

**Belle Fourche River  
Watershed Management and  
Project Implementation Plan  
Segment 5 **Amendment****

**319 Watershed Project  
October 1, 2011**

Sponsored By:

Belle Fourche River Watershed Partnership

Submitted to:

South Dakota Department of  
Environment and Natural Resources  
Pierre, South Dakota 57501

**PROJECT SUMMARY SHEET**

**PROJECT TITLE:** Belle Fourche River Watershed Management and Project Implementation Plan Segment 5

**NAME AND ADDRESS OF LEAD PROJECT SPONSOR:**

Belle Fourche River Watershed Partnership  
1837 5<sup>th</sup> Avenue  
Belle Fourche, SD 57717

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**STATE:** South Dakota

**WATERSHED:** Belle Fourche River Watershed

**HYDROLOGIC UNIT CODE:** 101202

**HIGH PRIORITY WATERSHED** (yes/no) Yes

**PROJECT TYPES:** [ ] BASE [  ] WATERSHED [ ] GROUNDWATER [ ] I&E

**WATERBODY TYPES**

- [  ] GROUNDWATER
- [  ] LAKES/RESERVOIRS
- [  ] RIVERS
- [  ] STREAMS
- [  ] WETLANDS
- [ ] OTHER

**NPS CATEGORY**

- [  ] AGRICULTURE
- [ ] URBAN RUNOFF
- [ ] SILVICULTURE
- [ ] CONSTRUCTION
- [ ] RESOURCE EXTRACTION
- [ ] HYDRAULIC MODIFICATION
- [ ] OTHER

**Project Location: Latitude:** 45 N      **Longitude:** -101 W

**SUMMARIZATION OF GOALS:** The project goal is to bring the Belle Fourche River into compliance for total suspended solids (TSS) by implementing the recommended Best Management Practices (BMPs) by 2014 and implementing additional BMP recommendations from other Total Maximum Daily Loads (TMDLs) studies for waterbodies within the watershed as they become available. At this time, TMDLs for fecal coliform have been submitted to the Environmental Protection Agency (EPA). Since they have yet to be finalized BMPs related to fecal coliform load reductions are not part of this project segment, although some of the TSS BMPs being implemented in this project also result in a reduction of fecal coliform loading. The goal of this project segment, as set forth in the Belle Fourche River Watershed TMDL study, is to continue:

- Implementation of BMPs in the watershed to reduce TSS 23( + 5 = 28) milligrams/liter (mg/L) reduction below the Belle Fourche Reservoir and 31 mg/L above the Belle Fourche River Reservoir.
- Public education and outreach to stakeholders within the Belle Fourche River Watershed.
- Tracking the progress made toward reaching the goals of the TMDL to help ensure that the BMPs are effective and the proper BMPs are being implemented.

**PROJECT DESCRIPTION:** The Belle Fourche River Watershed Partnership is the project sponsor for this 2-year project. This is the fifth segment of seven planned project segments that addresses a cluster of seven TMDLs. Completion of the activities planned for this segment will advance the BMP implementation for TSS pollutants to 61 (63) percent complete. This project will continue implementation of the BMPs identified in the TMDL report for the Belle Fourche River Watershed. These BMPs include irrigation control units, irrigation canal modeling, lining irrigation canals, replacing irrigation ditches with pipelines, installing irrigation sprinkler systems, implementing grazing management systems, and installing riparian vegetation improvements.

<b>FISCAL YEAR</b>	2011–2013
<b>319 FUNDS:</b>	\$332,000 + \$232,000 = \$564,000
<b>SRF FUNDS:</b>	\$200,000 + \$50,000 = \$250,000
<b>TOTAL PROJECT COST:</b>	\$3,142,726 + \$540,000 = \$3,682,726
<b>MATCH:</b>	\$423,926 + \$258,000 = \$681,926
<b>319 FUNDED FULL-TIME PERSONNEL:</b>	2

## **2.0 STATEMENT OF NEED**

- 2.1** The Belle Fourche River Watershed Partnership (BFRWP) developed and implemented an assessment project to determine the Total Maximum Daily Load (TMDL) for the Belle Fourche River. The project started during April 2001. The purpose of the assessment was to: (1) assess the current physical, chemical, and biological integrity of the Belle Fourche River and its tributaries; (2) determine the sources of total suspended solids (TSS) in the Belle Fourche River Watershed; and (3) define management prescriptions for identified nonpoint source critical areas in the watershed. The draft TMDL was completed during 2003 and approved by the Environmental Protection Agency (EPA) in 2005. The TMDL report includes two waterbodies: the Belle Fourche River and Horse Creek. The TMDL approved by EPA addresses a cluster of TMDLs.

The Belle Fourche River is identified in the 1998 and 2002 *South Dakota 303(d) Waterbody Lists* and the 2004 and 2006 *Integrated Report for Surface Water Quality Assessment* (IR) as impaired because of elevated TSS concentrations. According to the 2006 IR, the Belle Fourche River from the Wyoming border to the Cheyenne River, South Dakota, failed to support its assigned uses because of high TSS concentrations. In the report, agricultural activities were listed as a likely source of occasional impairment. This report also states that a natural source of TSS may be the erosion of exposed shale beds that lie along the river and its tributaries. The 2008 IR shows all segments of the Belle Fourche River, with the exception of the segment from the Wyoming border to Fruitdale, were delisted after water-quality standards for TSS were met. The draft 2010 IR reports that four out of the five stream segments are listed as nonsupporting for TSS warm-water permanent fish life assigned beneficial use. Table 2-1 contains a summary of the TMDL segments within the Belle Fourche River Watershed that are listed as impaired for TSS, fecal coliform, and specific conductance in the 2010 IR. The table also lists the impaired beneficial use, impairment parameter, water-quality data, and possible source.

Horse Creek was listed in the 1998 impaired waterbody list for TSS that was later determined to be a listing error. The Horse Creek listing was corrected to conductivity during 2002. During this assessment, approximately 10 percent of the samples collected from Horse Creek exceeded the water-quality standard for TSS. The 2010 IR lists Horse Creek as nonsupporting for conductivity and delisted for TSS. The TMDL report for Horse Creek includes both TSS and conductivity.

Implementation of the Best Management Practices (BMPs) recommended in the Belle Fourche River TMDL began during 2004. The first year of implementation included funding from local ranchers and farmers, BFRWP, Lawrence County, Belle Fourche Irrigation District (BFID), Wyoming Department of Environmental Quality (WY DEQ), National Resource Conservation Service (NRCS), Corps of Engineers, Bureau of Reclamation (BOR), and the U.S. Geological Survey (USGS). Two products of the project were the *Ten-Year Belle Fourche River Watershed Strategic Implementation Plan* (10-Year Plan) and the *Belle Fourche Irrigation District Water Conservation Plan* (5-Year Plan). These two plans outline the work that will be completed in the watershed during the next several years to meet the TMDLs. In the reports, the associated TSS and nonused water savings are presented for each BMP planned. Table 2-2 and Table 2-3 list the BMPs installed above and below the reservoir, respectively, to date. The tables also show the total planned number of each BMP to be installed in this segment. The watershed model is currently being revisited to help further quantify the TSS reduction realized as a result of the BMPs implemented. Segments I, II, and III were completed on schedule and within budget. Segment 4 is on schedule to be complete in June 2011.

The 10-Year Plan includes a TSS reduction schedule. The BMPs installed to date have resulted in an estimated 91 milligrams per liter (mg/L) above the reservoir and 73 mg/L below the reservoir for a total of 164 mg/L reduction in TSS (Figures 2-1 and 2-2). The goal of the 10-Year Plan was to reduce TSS by 357 mg/L, including 249 mg/L above and 108 mg/L below the reservoir. A reduction of 164 mg/L translates to 46 percent achievement of the goal since the project was initiated.

- 2.2** The Belle Fourche Watershed is shown in Figure 2-3. The ecoregions in the watershed include: Black Hills Foothills, Black Hills Plateau, Black Hills Core Highlands, River Breaks, Semiarid Pierre Shale Plains, Dense Clay Prairie, and Missouri Plateau. The Belle Fourche River is a tributary to the Cheyenne River.

**Table 2-1. Summary of Belle Fourche River Watershed Exceedance Water-Quality Data from Draft 2010 IR**

Stream	Basis	Beneficial Use	Impairment Parameter	Water-Quality Criteria	Source
Belle Fourche River <sup>(a)</sup>	SD DENR/ USGS	Immersion Recreation	Fecal Coliform (per/100 ml)	200 <sup>(b)</sup> /400 <sup>(c)</sup>	Riparian Grazing/Wildlife
		Warm-water Permanent Fish Life	TSS (mg/L)	90 <sup>(b)</sup> /158 <sup>(c)</sup>	Crop Production/Livestock
Belle Fourche River <sup>(d)</sup>	SD DENR	Warm-water Permanent Fish Life	TSS (mg/L)	90 <sup>(b)</sup> /158 <sup>(c)</sup>	Unkown
Belle Fourche River <sup>(e)</sup>	SD DENR/ USGS	Warm-water Permanent Fish Life	TSS (mg/L)	90 <sup>(b)</sup> /158 <sup>(c)</sup>	Unkown
Belle Fourche River <sup>(f)</sup>	SD DENR/ USGS	Immersion and Limited Contact Recreation	Fecal Coliform	200 <sup>(b)</sup> /400 <sup>(c)</sup> 1,000 <sup>(b)</sup> /2,000 <sup>(c)</sup>	Unknown
		Warm-water Permanent Fish Life	TSS (mg/L)	90 <sup>(b)</sup> /158 <sup>(c)</sup>	Unkown
Horse Creek <sup>(g)</sup>	USGS	Irrigation Waters	Conductivity (mohms/cm @ 25°C)	2,500 <sup>(b)</sup> /4,375 <sup>(c)</sup>	NA
West Strawberry Creek	SD DENR	Limited Contact Recreation	Fecal Coliform (per/100 mg/L)	1,000 <sup>(b)</sup> /2,000 <sup>(c)</sup>	NA
Whitewood Creek <sup>(h)</sup>	SD DENR/ USGS	Immersion Recreation	Fecal Coliform (per/100 mg/L)	200 <sup>(b)</sup> /400 <sup>(c)</sup>	Wildlife/Combined Sewers/Grazing
		Immersion Recreation	<i>Escherichia coli</i>	126 <sup>(b)</sup> /235 <sup>(c)</sup>	Wildlife/Combined Sewers/Grazing
Whitewood Creek <sup>(i)</sup>	SD DENR	Warm-water Permanent Fish Life	TSS (mg/L)	90 <sup>(b)</sup> /158 <sup>(c)</sup>	NA
Willow Creek <sup>(j)</sup>	USGS	Irrigation Waters	Conductivity (mohms/cm @ 25°C)	2,500 <sup>(b)</sup> /4,375 <sup>(c)</sup>	NA

(a) Wyoming border to near Fruitdale, South Dakota.

(b) 30-day average.

(c) Daily maximum.

(d) Whitewood Creek to Willow Creek.

(e) Willow Creek to Alkali Creek.

(f) Alkali Creek to mouth.

(g) Indian Creek to mouth..

(h) Deadwood Creek to Spruce Gulch.

(i) Crow Creek to Mouth.

(j) Near Vale, South Dakota.

The Belle Fourche River is a tributary to the Cheyenne River. Currently, nine stream segments in the Belle Fourche River Watershed are listed in the Draft South Dakota 2010 IR as impairment-related TMDL waters. These include Whitewood Creek (two listings), Strawberry Creek, Horse Creek, and Belle Fourche River (five segments). The 2008 IR shows all segments of the Belle Fourche River, with the exception of the segment from the Wyoming border to Fruitdale, South Dakota, were delisted after the beneficial use was met. Horse Creek was delisted for TSS with one segment found nonsupporting for conductivity.

The BMPs that will be installed during this project segment are consistent with the schedules contained in the 10-Year Watershed Plan and the 5-Year Irrigation Plan. The BMPs planned are described in Section 3.0 of this proposal. The planned BMPs will reduce the TSS in the Belle Fourche River by approximately 31 mg/L and 23 (28) mg/L above and below the Belle Fourche Reservoir, respectively (Table 2-4). This level of reduction is consistent with what is presented in the 10-Year Plan.

**Table 2-2. Best Management Practices Installed and Scheduled Above the Belle Fourche Reservoir**

Best Management Practice	Planned for Segment 5	Segment 5 Amendment	Amount Implemented October 2010	Amount Scheduled From 10-Year Plan
Flow Automation Units (Number)			2	2
Upgraded Water Card and Water Order System <sup>(a)</sup>	Complete		Phase III	Three Phases
Portable Stage/Flow-Measuring Devices (number)			0	3
Real-Time Stage Flow-Measuring Devices (number)			1	3
Alternative Keyhole Water Delivery Study			0	1
Alternative Keyhole Water Supply Method			0	1
Nonused Water Storage Pond (number)			0	1
Inlet Canal Lining (feet)	2,640		8,600	10,560
Pipeline Projects Delivering Water to Fields (feet)	1,000		7,382	500
Irrigation Sprinkler Systems (number)	2		4	2
Scheduling of Irrigation Water <sup>(a)</sup>	Complete		1	1
Managed Riparian Grazing (acres)	2,000	250	9,863	14,750
Public Meetings <sup>(a)</sup> (number)	8		32	40
Project Tours <sup>(a)</sup> (number)	2		8	8

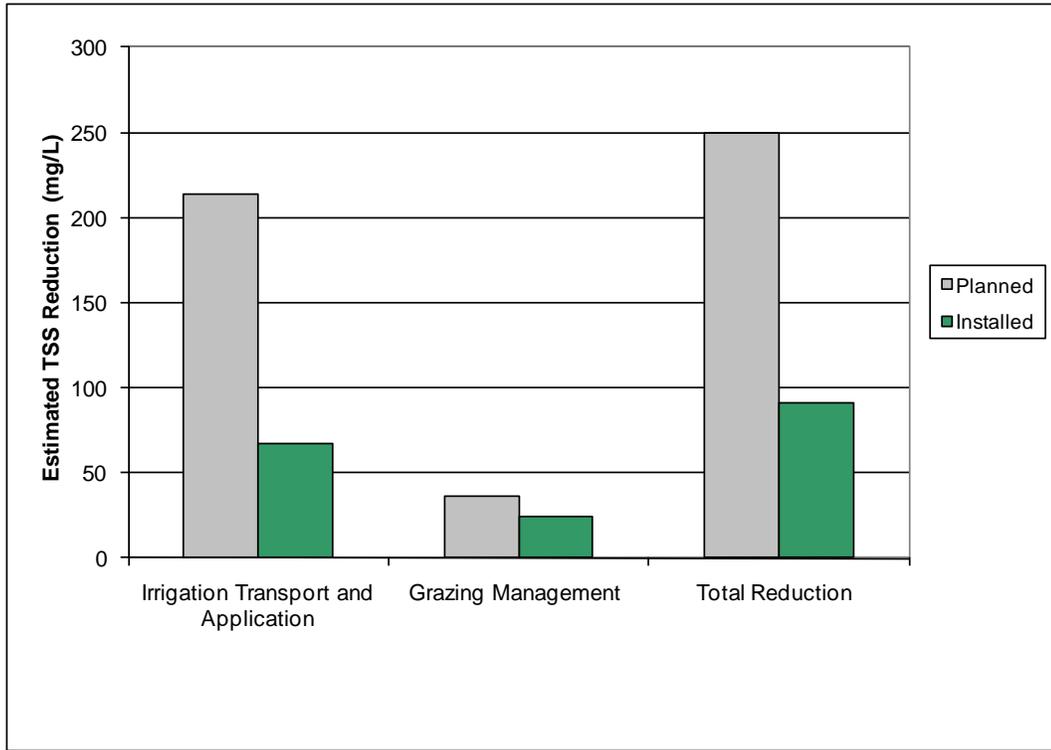
(a) BMPs are the same for both above and below the reservoir.

**Table 2-3. Best Management Practices Installed and Scheduled Below the Belle Fourche Reservoir**

Best Management Practice	Planned for Segment 5	Segment 5 Amendment	Amount Implemented October 2010	Amount Scheduled From 10-Year Plan
Flow Automation Units (number)			25	40
Upgraded Water Card and Water Order System <sup>(a)</sup>	Complete		Phase III	Three Phases
Portable Stage/Flow-Measuring Devices (number)			6	12
Real-Time Stage Flow-Measuring Devices (number)			8	12
Line Open Canals and Laterals (feet)			2,600	16,000
Replace Open Canals and Laterals With Pipelines (feet)	2,500		7,474	25,000
Nonused Water Storage Pond (number)				2
Pipeline Projects Delivering Water to Fields (feet)	19,000	10,500	27,407	8,500
Irrigation Sprinkler Systems (number)	13	10	27	34
Scheduling of Irrigation Water <sup>(a)</sup>			1	1
Managed Riparian Grazing (acres)	3,000		16,775	19,250
Public Meetings <sup>(a)</sup> (number)	8		32	40
Project Tours <sup>(a)</sup> (number)	2		8	8

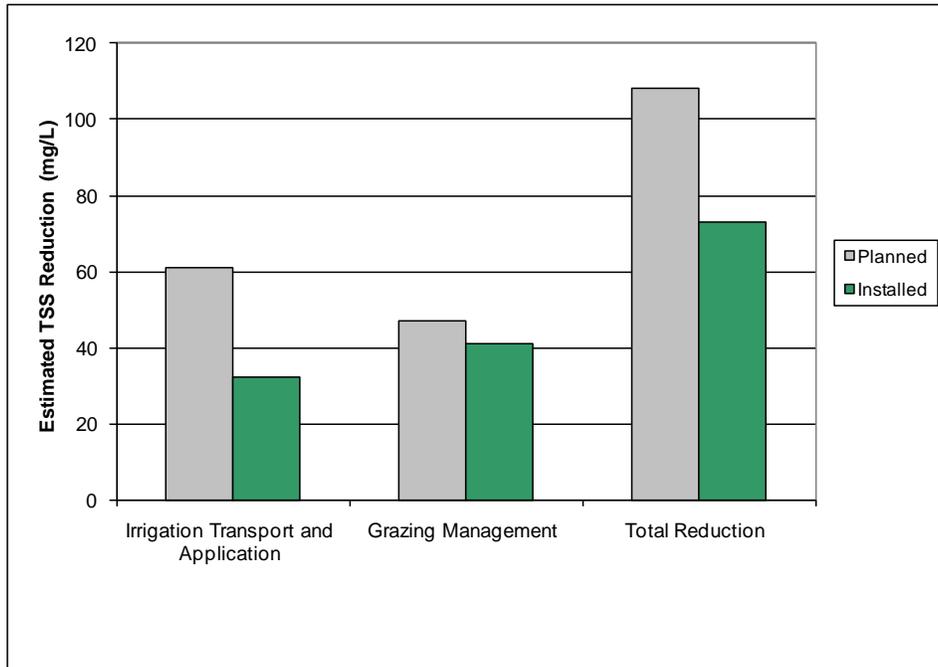
(a) BMPs are the same for both above and below the reservoir.

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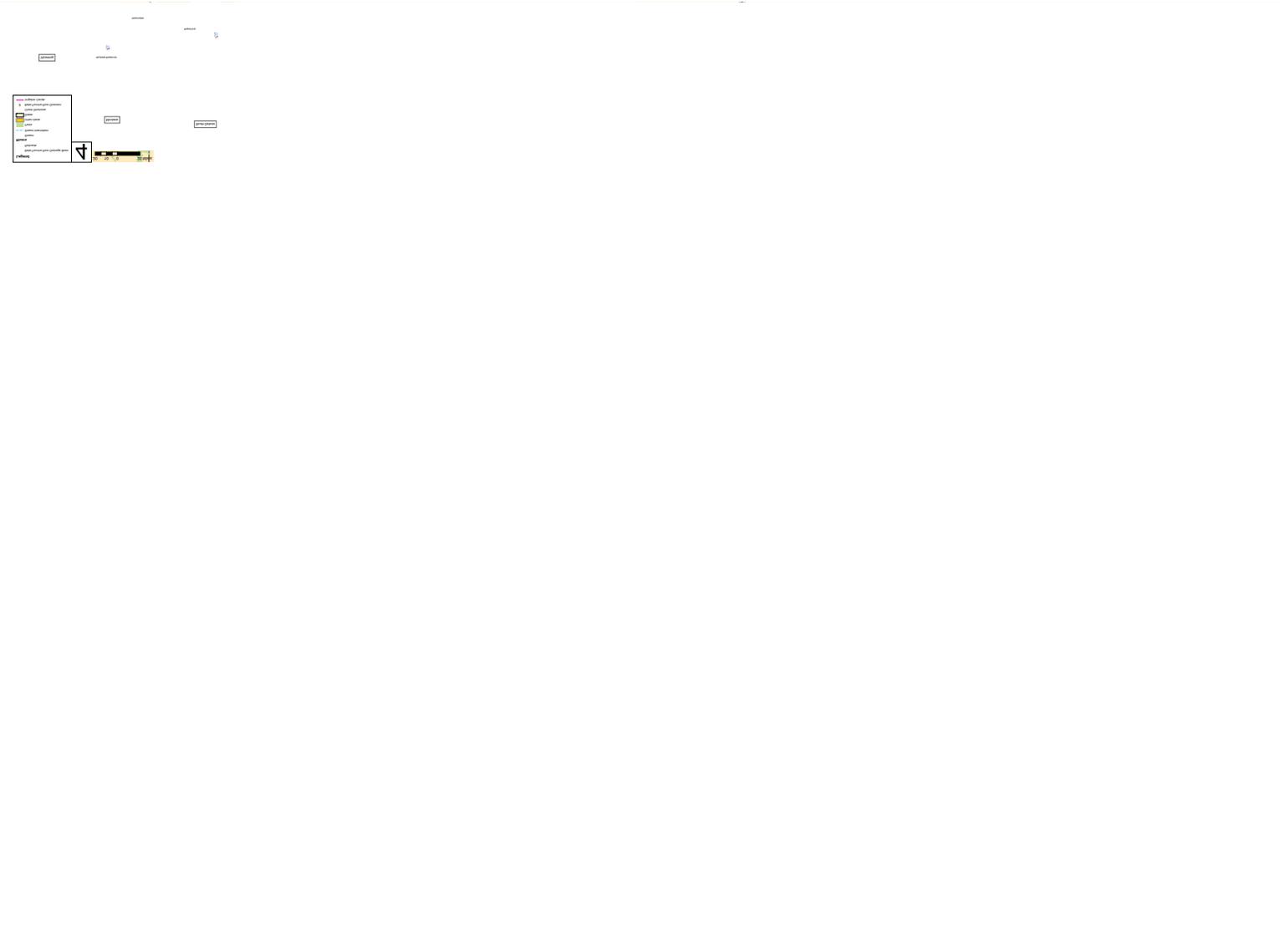


**Figure 2-1.** Planned Versus Installed Reductions Above Belle Fourche Reservoir.

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**Figure 2-2.** Planned Versus Installed Reductions Below Belle Fourche Reservoir.



**Figure 2-3.** Location of the Belle Fourche River Watershed.

**Table 2-4. Total Suspended Solids Reduction (mg/L)**

Location of Reductions	TSS Reductions to Date	TSS Reductions Planned for Segment 4	Amended TSS Reductions Planned for Segment 5	Planned TSS Reductions in the 10-Year Plan
Above the Reservoir	91	31	31	249
Below the Reservoir	73	23	28	108
Combined TSS Reductions	164	54	59	357

- 2.3** The surface area of the South Dakota portion of the Belle Fourche River encompasses approximately 2,103,040 acres and includes Hydraulic Units 10120201, 10120202, and 10120203. The city of Spearfish (population 8,606) is the largest municipality located in the Belle Fourche River Watershed. Other small communities in the watershed include Belle Fourche (population 4,565), Sturgis (population 4,442), Lead (population 3,027), Deadwood (population 1,380), Newell (population 646), Nisland (population 204), and Fruitdale (population 62).

Land use in the watershed is primarily livestock grazing with some cropland and a few urban and suburban areas. Wheat, alfalfa, native and tame grasses, and hay are the main crops. Within the BFID, some corn, wheat, and barley are grown. Some winter animal feeding areas are located in the watershed. Gold mining, while reduced in scope from the past, is conducted in some headwater areas of the watershed. Some of the watershed land is used for silviculture.

- 2.4** Approximately 11 percent of the watershed is U.S. Forest Service land, primarily the Black Hills National Forest, and 4 percent is Bureau of Land Management land.

Major soil associations found in the watershed include Winler-Lismas, Pierre-Kyle, Grummit-Shale, Epsie, Midway-Penrose, Cabbart-Absher, Butche-Colby, Arvada-Stetter, Lohmiller-Glenberg-Haverson, Caputa-Satanta, Delphill-Assinniboine, Nunn-Satanta-Zigweid, Blackpipe-Savo-Manvel, Blackpipe-Assinniboine-Savo, Canyon-Lakoa-Maitland, Tilford-Nevee, St. Onge-Keith, Lohmiller-Glenberg, Winler-Lismas-Swanboy, Kyle-Pierre-Hisle, Samsil-Lismas-Pierre, Nevee-Vale-Tilford, Butche-Satanta-Boneek, Nunn-Kyle-Pierre, Barnum-Swint-St. Onge, Grummit-Snomo-Rock, Paunsaugunt-Rock, Lakoa-Maitland, and Citadel-Vanocker-Grizzly.

The average annual precipitation in the Belle Fourche River Watershed ranges from 15 to 29 inches, of which 70 percent is usually received from April through September. Tornadoes and severe thunderstorms strike occasionally. These storms are local, of short duration, and occasionally produce heavy rainfall events. The average seasonal snowfall ranges from 155 inches in the higher elevations in the western part of the watershed to 23 inches per year in the eastern portion of the watershed. The average water allocation to the BFID is approximately 15 inches. The water added to the fields from irrigation nearly doubles the amount of water available for crop production.

The landscape in the watershed is characterized by prairies with some mountains in the south and west. Land elevation ranges from about 2,500 feet above mean sea level (msl) to about 7,071 msl. The Black Hills are strongly sloping hills. There are somewhat less strongly sloping hills near the Cheyenne River.

- 2.5** The Belle Fourche River Watershed within South Dakota encompasses over 2 million acres. TSS are contributed from natural, urban, agriculture, forest, and mining sources. The TMDL study identified the primary contributor of TSS to the Belle Fourche River and Horse Creek as the natural bank sloughing, quantity of nonused irrigation water discharged to the natural waterways, and riparian habitat impairment. Stream entrenchment and bank failure are responsible for approximately 75 percent of the TSS in the Belle Fourche River system. Stream energy causes natural bank failure, particularly in the eastern portion of the watershed. These areas are dominated by high banks composed of primarily clay soils that supply suspended solids to the channel. Improper grazing or overgrazing in the uplands as well as riparian areas facilitates natural bank failure, adding to TSS in the watershed. Increased quantities of water resulting from the nonused irrigation flows are the major driving cause of the channel incision and result in additional bank failures and resultant suspended solids.

Irrigation and return flow nonused irrigation water are responsible for approximately 20 percent of the TSS in the Belle Fourche River system. Much of the irrigation in the watershed is flood-irrigation. This type of irrigation results in sediments being mobilized by three processes: (1) tail water/runoff crossing fields, (2) water in the canals and laterals, and (3) water in the intermittent streams carrying tail water/runoff to the perennial streams within the watershed. Rangeland erosion contributes the remaining 5 percent of the TSS load.

### **3.0 PROJECT DESCRIPTION**

#### **3.1 GOALS**

The project goal is to bring Belle Fourche River into compliance for its warm-water permanent fish life beneficial use by implementing the BMPs laid out in the 10-year implementation plan and implementing additional BMP recommendations from other TMDLs for waterbodies within the watershed as they become available. At this time, TMDLs are under review for fecal coliforms. Therefore, BMPs related to fecal coliform load reductions are not included in this project segment. The goal of this project segment, as set forth in the Belle Fourche River Watershed TMDL study, is to continue:

- Implementation of BMPs in the watershed to reduce TSS 23 (28) mg/L reduction of the required 108 mg/L reduction below the Belle Fourche Reservoir and 31 mg/L of the required 249 mg/L reduction above the Belle Fourche River Reservoir.
- Public education and outreach to stakeholders within the Belle Fourche River Watershed.
- Tracking the progress made toward reaching the goals of the TMDL to help ensure that the BMPs are effective and the proper BMPs are being implemented.

#### **3.2 OBJECTIVES AND TASKS**

The strategy outlined in the Belle Fourche River Watershed Implementation Plan is to progressively implement BMPs, such as water management and grazing management systems in the riparian areas, within the Belle Fourche River Watershed to reduce TSS in Horse Creek and the Belle Fourche River. This project segment focuses on BMPs that reduce the amount of nonused irrigation water discharged to the local waterways from the irrigation water delivery and application as well as riparian vegetation improvement. Baseline and seasonal monitoring will be performed to measure improvement. The project strategy will be reviewed annually to measure overall success to determine adjustments and to obtain funding for the following project segment. Federal, state, and private funding will be used to fund BMPs. A final report will be produced for each 319 project segment completed.

Specifically, this project segment will fund the sixth and seventh years of BMP installation in the Belle Fourche River Watershed to continue TSS reduction. Additional projects and funding proposals will be submitted during the next 5 years to continue installing BMPs that reduce TSS and meet the TMDLs.

#### **OBJECTIVE 1: Implement BMPs Recommended in the Belle Fourche River Watershed TMDL to Reduce TSS**

The Belle Fourche River TMDL recommends BMPs focusing on reducing the amount of nonused irrigation water discharged to the waterway from irrigation as well as implementing riparian vegetation improvements. Nonused water reduction activities include water delivery as well as water application improvement.

The TMDL states that the amount of nonused water discharged to the local waterways needs to be reduced by 12,000 acre-feet. Implementation of BMPs before this project segment has reduced the nonused water discharged to local waterways by 7,936 acre-feet, or 66 percent of the overall goal.

##### **Task 1**

#### **Reduce Nonused Water Discharged to the Local Waterways From the Delivery and Application Systems by 1,310 (+ 404 = 1,714) Acre-Feet**

The BFID maintains and operates irrigation facilities for the BOR. The BFID has an active water conservation program. Historically, the program included lining the canals, piping, and operational and

maintenance procedures to conserve water. Irrigation significantly impacts the Belle Fourche River along with Horse Creek and other streams within the BFID's 57,000 (+) acres (irrigable land). The impact comes primarily from the additional water added to the system during the irrigation season. During the irrigation season (June–September), the average TSS concentrations at USGS Gaging Station Sites 06430500 (at the South Dakota-Wyoming border) and USGS 06438000 (upstream of the Cheyenne River) was historically over 2.5 times the 12-month average. For the same sites, over 95 percent of the load occurs during the irrigation season before the implementation project. Approximately 36 percent of the water lost is attributed to irrigation transportation and operational losses. Transportation losses include seepage and evaporation. Operational losses include overflow from the canals, laterals, and gates/valves into the adjacent waterways.

Approximately 64 percent of the water released from the reservoir is delivered to the field. Approximately 32 percent is used by crops. The rest is lost through evaporation and nonused water discharged to adjacent waterways. This water also carries TSS picked up from the fields from flood-irrigation water. This task will increase the overall irrigation delivery and application efficiencies through the use of sprinkler systems, pipelines, and water control and monitoring structures and equipment.

The Redwater Irrigation Association (RIA) diverts approximately 21,000 acre-feet of water from the Redwater River to meet the irrigation requests made by the producers of this 3,500-acre district. Irrigation records indicate that less than half of the water that is diverted from the Redwater River is delivered to the producer's fields because of losses in the canals of the delivery system. The BFRWP is currently being funded by the South Dakota Conservation Commission to accurately quantify losses and assess the impacts that this may have on water quality and quantity in the Belle Fourche River.

#### Products:

##### 1. Improved Irrigation Water Delivery and Application.

The goal for this project segment is to reduce the amount of nonused irrigation water discharged to the surrounding water by 1,310 (+ 404 = 1,714) acre-feet. This will be accomplished by reducing nonused irrigation water from BFID's delivery system and the producers' application systems. The following is a breakdown of anticipated activities that will be completed to reach the milestone:

- a) Line and pipe open canals and laterals within the delivery system (2,640 feet of lining and 2,500 feet of pipeline). Originally, it was planned to complete the 5,280 feet of inlet canal lining in the fall of 2009 and 2010. Weather has precluded the BFID from completing this project on schedule. Approximately 2,640 feet will be completed in the fall of 2010 as part of Segment 4 and the other 2,640 feet will be completed in the fall of 2011 as part of Segment 5. Water-loss savings from canals and laterals increase the overall water in the system. The canal lining and installation of pipeline projects will reduce the water lost to seepage during transport.

– Activity Cost: \$150,000

319 Cost: \$0

– Lead Group: BFID

– Other Groups: BOR, Consultants

– Milestone: June 2013, 2,600 feet of lined open canals and laterals and 2,500 feet of pipeline (see timeline, page 14).

- b) Install sprinkler-irrigation systems and pipeline projects delivering water to sprinkler irrigation systems and flood-irrigation systems, and plan irrigation scheduling. Total irrigation acres treated will be approximately 1,500 acres. **Install additional sprinkler-irrigation systems as well as pipeline projects treating and additional 1,000 acres.**

Sprinkler-irrigation systems have been shown to be more efficient at applying water for irrigation (i.e., use less water and reduce nonused water). In addition to improved water efficiency, pipeline projects delivering water to sprinkler systems and existing flood-irrigation systems decrease the amount of sediment transported through runoff. The TMDL for the Belle Fourche River includes the installation of irrigation sprinkler systems to help reach the goal of reducing the nonused water from the BFID and surrounding area by 12,000 acre-feet.

To reach this level of implementation, it is necessary to use supplemental funds in addition to Environmental Quality Incentives Program (EQIP) funds that are available in the watershed. Approximately 15 sprinkler irrigation systems will be installed during this segment of implementation. Depending on the availability of EQIP funds, the BFRWP would use State Revolving Funds (SRF) funds to provide supplemental cost share in addition to EQIP and solely funding some projects converting flood-irrigation to sprinkler-irrigation systems. Cost share is based on a docket price per acre and typically provides approximately 35 percent of the total cost of the project. In addition to funding for sprinkler irrigation, EQIP would be used to fund pipeline projects delivering water to sprinkler-irrigation systems and conversion of open ditches to pipeline on flood-irrigation systems. It is estimated 20,000 feet of pipe will be installed this funding round. Funds requested in this segment will be used to improve water use efficiency and decrease the amount of sediment transported through runoff on approximately 1,500 acres. **Funds requested by this amendment will be used to improve water use efficiency and decrease the amount of sediment transported through runoff on an additional 1,000 acres by replacing flood irrigated systems with sprinklers and converting open ditches to pipeline. Approximately 1,000 acres will be treated with 10 sprinkler systems and 10,500 feet of pipe.**

SRF funds would be used to offset any additional administration fees associated to the program including audit expense or bond council.

- Activity Cost:  $\$944,000 + \$465,000 = \$1,409,000$  319 Cost:  $\$0 + \$175,000 = \$175,000$
- Lead Group: NRCS, Consultants SRF Cost:  $\$200,000 + \$50,000 = \$250,000$
- Other Groups: Consultants, Producers
- Milestone: June 2013, Conversion of flood irrigation to sprinkler systems (15 + 10 sprinkler systems) plus converting open ditches pipeline delivering on flood-irrigation systems (20,000 + 10,500 = 30,500 feet of pipe) on approximately 1,500 + 1,000 = 2,500 acres (see timeline, page 14).

- c) **Project staff will work with up to 20 (approximately 1,000 acres) fields throughout the BFRWP to help optimize the timing and depth of irrigation deliveries through irrigation scheduling. This project, which was initiated during a national level Conservation Innovation Grant (CIG) funded by the NRCS, will involve installing soil moisture sensors at 1/3 and 2/3 of the crop rooting depth at up to two locations per field. A datalogger will be used to record soil moisture readings periodically throughout the day and then downloaded once per week by project staff. The results along with any necessary irrigation timing and depth recommendations will then be supplied to the individual producers throughout the growing season. This practice has been documented to reduce water application and associated sediment laden tailwater by up to 50 percent. Cost-share dollars will be supplied to offset the cost of the individual soil moisture sensors with the dataloggers being reused from the CIG grant.**

- Activity Cost:  $\$31,000$  319 Cost:  $\$18,000$
- Lead Group: Producers, Consultants
- Other Groups: NRCS
- Milestone: June 2013, 1,000 acres treated with irrigation scheduling (see timeline, page 14)
- Total Product Cost:  $\$1,094,000 + \$524,000 = 1,618,000$
- 319 Cost:  $\$0 + 216,000 = 216,000$  SRF Cost:  $\$200,000 + \$50,000 = \$250,000$
- Responsible Groups: BFID, BOR, NRCS, Consultants, Producers

Task 2

**Range and Riparian Area BMP Implementation**

Implementation of riparian vegetation improvement projects has been demonstrated to reduce TSS up to 70 percent (see the Belle Fourche River TMDL study). This reduction has been in areas where a large majority of the TSS is coming from the adjacent riparian area. In the Belle Fourche River Watershed, it is predicted that riparian vegetation improvement will reduce TSS concentrations by 18 percent. U.S. Department of Agriculture (USDA) cost-share funds will be used to install similar BMPs on upland sites. Installing BMPs in both the riparian and upland sites allows for overall improved grazing management and range condition that ultimately will reduce TSS concentrations.



avenue for input from residents in the area. Notification of meetings will be made to local agencies, mailings, and newspapers. In addition, a public Website will be maintained to provide the public with the latest available data as well as an overview of the project and status of work activities ([www.bellefourchewatershed.com](http://www.bellefourchewatershed.com)). Public awareness will be further enhanced by annual tours of the watershed along with informational booths at local county fairs and agriculture-related shows demonstrating BFRWP accomplishments. Educational workshops will be sponsored during the project demonstrating innovative approaches to addressing resource concerns in the watershed. The BFRWP's Soil Quality Demonstration Trailer will be used extensively to demonstrate the effects of soil erosion to agriculture producers, students, and the general public in the watershed. To date, over 2,000 people have watched the demonstration. Consultants will be responsible for organizing and planning all public outreach and education activities.

Riparian and irrigation implementation projects require working with the producer to complete applications, project planning, checking practices once they are complete, and organizing and filing applications and producer bills. Consultants will work with NRCS and Butte County Conservation District to carry out this task.

Grant Reporting and Track System (GRTS) Reports will be completed as required by the South Dakota Department of Environment and Natural Resources (SD DENR). A final report will be submitted to EPA at the conclusion of the project. This report will cover all the work completed during this segment of implementation and the estimated effects the BMPs will have on the water quality in the Belle Fourche River. During this segment, the BFRWP will be revising their 10-Year Strategic Implementation Plan. This revised plan will assist in guiding future implementation projects. Additional grants will be written to assist in resolving water-quality issues and support the cost of implementation projects. Additional grants proposed will include USDA-NRCS Agriculture Water Enhancement Program (AWEP) to assist with funding of irrigation improvements in the watershed.

As discussed in Product 3, the BFRWP received USDA CCPI funding of \$3.5 million dollars over a 5-year period. No administration funds are available from USDA through this program. BFRWP is responsible for progress reporting, soliciting program information to producers and the general public, and cooperating with NRCS in developing and implementing conservation plans that address priority natural resource concerns in the defined project area. Project management money would provide funding for a part-time support staff at the Butte County Conservation District office. This staff member is employed full time in the Butte County Conservation District and splits his/her time between the conservation district and the BFRWP. In addition to the support staff, consultants will assist with any additional planning and report writing.

- Activity Cost: \$332,000 319 Cost: \$332,000
  - Lead Group: BFRWP
  - Other Group: NRCS, Producers, Consultants, Butte Conservation District
  - Milestone: June 2013, two GRTS reports, one final report, eight public meetings, one Website, two watershed tours, two workshops, eight public information booths, and 20 soil-quality demonstrations (see timeline page 14).
- Total Product Cost: \$332,000 319 Cost: \$332,000  
 Responsible Groups: BFRWP, NRCS, Producers, Consultants, Butte Conservation District

**OBJECTIVE 3: Complete Essential Water-Quality Monitoring**

Water-quality monitoring will continue to use a targeted approach. Water-quality data will be collected at sites used during the watershed assessment to formulate the TMDL.

Task 4 **Water-Quality Monitoring to Assess BMPs**

Products:

5. Monitor Water-Quality Improvement.

Water-quality monitoring will use a targeted approach. Water-quality data will be collected at sites used during the watershed assessment to formulate the TMDL. Flow impact on the macrowatershed will be analyzed using the following USGS stations:

- USGS 06428500 (Belle Fourche River at South Dakota-Wyoming state line)
- USGS 06436000 (Belle Fourche River near Fruitdale, South Dakota)
- USGS 06437000 (Belle Fourche River near Sturgis, South Dakota)
- USGS 06438000 (Belle Fourche River near Elm Springs, South Dakota)
- USGS 06433000 (Redwater River above Belle Fourche, South Dakota).
- **HC01 (Horse Creek above BFID)**
- **HC02 (Historically called USGS 06436760 Horse Creek above Vale, South Dakota)**

The stations are long-term flow measurement sites operated, funded, and maintained by USGS. The practices installed to reduce the amount of nonused water discharging to the waterways within the irrigation district should be detectable at the Belle Fourche River sites near Sturgis and near Elm Springs as well as at the Horse Creek site above Vale. The other sites recommended will allow a water mass balance to be calculated, adding to the precision of the analysis. Turbidity, specific conductance, temperature, and pH will be measured on a continuous basis at Horse Creek above Vale to provide baseline data to measure water-quality improvements as a result of the nonused water reduction projects BMPs implemented within the Horse Creek Watershed.

The SD DENR Surface Water Quality Program has 21 monitoring stations within the watershed. Comparisons over time will be performed using applicable sites to measure the large-scale changes in water quality.

USGS collection of water-quality samples taken from long-term watershed monitoring sites. A breakdown of continuous flow for sites identified above is found below.

Conduct bi-weekly grab samples at HC01 and HC02 along with development of stage/discharge relationships to assess monthly variability, provide a better understanding of the impacts resulting from the BFID delivery system and on-farm delivery inefficiencies, and to compare chemical changes over time. A majority of the wastewater from the delivery system and on-farm practices flow directly into Horse Creek. There have been, and will continue to be, implementation projects completed within this region. This station is necessary to fully understand the impact that implementation projects within the BFID have on flow and water quality in Horse Creek.

- Activity Cost:  $\$316,726 + \$16,000 = \$332,726$       319 Cost:  $\$0 + \$16,000 = \$16,000$
- Lead Group: USGS

Total Product Cost:  $\$316,726 + \$16,000 = \$332,726$       319 Cost:  $\$0 + \$16,000 = \$16,000$

Responsible Groups: USGS

Milestone: report water-quality results (see timeline page 14).

#### 4.0 SCHEDULE

The project milestone schedule is shown in Figure 4-1. The milestone schedule is based on work approval by July 2011 and completion by June 2013.

RSI-1870-12-001

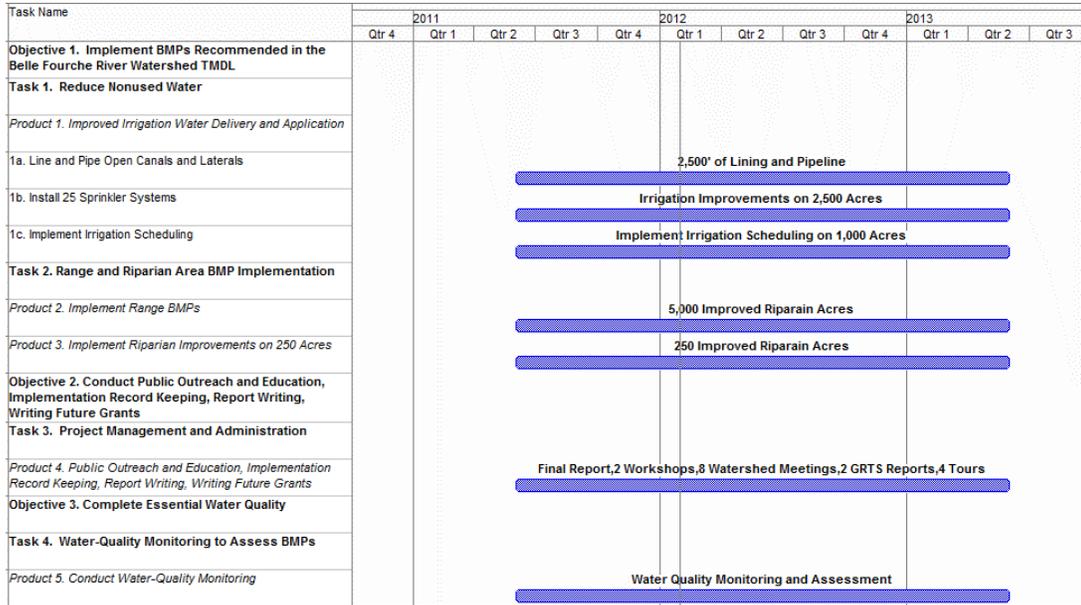


Figure 4-1. Timeline of the Project.

#### 4.1 PERMITS

Before any new construction, required permits will be obtained. An example of a permit that may need to be obtained is the National Environmental Policy Act (NEPA) permit required to perform work on BOR lands. Other required permits may be needed for stormwater or construction work. Additionally, the need for 401 and 404 stream permits will be checked for the riparian work.

#### 4.2 LEAD PROJECT SPONSOR

The BFRWP is the local sponsor for this implementation project. The BFRWP is a 501C(3) nonprofit group. The leaders of the BFRWP include the conservation districts within the watershed and the BFID. The BFRWP was the recipient of past 319 assessment and implementation grants for the Belle Fourche River TMDL.

#### 4.3 OPERATION AND MAINTENANCE QUALITY ASSURANCE

Responsibilities for operation and maintenance of 319 funded BMPs will be provided for through conservation district/landowner contracts. Contracts developed for BMP installation will specify operation and maintenance needs, procedures for BMP failure or abandonment, and the life span BMPs will be maintained for the terms agreed upon in the contract. The NRCS and consultants will be responsible for completing operation and maintenance scheduling, on-site evaluations, and follow-up with landowners when actions need to be taken to ensure BMP operation for its designated life span.

The NRCS; Farm Service Agency; the Butte, Lawrence, and Elk Creek Conservation Districts; District Supervisors; BOR; and consultants will be responsible for ensuring BMPs cost-shared with the EPA 319 and all systems are operated and maintained. Compliance for BMPs implemented with 319 funds will follow the same rules and regulations as the NRCS' EQIP. These rules are found in Section 515.113 of the EQIP Program Manual.

Landowners and operators who do not maintain practices funded by this project for the length of the agreed contract will be required to repay all cost-share funds and any liquidated damages incurred. Conservation district personnel supported by the agent acting on behalf of the BFRWP will be responsible for landowner contacts, developing a landowner/producer mailing list, keeping records, submitting vouchers and reports, and recording cash and in-kind match. Where BOR funds are used, the BOR will be responsible for ensuring the BMPs are operated and maintained properly for the life of the contract.

## **5.0 COORDINATION PLAN**

### **5.1 PARTICIPATING GROUPS AND AGENCIES**

The BFRWP has been working together for over 7 years. The BFRWP completed monitoring and evaluation work and submitted a TMDL study for approval. Some of the BMPs recommended in the TMDL have been implemented (one flow automation unit, partial completion of replacing open ditches with pipeline, partial completion of pipeline projects from BFID to fields, partial completion of installation of sprinkler systems, and partial completion of riparian vegetation improvement projects). The following groups/agencies have been participating and will continue to participate in the Belle Fourche River Watershed implementation project:

- **Butte Conservation District** – Voting member of the BFRWP, financial support and EQIP funding.
- **Belle Fourche Irrigation District (BFID)** – Voting member of the BFRWP, implements many BMPs, financial support and match funding.
- **Belle Fourche River Watershed Partnership (BFRWP)** – Local project sponsor.
- **Elk Creek Conservation District** – Voting member of the BFRWP, financial support and EQIP funding.
- **Lawrence County** – Local support, funding.
- **Lawrence Conservation District** – Voting member of the BFRWP, financial support and EQIP funding.
- **South Dakota Association of Conservation Districts** – New active participant of BFRWP, full-time effort under the 319 grant program titled *303 (d) Watershed Planning and Assistance Project*.
- **South Dakota Conservation Commission** – Financial support.
- **South Dakota Department of Environment and Natural Resources (SD DENR)** – Active participation in BFRWP, technical support and financial support.
- **South Dakota Game, Fish and Parks (SD GFP)** – Participant in BFRWP, technical and financial support.
- **South Dakota Grassland Coalition** – Grassland management project, financial support.
- **South Dakota School of Mines and Technology (SDSM&T)** – Active participant in BFRWP, technical support through Dr. Kenner and graduate students. SDSM&T performed the initial TMDL study.
- **South Dakota State University (SDSU)** – Technical support, West River Ag Center personnel.
- **US Bureau of Reclamation (BOR)** – Active participation in BFRWP, provide technical support through drawings and designs as requested by BFID, provides financial support.
- **US Environmental Protection Agency (EPA)** – Provide 319 and 106 funding and technical guidance.
- **US Geological Survey (USGS)** – Active participant in BFRWP, field work, and technical and financial support.
- **US Fish and Wildlife Service (USFWS)** – Participant in BFRWP, technical and financial support.
- **US Natural Resource Conservation Service (NRCS)** – Participant in BFRWP, technical and financial support.
- **Wyoming Department of Environmental Quality (WY DEQ)** – Local support and financial support for flow measurements at the South Dakota-Wyoming state line.

### **5.2 LETTERS OF SUPPORT**

Letters of support have been supplied by local organizations to the SD DENR supporting the Belle Fourche River Watershed Assessment Project.

### **5.3 COORDINATION WITH OTHER PROGRAMS**

The BFRWP will continue to coordinate activities with state, federal, and local government agencies through frequent personal communication and quarterly partnership meetings. SD GFP, USFWS, NRCS, SD DENR, local organizations, and local government agencies will provide input and involvement in this assessment. Coordination with these agencies will include work related to other grassland improvement projects and other 303(d) assessment work. Extra coordination with local NRCS personnel will be necessary for the riparian vegetation and irrigation improvement projects.

### **5.4 SIMILAR ACTIVITIES IN WATERSHED**

All practices within the Belle Fourche River Watershed are included in the funding table.

### **6.0 EVALUATION AND MONITORING PLAN**

#### **6.1 QUALITY CONTROL AND ASSURANCE**

The collection of field data will be performed in accordance with the SD DENR's *Standard Operating Procedures for Field Samplers, Tributary and In-Lake Sampling Techniques*. A minimum of 10 percent (1 sample) of all samples collected will be quality assurance/quality control (QA/QC) samples. QA/QC samples will consist of field duplicates or field replicate samples.

#### **6.2 DATA**

The data will be provided to SD DENR. The data and analysis for this project will be documented in a final report that will be provided by the BFRWP to the SD DENR.

**BASINS** and **HSPF** were used to model the Belle Fourche River Watershed when the TMDL was developed. To develop the TMDL and to determine the necessary load reductions, several BMPs were modeled in these programs to reduce TSS concentrations in the streams within the Belle Fourche River Watershed. The sources of TSS identified were range erosion, irrigation and on-farm waste, free cattle access to streams, riparian degradation, natural geologic processes, hydraulic alteration by irrigation, and reduced stream miles. To understand the progress being made in achieving the goals of the TMDL plan, the BFRWP monitors present progress against planned progress in midyear and annual reports (load reductions reported annually).

Evaluation of project success in reaching the project objectives and goals will be accomplished by measuring: (1) the scheduled versus the actual milestone completion dates; (2) comparisons of flow rates and chemistry for irrigation water application, delivery, and riparian BMPs; (3) reduction in nonused water from BFID discharged into streams; and (4) development of a sustainable watershed implementation project measured in part by the participation and approval of additional grants money for BMP implementation. Project monitoring will be reviewed by the BFRWP in quarterly meetings to report progress toward the goals and objectives.

#### **6.3 LONG-TERM OPERATION AND MAINTENANCE (O&M) FUNDING**

The long-term O&M funding for irrigation delivery improvements will be funded and maintained by the BFID. Proper management of stream riparian habitat and on-farm irrigation improvements will be managed and supported financially in part by the NRCS and EQIP funding.

### **7.0 BUDGET**

Table 7-1 identifies the funding sources and cash flow during the project. Table 7-2 defines the acronyms used in Table 7-1. Tables 7-3 and 7-4 present the budget for the 319 funds as well as the matching funds for the project. EPA 319 funds represent less than 30 percent of the total project budget. Table 7-5 shows the total budget and Table 7-6 summarize the other funds being spent on the project that can not be used as matching funds.

Table 7-1. Cash Flow

Budget	June 2011– May 2012 (\$)	June 2012– July 2013 (\$)	Amendment (\$)	Total (\$)	Amended Total (\$)
<b>319 Funds</b>	<b>166,000</b>	<b>166,000</b>	<b>232,000</b>	<b>332,000</b>	<b>564,000</b>
<b>SRF Funds</b>	<b>100,000</b>	<b>100,000</b>	<b>50,000</b>	<b>200,000</b>	<b>250,000</b>
<b>Subtotal</b>	<b>266,000</b>	<b>266,000</b>	<b>282,000</b>	<b>532,000</b>	<b>814,000</b>
<b>Nonmatching Funds</b>					
SD DENR (Water Rights)	35,750	35,750	0	71,500	71,500
NRCS EQIP	887,000	887,000	0	1,774,000	1,774,000
COE	7,150	7,150	0	14,300	14,300
BOR	78,574	78,574	0	157,148	157,148
USGS	84,926	84,926	0	169,852	169,852
<b>Subtotal</b>	<b>1,093,400</b>	<b>1,093,400</b>	<b>0</b>	<b>2,186,800</b>	<b>2,186,800</b>
<b>Matching Funds</b>					
Producer	185,000	185,000	258,000	370,000	628,000
Lawrence County	14,450	14,450	0	28,900	28,900
BFID	5,363	5,363	0	10,726	10,726
WY DEQ	7,150	7,150	0	14,300	14,300
<b>Subtotal</b>	<b>211,963</b>	<b>211,963</b>	<b>258,000</b>	<b>423,926</b>	<b>681,926</b>
<b>Total Budget</b>	<b>1,571,363</b>	<b>1,571,363</b>	<b>540,000</b>	<b>3,142,726</b>	<b>3,682,726</b>

Table 7-2.

Table 7-2. Table of Acronyms

Acronym	Definition
SD DENR	South Dakota Department of Environment and Natural Resources
NRCS EQIP	Natural Resources Conservation Service Environmental Quality Incentives Program
COE	Corps of Engineers
BOR	Bureau of Reclamation
USGS	United States Geological Survey
BFID	Belle Fourche Irrigation District
WY DEQ	Wyoming Department of Environmental Quality

Table 7-3. Budget of 319 and SRF Funds (Amendments in Red)

Project Description	Consultants (\$)	Consultants Amended (\$)	Producer (\$)	Producer Amended (\$)	BFID (\$)	BFID Amended (\$)	Butte Conservation District (\$)	Butte Conservation District Amended (\$)	Totals (\$)	Total Amended (\$)	Combined Total Amended (\$)
<b>Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL to Reduce TSS</b>											
<b>Task 1. Reduce Nonused Water</b>											
Product 1. Improved Irrigation Water Delivery and Application											
1a. Line and Pipe Open Canals and Laterals											
1b. Install 15 (25) Sprinkler Systems			200,000	225,000					200,000	225,000	425,000
1c. Irrigation Scheduling		15,000		3,000					0	18,000	18,000
<b>Task 2. Range and Riparian Area BMP Implementation</b>											
Product 2. Implement Range BMPs											
Product 3. Implement Riparian BMPs				23,000						23,000	23,000
<b>Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants</b>											
<b>Task 3. Project Management and Administration</b>											
Product 4. Public Outreach, and Education Implementation Record Keeping, Report and Future Grant Writing	292,000						40,000		332,000		332,000
<b>Objective 3. Complete Essential Water-Quality Monitoring</b>											
<b>Task 4. Water-Quality Monitoring to Assess BMPs</b>											
Product 5. Water-Quality Monitoring		16,000								16,000	16,000
<b>Total</b>	292,000		200,000				40,000		532,000		
<b>Amended Total</b>		31,000		251,000						282,000	
<b>Combined Total</b>		323,000		451,000			40,000				814,000

Table 7-4. Budget of 319, SRF, and Matching Funds Budget (Amendments in Red)

Project Description	EPA 319 (\$)	EPA 319 Amended (\$)	SRF 2011 (\$)	SRF 2012 Amended (\$)	Matching Funds (\$)								Sum of Matching Funds (\$)	Sum of Matching Funds Amended (\$)	Combined Sum of Matching Funds Amended (\$)
					Producer Cash and In-kind (\$)	Producer Cash and In-kind Amended (\$)	Lawrence County Cash (\$)	Lawrence County Cash Amended (\$)	BFID (Cash and In-kind) (\$)	BFID (Cash and In-kind) Amended (\$)	WY DEQ (Cash) (\$)	WY DEQ (Cash) Amended (\$)			
<b>Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL to Reduce TSS</b>															
<b>Task 1. Reduce Nonused Water</b>															
Product 1. Improved Irrigation Water Delivery and Application															
1a. Line and Pipe Open Canals and Laterals															
1b. Install 15 (25) Sprinkler Systems		175,000	200,000	50,000	370,000	240,000							370,000	240,000	610,000
1c. Irrigation Scheduling		18,000				10,000								10,000	10,000
<b>Task 2. Range and Riparian Area BMP Implementation</b>															
Product 2. Implement Range BMPs															
Product 3. Implement Riparian BMPs		23,000				8,000								8,000	8,000
<b>Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants</b>															
<b>Task 3. Project Management and Administration</b>															
Product 4. Public Outreach, and Education Implementation Record Keeping, Report and Future Grant Writing	332,000														
<b>Objective 3. Complete Essential Water-Quality Monitoring</b>															
<b>Task 4. Water-Quality Monitoring to Assess BMPs</b>															
Product 5. Water-Quality Monitoring		16,000					28,900		10,726		14,300		53,926		53,926
<b>Total</b>	332,000		200,000		370,000		28,900		10,726		14,300		423,926		
<b>Amended Total</b>		232,000		50,000		258,000								258,000	
<b>Combined Total</b>															681,926

**Table 7-5. Total Budget (Amendment in Red)**

Project Description	EPA 319 (\$)	EPA 319 Amended (\$)	SRF 2011 (\$)	SRF 2012 Amended (\$)	Matching Funds (\$)	Matching Funds Amended (\$)	Nonmatching Funds (\$)	Nonmatching Funds Amended (\$)	Totals (\$)	Totals Amended (\$)	Combined Total Amended (\$)
<b>Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL to Reduce TSS</b>											
<b>Task 1. Reduce Nonused Water</b>											
Product 1. Improved Irrigation Water Delivery and Application											
1a. Line and Pipe Open Canals and Laterals							150,000		150,000		150,000
1b. Install 15 (20) Sprinkler Systems		175,000	200,000	50,000	370,000	240,000	374,000		944,000	465,000	1,409,000
1c. Irrigation Scheduling		18,000				10,000			0	28,000	28,000
<b>Task 2. Range and Riparian Area BMP Implementation</b>											
							1,400,000		1,400,000		1,400,000
Product 2. Implement Range BMPs											
Product 3. Implement Riparian BMPs		23,000				8,000				31,000	31,000
<b>Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants</b>											
<b>Task 3. Project Management and Administration</b>											
Product 4. Public Outreach, and Education Implementation Record Keeping, Report and Future Grant Writing	332,000								332,000		332,000
<b>Objective 3. Complete Essential Water-Quality Monitoring</b>											
<b>Task 4. Water-Quality Monitoring to Assess BMPs</b>											
Product 5. Water-Quality Monitoring		16,000			53,926		262,800		316,726	16,000	332,726
<b>Total</b>	332,000		200,000		423,926		2,186,800		3,142,726		
<b>Amended Total</b>		232,000		50,000		258,000				540,000	
<b>Combined Total</b>		564,000		250,000		681,926		2,186,800			3,682,726

**Table 7-6. Nonmatching Funds Budget (no change to this budget)**

EPA 319 and Nonmatching Funds Budget	Nonmatching Funds					Sum of Nonmatching Funds (\$)
	SD DENR (Federal) (\$)	NRCS EQIP (Federal) (\$)	COE (Federal) (\$)	BOR (Federal) (\$)	USGS (Federal) (\$)	
<b>Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL to Reduce TSS</b>						
<b>Task 1. Reduce Nonused Water</b>						
Product 1. Improved Irrigation Water Delivery and Application						
1a. Line and Pipe Open Canals and Laterals				150,000		150,000
1b. Install 20 Sprinkler Systems		374,000				374,000
1c. Irrigation Scheduling						
<b>Task 2. Range and Riparian Area BMP Implementation</b>						
Product 2. Implement Range BMPs		1,400,000				1,400,000
Product 3. Implement Riparian BMPs						
<b>Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, and Writing Future Grants</b>						
<b>Task 3. Project Management and Administration</b>						
Product 4. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing						
<b>Objective 3. Complete Essential Water-Quality Monitoring</b>						
<b>Task 4. Water-Quality Monitoring to Assess BMPs</b>						
Product 5. Water-Quality Monitoring	71,500		14,300	7,148	169,852	262,800
<b>Total</b>	<b>71,500</b>	<b>1,774,000</b>	<b>14,300</b>	<b>157,148</b>	<b>169,852</b>	<b>2,186,800</b>

**8.0 PUBLIC INVOLVEMENT**

Communications with the major stakeholders in this project is critical to success. Public involvement in the project will be continued through public meetings with stakeholders, tours sponsored by BFRWP, newsletters sent out by conservation districts, word of mouth, and by the website developed by the partnership ([www.bellefourchewatershed.com](http://www.bellefourchewatershed.com)).

**9.0 THREATENED AND ENDANGERED SPECIES**

The following endangered species are identified by the SD GFP as located within and/or migrating through the Lawrence, Butte, and Meade Counties: bald eagles, whooping crane, least tern, black-tailed prairie dog, and the black-footed ferret. The implementation of this project is not expected to impact any of these species. An Endangered Species Act Compliance Assessment letter dated May 18, 2004, from Mr. Doug Lofstedt, South Dakota Section 319 Project Officer, documents the “no affect” determination for the bald eagle, whooping crane, least tern, black-tailed prairie dog, and black-footed ferret in the project area.

The procedure that will be followed to ensure that threatened and endangered species are not adversely affected by project activities is based on three main premises, which are the same ones used for Segments 1–4:

- The managed grazing systems, planned and implemented, will promote the restoration or preservation of critical grassland habitat.
- It is anticipated that many of the grazing systems planned and implemented will be within areas with compliance plans in place.
- Involvement of NRCS and the USFWS in planning and construction grazing systems ensures personnel trained with mitigating threatened and endangered species will be involved with the design and implementation of project BMPs.

Species most likely to be encountered during the project and the procedure to be followed relative to each follows.

### **8.1 BALD EAGLE**

The bald eagle is a threatened species with a known certainty of occurrence in all three counties. According to the USFWS, bald eagles are presently known to nest in the flood plain forest along the Missouri River in Yankton, Bon Homme, Union, and Gregory Counties; along the James River in Brown, Spink, Sanborn, and Hutchinson Counties; and in forested areas in Meade, Charles Mix, and Brown Counties of South Dakota.

The 319-funded activities will be very low intensity and widely dispersed over the landscape. The activities will not significantly increase or expand the level of human activity. Activities that disturb possible nesting sites or reduce food sources are not anticipated. Therefore, EPA-funded activities are expected to have no effect on the bald eagle and no consultation with the USFWS is planned.

### **8.2 WHOOPING CRANE**

The whooping crane is an endangered species with a known certainty of occurrence in all three counties. They are often found in South Dakota during spring and fall migrations. Migration through the state occurs from mid- to late-April and mid- to late-October. Although a variety of habitats are used during migration, a wetland is always used for night roosting and frequently for foraging. While migrating, whooping cranes roost in wide, shallow, open water areas, including marshes, flooded crop fields, artificial ponds, reservoirs, and rivers. Roosting sites must also be isolated from human disturbances.

The EPA-funded monitoring activities will be of low intensity, widely dispersed over the landscape, and will not significantly increase or expand the level of human activity. In addition, if any cranes are observed at any project work site, “all mechanical activities at the site will be suspended until the bird(s) leave the site under their own volition” (Section 8.1). Thus the EPA-funded activities are expected to have no effect on the whooping crane and no consultation with the USFWS is planned.

### **8.3 LEAST TERN**

The least tern is listed as an endangered species with a “known” certainty of occurrence in Meade County. This species historically breed in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems. The least tern is a local summer resident of the Missouri and Cheyenne Rivers in South Dakota. They can be found migrating through virtually all of South Dakota with the exception of the Black Hills. Least terns usually nest on open expanses of sand or small pebble beaches along shorelines, riverbanks, sandbars, and islands. Least terns typically select nesting sites that are well drained and away from the water line, usually near a small ridge or piece of driftwood. Their food source consists almost entirely of small fish, and feeding requires shallow water areas with an abundance of fish near the nesting area.

Major losses and alterations of habitat occur from shoreline, bank, and channel modification from construction of locks, dams, dikes, levees, and reservoirs. Flooding can prevent or destroy nesting and can be a byproduct of habitat alteration. Habitat losses can also result from increased development, recreational uses, natural erosion, human and domestic pet disturbances or harassment, and trampling by cattle. Pollution that affects fish populations can impact terns.

The 319-funded monitoring activities will be of low intensity, widely dispersed over the landscape, confined to a few isolated stream channel areas, and will not significantly increase or expand the level of human activity. Activities that disturb possible nesting sites or reduce food sources are not anticipated. If any least terns are observed near any project work site, “all mechanical activities at the site will be suspended until the bird(s) leave the site under their own volition” (PIP section 8.2). Therefore, EPA-funded activities are expected to have no effect on the least tern and no consultation with the USFWS is planned.

#### **8.4 BLACK-TAILED PRAIRIE DOG**

The black-tailed prairie dog is listed as a “Candidate” species with a “known” certainty of occurrence in all three counties. Black-tailed prairie dog colonies are almost exclusively located in grassland habitat because their primary diet consists of vegetation.

The 319-funded activities will be widely dispersed over the landscape and not related to black-tailed prairie dog habitat. The activities will not significantly increase or expand the level of human activity. Activities that disturb or reduce food sources are not anticipated. Therefore, EPA-funded activities are expected to have no effect on the black-tailed prairie dog and no consultation with the USFWS is planned.

#### **8.5 BLACK-FOOTED FERRET**

The black-footed ferret is an endangered species with a “possible” certainty of occurrence in all three counties. This species is a member of the weasel family. It feeds primarily on prairie dogs and uses their burrows for denning and shelter. Their historic range included Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming, Alberta, and Saskatchewan. The South Dakota population that disappeared in the wild in 1974 was thought to be the last remaining population. However, a captive propagation program was started with individuals from a Meeteetse, Wyoming, population that was discovered in 1981. Reintroductions have since occurred in Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. The South Dakota sites include the Conata Basin, Badlands National Park, and Cheyenne River Sioux tribal land in Dewey and Ziebach Counties.

Primary threats to the black-footed ferret include predation, disease, and loss of habitat. The ferrets can be affected by predators such as coyotes, golden eagles, great-horned owls, prairie falcons, badgers, bobcats, and foxes. Canine distemper will kill ferrets and sylvatic plague can eliminate entire prairie dog towns. In South Dakota, sylvatic plague currently poses the biggest threat to ferret populations. However, poisoning of prairie dogs and converting native prairie to cropland are main threats to ferret habitat.

The existence of black-footed ferrets is directly linked to the presence of prairie dogs. The sponsor will address the black-footed ferrets by complying with the South Dakota Prairie Dog Management Plan. If any actions are planned that may adversely effect the survival of a native or introduced population of black-footed ferrets the sponsor will consult with the US Fish and Wildlife Service.