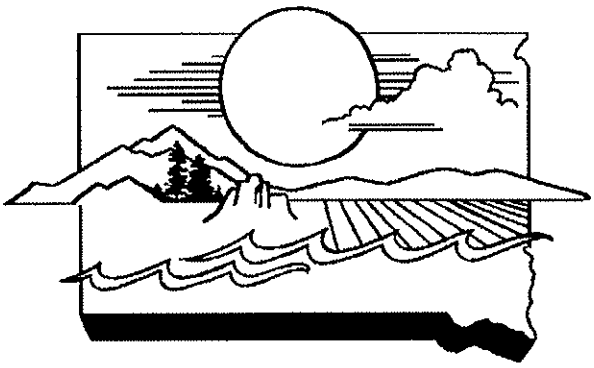
THE 2012 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT



Protecting South Dakota's Tomorrow...Today

Prepared By
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Exhibit 8013

Bad River Basin (Figure 10, Table 24)

The Bad River basin lies in west-central South Dakota between the Cheyenne and White River basins and drains approximately 3,175 square miles. Historically, a main characteristic of the basin has been a general lack of constant river flow. The upper portion of the Bad River receives water from the Badlands and artesian wells in the Phillip 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. During the 2010 reporting cycle EPA added Lake Waggoner to the 303(d) list for not supporting the designated warmwater fish life and recreation beneficial uses due to chlorophyll-*a*. This listing was based strictly on ad hoc criteria developed by EPA to address narrative standards associated with eutrophication. EPA's methodology and justification for this listing is defined in the 2010 Integrated Report.

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 Bad River, and an unnamed tributary of Cottonwood Creek. However, the data are very limited, and for most sites, the only parameters that were measured were specific conductance and water temperature.

The Bad River, from the Stanley County line to the mouth, is currently not supporting its designated beneficial uses due to exceedances of TSS. A TMDL was approved for TSS in 2001. The Bad River, from its north and south forks to the Stanley County line has not been assessed. There are no current watershed assessment or implementation projects ongoing in the Bad River Basin.

Grand River Basin (Figure 16, Table 28)

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

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

The USGS data are limited in the Grand River basin; however, USGS data were used for segments of the Grand River, South Fork Grand River, and North Fork Grand River. BOR submitted water quality data for Shadehill Reservoir.

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

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

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 buildup of sodium will break down soil structure and cause serious problems for plant growth.

During the 2010 reporting cycle EPA added Lake Isabel to the 303(d) list for not supporting the designated warmwater fish life and recreation beneficial uses due to chlorophyll-*a*. This listing was based strictly on ad hoc criteria developed by EPA to address narrative standards associated with eutrophication. EPA's methodology and justification for this listing is defined in the 2010 Integrated Report.

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

DENR has referred TMDL development for all waterbodies in the Grand River basin to EPA. Therefore, TMDL priority and schedule have not been populated in the basin table. DENR is currently in discussions with EPA to determine next steps regarding TMDL development and prioritization for the Grand River Basin.

Cheyenne River Basin (Figures 14 and 15, Table 27)

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

DENR has assessed 17 lakes and maintains 29 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. In addition, available data from DENR watershed assessment projects were also used to determine waterbody support. All DENR data, including WQM, assessment projects, implementation projects, special assessments, and other DENR funded projects, are all labeled as DENR as the basis in the basin tables.

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 are limited for most sites and mostly includes specific conductance and water temperature information. Data collected on all USGS sites were analyzed for this report. BOR submitted water quality information for Angostura Reservoir, Deerfield Reservoir, and Pactola Reservoir.

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, uranium exploration drilling has resumed. DENR maintains five water quality monitoring locations within the basin to monitor for uranium and other associated parameters. For this 2012 reporting cycle, there are no surface water quality exceedances for any parameters associated with past uranium mining or current explorations.

The Cheyenne River water quality continues to be generally poor due to both natural and agricultural sources. The lower Cheyenne drainage, in general, contains highly erodible soils. The landscape contributes considerable amounts of eroded sediment during periods of heavy rainfall. Segments downstream of the Fall River remain nonsupporting for fecal coliform and/or *E.coli* bacteria; however these segments have approved TMDLs.

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

The Black Hills region traditionally has some of the best surface water quality in the state. This is due in a large part to a cooler climate and higher precipitation than the surrounding plains as a result of greater elevation and forest cover. Also contributing to the water quality in this region are the local bedrock formations which are much less erodible than the highly erosive and leachable marine shales and badlands on the surrounding plains. However, the Black Hills streams are vulnerable to losses of flow exacerbated by periodic droughts. In addition, high summer ambient air temperature causes elevated water temperature and results in temperature impairments for coldwater fisheries. Grazing of

streamside vegetation, which increases stream bank erosion, water temperature, and nutrient loading, also continues to be a problem in some streams in this area.

There are currently twelve coldwater rivers and streams in the Cheyenne River basin that are on the 303(d) list for not supporting temperature water quality standards. The *Black Hills Regional Stream Temperature Assessment* conducted by RESPEC will be used to re-evaluate the current beneficial use attainment and to determine future impairments based on recommended temperature standards.

The Lower Cheyenne River Assessment project and the French Creek Assessment project were both completed during this reporting period. No other assessment projects are currently ongoing in the Cheyenne River basin. The Spring Creek Implementation Project is the only implementation project being conducted in the Cheyenne River basin.

Little Missouri River Basin (Figure 19, Table 30)

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

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

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

The Little Missouri River is listed as impaired for TSS. There are currently no watershed assessment or implementation projects in the basin.

White River Basin (Figure 27, Table 37)

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

DENR 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 White River, Little White River, Black Pipe Creek, Lake Creek, Rosebud Creek and others. The data are limited, and the only parameters that were measured were specific conductance and water temperature.

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. Support determinations were based on all parameters; however, there were no surface water quality exceedances for uranium or other parameters associated with uranium mining.

The White River basin receives the majority of the runoff and drainage from the western Badlands. The exposed Badlands are a major natural source of both suspended and dissolved solids to the river. Severe erosion and leaching of soils occurs in the Badlands and throughout the entire length of the basin. Site specific water quality standards for total suspended solids (TSS) were established by DENR in 2009 for the White River and Little White River. The White River is listed as impaired for SAR, fecal coliform, and *E. coli.*

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