BELLE FOURCHE RIVER WATERSHED PARTNERSHIP

Belle Fourche Office
1837 5th Avenue, South
Belle Fourche, SD 57717-2086
(605) 892-3368 – Ext. 3

October 1, 2009

Mr. Pete Jahraus
Department of Environment and Natural Resources
Division of Financial and Technical Assistance
523 East Capitol
Joe Foss Building
Pierre, SD 57501

Dear Mr. Jahraus:

We are pleased to submit the following proposal titled *Belle Fourche River Watershed Management and Project Implementation Plan Segment IV Amendment*. The amendment is a request for additional funding for Best Management Practices (BMPs) in the Belle Fourche Watershed. The project timeline will remain the same ending in June 2011.

We are looking forward to continuing the effort started over 8 years ago by the Belle Fourche River Watershed Partnership and many of the stakeholders within the watershed. This project will continue the implementation of the BMPs recommended in the Total Maximum Daily Load (TMDL) report for the watershed. The total cost of the 2-year segment of the project with the proposed amendment is $6,418,276 with $1,387,050 coming from EPA 319 funds. The project began in June 2009 and will be completed by June 2011.

We hope this proposal meets your decision requirements. Please call if we can provide any additional information.

Sincerely,

Tim Reich
President
Belle Fourche River Watershed Partnership

TR:llf

Enclosure

cc: Project Central File 1870 — Category A
Project Central File 996-2495 — Category B

Belle Fourche River Watershed Management and Project Implementation Plan Segment IV Amendment

319 Watershed Project

October 1, 2009

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 IV

NAME AND ADDRESS OF LEAD PROJECT SPONSOR

Belle Fourche River Watershed Partnership
1837 5th Avenue
Belle Fourche, SD 57717

STATE CONTACT PERSON: Lee Baron
TITLE: Natural Resources Engineer
EMAIL: Lee.Baron@state.sd.us
PHONE: 605.773 5092 **FAX:** 605.773.4068
STATE: South Dakota **WATERSHED**: Belle Fourche River Watershed
HYDROLOGIC UNIT CODE: 101202
HIGH PRIORITY WATERSHED (yes/no) Yes

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

WATERBODY TYPES	NPS CATEGORY
[X] GROUNDWATER	[X] AGRICULTURE
[X] LAKES/RESERVOIRS	[ ] URBAN RUNOFF
[X] RIVERS	[ ] SILVICULTURE
[X] STREAMS	[ ] CONSTRUCTION
[X] WETLANDS	[ ]RESOURCE EXTRACTION
[ ] OTHER	[ ] 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) for waterbodies within the watershed as they become available. At this time, TMDLs for fecal coliform is not complete. Therefore, 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 21.5 (7.5 + 14) milligrams/liter (mg/l) reduction of the required 108 mg/l reduction below the Belle Fourche Reservoir and 33 (2 + 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.

PROJECT DESCRIPTION: The Belle Fourche River Watershed Partnership is the project sponsor for this 2-year project. This is the fourth segment of seven planned project segments that addresses a cluster of nine TMDLs. Completion of the activities planned for this segment will advance the BMP implementation for TSS pollutants to 51 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.

FISCAL YEAR	2009–2011
319 FUNDS:	$1,387,050 (655,000 + 732,050)
TOTAL PROJECT COST:	$6,418,276 (3,444,226 + 2,974,050)
MATCH:	$2,355,926 (1,813,926+542,000)
319 FUNDED FULL-TIME PERSONNEL:	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 one were delisted after water-quality standards for TSS were met. Table 2-1 contains a summary of 12 impaired TMDL segments within the Belle Fourche River Watershed. 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 total dissolved solids (TDS) 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 2008 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. BMPs installed during the first project segment were: one flow automation unit, replacing open irrigation ditch with pipeline, lining open irrigation ditches, installing pipelines to deliver water from the BFID system to the fields, installing two sprinkler irrigation systems, and 3,000 acres of managed grazing. These BMPs resulted in an estimated 7 milligrams per liter (mg/l) reduction in TSS (2.3 percent of goal). Table 2-2 and Table 2-3 list the BMPs installed above and below the reservoir, respectively, during the first three project segments. The tables also show the total planned amount of each BMP to be installed in this segment. Segment I and Segment II were completed on schedule and within budget. Segment III is on schedule to be complete in December 2009.

The 10-year plan includes a TSS reduction schedule. The BMPs installed to date have resulted in an estimated 45 mg/l above the reservoir and 83.6 mg/l below the reservoir for a total of 128 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 128 mg/l translates to 36 percent achievement of the goal since the project was initiated. At the time of this amendment, 85 percent of the implementation funds awarded in this funding segment have been used or are under contract. The remaining funds are projected to be invested by spring of 2010.

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.

Table 2-1. Summary of Belle Fourche River Watershed Exceedance Water-Quality Data

Stream	WQM/ USGS	Beneficial Use	Impairment Parameter	Water Quality Criteria	Source
Bear Butte Creek[(a)]	460126	Cold-water Permanent Fish Life	Water Temperature (^oF)	<65^oF	Natural Source
Bear Butte Creek[(b)]	460125	Cold-water Permanent Fish Life	Water Temperature (^oF)	<65^oF	Natural Source
Belle Fourche River[(c)]	460130	Immersion Recreation	Fecal Coliform (per/100 ml)	200[(d)]/400[(e)]	Riparian Grazing/Wildlife
		Warm-water Permanent Fish Life	TSS (mg/l)	90[(d)]/158[(e)]	Crop Production/ Livestock
Horse Creek[(f)]	6436760	Irrigation Waters	Conductivity (mohms/cm @ 25^oC)	2,500[(d)]/4,375[(e)]	NA
Redwater River[(g)]	6430500	Cold-water Permanent Fish Life	Water Temperature (^oF)	<65^oF	Natural Source
Strawberry Creek	460116	Cold-Water Marginal Fish Life	pH	6.5 – 8.8	Mining Impacts
		Fish/Wildlife Prop. Rec. Stock Waters	Cadmium (mg/l)	(a)	Mining Impacts
West Strawberry Creek	460675	Cold-water Permanent Fish Life	Water Temperature (^oF)	<65^oF	NA
		Limited Contact Recreation	Fecal Coliform (per/100 mg/l)	1,000[(d)]/2,000[(e)]	NA
Whitewood Creek[(i)]	460686	Cold-water Permanent Fish Life	Water Temperature (^oF)	<65^oF	NA
Whitewood Creek[(j)]	460123	Immersion Recreation	Fecal Coliform (per/100 mg/l)	200[(d)]/400[(e)]	Combined Sewers/Grazing
Whitewood Creek[(k)]	460684	Cold-water Marginal Fish Life	pH	6.5 – 8.8	Natural Sources
Whitewood Creek[(l)]	460652	Warm-water Permanent Fish Life	pH	6.5 – 9.0	Natural Sources
Whitewood Creek[(m)]	NA	Irrigation Waters	Conductivity (mohms/cm @ 25^oC)	2,500[(d)]/4,375[(e)]	NA

(a) Headwaters to Strawberry Creek.
(b) Strawberry Creek to mouth.
(c) Wyoming border to near Fruitdale, South Dakota.
(d) 30-day average.
(e) Daily maximum.
(f) Indian Creek to mouth.
(g) Wyoming border to US HWY 85.
(h) Cadmium Concentration < (1.136672 – ((ln(hardness) × 0.041838) × exp(1.128 × (ln(hardness)) – 3.828).
(i) Whitetail Summit to Gold Run Creek.
(j) Deadwood Creek to Spruce Gulch.
(k) Sandy Creek to I-90.
(l) I-90 to Crow Creek.
(m) Near Vale, South Dakota.

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

BMP	Planned for Segment IV	Amount Implemented October 08	Amount Scheduled From 10-Year Plan
Flow Automation Units (Gates)		2	2
Upgraded Water Card and Water Order System [(a)]	Complete	Phase III	Three Phases
Portable Stage/Flow-Measuring Devices	3	0	3
Real-Time Stage Flow-Measuring Devices		1	3
Alternative Keyhole Water Delivery Study		0	1
Alternative Keyhole Water Supply Method		0	1
Nonused Water Storage Pond		0	1
Inlet Canal Lining		5,960	10,560
Pipeline Projects Delivering Water to Fields	1,500	6,532	500
Irrigation Sprinkler Systems	1	4	2
Scheduling of Irrigation Water [(a)]	Complete	1	1
Managed Riparian Grazing		13,033	14,750
Public Meetings [(a)]	8	24	40
Project Tours [(a)]	2	6	8

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

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

BMP	Planned for Segment IV	Amount Implemented October 08	Amount Scheduled From 10-Year Plan
Flow Automation Units (Gates)		2	2
Upgraded Water Card and Water Order System[(a)]	Complete	Phase III	Three Phases
Portable Stage/Flow-Measuring Devices	3	0	3
Real-Time Stage Flow-Measuring Devices		1	3
Alternative Keyhole Water Delivery Study		0	1
Alternative Keyhole Water Supply Method		0	1
Nonused Water Storage Pond		0	1
Inlet Canal Lining	5,280	5,960	10,560
Pipeline Projects Delivering Water to Fields	1,500	6,532	500
Irrigation Sprinkler Systems	1	4	2
Scheduling of Irrigation Water[(a)]	Complete	1	1
Managed Riparian Grazing	3,000	13,033	14,750
Public Meetings[(a)]	8	24	40
Project Tours[(a)]	2	6	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

BMP	Planned for Segment IV	Amount Implemented October 08	Amount Scheduled From 10-Year Plan
Flow Automation Units (Gates)		25	40
Upgraded Water Card and Water Order System [(a)]	Complete	Phase III	Three Phases
Portable Stage/Flow-Measuring Devices		6	12
Real-Time Stage Flow-Measuring Devices		8	12
Line Open Canals and Laterals	2,500	2,640	16,000
Replace Open Canals and Laterals With Pipelines	2,500	5,488	25,000
Nonused Water Storage Pond		0	2
Pipeline Projects Delivering Water to Fields	23,500	27,407	8,500
Irrigation Sprinkler Systems	17	14	34
Scheduling of Irrigation Water [(a)]		1	1
Managed Riparian Grazing		7,412	19,250
Public Meetings [(a)]	8	24	40
Project Tours [(a)]	2	6	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

BMP	Planned for Segment IV	Amount Implemented October 08	Amount Scheduled From 10-Year Plan
Flow Automation Units (Gates)	3	25	40
Upgraded Water Card and Water Order System[(a)]	Complete	Phase III	Three Phases
Portable Stage/Flow-Measuring Devices		6	12
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Line Open Canals and Laterals	2,500	2,640	16,000
Replace Open Canals and Laterals With Pipelines	2,500	5,488	25,000
Nonused Water Storage Pond	1	0	2
Pipeline Projects Delivering Water to Fields	23,500	27,407	8,500
Irrigation Sprinkler Systems	17	14	34
Scheduling of Irrigation Water[(a)]		1	1
Managed Riparian Grazing	5,500	7,412	19,250
Public Meetings[(a)]	8	24	40
Project Tours[(a)]	2	6	8

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

RSI-996-08-050

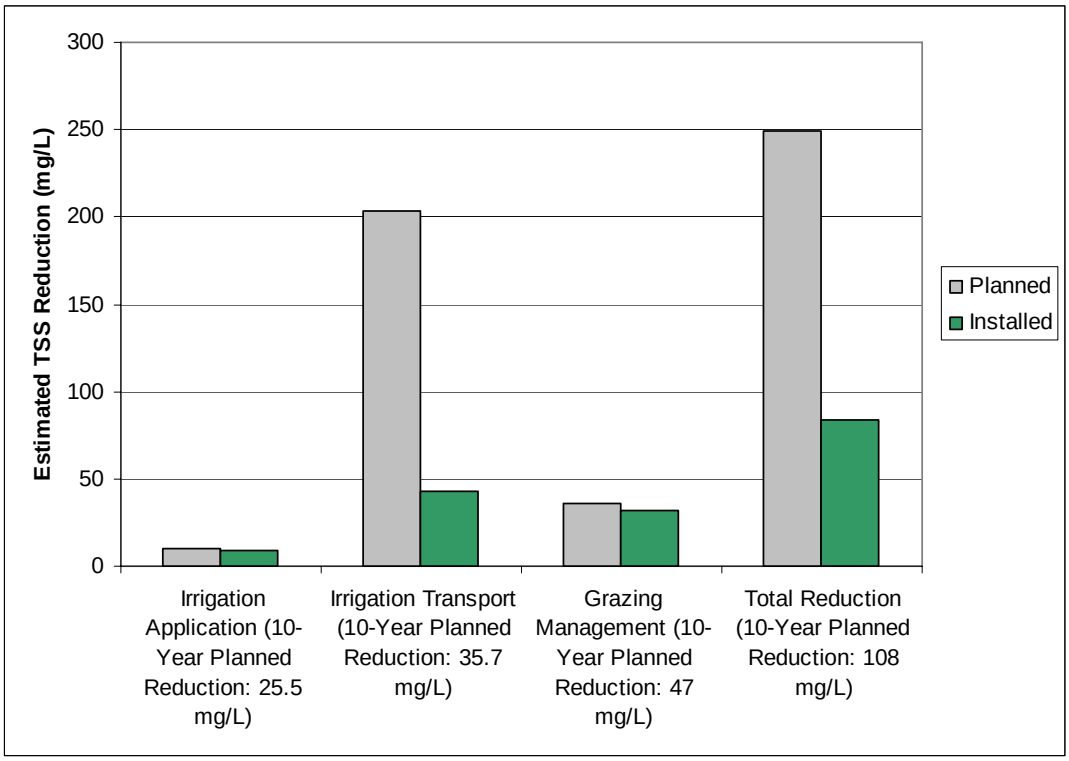

Figure 2-1. Planned Versus Installed Reductions Above Belle Fourche Reservoir.

RSI-996-08-051

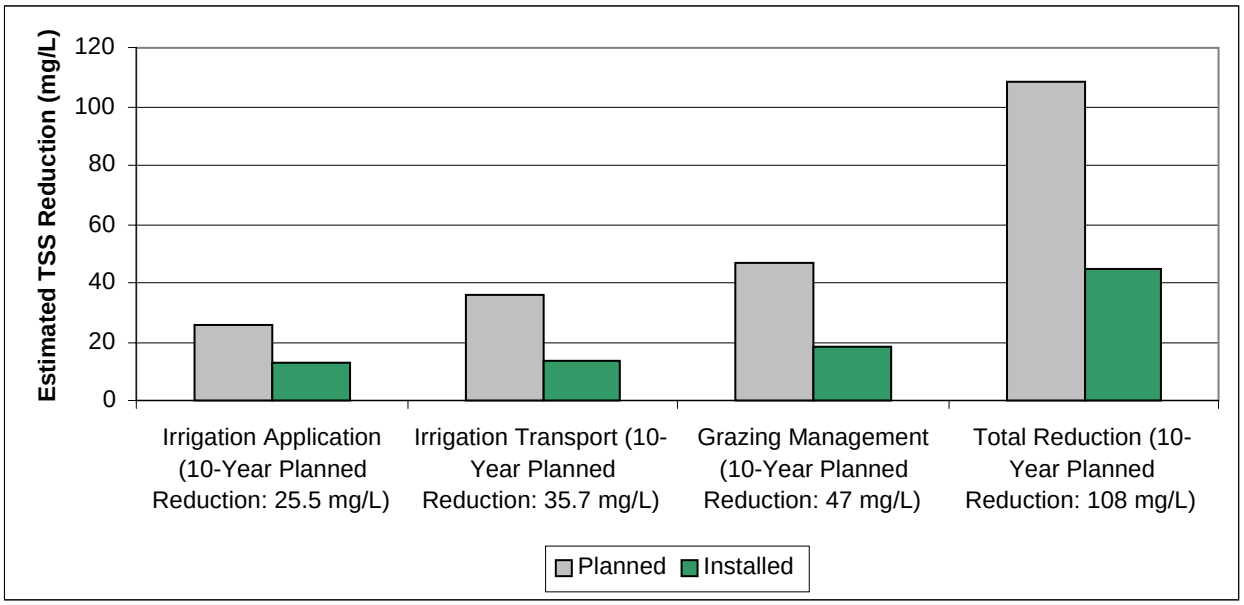

Figure 2-2. Planned Versus Installed Reductions Below Belle Fourche Reservoir.

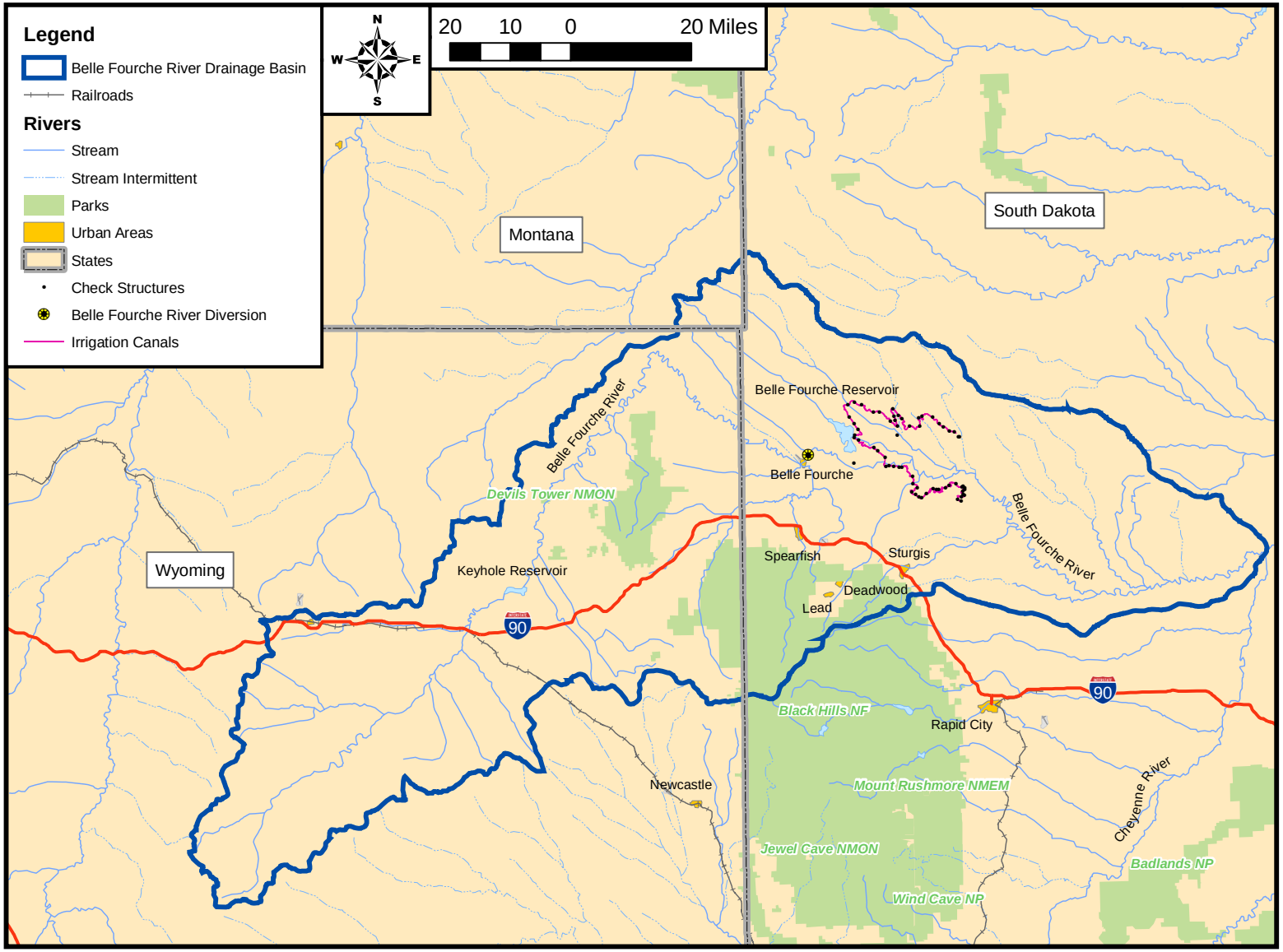

Figure 2-3. Location of the Belle Fourche River Watershed.

The Belle Fourche River is a tributary to the Cheyenne River. Nine stream segments in the Belle Fourche River Watershed are listed in the South Dakota 2004 and 2006 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 water-quality standard for TSS were 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 Plan and the 5-Year 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 33 mg/l and 21.5 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 2-4. Total Suspended Solids Reduction (mg/l)

Location of Reductions	TSS Reductions to Date	TSS Reductions Planned For Segment IV	Planned TSS Reductions in the 10–Year Plan
Above the Reservoir	45	2	249
Below the Reservoir	83	7.5	108
Combined TSS Reductions	128	9.5	357

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

Location of Reductions	TSS Reductions to Date	TSS Reductions Planned For Segment IV	Planned TSS Reductions in the 10–Year Plan
Above the Reservoir	83	33	249
Below the Reservoir	45	21.5	108
Combined TSS Reductions	128	54.5	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 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. 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 compliance for TSS by implementing the recommended BMPs by 2014 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 21.5 (7.5 + 14) mg/l reduction of the required 108 mg/l reduction below the Belle Fourche Reservoir and 33 (2 + 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 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 fifth and sixth years of BMP installation in the Belle Fourche 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 and riparian vegetation improvement. 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 4,261 acre-feet, or 36 percent of the overall goal.

Task 1 **Reduce Nonused Water Discharged to the Local Waterways From the Delivery and Application Systems by 1,620 Acre-Feet (Bringing the Total Reduction to 49 Percent of the Overall Goal, Including 4,261 Acre-Feet of Reduction From Previous Implementation)**

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) is over 2.5 times the 12-month average. For the same sites, over 95 percent of the load occurs during the irrigation season. 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 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 Belle Fourche River Watershed Partnership is currently seeking funds to improve the efficiency of the current system.

Irrigation scheduling is another method for increasing efficiency by controlling the rate, amount, and timing of irrigation water. Measurements of water flow, crop use rate, and soil measurements aid in scheduling. A current project, funded by an NRCS Conservation Innovation Grant (CIG), uses calculated evapotranspiration estimates from local weather stations in combination with direct soil moisture measurements to aid producers in determining the correct timing and amount of irrigation to apply.

Products:

1. Improved Irrigation Water Delivery and Application.

   Reduce the amount of nonused irrigation water discharged to the surrounding water by 3,400 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 (2,500 feet of lining and 2,500 feet of pipeline). BOR funded 5,280 feet of inlet canal lining for fiscal year 2010. This is an additional 2,780 feet from the original Segment IV Project Implementation Plan (PIP).

      The specific lining and pipeline projects for 2009 through 2011 have not been finalized by the BFID. When finalized, these projects will be submitted to the BOR for approval. 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: $300,000 319 Cost: $0
      – Lead Group: BFID
      – Other Groups: BOR
      – Milestone: June 2011, 2,500 feet of lined open canals and laterals and 2,500 feet of pipeline (see timeline, page 16) and an additional 2,780 feet of inlet canal lining.

   b) Install 18 sprinkler irrigation systems and 25,000 feet of pipeline projects delivering water to sprinkler irrigation systems and flood irrigation systems and install irrigation improvements on an additional 2,000 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. Eighteen sprinkler irrigation systems will be installed during this segment of implementation. Total sprinkler irrigation cost would be approximately $1,440,000. Approximately 87.5 percent of the sprinkler systems will be paid for by the producers and 12.5 percent by EPA 319 funds. Approximately 25,000 feet of pipeline projects delivering water to sprinklers and flood irrigation systems will be installed during this segment of implementation. Total cost pipeline cost would be approximately $500,000. Approximately 75 percent of the pipeline projects will be paid for by producers and 25 percent by EPA 319 funds. The EPA 319 funds are necessary to achieve this level of implementation. This will bring the installation of sprinkler irrigation systems to 36 of the planned 36. Funds requested by this amendment will be used to improve water use efficiency and decrease the amount of sediment transported through runoff on approximately 2,000 acres by replacing flood irrigated systems with center pivots and improving existing flood irrigation systems with pipelines. Budgeted 319 funds in the original Segment IV PIP were used to fund 12 pivots and approximately 25,000 feet of pipeline on 1,800 acres. Some of the funds supplemented existing Environmental Quality Incentive Program (EQIP) contracts for irrigation.

      – Activity Cost: $2,352,500 + 950,000 319 Cost: $305,000 + $300,000
      – Lead Group: NRCS
      – Other Groups**:** Consultants, Producers
      – Milestone: June 2011, Install 18 sprinkler systems plus pipeline improvement projects (see timeline, page 16) and install irrigation improvements on an additional 2,000 acres.

c) Install three stage-control automation units within the delivery system.

The three gate structures would focus on the major laterals off the main canals. To date the focus of the automation projects have been on the north and south canals and the Johnson lateral (upstream of the Belle Fourche Reservoir). The gate structures will more closely control the level within the canals and laterals, thereby reducing the amount of nonused water discharged into the waterways.

- Total Product Cost: $50,000 319 Cost: $50,000
- Lead: BFID
- Other Groups: BOR, Consultants
- Milestone: June 2011, 30 flow automation units (see timeline, page 16).

Total Product Cost: $2,352,500 + $1,300,000 319 Cost: $305,000 + $350,000
Responsible Groups: BFID, BOR, RIA, NRCS, Consultants

Task 2 **Riparian Area BMP Implementation**

Implementation of riparian vegetation improvement projects has been demonstrated to reduce TSS up to 70 percent (see 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. Plans that will be used to install the BMPs include: fencing, stream crossing, alternative water supplies, winter feeding systems, and stream channel bank stabilization.

Products:

2. 319 Funds would be used to provide cost-share assistance for producer projects that directly impact riparian areas reducing TSS in the Belle Fourche River. Water is typically the limiting factor in proper grazing distribution in the Belle Fourche River Watershed. Often, when relying on creeks or rivers for livestock, water excess vegetation removal and bank degradation can result from livestock spending an extended amount of time in these riparian areas. In the Belle Fourche River Watershed, complete livestock exclusion from riparian areas is typically not a feasible solution, and managed grazing in these riparian areas is recommended. This can be accomplished by fencing these areas and developing an alternate source of water and grazing plan that allows for maintaining the integrity of the system. There are some situations in the watershed where the stream bank has been damaged beyond natural repair. In these limited situations, mechanical stream bank stabilization may be appropriate to improve the condition of the stream. 319 Funds would be used to provide producer cost share for riparian fencing, alternate water development, tree planting, and stream bank stabilization projects. Planning assistance for these improved systems would be provided through South Dakota Grasslands Coalition (SDGLC).

Total Product Cost: $67,000 319 Cost: $50,000
- Lead Group: BFRWP
- Other Group: Conservation Districts, NRCS, Consultants
- Milestone: June 2011, 500 improved riparian acres (see timeline, page 16).

OBJECTIVE 2: Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants, and Federal Audit.

Public outreach and education is an essential part of this project. Public meetings and workshops keep the community informed and encourage involvement with the BFRWP. Producer implementation project planning and record keeping is important for efficient report writing. Grant writing for future projects involving water-quality issues in the watershed will further assist in the BFRWP efforts.

Task 3 **Project Management**

Products:

3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing, and Federal Audit.

   Eight public meetings will be held during the project. The function of the meetings will be to update the status of the project for the producers, landowners, and stakeholders and educate and encourage them to become involved with implementing BMPs. These meetings will provide an avenue for input from the residents in the area. Notification of meetings will be made to local agencies, mailings, and newspapers. In addition, a public Web page 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*>. Public awareness will be further enhanced by annual tours of the watershed along with informational booths at local county fairs 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. Consultants will be responsible for organizing and planning public outreach and education activities.

   Range 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, along with NRCS and Conservation District staff, will 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 (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. Additional grants will be written to assist in resolving water-quality issues and support the cost of implementation projects. Additional grants proposed will include U.S. Department of Agriculture (USDA)-NRCS Agriculture Water Enhancement Program (AWEP) to assist with funding of irrigation improvements in the watershed. Expenditures for federally required audits will be taken out of project management money as well.

   The BFRWP received USDA Cooperative Conservation Partnership Initiative (CCPI) funding of $3.5 million dollars over the next 5 years. Project management money specified in the PIP from Segments III and IV were used to write this proposal. CCPI funds are prioritized EQIP funds that will provide cost share for range improvement practices in the Belle Fourche River Watershed. No administration funds are available from USDA through this program. BFRWP will be responsible for progress reporting, soliciting program information to producers and the general public, and to cooperate with NRCS in developing and implementing conservation plans that address priority natural resource concerns in the defined project area. The proposal was written to work synergistically with 319 efforts in the watershed. Collaborative efforts would include using BMP tracking to report TSS reductions. Implementation projects are projected to treat 50,000–75,000 acres annually for the next 5 years, including 3,000–5,000 riparian acres annually. Project management money would provide funding for a part-time support staff in the Belle Fourche NRCS office and consultant money to assist with additional planning and report writing.

   Total Product Cost: $300,000 + $1,627,650 319 Cost: $300,000 + $227,650

   – Lead Group: BFRWP
   – Other Group: NRCS, Producers, Consultants, Butte Conservation District
   – Milestone: June 2011, two GRTS reports, one final report, eight public meetings, one Web site, two watershed tours, and two workshops (see timeline page 16). Approximately 125,000 range acres treated, including 8,000 riparian acres managed, four additional watershed tours, eight public information booths, and required federal audit.

OBJECTIVE 3: **Complete Essential Water-Quality Monitoring and TMDL Development**

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

As implementation efforts continue to move forward, it is critical to understand the current water quality in the Belle Fourche River, to understand the improvement to water quality from current implementation efforts, as well as to focus the remaining segments of implementation into the future. Water-quality data collected as part of this project will be compared to previous water-quality data collected as part of the TMDL assessment project or the state's ambient water-quality monitoring (WQM) program. This will help to identify any recent changes in water quality related to the improving watershed condition as well as to identify changes associated with changing climatic patterns.

Nine sites were selected for additional flow or water-quality monitoring (Figure 3-1). The current status of these sites, along with the additional monitoring to take place, is outlined in Table 3-1. Eight of the nine sites were selected at current USGS gaging or SD WQM stations. Note that one site (Belle Fourche River below Belle Fourche) is neither a USGS nor a WQM station; however, this site was sampled as part of the previous fecal TMDL assessment and was identified as a critical location in the watershed.

The primarily data collection to be completed for this project is water-quality grab sampling. Grab sampling will occur monthly at seven sites from March through October 2010; WQM stations where monthly sampling is currently taking place will not have additional grab samples collected as part of this effort. Constituents to be sampled include TSS, fecal coliform, total, and *E.* coli. Continuous water quality will be collected at the most upstream and most downstream sites in the watershed; these are USGS real-time sites where the continuous water-quality data collection will be added to their current effort. Continuous stage will be recorded at non-USGS gage stations; stage will be converted to discharge based on stage discharge relationships developed as part of this effort.

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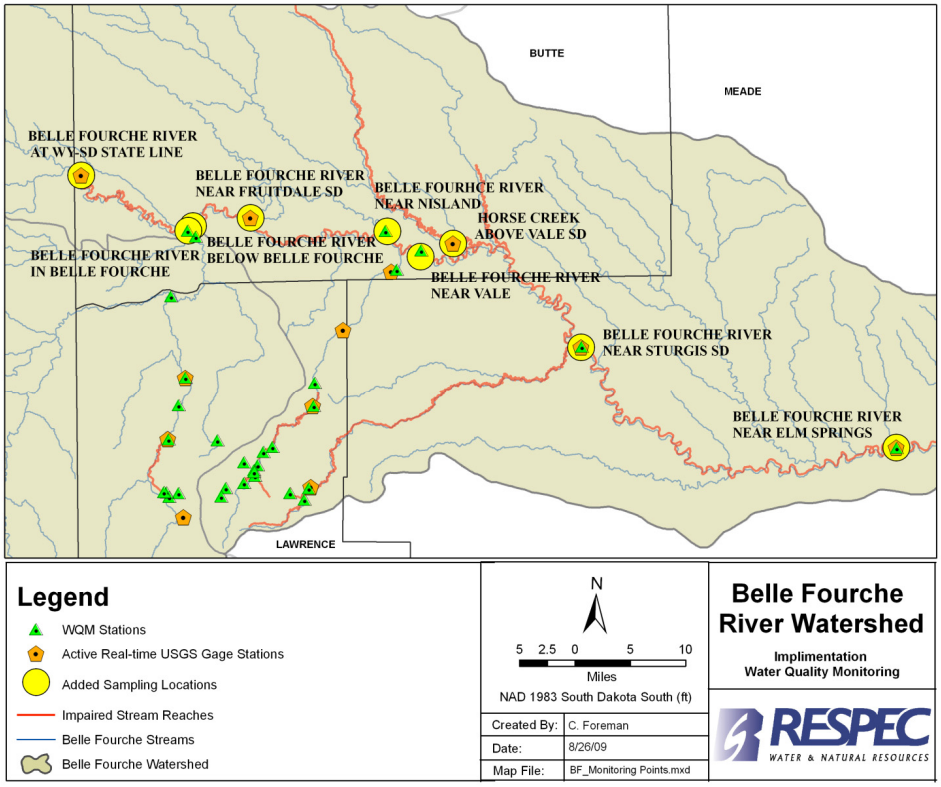

Figure 3-1. Current and Proposed Water-Quality Sampling in the Belle Fourche River.

Table 3-1. Flow and Water-Quality Monitoring Stations on the Belle Fourche River and Horse Creek

Site Name	USGS Site Number	Status	WQM No.	WQM Status	Added Sampling
Belle Fouche River and WY-SD State Line	6428500	Real-Time Flow			Continous Water Quality
Belle Fourche River in Belle Fourche			WQM 130	Monthly	Continuous Flow
Belle Fourche River Below Belle Fourche					Continous Flow and Monthly Grab Sampling
Belle Fourche River Near Fruitdale	6436000	Real-Time Flow			Monthly Grab Sampling
Belle Fourche River Near Nisland			WQM 83	Quarterly	Continous Flow and Monthly Grab Sampling
Belle Fourche River Near Vale			WQM 81	Quarterly	Continous Flow and Monthly Grab Sampling
Horse Creek above Vale	6436760	Real-Time Water Quality			Monthly Grab Sampling
Belle Fourche River Near Sturgis	6437000	Real-Time Flow	WQM 21	Quarterly	Monthly Grab Sampling
Belle Fourche River Near Elm Springs	6438000	Real-Time Flow	WQM 76	Monthly	Monthly Grab Sampling

Products:

4. Compile Water-Quality Monitoring Data

Total Product Cost: $90,900 319 Cost: $90,900

- Lead Group: Consultants
- Milestone: June 2011, Complete water-quality monitoring and analysis (see timeline, page 16)

Task 5 **Whitewood Creek Fecal Coliform TMDL Summaries**

In the *2008 South Dakota Integrated Report for Surface Water Quality Assessment*, Whitewood Creek was listed as impaired for fecal coliform bacteria from Deadwood Creek to Spruce Gulch. Whitewood Creek Watershed upstream of Sandy Creek was the focus of a previous watershed assessment, focusing on fecal coliform bacteria. The focus of this assessment was water-quality monitoring including microbial source tracking and water-quality modeling using **HSPF**. Watershed assessment reports generated from this assessment provide the needed data and analysis for TMDL summary reports for Whitewood Creek; however, TMDL summaries were not written. The focus of this task will be to write the TMDL summary for Whitewood Creek for fecal coliform bacteria based on the previously completed watershed assessment.

Products:

5. Complete TMDL Summary for Fecal Coliform Bacteria

Total Product Cost: $13,500 319 Cost: $13,500

- Lead Group: Consultants
- Milestone: June 2011, Complete TMDL (see timeline, page 16)

3.3 SCHEDULE

The project milestone schedule is shown in Figure 3-2. The milestone schedule is based on work approval by June 2009 and completion by May 2011.

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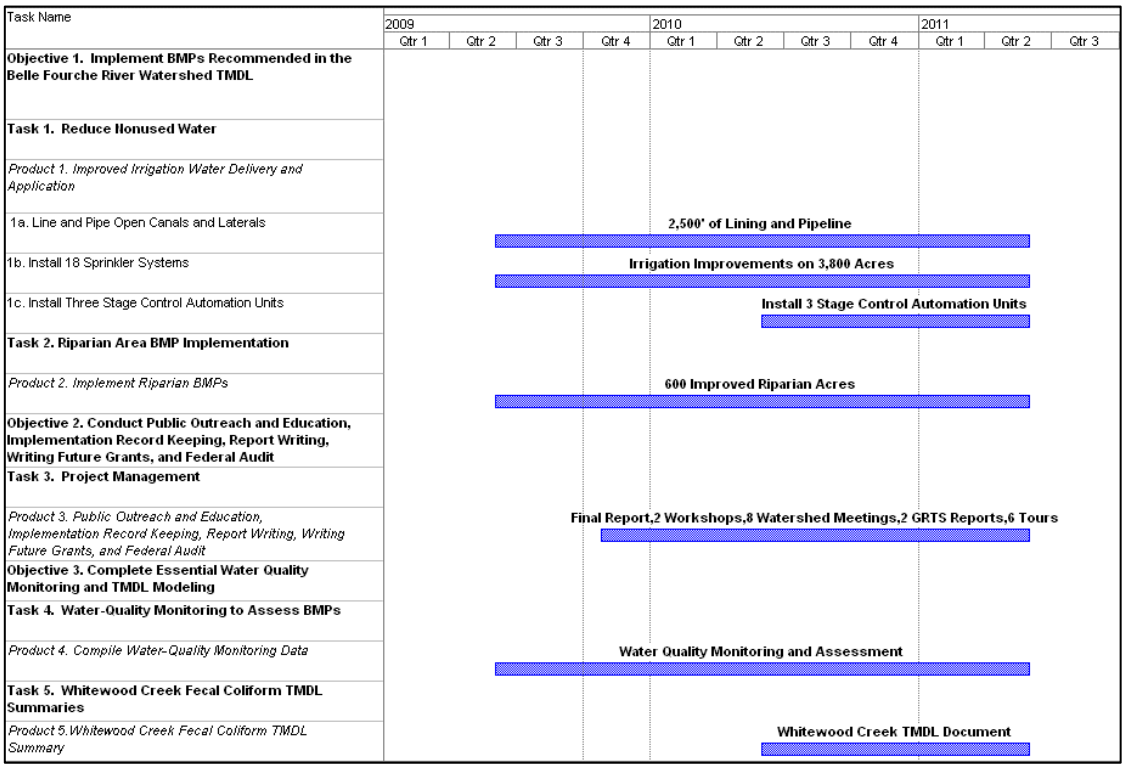

Figure 3-2. Timeline of the Project.

3.4 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 storm water or construction work. Additionally, the need for 401 and 404 stream permits will be checked for the riparian work.

3.5 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 has been the recipient of past 319 assessment and implementation grants for the Belle Fourche River TMDL.

3.6 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, Meade, 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 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 (see also Section 5.5).

4.0 COORDINATION PLAN

4.1 PARTICIPATING GROUPS AND AGENCIES

The BFRWP has been working together for over 7 years. The BFRWP has 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, 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** – Local support and technical assistance.
- **South Dakota Department of Agriculture** – Technical assistance with Whitewood Creek Compensation Plan.
- **South Dakota Department of Environment and Natural Resources (DENR)** – Active participation in BFRWP, GIS services for BFID, technical support and financial support.
- **South Dakota Game Fish and Parks** – Technical assistance with Whitewood Creek Compensation Plan.
- **South Dakota Grassland Coalition** – Grassland management project.
- **South Dakota School of Mines and Technology (SDSM&T)** – Active participant in BFWP, technical support through Dr. Kenner and graduate students. SDSM&T performed the initial TMDL study.
- **South Dakota State University (SDSU)** – Technical support through West River Ag Center personnel.
- **US Army Corps of Engineers (COE)** – Local support.
- **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 support, and potential financial support.
- **US Natural Resource Conservation Service (NRCS)** – Field work and lead agency for the river basin study to identify critical areas of nonpoint source pollution to the surface waters in the watershed.
- **Wyoming Department of Environmental Quality (WY DEQ)** – Local support and financial support for flow measurements at the South Dakota-Wyoming state line.

4.2 LETTERS OF SUPPORT

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

4.3 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. South Dakota Game, Fish and Parks, USFWS, NRCS, 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.

4.4 SIMILAR ACTIVITIES IN WATERSHED

All practices within the Belle Fourche River Watershed are included in the funding table. Additional partners and projects may be identified during the coordination segment.

5.0 EVALUATION AND MONITORING PLAN

5.1 QUALITY CONTROL AND ASSURANCE

The collection of field data will be performed in accordance with the 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.

5.2 DATA

The data will be provided to DENR. The data and analysis for this project will be documented in a final report and the BFRWP will review and submit the final report to 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. The following activities will be completed to determine the progress made to achieving the goals of the TMDL plan:

1. Monitor Present Progress Against Plan 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:

   - The scheduled versus the actual milestone completion dates.
   - Comparisons of flow rates and chemistry for irrigation water application, delivery, and riparian BMPs.
   - Reduction in nonused water from BFID discharged into streams.

- 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.

2. 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 06436760 (Horse Creek above Vale, South Dakota)
- USGS 06433000 (Redwater River above Belle Fourche, 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.

3. USGS collection, analysis, and statistical evaluation of water-quality samples taken from long-term watershed monitoring sites. The following is a breakdown of continuous flow for sites identified above.
   - Activity Cost: $135,226 319 Cost: $0
   - Lead Group: USGS

4. Continuous chemistry at Horse Creek above Vale, South Dakota, to determine the daily and weekly chemical variability, to provide a better understanding of the system, and to compare chemical changes over time (2 years).
   - Activity Cost: $34,625 319 Cost: $34,625
   - Lead Group: USGS

5. Perform statistical analysis of flow and chemistry monitoring sites to evaluate changes from BMPs. These results will be reported to EPA to show the changes made by BMP installation.
   - Activity Cost: $15,375 319 Cost: $15,375
   - Lead Group: Consultant

Total Product Cost: $366,726 + 104,900 319 Cost: $50,000 + 104,900
Responsible Groups: USGS, Consultants

5.3 LONG-TERM OPERATION AND MAINTENANCE (O&M) FUNDING

The long-term O&M funding for irrigation will be funded and maintained by the Belle Fourche Irrigation District. Proper management of stream riparian habitat will be managed and supported financially in part by the NRCS and EQIP funding (see also Section 3.6).

6.0 BUDGET

Table 6-1 identifies the funding sources and cash flow during the project. Table 6-2 defines the acronyms used in Tables 6-1. Tables 6-3 and 6-4 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. Tables 6-5 and 6-6 summarize the other funds being spent on the project that can not be used as matching funds.

Table 6-1. Cash Flow

Budget	June '09–May '10 ($)	June '10–July '11 ($)	Total ($)
319 Funds	**327,500**	**327,500**	**655,000**
Nonmatching Funds			
SD DENR (Water Rights)	35,750	35,750	71,500
NRCS EQIP	510,600	510,600	1,021,200
COE	7,150	7,150	14,300
BOR	3,575	3,575	7,150
USGS	84,925	84,925	169,850
NRCS CIG	300,000	–	300,000
Subtotal	**942,000**	**642,000**	**1,584,000**
Matching Funds			
Producer	817,500	817,166	1,635,000
Lawrence County	14,450	14,450	28,900
BFID	67,863	67,863	135,726
WY DEQ	7,150	7,150	14,300
Subtotal	**906,963**	**906,963**	**1,813,926**
Total Budget	**2,176,463**	**1,876,463**	**4,052,926**

Table 6-1. Cash Flow

Budget	June '09–May '10 ($)	June '10–July '11 ($)	Total ($)
319 Funds	**327,500**	**1,059,550**	**1,387,050**
Nonmatching Funds			
SD DENR (Water Rights)	35,750	35,750	71,500
NRCS EQIP	206,250	206,250	412,500
NRCS CCPI	700,000	700,000	1,400,000
COE	7,150	7,150	14,300
BOR	3,575	303,575	307,150
USGS	84,925	84,925	169,850
NRCS CIG	300,000	–	300,000
Subtotal	**1,337,650**	**1,337,650**	**2,675,300**
Matching Funds			
Producer	817,500	1,484,500	2,302,000
Lawrence County	14,450	14,450	28,900
BFID	5,363	5,363	10,726
WY DEQ	7,150	7,150	14,300
Subtotal	**844,463**	**1,511,463**	**2,355,926**
Total Budget	**2,509,613**	**3,908,663**	**6,418,276**

Table 6-2. Table of Acronyms

Acronym	Definition
USFWS	United States Fish and Wildlife Service
SD GF&P	South Dakota Game Fish & Parks
CIG	Conservation Innovation Grant
WHIP	Wildlife Habitat Incentives Program
NRCS EQIP	Natural Resources Conservation Service Environmental Quality Incentives Programs
COE	Corps of Engineers
BOR	Bureau of Reclamation
USGS	United States Geological Survey
BFRWP	Belle Fourche River Watershed Partnership
SD DENR	South Dakota Department of Environment and Natural Resources
BFID	Belle Fourche Irrigation District
WY DEQ	Wyoming Department of Environmental Quality

Table 6-3. Budget of 319 Funds

Project Description	Consultants ($)	USGS ($)	Producer ($)	Totals ($)
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL				
Task 1. Reduce Nonused Water				
Product 1. Improved Irrigation Water Delivery and Application 3,400 Ac-ft Reduction of Nonused Water				
1a. Line and Pipe Open Canals and Laterals	–	–	–	–
1b. Install 18 Sprinkler Systems	–	–	305,000	305,000
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, and Writing Future Grants				
Task 2. Project Management				
Product 2. Public Education and Outreach, Implementation Record Keeping, Report and Future Grant Writing	300,000	–	–	300,000
Objective 3. Complete Essential Water Quality Monitoring and Watershed Modeling				
Product 3. Monitor Water Quality	15,375	34,625	–	50,000
Other Watershed Improvement Projects	–	–	–	–
Total	**315,375**	**34,625**	**305,000**	**655,000**

Table 6-3. Budget of 319 Funds

Project Description	Consultants ($)	USGS ($)	Producer ($)	BFID ($)	Butte Conservation District ($)	BFRWP ($)	Totals ($)
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL							
Task 1. Reduce Nonused Water							
Product 1. Improved Irrigation Water Delivery and Application							
1a. Line and Pipe Open Canals and Laterals	–	–	–	–			–
1b. Install 18 Sprinkler Systems	–	–	605,000				605,000
1c. Install 3 Stage Control Automation Units				50,000			50,000
Task 2. Riparian Area BMP Implementation							
Product 2. Implement Riparian BMPs			50,000				50,000
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants, and Federal Audit							
Task 3. Project Management							
Product 3. Public Outreach, and Education Implementation Record Keeping, Report and Future Grant Writing, and Federal Audit	487,650	–	–		20,000	20,000	527,650
Objective 3. Complete Essential Water-Quality Monitoring and TMDL Development							
Task 4. Water-Quality Monitoring to Assess BMPs							
Product 4. Compile Water-Quality Monitoring Data	106,275	34,625	–				140,900
Task 5. Whitewood Creek Fecal Coliform TMDL Summaries							
Product 5. Whitewood Creek Fecal Coliform TMDL Summary	13,500						13,500
Other Watershed Improvement Projects	–	–	–				–
Total	**607,425**	**34,625**	**655,000**	**50,000**	**20,000**	**20,000**	**1,387,050**

Table 6-4. Total Budget

Total Budget	EPA 319 ($)	Matching Funds ($)	Nonmatching Funds ($)	Line Item Total ($)
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL				
Task 1. Reduce Nonused Water				
Product 1. Improved Irrigation Water Delivery and Application 3,400 Ac-ft Reduction of Nonused Water				
1a. Line and Pipe Open Canals and Laterals		125,000		125,000
1b. Install Eighteen Sprinkler Systems	305,000	1,635,000	412,500	2,352,500
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, and Writing Future Grants				
Task 3. Project Management				
Product 2. Public Education and Outreach, Implementation Record Keeping, Report and Future Grant Writing	300,000			300,000
Objective 3. Complete Essential Water Quality Monitoring and Watershed Modeling				
Product 3. Monitor Water Quality	50,000	53,926	262,800	366,726
Other Watershed Improvement Projects			300,000	300,000
Total	**655,000**	**1,813,926**	**975,300**	**3,444,226**

Table 6-4. Total Budget

Total Budget	EPA 319 ($)	Matching Funds ($)	Nonmatching Funds ($)	Line Item Total ($)
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL				
Task 1. Reduce Nonused Water				
Product 1. Improved Irrigation Water Delivery and Application				
1a. Line and Pipe Open Canals and Laterals			300,000	300,000
1b. Install 18 Sprinkler Systems	605,000	2,285,000	412,500	3,302,500
1c. Install 3 Stage Control Automation Units	50,000			50,000
Task 2. Riparian Area BMP Implementation				
Product 2. Implement Riparian BMPs	50,000	17,000		67,000
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, Writing Future Grants and Federal Audit				
Task 3. Project Management				
Product 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing, and Federal Audit	527,650		1,400,000	1,927,650
Objective 3. Complete Essential Water-Quality Monitoring and TMDL Development				
Task 4. Water-Quality Monitoring to Assess BMPs				
Product 4. Compile Water-Quality Monitoring Data	140,900	53,926	262,800	455,126
Task 5. Whitewood Creek Fecal Coliform TMDL Summaries				
Product 5. Whitewood Creek Fecal Coliform TMDL Summary	13,500			13,500
Other Watershed Improvement Projects			300,000	300,000
Total	**1,387,050**	**2,355,926**	**2,675,300**	**6,418,276**

Table 6-5. EPA 319 and Matching Funds Budget

EPA 319 and Matching Funds Budget	EPA 319 ($)	Matching Funds ($)				Sum of Matching Funds ($)
		Producer (Cash and In-kind) ($)	Lawrence County (Cash) ($)	BFID (Cash and In-kind) ($)	WY DEQ (Cash)	
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL						
Task 1. Reduce Nonused Water						
Product 1. Improved Irrigation Water Delivery and Application 3,400 Ac-ft Reduction of Nonused Water						
1a. Line and Pipe Open Canals and Laterals				125,000		125,000
1b. Install Sprinkler Systems	305,000	1,635,000				1,635,000
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, and Writing Future Grants						
Task 2. Project Management						
Product 2. Public Education and Outreach, Implementation Record Keeping, Write Reports	300,000					
Objective 3. Complete Essential Water Quality Monitoring and Watershed Modeling						
Product 3. Monitor Water Quality	50,000		28,900	10,726	14,300	53,926
Other Water Quality Improvements						
Total	**655,000**	**1,635,000**	**28,900**	**135,726**	**14,300**	**1,813,926**

Table 6-5. EPA 319 and Matching Funds Budget

EPA 319 and Matching Funds Budget	EPA 319 ($)	Matching Funds ($)				Sum of Matching Funds ($)
		Producer (Cash and In-kind) ($)	Lawrence County (Cash) ($)	BFID (Cash and In-kind) ($)	WY DEQ (Cash)	
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL						
Task 1. Reduce Nonused Water						
Product 1. Improved Irrigation Water Delivery and Application						
1a. Line and Pipe Open Canals and Laterals						
1b. Install 18 Sprinkler Systems	605,000	2,285,000				2,285,000
1c. Install 3 Stage Control Automation Units	50,000					
Task 2. Riparian Area BMP Implementation						
Product 2. Implement Riparian BMPs	50,000	17,000				17,000
Objective 2. Conduct Public Education and Outreach, Implementation Record Keeping, Report Writing, Writing Future Grants, and Federal Audit						
Task 3. Project Management						
Product 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing, and Federal Audit	527,650					
Objective 3. Complete Essential Water-Quality Monitoring and TMDL Development						
Task 4. Water-Quality Monitoring to Assess BMPs						
Product 4. Compile Water-Quality Monitoring Data	140,900		28,900	10,726	14,300	53,926
Task 5. Whitewood Creek Fecal Coliform TMDL Summary						
Product 5. Whitewood Creek Fecal Coliform TMDL Summary	13,500					
Other Water-Quality Improvements						
Total	**1,387,050**	**2,302,000**	**28,900**	**10,726**	**14,300**	**2,355,926**

Table 6-6. Nonmatching Funds Budget

EPA 319 and NonMatching Funds Budget	Nonmatching Funds						Sum of Nonmatching Funds ($)
	SD DENR (Federal) ($)	NRCS CIG Grant (Federal) ($)	NRCS EQIP (Federal) ($)	COE (Federal) ($)	BOR (Federal) ($)	USGS (Federal) ($)	
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL							
Task 1. Reduce Nonused Water							
Product 1. Improved Irrigation Water Delivery and Application 3,400 Ac-ft Reduction of Nonused Water							
1a. Line and Pipe Open Canals and Laterals							
1b. Install Sprinkler Systems			412,500				412,500
Objective 2. Conduct Public Outreach and Education, Implementation Record Keeping, Report Writing, and Writing Future Grants							
Task 2. Project Management							
Product 2. Public Education and Outreach, Implementation Record Keeping, Write Reports							
Objective 3. Complete Essential Water Quality Monitoring and Watershed Modeling							
Product 3. Monitor Water Quality	71,500			14,300	7,148	169,852	262,800
Other Water Quality Improvements		300,000					300,000
Total	**71,500**	**300,000**	**412,500**	**14,300**	**7,148**	**169,852**	**975,300**

Table 6-6. Nonmatching Funds Budget

EPA 319 and NonMatching Funds Budget	Nonmatching Funds						Sum of Nonmatching Funds ($)
	SD DENR (Federal) ($)	NRCS CIG Grant (Federal) ($)	NRCS EQIP (Federal) ($)	COE (Federal) ($)	BOR (Federal) ($)	USGS (Federal) ($)	
Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL							
Task 1. Reduce Nonused Water							
Product 1. Improved Irrigation Water Delivery and Application							
1a. Line and Pipe Open Canals and Laterals					300,000		300,000
1b. Install 18 Sprinkler Systems			412,500				412,500
1c. Install 3 Stage Control Automation Units							
Task 2. Riparian Area BMP Implementation							
Product 2. Implement Riparian BMPs							
Objective 2. Conduct Public Education and Outreach, Implementation Record Keeping, Report Writing, Writing Future Grants, and Federal Audit							
Task 3. Project Management							
Product 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing, and Federal Audit			1,400,000				1,400,000
Objective 3. Complete Essential Water-Quality Monitoring and TMDL Development							
Task 4. Water-Quality Monitoring to Assess BMPs							
Product 4. Compile Water-Quality Monitoring Data	71,500			14,300	7,148	169,852	262,800
Task 5. Whitewood Creek Fecal Coliform TMDL Summaries							
Product 5. Whitewood Creek Fecal Coliform TMDL Summary							
Other Water-Quality Improvements		300,000					300,000
Total	**71,500**	**300,000**	**1,812,500**	**14,300**	**307,148**	**169,852**	**2,675,300**

7.0 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 Web site developed by the partnership <*www.bellefourchewatershed.com*>.

8.0 THREATENED AND ENDANGERED SPECIES

The following endangered species are identified by the South Dakota Game, Fish and Parks 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 I and II:

- 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 bred 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 effects 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.