

PROJECT SUMMARY SHEET

PROJECT TITLE NAME: Belle Fourche River Watershed Assessment  
NAME AND ADDRESS OF LEAD PROJECT SPONSOR:

Belle Fourche River Partnership  
1837 5<sup>th</sup> Ave  
Belle Fourche, SD 57717-2086

STATE CONTACT PERSON: William C. Stewart TITLE: Environmental Senior Scientist

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STATE: South Dakota WATERSHED: Belle Fourche River Basin  
HUC #10120202  
HUC #10120203

PROJECT TYPES :  BASE  WATERSHED  GROUNDWATER  I&E  
WATERBODY TYPES NPS CATEGORY  
 Groundwater  Agriculture  
 Lakes/Reservoirs  Urban Runoff  
 Rivers  Silviculture  
 Streams  Construction  
 Wetlands  Resource Extraction  
 Other  Stowage and Land Disposal  
 Hydrologic Modification  
 Other  
PROJECT LATITUDE LONGITUDE

SUMMARIZATION OF MAJOR GOALS:

The long-term goal of the Belle Fourche River Watershed Assessment Project is to locate and document sources of nonpoint source pollution in the watershed and produce feasible restoration recommendations. The project will provide adequate background information needed to develop workplans and WRASs for a feasible watershed implementation project to improve sedimentation and nutrient problems with the rivers and streams in the watershed. This project will result in TMDL reports for four 303(d) listed waters. The 303(d) listed waters include Belle Fourche River, Horse Creek, Whitewood Creek, and Bear Butte Creek.

PROJECT DESCRIPTION:

The Belle Fourche River is a natural stream that drains portions of Butte, Lawrence and Meade Counties in South Dakota and flows to the Cheyenne River in Meade County. The river receives runoff from agricultural operations and both the river and its tributaries have experienced declining water quality. The Belle Fourche River Watershed is approximately 2,103,040 acres (3,280 sq. miles) in size in the State of South Dakota and drains approximately 2,400,000 acres (3,750 sq. miles) in Wyoming. The watershed is predominately agricultural land use with grazing and some cropland. Silviculture, mining, and urban are other land uses within the watershed. Mining issues will be addressed in the project using existing data.

This project is intended to be the initial phase of a watershed wide restoration project. Through water quality monitoring, stream gaging, stream channel analysis, and land use analysis, the sources of impairment to the stream and the watershed will be documented and feasible alternatives for restoration will be presented in the final project report. ,

FY01 319 funds requested \$226,742.40 Match \$151,161.60 Total project cost \$784,264.00

USGS funds \$186,360 NRCS funds \$220,000 319 funded FTEs 2

**2.0 STATEMENT OF NEED**

2.1 The purpose of this Pre-Implementation Assessment is to determine the sources of impairments to Belle Fourche River found in Butte, Lawrence, and Meade Counties, South Dakota, and the tributaries in the watershed. The watershed drains to the Cheyenne River and ultimately to the Missouri River. The creeks and small tributaries in the watershed are streams with loadings of sediment and nutrients related to snowmelt or rainfall events. Metals, low pH and dissolved solids impact some tributaries in the watershed.

2.2 The Belle Fourche River is a tributary to the Cheyenne River and includes five stream segments on the State 303(d) list as impairment-related TMDL waters (Whitewood Creek (2), Bear Butte Creek, Horse Creek, and Belle Fourche River). The streams in the watershed drain predominantly agricultural lands with grazing, dryland cropland, hayland, forest land, and some irrigated cropland acres. Winter feeding areas for livestock are present in the watershed. The streams carry sediment loads and nutrient loads, which degrade water quality.

The surface watershed area for the Belle Fourche River in South Dakota is approximately 2,103,040 acres in size and is the total project area. The city of Spearfish (population 6966) is the largest municipality located in the Belle Fourche watershed. Other small communities in the watershed include Deadwood (population 1830), Lead (population 3632), Sturgis (population 5330), Belle Fourche (population 4335), Fruitdale (population 43), Nisland (population 174), and Newell (population 675).

2.3 See map in Figure 1.

2.4 Land use in the watersheds is primarily agricultural grazing and some cropland with some urban and suburban areas. Wheat and hay are the main crops on cultivated lands. Some winter animal feeding areas are located in the watershed. Gold mining is conducted in some of the tributary headwater areas of the watershed and some of the watershed land is used for silviculture. 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 watershed is 15 to 29 inches of which 70% usually falls in April through September. Tornadoes and severe thunderstorms strike occasionally. These storms are local and 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 landscape in the watershed is characterized by prairie land with some mountains in the west and stream channels. Land elevation ranges from about 2500 feet MSL to about 7071 MSL. The Black Hills are strongly sloping hills to the somewhat less strongly sloping hills near the Cheyenne River.

2.5 The purpose of this assessment is to develop TMDLs with restoration recommendations for the Belle Fourche River, including the Whitewood Creek, Bear Butte Creek, and Horse Creek Watersheds, and serve as the foundation of a Section 319-implementation project.

# Belle Fourche River Basin

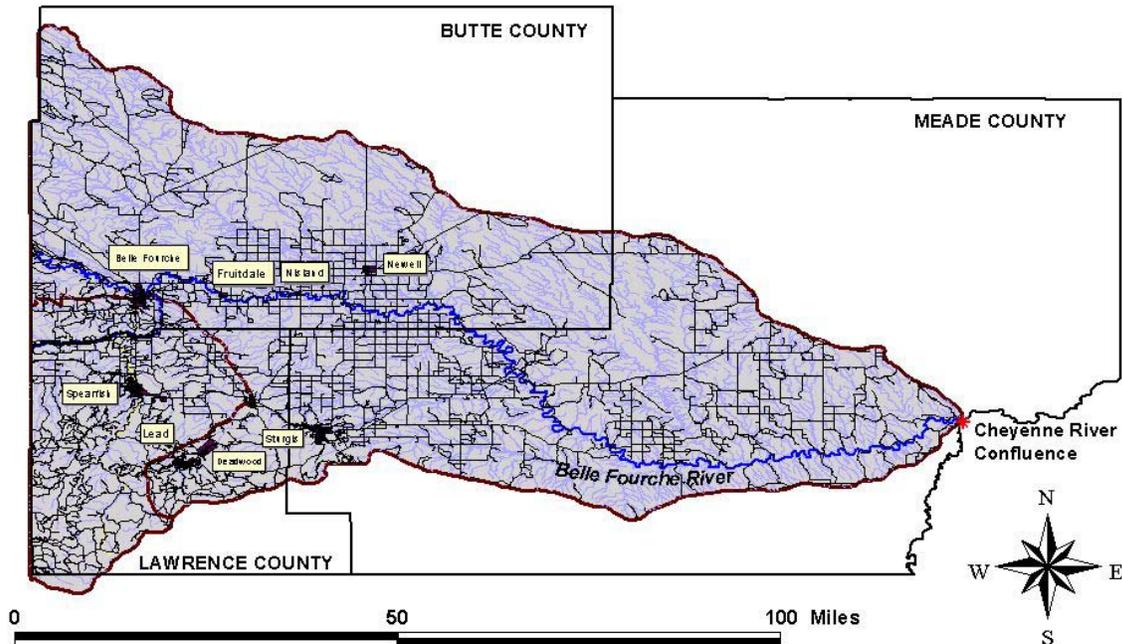


Figure 1. —Location of the study area

## 3.0 PROJECT DESCRIPTION

### 3.1 GOALS

The goal of this assessment project is to determine and document sources of impairments to the Belle Fourche River Watershed and to develop feasible recommendations for restoration. Critical areas of the watershed will be identified for implementation activities. TMDLs will be developed for all of the impaired waters of the watershed as listed in the 1998 South Dakota 303(d) list.

### 3.2 OBJECTIVES AND TASKS

**OBJECTIVE 1:** Collect discharge measurements and water quality measurements on the Belle Fourche River and tributaries necessary to estimate water quality parameter loadings.

**TASK 1** Water-level recorders will be installed on monitoring sites and maintenance of continuous stage recorders will continue for a full year with exception of winter months after freeze up (9 months) (Figure 2). Approximately half of the gaging sites including BF-2 through BF-6, SP-2 through SP-4, and BB-2 will be established during the first project year, BF-8 through BF-12 and HC-1 through HC-3 will be established during the second project year. Stations currently monitored by USGS for discharge will also be used for

sampling sites and flow analysis. Six sampling sites along the Belle Fourche (BF-1, BF-3, BF-5, BF-6, BF-7, and BF-11) will be sampled over both years for continuity of data collection and analysis.

**Table 1. —Proposed sampling sites with gaging funded by this project**

Site name	Latitude	Longitude	Gaging	Water Quality	Possible Biological Sites
BF-2	44.693457	-103.915508	X	X	X
BF-4	44.668884	-103.546927	X	X	X
BF-5	44.637691	-103.425979	X	X	X
BF-6	44.624970	-103.251961	X	X	X
BF-8	44.385341	-102.960657	X	X	X
BF-9	44.352995	-102.840148	X	X	X
BF-10	44.367078	-102.658589		Low Flow Only	X
BF-12	44.396595	-102.390784		Low Flow Only	X
HC-1	44.779476	-103.525902	X	X	X
HC-2	44.704953	-103.468068	X	X	X
HC-3	44.679529	-103.426254	X	X	X
WW-1	44.297731	-103.784437			X
WW-2	44.392087	-103.708090			X
SP-2	44.402401	-103.899161	X	X	X
SP-4	44.580000	-103.893622	X	X	X
BB-2	44.412222	-103.576667	X	X	X

Stations currently monitored by USGS for discharge will also be used for sampling sites and flow analysis. Six sites along the Belle Fourche (BF-1, BF-3, BF-5, BF-6, BF-7, and BF-11) will be sampled over both years for continuity of data collection.

Table 2. —Proposed sampling sites with gaging funded by other sources

Site Name	Latitude	Longitude	USGS Gaging Station ID	Water Quality	Possible Biological Site	Drainage Area in sq. miles
BF-1	44.742421	-104.047243	06428500	X	X	3280
BF-3	44.692606	-103.732011	06436000	X	X	4540
BF-7	44.512967	-103.133348	06437000	X	X	5870
BF-11	44.371277	-102.561376	06438000	X	X	7210
WW-3	44.457580	-103.622512	06436180		X	56.3
WW-4	44.545239	-103.569599	06436190		X	77.4
WW-5	44.620851	-103.471736	06436198		X	102
HC-4	44.652654	-103.367565	06436760	X	X	464
SP-1	44.298590	-103.868055	06430770	X	X	62.5
SP-3	44.476734	-103.851330	06431500	X	X	168
RW-1	44.580066	-104.013558	06430500	X	X	471
RW-2	44.667222	-103.838889	06433000	X	X	920
BB-1**	44.396667	-103.576667	06437200	X	X	51.8
** Site will need to be upgraded, currently just a stage site						

**TASK 2** Discrete discharge measurements will be taken on a regular schedule (monthly) and during storm events. Discharge measurements either will be taken with a hand-held current velocity meter under wadeable conditions or from a bridge crane during high flows using methods adapted by the U.S. Geological Survey. Continuous records of stage will be obtained with digital recorders. Discharge measurements and stage records will be used to generate stage-discharge relations and the mean daily discharges will be published in the USGS South Dakota Annual Water-Data Report.

**TASK 3** Water-quality samples will be collected from 24 monitoring sites. Samples will be collected during spring runoff, select storm events, and base flows. Some storm event samples will be the monthly sample. The location of proposed water quality monitoring sites may be found in Figure 2 and parameters to be collected presented in Table 3. Samples will be collected twice weekly during the first week of spring snowmelt runoff and once a week thereafter until runoff ceases for a maximum of 4 samples. Storm events and base flows will be sampled throughout the project period for an estimated total number of 394 samples. Only low-flow water-quality sampling will take place at sites BF-10 and BF-12 since access is not possible during wet or high-flow conditions.

Water-quality sampling will not take place on Whitewood Creek; data from historical and existing sampling programs will be used. Some additional sampling (5-6 samples per site) for selected dissolved trace elements (table 4) will take place at selected sites to fill gaps in data. The sites sampled will include Spearfish Creek, Bear Butte Creek, and Horse Creek. Dissolved trace elements will be analyzed since aquatic-life criterion is based on dissolved concentrations. If concentration levels indicate that other standards that are based on total concentrations are being approached, total concentrations will be added to further sampling events. Approved QA/QC procedures will be utilized on all sampling and collection of field data on the project.

**Table 3.—Parameters to be measured for all samples**

PHYSICAL/FIELD PARAMETERS	CHEMICAL
Air temperature	Alkalinity
Discharge	Ammonia as N
Dissolved oxygen	Ammonia, Un-ionized
Field pH	Nitrate + Nitrite as N
Specific Conductance	Nitrogen, Total Kjeldahl (TKN)
Stage	Total Dissolved Phosphate
Visual observations	Total Phosphate
Water temperature	Total Solids
	Total Dissolved Solids
	Total Suspended Solids
	Total Volatile Suspended Solids
	Turbidity
	Laboratory pH
	Laboratory Specific Conductance
	Fecal Coliform Bacteria

**Table 4.—Trace element analysis parameters for selected sites**

Parameter	
Mercury	Lead
Arsenic	Silver
WAD Cyanide	Cadmium
Total Cyanide	Hardness
Copper	Selenium

**TASK 4**

Discharge measurements and water level data will be analyzed to develop flows for all water quality sampling times. Stage and discharge measurements will be used to update existing gaging station rating curves and develop rating relationships at new gaging locations. This information will be used with concentrations of sediment, nutrients, and metals to calculate loadings from the watershed. Existing USGS gaging stations will be used where possible. There are 13 active USGS gaging stations in the project area, which will be used for this project (table 2).

LINE ITEMS	NON-FEDERAL		FEDERAL EPA 319	TOTAL
	CASH	IN-KIND		
Personnel (water-quality sampling and data verification)	\$20,568		\$30,852	\$51,420
Travel (site installation)	\$880		\$1,320	\$2,200
Water Quality Analysis	\$15,788		\$23,682	\$39,470
Metals Water Quality Analysis	\$4,860		\$7,290	\$12,150
Continuous Water Quality Monitoring (2-3 sites)	\$4,600		\$6,900	\$11,500
Supplies and Shipping	\$1,250		\$1,875	\$3,125
Equipment	\$16,170		\$24,255	\$40,425
Gaging (includes time and travel for monthly site visits, discharge measurements, and creation of stage/discharge relationships)	\$27,240		\$40,860	\$68,100
Total	\$91,356		\$137,034	\$228,390.00

PRODUCTS:

A tributary water-quality report, which will include a description of the relationship between and influence of chemical and physical data, will be produced.  
394 water quality samples collected

RESPONSIBLE AGENCIES:

Task Responsibilities:

Project Sponsor  
South Dakota School of Mines and Technology and US Geological Survey

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Water samples will be collected with an isokinetic sampler to ensure a depth-integrated sample along the stream cross-section or for grab samples. For suspended-sediment samples, the appropriate suspended-sediment sampler will be used. Samples will be composited in a churn and then processed into the appropriate bottles for delivery to the laboratory. All sample bottles will be iced and delivered to the lab and collected using the approved methods described in the Standard Operating Procedures for Field Samplers by the State of South Dakota South Dakota Watershed Protection Program. Nutrient and solids parameters will be sampled at 26 tributary sites in the Belle Fourche River watershed. Energy Laboratories Inc. in Rapid City, SD City will analyze all samples using state and EPA approved methods. The watershed water quality data will be integrated together with the hydrologic loading to provide a complete analysis of the hydrologic systems.

**OBJECTIVE 2:**            **Characterize the benthic macroinvertebrate communities within the Belle Fourche River watershed. This information will be used to develop biological indices to supplement assessment of water quality characteristics of the Belle /Fourche River watershed and tributaries.**

- TASK 5**            Identify location of biological sampling sites taking into consideration potential reference sites and impacted sites within the watershed. Additionally, sample sites will be coordinated with water quality sampling sites. A total of 16 sites are proposed for biological sampling, six (6) sites on the Belle Fourche River and two (2) sites on each of the tributaries, Whitewood Creek, Red Water Creek, Spearfish Creek, Horse Creek and Bear Butte Creek.
- TASK 6.**            Construct rock baskets and collect two (2) benthic samples at each site. Samples will be collected once per year for two years at each site. A sample will consist of three (3) rock baskets composited into one sample. Where the stream substrate is not appropriate for rock baskets, alternative-sampling techniques will be used.
- TASK 7.**            Biological samples will be sent to an independent laboratory for taxonomic identification to the genus level.
- TASK 8.**            The taxonomic data will be used to calculate a simple metric of biological indices to include, abundance, taxonomic diversity, family biotic index, and EPT/C ratio.

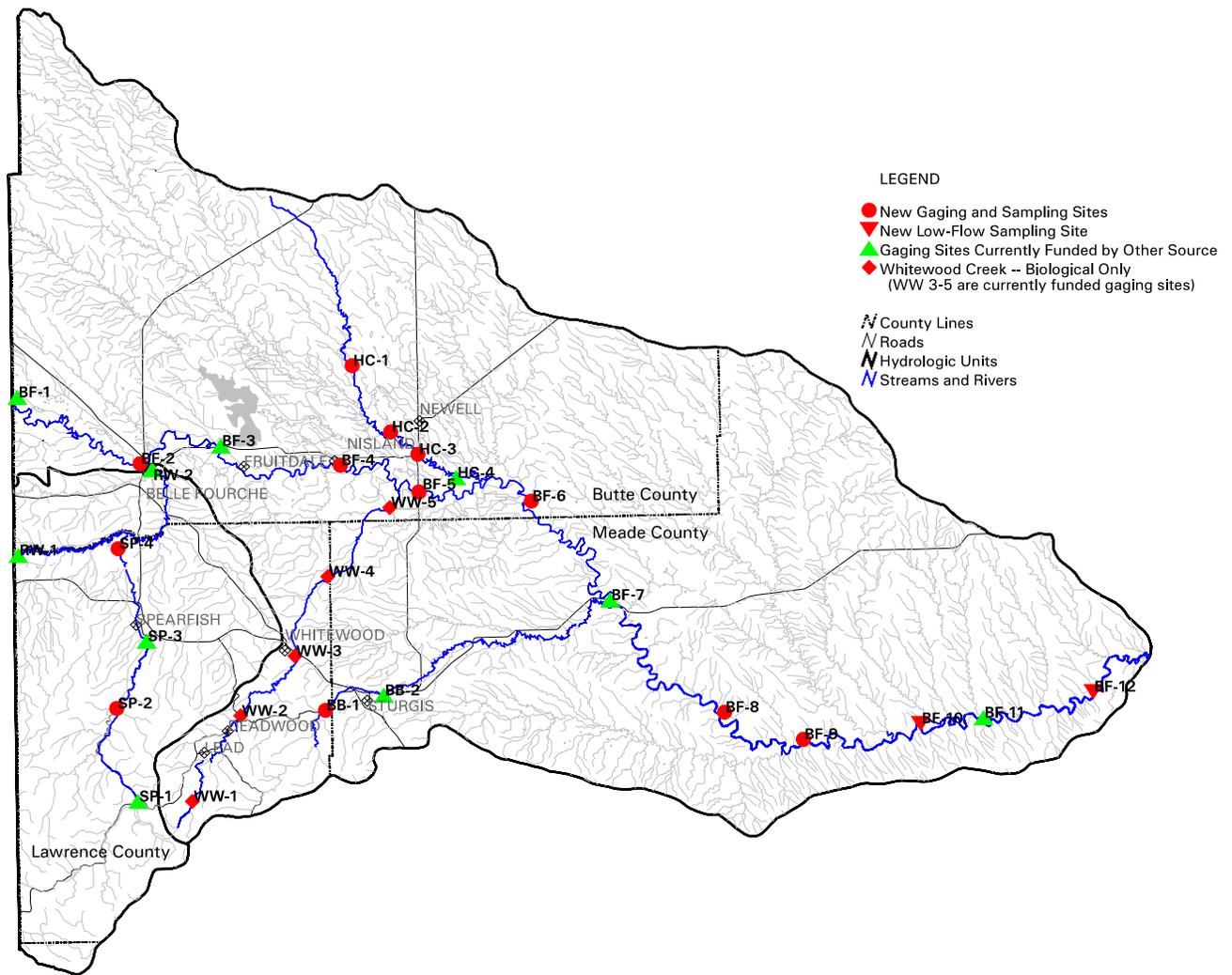


Figure 2. Location of sampling sites

LINE ITEMS	NON-FEDERAL		FEDERAL	TOTAL
	CASH	IN-KIND		
Personnel	\$3,058		\$4,587	\$7,645
Travel	\$120		\$180	\$300
Supplies and Shipping	\$320		\$480	\$800
Biological Analysis	\$2,560		\$3,840	\$6,400
Total	\$6,048		\$9,087	\$15,145.00

PRODUCTS:

The final report will include a presentation of the biological data and a characterization of the biological indices as they relate to water quality and land use within the watershed.  
64 benthic macroinvertebrate samples collected

RESPONSIBLE AGENCIES:

Task Responsibilities:

Project Sponsor  
 South Dakota School of Mines and Technology and US Geological Survey

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Biological samples will be collected twice at 16 sites where samples will consist of three (3) rock baskets composited into one sample. Where the stream substrate is not appropriate for rock baskets, alternative-sampling techniques will be used. Biological samples will be sent to an independent laboratory for taxonomic identification to the genus level. The taxonomic data will be used to calculate a simple metric of biological indices to include, abundance, taxonomic diversity, family biotic index, and EPT/C ratio.

**OBJECTIVE 3:**      **Approved Quality Assurance/Quality Control procedures will be used to ensure that all samples are accurate and defensible.**

TASK 9              The collection of all field data will be accomplished in accordance with the Standard Operating Procedures for Field Samplers, South Dakota Watershed Protection.

TASK 10             A minimum of 10 percent of all the water quality and biological samples collected will be QA/QC samples. QA/QC samples will consist of field blanks, field duplicates, or field replicate samples. An estimated 39 water-quality and 6 biological quality assurance samples will be collected during the project.

TASK 11             All QA/QC activities will be conducted in accordance with the Nonpoint Source Program Quality Assurance Project Plan.

TASK 12             The activities involved with QA/QC procedures and the results of QA/QC monitoring will be compiled and reported on in a section of the final project report and in all project quarterly progress reports.

LINE ITEMS	NON-FEDERAL		FEDERAL	TOTAL
	CASH	IN-KIND		
Personnel	\$388		\$582	\$970
Supplies and Shipping	\$20		\$30	\$50
Water Quality Analysis	\$1,600		\$2,400	\$4,000
Metals Water Quality Analysis	\$490		\$735	\$1,225
Biological Analysis	\$280		\$420	\$700
Total	\$2,778		\$4,167	\$6,945.00

PRODUCTS:

A Quality Assurance/Quality Control monitoring report.  
 Estimated 45 samples collected

RESPONSIBLE AGENCIES:

Task Responsibilities:

Project Coordinator  
 Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Approved QA/QC will be utilized on all sampling and field data collected during the Belle Fourche River Assessment project. Please refer to the South Dakota Nonpoint Source Program Quality Assurance Plan and the South Dakota Watershed Protection Program Standard Operating Procedures for Field Samplers for details of the procedures to be followed.

**OBJECTIVE 4: Evaluation of agricultural impacts to the water quality of the watershed through the use of the Natural Resource Conservation Service River Basin Study.**

TASK 13 The Belle Fourche River watershed and sub-watersheds will be modeled by the NRCS during the River Basin Study Project which will be conducted concurrently with the 319 assessment.

TASK 14 This River Basin Study Project will be used to identify critical areas of nonpoint source pollution to the surface waters in the watershed. Contributors of nutrients and sediments to surface water in the Belle Fourche River watershed and its tributaries will be identified.

LINE ITEMS	NON-FEDERAL		FEDERAL EPA 319	TOTAL
	CASH	IN-KIND		
Personnel	\$16,380		\$24,570	\$40,950
Travel	\$800		\$1,200	\$2,000
Supplies	\$40		\$60	\$100
Mapping materials	\$840		\$1,260	\$2,100
Total	\$18,060		\$27,090	\$45,150

PRODUCTS:

Report on land use in the watershed and recommendations for remediation of pollution sources in the watershed.

RESPONSIBLE AGENCIES:

Task Responsibilities:

Project Coordinator  
Project Sponsor

Design and Technical Assistance:

Natural Resource Conservation Service  
South Dakota Department of Environment and Natural Resources  
South Dakota School of Mines & Technology

**OBJECTIVE 5: Public participation and involvement.**

TASK 15 Informational meetings will be held on a quarterly basis for the public and to inform the involved parties of progress on the study. Public participation and involvement will be encouraged. These meetings will provide an avenue for input from the residents in the area. Notification of meeting will be made to local agencies 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.

TASK 16 News releases will be prepared and released to local news media on a quarterly basis. These releases will be provided to local newspapers, radio stations and TV stations.

TASK 17 Biannual progress reports will be completed and presented at the appropriate general public meeting to keep the involved parties up-to-date with work activities and time-line completion.

LINE ITEMS	NON-FEDERAL		FEDERAL	TOTAL
	CASH	IN-KIND		

Personnel	\$3,672		\$5,513	\$9,189
Travel	\$80		\$120	\$200
Supplies (reproduction, notices)	\$280		\$420	\$700
Total	\$4,032		\$6,053	\$10,089.00

PRODUCTS:

Public input to the project.  
 8 Quarterly public meetings  
 8 News releases  
 Information and education about the project.  
 Involvement and/or input from the public will be documented.

RESPONSIBLE AGENCIES:

Task Responsibilities:

Project Coordinator  
 Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Informational meetings will be held on a frequent basis for the public to inform the involved parties of progress on the study and provide a means of public input.

**OBJECTIVE 6:      **Development of watershed restoration recommendations.****

- TASK 18.      Concurrently with collection of field data, a review of the historical and project data will be conducted.
- TASK 19.      Calculate pollutant loadings based on project data and develop hydrologic, sediment and nutrient budgets for the Belle Fourche River watershed.
- TASK 20.      Using the results of the River Basin Study, hydrologic and water quality budgets, and biological information, identify critical areas in the watershed(s).
- TASK 21      The feasible management practices will be compiled into a list of recommendations for the development of an implementation project and TMDLs for 4 stream reaches.

LINE ITEMS	NON-FEDERAL		FEDERAL EPA 319	TOTAL
	CASH	IN-KIND		
Personnel	\$19,912		\$29,868	\$49,780
Travel	\$200		\$300	\$500
Supplies and Shipping	\$140		\$210	\$350
Total	\$20,252		\$30,378	\$50,630.00

PRODUCTS:

A list of viable watershed restoration recommendations for the Belle Fourche River watershed.

RESPONSIBLE AGENCIES:

Task Prioritization:

Project Coordinator

Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources  
South Dakota School of Mines and Technology  
U.S. Geological Survey

WORK ACTIVITIES:

A hydrologic budget and pollutant loadings will be calculated for the entire watershed. An extensive review and study of the historical and current data will be done to determine the best management practices and hydrologic restoration techniques needed to improve water quality and sediment transport in the Belle Fourche River watershed.

**OBJECTIVE 7:            Produce and publish a final project report containing 4 TMDLs, water quality results and restoration recommendations.**

TASK 22:            Document discharge measurements, water quality data, and methods used to calculate hydrologic budgets and pollutant loadings.

TASK 23            Summarize the results of the NRCS River Basin Study for the watershed and report locations of critical areas.

TASK 24            Write a summary of historical water quality and land use information and compare with project data to determine any possible trends.

TASK 25            Based on the data and information compiled for the project prepare a description of the physical, chemical, and biological condition of the river and its tributaries.

TASK 26            Write a summary report of all QA/QC activities conducted during the project and include in the final project report.

TASK 27            Write a description of feasible restoration recommendations for use in planning watershed nonpoint source implementation and develop TMDLs for the 4 listed waterbodies.

LINE ITEMS	NON-FEDERAL		FEDERAL	TOTAL
	CASH	IN-KIND	EPA 319	
Personnel	\$8,422		\$12,633	\$21,055
Supplies	\$200		\$300	\$500
Total	\$8,622		\$12,933	\$21,555.00

PRODUCTS:

A final project report incorporating all previously described objectives

RESPONSIBLE AGENCIES:

South Dakota School of Mines & Technology  
(Report published by South Dakota Department of Environment and Natural Resources)

WORK ACTIVITIES:

Statistical evaluation of all water quality and field data produced during the course of the study.            Review and compilation of historical data will be completed. Restoration alternatives will be developed. Graphic presentations of the information will be produced.

3.3            MILESTONE TABLE - see attached milestone.

- 3.4 No special permits are required to do this assessment project.
- 3.5 The Belle Fourche River Partnership is the appropriate lead project sponsor for this project. The three Conservation District boundaries encompass the majority of the involved watershed area; a small portion in the northeast part of the watershed is in the Tri-County Conservation District. The conservation districts are important to this project because of their relationship with watershed landowners. The main problems with the Belle Fourche River watershed appear to be sediment and nutrient loadings.

#### 4.0 COORDINATION PLAN

- 4.1 The following groups/agencies have agreed through an informal agreement to cooperate in the Belle Fourche River watershed assessment project.

**Belle Fourche Irrigation District** - Local support and technical assistance

**Belle Fourche River Partnership** - Local Project Sponsor

**Butte County Conservation District** - Local support and technical assistance

**Elk Creek Conservation District** - Local support and technical assistance

**Lawrence County Conservation District** - Local support and technical assistance

**South Dakota Conservation Commission** – Local support and technical assistance

**US Natural Resource Conservation Service** – Local support and technical assistance.

**US Environmental Protection Agency** –Support and technical assistance

**South Dakota Department of Environment and Natural Resources** - Technical assistance

**South Dakota Game Fish and Parks** – Technical assistance

**South Dakota Department of Agriculture** – Technical assistance

**Bureau of Reclamation** – Local support and technical assistance

**South Dakota School of Mines and Technology** – Local support and technical assistance

**US Geological Survey** – Local support and technical assistance

- 4.2 In January of 1999, a letter requesting assistance was received from the Belle Fourche River Partnership requesting assistance for the preparation of an assessment study grant for the Belle Fourche River watershed.
- 4.3 Letters of support have been supplied by local organizations to DENR supporting the Belle Fourche River Watershed Assessment Project.
- 4.4 This project will coordinate activities with state, federal, and local government agencies through frequent personal communication and monthly partnership meetings. SD Game, Fish, and Parks, NRCS, local organizations, and local government agencies will provide input and involvement in this assessment.
- 4.5 There currently are no other agencies conducting 319 assessment project activities on the Belle Fourche River Watershed. This project is intended to work with and cooperate with the Conservation District efforts to assess the Wyoming portion of the Belle Fourche River watershed.

#### 5.0 EVALUATION AND MONITORING PLAN

- 5.1 The monitoring strategy is explained in section 3. The project will produce bi-annual progress reports. The sampling and analysis procedures required to complete the tasks within section 3 can be located in the Standard Operating Procedures for Field Samplers for the South Dakota Non Point Source Program (SOP). The specific locations of these sampling methods within the SOP as they pertain to each task are documented in Table 3 on the following page.
- 5.2 This assessment project consists of a combination of chemical, hydrologic, land use and biological analyses. Monitoring sites will be maintained and sampled on the Belle Fourche River and selected tributary watersheds. Ambient samples will be collected along with spring runoff and storm events. Stream discharge will be routinely measured. The chemical, physical, and biological parameters to be sampled during this project can be located in Table 3 (page 6) and Table 4 (page 6). Loads will be calculated based on the samples and data collected with the approved methods identified in section 5.1. TMDL reports will be produced for reaches of the Belle Fourche, Whitewood Creek, Horse Creek, and Bear Butte Creek.
- 5.3 All water quality monitoring will be done in accordance with the approved South Dakota Nonpoint Source Program Quality Assurance/Quality Control Project Plan and the Standard Operating Procedures for Field Samplers for the South Dakota Watershed Protection Program.
- 5.4 Results from all water-quality monitoring efforts under the Belle Fourche River Watershed Assessment Project will be reported in the final project report. Data will be managed by the South Dakota Department of Environment and Natural Resources and maintained in a computer database. All sample data will be entered in the US EPA STORET Program. This data will be used as the foundation of a Section 319 Watershed Implementation Project proposal.

## **6.0 BUDGET**

<b>BELLE FOURCHE RIVER WATERSHED ASSESSMENT PROJECT BUDGET</b>				
<b>PART 1: FUNDING SOURCES</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>TOTAL</b>
EPA SECTION 319 FUNDS	\$94,540.03	\$89,818.37	\$42,384.00	\$226,742.40
NON-FEDERAL MATCH:				
SDSMT	\$3,235.00	\$4,014.00	\$4,130.00	\$11,379.00
BELLE FOURCHE WATERSHED PARTNERSHIP*	\$28,278.34	\$25,925.46	\$9,998.00	\$64,201.80
DENR STATE FUNDS	\$31,513.34	\$29,939.46	\$14,128.00	\$75,580.80
TOTAL NON-FEDERAL	\$63,026.68	\$59,878.92	\$28,256.00	\$151,161.60
Other Federal (NRCS and USGS)				406,360.00
TOTAL BUDGET	\$157,566.71	\$149,697.29	\$70,640.00	\$784,264.00

\*INCLUDES MULTIPLE COMMUNITY ORGANIZATIONS AND AGENCIES

## **7.0 PUBLIC INVOLVEMENT**

See Objective 5.

**TABLE 3. Location of Sampling and Analysis Procedures for each applicable task involved with the Belle Fourche River Watershed Assessment Project.**

<b>TASK NUMBER</b>	<b>TASK DESCRIPTION</b>	<b>ACTIVITY</b>	<b>REFERENCE IN SDWRA-1999 SOP</b>
Objective 1 Task 2	Discrete discharge measurements will be taken on a regular schedule and during storm surges.	Flow (Marsh-McBirney) or Flow (AquaCalc)	Section 7.1 pges 5-9 and USGS Approved Discharge Measurement Methods
Objective 1 Task 3	Collect water quality samples from 24 tributary monitoring sites. Table 3 shows the parameters to be measured. Sampling twice weekly during snowmelt and once a week thereafter until runoff ceases. Storm events and base flows will be sampled throughout the project period for an estimated total number of 394 samples.	Tributary Sampling Procedures	Section 7.1 pges 1-18
Objective 2 Task 5	Construct rock baskets and collect two (2) benthic samples at each site. Samples will be collected once per year for two years at each site. A sample will consist of three (3) rock baskets composited into one sample.	Benthic Macroinvertebrate Sampling  Physical Habitat Assessment	Section 15.0 pges 6-13 Section 15.1 pges 1-16  Section 16.0 pges 1-15
Objective 3 Task 9-10	A minimum of 10 percent of all the water quality samples collected will be QA/QC samples. QA/QC samples will consist of field blanks and field duplicate samples. An estimated 39 water quality and 6 biological quality assurance samples will be collected during the project.	Quality Assurance (water quality)  Quality Assurance (Macroinvertebrates)	Section 10.0 pges 1-3  Section 15.1 pges 15-16
Objective 3 Task 11	All QA/QC activities will be conducted in accordance with the Non Point Source Program Quality Assurance Project Plan.	Quality Assurance	Section 10.0 pges 1-3
Objective 3 Task 12	The activities involved with QA/QC procedures and the results of QA/QC monitoring will be compiled and reported in a section of the final project report and in all project reports.	Quality Assurance	Section 10.0 pges 1-7





Belle Fourche River Watershed Assessment  
 Belle Fourche Rivershed Partnership  
 Proposed Budget

	Total Budget	Federal EPA - 319	Non-Federal	SDSMT	Belle Fourche Watershed Partnership	DENR	Other Federal	
							NRCS	USGS
SDSMT Professors and students	\$102,524.00	\$61,514.40	\$41,009.60	\$11,379.00	\$11,850.60	\$17,780.00		
Belle Fourche Watershed Coordinator	\$30,000.00	\$18,000.00	\$12,000.00	\$0.00	\$12,000.00	\$0.00		
USGS Project Chief	\$17,775.00	\$10,665.00	\$7,110.00	\$0.00	\$2,835.00	\$4,275.00		
USGS Technicians	\$30,710.00	\$18,426.00	\$12,284.00	\$0.00	\$4,909.00	\$7,375.00		
Travel	\$5,200.00	\$3,120.00	\$2,080.00	\$0.00	\$2,080.00	\$0.00		
Supplies and Shipping	\$5,625.00	\$3,375.00	\$2,250.00	\$0.00	\$900.00	\$1,350.00		
Mapping Material	\$2,100.00	\$1,260.00	\$840.00	\$0.00	\$335.00	\$505.00		
Lab Analyses								
General samples@ \$100	\$39,470.00	\$23,682.00	\$15,788.00	\$0.00	\$6,217.20	\$9,570.80		
Metals samples @ \$221	\$12,150.00	\$7,290.00	\$4,860.00	\$0.00	\$1,950.00	\$2,910.00		
QA/QC: general + metals	\$5,225.00	\$3,135.00	\$2,090.00	\$0.00	\$830.00	\$1,260.00		
Biological Analyses (including)	\$7,100.00	\$4,260.00	\$2,840.00	\$0.00	\$1,135.00	\$1,705.00		
Continuous Water Quality	\$11,500.00	\$6,900.00	\$4,600.00	\$0.00	\$1,825.00	\$2,775.00		
Gaging**	\$68,100.00	\$40,860.00	\$27,240.00	\$0.00	\$10,890.00	\$16,350.00		
Gaging Equipment	\$40,425.00	\$24,255.00	\$16,170.00	\$0.00	\$6,445.00	\$9,725.00		
<b>TOTAL</b>	<b>\$377,904.00</b>	<b>\$226,742.40</b>	<b>\$151,161.60</b>	<b>\$11,379.00</b>	<b>\$64,201.80</b>	<b>\$75,580.80</b>	<b>\$220,000.00</b>	<b>\$186,360.00</b>

Equipment List	
Auto Samplers 2@4900 (includ	\$9,800.00
Display unit and cables	\$1,700.00
Stage Recorder: 7 @ \$5775	\$40,425.00
<b>TOTAL</b>	<b>\$51,925.00</b>

\*\*Includes time and travel for monthly site visits, discharge measurements and development of stage/discharge relations

SOUTH DAKOTA NONPOINT SOURCE PROGRAM  
QUALITY ASSURANCE PROJECT PLAN

SUBMITTED BY:

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF FINANCIAL AND TECHNICAL ASSISTANCE  
WATER RESOURCES ASSISTANCE PROGRAM

Prepared by: Robert Smith  
February 2001

Project Title: Belle Fourche River Watershed Assessment Project

APPROVED BY:

\_\_\_\_\_  
South Dakota Watershed Protection Program  
Environmental Senior Scientist, Assessment Section

\_\_\_\_\_  
Date

\_\_\_\_\_  
South Dakota Watershed Protection Program  
Project Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
South Dakota Watershed Protection Program  
Quality Assurance Coordinator

\_\_\_\_\_  
Date