the following fecal coliform levels are met.

(1) Any three consecutive samples exceed 200 fecal coliform per 100 milliliters;

(2) Any two consecutive samples exceed 300 fecal coliform per 100 milliliters; or

(3) Any single sample exceeds 1,000 fecal coliform per 100 milliliters.

Long term trends in TSI were estimated from data collected during the 1989 through 2007 statewide lake assessments and from individual assessment projects. A slope of $\pm$ five units between respective TSI values was selected as signifying a legitimate change in lake water quality over the course of data availability. Long term trends covering the period from 1989 through 2007 are summarized in the Lake Water Quality Assessment chapter of this section (Table 16).

STATEWIDE SURFACE WATER QUALITY SUMMARY

South Dakota has a total of about 9,289 miles of perennial rivers and streams (Table 1). Major or significant streams in this context are waters that have been assigned aquatic life use support in addition to the beneficial uses of fish and wildlife propagation, recreation, stock watering (9), and irrigation (10). 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 7,904 miles of perennial streams have been assessed to determine water quality status for a period covering the last five years (October 2002 through September 2007). Data needed to be evaluated over this longer time span to ensure enough data points were available for each stream segment (usually 20) to properly characterize existing stream conditions. Since some stream segments had only four (or fewer) samples available per year, evaluation of a data set covering at least five years of sampling was required to adequately portray the natural variability in water quality that is typical of stream environments.

Currently, 49% of the assessed stream miles fully support all assigned beneficial uses and 51% do not presently support one or more uses. The high percentage of impairment can be attributed largely to high levels of total suspended solids (TSS) and fecal coliform.

During this reporting cycle, 6,700 designated miles were assessed for fishery/aquatic life beneficial use attainment; 56% of assessed stream miles fully met fishery/aquatic life criteria, while 44% did not. 2,295 miles were also assessed for immersion recreation attainment. Seventy-seven percent fully supported immersion recreation criteria, while 23% did not.

Nonsupport in assessed streams was caused primarily by total suspended solids from agricultural nonpoint sources and natural origin. In approximate order of stream miles affected, additional causes of impairment this reporting cycle include: fecal coliform, water temperature, sodium adsorption ratio, specific conductance, total dissolved solids, and low concentrations of dissolved oxygen. 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). Large storm events that produce significant amounts of precipitation may contribute to suspended sediment problems over large areas of the state, particularly in the west and southeast. Fecal coliform concentrations also increase significantly during times of above normal rainfall. 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 570 classified publicly owned lakes and reservoirs totaling nearly 205,000 acres. The 570 waterbodies are listed in ARSD Chapter 74:51:02 and classified for aquatic life and recreation beneficial uses. GF&P presently manages 450 state lakes for recreational fishing.

Excluding the four mainstem reservoirs, an estimated 22% of the 570 lakes have been assessed, accounting for 65% of the total lake acreage. An estimated 49% (49 lakes) of the lake acreage was considered to support all assessed beneficial uses and 51% (75 lakes) did not support assessed beneficial uses. Eighteen lakes assessed during the 2006 reporting cycle had insufficient information to make support determinations for this reporting cycle. Approximately 98% of nonsupporting uses for lakes can be attributed to nonpoint sources. Most lakes in the state are characterized as eutrophic to hypereutrophic. They tend to be shallow and 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.

The mileage/acreage of use support for assessed surface waters in South Dakota during this reporting cycle is summarized in Tables 8 through 13.

Table 8: 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	-	3,906	3,906
Miles Insufficient Data but Threatened	-	-	-
Miles Not Supporting	-	3,998	3,998
TOTAL	-	7,904	7,904

Table 9: 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	-	65,851	65,851
Acres Insufficient Data but Threatened	4,012	-	4,012
Acres Not Supporting	-	63,818	63,818
TOTAL	4,012 [a]	129,669	133,681

[a] These lakes were only evaluated by fish flesh data, no water quality data was taken for this report cycle. Waterbodies marked as "Threatened" in Tables 17 – 30 are placed in Category 5, thus nonsupporting.

Table 10: Individual Use Support Summary for Rivers and Streams

Beneficial Use	Miles Fully Supporting	Miles Not Supporting	Miles Threatened with Insuff. Info.	Miles With Insuff. Info. Or Not Assessed	Miles Assessed
Overall Use Support	3,906	3,998	-	449	7,904
Coldwater Permanent Fish Life	224	345	28	962 (insuff info)	597
Coldwater Marginal Fish Life	152	73	-	10 (insuff info)	225
Warmwater Permanent Fish Life	700	346	-	-	1,046
Warmwater Semipermanent Fish Life	1,461	1,759	-	-	3,220
Warmwater Marginal Fish Life	1,244	233	134	110 (insuff info) 64 (not assessed)	1,611
Immersion Recreation	1,769	526	-	134 (not assessed) 5 (insuff info)	2,295
Limited Contact Recreation	4,972	1,381	15	198 (insuff info) 1,264 (not assessed)	6,367
Fish/Wldlf. Prop., Rec., and Stock Watering	7,722	93	55	357 (insuff info) 126 (not assessed)	7,870
Irrigation	6,833	717	327	342 (insuff info) 134 (not assessed)	7,877
Commerce and Industry	1,414	-	-	-	1,414
Domestic Water Supply	1,816	32	36	9 (not assessed)	1,884

Table 11: Individual Use Support Summary for Lakes and Reservoirs

Beneficial Use	Acres Fully Supporting	Acres Not Supporting	Acres Threatened with Insuff. Info.	Acres With Insuff. Info. Or Not Assessed	Acres Assessed
Overall Use Support	65,851	67,830	4,012	10,836	133,681
Coldwater Permanent Fish Life	1,181	96	368	31 (insuff info)	1,645
Coldwater Marginal Fish Life	158	5	-	-	163
Warmwater Permanent Fish Life	43,675	25,668	106	927 (insuff info)	69,449
Warmwater Semipermanent Fish Life	26,677	10,109	375	1,063 (insuff info) 150 (not assessed)	37,162
Warmwater Marginal Fish Life	3,089	18,308	-	8,994 (insuff info) 7 (not assessed)	21,397
Immersion Recreation	95,139	6,406	-	32,989 (not assessed) 6,453 (insuff info)	101,544
Limited Contact Recreation	95,193	4,890	-	34,450 (not assessed) 6,453 (insuff info)	100,083
Fish/Wldlf. Prop., Rec., and Stock Watering	123,559	55	8,421	11,250 (insuff info) 531 (not assessed)	132,035
Irrigation	38,708	5,070	-	-	43,778
Domestic Water Supply	8,919	4,371	-	31 (insuff info)	13,290

Table 12: Total Sizes of Water Impaired by Various Cause Categories in South Dakota

Rivers/Streams	
Cause/Stressor Category	**Miles**
Cadmium	2
Copper	2
Fecal Coliform	1,574
Nitrates	32
Nitrogen, Ammonia	43
Dissolved Oxygen	188
pH	168
Salinity/SAR	455
Specific Conductance	413
Temperature	510
Total Dissolved Solids	128
Total Suspended Solids	2,013
Zinc	2
Lakes/Reservoirs	
Cause/Stressor Category	**Acres**
Dissolved Oxygen	5,380
Fecal Coliform	1,516
Fish Consumption Advisories (Mercury)	4,218
Nitrates	55
pH	7,769
Sedimentation/Siltation	279
Selenium	55
Specific Conductance	55
Sulfates	4,196
Temperature	464
Total Dissolved Solids (TDS)	9,383
Trophic State Index (TSI)	51,451

Table 13: Total Sizes of Waters Impaired by Various Source Categories in South Dakota

Rivers/Streams	
Source Category	**Miles**
Acid Mine Drainage	2
Animal Feeding Operations (NPS)	467
Combined Sewer Overflow	1
Crop Production (including irrigated and non-irrigated crop production)	1,296
Grazing in Riparian or Shoreline Zones	561
Streambank Modification	77
Impacts from Abandoned Mine Lands	2
Industrial Point Source Discharge	9
Livestock (Grazing or Feeding Operations)	1,750
Mine Tailings	2
Municipal (Urbanized High Density Area)	5
Municipal Point Source Discharge	82
Natural Sources (including drought-related impacts)	1,749
On-Site Treatment Systems	76
Rangeland (Unmanaged Pasture) Grazing	367
Residential Districts	10
Wet Weather Discharges	19
Wildlife	505
Lakes/Reservoirs	
Source Category	**Acres**
Natural Sources	9,375
Nonpoint Sources	53,745

Not all sources of impairment have been identified for this reporting cycle. Unknown sources of impairment have been left blank in Tables 17 – 30 and are not included in the above summary table. Sources of impairment are based on best professional judgment. A formal evaluation of the source of impairment is identified during watershed assessments and TMDL development.

LAKE WATER QUALITY ASSESSMENT

A total of 570 lakes are currently designated for fishery/aquatic life beneficial uses in South Dakota. Twelve assessed lakes in South Dakota have a surface area greater than 4,000 acres and have a combined surface area of 91,134 acres. Lake monitoring and assessment efforts have been conducted routinely since 1989 as part of the DENR's Statewide Lakes Assessment (SWLA) project. Additional assessment data have also been acquired from individual assessment projects. When quantitative data was incomplete, a qualitative evaluation of lake water quality was provided. Approximately 22% of the 570 lakes have been assessed or are part of the SWLA cycle, accounting for 65% of the total lake acreage. The remaining lakes did not meet the assessment criteria listed below.

- Public access; and
- Are of regional significance.

The TSI provides a measure of water quality for targeting impaired lakes (Carlson 1977, 1991). DENR has adopted a TSI methodology based on Secchi depth transparency and chlorophyll-*a* using the fishery beneficial use as a classification tool to define support status. The rationale and methodology of this TSI approach entitled "Targeting Impaired Lakes in South Dakota" is located on the DENR web site at:

http://www.state.sd.us/denr/DFTA/WatershedProtection/WQInfo.htm#Information

In addition, water quality standards designed to protect designated beneficial uses were evaluated for each individual lake. Based on numeric water quality standards and TSI, 49 lakes fully supported beneficial uses and 75 failed to support one or more beneficial uses (Table 11). Of the 142 lakes, 18 did not meet the requirements for sufficient data.

The TSI approach was used to determine the trophic state of assessed lakes (Carlson 1977). Parameters used to generate the median TSI value included Secchi depth and chlorophyll-*a*. Phosphorus was not included into the index value despite being used in previous reporting cycles (1998-2004). The phosphorus component of the TSI was found to deviate more than $\pm$ 5 points from the chlorophyll-*a* TSI (median 11.3) in 82% of the assessed lakes. Carlson (1991) suggests that at this magnitude of deviation, the phosphorus component of the TSI will contribute to the misclassification of a lake's trophic state. Table 14 depicts the trophic status of assessed lakes across South Dakota.

Table 14: Trophic Status of Significant Publicly Owned Lakes

Trophic Status	Number of lakes	Acreage of Lakes
Total with Beneficial Use Criteria	570	204,987
Total Assessed*	142	144,516
Oligotrophic	1	822
Mesotrophic	18	18,415
Eutrophic	58	78,668
Hypereutrophic	41	31,299
Unknown	24	15,312

* May 15, 2000 to September 15, 2007

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. Lake specific data is tabulated in the River Basin Assessments section.

Water Resource Assistance Program

The approach used by the South Dakota Water Resource Assistance Program for addressing nonpoint source 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 319 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 Total Maximum Daily Load (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 Annualized Agricultural Nonpoint Source Model (USDA-ARS, 1998) 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 (BMP's).

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 nonpoint source 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 Department of Environment and Natural Resources, the Department of Agriculture, U.S. Natural Resources Conservation Service, Department of Game, Fish and Parks, 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 data evaluation 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://www.state.sd.us/denr/DFTA/WatershedProtection/WQInfo.html#information.

Impaired Lakes

A description of each impaired lake is included in the section of this document titled *River Basin Assessments*. The lakes are listed by their location in each major river basin in the state.

All water's of the state have been assigned the beneficial use of fish and wildlife propagation, recreation, and stock watering (9). 570 lakes listed in the ARSD have also been assigned 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.

Acid Effects on Lakes

During Lake Water Quality Assessments, each lake was measured for field pH. Monitoring efforts (May 2000-September 2007), suggest none of the assessed lakes had a pH reading less than 6.5 standard units (su). 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 15: Acid Effects on Lakes

	Number of Lakes	Acreage of Lakes
Assessed for pH	118	129,167
Impacted by High Acidity	0	0
Vulnerable to High Acidity	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 data collected during the lake water quality assessments and the Statewide Lakes Assessment (SWLA) project. The TSI using the chlorophyll-*a*, and Secchi transparency were calculated for each individual sample. The slope of a regression line was calculated for each TSI measurement over time. If a lake was not

sampled in the last eight years or had less than two years of data, it was not included due to insufficient data.

Most lakes' TSI values were within 5% slope range indicating stable or non-significant change (Table 16). Six lakes indicated negative slopes exceeding 5% and were considered degrading. In addition, five lakes showed positive slopes above 5% suggesting improvement. Due to the limited timeframe it is difficult to describe the significance of these conditions; however, it is likely due to natural hydrologic conditions. In general, most assessed lakes display relatively stable trophic status.

The maximum long term rate of change for any lake was approximately one TSI point every 125 years. Many of the lakes and reservoirs had much smaller changes. With only 18 years or less of data, it is difficult to draw any definite conclusions on the water quality trend of a lake. To have better trend analysis, more data over time will be needed.

A number of short term, cyclical changes or fluctuations were observed between monitoring periods. With the extreme drought experienced in the past 7 years, water levels have decreased and nutrients are being concentrated at higher levels. However, results of this recently revised long term trend analysis indicate that no major changes have occurred in the monitored lakes.

Table 16: Long Term Trends in Public Lakes (1989-2007)

	Number of Lakes	Lake Acreage
Assessed for Trends	142	144,516
Improving	5	21,826
Stable	105	104,455
Degrading	6	1,391
Insufficient Data	24	15,312
Fluctuating	2	1,532

RIVER BASIN WATER QUALITY ASSESSMENTS

South Dakota has fourteen major river basins, most of which drain into the Missouri River (Figure 2). 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 3). More specific information is provided in the accompanying river basin tables for the monitored waterbodies in each river basin that is identified in Figure 2 and shown in Figure 3.

Much of the information necessary for stream segments in the river basin assessments is obtained from the DENR stream ambient monitoring program. This fixed ambient network presently consists of 142 active in-stream stations. The collected data is 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, and general physical and chemical parameters. Stations that are located near historic hard rock mines are also analyzed for cyanide and ten metals including arsenic. Stations that are located near historic uranium mining sites or current uranium exploratory sites are also sampled for four other metals including uranium and two forms of radium radionuclides. DENR has only recently begun sampling at several new water quality monitoring sites for uranium and other metals; therefore, sufficient data is unavailable to determine the support status of the new sites. Several stations are sampled for sodium, calcium, and magnesium during the irrigation season.

The 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 NR92 Database. DENR is in the process of transitioning from EPA's STORET to EPA's WQX data warehouse system. 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.

Lake monitoring within each river basin is conducted in conjunction with the Watershed Assessment Program's Statewide Lake Assessment 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 temperature profiles, and total volatile solids. 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. Lake trophic state and trends are estimated with Carlson's (1977) Trophic State Indices (TSI).

Baseline data show whether or not a waterbody is meeting its assigned water quality beneficial uses. A description of the procedure involved is found in the methodology

section of this document. Baseline data evaluations are used as a management tool to determine the effectiveness of control programs on existing point and nonpoint sources and for directing future control activities.

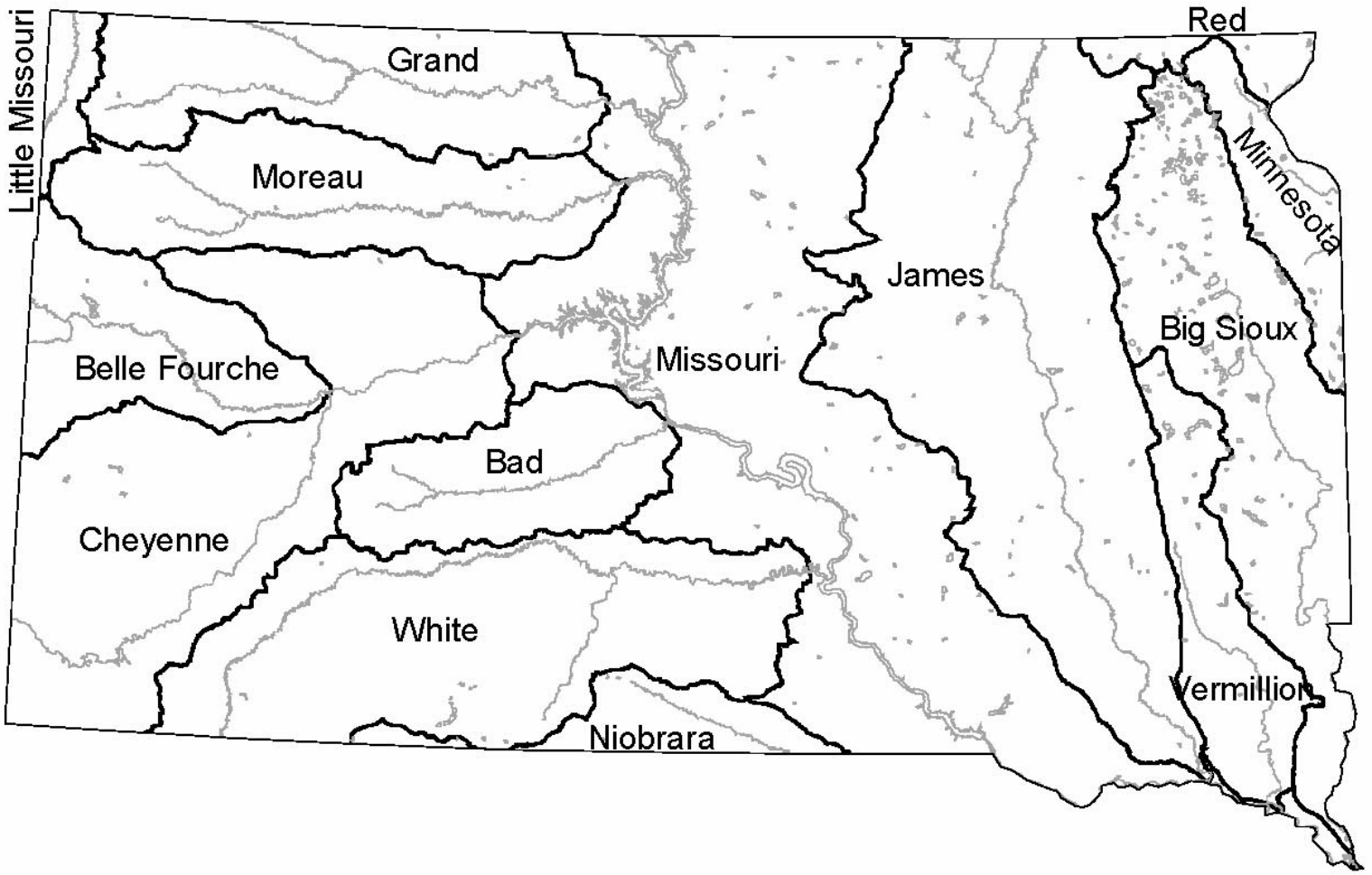

Figure 2: Major River Basins in South Dakota

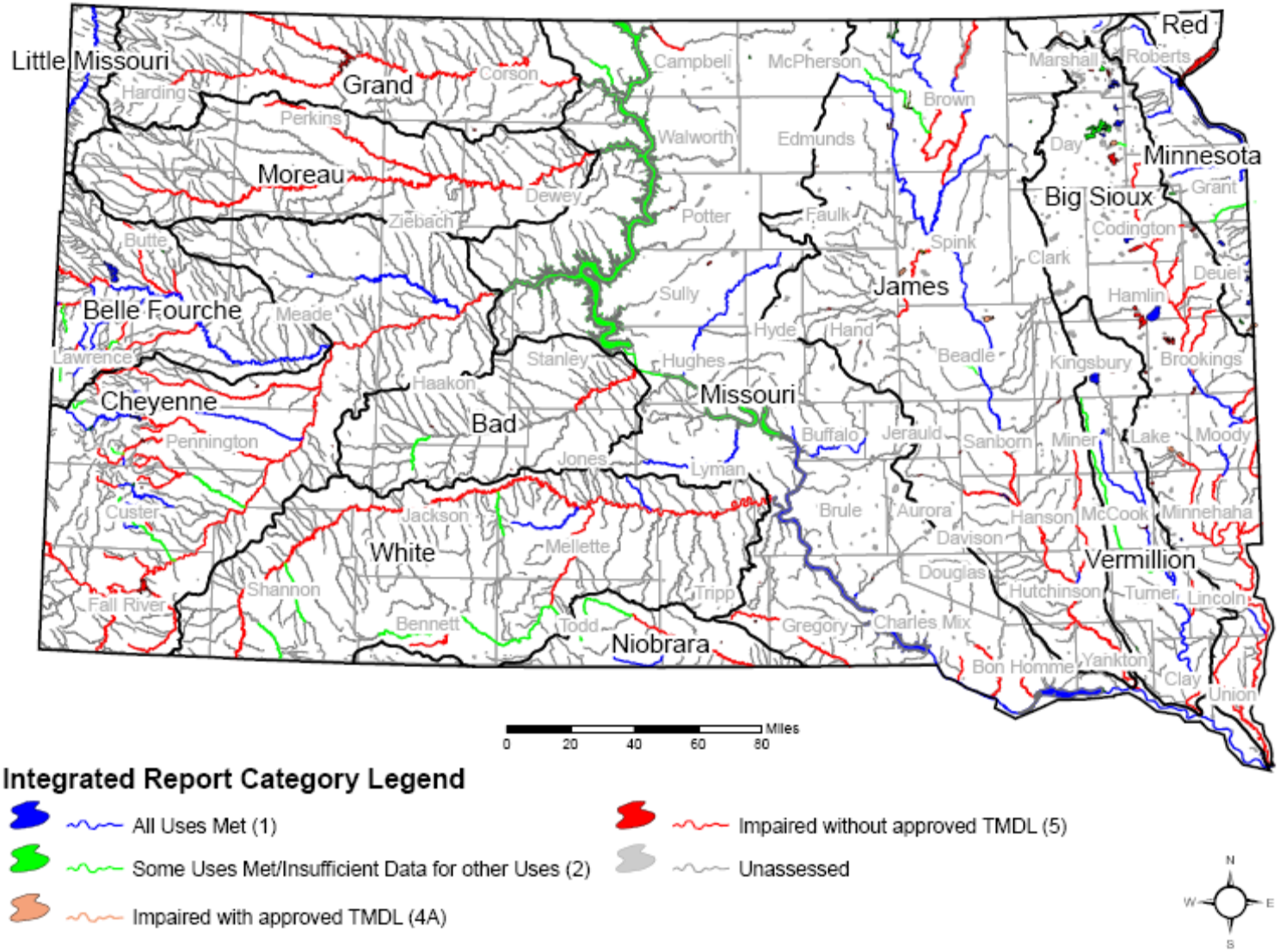

Figure 3: 2008 South Dakota Waterbody Status

KEY FOR RIVER BASIN INFORMATION TABLES

Waterbody - Name of waterbody
Location - Best available description
Map ID - Map identification
Basis - Monitoring agency/program and sampling site identification/WQM number
LA=Lake Assessment
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;
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: Water is impaired but implementation project (best management practices) is in place;
Category 4C: Water is impaired by a parameter that is not considered a "pollutant;" or
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 (had limited sample data and fewer than 25% water quality standard exceedances)
Not Assessed = No sample data for the given beneficial use
TH = Threatened
* = Waterbody has an EPA approved TMDL

Source categories -

- Point Sources
  - Controlled by permit
  - Industrial
  - Municipal
  - Combined sewer (end-of-pipe)
  - Storm sewers (end-of-pipe)
- Nonpoint Sources (includes agriculture sources)
  - Residential districts
- Agriculture Sources
  - Non-irrigated crop production
  - Irrigated crop production
  - Pasture land
  - Range land
  - Feedlots - all types
  - Animal feeding operations
  - Livestock
  - Grazing
- Hydromodification
  - Channelization
  - Dredging
  - Dam construction
  - Flow regulation/modification
  - Bridge construction
  - Removal of riparian vegetation
  - Streambank modification/destablization

Bad River Basin (Figure 4, Table 17)

The Bad River basin lies in west-central South Dakota between the Cheyenne and White River basins and drains approximately 3,151 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 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 flow in the Bad River reach from Midland to the Missouri River.

DENR has assessed four 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 and on some of the intermittent streams in the basin on Plum Creek, the South Fork of the Bad River, and an unnamed tributary of Cottonwood Creek. However, the data is very limited, and for most sites the only parameters that were sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

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.

Table 17: Bad River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Freeman Lake	Jackson County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	NON	Nitrates	Natural Sources	* 5	YES-2
			LA			Specific Conductance	Natural Sources		
SD-BA-L-FREEMAN_01						Total Dissolved Solids	Natural Sources		
				Immersion Recreation	NON	Fecal Coliform	Nonpoint Source		
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Selenium	Natural Sources		
						Trophic State Index	Nonpoint Source		
Hayes Lake	Stanley County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-BA-L-HAYES_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Murdo Dam	Jones County	L3	DENR	Domestic Water Supply	NON	Total Dissolved Solids	Unknown	5	YES-2
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BA-L-MURDO_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Waggoner Lake	Haakon County	L4	DENR	Domestic Water Supply	FULL			5	YES-1
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	NOT ASSESSED				
SD-BA-L-WAGGONER_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Bad River	Stanley County line to mouth	R1	DENR 460850	Fish/Wildlife Prop, Rec, Stock	INS -TH	Total Dissolved Solids	Natural Sources Crop Production Livestock	*5	YES-2
SD-BA-R-BAD_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Plum Creek	Near and below Hayes, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-BA-R-PLUM_01_USGS			6441100 6441110	Irrigation Waters	INS				
South Fork Bad River	Near Cottonwood, SD	R3		Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			USGS	Irrigation Waters	FULL				
SD-BA-R-S_FORK_BAD_01_USGS			6440200	Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Unnamed tributary of	Near Quinn, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
Cottonwood Creek			6440300	Irrigation Waters	INS				
SD-BA-R-UNNAMED_TRIB_COTTONWOOD_01_USGS									

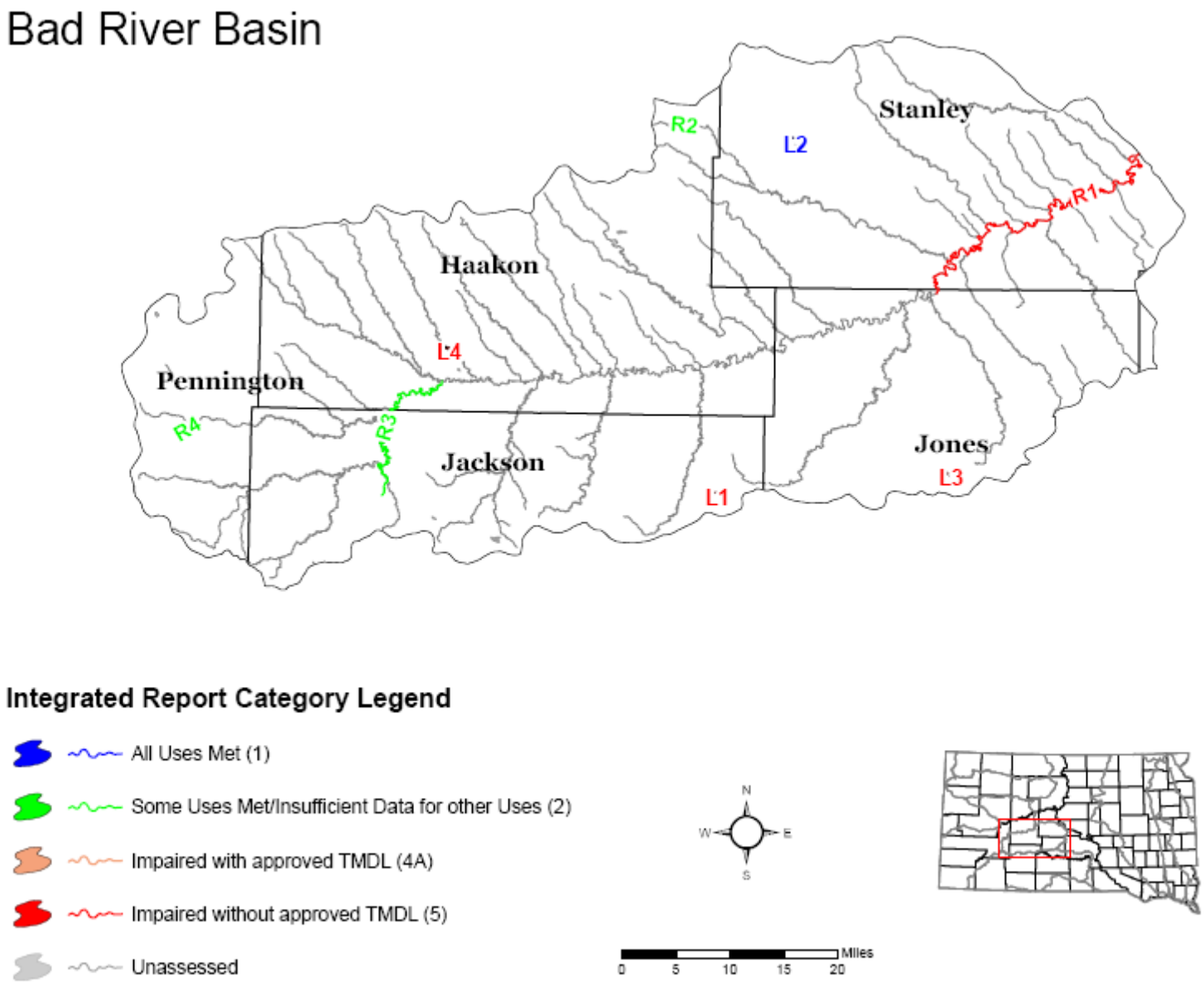

Figure 4: Bad River Basin

Belle Fourche River Basin (Figure 5, Table 18)

The Belle Fourche River basin lies in western South Dakota between the Cheyenne and Moreau River basins and drains approximately 3,200 square miles in South Dakota. The upper portion of the basin contains one active and several historic hard-rock mining operations. The middle and lower portion of the basin is mainly used for livestock watering and irrigation purposes.

DENR has assessed six lakes and maintains 30 water quality monitoring sites on several streams within the Belle Fourche basin. Five water quality monitoring sites are located on the Belle Fourche River, six are located on Spearfish Creek, and seven 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, since a number of hardrock mining operations are or were located in this basin.

The USGS has water quality monitoring sites on the Belle Fourche River, Crow Creek, Horse Creek, Little Spearfish Creek, and Willow Creek within the basin. The data on some streams is fairly extensive and includes information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

Past and current assessments show Spearfish Creek generally supports its beneficial uses; however, two segments near Elmore show elevated pH. The elevated pH is due largely to the limestone formations located along the course of the stream (natural conditions). The segments near Elmore were listed as nonsupporting for pH in 2006; however, in 2008, a smaller sample size dictated a higher percentage listing criterion which resulted in full support of the beneficial use. Due to the percent exceedances and that it was listed in 2006, a decision was made to list these segments as threatened so they remain on the 303(d) List.

Strawberry Creek is impacted by historic mine tailings 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 at the site. On July 31, 2000, EPA took over site operations, including water treatment, and on December 1, 2000, the site was listed on the National Priorities List as a Superfund Site. Strawberry Creek continues to be nonsupporting for high levels of zinc, cadmium, copper, and pH.

The middle segments of Whitewood Creek continue to be nonsupporting for fecal coliform. Sources of the high fecal coliform numbers in the stream's middle reach may be due to aging septic and sewer systems and from the combined sewer overflow (CSO) in Lead. A SWD permit has been issued to the city of Lead for the CSO, requiring compliance with EPA’s nine minimum controls for the CSO. The city of Lead is working to separate their sewer systems and ultimately eliminate the CSO.

The Belle Fourche River implementation project is currently on-going.

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.

Table 18: Belle Fourche River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Iron Creek Lake	Lawrence County	L1	DENR	Coldwater Permanent Fish Life	FULL			1	NO
			LA	Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-L-IRON_CREEK_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
Mirror Lake East	Lawrence County	L2	DENR	Coldwater Permanent Fish Life	NON	Temperature		5	YES-2
			LA	Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-L-MIRROR_EAST_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Mirror Lake West	Lawrence County	L3	DENR	Coldwater Permanent Fish Life	NON	Temperature		5	YES-2
			LA	Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-L-MIRROR_WEST_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Newell Lake	Butte County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BF-L-NEWELL_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	FULL				
Newell City Pond	Butte County	L5	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-L-NEWELL_CITY_01				Immersion Recreation	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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Orman Dam (Belle Fourche Reservoir)	Butte County	L6	DENR LA	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
SD-BF-L-ORMAN_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Annie Creek	Headwaters to Spearfish Creek	R1	DENR 46MN31	Coldwater Marginal Fish Life	FULL			1	NO
SD-BF-R-ANNIE_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Bear Butte Creek	Headwaters to Strawberry Creek	R2	DENR 460126	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-BEAR_BUTTE_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Bear Butte Creek	Strawberry Creek to mouth	R3	DENR	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	*5	YES-2
			460125	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-BEAR_BUTTE_02				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Belle Fourche River	Wyoming border to near Fruitdale	R4	DENR 460130	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
SD-BF-R-BELLE_FOURCHE_01				Immersion Recreation	NON	Fecal Coliform	Grazing in Riparian or Shoreline Zones Wildlife		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Livestock (Grazing or Feeding Operations)		
Belle Fourche River	Near Fruitdale to Whitewood Creek	R5	DENR 460683	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
				Immersion Recreation	FULL				
SD-BF-R-BELLE_FOURCHE_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Belle Fourche River	Whitewood Creek to Willow Creek	R6	DENR 460681	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
				Immersion Recreation	FULL				
SD-BF-R-BELLE_FOURCHE_03				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Belle Fourche River	Willow Creek to Alkali Creek	R7	DENR 460880	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
				Immersion Recreation	FULL				
SD-BF-R-BELLE_FOURCHE_04				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Belle Fourche River	Alkali Creek to mouth	R8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			460676	Immersion Recreation	FULL				
SD-BF-R-BELLE_FOURCHE_05				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Cleopatra Creek	Confluence with East Branch Cleopatra Creek to mouth	R36	DENR 46MN39	Coldwater Permanent Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-CLEOPATRA_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Crow Creek	Near Beulah, WY	R9	USGS	Coldwater Permanent Fish Life	FULL			2	NO
			6430532	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-CROW_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Deadwood Creek	Rutabaga Gulch to Whitewood Creek	R10	DENR 460127	Coldwater Marginal Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-DEADWOOD_01				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
False Bottom Creek	Headwaters to St. Onge	R11	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			46MN38	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-FALSE_BOTTOM_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Fantail Creek	Headwaters to Nevada Gulch	R12	DENR 460119	Coldwater Permanent Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-FANTAIL_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Horse Creek	Indian Creek to mouth	R13	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			*5	YES-2
			6436760	Irrigation Waters	NON	Specific Conductance			
SD-BF-R-HORSE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Little Spearfish Creek	Near Lead, SD	R14	USGS	Coldwater Permanent Fish Life	FULL			2	NO
			6430850	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-LITTLE_SPEARFISH__01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Murray Ditch	Above headgate at WY-SD state line	R15	USGS 6429997	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-BF-R-MURRAY_DITCH_01_USGS				Irrigation Waters	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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Redwater River	US HWY 85 to mouth	R16	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			460895	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-REDWATER_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Redwater River	WY border to US HWY 85	R37	USGS	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
			6430500	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-REDWATER_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Spearfish Creek	Intake Gulch to Annie Creek	R17	DENR 46MN32	Coldwater Permanent Fish Life	FULL			1	NO
				Domestic Water Supply	FULL				
SD-BF-R-SPEARFISH_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Spearfish Creek	Annie Creek to McKinley Gulch	R18	DENR 46MN33	Coldwater Permanent Fish Life	FULL-TH	pH (high)	Natural Sources	5	YES-2
				Domestic Water Supply	FULL				
SD-BF-R-SPEARFISH_02				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Spearfish Creek	McKinley Gulch to Cleopatra Creek	R19	DENR 46MN34	Coldwater Permanent Fish Life	FULL-TH	pH (high)	Natural Sources	5	YES-2
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-SPEARFISH_03				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Spearfish Creek	Cleopatra Creek to Fish Hatchery Gulch	R20	DENR 46MN35	Coldwater Marginal Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-SPEARFISH_04				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Spearfish Creek	Fish Hatchery Gulch to Higgens Gulch	R21	DENR 460900	Coldwater Permanent Fish Life	FULL			1	NO
				Domestic Water Supply	FULL				
SD-BF-R-SPEARFISH_05				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Spearfish Creek	Higgens Gulch to mouth	R22	DENR	Coldwater Permanent Fish Life	FULL			1	NO
			460689	Domestic Water Supply	FULL				
SD-BF-R-SPEARFISH_06				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Stewart Gulch	Headwaters to mouth	R24	DENR	Coldwater Permanent Fish Life	FULL			1	NO
			460124	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-STEWART_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Strawberry Creek	Headwaters to mouth	R25	DENR	Coldwater Marginal Fish Life	NON	pH (high & low)	Acid Mine Drainage	5	YES-2
			460116	Fish/Wildlife Prop, Rec, Stock	NON	Cadmium Copper pH (low)	Impacts from Abandoned Mine Lands		
SD-BF-R-STRAWBERRY_01						Zinc	Mine Tailings		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
West Strawberry	Headwaters to mouth	R26	DENR	Coldwater Permanent Fish Life	NON	Temperature		5	YES-2
Creek			460675	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-W_STRAWBERRY_01				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform			
Whitetail Creek	Headwaters to mouth	R27	DENR	Coldwater Permanent Fish Life	FULL			1	NO
			460118	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITETAIL_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Whitewood Creek	Whitetail Summit to Gold Run Creek	R28	DENR 460686	Coldwater Permanent Fish Life	NON	Temperature		5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITEWOOD_01				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Whitewood Creek	Gold Run Creek to Deadwood Creek	R29	DENR 460122	Coldwater Permanent Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITEWOOD_02				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Whitewood Creek	Deadwood Creek to Spruce Gulch	R30	DENR 460123	Coldwater Permanent Fish Life	FULL			5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITEWOOD_03				Immersion Recreation	NON	Fecal Coliform	Combined Sewer Overflows Wildlife Grazing in Riparian or Shoreline Zones		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Whitewood Creek	Spruce Gulch to Sandy Creek	R31	DENR 460685	Coldwater Permanent Fish Life	FULL			2	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITEWOOD_04				Immersion Recreation	INS				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Whitewood Creek	Sandy Creek to I-90	R32	DENR	Coldwater Marginal Fish Life	NON	pH (high)	Natural Sources	5	YES-2
			460684	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BF-R-WHITEWOOD_05				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Whitewood Creek	I-90 to Crow Creek	R33	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460652	Irrigation Waters	FULL				
SD-BF-R-WHITEWOOD_06				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)	Natural Sources		
Whitewood Creek	Crow Creek to mouth	R34	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460682	Irrigation Waters	FULL				
SD-BF-R-WHITEWOOD_07				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Willow Creek	Near Vale, SD	R35	USGS	Fish/Wildlife Prop, Rec, Stock	INS			5	YES-2
		443942103172800		Irrigation Waters	NON	Specific Conductance			
SD-BF-R-WILLOW_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				

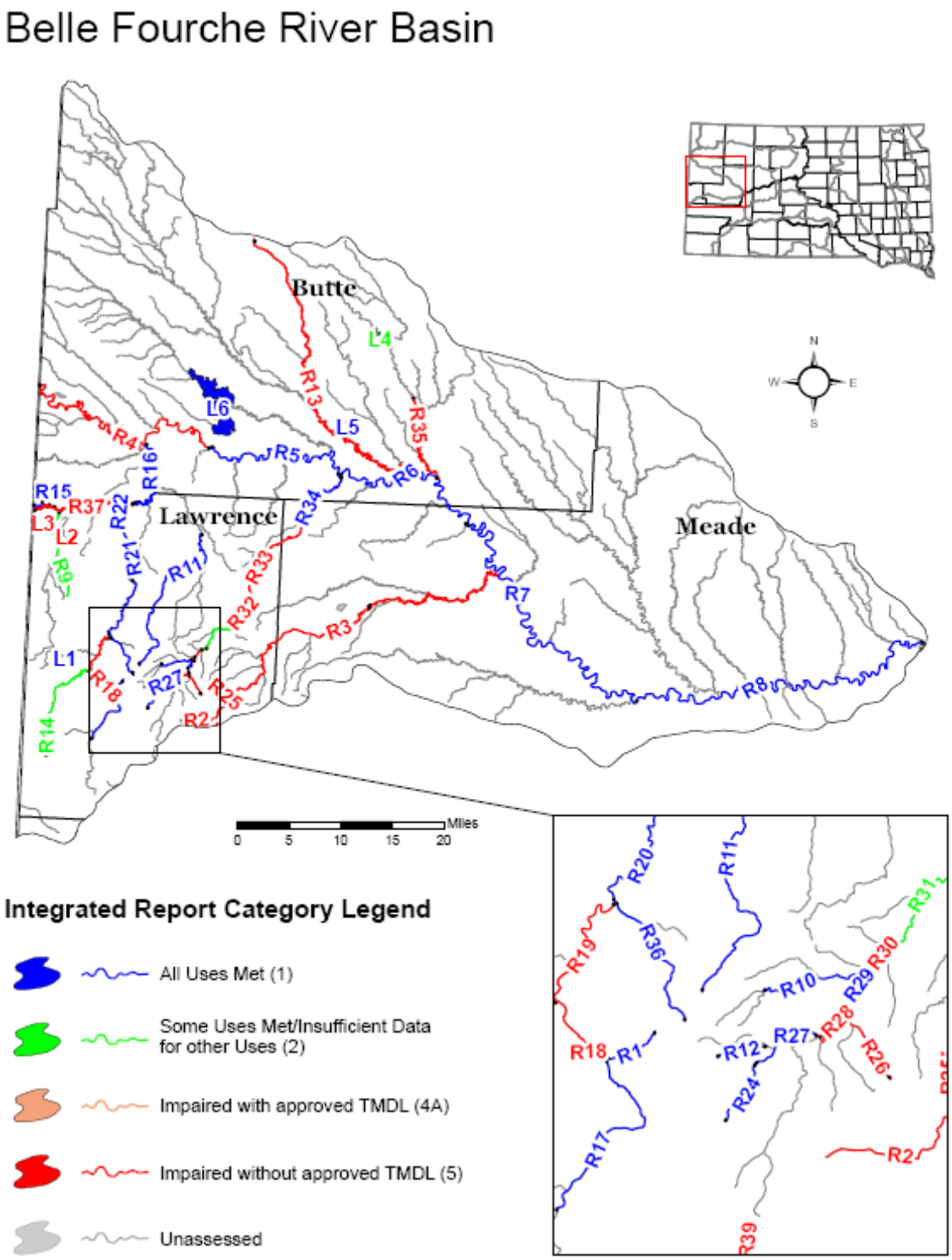

Figure 5: Belle Fourche River Basin

Big Sioux River Basin (Figures 6 and 7, Table 19).

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 4,280 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 wholesaler 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 38 lakes and maintains 18 water quality monitoring sites within the Big Sioux basin. Seventeen of the 18 sites are located on the Big Sioux River and one is located on Skunk Creek.

The USGS has water quality monitoring sites on the Big Sioux River and Split Rock Creek within the basin. The data on the Big Sioux River is fairly extensive and includes information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables. The cities of Watertown and Sioux Falls supplied water quality data for the Big Sioux River. The city of Sioux Falls also supplied water quality data for Skunk Creek.

The main causes of nonsupport within the Big Sioux River basin are due to fecal coliform and total suspended solids. The presence of fecal coliform in the Big Sioux is mainly due to runoff from livestock operations, wet weather discharges within municipal areas, and from the presence of wildlife. Sediment sources are overland runoff from nearby croplands, inflow from tributaries, and streambank erosion.

With one or two possible exceptions, lakes in the Big Sioux River basin are eutrophic due to algae, nutrient enrichment, and siltation. Nearly 39% of the monitored lakes can be considered hypereutrophic (highly eutrophic) at the present time. Hypereutrophic conditions are also related to the moderate size of some of the waterbodies and the shallow depth of most of the basin lakes. These lakes are susceptible to rapid changes produced by large nutrient and sediment loads from often sizeable agricultural watersheds comprised of nutrient-rich glacial soils.

Watershed management programs are attempting to reduce sediment and nutrient loads from both manmade and natural sources within the basin. On-going watershed implementation projects include Lake Poinsett and the upper, north central, central, and lower Big Sioux River. Active watershed assessment projects currently underway include Lake Campbell, and Northeast Glacial Lakes. An assessment on Covell Lake is currently in the planning phase.

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.

Table 19: Big Sioux River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Albert	Kingsbury County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-ALBERT_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	pH (high)			
						Trophic State Index	Nonpoint Source		
Lake Alvin	Lincoln County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-ALVIN_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Bitter Lake SD-BS-L-BITTER_01	Day County	L3	Fish Flesh Sampling	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in fish tissue		5	YES-2
Blue Dog Lake	Day County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	NON	Fecal coliform			
SD-BS-L-BLUE_DOG_01				Limited Contact Recreation	NA				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Brant Lake	Lake County	L5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	INS				
SD-BS-L-BRANT_01				Limited Contact Recreation	INS				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Bullhead Lake	Deuel County	L6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	FULL				
SD-BS-L-BULLHEAD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)			
						Trophic State Index			
Bullhead Lake	Marshall County		DENR	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-BULLHEAD_02				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	NOT ASSESSED				
Lake Campbell	Brookings County	L8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-CAMPBELL_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Cattail Lake	Marshall County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-CATTAIL_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Clear Lake	Deuel County	L10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-CLEAR_D_01				Limited Contact Recreation	NOT ASSESSED				
				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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Clear Lake	Marshall County	L11	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	INS				
SD-BS-L-CLEAR_M_01				Limited Contact Recreation	INS				
				Warmwater Permanent Fish Life	FULL				
Cottonwood Lake	Marshall County	L12	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	INS				
SD-BS-L-COTTONWOOD_01				Limited Contact Recreation	INS				
				Warmwater Semipermanent Fish Life	FULL				
Covell Lake	Minnehaha County	L39	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-COVELL_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Dry Lake	Codington County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-DRY_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Lake Drywood North	Roberts County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-DRYWOOD_NORTH_01				Limited Contact Recreation	NOT ASSESSED				
				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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
East Oakwood Lake	Brookings County	L14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-E_OAKWOOD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Enemy Swim Lake	Day County	L15	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-ENEMY_SWIM_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Four Mile Lake	Marshall County	L16	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-FOUR_MILE_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Lake Herman	Lake County	L17	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 2	NO
			LA	Immersion Recreation	INS				
SD-BS-L-HERMAN_01				Limited Contact Recreation	INS				
				Warmwater Semipermanent Fish Life	FULL				
Lake Kampeska	Codington County	L18	DENR	Domestic Water Supply	FULL			* 1	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-L-KAMPESKA_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Lake Madison	Lake County	L19	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	INS				
SD-BS-L-MADISON_01				Limited Contact Recreation	INS				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Marsh	Hamlin County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-MARSH_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Minnewasta Lake	Day County	L21	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-MINNEWASTA_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
North Buffalo Lake	Marshall County	L22	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-N_BUFFALO_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Nine Mile Lake	Marshall County	L23	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-NINE_MILE_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Lake Norden	Hamlin County	L24	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-NORDEN_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Pelican Lake	Codington County	L25	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-PELICAN_01				Limited Contact Recreation	FUL				
				Warmwater Semipermanent Fish Life	NON	pH (high)	Nonpoint Source		

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WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pickerel Lake	Day County	L26	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-PICKEREL_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Lake Poinsett	Hamlin County	L27	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-POINSETT_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Roy Lake	Marshall County	L28	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-ROY_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
South Red Iron Lake	Marshall County	L29	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-S_RED_IRON_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
School Lake	Deuel County	L30	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-SCHOOL_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Sinai	Brookings County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-SINAI_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	INS				

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WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
South Buffalo Lake	Marshall County	L32	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-SOUTH_BUFFALO_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Lake St. John	Hamlin County	L33	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-ST_JOHN_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Twin Lakes/W. Hwy 81	Kingsbury County	L34	Fish Flesh	Fish/Wildlife Prop, Rec, Stock	INS-TH	Mercury in fish tissue	Unknown	5	YES-2
SD-BS-L-TWIN_01			Sampling						
West Oakwood Lake	Brookings County	L35	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-BS-L-W_OAKWOOD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Wall Lake	Minnehaha County	L36	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-BS-L-WALL_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Waubay Lake	Day County	L37	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-BS-L-WAUBAY_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Beaver Creek	Big Sioux River to S9, T98N, R49W	R34	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-BS-R-BEAVER_01				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	R35	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-BS-R-BEAVER_02				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	NON	Total Suspended Solids			
Big Sioux River	SE or Ortley to Lake Kampeska	R1	DENR 46BSA1	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	FULL				
SD-BS-R-BIG_SIOUX_01				Limited Contact Recreation	NON	Oxygen, Dissolved			
				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved	Unknown		
Big Sioux River	Lake Kampeska to Willow Creek	R2	DENR 460655	Domestic Water Supply	NON	Nitrates	Municipal Point Discharges Industrial Point Discharges	5	YES-2
SD-BS-R-BIG_SIOUX_02			City of Watertown	Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Big Sioux River	Willow Creek to Stray Horse Creek	R3	DENR 460740	Domestic Water Supply	NON	Nitrates	Municipal Point Source Discharges	5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_03				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Stray Horse Creek to near Volga	R4	DENR 46BS08	Domestic Water Supply	FULL			5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
SD-BS-R-BIG_SIOUX_04				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Livestock (Grazing or Feeding Operations)		
Big Sioux River	Near Volga to Brookings	R5	DENR	Domestic Water Supply	FULL			1	NO
			460662	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_05				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Big Sioux River	Brookings to I-29	R6	DENR	Domestic Water Supply	FULL			1	NO
			460702	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_06				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	I-29 to near Dell Rapids	R7	DENR	Domestic Water Supply	FULL			1	NO
			46BS18	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_07				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Near Dell Rapids to below Baltic	R8	DENR 460703	Domestic Water Supply	FULL			5	YES-1
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_08				Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Below Baltic to Skunk Creek	R9	DENR 46BS23	Domestic Water Supply	FULL			5	YES-2
			City of	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_09			Sioux Falls	Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Skunk Creek to diversion return	R10	DENR 460664	Domestic Water Supply	FULL			5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-BS-R-BIG_SIOUX_10				Immersion Recreation	NON	Fecal Coliform	Residential Districts 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	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Big Sioux River	Diversion return to SF WWTF	R11	DENR 46BS29	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			City of Sioux Falls	Immersion Recreation	NON	Fecal Coliform	Municipal (Urbanized High Density Area)		
SD-BS-R-BIG_SIOUX_11							Livestock (Grazing or Feeding Operations)		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	SF WWTF to above Brandon	R12	DENR 460117	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			City of Sioux Falls	Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
SD-BS-R-BIG_SIOUX_12				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Sioux River	Above Brandon to Nine Mile Creek	R13	DENR 460831	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-BIG_SIOUX_13				Irrigation Waters	FULL		Grazing in Riparian or		
				Limited Contact Recreation	FULL		Shoreline Zones		
				Warmwater Semipermanent Fish Life	FULL		Livestock (Grazing or Feeding Operation		
Big Sioux River	Nine Mile Creek to near	R14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
	Fairview		460665	Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations) Rangeland Grazing		
SD-BS-R-BIG_SIOUX_14				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Big Sioux River	Fairview to near Alcester	R15	DENR 460666	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL		Grazing in Riparian or Shoreline Zones		
SD-BS-R-BIG_SIOUX_15				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
Big Sioux River	Near Alcester to Indian Creek	R16	DENR 460667	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
				Irrigation Waters	FULL		Grazing in Riparian or Shoreline Zones		
SD-BS-R-BIG_SIOUX_16				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Rangeland Grazing Streambank modification		

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Big Sioux River	Indian Creek to mouth	R17	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			460832	Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
				Irrigation Waters	FULL		Grazing in Riparian or Shoreline Zones		
SD-BS-R-BIG_SIOUX_17				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land) Streambank modifications		
Brule Creek	Big Sioux River to confluence of its east and west forks	R20	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-BS-R- BRULE_01				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	NON	Total Suspended Solids			
East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	R21	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-EAST_BRULE_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	NON	Total Suspended Solids			

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Flandreau Creek	Big Sioux River to Minnesota Border	R22	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-FLANDREAU_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Hidewood Creek	Big Sioux River to U.S. Highway 77	R23	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-HIDEWOOD_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Jack Moore Creek	Big Sioux River to S33, T107N, R49W	R24	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-BS-R-JACKJ_MOORE_01				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
North Deer Creek	Six Mile Creek to U.S. Highway 77	R25	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-NORTH_DEER_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Owens Creek	S18, T122N, to Blue Dog Lake	R27	USGS 6479159	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
				Irrigation Waters	FULL				
SD-BS-R-OWENS_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	FULL				

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WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pattee Creek	Big Sioux River to Lake	R26	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-BS-R-PATTEE_01	Lakota		WRAP	Irrigation Waters	FULL				
Peg Munky Run	Big Sioux River to S17, T113N, R50W	R27	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-PEG_MUNKY_RUN							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Pipestone Creek	Split Rock Creek to Minnesota border	R28	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
SD-BS-R-PIPESTONE_01				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	FULL				
Six Mile Creek	Big Sioux River to S30, T112N, R48W		DENR WRAP	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
				Irrigation Waters	INS				
SD-BS-R-SIXMILE_01				Limited Contact Recreation	INS				
				Warmwater Marginal Fish Life	INS				
Skunk Creek	Brandt Lake to mouth	R18	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			460121	Irrigation Waters	FULL				
SD-BS-R-SKUNK_01			City of Sioux Falls	Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Split Rock Creek	At Corson, SD	R19	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			6482610	Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
			DENR WRAP				Livestock (Grazing or Feeding Operations)		
SD-BS-R-SPLIT_ROCK_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Spring Creek	Big Sioux River to S22, T109, R47W	R30	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-SPRING_01				Warmwater Marginal Fish Life	FULL		Livestock (Grazing or Feeding Operations)		
Stray Horse Creek	Big Sioux River to S26, T116N, R51W	R31	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-STRAYHORSE_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Union Creek	Big Sioux River to confluence with East and West Forks	R32	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-BS-R-UNION_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Willow Creek	Big Sioux River to S7, T117N, R50W	R33	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-BS-R-WILLOW_01				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
				Warmwater Marginal Fish Life	FULL		Livestock (Grazing or Feeding Operations)		

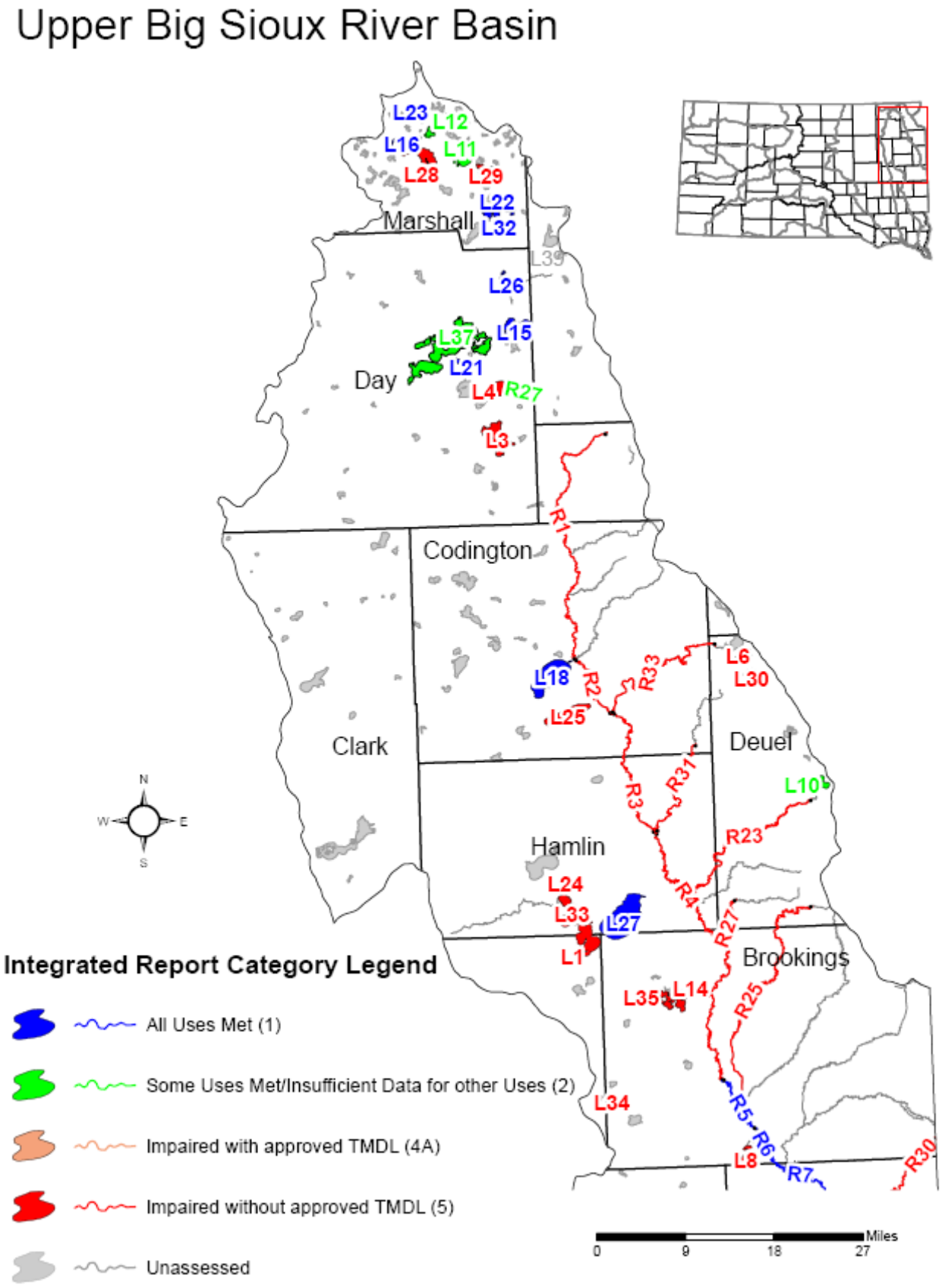


Figure 6: Upper Big Sioux River Basin

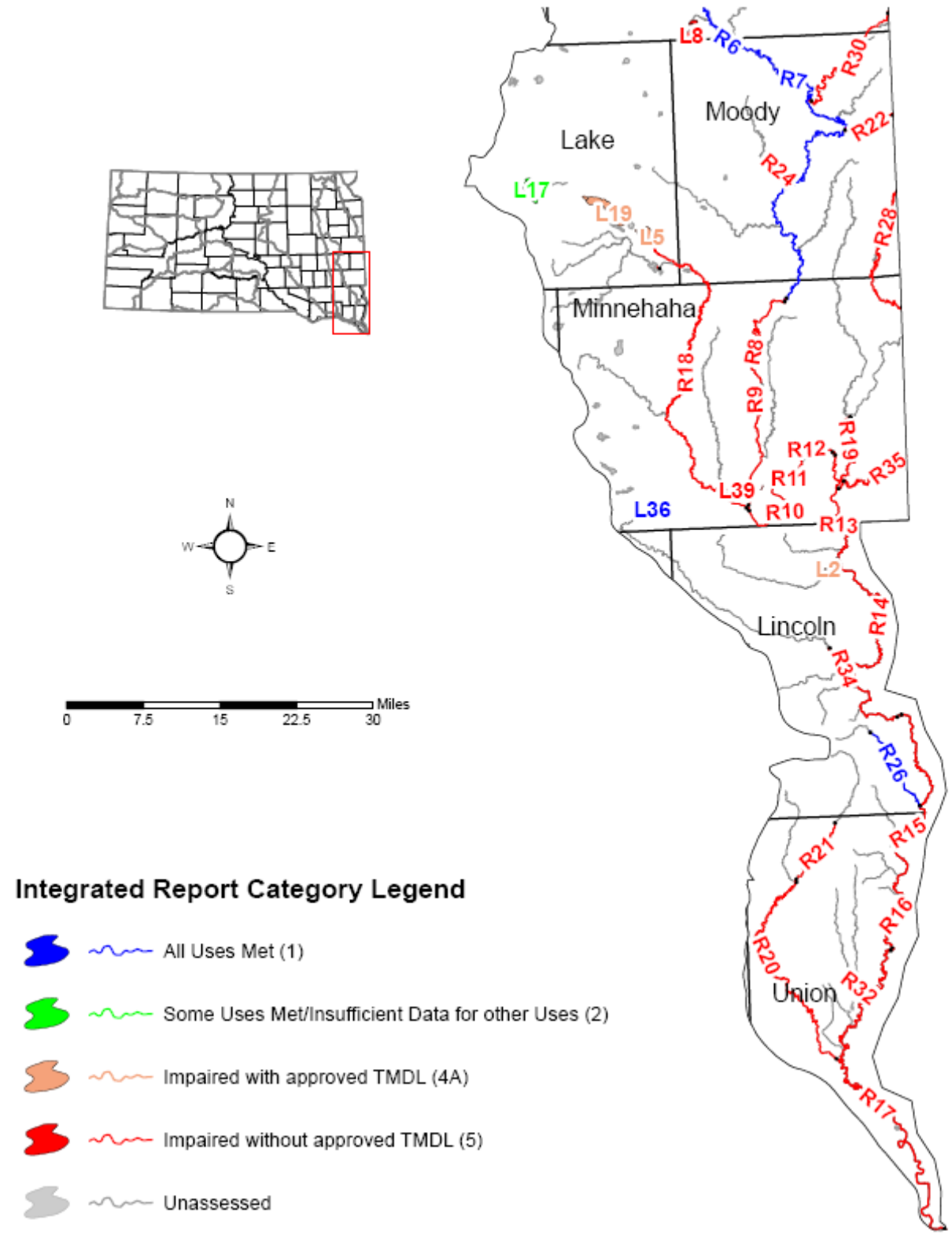


Figure 7: Lower Big Sioux River Basin

Cheyenne River Basin (Figures 8 and 9, Table 20)

The portion of the Cheyenne River basin that lies in southwestern South Dakota drains about 16,500 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 16 lakes and maintains 28 water quality monitoring sites within the Cheyenne basin. Eight monitoring sites are located on the Cheyenne River, three are located on French Creek, and five are located on Rapid Creek. The other sites are located on various other streams in the basin.

The USGS also maintains a number of water quality monitoring sites located along streams in the Cheyenne River Basin including: Battle Creek, Bear Gulch, Hat Creek, Highland Creek, Rapid Creek, Sunday Gulch, Cheyenne River, and others. The USGS data is limited for most sites and mostly includes specific conductance and water temperature information. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

The Cheyenne River basin is home to deposits of natural uranium and historic uranium mining activities. With the increasing price of uranium compounded with rising energy needs, exploratory uranium mining has resumed. DENR has established two new monitoring locations and expanded parameters on three locations within the basin to monitor for uranium and other associated parameters. For this reporting cycle, there is insufficient data to determine support on newly established monitoring sites. Support determinations have been made on previous existing sites based on conventional parameters but there is insufficient data to report on uranium and other associated parameters.

The Cheyenne River water quality continues to be generally poor due to both natural and agricultural sources. The lower Cheyenne drainage, in general, contains a high percentage of erodible cropland and rangeland in west-central South Dakota. This cropland may contribute additional amounts of eroded sediment during periods of heavy rainfall. Irrigation return flows, cropland, and rangeland also contribute to water quality problems. The latter two sources are particularly prevalent in the lower half of the river course.

Rapid Creek water quality typically ranges from good to satisfactory in its upper reaches with fair to poor quality downstream of Rapid City. A major recurring problem in the downstream segments of Rapid Creek is excessive fecal coliform bacteria levels.

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 rainfall than the surrounding plains as a result of greater elevation and forest cover. Also contributing to the water quality in this region is the nature of 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. 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.

During this reporting cycle, Canyon Lake had insufficient data to report trophic state index. Rapid City implemented restoration activities as part of a sediment removal project. This effort should improve the trophic state of Canyon Lake. Trophic state index of Canyon Lake will be monitored in future reporting cycles. The Lower Cheyenne River Project is the only assessment project in progress in the Cheyenne 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.

Table 20: Cheyenne River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Angostura Reservoir	Fall River County	L1	DENR LA	Domestic Water Supply	NON	Sulfates	Natural Sources	5	YES-1
						Total Dissolved Solids			
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
SD-CH-L-ANGOSTURA_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Bismark Lake	Custer County	L2	DENR LA	Coldwater Marginal Fish Life	FULL			2	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-L-BISMARK_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Canyon Lake	Pennington County		DENR LA	Coldwater Permanent Fish Life	INS			3	NO
				Domestic Water Supply	INS				
				Fish/Wildlife Prop, Rec, Stock	INS				
SD-CH-L-CANYON_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Center Lake	Custer County	L4	DENR LA	Coldwater Permanent Fish Life	NON	pH (high)		*5	YES-1
						Temperature			
						Trophic State Index	Nonpoint Source		
SD-CH-L-CENTER_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
Cold Brook Reservoir	Fall River County	L5	DENR LA	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-L-COLD_BROOK_O1				Immersion Recreation	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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Cottonwood Springs Lake	Fall River County	L6	DENR	Domestic Water Supply	FULL			2	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	NOT ASSESSED				
SD-CH-L-COTTONWOOD_SPRINGS_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	FULL				
Curlew Lake	Meade County	L7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-CH-L-CURLEW_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Deerfield Lake	Pennington County	L8	DENR	Coldwater Permanent Fish Life	FULL			2	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-L-DEERFIELD_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Horsethief Lake	Pennington County	L9	DENR	Coldwater Permanent Fish Life	NON	pH (high)	Natural Sources	5	YES-2
			LA			Temperature			
SD-CH-L-HORSETHIEF_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
Lakota Lake	Custer County	L10	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-L-LAKOTA_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
Legion Lake	Custer County	L11	DENR	Coldwater Marginal Fish Life	NON	pH (high)	Natural Sources	5	YES-1
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-L-LEGION_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
New Wall Lake	Pennington County	L12	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-CH-L-NEW_WALL_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pactola Reservoir	Pennington County	L13	DENR LA	Coldwater Permanent Fish Life	FULL			1	NO
SD-CH-L-PACTOLA_01				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Sheridan Lake	Pennington County	L14	DENR LA	Coldwater Permanent Fish Life	NON-TH	Oxygen, Dissolved		*5	YES-2
SD-CH-L-SHERIDAN_01						pH (high)			
						Temperature			
						Trophic State Index	Nonpoint Source		
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
Stockade Lake	Custer County	L15	DENR LA	Coldwater Marginal Fish Life	FULL			2	NO
SD-CH-L-STOCKADE_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Sylvan Lake	Custer County	L16	DENR LA	Coldwater Permanent Fish Life	NON	pH (high)		* 5	YES-2
SD-CH-L-SYLYAN_01						Temperature			
						Trophic State Index	Nonpoint Source		
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Battle Creek	Near Horsethief Lake to Teepee Gulch Creek	R1	DENR 460103	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
SD-CH-R-BATTLE_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Battle Creek	Teepee Gulch Creek to SD HWY 79	R2	DENR 460905	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
SD-CH-R-BATTLE_02				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Battle Creek	Hwy 79 to mouth	R46	USGS 6406500	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
SD-CH-R-BATTLE_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Bear Gulch	Near Hayward, SD		USGS	Coldwater Marginal Fish Life	INS			3	NO
			6405800	Fish/Wildlife Prop, Rec, Stock	INS				
SD-CH-R-BEAR_GULCH_01_USGS				Irrigation Waters	INS				
				Limited Contact Recreation	NOT ASSESSED				
Beaver Creek	WY border to mouth	R4	DENR	Coldwater Marginal Fish Life	FULL			5	YES-2
			460128	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance			
						Total Dissolved Solids			
SD-CH-R-BEAVER_01				Irrigation Waters	NON	Salinity			
						Specific Conductance			
				Limited Contact Recreation	INS-TH	Fecal Coliform	Livestock		
Beaver Creek	Near Buffalo Gap	R5	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			6402500	Irrigation Waters	FULL				
SD-CH-R-BEAVER_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Beaver Creek	Near Wind Cave Natl Park	R6	USGS	Coldwater Permanent Fish Life	FULL			2	NO
			multiple	Fish/Wildlife Prop, Rec, Stock	FULL				
			sites	Irrigation Waters	FULL				
SD-CH-R-BEAVER_02_USGS				Limited Contact Recreation	NOT ASSESSED				
Box Elder Creek	Above Box Elder to Owanka	R8	DENR 460679	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-CH-R-BOX_ELDER_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Box Elder Creek	Headwaters to near Bogus Jim Creek	R7	DENR 460925	Coldwater Permanent Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-BOX_ELDER_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Castle Creek	Deerfield Reservoir to Rapid Creek	R9	DENR 460646	Coldwater Permanent Fish Life	FULL			1	NO
SD-CH-R-CASTLE_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Cherry Creek	Headwaters to mouth	R10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460131	Irrigation Waters	FULL				
SD-CH-R-CHERRY_01			USGS	Limited Contact Recreation	FULL				
			6439000	Warmwater Marginal Fish Life	FULL				
Cheyenne River	WY border to Beaver	R11	DENR	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance		5	YES-2
			460156			Total Dissolved Solids			
				Irrigation Waters	NON	Salinity			
SD-CH-R-CHEYENNE_01						Specific Conductance			
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Cheyenne River	Beaver Creek to Angostura Reservoir	R12	DENR 460875	Fish/Wildlife Prop, Rec, Stock	NON	Total Dissolved Solids	Crop Production (Crop Land or Dry Land)	5	YES-2
			460163 460164				Livestock (Grazing or Feeding Operations)		
SD-CH-R-CHEYENNE_02				Irrigation Waters	NON	Salinity Specific Conductance	Natural Sources		
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Cheyenne River	Angostura Reservoir to Rapid Creek	R13	DENR 460132	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
SD-CH-R-CHEYENNE_03				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Grazing in Riparian or Shoreline Zones		
							Irrigated Crop Production		
							Natural Sources		
Cheyenne River	Rapid Creek to Belle Fourche River	R14	DENR 460865	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Immersion Recreation	NON	Fecal Coliform	Crop Production (Crop Land or Dry Land) Wildlife		
SD-CH-R-CHEYENNE_04							Livestock (Grazing or Feeding Operations)		
							Rangeland Grazing		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Cheyenne River	Belle Fourche River to Bull Creek	R15	DENR 468860	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations) Wildlife		
SD-CH-R-CHEYENNE_05				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Total Suspended Solids	Irrigated Crop Production		
Cheyenne River	Bull Creek to mouth	R16	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460133	Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations) Wildlife		
SD-CH-R-CHEYENNE_06				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform			
				Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Cold Springs Creek	0.1 mile west of park	R17	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
	Boundary on Hwy 385			Irrigation Waters	FULL				
SD-CH-R-COLD_SPRING_01_USGS									
Elk Creek	Near Roubaix, Rapid City, and Elm Springs, SD	R18	USGS 6424000	Coldwater Permanent Fish Life	NON	Temperature		5	YES-2
			6425100	Fish/Wildlife Prop, Rec, Stock	FULL				
			6425500	Immersion Recreation	NOT ASSESSED				
SD-CH-R-ELK_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Elm Creek	Near Fairpoint, Red Owl	R19	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-CH-R-ELM_01_USGS			6437650	Irrigation Waters	FULL				
			6438800						
Fall River	Hot Springs to mouth	R20	DENR	Coldwater Marginal Fish Life	FULL			5	YES-2
			460657	Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
SD-CH-R-FALL_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Temperature	Natural Sources		
Flynn Creek	Near SD HWY 87 to mouth	R21	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			460111	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-FLYNN_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
French Creek	Headwaters to Custer	R22	DENR	Coldwater Marginal Fish Life	NON	Oxygen, Dissolved	Drought-related Impacts	5	YES-2
			460102				Natural Sources		
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-FRENCH_01				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Oxygen, Dissolved			
French Creek	Custer to Stockade Lake	R23	DENR	Coldwater Marginal Fish Life	FULL			1	NO
			460653	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-FRENCH_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
French Creek	Stockade Lake to SD HWY 79	R24	DENR 460651	Coldwater Marginal Fish Life	FULL			1	NO
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-FRENCH_03				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Grace Coolidge Creek	Headwaters to Battle Cr	R25	DENR	Coldwater Permanent Fish Life	NON	Temperature	Drought-related Impacts	5	YES-2
			460650	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-GRACE_COOLIDGE_01				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Grizzly Bear Gulch	Near Keystone, SD	R26	USGS	Coldwater Permanent Fish Life	FULL-TH	Temperature	Natural Sources	5	YES-2
			6403850	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-GRIZZLY_BEAR_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Hat Creek	Near Edgemont, SD	R27	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			6400000	Irrigation Waters	NON	Specific Conductance	Natural Sources		
SD-CH-R-HAT_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Highland Creek	Wind Cave Natl Park and near Pringle, SD	R28	USGS multiple sites	Coldwater Permanent Fish Life	NON	pH (high) Temperature	Natural Sources	5	YES-2
SD-CH-R-HIGHLAND_01_USGS				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Horsehead Creek	At Oelrichs	R29	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			6400875	Irrigation Waters	FULL-TH	Specific Conductance			
SD-CH-R-HORSEHEAD_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Hot Brook Creek	Headwaters to mouth	R30	DENR WRAP	Coldwater Marginal Fish Life	NON	Temperature	Natural Sources	5	YES-2
				Domestic Water Supply	NOT ASSESSED				
SD-CH-R-HOT_BROOK_01				Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED				
				Irrigation Waters	NOT ASSESSED				
Lime Creek	At Rapid City, SD		USGS	Coldwater Permanent Fish Life	INS			3	NO
			6413650	Fish/Wildlife Prop, Rec, Stock	INS				
SD-CH-R-LIME_01_USGS				Irrigation Waters	INS				
				Limited Contact Recreation	NOT ASSESSED				
Lindsey Draw	Near Farmingdale, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-CH-R-LINDSEY_01_USGS			6421800	Irrigation Waters	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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pass Creek	Near Dewey, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-CH-R-PASS_01_USGS			6394450	Irrigation Waters	INS				
Rapid Creek	Headwaters to Pactola Reservoir	R34	DENR 460647	Coldwater Permanent Fish Life	FULL			1	NO
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-RAPID_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Rapid Creek	Pactola Reservoir to Lower Rapid City	R35	DENR 460669	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
				Domestic Water Supply	FULL				
SD-CH-R-RAPID_02				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Rapid Creek	Lower Rapid City to RC WWTF	R36	DENR 460110	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Crop Production (Crop Land or Dry Land)		
SD-CH-R-RAPID_03				Irrigation Waters	FULL		Livestock (Grazing or Feeding Operations)		
				Limited Contact Recreation	FULL		On-site Treatment Systems Wet Weather Discharges		
				Warmwater Semipermanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Rapid Creek	RC WWTF to above Farmingdale	R37	DENR 460692	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
				Irrigation Waters	FULL		On-site Treatment		
SD-CH-R-RAPID_04				Limited Contact Recreation	FULL		Systems		
				Warmwater Semipermanent Fish Life	FULL				
Rapid Creek	Above Farmingdale to mouth	R38	DENR 460910	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
SD-CH-R-RAPID_05				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
North Fork Rapid Creek	Above mouth	R39	BH Natl	Coldwater Permanent Fish Life	INS-TH	Temperature		5	YES-2
			Forest	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED				
SD-CH-R-RAPID_N_FORK_01				Irrigation Waters	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
Reno Gulch	Near Hill City, SD	R40	USGS	Coldwater Marginal Fish Life	FULL			2	NO
			6406760	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-RENO_GULCH_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Rhoads Fork	Near Rochford, SD	R41	USGS	Coldwater Permanent Fish Life	FULL			2	NO
			6408700	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-RHOADS_FORK_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Spring Creek	Headwaters to Sheridan Lake	R42	DENR 460654	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-1
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations) Wildlife		
SD-CH-R-SPRING_01							On-site Treatment Systems		
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Spring Creek	Sheridan Lake to SD HWY 79	R43	DENR 460649	Coldwater Marginal Fish Life	NON	Temperature	Natural Sources	5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
SD-CH-R-SPRING_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Sunday Gulch	Below Johnson Canyon near Hill City, SD	R44	USGS 6406740	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-CH-R-SUNDAY_GULCH_01_USGS				Irrigation Waters	FULL				
Victoria Creek	Near Rapid City, SD	R45	USGS	Coldwater Permanent Fish Life	NON	Temperature	Natural Sources	5	YES-2
			6412220	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-CH-R-VICTORIA_01_USGS			6412250	Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				

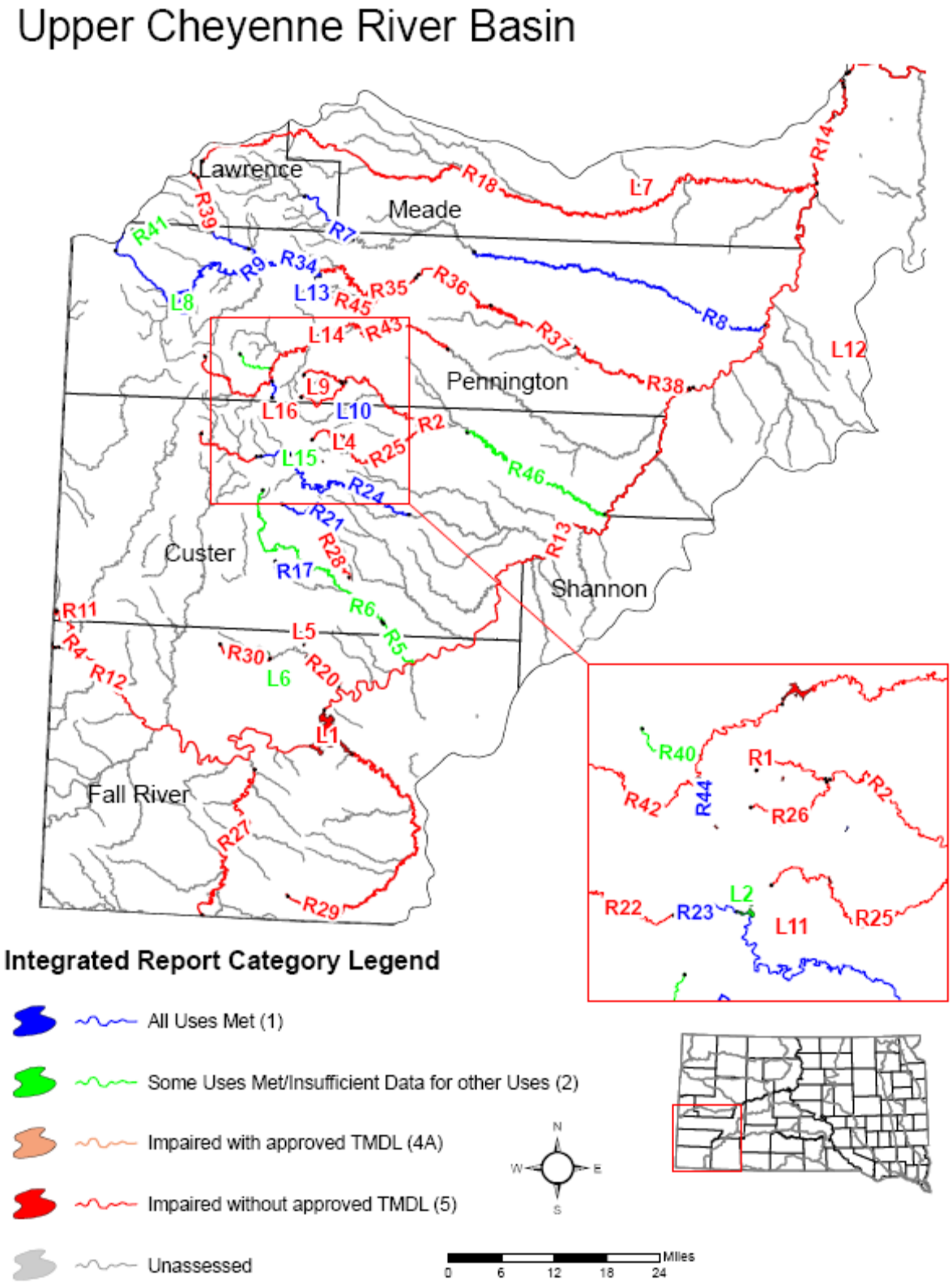


Figure 8: Upper Cheyenne River Basin

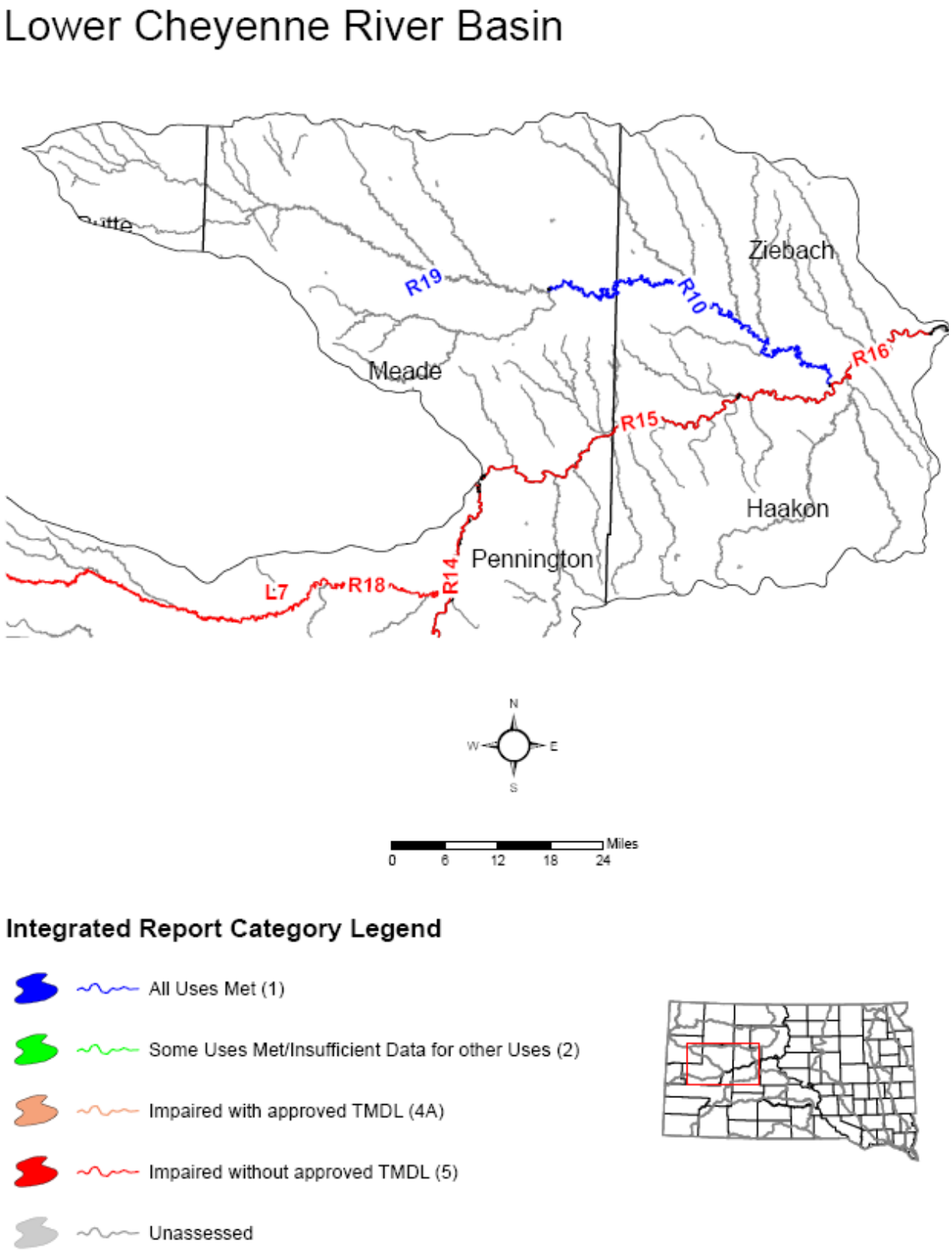


Figure 9: Lower Cheyenne River Basin

Grand River Basin (Figure 10, Table 21)

The Grand River basin covers 5,680 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 four lakes and maintains nine water quality monitoring sites within the Grand basin.

The USGS data is very limited and no sites were specifically listed within the basin. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

DENR has established additional monitoring sites in the Grand River basin due to historic uranium mining. Three new sites and two existing sites are now monitored for uranium and other associated parameters within the Grand River basin. For this reporting cycle, there is insufficient data to determine support on newly established monitoring sites. Support determinations have been made on previous existing sites based on conventional parameters but there is insufficient data to report on uranium and other associated parameters.

High specific conductance and TSS concentrations along with high 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 TSS. The South Fork drainage contains erosive soils, which contribute sediment and suspended solids that often produce high TSS levels in the South Fork. These largely natural sources are aggravated by agricultural and grazing practices.

Shadehill Reservoir and the Grand River are considered impaired for irrigation use due to natural limitations imposed by local soil-water incompatibility. High sodium concentration, combined with the clay characteristics of most soils in this region, significantly reduce the acreages suitable for continuous irrigation. This condition is measured by the sodium adsorption ratio (SAR). A SAR value of 10 or greater indicates that a build up 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.

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.

Table 21: Grand River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Flat Creek Dam	Perkins County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-GR-L-FLAT_CREEK_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Gardner	Harding County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-GR-L-GARDNER_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	INS				
Lake Isabel	Dewey County	L3	DENR	Domestic Water Supply	NON	pH (high)		5	YES-2
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-GR-L-ISABEL_01				Immersion Recreation	NOT ASSESSED				
			Fish Flesh	Limited Contact Recreation	NOT ASSESSED				
			Sampling	Warmwater Permanent Fish Life	NON	Mercury in fish tissue	Unknown		
						pH (high)			
						Trophic State Index	Nonpoint Source		
Shadehill Reservoir	Perkins County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
				Irrigation Waters	NON	Salinity	Natural Sources		
SD-GR-L-SHADEHILL_01						Total Dissolved Solids			
				Limited Contact Recreation	FULL				
				Warmwater Permanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Grand River	Shadehill Reservoir to Corson County line	R1	DENR 460640	Coldwater Marginal Fish Life	NON	pH (high)		5	YES-2
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-GR-R-GRAND_01				Irrigation Waters	INS-TH	Salinity	Natural Sources		
				Limited Contact Recreation	FULL				
Grand River	Corson County line to Bullhead	R2	DENR 460138	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	NON	Salinity	Natural Sources		
SD-GR-R-GRAND_02				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Total Suspended Solids			
Grand River	Bullhead to mouth	R3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460945	Irrigation Waters	NON	Salinity	Natural Sources		
				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
SD-GR-R-GRAND_03				Warmwater Permanent Fish Life	NON	Temperature			
						Total Suspended Solids	Grazing in Riparian or Shoreline zones		
Grand River, North Fork	North Dakota border to Shadehill Reservoir	R4	DENR 460677	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	NON	Salinity			
SD-GR-R-GRAND_N_FORK_01						Specific Conductance	Natural Sources		
				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Grand River, South Fork	Jerry Creek to Skull Creek	R6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460139	Irrigation Waters	NON	Salinity			
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
SD-GR-R-GRAND_S_FORK_01							Grazing in Riparian or Shoreline Zones		
							Natural Sources		
Grand River, South Fork	Skull Creek to Shadehill Reservoir	R7	DENR 460678	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460162	Irrigation Waters	INS-TH	Salinity			
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
SD-GR-R-GRAND_S_FORK_02							Grazing in Riparian or Shoreline Zones		
							Natural Sources		

Grand River Basin

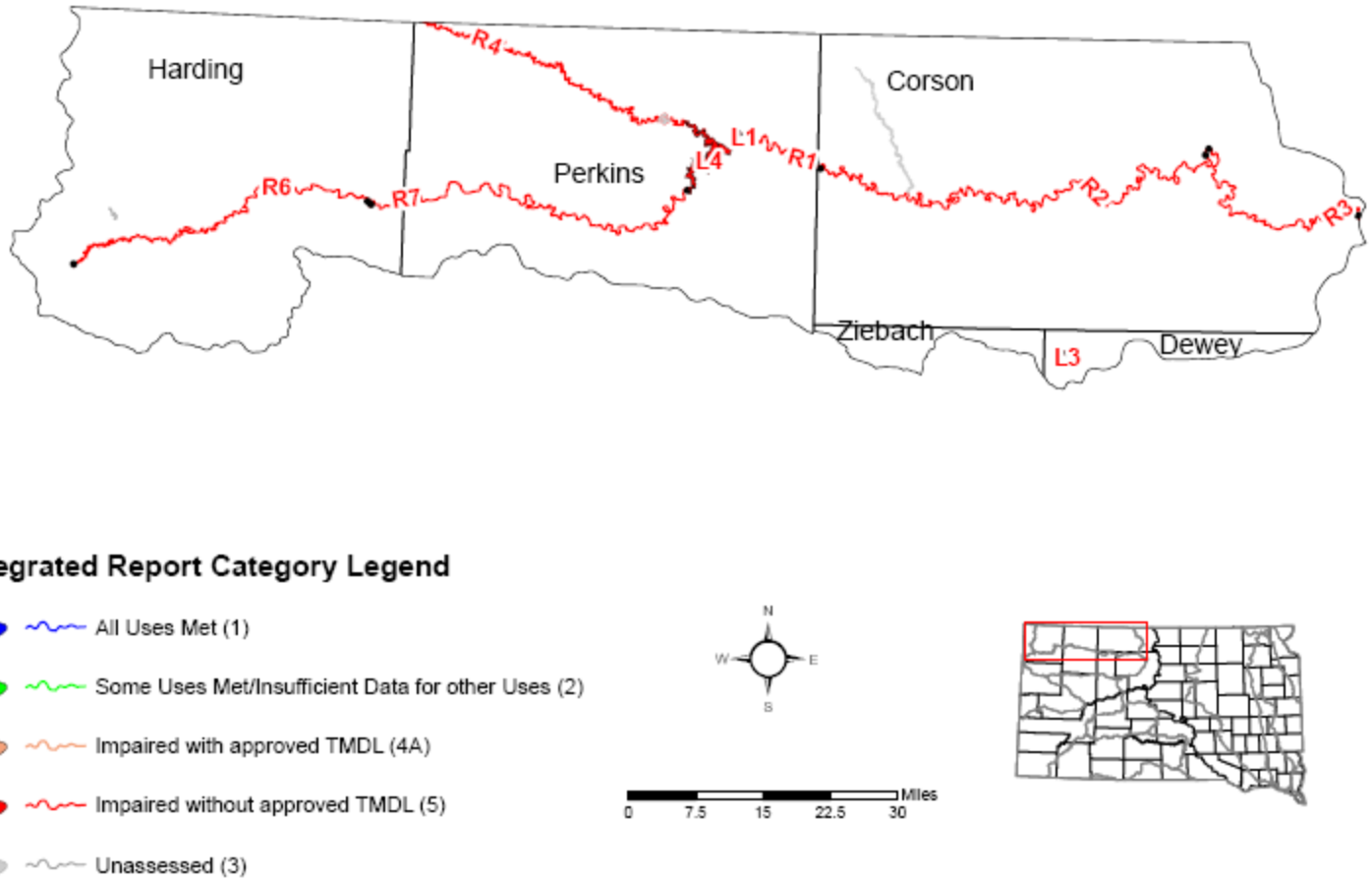


Figure 10: Grand River Basin

James River Basin (Figures 11 and 12, Table 22)

The James River drainage is the second largest river basin in the state. It drains approximately 12,000 square miles stretching from the northern to the southern state borders. It is located in east-central South Dakota. Agriculture and related businesses are the predominant sources of income.

DENR has assessed 28 lakes and maintains 21 water quality monitoring sites within the James basin. Eleven monitoring sites are located on the James River. The other sites are located on various other streams in the basin.

The USGS has two water quality monitoring sites on the James River and some intermittent streams in the basin on Foot Creek, Rock Creek, and several unnamed tributaries in the basin. However, the data is very limited, and for most sites the only parameters that were sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables. The city of Huron also supplied water quality data for the James River and Stony Run Creek.

Dissolved oxygen (DO), TSS, and fecal coliform 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 is attributed to low dissolved oxygen, especially during low or base flow conditions. 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 fecal coliform in the James River basin.

Lakes in the basin are highly eutrophic because of nutrient enrichment and siltation. Agricultural activities such as livestock operations and row crops are considered primary pollution sources.

The Lower James River assessment project is currently in progress. On-going implementation projects include Lake Hanson, Elm Lake, Lake Mitchell, and Firesteel Creek.

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.

Table 22: James River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Amsden Dam	Day County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-AMSDEN_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Beaver Lake	Yankton County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
SD-JA-L-BEAVER_01				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Bierman Lake	Spink County	L3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-JA-L-BIERMAN_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Byron	Beadle County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	NOT ASSESSED				
				Irrigation Waters	FULL				
SD-JA-L-BYRON_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Carthage	Miner County	L5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-CARTHAGE_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Cavour	Beadle County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-CAVOUR_01				Limited Contact Recreation	NOT ASSESSED				
				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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Cottonwood Lake	Spink County	L7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-COTTONWOOD_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Cresbard Lake	Faulk County	L8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-CRESBARD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Elm Lake	Brown County	L9	DENR	Domestic Water Supply	FULL			* 2	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-JA-L-ELM_01				Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Lake Faulkton	Faulk County	L10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
SD-JA-L-FAULKTON_01				Warmwater Semipermanent Fish Life	NON	pH (high)			
						Trophic State Index	Nonpoint Source		
Lake Hanson	Hanson County	L11	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-HANSON_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Jones Lake	Hand County	L12	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			LA	Immersion Recreation	FULL				
SD-JA-L-JONES_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)			
						Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Louise	Hand County	L13	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			LA	Immersion Recreation	FULL				
SD-JA-L-LOUISE_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)			
Loyalton Dam	Edmunds County	L14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-LOYALTON_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Menno Lake	Hutchinson County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-MENNO_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	INS				
Mina Lake	Edmunds County	L16	DENR	Domestic Water Supply	FULL			* 4A	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
SD-JA-L-MINA_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Mitchell	Davison County	L17	DENR	Domestic Water Supply	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-MITCHELL_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
North Scatterwood Lake	Edmunds County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-NORTH_SCATTERWOOD_01				Limited Contact Recreation	NOT ASSESSED				
				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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pierpont Lake	Day County	L19	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-PIERPONT_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	FULL				
Ravine Lake	Beadle County	L20	DENR	Fish/Wildlife Prop, Rec, Stock	INS			* 4A	NO
			LA	Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
SD-JA-L-RAVINE_01				Warmwater Semipermanent Fish Life	NON	Trophic State Index			
Lake Redfield	Spink County	L21	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-REDFIELD_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Richmond Lake	Brown County	L22	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-RICHMOND_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Rosehill Lake	Hand County	L23	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-JA-L-ROSEHILL_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Rosette Lake	Edmunds County	L24	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-JA-L-ROSETTE_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Twin Lakes	Sanborn County	L25	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	FULL				
SD-JA-L-TWIN_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Twin Lakes	Spink County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-TWIN_02				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	INS				
Wilmarth Lake	Aurora County	L27	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	FULL				
SD-JA-L-WILMARTH_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Wylie Pond	Brown County		DENR	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-JA-L-WYLIE_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NOT ASSESSED				

WATERBODY Streams/AUID	Location/ Year Listed	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	Category/ TMDL Schedule	ON 303(d) Priority
Dawson Creek	James River to Lake Henry	R26	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			WRAP	Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
SD-JA-R-DAWSON_01							Livestock (Grazing or Feeding Operations)		
				Warmwater Marginal Fish Life	FULL				
Elm River	Elm Lake to mouth	R1	DENR	Domestic Water Supply	FULL			1	NO
			460136	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-JA-R-ELM_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Firesteel Creek	West Fork Firesteel Creek to mouth	R2	DENR	Domestic Water Supply	FULL-TH	Total Dissolved Solids		* 5	YES-2
			460137	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-JA-R-FIRESTEEL_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Temperature			

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Foot Creek	Near Aberdeen, SD	R3	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			6471800	Irrigation Waters	FULL				
SD-JA-R-FOOT_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Foster Creek Tributary	Near Carpenter, SD			Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
SD-JA-R-FOSTER_TRIB_01_USGS				Irrigation Waters	NOT ASSESSED				
Tributary of Howard	Near Leola, SD			Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
SD-JA-R-HOWARD_TRIB_01_USGS				Irrigation Waters	NOT ASSESSED				
James River	North Dakota border to Mud Lake Reservoir	R6	DENR 460805	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
SD-JA-R-JAMES_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)			
James River	Mud Lake Reservoir	R7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460112	Irrigation Waters	FULL				
SD-JA-R-JAMES_02				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	pH (high)			
James River	Columbia Road Reservoir	R8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460113	Irrigation Waters	FULL				
SD-JA-R-JAMES_03				Limited Contact Recreation	NON	Oxygen, Dissolved			
				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River	Columbia Road Reservoir to near US HWY 12	R9	DENR 460733	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-JA-R-JAMES_04				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
James River	US HWY 12 to Mud	R10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
	Creek		460734	Irrigation Waters	FULL				
SD-JA-R-JAMES_05				Limited Contact Recreation	NON	Oxygen, Dissolved			
				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
James River	Mud Creek to James River Diversion Dam	R11	DENR 460140	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-JA-R-JAMES_06				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
James River	James River Diversion Dam to Huron 3rd Street Dam	R12	DENR 460735	Domestic Water Supply	FULL			1	NO
SD-JA-R-JAMES_07				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
James River	Huron 3rd Street Dam to Sand Creek	R13	DENR 460736	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-JA-R-JAMES_08				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
James River	Sand Creek to I-90	R14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			460737	Irrigation Waters	FULL				
SD-JA-R-JAMES_09				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Livestock (Grazing or Feeding Operations)		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
James River	I-90 to Yankton County Line	R15	DENR 460707	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
SD-JA-R-JAMES_10				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
James River	Yankton County line to mouth	R16	DENR 460761	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
SD-JA-R-JAMES_11				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform			
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Grazing in Riparian or Shoreline Zones		
Moccasin Creek	Headwaters to Aberdeen	R17	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460694	Irrigation Waters	FULL				
SD-JA-R-MOCCASIN_01				Limited Contact Recreation	NON	Fecal Coliform			
				Warmwater Marginal Fish Life	FULL				
Moccasin Creek	Aberdeen to Warner	R18	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			460695	Irrigation Waters	FULL				
SD-JA-R-MOCCASIN_02				Limited Contact Recreation	NON	Oxygen, Dissolved	Municipal Point		
				Warmwater Marginal Fish Life	NON	Ammonia (Total) pH (high)	Source Discharges		
Mud Creek	SD HWY 73 to mouth	R19	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460145	Irrigation Waters	FULL				
SD-JA-R-MUD_01				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Pierre Creek	James River to S11, T102N, R58W	R28	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-JA-R-PIERRE_01				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS)		
							Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	FULL				
Tributary of Preacher's Run Creek	At Ipswich, SD		USGS 6473300	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
				Irrigation Waters	INS				
SD-JA-R-PREACHERS_RUN_TRIB_01_USGS									
Rock Creek	Near Fulton, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-JA-R-ROCK_01_USGS			6477150	Irrigation Waters	INS				
Snake Creek	Headwaters to mouth	R22	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460146	Irrigation Waters	FULL				
SD-JA-R-SNAKE_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Stony Run Creek	Headwaters to Stony Run Lake	R29	City of Huron	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
				Irrigation Waters	NOT ASSESSED				
SD-JA-R-STONYRUN_01_H									
Turtle Creek	Hand County line to	R23	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460148	Irrigation Waters	FULL				
SD-JA-R-TURTLE_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	pH (high)			
Wolf Creek	Above Wolf Creek Colony	R24	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460157	Irrigation Waters	FULL				
SD-JA-R-WOLF_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Wolf Creek	Just above Wolf Creek Colony to the mouth.	R25	DENR 460158	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-JA-R-WOLF_02			WRAP	Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Total Suspended Solids	Nonpoint Source		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Wolf Creek	Near Burdette to mouth.	R30	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			WRAP	Irrigation Waters	FULL				
SD-JA-R-WOLF_SP_01			460151	Limited Contact Recreation	INS				
				Warmwater Marginal Fish Life	FULL				

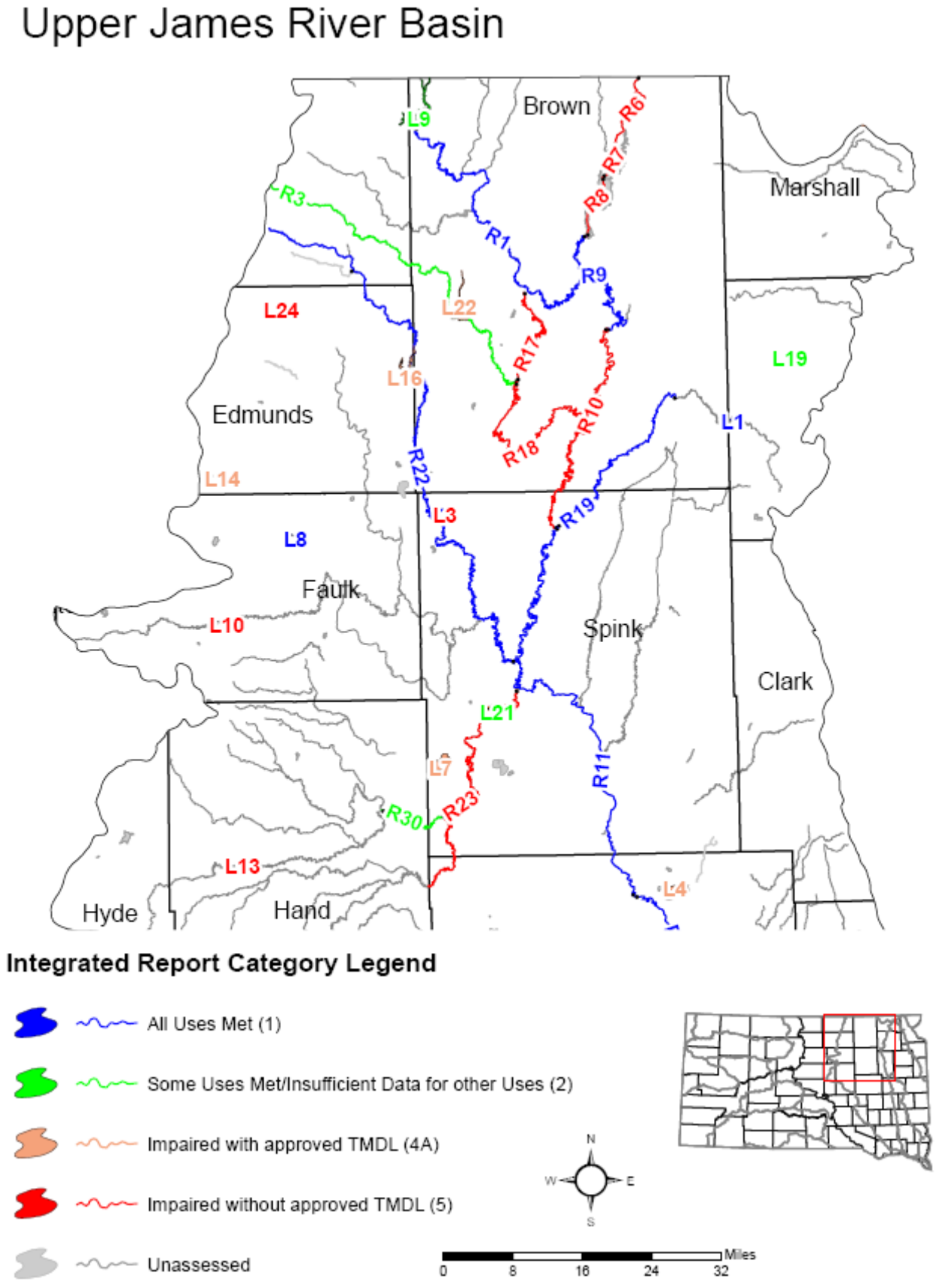


Figure 11: Upper James River Basin

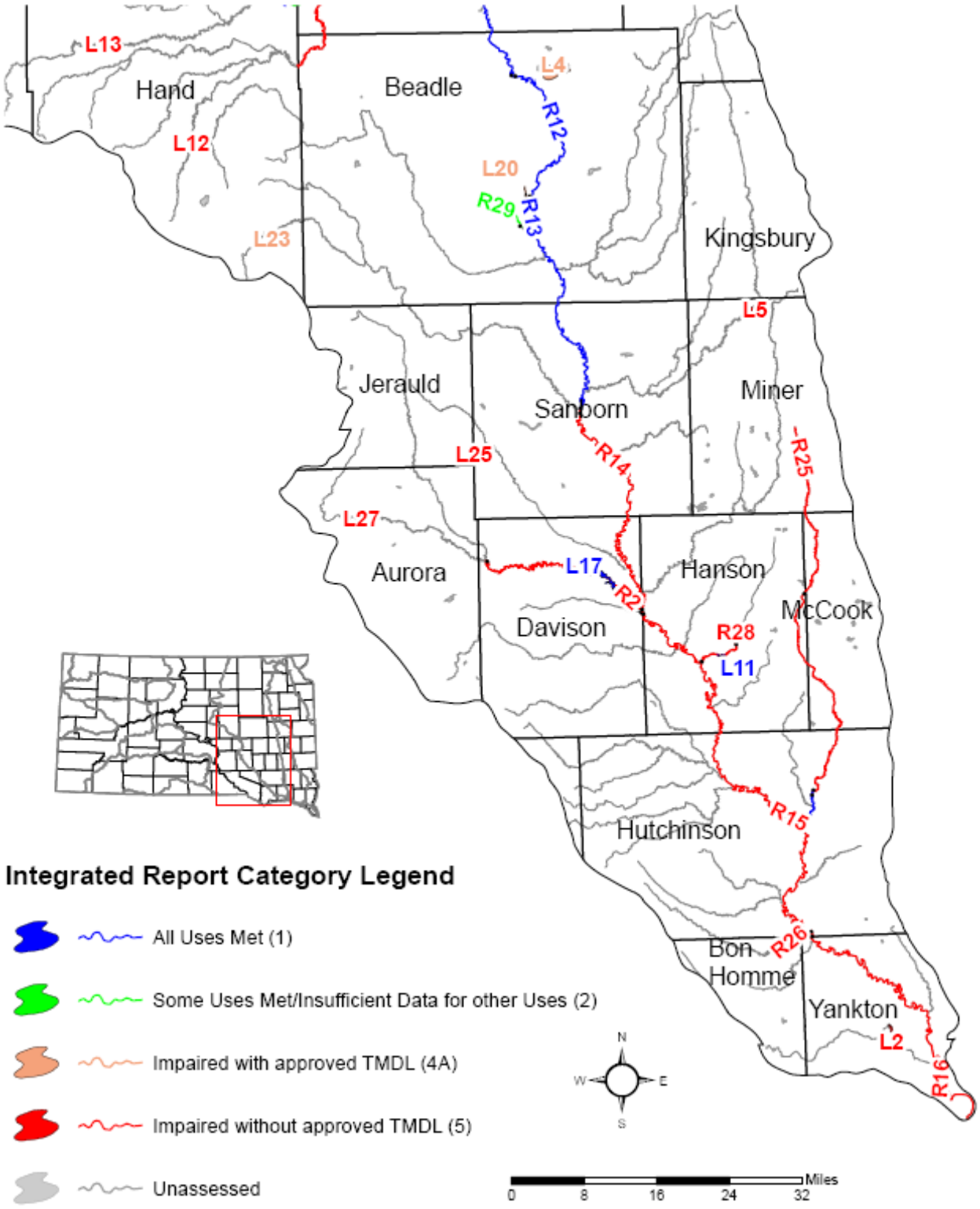


Figure 12: Lower James River Basin

Little Missouri River Basin (Figure 13, Table 23)

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 605 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 Little Missouri River is meeting all assigned beneficial uses; therefore, no assessment or implementation projects are necessary.

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.

Table 23: Little Missouri River Basin Information

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Little Missouri River	Montana border to North Dakota border	R1	DENR 460955	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-LM-R-LITTLE_MISSOURI_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				

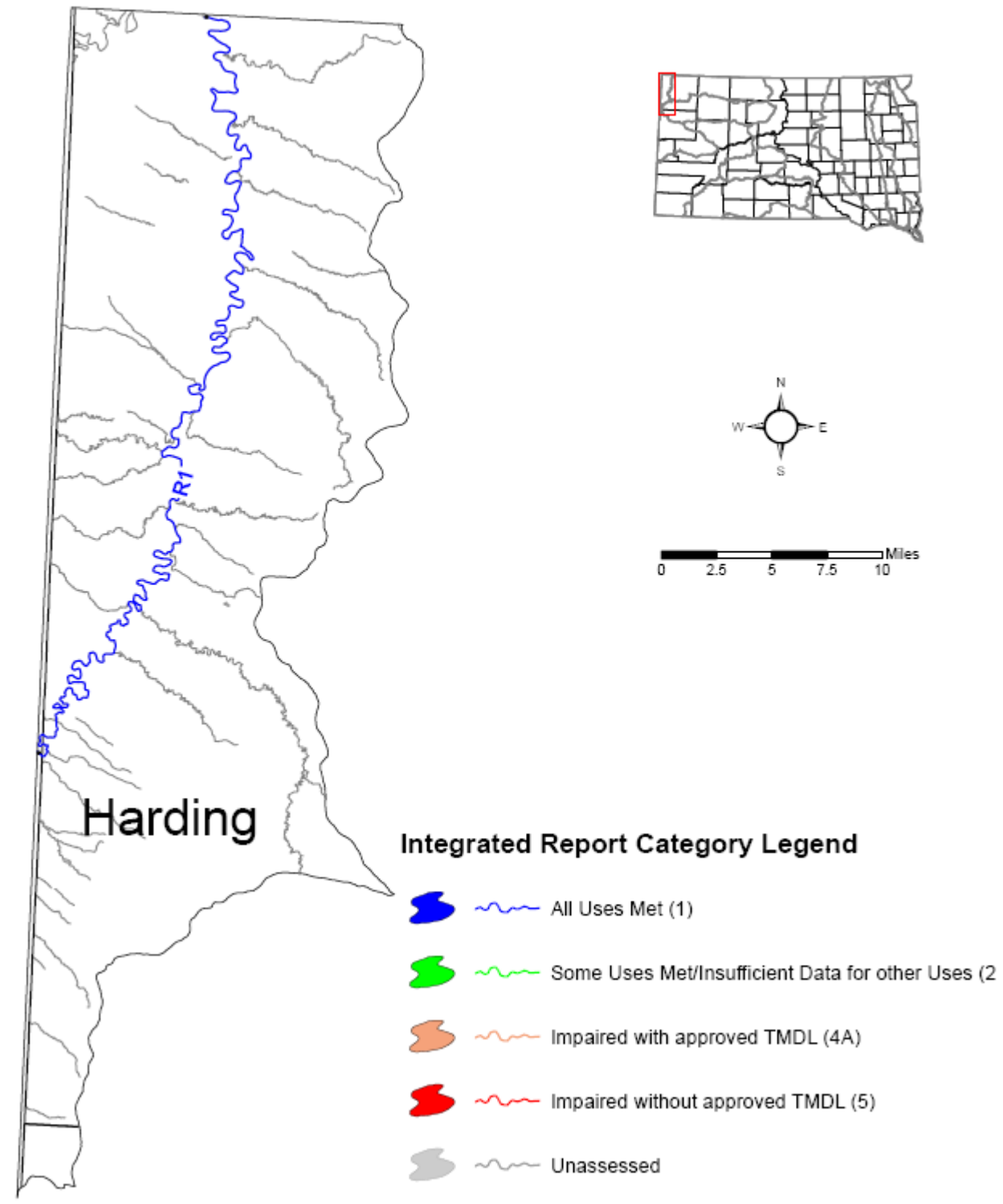


Figure 13: Little Missouri River Basin

Minnesota River Basin (Figure 14, Table 24)

The Minnesota River basin is found in the northeastern corner of the state. It 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 1,572 square miles within South Dakota.

DENR has assessed eight lakes and maintains seven water quality monitoring sites within the Minnesota basin.

The USGS has water quality monitoring sites on Cobb Creek and Big Coulee Creek in the basin. However, the data is very limited, and the only parameters sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

The upper half of the South Fork Whetstone River fully supported its assigned beneficial uses during the current assessment period. In the downstream half, the stream has experienced low DO levels during low river flows. The city of Milbank's wastewater treatment facility discharge makes up most the flow volume of the lower South Fork during dry periods. About five years ago, the city of Milbank had multiple violations of the Five-Day Biochemical Oxygen Demand (BOD_5) limit in its SWD permit. These violations likely caused or contributed to the dissolved oxygen impairment of this segment of the river. In 2003, DENR issued an enforcement action against the city of Milbank. In response to these violations and the resulting enforcement action, the city upgraded its wastewater treatment facility. Since the city completed its upgrades, there have been no further effluent violations and the stream has recovered. The downstream half of the South Fork Whetstone River has had no dissolved oxygen exceedances in the last two years. However, the stream is currently listed as impaired due to the past violations.

There are currently no on-going assessment projects at this time. Current implementation projects include Fish Lake and Lake Alice.

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.

Table 24: Minnesota River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Alice	Deuel County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			*1	NO
			LA	Immersion Recreation	FULL				
SD-MN-L-ALICE_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Big Stone Lake	Roberts County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			*1	NO
			LA	Immersion Recreation	FULL				
				Irrigation Waters	FULL				
SD-MN-L-BIG_STONE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Lake Cochrane	Deuel County	L3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-MN-L-COCHRANE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Fish Lake	Deuel County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-MN-L-FISH_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Lake Hendricks	Brookings County	L5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MN-L-HENDRICKS_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Oak Lake	Brookings County	L6	DENR	Fish/Wildlife Prop, Rec, Stock	INS			2	NO
			LA	Immersion Recreation	FULL				
SD-MN-L-OAK_01				Limited Contact Recreation	FULL				
				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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Oliver	Deuel County	L7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			*1	NO
			LA	Immersion Recreation	FULL				
SD-MN-L-OLIVER_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Punished Woman Lake	Codington County	L8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 2	NO
			LA	Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
SD-MN-L-PUNISHED_WOMAN_01				Warmwater Semipermanent Fish Life	FULL				
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**BASIS**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA CATEGORY**	**ON 303(d) &Priority**
Big Coulee Creek	Near Peever, SD	R1	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-MN-R-BIG_COULEE_01_USGS			5289985	Irrigation Waters	FULL				
Cobb Creek	Near Gary, SD		USGS	Coldwater Marginal Fish Life	INS			3	NO
			5299700	Fish/Wildlife Prop, Rec, Stock	INS				
SD-MN-R-COBB_01_USGS				Irrigation Waters	INS				
				Limited Contact Recreation	NOT ASSESSED				
Lac Qui Parle River, West branch	Above Gary to Minnesota border	R3	DENR 460645	Coldwater Marginal Fish Life	FULL			1	NO
SD-MN-R-LAC_QUI_PARLE_W_BR_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Little Minnesota River	Near Claire City to Minnesota border	R4	DENR 460710	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-MN-R-LITTLE_MINNESOTA_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Whetstone River	Headwaters to Minnesota border	R5	DENR 460700	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-MN-R-WHETSTONE_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
South Fork Whetstone	Headwaters to Lake Farley	R6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460690	Irrigation Waters	FULL				
SD-MN-R-WHETSTONE_S_FORK_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
South Fork Whetstone	Lake Farley to mouth	R7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460691	Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Oxygen, Dissolved	Municipal Point		
SD-MN-R-WHETSTONE_S_FORK_02				Warmwater Marginal Fish Life	NON	Oxygen, Dissolved	Source Discharges		
North Fork Yellow Bank	Grant County HWY 35 to Minnesota border	R8	DENR 460688	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-MN-R-YELLOW_BANK_N_FORK_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
South Fork Yellow Bank	Near Caine Creek to Minnesota border	R9	DENR 460687	Coldwater Marginal Fish Life	FULL			2	NO
SD-MN-R-YELLOW_BANK_S_FORK_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	INS				

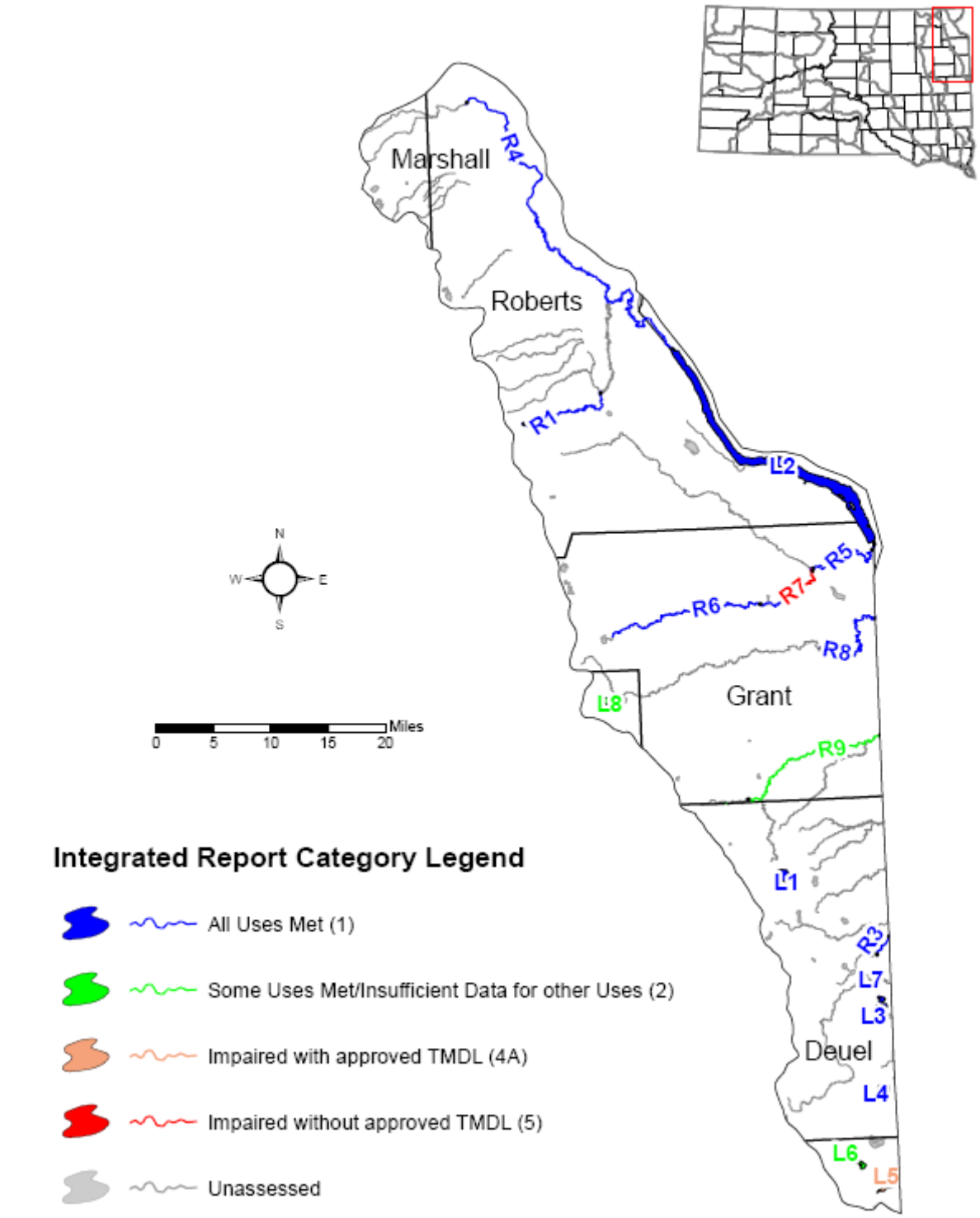


Figure 14: Minnesota River Basin

Missouri River Basin (Figures 15 and 16, Table 25)

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 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 is Lake Oahe with 22,240,000 acre-feet of storage capacity. 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 24 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 itself is fairly extensive and includes data for dissolved oxygen, pH, water temperature, sodium adsorption ratio, alkalinity, sulfate, nitrates, total dissolved solids, ammonia, and chlorides.

Water quality remains good although exceedances of the surface water quality standards for temperature and pH have exceeded the 10% criteria found in Table 6. However, these samples are taken from the power houses and are not considered representative of actual water quality within the river. More extensive monitoring is required for these large reservoirs to properly characterize the present water quality and reliably determine support. In 2006 and 2007, DENR conducted a water quality monitoring study of the Missouri River reservoirs. Data is currently being analyzed to determine if the river is fully supporting its beneficial uses and to develop a long term sampling strategy.

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

During this reporting period, Spring Creek, including Lakes Campbell and Pocasse, is the only assessment project underway in the Missouri River basin. On-going implementation projects are located in the Medicine Creek and Lewis and Clark watersheds.

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.

Table 25: Missouri River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Academy Lake	Charles Mix County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-ACADEMY_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Andes	Charles Mix County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	NON	Oxygen, Dissolved			
SD-MI-L-ANDES_01				Limited Contact Recreation	NON	Oxygen, Dissolved			
				Warmwater Marginal Fish Life	NON	Oxygen, Dissolved			
						Trophic State Index	Nonpoint Source		
Brakke Dam	Lyman County	L3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-MI-L-BRAKKE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Burke Lake	Gregory County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
SD-MI-L-BURKE_01				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
						pH (high)			
						Trophic State Index	Nonpoint Source		
Byre Lake	Lyman County	L5	DENR	Domestic Water Supply	FULL			* 4A	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-MI-L-BYRE_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Campbell	Campbell County	L6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-CAMPBELL_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Corsica Lake	Douglas County	L7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-CORSICA_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
						pH (high)			
						Trophic State Index	Nonpoint Source		
Cottonwood Lake	Sully County	L8	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-COTTONWOOD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Dante Lake	Charles Mix County	L9	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 4A	NO
			LA	Immersion Recreation	FULL				
SD-MI-L-DANTE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Eureka Lake	McPherson County	L10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-EUREKA_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Fairfax Lake	Gregory County	L11	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-FAIRFAX_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Fate Dam	Lyman County	L12	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			*1	NO
			LA	Immersion Recreation	FULL				
SD-MI-L-FATE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Geddes Lake	Charles Mix County	L13	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-GEDDES_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Trophic State Index	Nonpoint Source		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Hiddenwood	Walworth County	L14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-MI-L-HIDDENWOOD_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Lake Hurley	Potter County	L15		Fish/Wildlife Prop, Rec, Stock	INS			5	YES-2
				Immersion Recreation	NOT ASSESSED				
SD-MI-L-HURLEY_01			Fish Flesh	Limited Contact Recreation	NOT ASSESSED				
			Sampling	Warmwater Permanent Fish Life	INS-TH	Mercury in fish tissue	Unknown		
McCook Lake	Union County	L16	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			LA	Immersion Recreation	FULL				
SD-MI-L-MCCOOK_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Platte Lake	Charles Mix County	L17	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-PLATTE_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Pocasse	Campbell County	L18	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-POCASSE_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Potts Dam	Potter County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-POTTS_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	INS				
Roosevelt Lake	Tripp County	L20	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-MI-L-ROOSEVELT_01			Fish Flesh	Limited Contact Recreation	FULL				
			Sampling	Warmwater Permanent Fish Life	NON	Mercury in fish tissue	Unknown		

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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Sully Lake	Sully County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-SULLY_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Sully Dam	Tripp County	L22	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-SULLY_DAM_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Swan Lake	Walworth County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-SWAN_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Lake Yankton	Yankton County	L24	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MI-L-YANKTON_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Andes Creek	Near Armour, SD		USGS	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
SD-MI-R-ANDES_01_USGS			6452380	Irrigation Waters	NOT ASSESSED				
Campbell Creek	Near Lee's Corner	R2	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-MI-R-CAMPBELL_01_USGS			6442718	Irrigation Waters	FULL				
Choteau Creek	Wagner to mouth	R3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			460134	Irrigation Waters	FULL				
SD-MI-R-CHOTEAU_01			WRAP	Limited Contact Recreation	FULL				
			USGS	Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Crow Creek	Bedashosha Lake to Jerauld County line	R4	DENR 460135	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-MI-R-CROW_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
East Fork Platte Creek	Near Aurora Center, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-MI-R-EAST_FORK_PLATTE_01_USGS			6452290	Irrigation Waters	INS				
Elm Creek	Near Gann Valley, SD		USGS	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			3	NO
			6442900	Irrigation Waters	NOT ASSESSED				
SD-MI-R-ELM_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NOT ASSESSED				
Emanuel Creek	Lewis and Clark Lake to S20, T94N, R60W	R18	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
				Irrigation Waters	FULL				
SD-MI-R-EMANUEL_01				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Missouri River (Lake Oahe)	North Dakota border to Oahe Dam	R11	DENR 460671	Coldwater Permanent Fish Life	INS			2	NO
				Commerce & Industry	FULL				
				Domestic Water Supply	FULL				
SD-MI-R-OAHE_01				Fish/Wildlife Prop, Rec, Stock	FULL				
				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam	R15	DENR 460674	Coldwater Permanent Fish Life	INS			2	NO
				Commerce & Industry	FULL				
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-MI-R-SHARPE_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
Missouri River (Lake Francis Case)	Big Bend Dam to Fort Randall Dam	R7	DENR 460673	Commerce & Industry	FULL			1	NO
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-MI-R-FRANCIS_CASE_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	FULL				
Missouri River (Lewis and Clark Lake)	Fort Randall Dam to North Sioux City	R8	DENR 460674	Commerce & Industry	FULL			1	NO
				Domestic Water Supply	FULL				
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-MI-R-LEWIS_AND_CLARK_01				Immersion Recreation	FULL				
				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Medicine Creek	US HWY 83 to mouth	R9	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			* 1	NO
			460141	Irrigation Waters	FULL				
SD-MI-R-MEDICINE_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Medicine Knoll Creek	Headwaters to mouth	R10	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			460142	Irrigation Waters	FULL				
SD-MI-R-MEDICINE_KNOLL_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Oak Creek	S20, T21N, R28E	R12	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
	to Lake Oahe		6354882	Irrigation Waters	FULL				
SD-MI-R-OAK_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Platte Creek	Near Platte, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			6452320	Irrigation Waters	INS				
SD-MI-R-PLATTE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	INS				
Ponca Creek	Gregory to near St. Charles	R14	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			460670	Irrigation Waters	FULL				
SD-MI-R-PONCA_01			WRAP	Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Slaughter Creek	Missouri River to headwaters	R19	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	NON	Total Dissolved Solids	Natural Sources	5	YES-2
SD-MI-R-SLAUGHTER_01				Irrigation Waters	NON	Specific Conductance	Natural Sources		
Snake Creek	Near Bijou Hills, SD		USGS	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
SD-MI-R-SNAKE_01_USGS			6452275	Irrigation Waters	INS				
Spring Creek	US HWY 83 to mouth	R17	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460155	Irrigation Waters	FULL				
SD-MI-R-SPRING_01				Limited Contact Recreation	NON	Oxygen, Dissolved			
				Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved			
						Total Suspended Solids	Natural Sources		

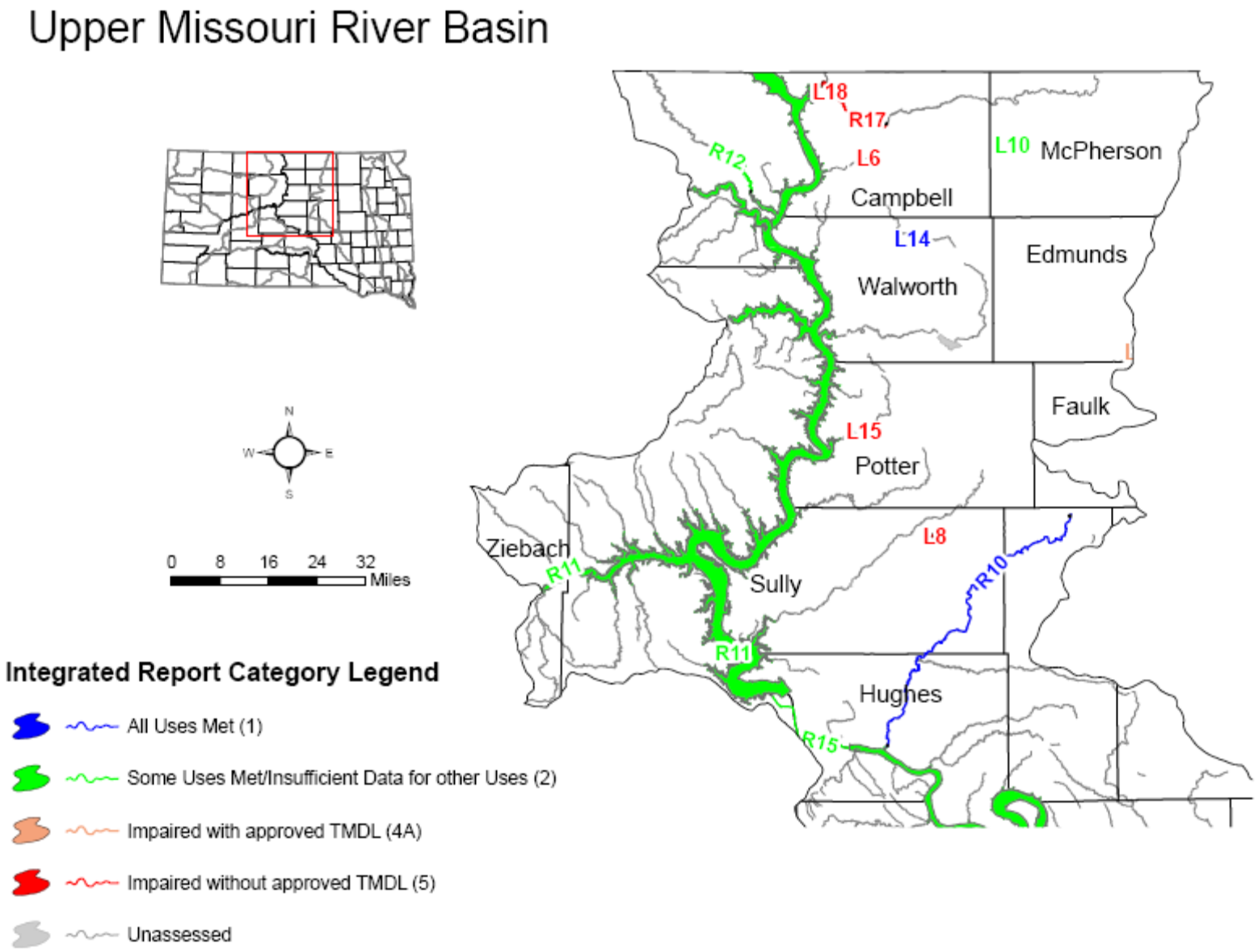


Figure 15: Upper Missouri River Basin

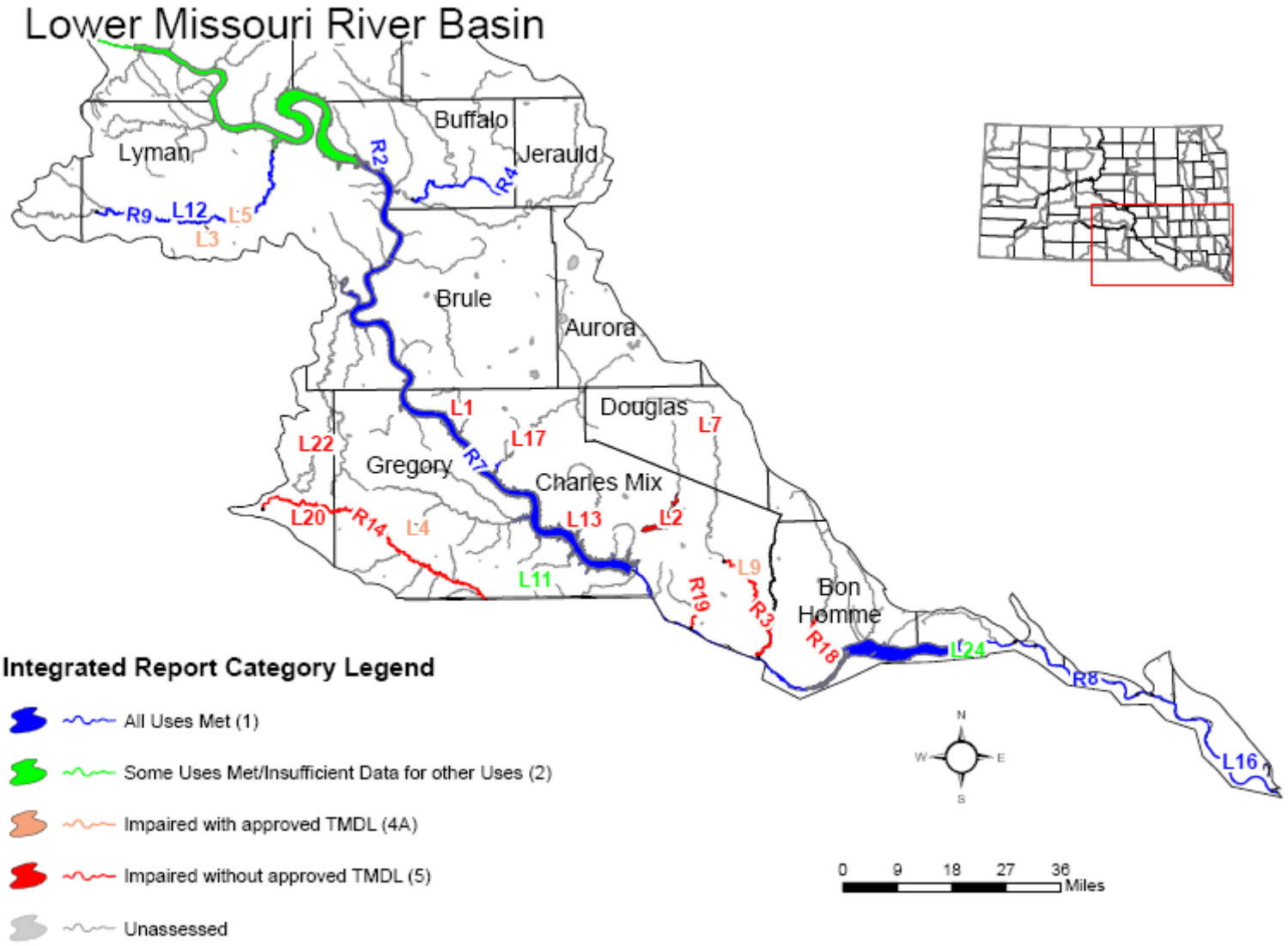


Figure 16: Lower Missouri River Basin

Moreau River Basin (Figure 17, Table 26)

The Moreau River basin is located in the northwest part of South Dakota and drains an area of 5,037 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. Approximately two-thirds of the basin's land is devoted to ranching operations.

DENR has assessed two lakes and maintains five water quality monitoring sites within this basin. Three of the five monitoring sites are located on the Moreau River, one is located on the South Fork Moreau, and one is located on Thunder Butte Creek.

The USGS has water quality monitoring sites in the basin. The data is very limited, and the only parameters that were sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

Water quality within this basin is marginal. 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 TDS in the water of local streams, primarily sulfate, iron, manganese, sodium, and other minerals.

Dewberry Dam was listed for TSI in previous reporting cycles; however, there is insufficient data to determine trophic state within the reporting period (2000 – 2007). Water Resources Assistance Program (WRAP) staff attempted to sample Dewberry Dam in 2007. However, access through private property to the lake was denied by the landowner. Based on the inability to access Dewberry Dam, WRAP staff are unable to assess trophic state for the purpose of TMDL development. As a result, Dewberry Dam remains on the 303(d) list for TSI.

There are no on-going assessment or implementation projects occurring within the 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.

Table 26: Moreau River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Coal Springs Reservoir	Perkins County		DENR	Fish/Wildlife Prop, Rec, Stock	INS			3	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-MU-L-COAL_SPRINGS_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	INS				
Dewberry Dam	Dewey County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	INS			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-MU-L-DEWBERRY_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Trophic State Index			
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**BASIS**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA CATEGORY**	**ON 303(d) &Priority**
Moreau River	Headwaters to near Iron Lightning	R1	DENR 460039	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	INS-TH	Salinity	Natural Sources		
SD-MU-R-MOREAU-01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Moreau River	Iron Lightning to Green Grass	R3	DENR 460143	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	INS-TH	Salinity	Natural Sources		
SD-MU-R-MOREAU-02				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids			
Moreau River	Green Grass to mouth	R5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460935	Irrigation Waters	NON	Salinity			
				Limited Contact Recreation	NON	Fecal Coliform			
SD-MU-R-MOREAU-03				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Livestock (Grazing or Feeding Operations)		
							Natural Sources		

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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
South Fork Moreau River	Alkali Creek to mouth	R6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460144	Irrigation Waters	NON	Specific Conductance	Natural Sources		
SD-MU-R-MOREAU_S_FORK_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Thunder Butte Creek	Headwaters to mouth	R7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460147	Irrigation Waters	FULL				
SD-MU-R-THUNDER_BUTTE_01				Limited Contact Recreation	INS				
				Warmwater Marginal Fish Life	INS-TH	Oxygen, Dissolved	Unknown		

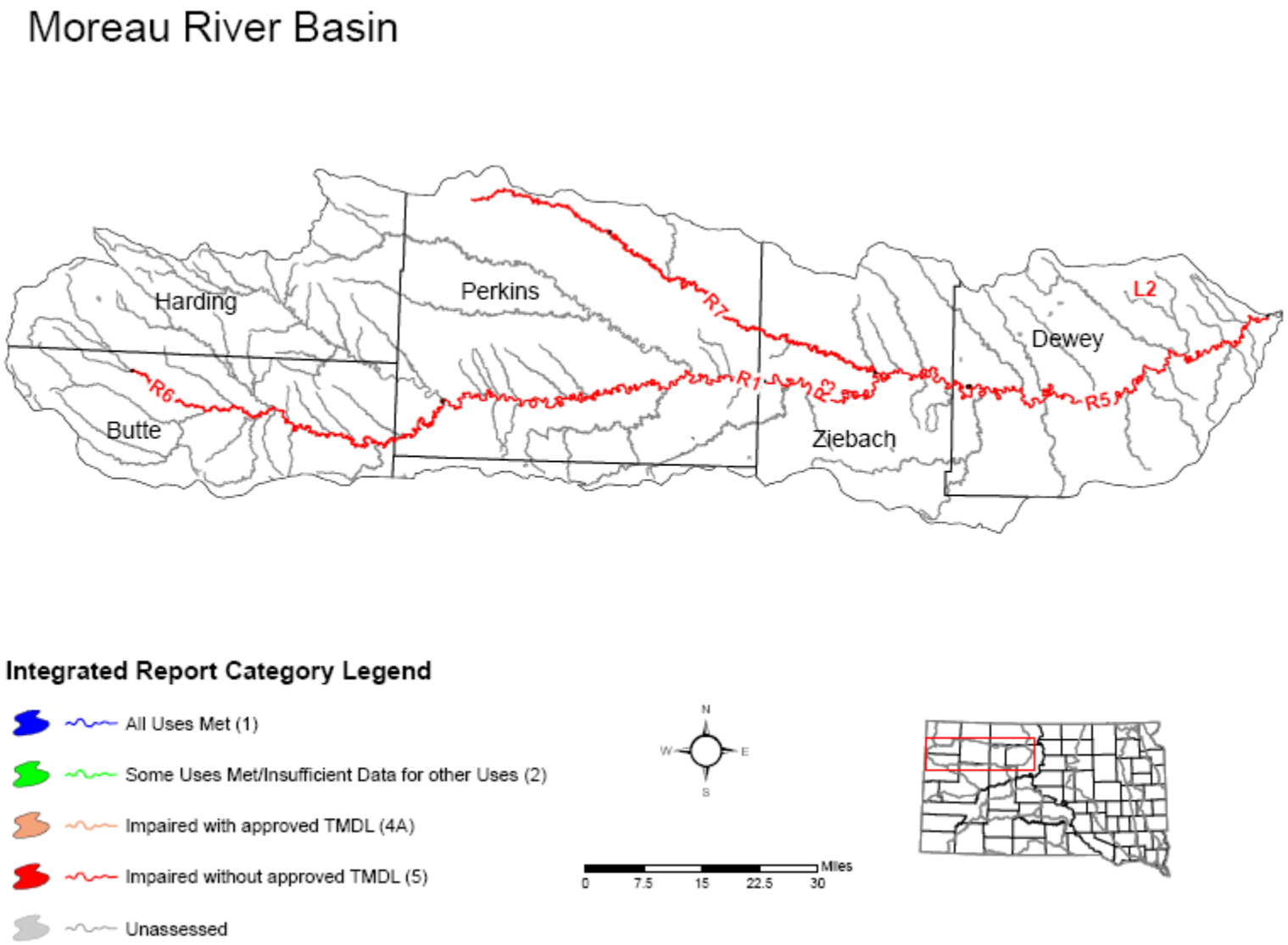


Figure 17: Moreau River Basin

Niobrara River Basin (Figure 18, Table 27)

The tributaries of this 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 the Minnechadusa River. These streams drain approximately 2,000 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 sites that had water quality information within this basin are located on Antelope Creek and Sand Creek. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

Rahn Dam, the only assessed lake in the basin, is impaired for TSI due to nutrient enrichment and siltation. These causes are related to agricultural activities.

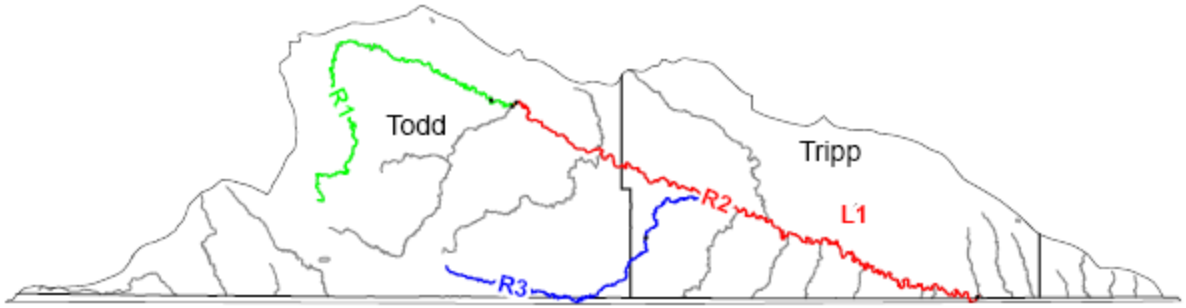
Rahn Dam was assessed as part of the Lewis and Clark assessment project. The Lewis and Clark Project is currently in the implementation phase.

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.

Table 27: Niobrara River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Rahn Lake	Tripp County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-1
			LA	Immersion Recreation	FULL				
SD-NI-L-RAHN_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**BASIS**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA CATEGORY**	**ON 303(d) &Priority**
Antelope Creek	Near Mission, SD	R1	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			6463900	Irrigation Waters	FULL				
SD-NI-R-ANTELOPE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	FULL				
Keya Paha River	Keya Paha to Nebraska border	R2	DENR 460815	Domestic Water Supply	FULL			5	YES-1
				Fish/Wildlife Prop, Rec, Stock	FULL				
SD-NI-R-KEYA_PAHA_01				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Grazing in Riparian or Shoreline Zones		
							Rangeland Grazing		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources		
Sand Creek	Near Olsonville, SD	R3	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-NI-R-SAND_01_USGS			6464120	Irrigation Waters	FULL				

Niobrara River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Unassessed

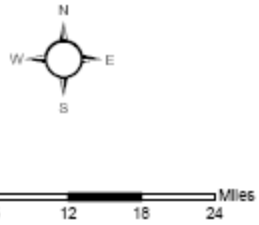


Figure 18: Niobrara River Basin

Red River Basin (Figure 19, Table 28)

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 600 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. One USGS site had adequate data for analysis on La Belle Creek in this basin and is included in this report.

A lake assessment has been completed for Lake Traverse and a TMDL is currently being written.

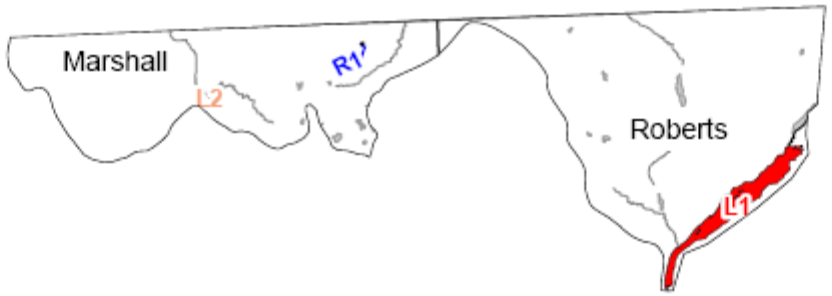
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4a) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 28: Red River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Lake Traverse	Roberts County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-RD-L-TRAVERSE_01				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
White Lake	Marshall County	L2	DENR	Domestic Water Supply	FULL			* 4A	NO
			LA	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-RD-L-WHITE_01				Immersion Recreation	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
La Belle Creek	Near Veblen, SD	R1	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-RD-R-LA_BELLE_01_USGS			5051650	Irrigation Waters	FULL				

Red River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Unassessed

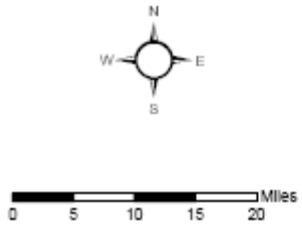


Figure 19: Red River Basin

Vermillion River Basin (Figure 20, Table 29)

The Vermillion River basin covers an area of 2,652 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 is channelized. 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 are municipalities, sand and gravel operations, and other uses.

DENR has assessed eight 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 and the West Fork Vermillion River. The data is very limited and the only parameters that were sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

On-going implementation projects in the Vermillion River basin include the Vermillion River, Turkey Ridge Creek, and Kingsbury County Lakes (which includes Lakes Preston, Thompson, Whitewood, and Henry) watersheds.

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.

Table 29: Vermillion River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
East Vermillion Lake	McCook County	L1	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-VM-L-E_VERMILLION_01				Limited Contact Recreation	FULL				
				Warmwater Permanent Fish Life	NON	Trophic State Index	Nonpoint Source		
Lake Henry	Kingsbury County	L2	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-VM-L-HENRY_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Marindahl Lake	Yankton County	L3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-VM-L-MARINDAHL_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	FULL				
Silver Lake	Hutchinson County	L4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	NOT ASSESSED				
SD-VM-L-SILVER_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
Swan Lake	Turner County	L5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			*4A	NO
			LA	Immersion Recreation	NOT ASSESSED				
SD-VM-L-SWAN_01				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Semipermanent Fish Life	NON	Sedimentation/Siltation	Nonpoint Source		
						Trophic State Index	Nonpoint Source		
Lake Thompson	Kingsbury County	L6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
			LA	Immersion Recreation	FULL				
SD-VM-L-THOMPSON_01				Limited Contact Recreation	FULL				
				Warmwater Permanent 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.

WATERBODY Lakes/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Whitewood Lake	Kingsbury County	L7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			LA	Immersion Recreation	FULL				
SD-VM-L-WHITEWOOD_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	NON	Trophic State Index	Nonpoint Source		
North Island Lake	Minnehaha County	L8	Fish Flesh	Fish/Wildlife Prop, Rec, Stock	NOT ASSESSED			5	YES-2
			Sampling	Immersion Recreation	NOT ASSESSED				
				Limited Contact Recreation	NOT ASSESSED				
SD-VM-L-ISLAND_N_01				Warmwater Semipermanent Fish Life	INS-TH	Mercury in fish tissue			

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Camp Creek	Vermillion River to S6, T99N, R52W	R8	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-VM-R-CAMP_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
Little Vermillion River	Near Salem, SD	R1	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-VM-R-LITTLE_VERMILLION_01_USGS			6478540	Irrigation Waters	FULL				
Long Creek	Vermillion River to Highway 44	R9	DENR WRAP	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	FULL				
SD-VM-R-LONG_01				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations		
				Warmwater Semipermanent Fish Life	FULL		Livestock		
Vermillion River	Headwaters to Turkey Ridge Creek	R2	DENR 460661	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-VM-R-VERMILLION_01				Limited Contact Recreation	FULL				
				Warmwater Semipermanent 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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Vermillion River	Turkey Ridge Creek to Baptist Creek	R3	DENR 460755	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-VM-R-VERMILLION_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	FULL				
Vermillion River	Baptist Creek to mouth	R4	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460745	Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
SD-VM-R-VERMILLION_03				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Grazing in Riparian or Shoreline Zones		
							Livestock (Grazing or Feeding Operations)		
East Fork Vermillion	McCook/Lake County line to Little Vermillion	R5	DENR 460150	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
				Irrigation Waters	FULL				
SD-VM-R-VERMILLION_E_FORK_01				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
East Fork Vermillion	Little Vermillion River to mouth	R6	DENR 460154	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-VM-R-VERMILLION_E_FORK_02				Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Marginal Fish Life	FULL				
West Fork Vermillion	Near Parker, SD	R7	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
			6478690	Irrigation Waters	FULL				
SD-VM-R-VERMILLION_WEST_FORK_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				

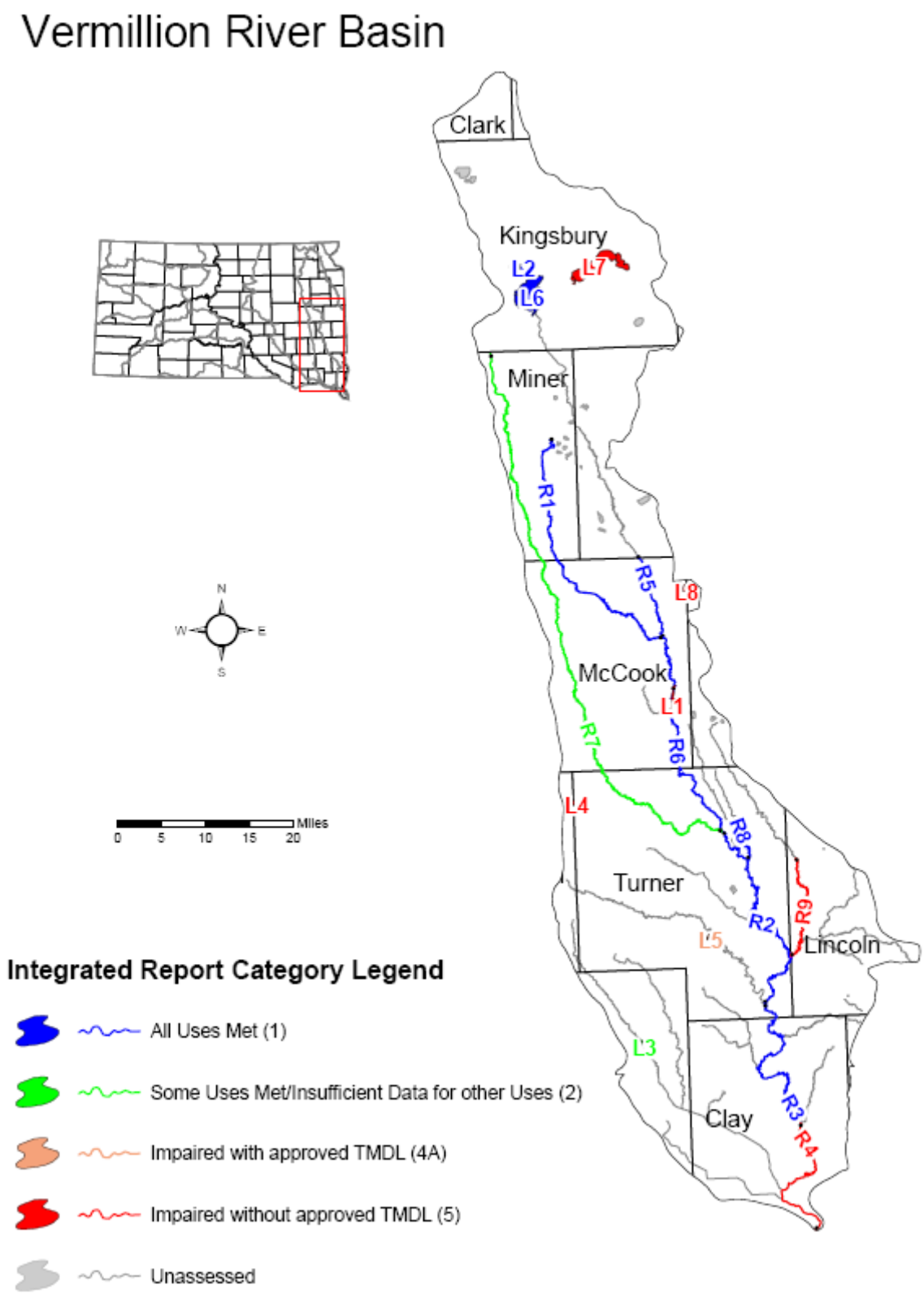


Figure 20: Vermillion River Basin

White River Basin (Figure 21, Table 30)

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 8,250 square miles. Agriculture dominates the basin's economy, with the majority of the land used as rangeland or cropland.

DENR maintains six water quality monitoring sites within this basin. Four of the six monitoring sites are located on the White River, one is located on Cottonwood Creek, and the other is located on the Little White River.

The USGS has water quality monitoring sites in the basin, including sites on the Little White River, Black Pipe Creek, Lake Creek, Rosebud Creek and others. The data is very limited, and the only parameters that were sampled were specific conductance and water temperature. Data collected on all USGS sites was analyzed for this report. However, if the site was located on a river or creek in conjunction with a DENR site, the data was analyzed but the USGS site name may not have been specifically listed within the tables.

DENR has increased sampling parameters to include uranium, and others 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. For this reporting cycle, there is insufficient data to report on uranium and other associated parameters. However, support determinations were made on existing conventional parameters.

Based on current water quality standards, water quality within the White River basin is generally poor and often exceeds numeric criteria. This is primarily due to the highly erosive soils within the river drainage. This 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. DENR is currently reviewing a study to develop site-specific water quality criteria for the White River to address naturally occurring total suspended solids.

Assessment projects have been completed for the White River and Little White River watersheds. A final report is in progress for the assessment on Cottonwood Creek.

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.

Table 30: White River Basin Information

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Black Pipe Creek	S25, T42N, R33W	R10	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
	to the White River		6447230	Irrigation Waters	FULL				
SD-WH-R-BLACKPIPE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				
Cottonwood Creek	Headwaters to White	R3	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-WH-R-COTTONWOOD_01			460153	Irrigation Waters	FULL				
Lake Creek	Above and below refuge near Tuthill, SD	R4	USGS 6448000	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			6449000	Irrigation Waters	FULL				
SD-WH-R-LAKE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent Fish Life	NON	Temperature			
Little White River	Rosebud Creek to mouth	R5	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460840	Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
SD-WH-R-LITTLE_WHITE_01							Livestock (Grazing or Feeding Operations)		
							Natural Sources		
Little White River	S6, T36N, R39W to Rosebud Creek	R11	USGS 6447500	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
SD-WH-R-LITTLE_WHITE_02_USGS		430939101003500		Irrigation Waters	FULL				
			6449300	Limited Contact Recreation	NOT ASSESSED				
			6449100	Warmwater Semipermanent Fish Life	FULL				
Omaha Creek	Headwaters to Little White River	R12	USGS 431146100574900	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-WH-R-OMAHA_01_USGS				Irrigation Waters	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.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Rosebud Creek	S34, T38N, R30W to Little White River	R13	USGS 431600100533600	Coldwater Marginal Fish Life	FULL			2	NO
			6449400	Fish/Wildlife Prop, Rec, Stock	FULL				
SD-WH-R-ROSEBUD_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
Sawmill Canyon	Headwaters to Little White River	R14	USGS 430724101010200	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-WH-R-SAWMILL_CANYON_01_USGS				Irrigation Waters	FULL				
White River	Nebraska border to	R6	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
	Interior		460842	Irrigation Waters	FULL				
				Limited Contact Recreation	FULL				
SD-WH-R-WHITE_01				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land) Livestock (Grazing or Feeding Operations) Natural Sources		
White River	Interior to Black Pipe Creek	R7	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460835	Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Livestock (Grazing or Feeding Operations) Wildlife		
SD-WH-R-WHITE_02				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land) Livestock (Grazing or Feeding Operations) Natural Sources		

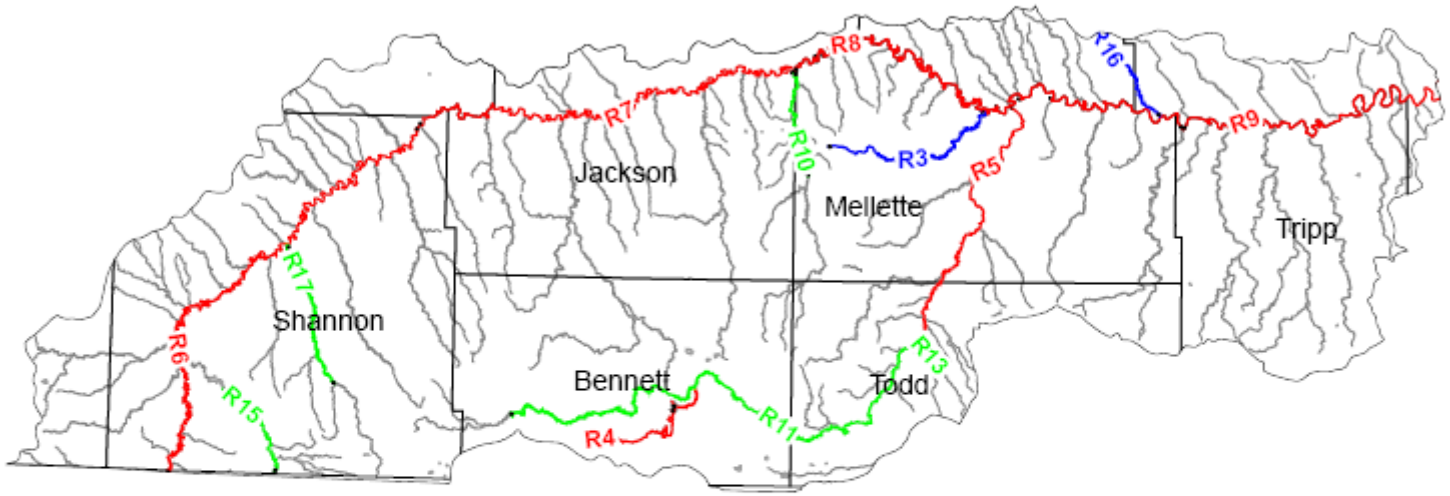
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4a) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
White River	Black Pipe Creek to Oak Creek	R8	DENR 460152	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
				Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Crop Production (Crop Land or Dry Land) Wildlife		
SD-WH-R-WHITE_03							Livestock (Grazing or Feeding Operations)		
							Natural Sources		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Crop Production (Crop Land or Dry Land)		
							Natural Sources		
							Rangeland Grazing		
White River	Oak Creek to mouth	R9	DENR	Fish/Wildlife Prop, Rec, Stock	FULL			5	YES-2
			460825	Irrigation Waters	FULL				
				Limited Contact Recreation	NON	Fecal Coliform	Animal Feeding Operations (NPS) Wildlife		
SD-WH-R-WHITE_04							Crop Production (Crop Land or Dry Land)		
							Livestock (Grazing or Feeding Operations)		
				Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Rangeland Grazing Natural Sources		
White Clay Creek	White Clay Lake to Oglala Lake	R15	USGS 6445980	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
SD-WH-R-WHITECLAY_01_USGS				Irrigation Waters	FULL				
				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Permanent 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.

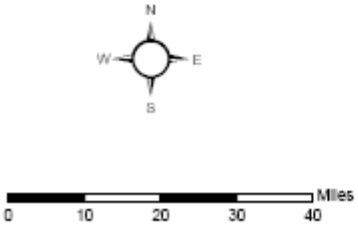
WATERBODY Streams/AUID	LOCATION	MAP ID	BASIS	USE	SUPPORT	CAUSE	SOURCE	EPA CATEGORY	ON 303(d) &Priority
Williams Creek	Headwaters to mouth	R16	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			1	NO
SD-WH-R-WILLIAMS_01_USGS			6451650	Irrigation Waters	FULL				
Wounded Knee Creek	Spring Creek to	R17	USGS	Fish/Wildlife Prop, Rec, Stock	FULL			2	NO
	White River		6446100	Irrigation Waters	FULL				
SD-WH-R-WOUNDEDKNEE_01_USGS				Limited Contact Recreation	NOT ASSESSED				
				Warmwater Marginal Fish Life	FULL				

White River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Unassessed



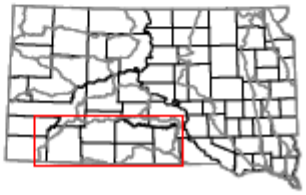


Figure 21: White River Basin

WETLANDS

Wetlands are a common feature in the glaciated prairie pothole region of eastern South Dakota (Figure 22). However, 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 1940's and 1950's to drain wetlands for increased agricultural production. Several government agencies, including the U.S. Department of Agriculture (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 22: Map Depicting Prairie Pothole Region

Wetland resources across the prairie pothole region of eastern South Dakota provide many ecological services (Rickeral 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 (NWI). The Cowardin et al. (1982), classification system was adopted by the USFWS to classify wetlands based on hydrologic, geomorphologic, biologic and chemical characteristics. The NWI efforts conducted in South Dakota provide documentation regarding identity and extent, characteristics and distribution of wetland resources. In short, eastern South Dakota has an estimated 2.2 million acres of wetlands and deep water habitat. Of this total, an estimated 80.1% or 1.8 million acres are palustrine systems. Palustrine wetlands (prairie potholes) represent small depressional wetlands with shallow water habitat. Results of the latest NWI survey conducted in eastern South Dakota are summarized by Johnson and Higgins (1997).

South Dakota 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 74:51:01). 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 U.S. Army Corps of Engineers (COE) is responsible for the control of activities that place fill in wetlands. The Corps' authority stems from Section 404 of the Clean Water Act. 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 COE 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 Clean Water Act 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 have 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. The 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.

South Dakota State University in cooperation with GF&P is in the final stages of developing a Level-1 and Level-2 wetland rapid assessment protocol for prairie pothole wetlands in eastern South Dakota. The development 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 will be used by 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).

PUBLIC HEALTH/AQUATIC LIFE CONCERNS

The cost of routinely monitoring most toxic pollutants is prohibitive. At present, priority toxins (heavy metals) are routinely monitored at several WQM stream sites located near historic or current mining activities in the northern Black Hills. Ammonia, which is a 307(a) toxic pollutant, is frequently monitored throughout the DENR fixed station monitoring network (Table 31).

Table 31: Total Size Affected by Toxics

WATERBODY	SIZE MONITORED FOR TOXICS*	SIZE WITH ELEVATED LEVELS OF TOXICS**
Rivers (miles)	6,255	45
Lakes (acres)	142,917	261

* 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 27 separate aquatic life concern incidents investigated from October 1, 2005, to September 30, 2007. Of these incidents, eight were the result of a winter kill. The remaining fish kills occurred for a variety of other reasons but mostly due to natural conditions and biological processes during the warm weather months.

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, 2005, to September 30, 2007, there were 15 minor fish kills in South Dakota. During this same time period, there were 10 moderate fish kills and two major fish kills.

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 suggests that the cause of impairment is related to human influence.

Table 32: Summary of Fish Kill Investigations (October 1, 2005 - September 30, 2007)

Date Reported	Fish Species	Number Dead Fish Observed	Kill Classification	Waterbody	County	Conclusions /Cause of Fish Kill
9/10/2007	Unidentified	Undetermined	Moderate	Lake Alvin	Lincoln	High water temperature and large algae blooms
9/05/2007	Crappie	277	Moderate	Foot Creek	Brown	Unknown
8/22/2007	White Sucker	500	Moderate	Brant Lake	Lake	Parasitic *Ergasilus* and *Argulus*
8/02/2007	Bluegill	100+	Moderate	Pond near Ellsworth AFB	Pennington	Summer kill
8/01/2007	White Sucker	50	Minor	Long Creek	Turner	Low dissolved oxygen
7/12/2007	White Sucker	Undetermined	Minor	Gator Pond in Custer State Park	Custer	Low dissolved oxygen and high water temperatures
7/10/2007	Unidentified	100	Minor	Lake Madison	Lake	Algae blooms causing low dissolved oxygen
3/31/2007	Crappie, drum, catfish	Undetermined	Moderate	Lake Mitchell	Davison	Unknown
3/30/2007	Longnose gar, catfish	12	Minor	Missouri River confluence with James River	Yankton	Winter kill
3/29/2007	Carp, black bullhead	410	Moderate	Moccasin Creek	Brown	Winter kill
3/27/2007	Bluegill, crappie, northern pike, largemouth bass	2000	Major	Rahn Dam	Tripp	Winter kill
3/27/2007	Unidentified	100	Minor	Dimock Lake	Hutchinson	Winter kill
3/27/2007	Largemouth bass, perch, bluegill	69	Minor	Twin Dams	Stanley	Winter kill
3/27/2007	Walleye, carp, crappie	112	Moderate	Lake Cavour	Beadle	Winter kill
3/27/2007	Carp	351	Moderate	Pelican Lake	Codington	Winter kill

Date Reported	Fish Species	Number Dead Fish Observed	Kill Classification	Waterbody	County	Conclusions /Cause of Fish Kill
3/19/2007	Gizzard shad	Undetermined	Minor	Capitol Creek	Hughes	Winter kill
11/07/2006	Carp, gar, catfish, bullheads, bighead buffalo	1000	Major	James River near Huron	Beadle	Toxic levels of ammonia from an unknown source
7/31/2006	Common carp	Undetermined	Minor	Fish Lake GPA	Aurora	High water temperatures and receding water levels
7/28/2006	Sunfish	150	Moderate	Lake Henry	Bon Homme	Low dissolved oxygen
7/28/2006	Carp	Undetermined	Minor	Choteau Creek	Charles Mix	High water temperatures and receding water levels
7/28/2006	Carp	1000s	Moderate	Lake Preston	Kingsbury	High water temperatures
7/26/2006	Black bullhead	30	Minor	Whetstone River	Grant	Unknown
7/25/2006	Black bullhead	Undetermined	Minor	Lake Andes	Charles Mix	Summer kill
7/24/2006	Black bullhead	100	Minor	Murdo Dam	Jones	Stress, high water temperatures
7/05/2007	Northern pike	Undetermined	Minor	Lake Campbell	Brookings	High water temperatures and large algae blooms
7/05/2006	Walleye	75	Minor	Beaver Lake	Minnehaha	High water temperatures and large algae blooms
6/08/2006	Carp, walleye, perch, crappie	36	Minor	West golf course pond Custer State Park	Custer	Unknown

Unsafe Beaches

Recent monitoring data compiled for swimming beaches by the DENR Drinking Water Program appear in Table 33. Monitoring of the approximately 58 designated public beach areas in the state is conducted weekly during the swimming season from May to September. Water quality samples are collected by the municipality or governmental agency charged with managing the given waterbody. GF&P is often the monitoring agency responsible for managing lake swimming beaches in the state. Following analysis of samples by an approved lab, the Drinking Water Program in DENR will close a beach area if fecal bacteria concentrations exceed Beach Closure Standards. Beach closings are controlled by the entity regulating the swimming areas.

A Waterbody is listed as impaired if three beach closures per season occurred in a consecutive three-week sampling period. A public beach is recommended for closure if the following fecal coliform levels are not met.

(1) Any three consecutive samples exceed 200 fecal coliform per 100 milliliters;
(2) Any two consecutive samples exceed 300 fecal coliform per 100 milliliters; or
(3) Any single sample exceeds 1,000 fecal coliform per 100 milliliters.

Table 33: Waterbodies Affected by Swimming Beach Closures

Waterbody	Sample Date	Closure	Pollutant	Result	Source	# of events
Angostura	7/9/07	yes	Fecal Coliform	1900	NPS	
Angostura	7/31/06	yes	Fecal Coliform	2900	NPS	2
Big Stone Lake	6/20/06	yes	Fecal Coliform	1900	NPS	1
Lake Poinsett	6/6/06	yes	Fecal Coliform	500	NPS	
Lake Poinsett	6/14/06	yes	Fecal Coliform	640	NPS	1
Lake Vermillion	8/14/06	yes	Fecal Coliform	2900	NPS	1
Mina Lake	8/7/06	yes	Fecal Coliform	1700	NPS	1
East Oakwood	5/22/07	yes	Fecal Coliform	25000	NPS	1
Pickerel Lake	7/23/07	yes	Fecal Coliform	2500	NPS	1
Lake Alvin	5/30/06	yes	Fecal Coliform	540	NPS	
Lake Alvin	6/18/07	yes	Fecal Coliform	800	NPS	1
Gavins Point West	5/29/07	yes	Fecal Coliform	1780	NPS	1
Eureka Lake	6/4/07	yes	Fecal Coliform	73000	NPS	1
Lake Hanson	5/21/07	yes	Fecal Coliform	1400	NPS	1
N. Shore-New, Ft. Thompson-COE	5/21/07	yes	Fecal Coliform	1400	NPS	1
Cold Brook	7/1/07	yes	Fecal Coliform	1650	NPS	1
Lake Thompson	8/13/07	yes	Fecal Coliform	2000	NPS	1

Fish Consumption Restrictions

During the years 2006 and 2007, the Surface Water Quality Program, in partnership with the South Dakota Department of Game, Fish and Parks sampled fish from a variety of sites. DENR has been collecting and actively studying fish flesh analysis data since 1994. The purpose of this work is to determine the concentration of various contaminants in fish from locations throughout the state.

In 2006 and 2007, fish were collected from a total of 24 different sites:

Waterbody	County	Years Sampled
Lake Thompson	Kingsbury	1994 & 2007
Enemy Swim Lake	Day	1996 & 2007
Spearfish Creek	Lawrence	1996 & 2007
Bear Butte Creek	Lawrence	1996 & 2007
Lake Oahe–Whitlock & Minneconjou Bay	Potter, Dewey & Stanley	2002 & 2007
North Island Lake	Minnehaha	2005 & 2006
Simon Dam	Potter	2005 & 2006
Beaver Lake	Minnehaha	2006
Staum Dam	Beadle	2006
Murdo Dam	Jones	2006
Hayes Lake	Stanley	2006
Missouri River – near Gavin's Point	Yankton	2006
Summit Lake	Grant	2006
Punished Woman Lake	Codington	2006
East Lemmon Lake	Perkins	2006
Belle Fourche Reservoir	Butte	2006
North Twin Lake	Minnehaha	2007
South Twin Lake	Minnehaha	2007
Horse Shoe Lake	Day	2007
Pudwell Lake	Corson	2007
Rose Hill Lake	Hand	2007
Bullhead Lake	Deuel	2007
North Fork Whetstone River	Grant	2007
Lake Alice	Deuel	2007

Most samples are composites of fillets 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. The parameters sampled are listed below.

PCB's	Pesticides		Metals
Aroclor 1016	DDT	DDD	Total Cadmium
Aroclor 1221	DDE	Aldrin	Total Selenium
Aroclor 1232	BHC alpha	Dieldrin	Total Mercury
Aroclor 1242	BHC-beta	Endosulfan I	
Aroclor 1248	BHC-delta	Endosulfan II	
Aroclor 1254	BHC-gamma	Endosulfan Sulfate	
Aroclor 1260	Heptachlor	Chlorodane	
Total PCB's	Heptachlor Epoxide	Toxaphene	
	Hexachlorobenzene	Endrin	
	Methoxychlor	Andrin Aldehyde	

The Food and Drug Administration (FDA) has set 1 ppm (part per million) total mercury as the action level for commercial fish. In South Dakota, the Department of Health is responsible for issuing fish consumption advisories. Please refer to Table 34 for specific fish consumption guidelines.

Table 34: Waterbodies Affected by Fish and Shellfish Consumption Restrictions

Name of Waterbody	Pollut-ant of Concern	Size Affected (acres)	Type of Fishing Restriction				Consumption Guidelines
			Non Consumption		Limited Consumption		
			General Popula-tion	Sub-Popula-tion	General Popula-tion	Sub-Popula-tion	
Bitter Lake	Mercury	3,228	-	-	1	1	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.
Lake Hurley	Mercury	106	-	-	1	1	
Lake Isabel	Mercury	113	-	-	1	1	
Roosevelt Lake	Mercury	93					
Twin Lakes W. Hwy 81, Kingsbury County	Mercury	303	-	-	1	1	
North Island Lake	Mercury	375	-	-	1	1	

Domestic Water Supply Restrictions

There are currently no consumption restrictions on waterbodies with the domestic water supply beneficial use. However, several waterbodies, including Angostura, Murdo Dam in Jones County, Lake Isabel in Dewey County, and the Big Sioux River near Watertown, are listed as impaired for that use. Although the above listed waterbodies are designated the domestic water supply beneficial use, none are currently used as a public water source. The following tables contain information on reach descriptions, pollutant causes, and pollutant sources.

Table 35: Waterbodies Affected by Domestic Water Supply Restrictions

Name of Waterbody	Waterbody Type	Type of Restriction			Cause(s) (Pollutant(s)) of Concern	Source(s) of Pollutant(s)
		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 ingestion).

Table 36: Summary of Waterbodies Not Fully Supporting Domestic Water Supply Use

Waterbodies (List)	Source(s) of Data (√)			Characterization	Major Causes
	Ambient	Finished	Use Restrictions		
River and Streams					
Big Sioux River – Lake Kampeska to Willow Creek	√	√	None	Not Supporting	Nitrates
Big Sioux River – Willow Creek to Stray Horse Creek	√	√	None	Not Supporting	Nitrates
Lakes and Reservoirs					
Angostura Reservoir	√	√	None	Not Supporting	Total Dissolved Solids, Sulfates
Murdo Dam	√			Not Supporting	Total Dissolved Solids
Lake Isabel	√		None	Not Supporting	pH

Table 37: Summary of Domestic Water Supply Use Assessments for Streams

Total Miles Designated for Domestic Water Supply Use 1,893[a]

Total Miles Assessed for Domestic Water Supply Use 1,885

Miles Fully Supporting Domestic Water Supply Use	1,853	% Fully Supporting Domestic Water Supply Use	98%	Major Causes
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	32	% Not Supporting Domestic Water Supply Use	2%	Nitrates
Total Miles Assessed for Domestic Water Supply Use	1,885			

[a]Includes the Missouri River (mainstem reservoirs and flowing river)

Table 38: Summary of Domestic Water Supply Use Assessment for Lakes

Total Waterbody Area designated for Domestic Water Supply Use 13,321 acres

Total Waterbody Area Assessed for Domestic Water Supply Use 13,291 acres

Acres Fully Supporting Domestic Water Supply Use	8,920	% Fully Supporting Domestic Water Supply Use	67%	Major Causes
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	4,371	% Not Supporting Domestic Water Supply Use	33%	Total Dissolved Solids; Sulfates; pH
Total Acres Assessed for Domestic Water Supply Use	13,291			

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, 2007, a total of 374 SWD permits have been issued in South Dakota.

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 limit to ensure the surface water quality standards are met and maintained.

The state continues to require whole effluent toxicity testing for all major SWD permittees 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 identify ways to eliminate the toxicity.

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://state.sd.us/denr/DFTA/WWFunding/CWSRF/CWSRFprogram.htm

Between October 1, 2005, and September 30, 2007, the department's Board of Water and Natural Resources awarded a total of 27 loans for a total amount of $73,487,042. These funds were used for the design and construction of collection systems, wastewater treatment facilities, storm sewers, and nonpoint source implementation Best Management Practices (BMPs).

The current interest rates are 2.50% for loans with a term of 10 years or less, 3.25% for loans with a term greater than 10 years up to 20 years, and 3.50% 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 select communities that are sponsoring a nonpoint source

implementation project. The loan rate for these projects ranges from 1.5% for up to 10 years and 2.25% for up to 20 years.

Administrative surcharges have been used to assist in the design of manure management systems for concentrated animal feeding operations (CAFOs) and provide water quality grants for construction of manure management systems for livestock auction markets. EPA issued revised regulations in December 2003 for CAFOs. DENR adopted the federal regulations and was the first state in the nation to get EPA approval of their regulations. To assist CAFO operators to achieve compliance with these new regulations, the department allocated $522,784 for the cost share of CAFO engineering designs. These funds assisted 59 producers with existing CAFOs complete engineering designs which enabled them to apply for U.S. Department of Agriculture's Environmental Quality Incentive Program grant funds for construction. In fiscal year 2005, $2.5 million was allocated for grants to assist in the construction of manure management systems at livestock auction markets, since this was not eligible for assistance from the USDA Environmental Quality Incentive Program (EQIP). The grants reimburse 75% of actual construction and construction engineering costs, with the maximum grant amount for any recipient being $162,500. From October 1, 2005, to September 30, 2007, $2,096,190 was awarded to 15 livestock auction markets.

To encourage responsible and proactive engineering planning, the department also uses CWSRF administrative surcharge funds to cost share engineering planning for small communities (2,500 population and below). Between October 1, 2005, and September 30, 2007, the department awarded a total of $173,360 for 27 engineering studies.

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 also developed a dedicated water funding program in 1993. The dedicated funding totals approximately $8 million annually. Between October 1, 2005, and September 30, 2007, $4.14 million in state grants was awarded to 17 wastewater collection or treatment projects.

COST/BENEFIT ASSESSMENT

DENR provides the Governor and the Legislature with annual reports summarizing water and wastewater development activities for the preceding calendar year. The 2006 and 2007 annual reports can be accessed at:

http://www.state.sd.us/denr/document.htm#Water%20and%20Waste%20Funding.

Information on operation and maintenance costs for local units of government is not readily available. The benefit data is also not readily available, but what is available has been included in the *STATEWIDE SURFACE WATER QUALITY SUMMARY* section of this report.

NONPOINT SOURCE POLLUTION CONTROL PROGRAM

South Dakota's nonpoint source (NPS) 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 39.

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://www.state.sd.us/denr/DFTA/WatershedProtection/wpprg.htm

South Dakota Nonpoint Source Management Program

The South Dakota Nonpoint Source Pollution (NPS) Management Program is housed in DENR Water Resources Assistance Program (WRAP). 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 December 2007. The NPS Management Plan:

- addresses the nine mandated elements required to access Section 319 incremental 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://www.state.sd.us/denr/DFTA/WatershedProtection/NPSMgmtPlan07.pdf

The water quality assessment and implementation strategy outlined in the management plan directly addresses the development and implementation of TMDLs. The department established a goal of developing 11 TMDLs and implementing five work plans each year to complete the NPS TMDLs for all of the state's impaired waters within 13 years of initial listing.

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 30 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 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://www.state.sd.us/denr/DFTA/WatershedProtection/npstf.htm

South Dakota Nonpoint Source Projects

Since the reauthorization of the Clean Water Act in 1987, the South Dakota NPS Pollution Management Program has used Section 319, 104(b)(3), 106, and 604(b), Pollution Prevention and state and local funding to support more than 210 NPS projects. During 2007, there were approximately 40 active NPS projects. The total includes 15 watershed assessment/total maximum daily load (TMDL) development, 18 watershed/TMDL implementation, three statewide BMP planning technical assistance, and four information and education (I & E) projects. The technical assistance projects provide watershed project and TMDL development project sponsors with technical assistance for planning and arranging funding for livestock feeding and grazing

management and other sediment and nutrient reduction BMP installation. The I & E projects include four projects focusing on development of manure management BMPs.

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://www.state.sd.us/denr/DFTA/WatershedProtection/NPS_ANNUAL_REPORTS.htm

Project implementation plans, reports of project progress/results, and final reports for completed projects are available on the EPA Grants Reporting and Tracking System (GRTS). 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 State Library web site or by visiting:

http://www.state.sd.us/denr/DFTA/WatershedProtection/tmdlpage.htm

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/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 three categories:

- assessment/development;
- information and education (I & E); or
- watershed implementation;

most include components of each category.

A portion of the Section 319 funds awarded to the state has also been used to assess major aquifers in the state, and promote and implement practices that prevent ground water contamination.

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.

The primary purposes of assessment/development projects are:

- identify beneficial use impairments or threats to specific waterbodies; and
- determine the extent to which the threats or impairments are from NPS pollution.

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 (I & E) 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. I & E projects usually range from one to five years in length. During recent years the NPS Program has:

- focused a portion of its I & E 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 and Aquarium for the implementation of the statewide, coordinated I & E effort 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 dependant 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 $3.2 million Section 319 funds annually from EPA. Administrative costs total about $600,000. The remaining $2.6 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, dedicated water development funding, 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 Ducks Unlimited and Izaac Walton League funding.

For many TMDL assessment and implementation projects, DENR attempts to fund about half of the 40% nonfederal share needed to match the Section 319 funds.

Other federal funding sources commonly used in completing NPS projects includes U.S. Bureau of Reclamation funds (or services); U.S. Department of Agriculture's Environmental Quality Incentive (EQIP), Wildlife Habitat Incentives, Wetlands Reserve, Grasslands Reserve and Conservation Reserve Programs; and EPA Pollution Prevention Program Grants. Local project partners are also encouraged to apply for EPA Region VIII Consolidated Funding Process and Information and Education Grant Program funds.

DENR is on schedule to complete the TMDL assessments for those waterbodies on the 1998, 2002, 2004, and 2006 303(d) lists. The department typically moves completed TMDLs to implementation within a year after completion.

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. A second phase is funded only if sufficient progress is made during the first 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.

Since the TMDL assessments in eastern South Dakota are showing high numbers of Animal Feeding Operations (AFOs) needing upgrades, DENR is now limiting Section 319 funding to AFOs, riparian areas, and some managed grazing systems. The department's project partners are urged to seek funding for other BMPs from EQIP and other state and federal programs referenced previously.

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 Clean Water Act Section 319 funds, contact DENR or access the GRTS database.

Table 39: 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	
	Urban Runoff
Construction Runoff	Surface runoff
<1 acre highway/road/bridge construction projects	Highway/road/bridge runoff
Land development	
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 tried. 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 23 depicts the status of TMDL assessment and implementation projects within South Dakota.

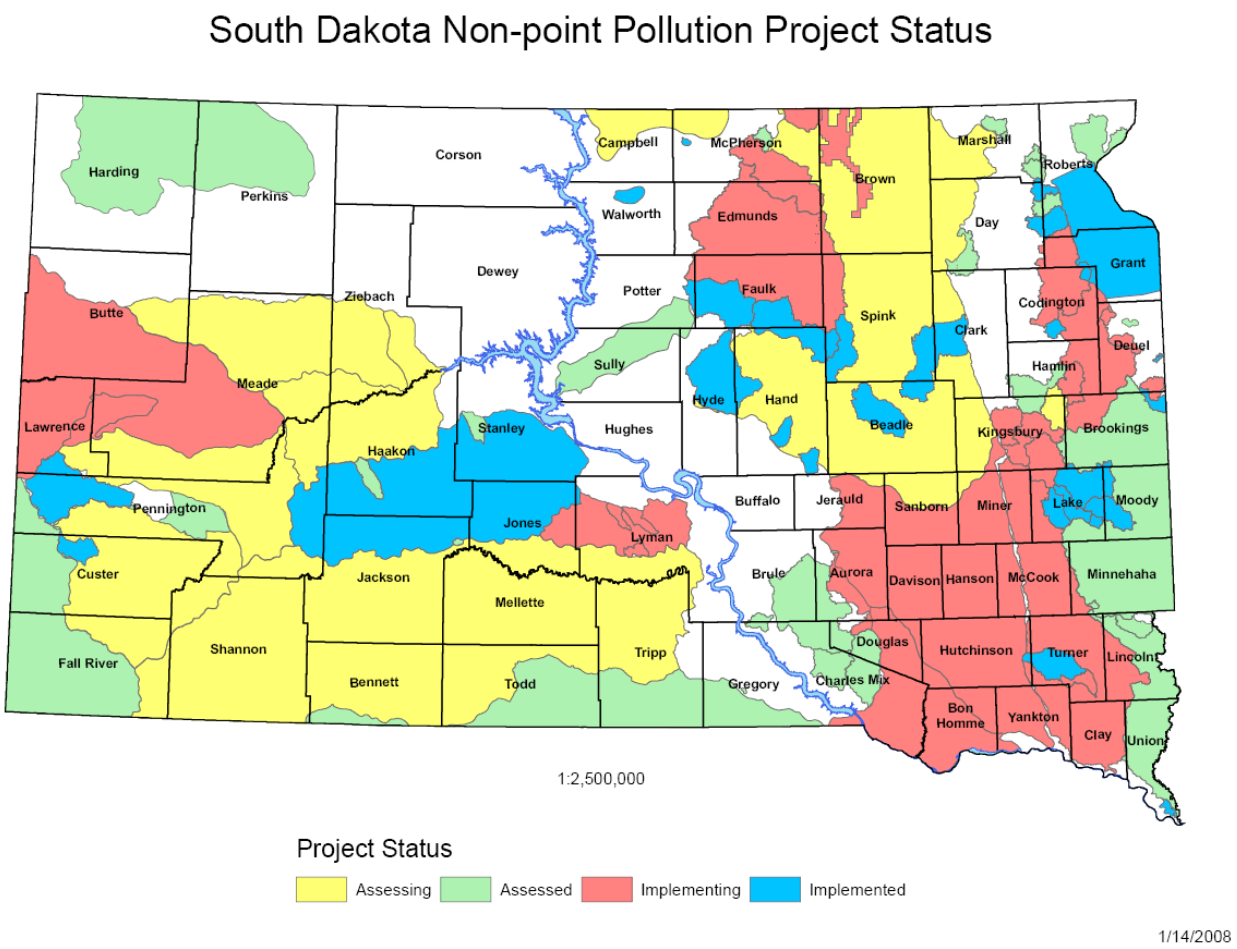


Figure 23: Status of TMDL Assessment and Implementation Projects

V. PUBLIC PARTICIPATION PROCESS

To fulfill the requirements of the federal Clean Water Act 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 approximately 11 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 70 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 11 daily newspapers. The draft report is also made available on DENR's web page at: http://www.state.sd.us/denr/DraftIR2008.pdf. At this time, the draft list 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 G.

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VII. KEY TO ABBREVIATIONS

AGNPS - agricultural nonpoint source computer model
ARSD - Administrative Rules of South Dakota
BMP - best management practice
COE - United States Army Corps of Engineers
CSO – Combined Sewer Overflow
CWA - Clean Water Act
CWSRF – Clean Water State Revolving Fund
DENR - Department of Environment and Natural Resources
DO - dissolved oxygen
EPA - Environmental Protection Agency
EQIP – Environmental Quality Incentive Program
GF&P - South Dakota Department of Game, Fish and Parks
GRTS – EPA Grants Reporting and Tracking System
I & E – information and education projects
IPCI - Index of Plant Community Integrity
LA – Lake Assessment
NPDES - National Pollutant Discharge Elimination System
NPS - nonpoint source
NRCS - Natural Resources Conservation Service (formerly SCS)
NWI - National Wetlands Inventory
QA - quality assurance
QC - quality control
SAR – Sodium adsorption ratio
SDCL – South Dakota Codified Law
SDSWQS - South Dakota Surface Water Quality Standards
SSO – Sanitary sewer overflow
STORET - EPA computer data storage and retrieval system
SWD - Surface Water Discharge
SWLA - Statewide Lakes Assessment
TDS - total dissolved solids
TMDL - Total Maximum Daily Load
TSI - Carlson's (1977) Trophic State Indices
TSS - total suspended solids
USDA - United States Department of Agriculture
USGS - United States Geological Survey
WQM - ambient water quality monitoring
WQS - water quality standards
WQX – EPA's Water Quality Exchange database
WRAP – Water Resources Assistance Program
USFWS – United States Fish and Wildlife Service

APPENDICES

APPENDIX A

WATERBODIES WITH EPA APPROVED TMDLS

River Basin	Waterbody	Segment or Lake Location	Impairment	TMDL Approved
Bad	Freeman Lake	Jackson County	Nitrates/Selenium	2/7/01
Bad	Hayes Lake	Stanley County	TSI	9/29/04
Bad	Bad River	Stanley County line to mouth	TSS	2/7/01
Belle Fourche	Bear Butte Creek	Strawberry Creek to near Bear Den Mountain	TSS	8/807
Belle Fourche	Belle Fourche River	Wyoming to near Fruitdale	TSS	2/5/05
Belle Fourche	Belle Fourche River	Near Fruitdale to Whitewood Creek	TSS	2/5/05
Belle Fourche	Belle Fourche River	Whitewood Creek to Willow Creek	TSS	2/5/05
Belle Fourche	Belle Fourche River	Willow Creek to Alkali Creek	TSS	2/5/05
Belle Fourche	Belle Fourche River	Alkali Creek to mouth	TSS	2/5/05
Belle Fourche	Horse Creek	Indian Creek to mouth	TSS	2/5/05
Big Sioux	Lake Alvin	Lincoln County	TSI/Fecal	11/9/01
Big Sioux	Blue Dog Lake	Day County	TSI/Fecal	2/7/01
Big Sioux	Brant Lake	Lake County	TSI	4/12/99
Big Sioux	Clear Lake	Deuel County	TSI	2/7/01
Big Sioux	Lake Herman	Lake County	TSI	9/29/04
Big Sioux	Lake Madison	Lake County	TSI/fish Kill	4/12/99
Big Sioux	Lake Kampeska	Codington County	nutrients-special approval	12/26/96
Big Sioux	Pelican Lake	Codington County	nutrients-special approval	12/26/96
Big Sioux	Lake Poinsett	Hamlin County	nutrients-special approval	11/26/96
Cheyenne	Center Lake	Custer County	TSI	8/8/07
Cheyenne	Sheridan Lake	Pennington County	TSI	8/30/06
Cheyenne	Sylvan Lake	Custer County	TSI	9/1/05
James	Cottonwood Lake	Spink County	TSI/pH	11/9/01
James	Cresbard Lake	Faulk County	TSI	12/3/03
James	Elm Lake	Brown County	TSI	4/12/99
James	Lake Faulkton	Faulk County	TSI/Sediment	4/12/99
James	Lake Hanson	Hanson County	TSI/Sediment	6/3/04
James	Jones Lake	Hand County	TSI	4/2/03
James	Lake Louise	Hand County	TSI/Fecal	11/9/01
James	Loyalton Dam	Edmunds County	TSI	4/2/03
James	Mina Lake	Edmunds County	TSI	4/2/03
James	Moccasin Creek	Aberdeen to Warner	Ammonia	3/19/01
James	Ravine Lake	Beadle County	TSI/Fecal	4/12/99
James	Redfield Lake	Spink County	TSI	4/12/99
James	Richmond Lake	Brown County	TSI	8/8/07
James	Rose Hill Lake	Hand County	TSI	4/2/03
James	Lake Byron	Beadle County	nutrients-special approval	4/12/99
James	Lake Mitchell	Davison County	nutrients-special approval	4/22/97
James	Firesteel Creek	West Fork Firesteel to mouth	nutrients-special approval	4/22/97
Minnesota	Lake Alice	Deuel County	TSI	6/3/04
Minnesota	Fish Lake	Deuel County	TSI	9/29/04
Minnesota	Lake Hendricks	Brookings County	TSI	4/12/99
Minnesota	Lake Oliver	Deuel County	TSI	11/9/01
Minnesota	Punished Woman Lake	Codington County	TSI	2/7/01
Minnesota	Big Stone Lake	Roberts County	nutrients-special approval	12/26/96
Missouri	Brakke Dam	Lyman County	TSI	9/29/04
Missouri	Burke Lake	Gregory County	DO/pH/TSI	8/8/07
Missouri	Byre Lake	Lyman County	TSI	6/3/04

River Basin	Waterbody	Segment or Lake Location	Impairment	TMDL Approved
Missouri	Corsica Lake	Douglas County	TSI	8/30/06
Missouri	Dante Lake	Charles Mix County	TSI/DO	9/27/06
Missouri	Fate Dam	Lyman County	TSI	1/14/05
Missouri	Hiddenwood Lake	Walworth County	TSI/Sediment	4/12/99
Missouri	McCook Lake	Union County	TSI	4/12/99
Missouri	Medicine Creek	US Hwy 83 to mouth	Fecal/TSS	8/30/06
Minnesota	White Lake	Marshall County	DO/TSI	8/20/06
Vermillion	Swan Lake	Turner County	TSI	4/12/99

APPENDIX B

SD DENR 2008 WATERBODY DELISTING REPORT

BASIN	WATERBODY/AU ID	LOCATION/2008 Category	CAUSE	DELISTING REASON
Bad River	Bad River SD-BA-R-BAD_01	Stanley County line to mouth 5	Specific Conductance Total Suspended Solids (TSS)	State Determines water quality standard is being met Applicable WQS attained: original basis for listing was incorrect; TMDL approved or established by EPA (4A)
Belle Fourche River	Bear Butte Creek SD-BF-R-BEAR_BUTTE_02	Strawberry Creek to mouth 5	Total Suspended Solids (TSS)	State Determines water quality standard is being met; TMDL approved or established by EPA (4A)
	Belle Fourche River SD-BF-R-BELLE_FOURCHE_01	Near Fruitdale to Whitewood Creek 1	Total Suspended Solids (TSS)	State Determines water quality standard is being met; TMDL approved or established by EPA (4A)
	Belle Fourche River SD-BF-R-BELLE_FOURCHE_03	Whitewood Creek to Willow Creek 1	Total Suspended Solids (TSS)	State Determines water quality standard is being met; TMDL approved or established by EPA (4A)
	Belle Fourche River SD-BF-R-BELLE_FOURCHE_04	Willow Creek to Alkali Creek 1	Total Suspended Solids (TSS)	State Determines water quality standard is being met; TMDL approved or established by EPA (4A)
	Belle Fourche River SD-BF-R-BELLE_FOURCHE_05	Alkali Creek to mouth 1	Total Suspended Solids (TSS)	State Determines water quality standard is being met; TMDL approved or established by EPA (4A)
	Horse Creek SD_BF-R-HORSE_01_USGS	Indian Creek to mouth 5	Total Suspended Solids (TSS)	Applicable WQS attained: original basis for listing was incorrect; TMDL approved or established by EPA (4A)
	Strawberry Creek SD-BF-R-STRAWBERRY_01	Headwaters to mouth 5	Specific Conductance Total Dissolved Solids (TDS)	State Determines water quality standard is being met State Determines water quality standard is being met
	Whitewood Creek SD-BF-R-WHITEWOOD_04	Spruce Gulch to Sandy Creek 2	Fecal Coliform	Applicable WQS attained: original basis for listing was Incorrect
Big Sioux River	Bullhead Lake SD-BS-L-BULLHEAD_02	Marshall County 3	Trophic State Index pH	Original basis for listing was incorrect Original basis for listing was incorrect
	Clear Lake SD-BS-L-CLEAR_D_01	Deuel County 2	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Lake Kampeska SD-BS-L-KAMPESKA_01	Codington County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Minnewasta Lake SD-BS-L-MINNEWASTE_01	Day County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Nine Mile Lake SD-BS-L-NINE_MILE_01	Marshall County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Lake Poinsett SD-BS-L-POINSETT_01	Hamlin County 1	Sedimentation/Siltation Trophic State Index	State Determines water quality standard is being met State Determines water quality standard is being met
	South Buffalo Lake SD-BS-L-SOUTH_BUFFALO_01	Marshall County 1	Trophic State Index pH	Applicable WQS attained; according to new assessment method Applicable WQS attained; original basis for listing was incorrect

BASIN	WATERBODY/AU ID	LOCATION/2008 Category	CAUSE	DELISTING REASON
Big Sioux	South Red Iron Lake SD-BS-L-S_RED_IRON_01	Marshall County 5	pH	Applicable WQS attained; original basis for listing was incorrect
	Split Rock Creek SD-BS-R-SPLIT_ROCK_01_USGS	At Corson, SD 5	Total Suspended Solids (TSS)	State Determines water quality standard is being met
Cheyenne River	Horsethief Lake SD-CH-L-HORSETHIEF_01	Pennington County 5	Oxygen, Dissolved	Applicable WQS attained; according to new assessment method
			Trophic State Index	Applicable WQS attained; according to new assessment method
	Lakota Lake SD-CH-L-LAKOTA_01	Custer County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Legion Lake SD-CH-L-LEGION_01	Custer County 5	Trophic State Index	Applicable WQS attained; according to new assessment
	Sheridan Lake SD-CH-L-SHERIDAN_01	Pennington County 5	Trophic State Index	TMDL approved or established by EPA (4A)
	Beaver Creek SD-CH-R-BEAVER_01	WY border to mouth 5	Temperature Total Suspended Solids (TSS)	State Determines water quality standard is being met State Determines water quality standard is being met
	Beaver Creek SD-CH-R-BEAVER_02_USGS	Near Wind Cave Natl Park 2	pH Temperature	State Determines water quality standard is being met State Determines water quality standard is being met
	Box Elder Creek SD-CH-R-BOX_ELDER_02	Headwaters to near Bogus Jim Creek 1	Temperature	State Determines water quality standard is being met
	Cherry Creek SD-CH-R-CHERRY_01	Headwaters to mouth 1	Specific Conductance	State Determines water quality standard is being met
	Cheyenne River SD-CH-R-CHEYENNE_02	Beaver Creek to Angostura Reservoir 5	Sodium Total Suspended Solids (TSS)	Other State Determines water quality standard is being met
	Grizzly Bear Creek SD-CH-R-GRIZZLY_BEAR_01_USGS	Near Keystone, SD 5	Temperature	State Determines water quality standard is being met
	Horsehead Creek SD-CH-R-HORSEHEAD_01_USGS	At Oelrichs 5	Specific Conductance	State Determines water quality standard is being met
Grand River	Shadehill Reservoir SD-GR-L-SHADEHILL_01	Perkins County 5	Chloride	Flaws in original listing
	Grand River, North Fork SD-GR-R-GRAND_N_FORK_01	North Dakota border to Shadehill 5	Total Dissolved Solids	State Determines water quality standard is being met
James River	Amsden Dam SD-JA-L-AMSDEN_01	Day County 1	Trophic State Index	Applicable WQS attained; according to new assessment method

BASIN	WATERBODY/AU ID	LOCATION/2008 Category	CAUSE	DELISTING REASON
James River	Elm Lake SD-JA-L-ELM_01	Brown County 2	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Lake Faulkton SD-JA-L-FAULKTON_01	Faulk County 5	Sedimentation/Siltation	TMDL approved or established by EPA (4A)
	Lake Louise SD-JA-L-LOUISE_01	Hand County 5	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Lake Mitchell SD-JA-L-MITCHELL_01	Davison County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Ravine Lake SD-JA-L-RAVINE_01	Beadle County 4A	Fecal Coliform	TMDL approved or established by EPA (4A)
	Lake Redfield SD-JA-L-REDFIELD_01	Spink County 2	Sedimentation/Siltation Trophic State Index	Applicable WQS attained; due to restoration Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Richmond Lake SD-JA-L-RICHMOND_01	Brown County 4A	Trophic State Index	TMDL approved or established by EPA (4A)
	Moccasin Creek SD-JA-R-MOCCASIN_01	Headwaters to Aberdeen 5	Oxygen, Dissolved	State Determines water quality standard is being met
	Mud Creek SD-JA-R-MUD_01	SD HWY 73 to mouth 1	Oxygen, Dissolved	State Determines water quality standard is being met
	Snake Creek SD-JA-R-SNAKE_01	Headwaters to mouth 1	Oxygen, Dissolved	State Determines water quality standard is being met
	Turtle Creek SD-JA-R-TURTLE_01	Hand County line to mouth 5	Ammonia (Total)	State Determines water quality standard is being met
Little Missouri River	Little Missouri River SD-LM-R-LITTLE_MISSOURI_01	Montana border to North Dakota border 1	Salinity	Applicable WQS attained: original basis for listing was Incorrect
Missouri River	Fate Dam SD-MI-L-FATE_01	Lyman County 1	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Lake Hiddenwood SD-MI-L-HIDDENWOOD_01	Walworth County 1	Sedimentation/Siltation	Applicable WQS attained; due to restoration
			Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)

BASIN	WATERBODY/AU ID	LOCATION/2008 Category	CAUSE	DELISTING REASON
Missouri River	McCook Lake SD-MI-L-MCCOOK_01	Union County 1	Sedimentation/Siltation Total Suspended Solids (TSS) Trophic State Index Turbidity	Applicable WQS attained; due to restoration Applicable WQS attained; according to new assessment method Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A) Applicable WQS attained; due to restoration
	Medicine Creek SD-MI-R-MEDICINE_01	US HWY 83 to mouth 1	Fecal Coliform Specific Conductance Total Dissolved Solids Total Suspended Solids (TSS)	State Determines water quality standard is being met State Determines water quality standard is being met State Determines water quality standard is being met State Determines water quality standard is being met
Minnesota River	Fish Lake SD-MN-L-FISH_01	Deuel County 1	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Lake Oliver SD-MN-L-OLIVER_01	Deuel County 1	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
	Punished Woman Lake SD-MN-L-PUNISHED_WOMAN_01	Codington County 2	Trophic State Index	Applicable WQS attained; according to new assessment method; TMDL approved or established by EPA (4A)
Moreau River	South Fork Moreau River SD-MU-R-MOREAU_S_FORK_01	Alkali Creek to mouth 5	Total Dissolved Solids	State Determines water quality standard is being met
Red River	White Lake SD-RD-L-WHITE_01	Marshall County 4A	Trophic State Index	TMDL approved or established by EPA (4A)
Vermillion River	Lake Thompson SD-VM-L-THOMPSON_01	Kingsbury County 1	Trophic State Index	Applicable WQS attained; according to new assessment method
	Vermillion River SD-VM-R-VERMILLION_02	Turkey Ridge Creek to Baptist Creek 1	Total Suspended Solids (TSS)	State Determines water quality standard is being met
	Vermillion River SD-VM-R-VERMILLION_03	Baptist Creek to mouth 5	Fecal Coliform	State Determines water quality standard is being met
	East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_01	McCook/Lake County line to Little 1 Vermillion River	Total Suspended Solids (TSS)	State Determines water quality standard is being met
White River	Cottonwood Creek SD-WH-R-COTTONWOOD_01	Headwaters to White River 1	Specific Conductance Total Dissolved Solids	State Determines water quality standard is being met State Determines water quality standard is being met

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
Specific Conductance	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											
Alkalinity	X	X	X	X	X	X	X	X	X	X	X
Hardness	X	X	X	X	X	X	X	X	X	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
Dissolved Phosphorus	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	*	*	*	*	*		*	X	*	*	*
Total Fecal Coliform	M/S	M/S	M/S	M/S	M/S	M/S	M/S	M/A	M/S	M/S	M/S
Total Calcium	M/A	M/A		M/A		M/A	X		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
Total Cyanide					X	X					
WAD Cyanide					X	X					
Total and Dissolved Arsenic					X	X				X	X
Total and Dissolved Cadmium					X	X					
Total and Dissolved Chromium					X	X					
Total and Dissolved Copper					X	X					
Total and Dissolved Lead					X	X					
Total and Dissolved Mercury					X	X					
Total and Dissolved Nickel					X	X					
Total and Dissolved Selenium					X	X					
Total and Dissolved Silver					X	X					
Total and Dissolved Zinc					X	X					
Total and Dissolved Barium										X	X
Total and Dissolved Molybdenum										X	X
Total and Dissolved Uranium										X	X
Radium 226										X	X
Radium 228										X	X

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

*Perform analysis May through September at these sites: WQM-1, WQM-3, WQM-5, WQM-6 WQM-67, WQM-71, WQM-79, WQM-90, WQM-112, WQM-116, WQM-117, WQM-123, WQM-BS29 WQM-8, WQM-10, WQM-11, WQM-12, WQM-14, WQM-16, WQM-17, WQM-19, WQM-24 WQM-25, WQM-29, WQM-32, WQM-33, WQM-34, WQM-35, WQM-40, WQM-65, WQM-66

Waterbody	Station	STORET ID	County	Sampling Frequency	Analysis Group	Region
Annie Creek	WQM -MN31	46MN31	LAWRENCE	Quarterly@	Group 5	Black Hills
Bad River	WQM -29	460850	STANLEY	Quarterly*	Group 4	Central
Battle Creek	WQM -17	460905	PENNINGTON	Monthly	Group 3	Black Hills
Battle Creek	WQM -103	460103	PENNINGTON	Seasonal**	Group 3	Black Hills
Bear Butte Creek	WQM -125	460125	LAWRENCE	Monthly	Group 5	Black Hills
Bear Butte Creek	WQM -126	460126	LAWRENCE	Monthly	Group 5	Black Hills
Beaver Creek	WQM -128	460128	FALL RIVER	Quarterly*	Group 11	Black Hills
Belle Fourche River	WQM -21	460880	MEADE	Quarterly*	Group 2	Central
Belle Fourche River	WQM -76	460676	MEADE	Monthly	Group 2	Central
Belle Fourche River	WQM -81	460681	BUTTE	Quarterly*	Group 6	Central
Belle Fourche River	WQM -83	460683	BUTTE	Quarterly*	Group 6	Central
Belle Fourche River	WQM -130	460130	BUTTE	Monthly	Group 7	Central
Big Sioux River	WQM -1	460740	CODINGTON	Monthly	Group 1	Northeast
Big Sioux River	WQM -2	460702	BROOKINGS	Monthly	Group 1	Southeast
Big Sioux River	WQM -3	460703	MINNEHAHA	Monthly	Group 1	Southeast
Big Sioux River	WQM -31	460831	MINNEHAHA	Monthly	Group 2	Southeast
Big Sioux River	WQM -32	460832	UNION	Monthly	Group 3	Southeast
Big Sioux River	WQM -55	460655	CODINGTON	Monthly	Group 2	Northeast
Big Sioux River	WQM -62	460662	BROOKINGS	Monthly	Group 1	Southeast
Big Sioux River	WQM -64	460664	MINNEHAHA	Monthly	Group 4	Southeast
Big Sioux River	WQM -65	460665	LINCOLN	Monthly	Group 2	Southeast
Big Sioux River	WQM -66	460666	LINCOLN	Monthly	Group 2	Southeast
Big Sioux River	WQM -67	460667	UNION	Monthly	Group 2	Southeast
Big Sioux River	WQM -117	460117	MINNEHAHA	Monthly	Group 4	Southeast
Big Sioux River	WQM -BSA1	46BSA1	GRANT	Monthly	Group 1	Northeast
Big Sioux River	WQM -BS08	46BS08	HAMLIN	Monthly	Group 1	Northeast
Big Sioux River	WQM -BS18	46BS18	MOODY	Monthly	Group 1	Southeast
Big Sioux River	WQM -BS23	46BS23	MINNEHAHA	Monthly	Group 1	Southeast
Big Sioux River	WQM -BS29	46BS29	MINNEHAHA	Monthly	Group 4	Southeast
Box Elder Creek	WQM -30	460925	LAWRENCE	Monthly	Group 3	Black Hills
Box Elder Creek	WQM -79	460679	PENNINGTON	Quarterly@	Group 2	Black Hills
Bull Creek	WQM -161	460161	Harding	Quarterly*	Group 10	Central
Castle Creek	WQM -46	460646	PENNINGTON	Monthly	Group 3	Black Hills
Cherry Creek	WQM -131	460131	MEADE	Quarterly*	Group 2	Central
Cheyenne River	WQM -14	460875	FALL RIVER	Monthly	Group 11	Black Hills
Cheyenne River	WQM -15	460865	PENNINGTON	Monthly	Group 2	Central
Cheyenne River	WQM -16	468860	ZIEBACH	Monthly	Group 2	Central
Cheyenne River	WQM -132	460132	CUSTER	Monthly	Group 2	Black Hills
Cheyenne River	WQM -133	460133	HAAKON	Monthly	Group 2	Central
Cheyenne River	WQM -163	460163	Fall River	Quarterly*	Group 11	Black Hills
Cheyenne River	WQM -164	460164	Fall River	Quarterly*	Group 11	Black Hills
Cheyenne River	WQM -156	460156	FALL RIVER	Monthly	Group 11	Black Hills
Choteau Creek	WQM -134	460134	BON HOMME	Quarterly*	Group 2	Southeast
Cleopatra Creek	WQM -MN39	46MN39	LAWRENCE	Quarterly@	Group 5	Black Hills
Cottonwood Creek	WQM -153	460153	MELLETTE	Monthly	Group 2	Central
Crooked Creek	WQM -160	460160	Harding	Quarterly*	Group 10	Central
Crow Creek	WQM -135	460135	BUFFALO	Quarterly*	Group 2	Central
Deadwood Creek	WQM -127	460127	LAWRENCE	Monthly	Group 5	Black Hills
Elm River	WQM -136	460136	BROWN	Monthly	Group 2	Northeast
Fall River	WQM -57	460657	FALL RIVER	Quarterly*	Group 1	Black Hills
False Bottom Creek	WQM -MN38	46MN38	LAWRENCE	Quarterly@	Group 5	Black Hills
Fantail Creek	WQM -119	460119	LAWRENCE	Quarterly*	Group 5	Black Hills
Firesteel Creek	WQM -137	460137	DAVISON	Quarterly*	Group 2	Southeast
Flynn Creek	WQM -111	460111	CUSTER	Quarterly*	Group 3	Black Hills
French Creek	WQM -51	460651	CUSTER	Quarterly*	Group 3	Black Hills
French Creek	WQM -53	460653	CUSTER	Quarterly*	Group 3	Black Hills
French Creek	WQM -102	460102	CUSTER	Monthly	Group 2	Black Hills
Grace Coolidge Creek	WQM -50	460650	CUSTER	Quarterly*	Group 3	Black Hills
Grand River	WQM -25	460945	CORSON	Monthly	Group 2	Central
Grand River	WQM -40	460640	PERKINS	Quarterly*	Group 10	Central
Grand River	WQM -138	460138	CORSON	Quarterly*	Group 2	Central
Grand River, N Fork	WQM -77	460677	PERKINS	Quarterly*	Group 2	Central
Grand River, S Fork	WQM -78	460678	PERKINS	Quarterly*	Group 2	Central

Waterbody	Station	STORET ID	County	Sampling Frequency	Analysis Group	Region
Grand River, S Fork	WQM -139	460139	HARDING	Quarterly*	Group 2	Central
Grand River, S Fork	WQM -162	460162	Perkins	Quarterly*	Group 10	Central
James River	WQM -6	460805	BROWN	Monthly	Group 2	Northeast
James River	WQM -7	460707	HANSON	Quarterly*	Group 2	Southeast
James River	WQM -8	460761	YANKTON	Monthly	Group 2	Southeast
James River	WQM -33	460733	BROWN	Monthly	Group 2	Northeast
James River	WQM -34	460734	BROWN	Quarterly*	Group 2	Northeast
James River	WQM -35	460735	BEADLE	Quarterly*	Group 9	Southeast
James River	WQM -36	460736	BEADLE	Quarterly*	Group 9	Southeast
James River	WQM -37	460737	DAVISON	Quarterly*	Group 2	Southeast
James River	WQM -112	460112	BROWN	Monthly	Group 2	Northeast
James River	WQM -113	460113	BROWN	Monthly	Group 2	Northeast
James River	WQM -140	460140	SPINK	Monthly	Group 2	Northeast
Keya Paha River	WQM -10	460815	TRIPP	Quarterly*	Group 1	Central
Lac Qui Parle River, W Branch	WQM -45	460645	DEUEL	Biennial***	Group 3	Northeast
Little Minnesota River	WQM -27	460710	ROBERTS	Quarterly*	Group 3	Northeast
Little Missouri River	WQM -26	460955	HARDING	Quarterly*	Group 2	Central
Little White River	WQM -13	460840	MELLETTE	Monthly	Group 2	Central
Medicine Creek	WQM -141	460141	LYMAN	Monthly	Group 2	Central
Medicine Knoll Creek	WQM -142	460142	HUGHES	Quarterly*	Group 2	Central
Missouri River	WQM -71	460671	HUGHES	Quarterly*	Group 2	Central
Missouri River	WQM -72	460672	LYMAN	Quarterly*	Group 2	Central
Missouri River	WQM -73	460673	CHARLES MIX	Quarterly*	Group 2	Southeast
Missouri River	WQM -74	460674	YANKTON	Quarterly*	Group 2	Southeast
Moccasin Creek	WQM -94	460694	BROWN	Monthly	Group 3	Northeast
Moccasin Creek	WQM -95	460695	BROWN	Monthly	Group 3	Northeast
Moreau River	WQM -24	460935	DEWEY	Monthly	Group 2	Central
Moreau River	WQM -39	460039	PERKINS	Quarterly*	Group 10	Central
Moreau River	WQM -143	460143	ZIEBACH	Quarterly*	Group 2	Central
Moreau River, S Fork	WQM -144	460144	PERKINS	Quarterly*	Group 2	Central
Mud Creek	WQM -145	460145	BROWN	Quarterly*	Group 2	Northeast
Ponca Creek	WQM -70	460670	GREGORY	Quarterly*	Group 1	Central
Rapid Creek	WQM -19	460910	PENNINGTON	Monthly	Group 2	Black Hills
Rapid Creek	WQM -47	460647	PENNINGTON	Monthly	Group 1	Black Hills
Rapid Creek	WQM -69	460669	PENNINGTON	Monthly	Group 1	Black Hills
Rapid Creek	WQM -92	460692	PENNINGTON	Monthly	Group 2	Black Hills
Rapid Creek	WQM -110	460110	PENNINGTON	Monthly	Group 3	Black Hills
Redwater River	WQM -23	460895	BUTTE	Monthly	Group 2	Central
Skunk Creek	WQM -121	460121	MINNEHAHA	Quarterly*	Group 4	Southeast
Snake Creek	WQM -146	460146	SPINK	Quarterly*	Group 2	Northeast
Spearfish Creek	WQM -22	460900	LAWRENCE	Monthly	Group 3	Black Hills
Spearfish Creek	WQM -89	460689	LAWRENCE	Monthly	Group 3	Black Hills
Spearfish Creek	WQM -MN32	46MN32	LAWRENCE	Quarterly@	Group 5	Black Hills
Spearfish Creek	WQM -MN33	46MN33	LAWRENCE	Quarterly@	Group 5	Black Hills
Spearfish Creek	WQM -MN34	46MN34	LAWRENCE	Quarterly@	Group 5	Black Hills
Spearfish Creek	WQM -MN35	46MN35	LAWRENCE	Quarterly@	Group 5	Black Hills
Spring Creek	WQM -49	460649	PENNINGTON	Quarterly*	Group 3	Black Hills
Spring Creek	WQM -54	460654	PENNINGTON	Monthly	Group 3	Black Hills
Spring Creek	WQM -155	460155	CAMPBELL	Monthly	Group 2	Central
Stewart Gulch	WQM -120A	460124	LAWRENCE	Quarterly*	Group 5	Black Hills
Strawberry Creek	WQM -116	460116	LAWRENCE	Monthly	Group 5	Black Hills
Thunder Butte Creek	WQM -147	460147	PERKINS	Quarterly*	Group 2	Central
Turtle Creek	WQM -148	460148	SPINK	Quarterly*	Group 2	Northeast
Vermillion River	WQM -4	460755	CLAY	Monthly	Group 2	Southeast
Vermillion River	WQM -5	460745	CLAY	Monthly	Group 2	Southeast
Vermillion River	WQM -61	460661	TURNER	Monthly	Group 2	Southeast
Vermillion River, E Fork	WQM -150	460150	MCCOOK	Quarterly*	Group 2	Southeast
Vermillion River, E Fork	WQM -154	460154	MCCOOK	Quarterly*	Group 2	Southeast
West Strawberry Creek	WQM -75	460675	LAWRENCE	Quarterly*	Group 3	Black Hills
Whetstone River	WQM -28	460700	GRANT	Quarterly*	Group 3	Northeast
Whetstone River, S Fork	WQM -90	460690	GRANT	Quarterly*	Group 3	Northeast
Whetstone River, S Fork	WQM -91	460691	GRANT	Quarterly*	Group 3	Northeast
White River	WQM -11	460835	JACKSON	Monthly	Group 2	Central
White River	WQM -12	460825	LYMAN	Monthly	Group 2	Central

Waterbody	Station	STORET ID	County	Sampling Frequency	Analysis Group	Region
White River	WQM -42	460842	SHANNON	Quarterly*	Group 10	Black Hills
White River	WQM -152	460152	MELLETTE	Monthly	Group 2	Central
Whitetail Creek	WQM -118	460118	LAWRENCE	Monthly	Group 5	Black Hills
Whitewood Creek	WQM -52	460652	LAWRENCE	Monthly	Group 3	Black Hills
Whitewood Creek	WQM -82	460682	BUTTE	Monthly	Group 5	Central
Whitewood Creek	WQM -84	460684	LAWRENCE	Monthly	Group 5	Black Hills
Whitewood Creek	WQM -85	460685	LAWRENCE	Quarterly*	Group 5	Black Hills
Whitewood Creek	WQM -86	460686	LAWRENCE	Quarterly*	Group 5	Black Hills
Whitewood Creek	WQM -122	460122	LAWRENCE	Monthly	Group 5	Black Hills
Whitewood Creek	WQM -123	460123	LAWRENCE	Monthly	Group 5	Black Hills
Wolf Creek	WQM -151	460151	SPINK	Quarterly*	Group 2	Northeast
Wolf Creek above Wolf Creek Colony	WQM -157	460157	HUTCHINSON	Monthly	Group 8	Southeast
Wolf Creek below Wolf Creek Colony	WQM -158	460158	HUTCHINSON	Monthly	Group 8	Southeast
Yellow Bank River, N Fork	WQM -88	460688	GRANT	Biennial***	Group 3	Northeast
Yellow Bank River, S Fork	WQM -87	460687	GRANT	Biennial***	Group 3	Northeast

Number of Monthly Stations:	71
Number of Quarterly* Stations:	59
Number of Quarterly@ Stations:	8
Number of Seasonal** Stations	1
Number of Biennial*** Stations:	3
Total Number of WQM Stations:	142

** = Quarterly WQM sites sampled in January, April, July, and October.*

@ = Quarterly WQM sites sampled in February, May, August, and November.

*** = Seasonal WQM Sites sampled in May, June, July, and August.*

**** = Biennial WQM sites sampled in April and October.*

Lakes Sampling Schedule for 2004 – 2008

Waterbody	Basin	County	Lake ID	Rotation Year
Albert	Big Sioux	Kingsbury	4202	1
Alvin	Big Sioux	Lincoln	4401	1
Amsden	James	Day	2201	1
Buffalo North	Big Sioux	Marshall	4803	1
Campbell	Big Sioux	Brookings	9606	1
Center	Cheyenne	Custer	2105	1
Cochrane	Minnesota	Deuel	2305	1
Corsica	Missouri	Douglas	2502	1
Cottonwood	Missouri	Sully	5901	1
Dante	Missouri	Charles Mix	1703	1
Deerfield	Cheyenne	Pennington	9207	1
East Oakwood	Big Sioux	Brookings	9613	1
Faulkton	James	Faulk	2802	1
Freeman	Bad	Jackson	3907	1
Geddes	Missouri	Charles Mix	1705	1
Jones	James	Hand	3304	1
Mina Parmley	James	Edmunds	2606	1
New Wall No. 1	Cheyenne	Pennington	9243	1
Newell	Belle Fourche	Butte	1501	1
North Waubay	Big Sioux	Day	2226	1

Year 1	28 Lakes
Year 2	27 Lakes
Year 3	31 Lakes
Year 4	29 Lakes
Total	115 Lakes

Waterbody	Basin	County	Lake ID	Rotation Year
Oliver	Minnesota	Deuel	2315	1
Punished Woman	Minnesota	Codington	9518	1
Richmond	James	Brown	9309	1
Shadehill	Grand	Perkins	5315	1
Silver	Vermillion	Hutchinson	3703	1
Wall	Big Sioux	Minnehaha	9118	1
Wilmarth	James	Aurora	1015	1
Yankton	Missouri	Yankton	9704	1
Alice	Minnesota	Deuel	2301	2
Angostura	Cheyenne	Fall River	2701	2
Buffalo South	Big Sioux	Marshall	4804	2
Bullhead	Big Sioux	Deuel	2303	2
Campbell	Missouri	Campbell	1601	2
Coldbrook	Cheyenne	Fall River	2705	2
Cottonwood	Big Sioux	Marshall	4808	2
Cresbard	James	Faulk	2801	2
Fish	Minnesota	Deuel	2310	2
Iron Creek	Belle Fourche	Lawrence	9903	2
John St. John	Big Sioux	Hamlin	3211	2
Legion	Cheyenne	Custer	2107	2
Madison	Big Sioux	Lake	4309	2
McCook	Missouri	Union	6202	2
Murdo	Bad	Jones	4102	2
Newell City Pond	Belle Fourche	Butte	1502	2
Orman	Belle Fourche	Butte	1503	2
Pickerel	Big Sioux	Day	2219	2
Platte	Missouri	Charles Mix	1711	2
Ravine	James	Beadle	9406	2
Red Iron South	Big Sioux	Marshall	4834	2
Rose Hill	James	Hand	3307	2
School	Big Sioux	Deuel	2319	2
State (Beaver)	James	Yankton	9701	2
Traverse	Red	Roberts	5521	2
Vermillion	Vermillion	McCook	4613	2
Preston	Vermillion	Kingsbury	4214	2
Andes	Missouri	Charles Mix	1708	3
Big Stone	Minnesota	Roberts	5502	3
Bismarck	Cheyenne	Custer	2103	3
Blue Dog	Big Sioux	Day	2207	3
Carthage Lake	James	Miner	5103	3
Clear	Big Sioux	Deuel	2304	3
Coal Springs	Moreau	Perkins	5303	3
Covell	Big Sioux	Minnehaha	9105	3
Elm	James	Brown	9301	3
Four Mile	Big Sioux	Marshall	4814	3
Hanson	James	Hanson	3404	3
Hayes	Bad	Stanley	5802	3
Herman	Big Sioux	Lake	4306	3

Year 1	28 Lakes
Year 2	27 Lakes
Year 3	31 Lakes
Year 4	29 Lakes
Total	115 Lakes

Waterbody	Basin	County	Lake ID	Rotation Year
Hiddenwood	Missouri	Walworth	6301	3
Kampeska	Big Sioux	Codington	9508	3
Mirror 1	Belle Fourche	Lawrence	9904	3
Nine Mile	Big Sioux	Marshall	4830	3
Norden	Big Sioux	Hamlin	3214	3
Pierpont	James	Day	2220	3
Pocasse	Missouri	Campbell	1608	3
Poinsett	Big Sioux	Hamlin	3215	3
Rahn	Niobrara	Tripp	6008	3
Sheridan	Cheyenne	Pennington	9233	3
Sully	Missouri	Sully	5908	3
Swan	Vermillion	Turner	6103	3
Swan	Missouri	Walworth	6304	3
Sylvan	Cheyenne	Custer	2111	3
Thompson	Vermillion	Kingsbury	4222	3
Waggoner	Bad	Haakon	3104	3
West Oakwood	Big Sioux	Brookings	9615	3
White	Red	Marshall	4843	3
Mirror 2	Belle Fourche	Lawrence	9908	3
Academy	Missouri	Charles Mix	1701	4
Biltmore	Cheyenne	Custer	2102	4
Brakke	Missouri	Lyman	4502	4
Brandt	Big Sioux	Lake	4302	4
Burke	Missouri	Gregory	3004	4
Byron	James	Beadle	9403	4
Clear	Big Sioux	Marshall	4807	4
Cottonwood	James	Spink	5702	4
Cottonwood Springs	Cheyenne	Fall River	2706	4
Enemy Swim	Big Sioux	Day	2209	4
Eureka No. 1	Missouri	McPherson	4703	4
Fate	Missouri	Lyman	4505	4
Flat Creek	Grand	Perkins	5305	4
Hendricks	Minnesota	Brookings	9609	4
Horsethief	Cheyenne	Pennington	9213	4
Isabel	Grand	Dewey	2408	4
Louise	James	Hand	3305	4
Loyalton Stafford	James	Edmunds	2605	4
Marindahl	Vermillion	Yankton	9702	4
Minnewasta	Big Sioux	Day	2216	4
Mitchell Lake	James	Davison	9801	4
Pactola	Cheyenne	Pennington	9223	4
Pelican	Big Sioux	Codington	9517	4
Redfield	James	Spink	5706	4
Roosevelt	Missouri	Tripp	6009	4
Roy	Big Sioux	Marshall	4835	4
Stockade	Cheyenne	Custer	2110	4
Twin	James	Sanborn	5606	4
Whitewood	Vermillion	Kingsbury	4223	4

Year 1	28 Lakes
Year 2	27 Lakes
Year 3	31 Lakes
Year 4	29 Lakes
Total	115 Lakes

SDDENR Water Quality Monitoring Sites

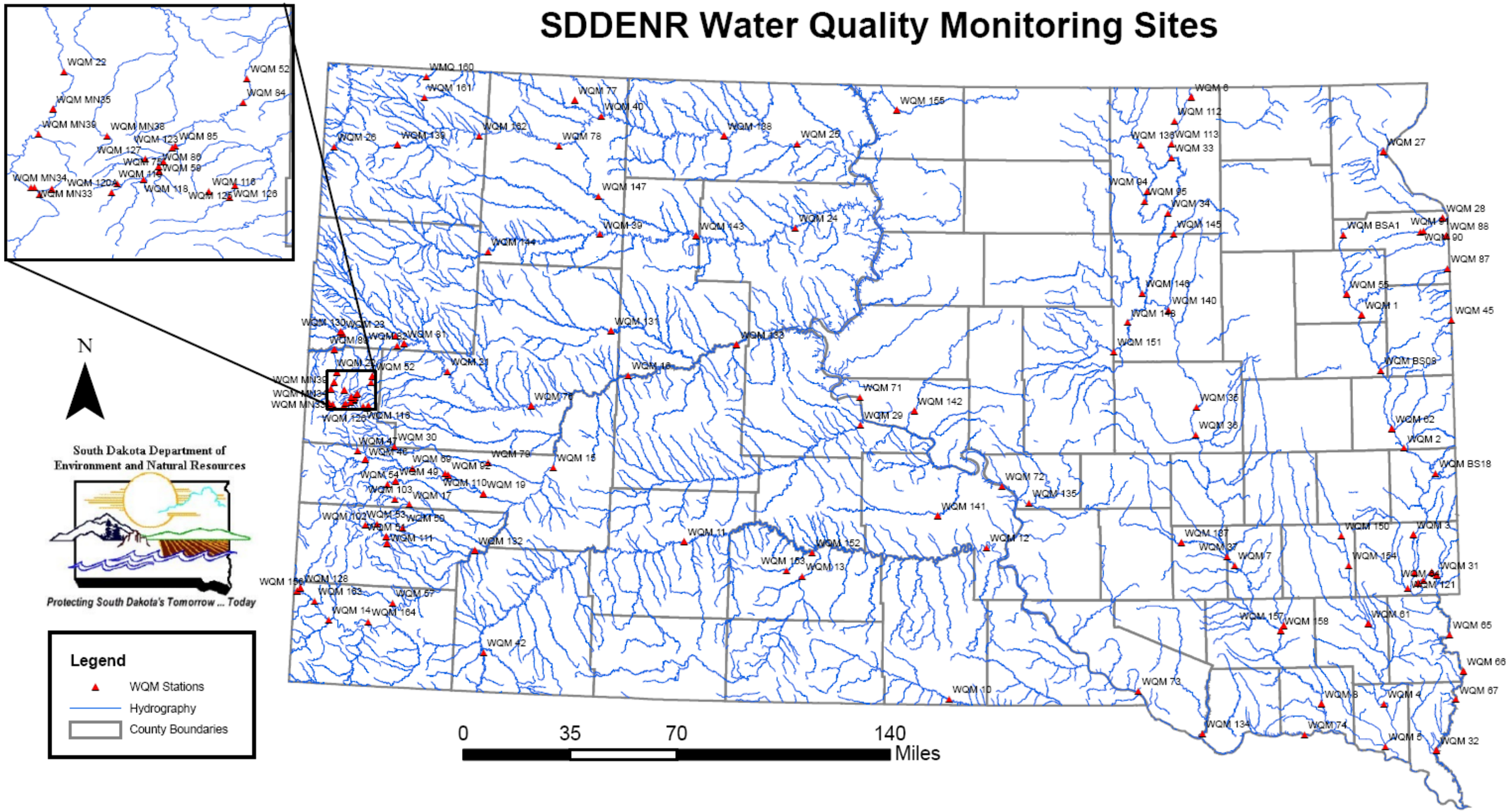


Figure 24: South Dakota DENR Water Quality Monitoring Sites

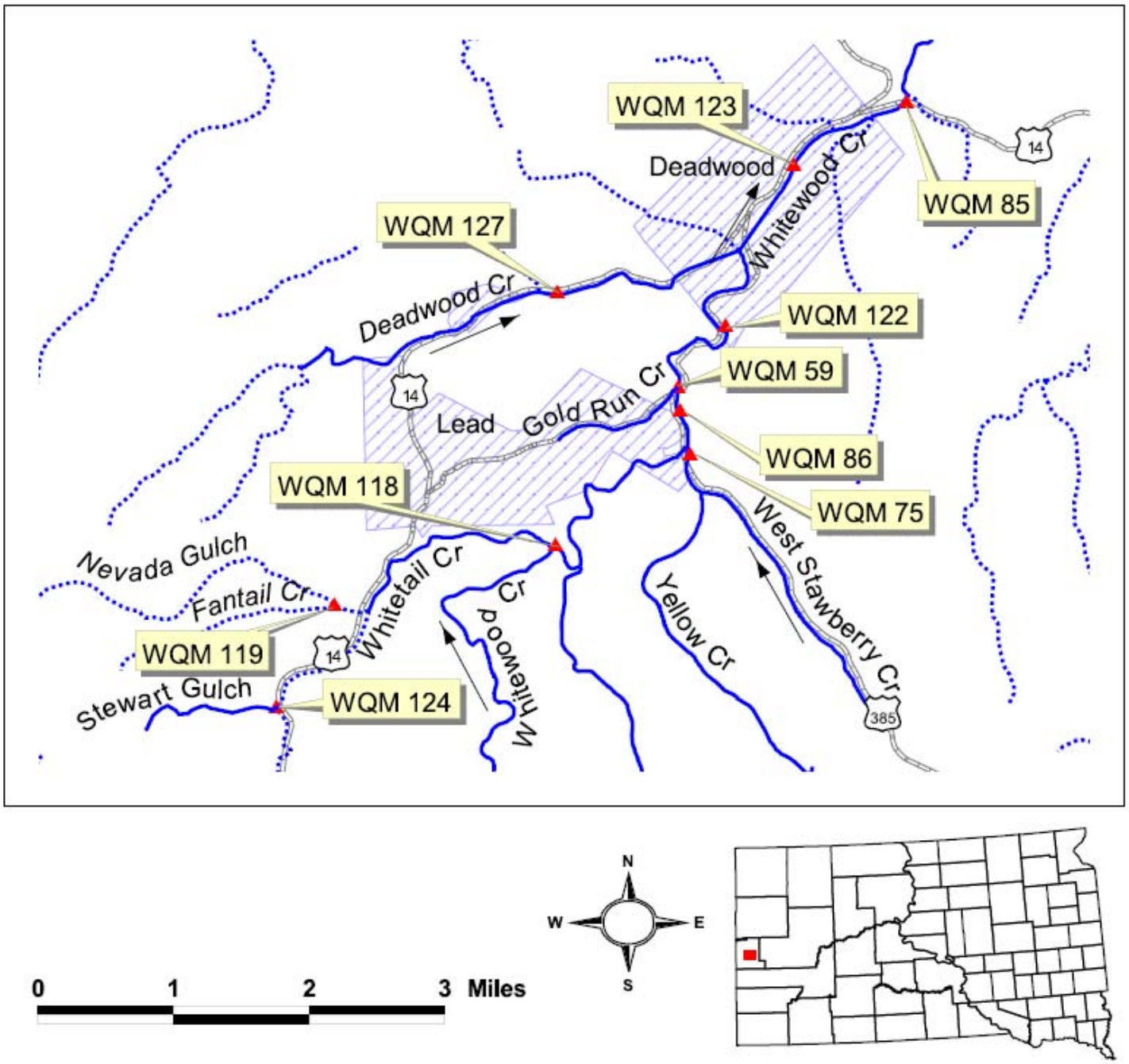


Figure 25: Water Quality Monitoring Sites on Whitewood Creek and Tributaries in Lead-Deadwood Area

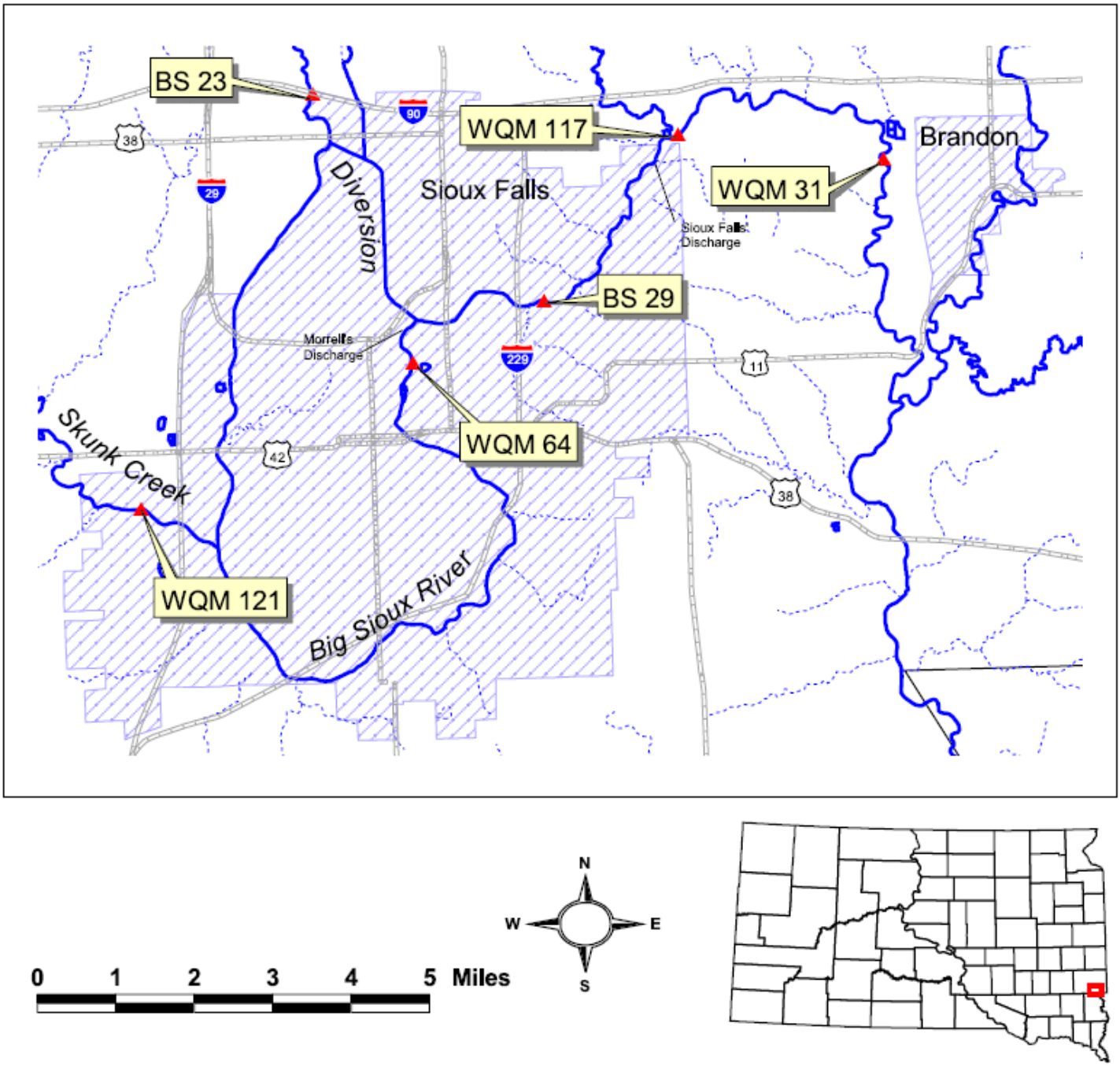


Figure 26: Water Quality Monitoring Sites Located on the Big Sioux River in the Sioux Falls Area

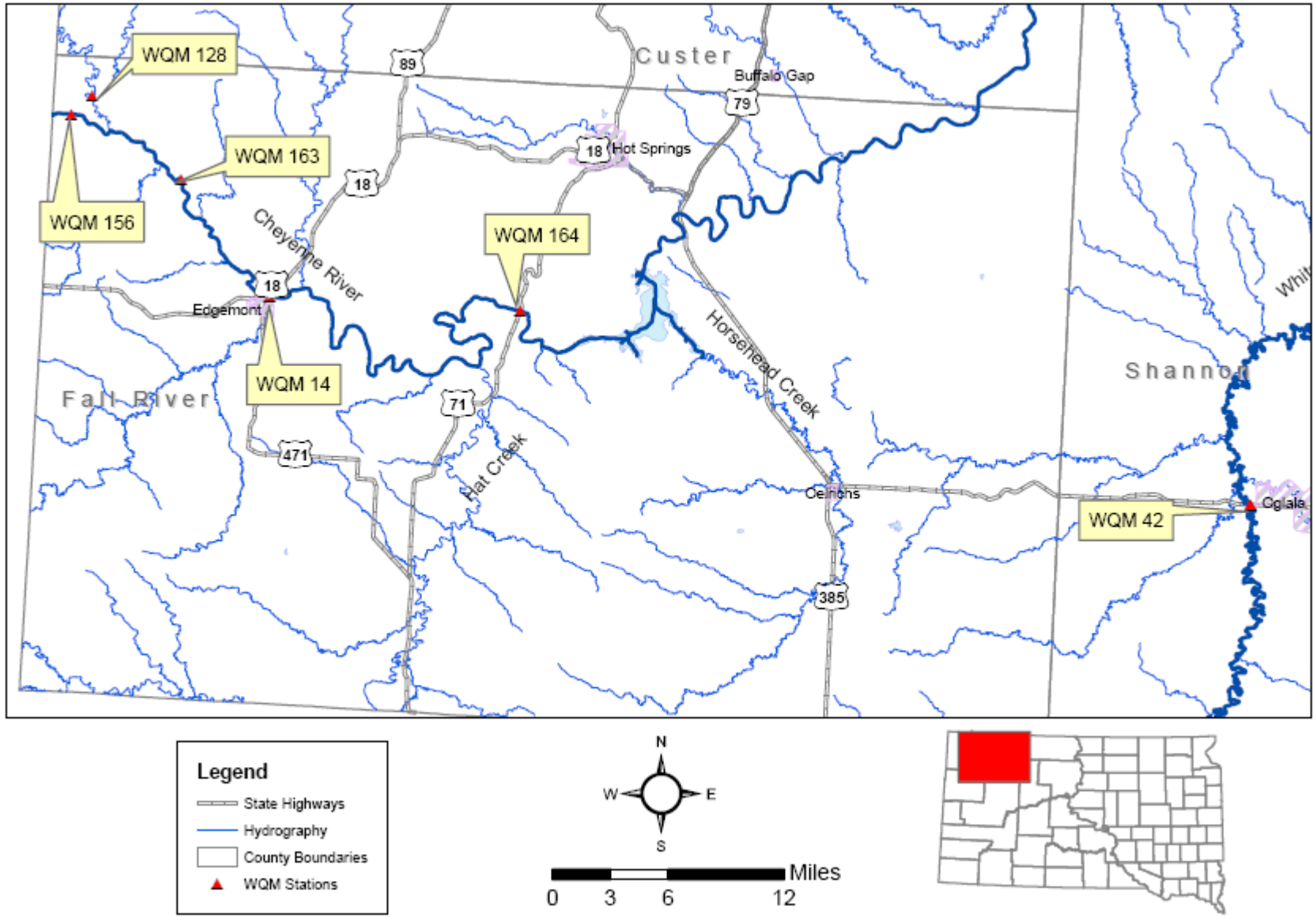


Figure 27: Water Quality Monitoring Sites Located along the Cheyenne River and White River that are Monitored for Uranium

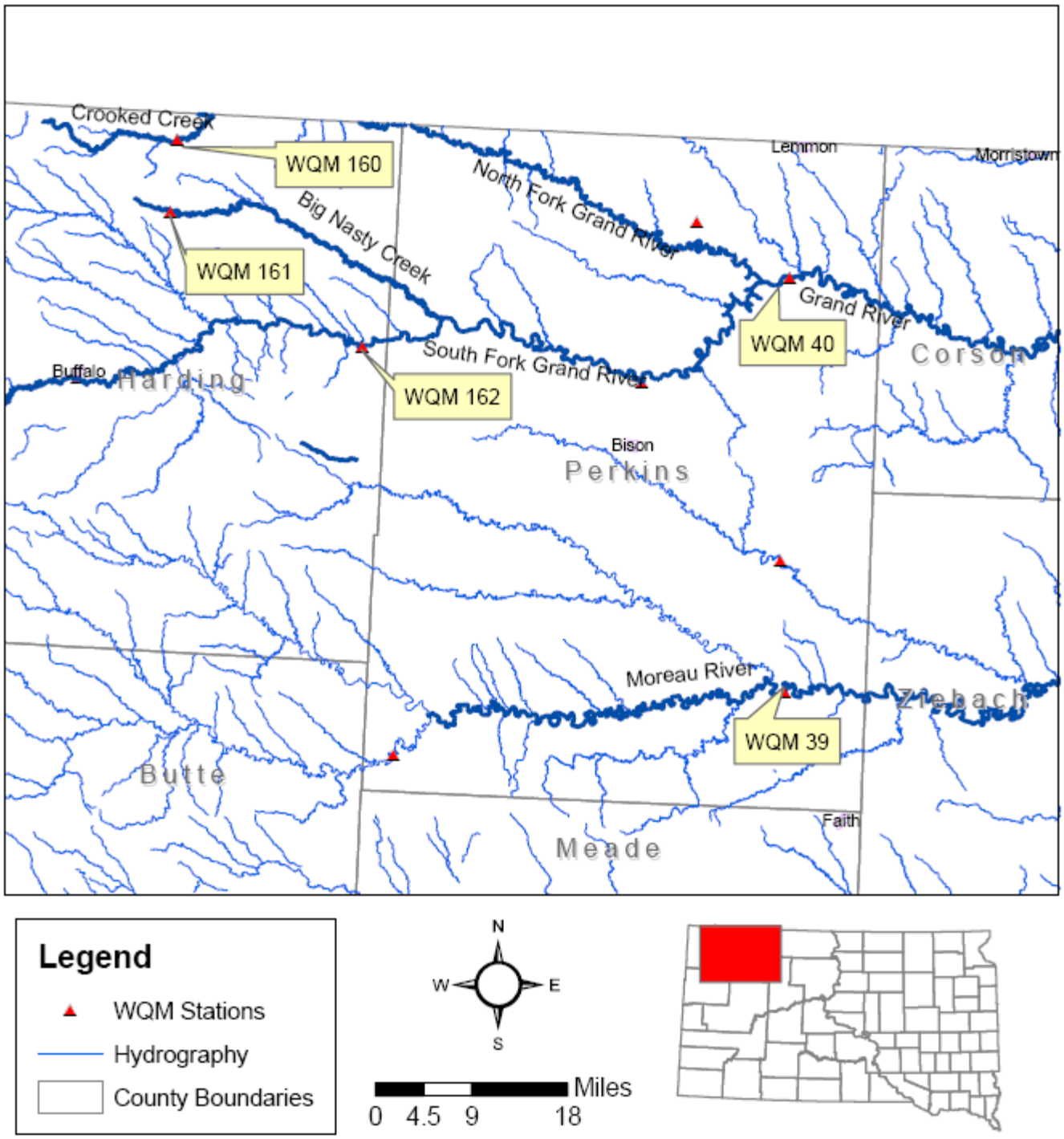
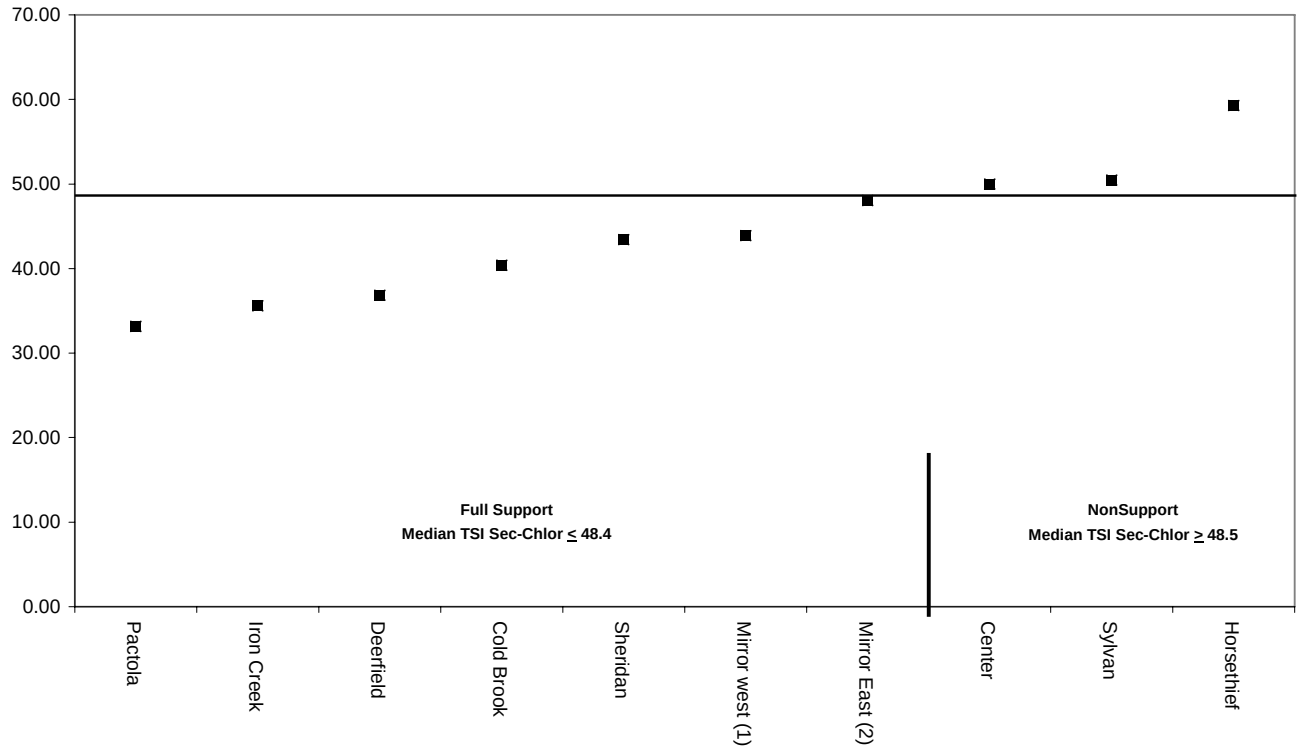


Figure 28: Water Quality Monitoring Sites Located near the Grand River and Moreau River that are Monitored for Uranium

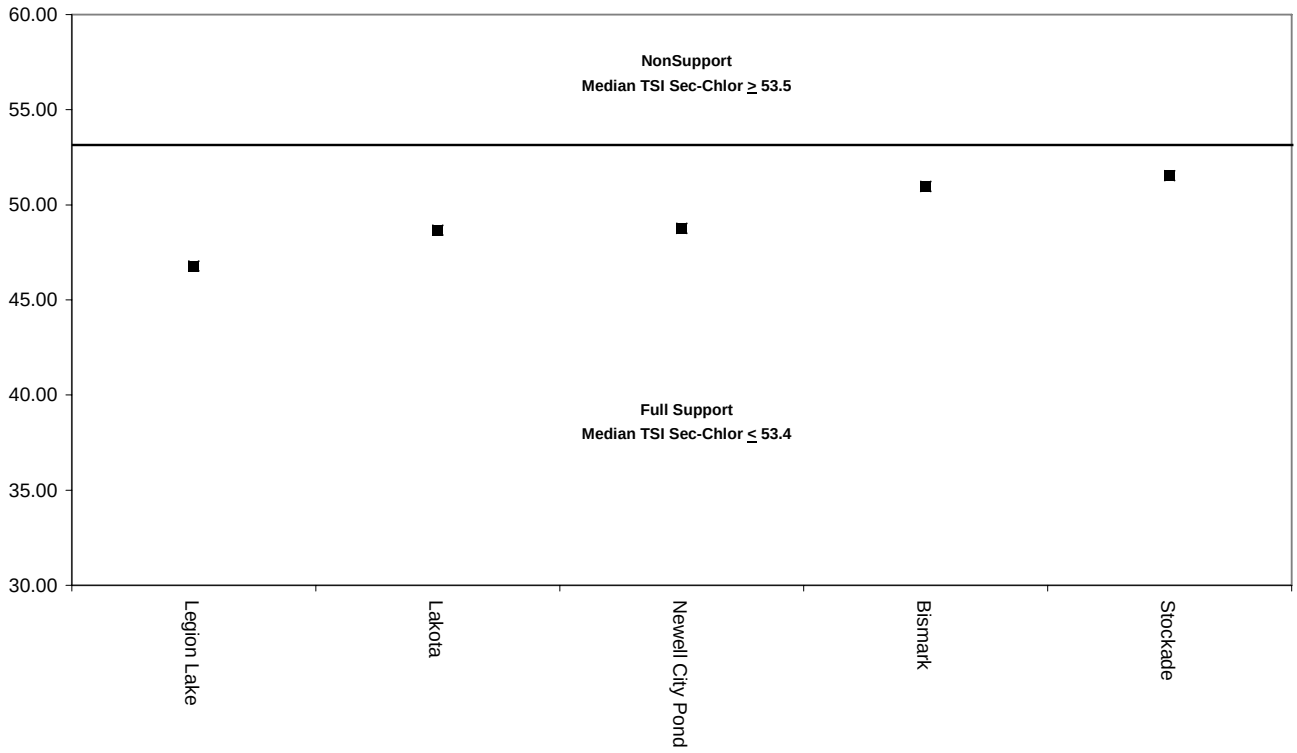
APPENDIX D

MEDIAN TSI SECCHI-CHLOROPHYLL FOR ASSESSED LAKES BY FISHERY BENEFICIAL USE

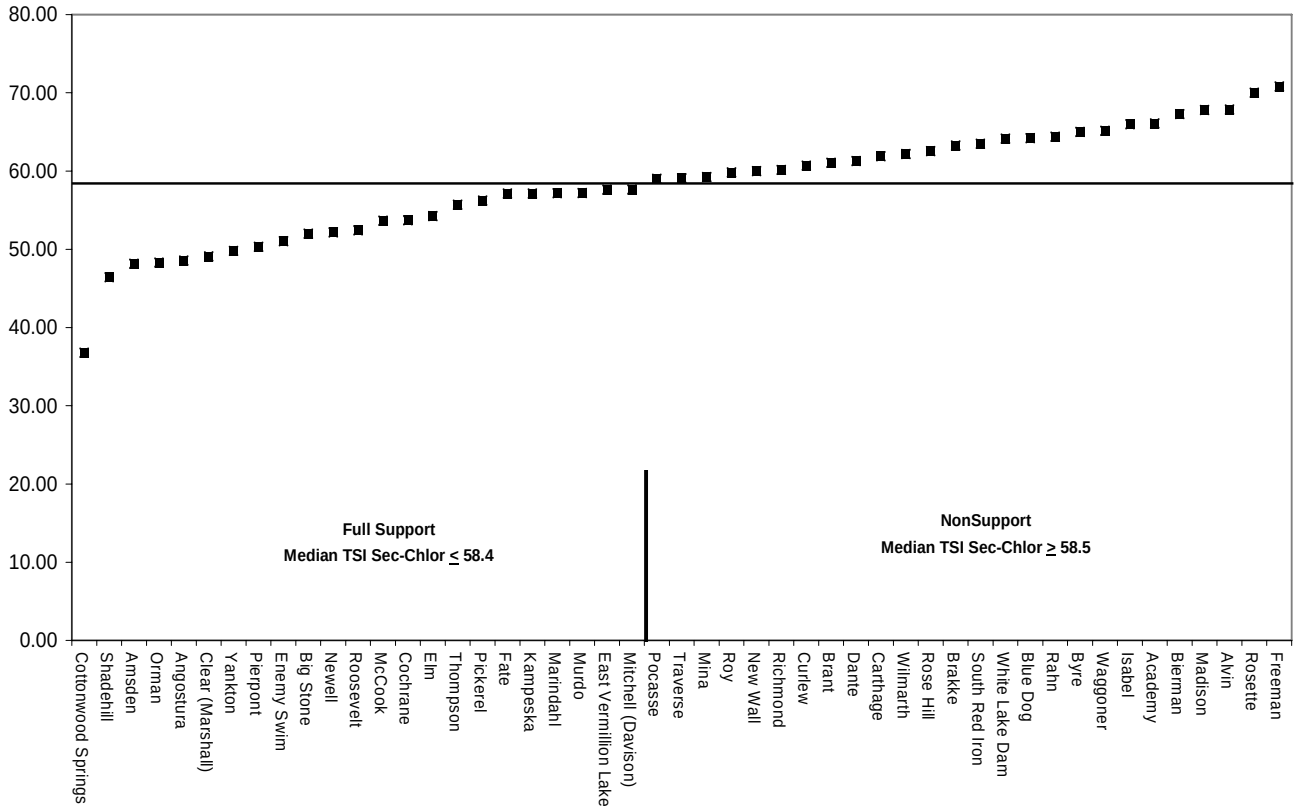
Median Trophic State Index (TSI) for Assessed Lakes Designated for Coldwater Permanent Fish Life Propagation: 2000-2007



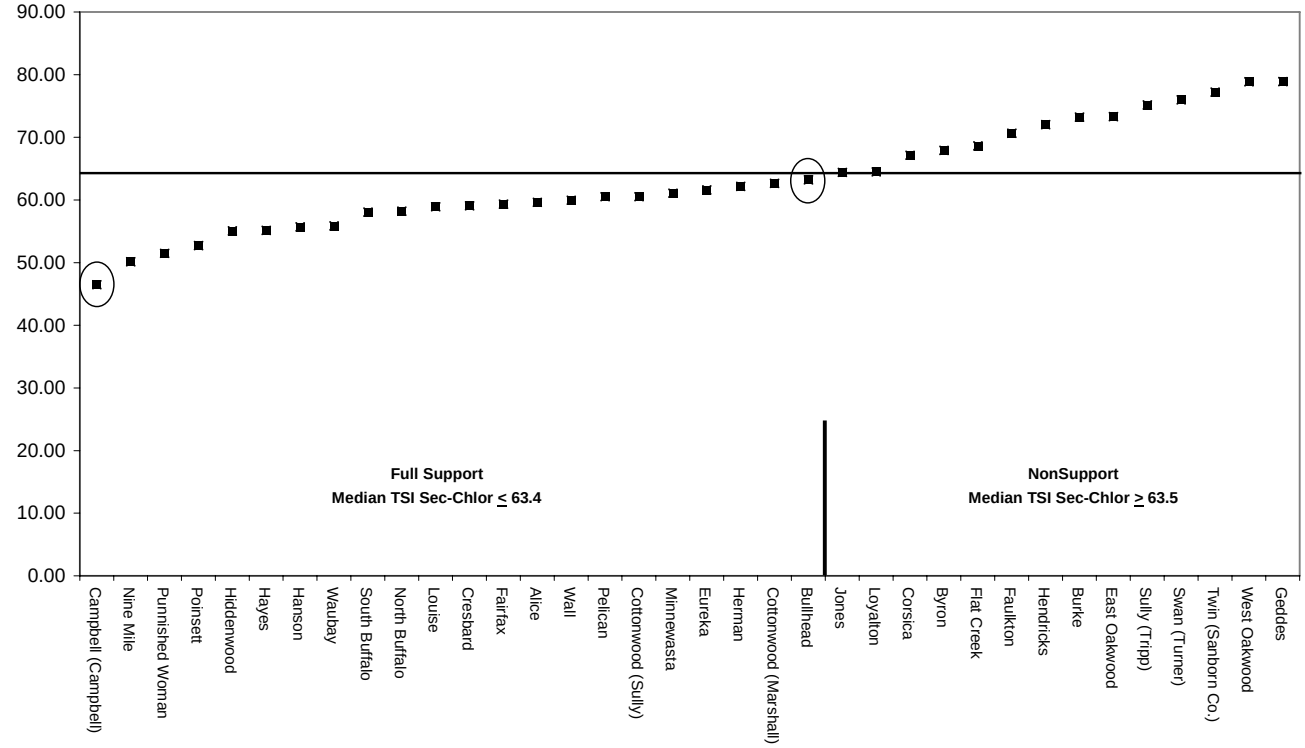
Median Trophic State Index (TSI) for Assessed Lakes Designated for Coldwater Marginal Fish Life Propagation: 2000-2007



Median Trophic State Index (TSI) for Assessed Lakes Designated for Warmwater Permanent Fish Life Propagation: 2000-2007



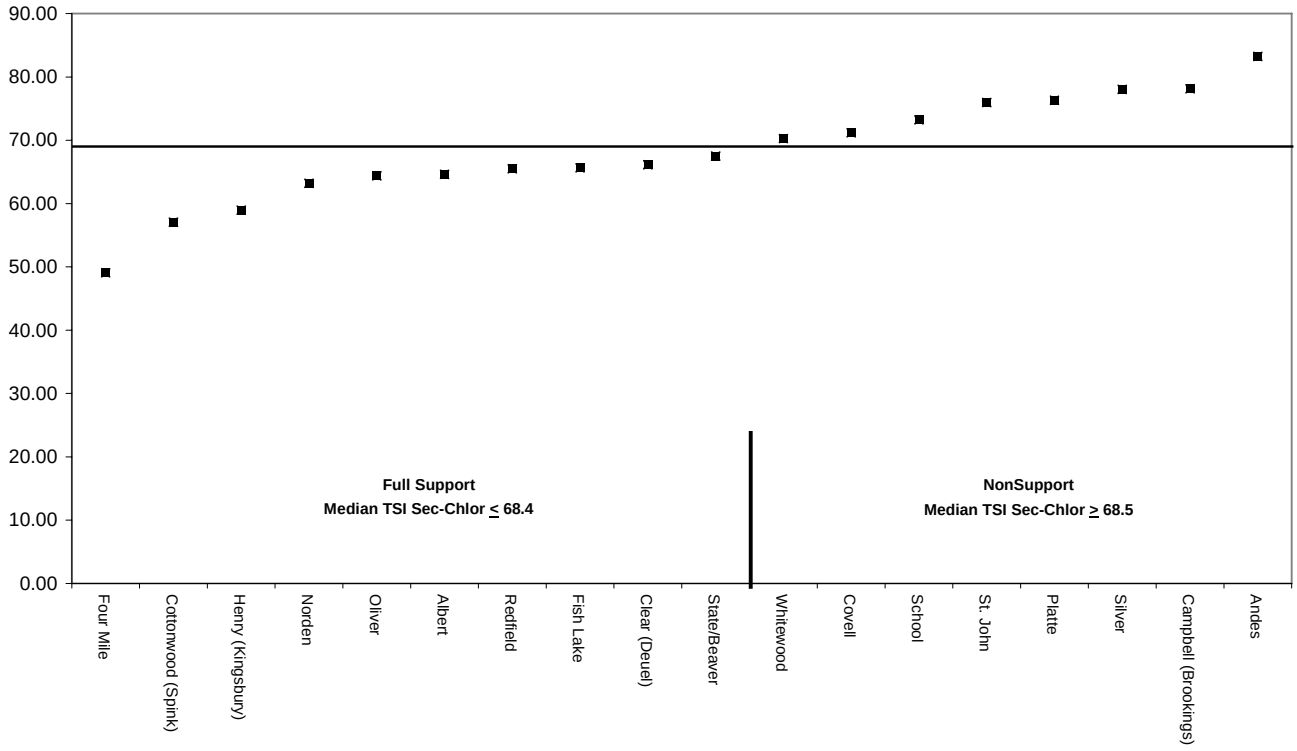
Median Trophic State Index (TSI) for Assessed Lakes Designated for Warmwater Semi-Permanent Fish Life Propagation: 2000-2007



The circles indicate lakes that were listed as impaired due to special circumstances despite meeting TSI impairment criteria. Lake Campbell has historically been characterized as hypereutrophic (TSI > 65). Data from an ongoing assessment project contributed to Lake Campbell's mesotrophic state (TSI < 50). The lake trophic state was uncharacteristically low in 2007 while nutrient levels (phosphorus) remained high. Further investigation is required to track changes in trophic state before delist is recommended.

The trophic state of Bullhead Lake in Deuel County is borderline meeting the impairment target. An assessment study conducted in 2002 indicates Bullhead Lake as not meeting the impairment target. Future monitoring is needed to determine the support status of Bullhead Lake.

Median Trophic State Index (TSI) for Assessed Lakes Designated for Warmwater Marginal Fish Life Propagation: 2000-2007



APPENDIX E

SURFACE WATER DISCHARGE PERMITS BY BASIN

Bad River Basin WATERBODY	LOCATION	BASIS	PARAMETER	DATE APPROVED
Bad River	Near Ft. Pierre	SD0023582	Ammonia	10/22/2003
Bad River	Near Philip	SD0020303	Ammonia	08/06/2003
Belle Fourche River Basin **WATERBODY**	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Spring Creek	Near Spearfish	SD0020044	Ammonia	
Belle Fourche River	Near Nisland	SD0020109	Ammonia	03/28/2002
Whitewood Creek	Near Lead-Deadwood	SD0020796	Ammonia, Dissolved Oxygen	05/14/2003
Whitewood Creek	Near Lead	SD0000043		
Whitewood Creek	Near Lead	SD0025933		
Whitewood Creek	Near Whitewood	SD0021466	Ammonia	12/12/2001
Big Sioux River Basin **WATERBODY**	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Beaver Creek	Near Valley Springs	SD0020923	Ammonia	05/14/2003
Big Ditch	Near Vermillion	SD0027456	Ammonia	01/10/2006
Big Sioux River	Near Baltic	SD0022284	Ammonia	05/14/2003
Big Sioux River	Near Brookings and Volga	SD0023388 SD0021920	Ammonia, Dissolved Oxygen	06/28/1999 03/10/1999
Big Sioux River	Near Canton	SD0022489	Ammonia	04/25/2007
Big Sioux River	Near Dell Rapids	SD0022101	Ammonia	04/25/2007
Big Sioux River	Near Egan	SD0022462	Ammonia	04/25/2007
Big Sioux River	Near Estelline	SD0022144	Ammonia	04/25/2007
Big Sioux River	Near Flandreau	SD0021831	Ammonia	10/21/2003
Big Sioux River	Near Sioux Falls and Brandon	SD0000078 SD0022128 SD0022535	Ammonia, Dissolved Oxygen	03/03/2000 03/03/2000 03/03/2000
Big Sioux River	Near Watertown	SD0027324 SD0023370 SD0026786	Ammonia, Dissolved Oxygen	04/19/2004
Colton Creek	Near Colton	SD0022322	Ammonia	04/25/2007
East Brule Creek	Near Alcester	SD0021695	Ammonia	04/25/2007
Hidewood Creek	Near Clear Lake	SD0020699	Ammonia	06/21/2004
Medary Creek	Near Aurora	SD0021661	Ammonia	11/21/2002
Six Mile Creek	Near White	SD0021636	Ammonia	03/25/2004
Skunk Creek	Near Chester	SD0020338	Ammonia	12/02/2002
Skunk Creek	Near Hartford	SD0021750	Ammonia	11/21/2002
Split Rock Creek	Near Corson	SD0000299	Ammonia, Metals, Cyanide	05/25/2005
Spring Creek	Near Elkton	SD0020788	Ammonia	11/21/2002
Willow Creek	Near Crooks	SD0020761	Ammonia	01/10/2006

Cheyenne River Basin WATERBODY	LOCATION	BASIS	PARAMETER	DATE APPROVED
Battle Creek	Near Hermosa	SD0022349	Ammonia	09/09/2002
Battle Creek	Near Keystone	SD0024007	Ammonia	05/14/2003
Box Elder Creek	USFS-Box Elder CCCC	SD0020834	Ammonia	08/06/2003
Cheyenne River	Edgemont	SD0023701	Ammonia	12/12/2001
French Creek	Near Blue Bell Lodge	SD0024228	Ammonia	11/21/2002
Lafferty Gulch	Near Keystone	SD0021610	Ammonia	
Rapid Creek	Near Rapid City	SD0023574	Ammonia, Dissolved Oxygen	01/11/2001
Willow Creek	Near Sylvan Lake	SD0024279	Ammonia	09/03/2003
Grand River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
South Fork Grand River	Near Buffalo	SD0023400	Ammonia	05/28/2003
James River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Dawson Creek	Near Scotland	SD0022853	Ammonia	06/29/2005
James River	Near Ashton	SD0022276	Ammonia	07/16/2002
James River	Near Columbia	SD0022926	Ammonia	04/25/2007
James River	Near Frankfort	SD0020869	Ammonia	
James River	Near Huron	SD0023434	Ammonia	04/25/2007
James River	Near Mitchell	SD0023361	Ammonia	01/10/2006
James River	Near Menno	SD0020087	Ammonia	12/02/2002
Jim Creek	Near Artesian	SD0021733	Ammonia	12/12/2001
Maple River	Near Frederick	SD0022152	Ammonia	03/19/2001
Moccasin Creek	Near Aberdeen	SD0020702	Ammonia	03/19/2001
Moccasin Creek	Near Warner	SD0020389	Ammonia	
Snake Creek	Near Mina Lake	SD0026344	Ammonia	01/07/2004
South Fork Snake Creek	Near Faulkton	SD0021971	Ammonia	03/28/2002
Wolf Creek	Near Bridgewater	SD0021512	Ammonia	09/03/2003
Wolf Creek	Near Emery	SD0021741	Ammonia	07/21/2006
Little Missouri River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Little Missouri River	Near Camp Crook	SD0024759	Ammonia	04/25/2007
Missouri River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Dry Choteau Creek	Near Avon	SD0022730	Ammonia	09/20/2004
Medicine Creek	Near Kennebec	SD0022861	Ammonia	04/25/2007
Medicine Creek	Near Presho	SD0020117	Ammonia	08/06/2003
Okobojo Creek	Near Agar	SD0022241	Ammonia	09/09/2002
Platte Creek	Near Platte	SD0020354	Ammonia	03/10/1999
Ponca Creek	Near Colome	SD0023230	Ammonia	03/25/2004
Ponca Creek	Near Gregory	SD0022179	Ammonia	07/11/2002
Spring Creek	Near Herreid	SD0022900	Ammonia	11/21/2002
Swan Creek	Near Akaska	SD0022250	Ammonia	01/07/2004

Minnesota River Basin WATERBODY	LOCATION	BASIS	PARAMETER	DATE APPROVED
Jorgensen River	Near Peever	SD0022756	Ammonia	04/25/2007
Little Minnesota River	Near Veblen	SD0020001	Ammonia	04/25/2007
Whetstone River	Near Big Stone City	SD0023663	Ammonia	10/21/2003
South Fork Whetstone River	Near Milbank	SD0020371 SD0027987	Ammonia, Dissolved Oxygen	03/25/2004 03/25/2004
North Fork Whetstone River	Near Wilmot	SD0021024	Ammonia	03/25/2004
Vermillion River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Big Slough Creek	Near Rosholt	SD0027855	Ammonia	04/25/2007
		SD0020524	Ammonia	04/25/2007
Long Creek	Near Lennox	SD0021768	Ammonia	04/25/2007
Turkey Creek	Near Irene	SD0022454	Ammonia	11/21/2002
Turkey Ridge Creek	Near Viborg	SD0020541	Ammonia	04/25/2007
Vermillion River	Near Centerville	SD0022527	Ammonia	08/06/2003
Vermillion River	Near Chancellor	SD0023639	Ammonia	05/12/2005
Vermillion River	Near Hurley	SD0021997	Ammonia	05/16/2002
Vermillion River	Near Vermillion	SD0020061	Ammonia, Dissolved Oxygen	05/28/2003
W. Fork Vermillion River	Near Canistota	SD0022497	Ammonia	12/02/2002
W. Fork Vermillion River	Near Marion	SD0020311	Ammonia	04/25/2007
W. Fork Vermillion River	Near Parker	SD0020940	Ammonia	10/22/2003
W. Fork Vermillion River	Near Salem	SD0020966	Ammonia	04/25/2007
White River Basin WATERBODY	**LOCATION**	**BASIS**	**PARAMETER**	**DATE APPROVED**
Little White River	Near Interior	SD0021857	Ammonia	
Little White River	Near White River	SD0022063	Ammonia	07/30/2002

APPENDIX F

303(d) SUMMARY

303(d) List Summary

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Tropic State Index	1998	2	2011
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Fecal Coliform	2008	2	2020
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Specific Conductance	2006	2	2018
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	Total Dissolved Solids	2006	2	2018
SD-BA-L-MURDO_01	Murdo Dam	Jones County	Total Dissolved Solids	2008	2	2020
SD-BA-L-WAGGONER_01	Waggoner Lake	Haakon County	Tropic State Index	2004	1	2011
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	Total Dissolved Solids	1998	2	2011
SD-BF-L-MIRROR_EAST_01	Mirror Lake East	Lawrence County	Temperature, water	2006	2	2018
SD-BF-L-MIRROR_WEST_01	Mirror Lake West	Lawrence County	Temperature, water	2008	2	2020
SD-BF-R-BEAR_BUTTE_01	Bear Butte Creek	Headwaters to Strawberry Creek	Temperature, water	1998	2	2011
SD-BF-R-BEAR_BUTTE_02	Bear Butte Creek	Strawberry Creek to mouth	Temperature, water	2008	2	2020
SD-BF-R-BELLE_FOURCHE_01	Belle Fourche River	Wyoming border to near Fruitdale	Fecal Coliform	2004	2	2015
SD-BF-R-HORSE_01_USGS	Horse Creek	Indian Creek to mouth	Specific Conductance	2004	2	2011
SD-BF-R-REDWATER_01_USGS	Redwater Creek	WY border to Hwy 85	Temperature, water	2008	2	2020
SD-BF-R-SPEARFISH_02	Spearfish Creek	Annie Creek to McKinley Gulch	pH	2006	2	2018
SD-BF-R-SPEARFISH_03	Spearfish Creek	McKinley Gulch to Cleopatra Creek	pH	2006	2	2018
SD-BF-R-STRAWBERRY_01	Strawberry Creek	Headwaters to mouth	Cadmium	1998	2	2011
SD-BF-R-STRAWBERRY_01	Strawberry Creek	Headwaters to mouth	Copper	1998	2	2011
SD-BF-R-STRAWBERRY_01	Strawberry Creek	Headwaters to mouth	Zinc	1998	2	2011
SD-BF-R-STRAWBERRY_01	Strawberry Creek	Headwaters to mouth	pH	2004	2	2011
SD-BF-R-W_STRAWBERRY_01	West Strawberry Creek	Headwaters to mouth	Fecal Coliform	2008	2	2020
SD-BF-R-W_STRAWBERRY_01	West Strawberry Creek	Headwaters to mouth	Temperature, water	2006	2	2018
SD-BF-R-WHITEWOOD_01	Whitewood Creek	Whitetail Summit to Gold Run Creek	Temperature, water	2006	2	2018
SD-BF-R-WHITEWOOD_03	Whitewood Creek	Deadwood Creek to Spruce Gulch	Fecal Coliform	2004	2	2011
SD-BF-R-WHITEWOOD_05	Whitewood Creek	Sandy Creek to I-90	pH	2006	2	2018
SD-BF-R-WHITEWOOD_06	Whitewood Creek	I-90 to Crow Creek	pH	2008	2	2020
SD-BF-R-WILLOW_01_USGS	Willow Creek	Near Vale, SD	Specific Conductance	2006	2	2018
SD-BS-L-ALBERT_01	Lake Albert	Kingsbury County	pH	2008	2	2011
SD-BS-L-ALBERT_01	Lake Albert	Kingsbury County	Tropic State Index	2004	2	2011
SD-BS-L-BITTER_01	Bitter Lake	Day County	Mercury	2006	2	2012
SD-BS-L-BULLHEAD_01	Bullhead Lake	Deuel County	Tropic State Index	2008	1	2008
SD-BS-L-BULLHEAD_01	Bullhead Lake	Deuel County	pH	2008	2	2020
SD-BS-L-CAMPBELL_01	Lake Campbell	Brookings County	Tropic State Index	2004	2	2011
SD-BS-L-COVELL_01	Covell Lake	Minnehaha County	Tropic State Index	2004	2	2011
SD-BS-L-E_OAKWOOD_01	East Oakwood Lake	Brookings County	Tropic State Index	2004	2	2011
SD-BS-L-NORDEN_01	Lake Norden	Hamlin County	Tropic State Index	2004	2	2011

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-BS-L-PELICAN_01	Pelican Lake	Codington County	pH	2008	2	2020
SD-BS-L-ROY_01	Roy Lake	Marshall County	Tropic State Index	2006	2	2010
SD-BS-L-S_RED_IRON_01	South Red Iron Lake	Marshall County	Tropic State Index	2006	2	2018
SD-BS-L-SCHOOL_01	School Lake	Deuel County	Tropic State Index	2004	2	2011
SD-BS-L-ST_JOHN_01	Lake St. John	Hamlin County	Tropic State Index	2004	2	2015
SD-BS-L-TWIN_01	Twin Lakes/W. Hwy 81	Kingsbury County	Mercury	2006	2	2012
SD-BS-L-W_OAKWOOD_01	West Oakwood Lake	Brookings County	Tropic State Index	2004	2	2015
SD-BS-R-BEAVER_01	Beaver Creek	Big Sioux River to S9, T98N, R49W	Fecal Coliform	2008	1	2009
SD-BS-R-BEAVER_02	Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	Fecal Coliform	2008	1	2008
SD-BS-R-BEAVER_02	Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	Total Suspended Solids (TSS)	2008	1	2008
SD-BS-R-BIG_SIOUX_01	Big Sioux River	SE or Ortley to Lake Kampeska	Oxygen, Dissolved	2004	2	2015
SD-BS-R-BIG_SIOUX_02	Big Sioux River	Lake Kampeska to Willow Creek	Nitrates	2008	2	2015
SD-BS-R-BIG_SIOUX_03	Big Sioux River	Willow Creek to Stray Horse Creek	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_03	Big Sioux River	Willow Creek to Stray Horse Creek	Nitrates	2004	2	2011
SD-BS-R-BIG_SIOUX_04	Big Sioux River	Stray Horse Creek to near Volga	Total Suspended Solids (TSS)	2008	2	2015
SD-BS-R-BIG_SIOUX_08	Big Sioux River	Near Dell Rapids to below Baltic	Fecal Coliform	2004	1	2008
SD-BS-R-BIG_SIOUX_09	Big Sioux River	Below Baltic to Skunk Creek	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_10	Big Sioux River	Skunk Creek to diversion return	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_11	Big Sioux River	Diversion return to SF WWTF	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_12	Big Sioux River	SF WWTF to above Brandon	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Above Brandon to Nine Mile Creek	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_14	Big Sioux River	Nine Mile Creek to near Fairview	Fecal Coliform	2004	2	2011
SD-BS-R-BIG_SIOUX_15	Big Sioux River	Fairview to near Alcester	Fecal Coliform	2004	1	2008
SD-BS-R-BIG_SIOUX_15	Big Sioux River	Fairview to near Alcester	Total Suspended Solids (TSS)	2004	1	2009
SD-BS-R-BIG_SIOUX_16	Big Sioux River	Near Alcester to Indian Creek	Fecal Coliform	2004	1	2008
SD-BS-R-BIG_SIOUX_16	Big Sioux River	Near Alcester to Indian Creek	Total Suspended Solids (TSS)	2004	1	2009
SD-BS-R-BIG_SIOUX_17	Big Sioux River	Indian Creek to mouth	Fecal Coliform	2004	1	2008
SD-BS-R-BIG_SIOUX_17	Big Sioux River	Indian Creek to mouth	Total Suspended Solids (TSS)	2004	1	2009
SD-BS-R-BRULE_01	Brule Creek	Big Sioux River to confluence of its east and west forks	Fecal Coliform	2008	1	2009
SD-BS-R-BRULE_01	Brule Creek	Big Sioux River to confluence of its east and west forks	Total Suspended Solids (TSS)	2008	1	2009
SD-BS-R-EAST_BRULE_01	East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	Fecal Coliform	2008	1	2009
SD-BS-R-EAST_BRULE_01	East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	Total Suspended Solids (TSS)	2008	1	2009
SD-BS-R-FLANDREAU_01	Flandreau Creek	Big Sioux River to Minnesota Border	Fecal Coliform	2008	1	2008
SD-BS-R-HIDEWOOD_01	Hidewood Creek	Big Sioux River to U.S. Highway 77	Fecal Coliform	2008	1	2008

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-BS-R-JACK_MOORE_01	Jack Moore Creek	Big Sioux River to S33, T107N, R49W	Fecal Coliform	2008	1	2008
SD-BS-R-NORTH_DEER_01	North Deer Creek	Six Mile Creek to U.S. Highway 77	Fecal Coliform	2008	1	2008
SD-BS-R-PEG_MUNKY_RUN-01	Peg Munky Run	Big Sioux River to S17, T113N, R50W	Fecal Coliform	2008	2	2010
SD-BS-R-PIPESTONE_01	Pipestone Creek	Split Rock Creek to Minnesota border	Fecal Coliform	2008	1	2008
SD-BS-R-SKUNK_01	Skunk Creek	Brandt Lake to mouth	Fecal Coliform	2008	1	2008
SD-BS-R-SPLIT_ROCK_01_USGS	Split Rock Creek	At Corson, SD	Fecal Coliform	2008	1	2008
SD-BS-R-SPRING_01	Spring Creek	Big Sioux River to S22, T109, R47W	Fecal Coliform	2008	1	2008
SD-BS-R-STRAYHORSE_01	Stray Horse Creek	Big Sioux River to S26, T116N, R51W	Fecal Coliform	2008	1	2008
SD-BS-R-UNION_01	Union Creek	Big Sioux River to confluence with East and West Forks	Fecal Coliform	2008	2	2010
SD-BS-R-UNION_01	Union Creek	Big Sioux River to confluence with East and West Forks	Total Suspended Solids (TSS)	2008	2	2010
SD-BS-R-WILLOW_01	Willow Creek	Big Sioux River to S7, T117N, R50W	Fecal Coliform	2008	1	2008
SD-CH-L-ANGOSTURA_01	Angostura Reservoir	Fall River County	Sulfates	2006	1	2009
SD-CH-L-ANGOSTURA_01	Angostura Reservoir	Fall River County	Total Dissolved Solids	2006	1	2009
SD-CH-L-CENTER_01	Center Lake	Custer County	Tropic State Index	2004	1	2008
SD-CH-L-CENTER_01	Center Lake	Custer County	Temperature, water	2008	2	2020
SD-CH-L-CENTER_01	Center Lake	Custer County	pH	2006	2	2018
SD-CH-L-COLD_BROOK_01	Cold Brook Reservoir	Fall River County	Temperature, water	2006	2	2018
SD-CH-L-CURLEW_01	Curlew Lake	Meade County	Tropic State Index	2006	2	2011
SD-CH-L-HORSETHIEF_01	Horsethief Lake	Pennington County	pH	2006	2	2018
SD-CH-L-HORSETHIEF_01	Horsethief Lake	Pennington County	Temperature, water	2006	2	2018
SD-CH-L-LEGION_01	Legion Lake	Custer County	pH	1998	1	2008
SD-CH-L-NEW_WALL_01	New Wall Lake	Pennington County	Tropic State Index	2004	2	2011
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	Oxygen, Dissolved	2006	2	2018
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	pH	2006	2	2018
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	Temperature, water	2006	2	2018
SD-CH-L-SYLVAN_01	Sylvan Lake	Custer County	pH	2008	2	2020
SD-CH-L-SYLVAN_01	Sylvan Lake	Custer County	Temperature, water	2008	2	2020
SD-CH-R-BATTLE_01	Battle Creek	Near Horsethief Lake to Teepee Gulch Creek	Temperature, water	2004	2	2011
SD-CH-R-BATTLE_02	Battle Creek	Teepee Gulch Creek to SD HWY 79	Temperature, water	2004	2	2011
SD-CH-R-BEAVER_01	Beaver Creek	WY border to mouth	Fecal Coliform	1998	2	2010
SD-CH-R-BEAVER_01	Beaver Creek	WY border to mouth	Salinity	2006	2	2010
SD-CH-R-BEAVER_01	Beaver Creek	WY border to mouth	Specific Conductance	2004	2	2010
SD-CH-R-BEAVER_01	Beaver Creek	WY border to mouth	Total Dissolved Solids	2004	2	2010
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Salinity	2004	2	2013
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Specific Conductance	2004	2	2013
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	Total Dissolved Solids	2004	2	2013
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Angostura Reservoir	Salinity	2008	2	2013

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Angostura Reservoir	Specific Conductance	2004	2	2013
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Angostura Reservoir	Total Dissolved Solids	2004	2	2013
SD-CH-R-CHEYENNE_03	Cheyenne River	Angostura Reservoir to Rapid Creek	Total Suspended Solids (TSS)	2004	2	2013
SD-CH-R-CHEYENNE_04	Cheyenne River	Rapid Creek to Belle Fourche River	Fecal Coliform	2004	2	2013
SD-CH-R-CHEYENNE_04	Cheyenne River	Rapid Creek to Belle Fourche River	Total Suspended Solids (TSS)	2004	2	2013
SD-CH-R-CHEYENNE_05	Cheyenne River	Belle Fourche River to Bull Creek	Fecal Coliform	2004	2	2013
SD-CH-R-CHEYENNE_05	Cheyenne River	Belle Fourche River to Bull Creek	Total Suspended Solids (TSS)	2004	2	2013
SD-CH-R-CHEYENNE_06	Cheyenne River	Bull Creek to mouth	Fecal Coliform	2004	2	2013
SD-CH-R-CHEYENNE_06	Cheyenne River	Bull Creek to mouth	Total Suspended Solids (TSS)	2004	2	2013
SD-CH-R-ELK_01_USGS	Elk Creek	Near Roubaix, Rapid City, and Elm Springs, SD	Temperature, water	2008	2	2020
SD-CH-R-FALL_01	Fall River	Hot Springs to mouth	Temperature, water	2004	2	2017
SD-CH-R-FRENCH_01	French Creek	Headwaters to Custer	Oxygen, Dissolved	2006	2	2018
SD-CH-R-GRACE_COOLIDGE_01	Grace Coolidge Creek	Headwaters to Battle Creek	Temperature, water	2004	2	2015
SD-CH-R-GRIZZLY_BEAR_01_USGS	Grizzly Bear Creek	Near Keystone, SD	Temperature, water	2006	2	2018
SD-CH-R-HAT_01_USGS	Hat Creek	Near Edgemont, SD	Specific Conductance	2006	2	2010
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	pH	2006	2	2018
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	Temperature, water	2006	2	2018
SD-CH-R-HORSEHEAD_01_USGS	Horsehead Creek	At Oelrichs	Specific Conductance	2006	2	2018
SD-CH-R-HOT_BROOK_01	Hot Brook Creek	Headwaters to mouth	Temperature, water	2006	2	2018
SD-CH-R-RAPID_02	Rapid Creek	Pactola Reservoir to Lower Rapid City	Temperature, water	2008	2	2020
SD-CH-R-RAPID_03	Rapid Creek	Lower Rapid City to RC WWTF	Fecal Coliform	2004	1	2009
SD-CH-R-RAPID_04	Rapid Creek	RC WWTF to above Farmingdale	Fecal Coliform	2004	1	2009
SD-CH-R-RAPID_05	Rapid Creek	Above Farmingdale to mouth	Fecal Coliform	2004	1	2009
SD-CH-R-RAPID_N_FORK_01	North Fork Rapid Creek	Above mouth	Temperature, water	2004	2	2011
SD-CH-R-SPRING_01	Spring Creek	Headwaters to Sheridan Lake	Fecal Coliform	2006	1	2009
SD-CH-R-SPRING_01	Spring Creek	Headwaters to Sheridan Lake	Temperature, water	2008	2	2020
SD-CH-R-SPRING_02	Spring Creek	Sheridan Lake to SD HWY 79	Temperature, water	2008	2	2020
SD-CH-R-VICTORIA_01_USGS	Victoria Creek	Near Rapid City, SD	Temperature, water	1998	2	2011
SD-GR-L-FLAT_CREEK_01	Flat Creek Dam	Perkins County	Tropic State Index	2004	2	2011
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	pH	2008	2	2020
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	Mercury	2006	2	2012
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	Tropic State Index	2004	2	2011
SD-GR-L-SHADEHILL_01	Shadehill Reservoir	Perkins County	Chloride	2008	2	2020
SD-GR-L-SHADEHILL_01	Shadehill Reservoir	Perkins County	Total Dissolved Solids	2006	2	2018
SD-GR-L-SHADEHILL_01	Shadehill Reservoir	Perkins County	Salinity	2004	2	2015

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	Salinity	1998	2	2011
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	pH	2004	2	2011
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	Salinity	2004	2	2017
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	Total Suspended Solids (TSS)	2004	2	2017
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Temperature, water	2006	2	2018
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Fecal Coliform	2004	2	2011
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Salinity	2004	2	2011
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Total Suspended Solids (TSS)	2004	2	2011
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	Salinity	2004	2	2015
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	Specific Conductance	2004	2	2015
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	Jerry Creek to Skull Creek	Salinity	2006	2	2018
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	Jerry Creek to Skull Creek	Total Suspended Solids (TSS)	2004	2	2011
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	Skull Creek to Shadehill Reservoir	Salinity	2004	2	2011
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	Skull Creek to Shadehill Reservoir	Total Suspended Solids (TSS)	2004	2	2011
SD-JA-L-BEAVER_01	Beaver Lake	Yankton County	Tropic State Index	2004	1	2009
SD-JA-L-BIERMAN_01	Bierman Dam	Spink County	Tropic State Index	2004	2	2011
SD-JA-L-CARTHAGE_01	Lake Carthage	Miner County	Tropic State Index	2004	1	2009
SD-JA-L-FAULKTON_01	Lake Faulkton	Faulk County	pH	2008	2	2020
SD-JA-L-JONES_01	Jones Lake	Hand County	pH	2006	2	2018
SD-JA-L-LOUISE_01	Lake Louise	Hand County	pH	2008	2	2020
SD-JA-L-ROSETTE_01	Rosette Lake	Edmunds County	Tropic State Index	2004	2	2011
SD-JA-L-TWIN_01	Twin Lakes	Sanborn County	Tropic State Index	2004	1	2009
SD-JA-L-WILMARTH_01	Wilmarth Lake	Aurora County	Tropic State Index	2004	1	2009
SD-JA-R-DAWSON_01	Dawson Creek	James River to Lake Henry	Fecal Coliform	2008	1	2009
SD-JA-R-JAMES_01	James River	North Dakota border to Mud Lake Reservoir	pH	2006	2	2018
SD-JA-R-JAMES_02	James River	Mud Lake Reservoir	pH	2006	2	2018
SD-JA-R-JAMES_03	James River	Columbia Road Reservoir	Oxygen, Dissolved	2008	2	2020
SD-JA-R-JAMES_05	James River	US HWY 12 to Mud Creek	Oxygen, Dissolved	2006	2	2018
SD-JA-R-JAMES_09	James River	Sand Creek to I-90	Total Suspended Solids (TSS)	2004	1	2009
SD-JA-R-JAMES_10	James River	I-90 to Yankton County line	Total Suspended Solids (TSS)	1998	1	2009
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	Fecal Coliform	1998	1	2009
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	Total Suspended Solids (TSS)	2004	1	2009
SD-JA-R-MOCCASIN_01	Moccasin Creek	Headwaters to Aberdeen	Fecal Coliform	2006	2	2018
SD-JA-R-MOCCASIN_02	Moccasin Creek	Aberdeen to Warner	Oxygen, Dissolved	2008	2	2020

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-JA-R-MOCCASIN_02	Moccasin Creek	Aberdeen to Warner	pH	2008	2	2020
SD-JA-R-PIERRE_01	Pierre Creek	James River to S11, T102N, R58W	Fecal Coliform	2008	1	2009
SD-JA-R-TURTLE_01	Turtle Creek	Hand County line to mouth	pH	2008	2	2020
SD-JA-R-WOLF_02	Wolf Creek	Just above Wolf Creek Colony to the mouth.	Total Suspended Solids (TSS)	2008	1	2009
SD-MI-L-ACADEMY_01	Academy Lake	Charles Mix County	Tropic State Index	2004	2	2011
SD-MI-L-ANDES_01	Lake Andes	Charles Mix County	Tropic State Index	2004	1	2008
SD-MI-L-ANDES_01	Lake Andes	Charles Mix County	Oxygen, Dissolved	2006	2	2011
SD-MI-L-CAMPBELL_01	Lake Campbell	Campbell County	Tropic State Index	2004	2	2015
SD-MI-L-CORSICA_01	Corsica Lake	Douglas County	Oxygen, Dissolved	2008	2	2020
SD-MI-L-CORSICA_01	Corsica Lake	Douglas County	pH	2008	2	2020
SD-MI-L-COTTONWOOD_01	Cottonwood Lake	Sully County	Tropic State Index	2004	2	2011
SD-MI-L-GEDDES_01	Geddes Lake	Charles Mix County	Tropic State Index	2004	2	2011
SD-MI-L-HURLEY_01	Lake Hurley	Potter County	Mercury	2006	2	2012
SD-MI-L-PLATTE_01	Platte Lake	Charles Mix County	Tropic State Index	2004	2	2011
SD-MI-L-POCASSE_01	Lake Pocasse	Campbell County	Tropic State Index	2004	2	2011
SD-MI-L-ROOSEVELT_01	Roosevelt Lake	Tripp County	Mercury	2006	2	2012
SD-MI-L-SULLY_DAM_01	Sully Dam	Tripp County	Tropic State Index	2004	2	2011
SD-MI-R-CHOTEAU_01	Choteau Creek	Wagner to mouth	Total Suspended Solids (TSS)	1998	1	2009
SD-MI-R-EMANUEL_01	Emanuel Creek	Lewis and Clark Lake to S20, T94N, R60W	Fecal Coliform	2008	1	2009
SD-MI-R-EMANUEL_01	Emanuel Creek	Lewis and Clark Lake to S20, T94N, R60W	Total Suspended Solids (TSS)	2008	1	2009
SD-MI-R-PONCA_01	Ponca Creek	Gregory to near St. Charles	Fecal Coliform	2008	1	2009
SD-MI-R-PONCA_01	Ponca Creek	Gregory to near St. Charles	Total Suspended Solids (TSS)	2008	1	2009
SD-MI-R-SLAUGHTER_01	Slaughter Creek	Missouri River to headwaters	Specific Conductance	2008	2	2010
SD-MI-R-SLAUGHTER_01	Slaughter Creek	Missouri River to headwaters	Total Dissolved Solids	2008	2	2010
SD-MI-R-SPRING_01	Spring Creek	US HWY 83 to mouth	Total Suspended Solids (TSS)	2008	2	2020
SD-MI-R-SPRING_01	Spring Creek	US HWY 83 to mouth	Oxygen, Dissolved	2006	2	2018
SD-MN-R-WHETSTONE_S_FORK_02	South Fork Whetstone River	Lake Farley to mouth	Oxygen, Dissolved	2004	2	2018
SD-MU-L-DEWBERRY_01	Dewberry Dam	Dewey County	Tropic State Index	1998	2	2011
SD-MU-R-MOREAU_01	Moreau River	Headwaters to near Iron Lightning	Salinity	1998	2	2011
SD-MU-R-MOREAU_01	Moreau River	Headwaters to near Iron Lightning	Total Suspended Solids (TSS)	2006	2	2018
SD-MU-R-MOREAU_02	Moreau River	Iron Lightning to Green Grass	Salinity	1998	2	2011
SD-MU-R-MOREAU_02	Moreau River	Iron Lightning to Green Grass	Total Suspended Solids (TSS)	1998	2	2011
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	Salinity	1998	2	2011

Assessment Unit ID (AUID)	Waterbody	Location	Cause	Cycle First Listed	TMDL Priority	TMDL Schedule
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	Fecal Coliform	2006	2	2018
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	Total Suspended Solids (TSS)	2004	2	2011
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	Specific Conductance	1998	2	2011
SD-MU-R-THUNDER_BUTTE_01	Thunder Butte Creek	Headwaters to mouth	Oxygen, Dissolved	1998	2	2011
SD-NI-L-RAHN_01	Rahn Lake	Tripp County	Tropic State Index	2004	1	2009
SD-NI-R-KEYA_PAHA_01	Keya Paha River	Keya Paha to Nebraska border	Total Suspended Solids (TSS)	1998	1	2009
SD-NI-R-KEYA_PAHA_01	Keya Paha River	Keya Paha to Nebraska border	Fecal Coliform	2008	1	2009
SD-RD-L-TRAVERSE_01	Lake Traverse	Roberts County	Tropic State Index	2004	2	2011
SD-VM-L-E_VERMILLION_01	East Vermillion Lake	McCook County	Tropic State Index	2004	2	2011
SD-VM-L-ISLAND_N_01	North Island Lake	Minnehaha/McCook counties	Mercury	2008	2	2012
SD-VM-L-SILVER_01	Silver Lake	Hutchinson County	Tropic State Index	2004	2	2011
SD-VM-L-WHITEWOOD_01	Whitewood Lake	Kingsbury County	Tropic State Index	2004	2	2011
SD-VM-R-LONG_01	Long Creek	Vermillion River to Highway 44	Fecal Coliform	2008	2	2010
SD-VM-R-VERMILLION_03	Vermillion River	Baptist Creek to mouth	Total Suspended Solids (TSS)	2004	2	2010
SD-WH-R-LAKE_01_USGS	Lake Creek	Above and below refuge near Tuthill, SD	Temperature, water	2006	2	2018
SD-WH-R-LITTLE_WHITE_01	Little White River	Rosebud Creek to mouth	Total Suspended Solids (TSS)	2004	2	2011
SD-WH-R-WHITE_01	White River	Nebraska border to Interior	Total Suspended Solids (TSS)	2004	2	2011
SD-WH-R-WHITE_02	White River	Interior to Black Pipe Creek	Fecal Coliform	2004	2	2011
SD-WH-R-WHITE_02	White River	Interior to Black Pipe Creek	Total Suspended Solids (TSS)	2004	2	2011
SD-WH-R-WHITE_03	White River	Black Pipe Creek to Oak Creek	Fecal Coliform	2004	2	2011
SD-WH-R-WHITE_03	White River	Black Pipe Creek to Oak Creek	Total Suspended Solids (TSS)	2004	2	2011
SD-WH-R-WHITE_04	White River	Oak Creek to mouth	Fecal Coliform	2004	2	2011
SD-WH-R-WHITE_04	White River	Oak Creek to mouth	Total Suspended Solids (TSS)	2004	2	2011

APPENDIX G

PUBLIC COMMENTS

Summary of Public Comments Received on
South Dakota's Draft 2008
Integrated Report
and
DENR's Response to Comments

Comment:
Luanne Napton, South Dakota Resources Coalition, President. Ms. Napton submitted the following letter to DENR in October 2007.

South Dakota Resources Coalition
Volunteers in the public interest since 1972 Phone: 605-697-6675 928 4th Street, Office 4, Brookings, SD 57006

October 3, 2007

Mr. Steve Pirner, Secretary
Department of Environment and Natural Resources
523 E. Capital Avenue
Pierre, South Dakota 57501

Dear Mr. Pirner,

This letter is to request that Lake Cochrane be placed on the list of impaired water bodies. In the last few years, the phosphorus content of Lake Cochrane has risen significantly resulting in algae growth that is at an unacceptable level. Since this lake is surrounded by rather expensive homes and is therefore the leading source of property tax in Deuel County, it seems prudent to take steps to restore Lake Cochrane to its former high quality.

Thank you for your consideration.

Very truly yours,

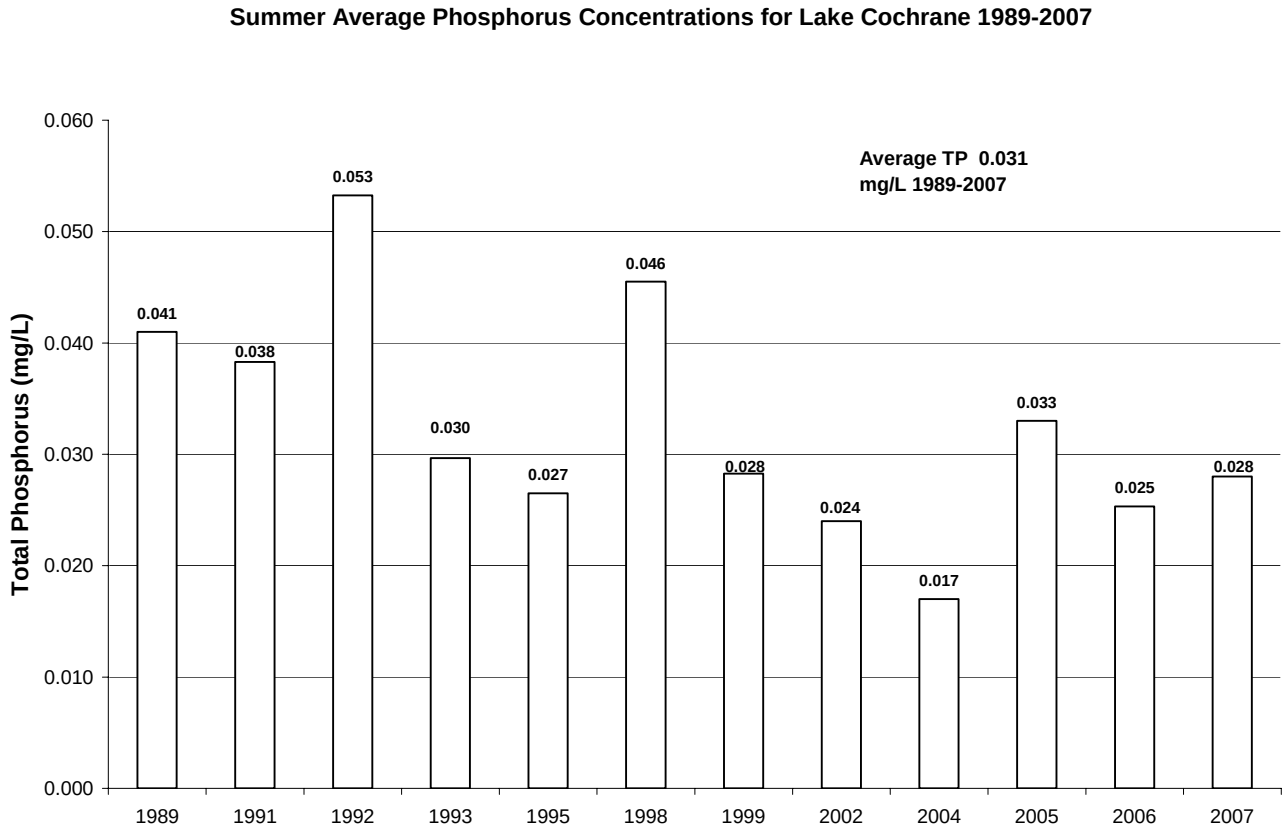
Luanne Napton

Luanne Napton, president

President - Luanne Napton, Brookings Street Address: 928 4th St. Office 4 Brookings Executive Director - Luanne Napton, Brookings

Response to Comment:

The impairment status of Lake Cochrane was evaluated based on 303(d) listing methodologies set forth in this 2008 IR. It was determined that Lake Cochrane met narrative and numeric water quality standards indicating full support of all designated beneficial uses. DENR has sampled the phosphorus concentration of Lake Cochrane over the past several years, including the past four consecutive years. Results of DENR's sampling efforts are depicted below.



Results indicate Lake Cochrane phosphorus concentrations are variable over the years with a slight trend towards improvement. Lake Cochrane has had sufficient phosphorus content to support an algae bloom (>0.02 mg/L) for many years. Most of the phosphorus load to the lake settles out in the sediments of the lake where aquatic plants use it for growth, maintenance and reproduction.

DENR has recently examined the algae community based on available data over the past 30 years. A summarization of the results suggests the algae community is variable, and a significant change in density and community structure has not occurred over the past thirty years. Most algae blooms occur in the late summer to early fall following the deterioration of the macrophyte community. The macrophyte community likely suppresses algae growth in the

summer months due to several mechanisms. Regional climatic variation is another potential cause of variation associated with the algae community in Lake Cochrane.

DENR has and continues to be proactive in regards to allegations related to Lake Cochrane water quality. The following timeline outlines specific events that have been administered by DENR in the interest of Lake Cochrane water quality.

1998- *The Lake Cochrane Improvement Association (LCIA) requested that Lake Cochrane be added to the 1998 303(d) list of impaired waterbodies. The association felt Lake Cochrane water quality was declining. DENR added Lake Cochrane to the 1998 303(d) list for impairing the immersion recreation beneficial use due to elevated fecal coliform concentrations associated with the public beach.*

1999- *With technical guidance from DENR, the Deuel County Conservation District (DCCD) was awarded an EPA 319 grant to conduct a comprehensive phase I watershed assessment project on Lakes Cochrane and Oliver. The goal of the project was to document nonpoint source pollution in the watershed and produce feasible restoration alternatives required to drive a watershed implementation project and as develop TMDL reports.*

2000- *A phase I watershed assessment final report for Lakes Cochrane and Oliver was produced by DENR. The report documented nutrient and sediment loadings and as critical areas of the watershed. Several water quality attributes were characterized for both lakes. A TMDL for Trophic State Index (TSI) was developed for Lake Oliver, while Lake Cochrane met the TSI listing criteria and did not require a TMDL. The report recommended a suite of Best Management Practices (BMP) to help reduce nutrient loading to both lakes.*

2002- *With technical guidance from DENR, the Deuel County Conservation District (DCCD) was awarded an EPA 319 grant to conduct an implementation project. The DCCD hired a local coordinator to implement BMPs within both watersheds. The major implementation activities included: an alum treatment on Lake Oliver, dredging and repair of two Lake Cochrane tributary sediment retention ponds and construction of a livestock fence on a third retention pond to exclude livestock access. The project was conducted for three years ending in 2005. Approximately $200,000 in federal, state and local funds was spent on the assessment and implementation efforts.*

2002-2007- *DENR has sampled Lakes Cochrane and Oliver on a yearly basis to document potential changes in water quality. Results of* ***all*** *sampling efforts conducted by DENR were presented to the LCIA.*

At this time, DENR can not justify placing Lake Cochrane on the 303(d) list of impaired waterbodies. DENR is working with the LCIA to develop a volunteer water quality monitoring program. Under guidance from DENR, this monitoring program is intended to enhance the LCIA's ability to document and report changes in water quality over-time on both Lake Cochrane and Lake Oliver. In addition, the LCIA will provide educational information to lake residents regarding phosphorus removal through several localized Best Management Practices.

Comment:
Jay Gilbertson, East Dakota Water Development District, Manager/Treasurer

East Dakota Water Development District
132B Airport Avenue
Brookings, SD 57006

605-688-6741 605-688-6744 Fax

February 29, 2008

Shannon Minerich
DENR-Water Resources Assistance Program
523 East Capitol Avenue
Pierre, South Dakota 57501

Dear Ms. Minerich:

I am writing to provide comments on the Draft 2008 South Dakota Integrated Report for Surface Water Quality Assessment. The document has been reviewed by the staff at East Dakota, and these represent our collective comments. I have numbered each comment, and included the page number and paragraph (if possible) from the text that generated the comment. Finally, I have included a general comment about how we assess the beneficial uses in lakes.

1. Page 17, fourth paragraph. This section describes additional sources of information and/or requests for consideration. On September 26, 2007, a letter was filed by this office reporting several water quality samples which yielded elevated fecal coliform bacteria numbers from Lake Herman. The analyses were conducted by the SD State Health lab. Was this correspondence considered?

2a. Page 23, first paragraph. Reference is made to the various sources of data used in compilation of the document. Notably absent are any of the ongoing watershed assessment studies or watershed implementation projects. In our case, the Central Big Sioux River Watershed Project conducts monthly water quality sampling at 37 sites on the Big Sioux River and numerous tributaries between April and October. Is there a reason why this information, collected in accordance with State sampling procedures, is not being used.

This same comment would apply to the summary information on the Big Sioux River on pages 63-80. There are several points about which we would wish to quibble with DENR staff, in that the results of our assessment studies of the Central Big Sioux River, North-Central Big Sioux River, Oakwood Lakes and School and Bulhead lakes point to different results.

2b. Page 23, first paragraph. Reference is made to the various sources of data used in

compilation of the document. Another missing source of data, particularly for lakes, is the information collected by volunteer monitors. As noted on page 42 of the 2007 SD Nonpoint Source Program Management Plan, this type of information is utilized provided proper data gathering procedures are followed. Was any such data used in the development of this report? In particular, a number of volunteer monitors have been collecting water clarity data (Secchi depths) for a number of years. Each has received formal training and therefore should be a source of otherwise scarce information on the current condition of our lakes.

As noted later in the report (Lake Water Quality Assessment, pages 37-41), Secchi depth is one of the two primary criteria used to assess the condition (trophic state) of a lake. Volunteer monitors, when properly trained, represent a tremendous potential source of information. If their information is being utilized, what can be done to get it included?

3. Page 38, Table 14. The table indicates that a total of 142 lakes have been assessed. However, only 118 have been assigned a trophic state, with 24 (of the 142) listed as unknown. Why? It would seem that if it is not possible to determine a trophic state, then the assessment was not complete. If the data is no longer valid, then the number of assessed lakes should be lowered accordingly, and the 24 unkowns need to be re-evaluated.

4. Page 63, last paragraph. Covell Lake is listed as having an active assessment in progress. We are unaware of any such effort. Who is conducting this project?

5. Page 64, Table 19. For Blue Dog Lake, it states that Limited Contact Recreation is fully supported. However, information on immersion recreation is not available. In that the exact same criteria are used to evaluate both beneficial uses, there appears to be a problem. Is this a typographic error?

6. Page 70, Table 19. For Lake St. John, Irrigation waters is listed as a beneficial use. While this may be the case, was this actually intended to be Limited contact recreation, or should LCR have been listed as a fifth use?

7. Page 72, Table 19. For the Big Sioux River segment Willow Creek to Stray Horse Creek, our CBSRWP sample data does not indicate a nitrate violation.

8. Page 104, last paragraph. Reference is made to the data used in the evaluation. Were the results of the Lower James River Assessment considered in this document?

9. Page 121, Table 24. For Oak Lake, limited contact recreation and immersion recreation are shown as fully supporting. For most lakes, these uses are the least understood. At the same time, we do not know the support level of warm water marginal fish life or fish/wildlife propagation, etc.. Is this another typo?

10. Page 146, last paragraph. Reference is made to the data used in the evaluation. Were the results of the Vermillion River Assessment considered in this document?

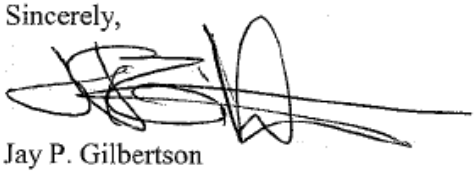
11. Page 177, Figure 23. The map show the areas covered by the Central Big Sioux River and Lower Big Sioux River projects as Assessed (green). They are both in the implementation phase.

12. Page 189. Delisting of Split Rock Creek for TSS. According to the TMDL for this stream, a 70% reduction at high flow conditions were needed. Have these conditions actually been met?

Finally, as I read through the Draft IR, one of the things that always catches my eye is the relative paucity of information on whether or not our lakes are meeting either the limited contact or immersion recreation standard. In past versions of the report, it was not uncommon to have "we don't know" (INS, NA, etc..) as the Support Status for these uses on over 70% of the listed lakes. Further, for those lakes for which there is information, most of this data is coming from the center of the lake, while pretty much all immersion recreation takes place at the beaches. I would appreciate an opportunity to sit down with DENR and discuss these and other issues (he use of fecal coliform versus *E. Coli* bacteria), both in the context of the 2008 IR, and long-term water quality assessment and public safety.

If you have any questions about my comments or need additional information, please let me know. Otherwise, I look forward to your response.

Sincerely,



Jay P. Gilbertson
Manager/Treasurer

Response to Comment:

1. DENR received the aforementioned letter on September 28th 2007. This letter described bacteria monitoring efforts being conducted by East Dakota Water Development District (EDWDD) with an emphasis on support of the immersion recreation beneficial use of Lake Herman. The letter indicated that Lake Herman was experiencing elevated levels of fecal coliform bacteria according to non-certified screening methods. Based on the screening results, additional samples were collected and sent to the State of South Dakota Health Laboratory for analysis with EPA approved methods. Two independent samples (May and September) yielded fecal coliform concentrations in excess of the state standard for immersion recreation. Both samples were collected near the mouth of the northern most tributary to Lake Herman.

DENR did cross-check the fecal coliform data provided by EDWDD to conventional data collected at the public beach to determine if an impairment was evident. During the 2006-2007 sampling season (May 1 to September 30) thirty-one fecal coliform samples were collected at the public beach. All samples were well below the immersion recreation standard with the majority (94%) of the samples registering below detectable limits. In addition, DENR sampled fecal

coliform during August 2007 from the public boat landing, and the result was also below detectable limits. Results of these efforts including that of EDWDD indicated full support of the limited contact and immersion recreation beneficial uses in accordance with listing methodologies described in the 2008 Integrated Report (IR).

DENR is subject to performing data analysis during a reporting cycle for the IR by August of the previous cycle year in order to complete the report by the EPA deadline of April 1. DENR sends out a request letter to many natural resource entities to request supplemental data. In this request, the department requires entities to submit data no later than August 1 and to provide the data in electronic format. DENR will work with EDWDD in the future to facilitate this process to ensure results from the bacterial monitoring project get incorporated into lake specific datasets used for IR development.

2a. Watershed assessment and implementation project data is managed and maintained by DENR and is used in waterbody support determinations. Thus, the reference to the various sources of data used in compilation to this data is a correct statement. Although DENR appreciates the efforts of contractors, including East Dakota Water Development District, the data collected under the terms of the contract is property of DENR and is considered an internal source of data. Therefore, EDWDD was not listed in the Integrated Report as an external data source, although data collected by EDWDD was used.

DENR invites the opportunity to discuss any differences and would like to clarify that waterbody support determinations are made from a compilation of data, including watershed assessment and implementation projects, WQM data, and data submitted by external sources, including USGS, and the cities of Watertown, Huron, and Sioux Falls. The reporting period used for streams is 2002 to 2007.

With regards to Oakwood Lakes and School and Bullhead lakes, it is possible that the results described in the respective assessment reports deviate from those generated from analysis specific to 303(d) listing for this 2008 cycle. DENR has reviewed these assessment documents and provided edits in response to EPA's comments associated with final approval. It is plausible that the conclusions formed by EDWDD have changed as a result of these edits. While the lake assessments in question provided a wealth of water quality information, all pertinent water quality information available for each lake was used to generate 303(d) and 305(b) reporting elements within an 8 year index period for this reporting cycle. DENR recommends EDWDD contact project officers assigned to the respective lake assessments to discuss specific outcomes.

2b. SD DENR recognizes the efforts of the volunteer monitors as an essential dataset that has great potential for tracking the water quality of the state's lakes and streams. In the past, there has been a great amount of uncertainty regarding exact sample location and an assurance that collection procedures were in accordance with the state's EPA approved standard operating procedures, including quality control measures. Efforts to remedy this began in 2005. Since then, East Dakota Water Development District has assisted the department in collecting the required information to use this data. DENR anticipates that data collected by volunteer monitors will meet usability requirements, and will be incorporated into the 2010 Integrated Report.

In terms of Secchi depth, site location is a limiting factor. Trophic state is characterized with measures collected at various locations within the deeper portion of lake basins. Volunteer monitors are often limited to taking Secchi measurements from docks within the littoral zone or shoreline margins. This data is best used to develop trends in water clarity and not for characterizing trophic state.

DENR is working with EDWDD to resolve issues associated with the use of Secchi depth data collected by volunteer monitors. As part of this cooperation, site locations are being established and data is being submitted directly to DENR. In addition, DENR's new database will facilitate the inclusion of volunteer monitoring data with conventional data used for IR development. It is anticipated that a wealth of Secchi depth data will be used to generate results associated with trophic state in the 2010 IR.

3. DENR recognizes that this number agreement can be confusing, and we commend EDWDD for addressing this issue. DENR has classified 570 lakes statewide with multiple beneficial use criteria. A total of 142 lakes out of the 570 have been assessed for trophic state since 1989. However, during this reporting cycle, lake data within an 8 year index period was used to generate the required 303(d) and 305(b) reporting information. To stay consistent with the 8 year index period, only 118 lakes were assigned a trophic status. The remaining 24 lakes did not meet the index period criteria. These lakes have been assessed, but it was determined that not enough data was available to assign a trophic status with any degree of confidence (i.e. unknown). This subset of lakes was also included in the support tables as insufficient data for their associated fish life beneficial uses. According to EPA Region 8, lakes should not be removed from the support tables if they are no longer being assessed nor have sufficient data to make a support determination. They remain in the "system" until they are re-assessed. The unknown category is in place so that consistency can be maintained between 305(b) and 303(d) reporting elements. Once a lake has been assessed it is now on record; and the number of assessed lakes should remain the same or increase in future cycles. Therefore, the unknown category does in fact imply that the unknowns need to be re-evaluated.

Table 14 was generated using EPA's ADB-assessment database, which was designed to help states generate reporting elements. DENR has entered 142 lakes in the ADB database along with all associated reporting information for each lake. If a lake has never been assessed, both in this or previous reporting cycles, it would not be included in this database. This particular report was generated from the ADB and interpreted as explained above with the unknown category as the main qualifier. DENR uses the ADB to generate reporting elements consistent with EPA's IR guidance.

4. An active assessment on Covell Lake is not currently in progress. This error was corrected to indicate that an assessment of Covell Lake is currently in the planning phase. An assessment of Covell Lake will be incorporated into a TMDL project being proposed by the city of Sioux Falls within city limits.

5. An error in support status was made regarding the recreation beneficial uses for Blue Dog Lake. As a result, immersion recreation was changed to non-support which is consistent with

previous reporting cycles. During the index period of this reporting cycle Blue Dog Lake was not assessed for fecal coliform rendering a "not assessed" support status for the limited contact recreation beneficial use.

6. Lake St. John in Hamlin County is assigned the beneficial uses (6) Warmwater marginal fish life propagation; (7) Immersion recreation waters; (8) Limited contact recreation waters; and (9) Fish and wildlife propagation, recreation, and stock watering waters. (8) Limited contact recreation has been added to the summary page and the (10) Irrigation waters use has been removed.

7. Two reaches along the Big Sioux River are listed as impaired for nitrates. This part of the Big Sioux River includes the beneficial use classification (1) Domestic water supply waters, which has a more stringent nitrate criterion than that of waters not designated as such. In addition, waterbody support determination for streams includes five years of data. Data compiled from watershed assessments, USGS, the city of Watertown, and WQM data from the last five years indicate nitrate impairment for these two reaches.

8. Yes, results from various sources, including the Lower James River Assessment, were used to determine waterbody support. Watershed assessment and implementation project data is identified as "DENR," "WRAP," or "LA" under the "Basis" heading in the basin summary tables.

9. The director of the Oak Lake Field Station (OLFS) samples fecal coliform bacteria on a weekly basis during the period of May 1 through September 30. Samples are collected from a canoe dock located off the west-central shoreline of the lake. This location represents a high use area due to summer recreation and educational activities associated with the OLFS. Weekly samples are sent to the State of South Dakota Health Laboratory for analysis in accordance with EPA approved methods. This fecal coliform data is then submitted to DENR. These data were examined in agreement with recreational use listing methodologies described on page 29 of this document. Based on this criterion, it was determined that Oak Lake was in full support of the limited contact and immersion recreation beneficial uses.

DENR has sampled Oak Lake once in the past eight years rendering insufficient information to make support determinations for the remaining beneficial uses in question. The director of the OLFS has indicated to DENR that a comprehensive limnological investigation of Oak Lake is conducted monthly during ice-free conditions and that a wealth of water quality information exists. It is the intention of DENR to take the necessary steps required to obtain water quality data from the OLFS for the purpose of making support determinations for all beneficial uses associated with Oak Lake. DENR expects this matter will be resolved in the 2010 reporting cycle.

10. Yes, results from various sources, including the Vermillion River Assessment, were used to determine waterbody support. Watershed assessment and implementation project data is identified as "DENR," "WRAP," or "LA" under the "Basis" heading in the basin summary tables.

11. The Central Big Sioux River and Lower Big Sioux River project are still considered by DENR to be in the assessment phase. Many reaches within these projects do not have approved TMDLs. Implementation activities may be in place in these watersheds; however, before a TMDL is approved by EPA, the project has technically not moved out of the assessment phase.

12. Five years of water quality data is used to determine waterbody support for streams. Split Rock Creek was delisted for TSS because assessment data collected by East Dakota Water Development District within the previous five years did not indicate any TSS violations. Differences in hydrological conditions of Split Rock Creek from earlier assessments (2001 – 2002) to recent assessments (2005 -2007) may account for water quality attainment. The TMDL for TSS in Split Rock Creek is still awaiting final approval by EPA. Removing Split Rock Creek from the 303(d) list should not affect the TMDL or planned implementation activities in that watershed.

DENR has recognized shortcomings associated with providing support determinations for lake recreation beneficial uses. DENR has incorporated fecal coliform monitoring into the sample regime during statewide lakes assessment (SWLA) visits. Fecal coliform data has also been made more accessible through database advances in which results of assessment projects are incorporated into recreational use support determinations. Fecal coliform data collected at 57 public beaches across South Dakota is also used to make support determinations. During this reporting cycle approximately 60% of the assessed lakes were assigned a support determination for the recreation beneficial uses which indicates progress is being made. In addition, DENR has expressed support of the bacteria monitoring project conducted by volunteer monitors through EDWDD's Dakota Water Watch program. This project will provide fecal coliform data to enhance DENR's ability to make support determinations for the recreation beneficial uses of select lakes.

DENR continues to consider an optimal sample location to best determine support for lakes on an individual basis, especially when public beaches are not formally established. During project assessments samples are collected in the basin or deeper portion of lakes and during SWLA visits samples are collected at established (public or otherwise) boat landing sites. Both locations offer representation for both swimming and boating activities. DENR is willing to further discuss in detail, the concerns of EDWDD in relation to protecting the recreation beneficial uses of South Dakota waterbodies.

Comment:
Mike Williams, Upper Big Sioux River Watershed Project

My observations are limited to the Northern Big Sioux River. However, on page 37 lake water quality assessment criteria lists three parameters for not testing waterbodies. It has been my understanding that state law says that all water, above or below the surface belongs to the public. It is apparent that access may be denied but the water is public.

Beginning on page 64 there are several lakes listed (Day and Marshall Counties) that are not in the Big Sioux Basin.

Response to Comment:
The criterion "publicly owned" was removed from page 38 of the 2008 IR. Due to limited time and resources, DENR primarily focuses its monitoring efforts on those lakes; 1) with public access and; 2) that are of regional significance. However, DENR is not limited to this general rule and may sample lakes located on private property with appropriate permissions.

DENR uses advanced GIS tools to establish drainage boundaries based on hydrologic unit codes (HUC). DENR has discussed this issue with Mike Williams and acknowledges that most lakes in Day and Marshall Counties are isolated due to geographic barriers and do not flow directly into the Big Sioux River during normal hydrologic conditions. However, most lakes in Day and Marshall Counties would flow to the Big Sioux River in the event of abnormally high water levels or if the natural barriers were breached. Therefore, DENR believes that these waterbodies are placed in the correct drainage basin for the intended purposes of the IR.

Comment:
Craig Bobzien, Black Hills National Forest, United States Department of Agriculture

United States Department of Agriculture
Forest Service
Black Hills National Forest
Supervisor's Office
www.fs.fed.us/r2/blackhills
1019 N. 5th Street
Custer SD 57730-8214
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File Code: 2530-3
Date: March 7, 2008

SHANNON MINERICH
DEPARTMENT OF NATURAL RESOURCES,
SURFACE WATER QUALITY PROGRAM
523 EAST CAPITOL AVENUE
JOE FOSS BUILDING
PIERRE, SD 57501-3181

Dear Shannon:

Various Black Hills National Forest personnel took the opportunity to review the draft 2008 South Dakota Integrated Report for Surface Water Quality Assessment that was available for comment at http://www.state.sd.us/denr/denr.html. The Forest would like to commend the Department of Environment and Natural Resources on the information presented in the report and the quality of the document. At this time we have no comments specifically regarding the report.

The Forest does have a request that relates to the report. Throughout the year, the Forest completes many assessments and environmental analyses that include addressing water quality. For the completion of environmental documents, it would be beneficial to have a GIS coverage that delineates the stream reaches and lakes and their assigned beneficial uses for the Black Hills area. If you could make that coverage available, please contact Deanna Reyher, Forest Watershed Coordinator or Lorrie Martinez, Forest GIS Specialist at (605) 673-9200 regarding any coordination needed for providing that coverage to the Forest.

Thank you for the opportunity to comment on the draft Surface Water Quality Assessment.

Sincerely,

/s/ Craig Bobzien
CRAIG BOBZIEN
Forest Supervisor

cc:
Deanna Reyher
Lorrie A Martinez

Response to Comment:
GIS coverage that delineates stream reaches and lakes is available at:
ftp://ftp.state.sd.us/DENR/IntegratedReport/.

GIS coverage for waterbody beneficial use is available by contacting:
http://www.epa.gov/waters/data/downloads.html

Comment:
Mary Jo Stueve, Clean Water Action

In response to the Department's call for public comments from the general public and other interested parties and organizations on the draft 2008 South Dakota Integrated Report for Surface Water Quality Assessment, Clean Water Action submits the following comments/requests based on the assertion found on page 43 of the draft. "Baseline data evaluations are used as a management tool to determine the effectiveness of control programs on existing point and nonpoint sources and for directing future control activities."

Clean Water Action notes with particular concern, the absence of levels of mercury, or warning thereof for Big Stone Lake, the Whetstone River or most water bodies in Grant and Roberts counties.

With the Big Stone II permitting project going forward – and already over thirty plus years of operation of Big Stone Plant Unit 1 – Clean Water Action requests high-priority status to get baseline data for Roberts and Grant Counties. In particular, with regard to mercury content (water, fish tissue, lakes and river sediment), but also, heavy toxins tied to the burning of coal.

Recent statistic from the Center for Disease Control (CDC) show that the four counties (Grant and Roberts in SD) (Traverse and Big Stone in MN) in close proximity to the Big Stone Plant (windward emissions) carry extraordinarily high cancer death rates, even when adjusted for age. These counties show up as red alert.

Moreover, in a letter from Otter Tail Power to South Dakota DENR dated December 21, 2005 RE: Otter Tail Power Company solid Waste Permit Number 02-25, Otter Tail Power indicated that the average coal burned per year with the addition of Big Stone II would come to 4.5-5.0 million tons with an estimated 639-710 pounds of mercury present. This poses great risk to vulnerable populations. Without baseline data, determining mitigation or safety measures nearly impossible.

Our office would be happy to compile supporting documents and data on mercury content and risk, as well as the two documents referenced above. Please add our office to the notification list in the future. We did not receive a notice of availability.

CLEAN WATER ACTION has a long history of supporting citizen efforts to protect water resources, promoting sound solid waste management, pushing for agriculture policies that strengthen rural communities, and working for a transition to clean renewable energy.

Response to Comment:
The State of South Dakota has an active Fish Flesh Contaminants Program and shares fish flesh contaminant data with other states and organizations. Since 1994, the program has collected or acquired data from more than 130 locations within South Dakota. DENR is actively collecting baseline fish flesh contaminant data from the northeastern part of South Dakota in anticipation of Big Stone II. DENR has fish tissue mercury data available on many lakes in the Big Stone area, including: Big Stone Lake, Canby Creek, Lac Qui Parle River, Pipestone Creek, Split Rock Reservoir, Lake Traverse, Lake Hendricks, and the Whetstone River. South Dakota has issued fish consumption advisories on six waterbodies scattered throughout the state, none of which are in Roberts or Grant Counties. Additional information on South Dakota's Fish Flesh Contaminants program, including waterbodies sampled, is available at:
http://www.state.sd.us/denr/DES/Surfacewater/Fish.htm. Information regarding border waters sampled by bordering states or other organizations is available by contacting: Shannon.Minerich@state.sd.us. To address mercury in water and sediments relating to accumulation in fish tissue, South Dakota is developing a statewide mercury TMDL. A summary of the TMDL is described below:

"Existing fish mercury concentration data will be reviewed to determine relationships between lake trophic status, biomagnification indices, geospatial locations, and other relevant factors as they compare to elevated mercury fish tissue concentrations. Lakes and small impoundments will be grouped separately to explore relationships between fish mercury concentration and physical/biological attributes. Approximately six to eight lakes (depending on data available) will be assigned to each grouping for assessment tasks described later. Lake grouping will also take into account the various geographic regions of South Dakota (i.e. eastern, central plains, and Black Hills).

Existing lake water quality data will be reviewed to determine whether relationships exist between water quality and elevated mercury fish tissue concentrations. The lakes, [classified as explained above], will be assessed to determine whether relationships between existing water quality parameters and mercury fish tissue concentrations exist. Water quality parameters that will be reviewed will include: TSS, DO, pH, sulfate, alkalinity, nitrogen (nitrate, nitrite, total nitrogen, TKN), chlorophyll A, phosphorus (phosphate, total phosphorous), tropic state index (TSI), percent submerged vegetative cover, water residence time (for impoundments), turnover rate, and other water quality parameters that may be routinely collected.

The existing lake water quality database will be supplemented through the collection of water quality parameters that may not be routinely collected by DENR and GF&P. These supplemental water quality parameters are important for understanding MeHg transformation within aquatic systems. For each of the lake groupings, the following water quality parameters will be analyzed: sulfur (sulfate and sulfide for quantification of sulfate reducing bacteria activity), carbon (total and dissolved organic carbon), and oxidation-reduction potential (ORP) and dissolved oxygen (DO) as a function of depth.

Estimates of bulk mercury deposition will be determined using passive samplers. A total of six bulk samplers will be deployed across South Dakota in order to provide total mercury deposition estimates across South Dakota. In addition, mercury deposition rates for the individual monitors

will provide useful data to determine whether local or regional mercury deposition "hot spots" exist due to the proximity of regional coal-fired power plants to advisory lakes. Bulk samplers will be placed near several advisory lakes, in addition to other locations within South Dakota in order to provide state-wide spatial mercury deposition estimates."

The South Dakota Department of Health has collected information on South Dakotans with cancer since 2001. Information on cancer in Grant and Roberts Counties is provided in the table below. Both incidence and mortality rates are given in order to determine if there are more cancers in these counties compared to the rest of South Dakota. The rates show the number of cancers expected if there were 100,000 people in these counties. They have also been adjusted to take into account the age distributions of the counties since people with cancer tend to be older.

Incidence Rates	**3-Year (2003-2005)**
South Dakota	484.5
Grant	448.5
Roberts	348.6

Mortality Rates	**5-Year (2002-2006)**
South Dakota	189.7
Grant	166.9
Roberts	192.8

Comparing the rates of cancer in these counties to the state of South Dakota, there does not appear to be any excess cancer in these counties.

Although the addition of Big Stone II will increase the total amount of coal burned by Big Stone I & II, the amount of mercury emitted to the atmosphere will not increase. As required under PUC order and transmission line permit requirements, Big Stone I & II combined must not increase emissions of sulfur dioxide, nitrogen oxide, and mercury above predefined 2005 base levels. This will be achieved by Big Stone I & II using an emissions control system. So although there is an increase in coal burned on an annual basis, mercury emissions will not increase due to the emissions control system.

Comment:
Bruce Van Haveren, Adjunct Professor, University of Colorado-Boulder

I wish to comment on the following:

p. 160 -- PUBLIC HEALTH/AQUATIC LIFE CONCERNS

The proposed Big Stone II coal-fired electric-power generation plant has raised important air and water quality issues. Since 1975 the existing Big Stone I power plant has emitted particulates that include mercury, cadmium, chromium, arsenic, and selenium. Given that the prevailing wind direction in northeastern South Dakota is southeast or south-southeast during the spring, summer, and early fall periods, those emissions travel in the direction of the northern portions of the Prairie Coteau, including much of the Lake Traverse Reservation.

Inorganic mercury is known to react with bacteria in waterbodies and form methylmercury, a neurotoxin. Methylmercury is known to bioaccumulate in fish tissue through a variety of potential biological pathways. Inorganic mercury and the heavy metals listed above tend to

accumulate in the bottom sediments of lakes and wetlands. Contaminated sediments in shallow lakes and wetlands are susceptible to resuspension in the water column during wind events.

Little or no background or baseline data have been collected on these potential toxins and heavy metals within the airshed of the Big Stone plant. A significant expansion to the existing plant has been proposed by Ottertail Power and its cooperators. The new plant, known as Big Stone II, will significantly increase both the amount of coal burned and the emissions. This is a serious concern for humans who consume fish from these waters. The northern portions of the Prairie Coteau contain rare and unique wetlands, including rich prairie fens that provide habitat for rare, threatened, and endangered plants. Aquatic ecosystems may be at risk from toxic levels of methylmercury and heavy metals residing in the bottom sediments of these wetlands.

Please address these issues in the final report.

Response to Comment:
The South Dakota Fish Flesh Contaminants Program is a collaborate effort among DENR, GF&P, and DOH. The purpose of the program is to collect data on contaminants in fish tissue, including mercury, cadmium, selenium, PCBs and pesticides. Data is used to determine contaminant levels in fish tissue and advise the public. Fish tissue, from many lakes in the northeastern portion of South Dakota, including lakes in Grant, Deuel, Day, Marshall, and Codington Counties, have been sampled for contaminants. For the past several years, DENR has targeted specific waterbodies based on their proximity to Big Stone and in anticipation of Big Stone II. South Dakota is in the process of collecting data on fish tissue contaminant levels in the Big Stone area. Additional information regarding waterbodies in South Dakota sampled for fish tissue contaminants is available at:
http://www.state.sd.us/denr/DES/Surfacewater/Fish.htm. Information regarding border waters sampled by border states or other organizations may be obtained by contacting: Shannon.Minerich@state.sd.us. South Dakota has issued fish consumption advisories on six waterbodies scattered throughout the state. The location of the impaired waterbodies does not indicate a localized problem; however, DENR is in the process of developing a statewide mercury TMDL. A summary of the TMDL is available on page 237.

The combination of Big Stone I & II will increase the amount of coal that is burned on an annual basis; however, mercury emissions will not increase. As required under PUC order and the transmission line permit, emissions of mercury, sulfur dioxide, and nitrogen oxide may not exceed predefined 2005 baseline emission levels. Big Stone will achieve this through an emissions control system that will reduce mercury and other pollutants from the emissions.

Comment:
Thomas R. Johnson, Region 8, United States Environmental Protection Agency

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 March 10, 2008

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

Re: Year 2008 South Dakota Integrated Report
for Surface Water Quality Assessment

Dear Ms. Minerich:

We have reviewed the Department's draft 2008 Integrated Report for Surface Water Quality Assessment and appreciate the opportunity to provide comments. We commend the Department of Environment and Natural Resources (DENR) for the use of the integrated report (IR) format, the Assessment Database (ADB), and associated GIS files for reporting both the Section 305(b) Water Quality Report to Congress and the Section 303(d) list of impaired or threatened waterbodies.

DENR's draft IR is well-organized, comprehensive, and detailed. However, we have some comments that should be addressed prior to finalizing the document.

Please contact me at 303-312-6226, should you have any questions with regard to our comments. Again, we appreciate your diligent work on this report.

Sincerely,

Thomas R. Johnson
Monitoring and Assessment Team
Water Quality Unit
Ecosystems Protection Program

Specific Comments on the 2008 Draft Integrated Report

General

• EPA commends DENR for assessing many new streams in this cycle than the previous cycle. This is especially true for the Big Sioux and White River Basins.

• EPA also commends DENR for including a thorough discussion of wetlands in the IR It would be helpful if DENR would also include discussions (in the Surface Water Quality Monitoring Program section) of the present intermittent streams study and the potential use of probability monitoring of lakes in the future.

Response to Comment:
The suggested information has been added to the Surface Water Quality Monitoring Program section on pages 8 and 9.

• DENR did not include waterbody or assessment unit IDs in the river basin tables of waterbody status. In the 2008 IR letter of May 15, 2007, EPA Region 8 noted that states need to include this information. In the same letter, it was also requested that the year the waterbody/pollutant combination was first listed and a TMDL schedule be included for category 5 listings.

Response to Comment:
Assessment unit IDs (AUID) have been added to the basin tables. The year that the waterbody/pollutant combination was first listed and TMDL schedule for category 5 listings has been included as Appendix F.

Assessment Methodology

• Future versions of the assessment methodology should provide methods for interpreting narrative criteria. The present monitoring scheme used by DENR (focused on monitoring certain chemical parameters at fixed stations) allows for excellent coverage of the state. However, DENR could improve assessments with the addition of biological monitoring, which could detect problems not necessarily revealed with chemical sampling only, especially the parameters typically sampled. EPA supports the present emphasis DENR is placing on determining reference sites, as this will greatly improve DENR's assessment capabilities. Additionally, incorporating biological monitoring in assessments may help to alleviate some of the problems associated with waterbodies going in and out of category 5 from one cycle to another.

Response to Comment:
DENR is in the initial stages of developing a reference network for streams within the Glaciated Plains ecoregion of eastern South Dakota. This reference network is expected to provide the state with a framework for developing bioassessment tools capable of addressing issues associated with the shortcomings of chemical surveys. Progress related to the development of this bioassessment effort will be updated in future IR reports.

• On page 26, it would be helpful if the assessment methodology included a discussion on how and what parameters are used for assessing irrigation and domestic water supply use, similar to the discussion for fish and aquatic life propagation and recreation uses.

Response to Comment:
A discussion on parameters used in support determination for domestic water supply and irrigation uses has been included in the methodology section on page 27.

• DENR should add fecal coliform to the list of conventional pollutants in Table 6 of the assessment methodology so it is clear that pathogens are assessed as conventional pollutants.

Response to Comment:
Fecal coliform bacteria has been added to Table 6 as a conventional parameter.

• It is implied in the IR that the threatened category is applied to a waterbody when the data does not definitively require listing as nonsupporting, but other circumstances warrant it. The assessment methodology should outline how a threatened determination is made for a waterbody.

Response to Comment:
A discussion of threatened waters has been added to the methodology section on page 26.

• Presently, most use support is determined by the percentage of samples meeting or exceeding acute water quality criteria. It is unknown at present how many waterbodies may be meeting acute water quality criteria but not chronic criteria. However, in the future DENR also needs to consider assessing use support based on chronic criteria.

Response to Comment:
The sampling design of fixed WQM stations, watershed assessment and implementation projects, and data submitted by external sources, does not meet assessment criteria for chronic water quality standards criteria. In the event that data collected meets chronic assessment criteria, chronic water quality standards will be applied and support determinations made based on that criteria.

Fish Kills

• On page 163 it is noted that the James River near Huron experienced a major fish kill of approximately one thousand fish on November 7, 2006. Ammonia was thought to be the cause, but from an unknown source. Another unspecified segment of the James River had major fish kill attributed to low dissolved oxygen on July 10, 2005, which was noted in the 2006 IR. While these may not be in the same segment, major fish kills in the James River appear to be fairly common. Please explain why this fish kill does not warrant a listing, especially since there are numeric criteria for ammonia. At a minimum this segment(s) should be monitored carefully in the future, perhaps with biological indicators since routine chemical monitoring is not detecting these problems.

Response to Comment:
DENR reviews the cause(s) of a fish kill, the waterbodies' designated uses and water quality data to determine impairment. The James River is classified as a semipermanent fishery; therefore occasional fish kills are not considered an impairment. However, if a fish kill is attributed to human activities and is a reoccurring problem, DENR considers listing the water as impaired. Elevated ammonia levels were detected following the November 7, 2006, fish kill investigation. While this toxic parameter was labeled as the cause it was attributed to an unknown source. Based on this single sampling event insufficient data was collected to justify listing the segment as impaired based on toxic listing criteria described in the 2008 IR. Ambient water quality monitoring at 13 stations along the James River did not identify ammonia as a problem or cause of impairment during this listing cycle. Nonetheless, several segments on the James River are listed as impaired for dissolved oxygen, total suspended solids and fecal coliform bacteria.

DENR is scheduled to conduct a comprehensive watershed assessment project on the upper James River beginning in the spring of 2008. The Upper James River project boundary encompasses the segment in question. Chemical, physical and biological assessments will be conducted on many main stem and tributary reaches within several segments of the upper James River watershed. Information gained from this effort will be used to identify causes and sources of impairment to the upper James River.

GIS Files

Basin / Waterbody	Comments
Cheyenne / Box Elder Creek_02	This description of this segment in the IR does not match what is shown in both the GIS files and the map in the IR. It appears to be a downstream segment. ***Response:*** *The map labels were mismatched for the two reaches on Box Elder Creek. This has been corrected.*
Grand / Willow Creek	This segment was not listed in the 2006 IR, but in the 2006 cycle it was in category 5 in both the IR map and in GIS. For 2008, it was not in the IR segment description, but the IR map and GIS files have it listed as a category 3. Clarify the status of this particular stream segment. ***Response:*** *In 2006 the Willow Creek segment was placed on the basin map and in the GIS files in error. DENR did not have sufficient information to determine support at this location. DENR made the decision not to create a new reach for this waterbody. In the 2008 report, Willow Creek was not assessed.*

Assessment Database

In reviewing the Assessment Database (ADB) provided with the IR, it was found to generally match the information provided in the Integrated Report, with the exceptions listed below:

Basin / Waterbody	Comments
Big Sioux / South Buffalo Lake	In the ADB this lake is listed as nonsupporting for warmwater semipermanent fishlife, but no causes were listed. However, in both the IR and GIS this segment is listed as fully supporting. ***Response:*** *It was determined that South Buffalo Lake fully supports the semipermanent fish life beneficial use. As a result, the ADB was corrected to indicate full support. The IR, GIS map and ABD are now in agreement.*
Big Sioux / Split Rock Creek	The ADB lists this stream segment as nonsupporting immersion recreation and warmwater semipermanent fishlife, but no cause is listed for aquatic life nonsupport. In the IR it is listed only as nonsupporting for immersion recreation. ***Response:*** *Split Rock Creek is fully supporting the aquatic fish life use. This has been corrected in ADB.*
Cheyenne / Sheridan Lake	In the ADB this lake has a threatened flag under coldwater permanent fishlife. This is included in the total miles threatened table for lakes in the IR, but not in the individual description of this lake. ***Response:*** *The threatened acronym "TH" has been added to the basin table for Sheridan Lake.*

Partially, but not completely the result of the above discrepancies, a number of the results tables from the ADB do not match those in the IR. These are discussed below:

Causes (Comparison of Table 12 in the IR to ADB Report)
• The ADB lists 128 stream miles impacted by TDS, while the IR has only 91 miles.
• The ADB lists 55 acres impacted by fecal coliform, while the IR has 1611 acres. This appears to be an error in the IR since only Freeman Lake at 55 acres is listed for fecal coliform.
• The ADB lists 55 acres as impacted by conductivity (Freeman Lake), while the IR table does not list any.
• The ADB lists 9383 acres impacted by TDS and the IR lists 9283 acres. Since all the same lakes in both the ADB and IR are listed this may be simply a math error.

Use Support for Streams (Comparison of Table 10 in the IR to ADB Report)
• The total stream length for full support and nonsupport for warmwater semipermanent fishlife and immersion recreation do not match between ADB and the IR. This is most likely due to the discrepancy over Split Rock Creek.
•Nonsupporting stream length totals for limited contact recreation also differ between ADB (1381 miles) and IR (1361 miles).

Use Support for Lakes (Comparison of Table 11 in the IR to ADB Report)
• Total acres listed for full support for warmwater semipermanent fishlife reported in the ADB (24,636 acres) does not match the IR (26,677 acres). This is probably due to the discrepancy over South Buffalo Lake.
• Total acres listed for both full support and nonsupport for immersion recreation reported in the ADB (95,138 acres full support, 4944 acres nonsupport) does not match with those reported in the IR (95,043 acres full support, 6501 acres nonsupport).

Response to Comment:
The above referenced discrepancies have been corrected in the ADB. New data was generated and exported from ADB and used to update the 2008 IR. As a result, the stream miles and lake acreages in question have been reconciled accordingly.

Comparison of ADB Delisting Table to Appendix B of the IR
• Bullhead Lake_02 (Big Sioux Basin) is shown as delisted in the ADB for pH, but there is no mention of delisting for pH in the IR.
• Byron Lake (James Basin) is shown as delisted in the ADB for sedimentation/siltation, but there is no mention of this delisting in the IR.
• Lake Oliver (Minnesota Basin) is shown as delisted in the ADB for TSI, but there is no mention of this delisting in the IR.

Response to Comment:
<u>Bullhead Lake -02 (Big Sioux River Basin)</u> -pH has been added to Appendix B.
<u>Lake Byron (James River Basin)</u> - EPA approved a TMDL for sedimentation/siltation in 1999; therefore, this cause was delisted in a previous cycle. In 2008, DENR delisted this cause in error. This delisting has been deleted from ADB.
<u>Lake Oliver (Minnesota Basin)</u> – Lake Oliver/TSI has been added to Appendix B.

Listing / Delisting Issues

• Approximately 99 category 5 listings are listed as priority 1 for TMDL development. Priority 1 waterbody listings are those waterbodies for which TMDLs are expected to be developed within the next 2 years (before the 2010 IR). Does DENR consider this number of priority 1 waters to be a realistic list of TMDLs that will be submitted to EPA for approval during the next two years? For 2008, DENR calculated that the number of TMDLs needed to be completed to stay "on pace" was 35. If the 2009 pace is similar to 2008, then it would appear that there are many more priority 1 waterbodies than the projected pace would allow for. Is the list of priority 1 waterbodies an accurate representation of what DENR intends to accomplish in the next 2 years?

Response to Comment:
DENR has reevaluated the TMDL priority schedule and has reduced the number of Priority 1 waterbodies/causes to 54. This amount represents a more realistic goal for TMDL approvals within the next two years. The basin tables have been updated to reflect this priority goal.

• In EPA Region 8's May 2007 letter detailing suggestions for the 2008 IR, we recommended that States include a separate table of delistings that include: 1) the assessment unit IDs and waterbody names being delisted; 2) the pollutants being delisted; 3) the new category for 2008; and 4) a brief justification for the delisting. The delisting table (Appendix B) did not include waterbody or assessment unit IDs, nor did it include the new category that the delisted waterbody/pollutant is being moved to.

Response to Comment:
Assessment unit IDs (AUID) and the 2008 EPA Category have been added to Appendix B.

• The following table contains those waterbodies where discrepancies were noticed between the 2006 IR and the draft 2008 IR, or where additional information is needed. Please respond to the comments listed in the last column.

Basin / Waterbody	2008 Listing	2006 Listing	Comments
Big Sioux / Lake Alvin	Category 5 - TSI	Category 5 – TSI; fecal coliform	Fecal coliform was removed from the 2008 list, but not mentioned in Appendix B (delisting). ***Response:*** *In the 2006 IR a category 4a was assigned to TSI and fecal coliform for Lake Alvin. EPA approved the TMDL for both parameters 11/9/01. Both parameters were delisted in a previous reporting cycle and removed from the 303(d) list. Therefore, it was not necessary to place Lake Alvin in Appendix B for fecal coliform.*
Big Sioux / Blue Dog Lake	Category 5 - TSI	Category 5 – TSI; fecal coliform	Fecal coliform was removed from the 2008 list, but not mentioned in Appendix B (delisting). The assessment report indicates that fecal coliform is still a major problem. ***Response:*** *EPA approved a TSI/fecal coliform TMDL for Blue Dog Lake 2/7/01. The 2006 IR indicates a 4a for both parameters. The 2008 IR support status and EPA category remained unchanged from 2006 IR. Therefore, it was not necessary to place Blue Dog Lake in Appendix B for fecal coliform.*
Big Sioux / Bullhead Lake – Marshall County	Category 3	Category 5 – TSI; pH	Table 19 in the basin description states that this waterbody was not assessed, but the delisting table describes that it now meets WQS and the original basis for listing is incorrect. A waterbody cannot be delisted simply due to a lack of data unless warranted by a change in the assessment methodology. The differences in delisting reasons need to be reconciled. ***Response:*** *Lake Bullhead in Marshall County was listed in error for the 2006 IR. It should have been a category 3. The delist reason was changed to "Original basis for listing was incorrect" in the 2008 IR delist table.*

Basin / Waterbody	2008 Listing	2006 Listing	Comments
Big Sioux / Pelican Lake	Category 5 - pH	Category 5 – TSI; Sedimentation	Appendix B states that sedimentation was removed as a cause due to lack of information. Unless the original basis for listing was incorrect, it cannot be removed due to lack of information. A new assessment must show that it is now meeting uses. ***Response:*** *In the 2006 IR a 4a was assigned to TSI and Sedimentation for Pelican Lake. A TMDL for both parameters was approved by EPA 12/26/96. Both parameters were removed from 303(d) listing in a previous reporting cycle. DENR placed Pelican Lake in the 2008 IR delist table in error. Therefore, it was removed from the delist table.*
James / Lake Hanson	Category 1	Category 4A - TSI	This lake is included in Appendix B, but it refers to sedimentation, not TSI. The 2006 IR did not have Lake Hanson listed for sedimentation. This should be clarified. ***Response:*** *This was a mistake in the delist table of the 2008 IR. Lake Hanson has been removed from Appendix B.*
James / Richmond Lake	Category 4A - TSI	Category 5 - TSI	This waterbody should be added to the delisting report in Appendix B. ***Response:*** *Richmond Lake was added to the delisting table in Appendix B with the appropriate delisting reason.*
Moreau / Dewberry Dam	Category 3	Category 5 - TSI	A waterbody cannot be delisted simply due to a lack of data unless warranted by a change in the assessment methodology. However, the delisting table states also that the original basis for listing was incorrect. Please clarify which is the case for this waterbody. ***Response:*** *Dewberry Dam has presented many challenges with respect to obtaining data for TMDL development. Nonetheless, DENR understands that a waterbody cannot be delisted due to a lack of data. Dewberry has been removed from the delist table in Appendix B and placed on the 303(d) list as a category 5 non-support for the permanent fish life beneficial use with TSI as the cause.*

Comments:
Larry Nelson, President, South Dakota Stockgrowers Association

Background:
The South Dakota Stockgrowers Association (SDSGA) is an organization of 1650 independent producers committed to representing the industry's needs in regard to animal health, trade, marketing and land use issues.

SDSGA appreciates the opportunity to provide meaningful input regarding the 2008 South Dakota Integrated Report for Surface Water Quality Assessment.

Comments:
SDSGA believes that the Clean Water Act should maintain its original focus on the control of discharges of pollutants to waters of the U.S. as is necessary to protect the classified uses of a particular water body which are designated by states.

SDSGA suggests a re-evaluation of the "contamination from livestock" (p.3) to determine how much of the contamination is actually caused by wildlife, including deer, antelope and prairie dogs.

Research has shown serious affects caused by prairie dogs, including blowing topsoil and fecal contamination, both deposited in nearby water sources. In excess of 625,000 acres of prairie dogs exist in South Dakota. The majority of these can be found in the White River shed. The maximum daily loads on the White River have increased in recent years with prairie dog fecal contamination.

The South Dakota Stockgrowers Association is very concerned about surface water quality and hopes to stay involved in this issue in the future.

Response to Comment:
The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. This objective is to be achieved by a set of national goals and policies. Section 101(a)(7) of the Clean Water Act states "it is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution." Section 319 of the Clean Water Act, titled Nonpoint Source Management Programs, requires states to identify and control nonpoint sources of pollution. Therefore, the original focus of the Clean Water Act was to address both point and nonpoint sources of pollution.

Sources of impairment are based on best professional judgment. A formal evaluation of the source of impairment is identified during watershed assessments and TMDL development. The department has done DNA bacterial source tracking sampling in several west river basins to identify potential sources of fecal coliform in the streams. The studies indicated that wildlife contribute to the overall source of fecal contamination; as a result, DENR has added "wildlife" as a source of fecal coliform contamination in watersheds where bacterial source tracking was conducted. Fecal coliform contamination from livestock is a source that may be reduced based

on best management practices. Fecal contamination from wildlife constitutes a natural background source in the environment and management is not feasible.

As commented by SDSGA, prairie dog populations are prevalent in portions of the White River watershed, and the White River is listed as impaired by fecal coliform. Source tracking data collected from May through September 2007, during the White River assessment project indicated that less than two percent originated from prairie dogs. These studies suggest that fecal coliform from prairie dog pellets have limited viability due to their small size (making them more susceptible to ultraviolet radiation which kill bacteria) and the arid climate in the White River basin.

Comment:
Charmaine White Face, Coordinator, Defenders of the Black Hills

Please accept these as our comments regarding surface water quality of the Cheyenne River, Rapid Creek, the Belle Fourche River, the Bad River, the Morreau River, the Grand River, the White River and the Missouri River.

Our concerns stem from the amount of uranium, radionuclides, and other radioactivity found in these rivers both from state studies and our own small sampling of some of these rivers. We are very concerned as these are the sources of drinking water for some communities and are used for agricultural purposes. We are also concerned about the river water that is being carried in pipelines across the state. The public needs to be informed of the dangers of nuclear radiation in the water.

More and more scientists agree that there is no safe dose of radiation. Even though EPA standards allow for small amounts of radiation, a purusal of current literature will show that more evidence is available on the serious consequences of even small doses of radiation. The high incidences of cancer, birth defects, infant mortality, and diabetes in South Dakota would indicate the presence of radioactivity in the water.

We strongly recommend the state pursue more vigorous testing for radioactive contaminants in the surface water, and primarily in the above named rivers. We also recommend an active public campaign to educate the public of the dangers of radioactivity.

Response to Comment:
In June 2007, DENR published a call for water quality data with 11 newspapers around the state and approximately 70 individuals and organizations. Water quality data was not received from Defenders of the Black Hills by DENR, thus DENR is unable to comment on water quality results obtained by Defenders of the Black Hills.

Rapid Creek and the Missouri River are designated with the beneficial use for (1) Domestic water supply waters and are used as water sources by public water systems. Public water systems use raw water out of these waterbodies, treat the water to applicable Drinking Water Standards, and supply the water to their customers. There have not been any exceedances of maximum contaminant levels of radiological parameters from drinking water derived from

surface water sources by public water systems in South Dakota. Water provided by public water systems, and the pipelines used to transfer the water, does not contain nuclear radiation and is not a danger to the public.

Based on information provided by the South Dakota Department of Health (DOH), the incidences of cancer, birth defects, infant mortality, and diabetes in South Dakota citizens are not significantly different than those same incidences in United States citizens. A recent review by the DOH concerning cancer incidences and death rates over a 33 year period concluded that "data do not indicate an association between uranium mines and cancer deaths." Although the aforementioned health issues are of concern, there have not been any exceedances of radiological parameters in public water systems derived from surface water. The statement by Defenders of the Black Hills that health issues in South Dakota indicate radioactivity in water is unfounded.

Based on comments in the 2006 Integrated Report provided by Defenders of the Black Hills, DENR added radiological sampling to routine water quality monitoring activities and added new monitoring stations. In total, 11 locations in western South Dakota are now routinely monitored for radiological parameters. These 11 water quality monitoring sites are located on the Cheyenne River, the Grand River (mainstem and south fork), the Moreau River, the White River, Beaver Creek (Fall River County), Crooked Creek, and Bull Creek. Additional information on site location and sample parameters is available in Appendix C. Based on data collected in 2006 and 2007, there have not been any surface water quality standard violations of these radiological parameters. DENR will continue to evaluate the Ambient Water Quality Monitoring program and make changes as necessary.

Comment:
Nancy Hilding, President, Prairie Hills Audubon Society

We regret that we have not been able but to give a cursory review to this important document and we request an extension, so we can review it in more depth before commenting.. We do however thank the Department for preparing this Report periodically, we save them and use them as reference during the intervening years.

We shall submit these comments, with more time they could be better.

1. Motorcycle Rally,

The Sturgis Motorcycle Rally brings in up to a half million persons to Western SD for a few weeks each year. We are not sure what the population of Western SD is but we suspect this influx at least doubles the population. We believe this sudden surge of human population puts stress on sewage systems through western SD. We would like the monitoring plan to reflect increased monitoring during and after the Rally to see the impacts to our streams and the adequacy of the sewage/septic treatment facilities, that serve the Rally folks and the communities they visit.

2. Bear Butte

We believe the Bear Butte area is an area that is important to many people. The Department of Transportation is planning a by-pass from I-90 to the intersection of State highway 34 and 79. This is about 3 miles from Bear Butte. We believe that intense development south of and around Bear Butte is likely unless the Meade Commissioners take some protective action, which is unlikely. We request increased monitoring, to establish a base line prior to increase development and to help understand impacts of Rally onto the relevant Creeks in the area which include but are not limited to Spring Creek and Bear Butte Creek. We don't think you monitor at Spring Creek.

There are periodic fish kills at Bear Butte Lake. The Department assumes these kills are due to loss of oxygen as Lake shrinks, however no testing of water quality is done. We request some testing/monitoring of the water quality at Bear Butte Lake.

3. Expected developments

Wyoming which is upstream is engaging in coal bed methane development and some in-situ uranium mining. There is exploration for hard rock mining north of Sundance . We hope you will monitor at the border for any pollutants such Wyoming development will send to SD.

We expect the DM&E or Canadian Pacific Railroad to build a brand new line from Wyoming to Wasta. It will up grade the line from Wasta to Minnesota. We hope you will engage in adequate monitoring to establish the base line before DM&E starts construction. After development we hope your monitoring is sufficient.

We expect in-situ uranium mining may happen in SD. We hope you will also engage in sufficient monitoring to establish base lines before the mining starts. After development we hope your monitoring is sufficient.

We are looking at proposed new or expanded coal mines, oil pipelines and oil refineries. We hope you will engage in sufficient monitoring to establish base lines before these new energy facilities are built. After development we hope your monitoring is sufficient.

4. Prairie Rivers

We hope you will work hard to monitor and clean up the Cheyenne and Grand River basins and address the issues associated with past not reclaimed uranium mines. We believe that some prairie rivers/streams were muddy naturally. Species such as the sturgeon chub actually need turbidity to help them survive. When aquatic species need turbidity, as they evolved with it, this need creates an irony/paradox where the addition of crystal clear water to a drainage, may actually actually be pollution and removing the turbidity harmful, as it changes the parameters the natural/historic aquatic life, evolved with. We hope the Department & GFP have identified all native species that depend on turbid water & protect their habitat.

Our organization has problems with some of the beneficial use/criteria and standards on some prairie streams and some of the addition of non-native fish to our water bodies. But we think that is an issue for rule making or GFP not this report.

The Department should try to figure out what is natural levels of turbidity or natural levels of suspended or dissolved solids and what is from mans activities.

5. CAFOs and Slaughter Houses

We don't think you monitor for phosphorous. We think phosphorous is an issue with land application of treated sewage water and we wish you would monitor for it in some places. We are not sure if that issue should be addressed in this document or other rule making.

In Aberdeen, SD a proposed beef slaughter house is working on a proposal to irrigate corn fields with the waste water from the "solid waste" residue left after washing down the slaughter house. They may send the waste water to the traditional City waste water plant or may spray the treated waste water over corn fields. There are difficulties in decontaminating surgical instruments from Creutzfeldt-Jakob or the new variant Creutzfeldt-Jakob-(Bovine_spongiform_encephalopathy - BSE). I wonder if BSE prion contaminated waste water that enters traditional waste water treatment ponds, would be killed by traditional waste water treatment?. I very much doubt it, as sterilizing prion contaminated material needs at least strong oxidation plus heat. Thus I wonder how European law handles the washing down/decontamination of slaughter houses, and specifically the decontamination of slaughter houses or other facilities that have been know to have processed/handled beef with BSE. How do they dispose safely of BSE contaminated beef and then sterilize the facility?

American testing for BSE in slaughtered cows is not thorough. I thus wonder if BSE cows are killed in a SD slaughter house undetected and the waste water or waste products are unknowingly disposed of through conventional means -- what exposure routes to humans, wildlife or livestock are created, especially as treated waste water may be dumped in streams. I also wonder at the proposed plant in Aberdeen spraying the wash water waste over the corn fields. Perhaps the potential exposure to livestock from such actions could be large and unprecedented.

I suggest that the Department investigate this issue and think of monitoring for prions downstream of slaugher houses, if such is feasible; however this may be an issue for rule-making not enforcement.

6. Intermittent waters

We believe only about 10% of streams are perennial and 90% are intermittent. We believe that to adequately protect SD waters much more monitoring of intermittent streams and water bodies is needed

7. Threatened and Endangered species and Comprehensive Wildlife Conservation Plan

We hope the Department will identify all water bodies that may be significant to survival of any federal listed threatened and endangered species and adequately monitor and protect such waters. We hope the Department will identify all water bodies that may be significant to survival of any state listed threatened and endangered species and adequately monitor and protect such waters.

We hope the Department will closely study Game Fish and Parks Comprehensive Wildlife Conservation Plan and implement monitoring and protections to achieve protection for species and habitat identified in that document. This document fails to make any commitments, evaluations or recommendations to use any regulatory or enforcement powers of the state to protect species or their habitats, and we believe that reflects the state's lack of will and lack of commitment to protection and restoration of at risk species in the State. We hope you will cooperate with GFP to put some teeth into protection of the priority species and habitat identified in this document.

8. Environmental Justice

When identifying which waters get TMDL enforcement and clean up programs, we hope you give fair consideration to waters near minority or low income people.

9. TMDLs

We wish you would clean up more waters hurt by non point source pollution & do it faster. We have never been sure why agriculture has so many exemptions from CWA enforcement actions, however that may be beyond the scope of this document..

We do not fully understand your priority system & how it has been applied. We wish for more time to review this document.

On page 36 of the Draft 2008 South Dakota Integrated Report, is your impairment chart. I don't see a section for storm water discharges. IWhy? Is it a subset of one of these categories like municipal point source discharge? I don't see a section for run off from dirt roads or timber sales. Why?

It indicates that of the Rivers/Streams waters that are impaired by "Natural Sources (including drought-related impacts) involve 1,749 miles of streams and 9,375 acres of Lakes/Reservoirs are also impaired by "Natural Sources".
What is a natural source. Is it wild lands undisturbed by man or land that has been modified by man's activities? For example is run off from the slopes of the Badlands formation considered a "natural source" and is the run off from an overgrazed pasture a "natural source". How do you decide what is natural?

We would like further clarification of impairment by "natural sources". If the "impairment" source is "natural", does it meet the definition of "pollutant" or "impairment". DENR should review the question --- if the problem is that the streams are "impaired" in a natural state, could

the problem be the beneficial use/criteria and/or standards, humans have assigned to them, not the "impairment".?

Response to Comment:
1. The temporary campgrounds in Sturgis and the Black Hills area have made arrangements to have the port-a-potties and vault toilets pumped nightly and the septage taken to the Sturgis wastewater treatment plant for treatment during the Rally.

The various wastewater treatment facilities in the area have been issued surface water discharge permits which require the facilities to sample the wastewater and remain in compliance with the permit limits while discharging to surface water. Many of the wastewater treatment facilities in the area, including the city of Sturgis, operate as total retention facilities, which do not discharge to surface water under normal conditions. These wastewater treatment facilities in the Black Hills area were designed to support the influx in tourism.

Several of the large campgrounds land apply graywater onto adjacent property from the showers and hand sinks. Graywater is non-industrial wastewater generated from domestic processes such as washing dishes, laundry and bathing. Graywater must be applied at a rate which will not allow runoff from the land application site.

The permanent campgrounds in the area have septic systems or lagoon systems that are designed for total retention and are checked by the South Dakota Department of Health during the Rally to ensure they are not surfacing or discharging. These systems are designed to handle the quantity of tourists, including the Sturgis Motorcycle Rally. For these reasons, DENR does not believe an increase in monitoring during the Rally is warranted.

2. Bear Butte Lake is a man-made impoundment that historically received water from runoff and an artesian well. The artesian well stopped flowing in 1987 and was capped. As a result, Bear Butte Lake has lost its primary source of water and is now completely dependant upon precipitation and runoff from a small watershed. Several years of drought in the Black Hills and surrounding area have impacted area waterbodies. Bear Butte Lake is often not accessible due to low water or dry conditions. Substantial precipitation is required to restore the fishery and recreational uses. Bear Butte Lake is classified as a (5) Semipermanent fish life propagation waters. As indicated on page 162 of this document, semipermanent lakes may experience occasional fish kills and not be listed as impaired if the fish kill is attributed to natural causes. Bear Butte Lake has had fish kills in previous reporting cycles. These fish kills were a result of low dissolved oxygen caused by drought- induced water levels. DENR will consider future investigative sampling of fish kills and water quality at Bear Butte Lake in the event water levels are restored and a fishery is re-established.

3. In response to coal-bed methane production in Wyoming, DENR established monitoring sites in 2001 near the South Dakota/Wyoming border on the Belle Fourche River and Cheyenne River to monitor potential impacts. DENR is also monitoring the Cheyenne River (and other waterbodies) for potential impacts related to in-situ uranium mining. This information is available in Appendix C of this document and depicts site location, sampling parameters, and other information pertaining to water quality monitoring throughout South Dakota. In this same

Appendix, you will also find information on water quality monitoring site location and parameters for other areas of interest including railroads and proposed oil pipelines and refineries.

4. The Cheyenne and Grand Rivers are both on the 303(d) list. A comprehensive watershed assessment and TMDL project is being conducted on the Cheyenne River. In addition, a similar project will be conducted on the Grand River in the future. Many of the questions associated with these two waterbodies are likely to be addressed through chemical, physical, and biological monitoring efforts associated with each of the respective projects.

5. DENR samples total and dissolved phosphorus at all WQM sites. This information is available in Appendix C of this document. The federal rules for CAFOs require that states develop technical standards for nutrient management for land application of manure. We have adopted the federal rules by reference in our state rules and have incorporated our technical standards into the state's general water pollution control permit for concentrated animal feeding operations.

6. DENR acknowledges that about 10% of the state's streams are perennial and about 90% are intermittent and has identified this in Table 1 of this document. Of the 142 WQM stations, 23 are located on intermittent streams. Intermittent streams must be flowing in order to collect water quality data. DENR believes the ratio of WQM stations on perennial streams to intermittent streams is adequate to ensure the public is provided with useful water quality information.

7. Threatened and endangered species protection, as well as the protection of other aquatic life, is evident though Administrative Rules of South Dakota (ARSD), Section 74:51:01:12, Biological integrity of water, and ARSD Sections 74:51:01:34-37, Antidegradation policies.

8 - 9. DENR's priority for TMDL development is influenced by:

- **the availability of willing, local entities to coordinate the TMDL work;*
- **whether there are other impaired waters or an ongoing implementation project in the area whereby activities or waterbodies could be combined to increase the efficiency in completing the TMDLs; and*
- **the size of the watershed to be studied, funding availability may also affect the priority.*

The source of impairment chart on page 36 of this document includes wet weather discharges and combined sewer overflow. Storm water discharges are included within either of those two categories. Sources of impairment are based on best professional judgment until a watershed assessment can support or disprove that decision. Best management practices are employed by the timber industry to minimize potential impacts of soil erosion to nearby waterbodies. Therefore, soil erosion from logging roads and timber sales has not been identified as a source of impairment by a watershed assessment nor identified by best professional judgment.

A natural source is defined in EPA's Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act as "Natural Sources can represent a combination of factors that are natural occurring, but one particular source could not be identified." This source description is typically assigned to a stream segment

where there are no known large human or domestic livestock sources of pollution. This source description is not limited to pristine areas but also is used for areas that are minimally impacted by humans or domestic livestock.

DENR thanks Nancy Hilding and the Prairie Hills Audubon Society for submitting comments to the draft 2008 Integrated Report and has provided department responses to those items that lie within the scope of this report.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

June 1, 2007

RE: Request for Water Quality Data

Dear Interested Party:

It is time for the department to begin preparation of the 2008 Integrated Report. The Integrated Report combines the 305(b) report and the 303(d) list into one report, which provides an assessment of the quality of South Dakota's surface water resources and identifies the impaired waters that require Total Maximum Daily Loads (TMDLs). Total Maximum Daily Loads calculate the amount of pollution a water body can receive and still meet water quality standards along with supporting assigned beneficial uses. Once TMDLs are determined, local, state, and federal activities can be directed toward improving the quality of the water body.

To develop an accurate, defensible, and comprehensive list, the department is soliciting water quality data or other information you may have to help us determine the quality of South Dakota's waters. Chemical, physical, or biological data will be considered. Data that represent the condition of a specific water body will be used to update the 303(d) list. Only data less than eight years old and in electronic format will be considered. Please provide any quality assurance/quality control measures that were used in collecting the data you submit. Specific water quality reports that explain and interpret the data are also requested.

We need to have this information for the 2008 Integrated Report by August 1, 2007. South Dakota's most recent Integrated Report is available at the department's website: http://www.state.sd.us/denr/document.htm. If you have questions or water quality data for our list, contact either Shannon Minerich or Gene Stueven at (605) 773-3351, or email an electronic version of the data to Shannon.Minerich@state.sd.us or Gene.Stueven@state.sd.us. Thank you for your help.

Sincerely,

Steven M. Pirner
Secretary

NOTICE OF THE 2008 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT AND OPPORTUNITY FOR COMMENT

The Department of Environment and Natural Resources (DENR) is announcing the availability of the draft 2008 South Dakota Integrated Report for Surface Water Quality Assessment (Integrated Report) and the opportunity for public comment on the draft report.

The Integrated Report combines the 305(b) Water Quality Report to Congress and the 303(d) Total Maximum Daily Load list into one document for the purposes of reporting on South Dakota's surface water quality. The Integrated Report also lists those waterbodies that require the completion of a Total Maximum Daily Load. This final Integrated Report must be submitted to the U.S. Environmental Protection Agency (EPA) on or before April 1, 2008.

The 2008 Integrated Report contains the following information:
1. An assessment of the surface water quality of South Dakota's waters;
2. A description of South Dakota's water quality monitoring programs;
3. Pollutants causing or expected to cause violations of the applicable water quality standards; and
4. Identification of waters targeted for TMDL development.

The department is providing a public participation process in which the members of the general public, affected organizations, and other interested parties can review and comment on the content of the draft 2008 Integrated Report. A copy of the draft 2008 Integrated Report is available on DENR's web site at: **http://www.state.sd.us/denr/DraftIR2008.pdf**

Copies of the draft may also be obtained by writing to Shannon Minerich at the address below, emailing Shannon.Minerich@state.sd.us or by calling her at 1-800-438-3367.

Any person desiring to comment on the list should submit comments to the address below. Persons are encouraged to comment electronically by emailing comments to Shannon.Minerich@state.sd.us. The department must receive public comments by March 12, 2008.

At the conclusion of the public comment period, the department will prepare a written response to each comment received and post the response to the department web site or, if requested, by written response to each person who provided comments or requested a copy of the department's response.

The department will finalize the 2008 Integrated Report after consideration of the comments received during the public participation process. The final 2008 Integrated Report will then be sent to EPA for approval. Once EPA approves the list, the Integrated Report will be made available on the department's web site and will be sent to persons who request a copy.

Department of Environment and Natural Resources
Water Resources Assistance Program
523 East Capitol Avenue – Joe Foss Building
Pierre, South Dakota 57501-3181

Steven M. Pirner
Secretary

DEPARTMENT of ENVIRONMENT
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FOR IMMEDIATE RELEASE: Friday, February 8, 2008
FOR MORE INFORMATION: Shannon Minerich or Paul Lorenzen, 1-800-438-3367

DENR Seeks Comments on Waterbody Report

PIERRE – The state Department of Environment and Natural Resources (DENR) is seeking public comments on a draft report the state uses to identify impaired waterbodies in the state. Public comments from the general public and other interested parties and organizations will be accepted through March 12, 2008. Comments can be emailed to Shannon Minerich at *Shannon.Minerich@state.sd.us* or by writing:

Department of Environment and Natural Resources
Surface Water Quality Program
523 East Capitol Avenue – Joe Foss Building
Pierre, South Dakota 57501-3181

A copy of the draft 2008 Integrated Report is available by contacting DENR at the above address, by phone at 1-800-438-3367, or by visiting DENR's website at *www.state.sd.us/denr/DraftIR2008.pdf*.

The 2008 Integrated Report contains an assessment of the surface water quality of South Dakota's waters, a description of South Dakota's water quality monitoring programs, pollutants causing impairments of the water bodies, and identification of waters targeted for total maximum daily load development. A total maximum daily load is a determination of the amount of pollution a waterbody can receive and still maintain water quality standards.

"Because this list drives state water quality programs, it is important that people in South Dakota see the draft report and provide us comments before it is finalized and sent to EPA for approval," said DENR Secretary Steve Pirner.

The draft 2008 report lists 168 waterbodies or waterbody segments needing a total maximum daily load. Of those listed, 111 (or 66%) are stream and river segments that periodically exceed one or more specific water quality standards; and 57 (or 34%) are lakes that have too many nutrients and are prone to excessive algae and aquatic weed growth.

Pollutant reductions to meet total maximum daily loads can be achieved through many different ways, depending on the type and source of pollutants. For example, if the pollutant comes from runoff, DENR can help local sponsors of water quality improvement projects seek cost share funding to help landowners install best management practices that will reduce the pollutant in runoff.

Since the last biennial report was completed in 2006, 30 total maximum daily loads have been completed or determined to be unnecessary, 78 are in progress and 39 are planned.

- 30 -