



**PENNINGTON COUNTY
PLANNING DEPARTMENT**
Pride in the past; faith in the future.

September 28, 2010

Pete Jahraus
Environmental Senior Scientist
South Dakota Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Mr. Jahraus:

The goal of the Spring Creek Watershed Management and Project Implementation Plan - Segment I is to bring Spring Creek into compliance with federal requirements for fecal coliform levels.

Pennington County assumes responsibility for implementing, coordinating, and overseeing the Spring Creek Watershed Management and Project Implementation Plan - Segment I. Please accept this amendment request of \$490,000 in additional 319 Funds for the Spring Creek Watershed Management and Project Implementation Plan - Segment I.

PENNINGTON COUNTY COMMISSION



Chairman, Ethan Schmidt

Dated this 28 day of Sept., 2010.

**Spring Creek
Watershed Management and
Project Implementation Plan
Segment I **Amendment****

**319 Watershed Project
October 1, 2010**

Sponsored By:

Pennington County
315 St. Joseph Street
Suite 118
Rapid City, South Dakota 57701

Submitted to:

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

PROJECT SUMMARY SHEET

PROJECT TITLE: Spring Creek Watershed Management and Project Implementation Plan Segment I **Amendment**

NAME AND ADDRESS OF LEAD PROJECT SPONSOR:

Pennington County
315 Saint Joseph Street
Suite 118
Rapid City, SD 57701

STATE CONTACT PERSON: Lee Baron

TITLE: Natural Resources Engineer

EMAIL: Lee.Baron@state.sd.us

PHONE: 605.773.4254

FAX: 605.773.4068

STATE: South Dakota

WATERSHED: Cheyenne River

HYDROLOGIC UNIT CODE: 10120109

HIGH PRIORITY WATERSHED (yes/no) Yes

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

WATERBODY TYPES

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

NPS CATEGORY

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

Project Location: Latitude: 43.9751974 **Longitude:** -103.4705745

SUMMARIZATION OF GOALS: The project goal is to bring Spring Creek into compliance for fecal coliform/*E. coli* by implementing the recommended Best Management Practices (BMPs) by 2021. The goal of this project segment, as set forth in the Spring Creek/Sheridan Lake Total Maximum Daily Load (TMDL) study, is to:

- Implement several BMP pilot projects that will be used to demonstrate and promote the effectiveness of BMP implementation on water quality.
- Develop a 10-year Spring Creek Watershed Project Plan, Stormwater Management Plan, and Septic System Management Plan that will help prioritize BMP implementation and public outreach efforts.
- Conduct significant public education and outreach to stakeholders within the Spring Creek Watershed.
- Perform water-quality monitoring to aid in developing a baseline condition that will ensure that the BMPs are effective and the proper BMPs are being implemented.

PROJECT DESCRIPTION: Pennington County is the project sponsor for this 2-year project. This is the first of six planned segments. This project will begin implementation of the BMPs identified in the TMDL report for the Spring Creek Watershed. These BMPs include management of riparian zones, stormwater, and septic systems along with sediment removal in Mitchell and Major Lakes.

FISCAL YEAR	2010–2012
319 FUNDS:	\$814,000 (\$324,000+ \$490,000)
TOTAL PROJECT COST:	\$1,482,510 (\$629,176+ \$853,334)
MATCH:	\$668,510 (\$305,176+ \$363,334)
319 FUNDED FULL-TIME PERSONNEL:	1

2.0 STATEMENT OF NEED

2.1 The South Dakota School of Mines & Technology (SDSM&T), along with the South Dakota Department of Environment and Natural Resources (SD DENR), developed and implemented an assessment project to determine the fecal coliform Total Maximum Daily Load (TMDL) for Spring Creek and the Sheridan Lake TMDL for Trophic State Index (TSI). The project started during 2002. The purpose of the assessment was to address rural and urban nutrient, sediment, and fecal coliform problems in the watershed. The overall goal was to produce a TMDL for fecal coliform in Spring Creek and a TSI TMDL in Sheridan Lake to improve water quality by reducing fecal coliform, nutrient, and sediment loading in Spring Creek. The TMDL for fecal coliform and TSI was completed and approved by the Environmental Protection Agency (EPA) in 2008.

Spring Creek was assigned the following beneficial uses: cold-water permanent fish life propagation (above Sheridan Lake), cold-water marginal fish life propagation (below Sheridan Lake), immersion recreation, limited contact recreation, fish and wildlife propagation, recreation and stock watering, and irrigation. Sheridan Lake was assigned the following beneficial uses: cold-water permanent fish life propagation, immersion recreation, limited contact recreation, fish and wildlife propagation, and recreation and stock watering. When multiple criteria exist for a particular parameter, the most stringent criterion is used.

Individual parameters determine the support of these beneficial uses. South Dakota has narrative standards that may be applied to the undesired eutrophication of lakes and streams. Administrative Rules of South Dakota (ARSD) Article 74:51 contains language that prohibits the presence of materials causing pollutants to form, visible pollutants, taste- and odor-producing materials, and nuisance aquatic life. Reduction of nutrients in Spring Creek, specifically phosphorus, was addressed in the TSI TMDL developed for Sheridan Lake, although TSI is no longer a beneficial use criterion.

The numeric TMDL target established for the beneficial uses for Spring Creek is based on the current daily maximum criteria for fecal coliform bacteria. Water-quality criteria for the immersion recreation beneficial use requires that (1) no sample exceeds 400 colony-forming units (cfu)/100 milliliters (mL) and (2) during a 30-day period, the geometric mean of a minimum of five samples collected during separate 24-hour periods must not exceed 200 cfu/100 mL. This criteria is applicable from May 1 through September 30.

Of all the assessed parameters for which surface water-quality criteria are established, fecal coliform and water temperature exceed criteria for the cold-water permanent fish life propagation beneficial use on Spring Creek. During the TMDL study, ten samples collected from several sites within the assessed stream segment exceeded the total suspended solids (TSS) criterion. However, TSS was not included as a cause of impairment for this reach in the 2008 Impaired Waterbodies List because less than 10 percent of the TSS samples collected during the period of record considered for the 2008 report (October 1, 2002, to September 30, 2007) exceeded the numeric criterion.

The impaired (303(d) listed) segment, because of fecal coliform, of Spring Creek has a length of 31 miles and flows through Mitchell Lake, which has a surface area of 10 acres. This segment ends where Spring Creek empties into Sheridan Lake, approximately 4 miles downstream of Mitchell Lake. The impaired (303(d) listed) segment, because of temperature, also begins at the headwaters and ends where Spring Creek crosses Highway 79, south of Rapid City. The drainage area of the 303(d) listed segment is approximately 425 square miles.

In August 2010, the Pennington County Board of Commissioners received 30 cost-share applications requesting approximately \$230,000 for Best Management Practices (BMPs) in the Spring Creek Watershed Management and Implementation Project – Segment I. The Spring Creek Watershed Advisory Group ranked those 30 applications and recommended to the County Board to allocate \$50,000 for riparian BMP applications and \$50,000 for septic BMP applications. On September 28, 2010, the County Board approved the advisory group's recommendation to fund six riparian and manure management projects totaling \$46,658 and seven On-Site Wastewater Treatment System (OWTS) projects totaling \$48,200. The County Board has obligated 95 percent of the funds awarded in Segment I for Objective 1: Task 1–Riparian Vegetation and Manure Management Improvements and Task 2–Septic System Improvements.

There are 20 additional applications requesting \$134,496 that were deferred by the advisory group pending availability of funding. Approximately \$5,142 remains under Objective 1: Task 1 and Task 2, and the advisory group will recommend which deferred applications to fund with these dollars. Table 2-1 lists the BMP applications approved to be installed and additional applications that are pending for cost-share funding during Segment I.

Table 2-1. Best Management Practices Scheduled to Be Installed in the Spring Creek Watershed

Best Management Practices	BMP Units	Funded for Segment I	Pending for Segment I Amendment
OSWTS – Single Family Residence	Each	5	9
OSWTS – Residential Cluster	Each	1	0
OSWTS – Small Commercial/Industrial	Each	0	0
OSWTS– Medium Commercial/Industrial	Each	1	0
OSWTS – Large Commercial/Industrial	Each	0	1
OSWTS – Aerobic Treatment Unit (ATU)	Each	0	2
OSWTS – Mounds	Each	1	1
OSWTS – Cluster, Advanced Treatment, or Commercial Mgmt Plan	Each	2	1
Access Control	Acre	6	10
Channel Vegetation	Feet	500	100
Fence, 4-Wire	Feet	1,500	500
Fence, 2-Wire Electric	Feet	400	0
Fence, Corral Panel	Each	6	0
Filter Strip	Acre	1	0
Grazing Land Mechanical Treatment	Acre	10	0
Heavy Use Area Protection	Feet	0	200
Irrigation System, Microirrigation	Each	250	0
Nutrient Management	Acre	9	0
Pest Management	Acre	45	24
Pipeline, PVC, HDPE, PE Pipe 1.25”- 8”	Feet	2,000	0
Prescribed Grazing	Acre	112	0
Pumping Plant for Water Control	Each	2	0
Riparian Forest Buffer	Acre	1	0
Riparian Herbaceous Cover	Acre	2	5
Spring Development	Each	0	1
Stream Crossing	Feet	250	100
Stream Bank and Shoreline Protection	Feet	200	350
Structure for Water Control	Each	1	0
Waste Storage Facility	Each	1	0
Water and Sediment Control Basin	Each	2	0
Watering Facility	Each	8	0
Wetland Enhancement	Acre	0	1

2.2 Spring Creek is a small perennial mountain stream located in Pennington and Custer Counties in the Black Hills of South Dakota. Spring Creek is a tributary of the Cheyenne River, which flows into the Missouri River. The drainage area of Spring Creek is approximately 425 square miles (1,100 square kilometers) at the confluence with the Cheyenne River.

The surface area of the watershed that impacts the impaired reach of Spring Creek above Sheridan Lake encompasses approximately 93,124 acres and includes Hydrologic Units 101201090901, 101201090902, 101201090903, 101201090904. The city of Hill City (population ~1,000) is the only municipality located in the Spring Creek Watershed.

Figure 2-1 displays the 25th, 50th, and 75th percentile annual flows from October 1, 1990–September 30, 2004, for U.S. Geological Survey (USGS) Station 06406920, located just above where Spring Creek empties into Sheridan Lake. Stream flows displayed seasonal variation for the period of record (October 1, 1990–September 30, 2004). Highest stream flows typically occur during late spring, with highest monthly average stream flow reported in June (72 cubic feet per second (cfs)), and lowest stream flows occur during the winter months, with lowest monthly average stream flow reported in January (11 cfs). Fecal coliform concentrations also displayed seasonal variation and were positively correlated with stream flow.

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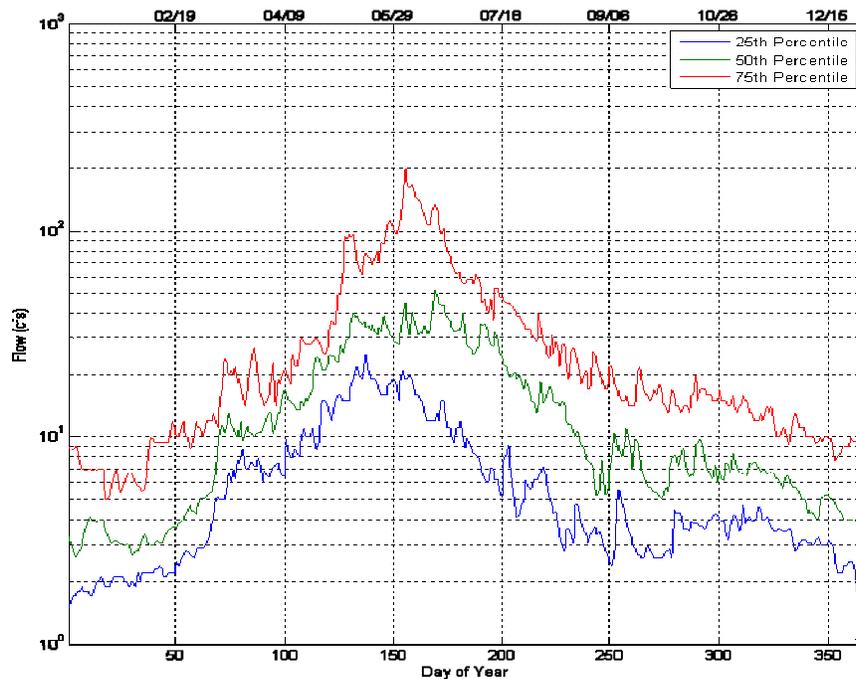


Figure 2-1. Annual Hydrograph Displaying 25th, 50th, and 75th Percentile Flows for U.S. Geological Survey Station 06406920, (Located Just Above Where Spring Creek Flows Into Sheridan Lake).

2.3 The location of the Spring Creek Watershed is shown in Figure 2-2.

2.4 Land use in the watershed is primarily silviculture, recreation, residential, and grazing. Some animal feeding areas are located in the watershed. Metamorphic slates and schists, along with granite rock, underlie a large portion of the basin and form the Central Crystalline Area of the Black Hills that covers the majority of the study area.

The watershed’s major soil types are Pactola, Buska, Mocmont, and Stovho. The Pactola series of soils, which cover most of the basin, were formed by the weathering of materials in steeply tilted metamorphic rock. The Buska series descends from micaceous schist while the Mocmont formed from material weathered from granite. Those two series generally occur in the upper reaches of the basin in the Harney Peak area. The Stovho series formed from the weathering of limestone and calcareous sandstone and is found in the upper reaches of the basin in the area underlain by the Madison Limestone Formation.

Digital Elevation Models (DEMs) of the area show the average slope to be approximately 20 percent. Much of the land is located within the Black Hills National Forest and is predominantly forested with ponderosa pine. Other cover includes grasslands and hardwoods.

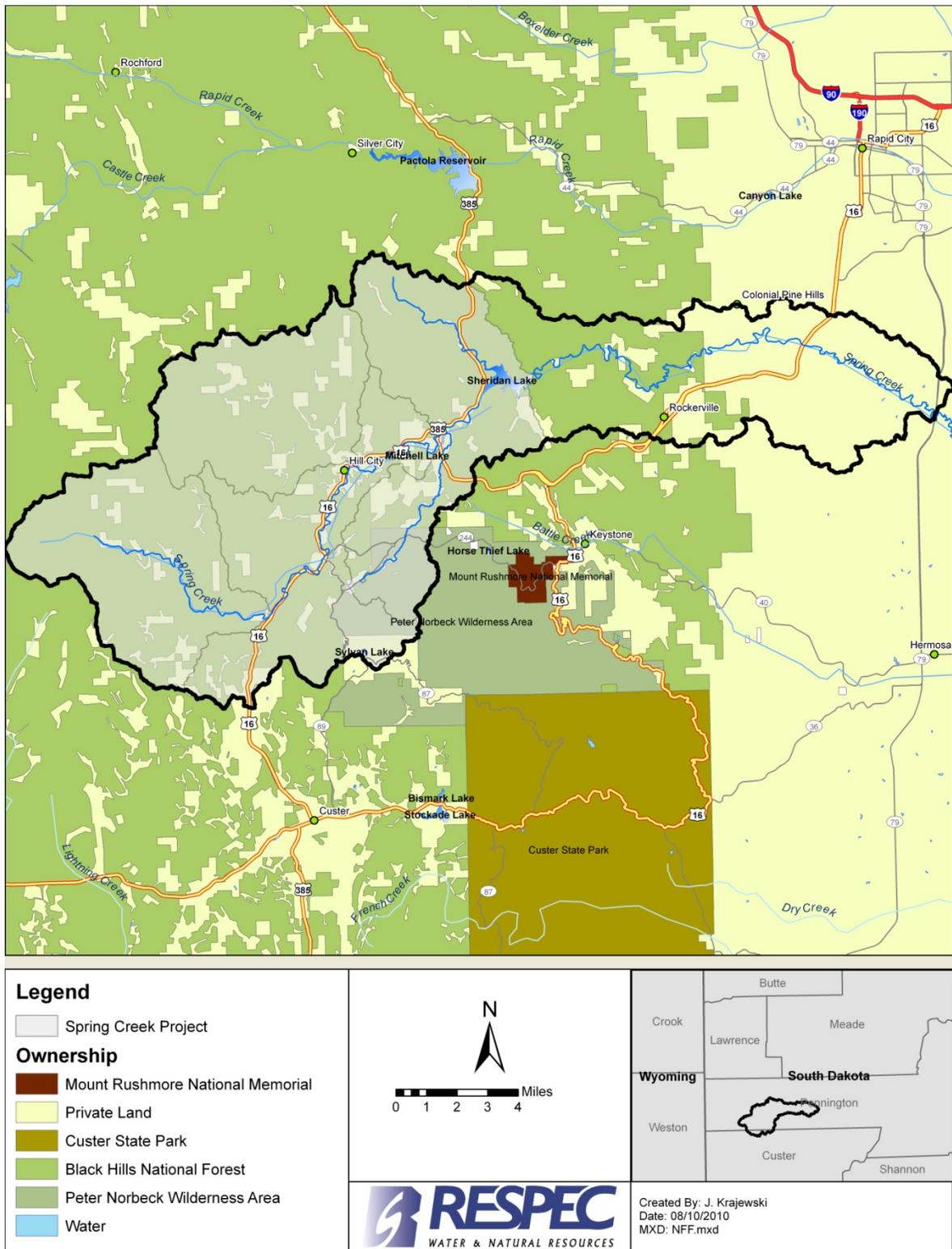


Figure 2-2. Location of the Spring Creek Watershed.

The average annual precipitation in the watershed is 20.8 inches; 80 percent 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 snow pack is 27.3 inches per year.

The results of the TMDL assessment indicate that more than half (63.5 percent) of the bacteria load originates from livestock and other agricultural land uses. The remaining load originates from urban runoff (13.7 percent) and other human sources (14.8 percent), including failing septic and leaking sanitary sewer systems.

Critical conditions occur within the basin during the summer. Typically, greatest numbers of livestock and tourist activities (i.e., trail rides, camping) occur in the basin during summer months. Combined with the peak in bacteria sources, high-intensity rainstorm events are also common during the summer and produce a significant amount of fecal coliform load because of bacterial washoff from the watershed.

3.0 PROJECT DESCRIPTION

The subsections below describe the overall project goals, objectives, and tasks for Segment I of the Spring Creek Watershed Management and Project Implementation Plan.

3.1 GOALS

The project goal is to bring Spring Creek into compliance for fecal coliform/*E. coli* by implementing the recommended BMPs by 2021. The goal of this project segment, as set forth in the Spring Creek/Sheridan Lake TMDL study, is to:

- Implement several BMP pilot projects that will be used to demonstrate and promote the effectiveness of BMP implementation on water quality.
- Develop a 10-year Spring Creek Watershed Project Plan, Stormwater Management Plan, and Septic System Management Plan that will help prioritize BMP implementation and public outreach efforts.
- Conduct significant public education and outreach to stakeholders within the Spring Creek Watershed.
- Perform water-quality monitoring to aid in developing a baseline condition that will ensure that BMPs are effective and proper BMPs are being implemented.

3.2 OBJECTIVES AND TASKS

The strategy of the Spring Creek Watershed Implementation Team is to progressively and efficiently implement BMPs within the Spring Creek Watershed to bring the creek back into compliance with its assigned beneficial uses. This project segment focuses heavily on planning and public outreach that will ensure the proper prioritization and adoption of BMPs. Baseline and event monitoring will be conducted to assess preimplementation conditions and measure improvement. The project strategy will be reviewed annually to measure overall success, to determine adjustments, and to obtain funding for the future project segments. Federal, state, and private funding will be used to fund BMPs. A final report will be produced for each 319 project segment completed. Additional projects and funding proposals will be submitted during the next 10 years to continue installing BMPs that reduce fecal coliform, temperature, and nutrients to meet the TMDLs.

OBJECTIVE 1: Implement BMPs Recommended in the Spring Creek Watershed TMDL

The Spring Creek TMDL recommends BMPs focusing on improving riparian zone management, controlling stormwater runoff, identifying and repairing of defective septic systems and sewers, and removing sediment in Mitchell and Major Lakes. The TMDL identifies that a load reduction of 90 percent needs to be achieved in the high flow zone (48–525 cfs), 16 percent reduction in the moist flow zone (14–47 cfs), and 38 percent reduction in the low flow zone (0–2.1 cfs) for the stream to meet its assigned beneficial uses. BMPs implemented in this project segment will be focused on highly visible areas in the watershed and will be used to promote the adoption of similar BMPs in future segments.

Task 1

Riparian Vegetation and Manure Management Improvements

Results from the HSPF model developed in the TMDL assessment indicate that approximately 63.5 percent of the current bacteria load originates from livestock and other agricultural land uses. Types of BMPs suggested in the TMDL include livestock access (off-stream water supply), manure management, buffer zones, and stream bank stabilization. The focus of this project segment will be to identify, implement, and assess the effectiveness of two riparian vegetation improvement projects. These projects will be selected for their impact on water quality and their visibility and potential for public outreach. Water-quality monitoring upstream and downstream of the project boundaries' pre- and postimplementation will be conducted to aid in assessing the water-quality impacts to be presented in the public outreach effort. **Currently, there are six riparian and manure management contracts approved for \$46,658 and another eleven pending applications requesting \$53,496 additional funds. This amendment requests another \$60,000 in Objective 1: Task 1–Riparian Vegetation and Manure Management Improvements that will be used to improve riparian conditions and decrease livestock access and stream bank erosion through another 11 projects.**

Products:

1. Riparian Vegetation Pilot Projects.

- Product Cost: **\$223,000** 319 Cost: **\$120,000**
- Lead: Local Citizens, **Spring Creek Watershed Advisory Group**, Watershed Coordinator Consultants
- Other Groups: Natural Resources Conservation Service (NRCS), U.S. Forest Service (USFS), Game, Fish & Parks (GF&P), U.S. Fish and Wildlife Service (USFWS), Pennington County
- Milestone: October 2011, **six complete riparian vegetation/stream bank stabilization pilot projects and eleven manure management and grazing management pilot projects** (see timeline, page 13)

Task 2

Septic System Improvements

Human sources, including failing septic systems and leaking sanitary sewer systems, contribute 14.8 percent of the existing bacteria load according to the HSPF model used in the TMDL assessment project. The study area contains over 700 septic systems that are mostly located near Spring Creek and its tributaries, although limited information is available on the age and condition of these systems. The goal of this task will be to identify a group of septic systems that are in need of repair and complete the required upgrades. As with the riparian vegetation pilot projects, water-quality monitoring upstream and downstream of the project boundaries' pre- and postimplementation will be conducted to aid in assessing the water-quality impacts as well as aid in the public outreach effort. **Currently, there are seven On-Site Wastewater Treatment Systems (OWTS) contracts approved for \$48,200 and another twelve pending applications requesting \$81,000 additional funds. This amendment requests another \$240,000 in Objective 1: Task 2–Septic System Improvements that will be used to improve and replace existing malfunctioning or failing systems and decrease septic effluent impacts to Spring Creek and its perennial tributaries through another 28 projects.**

Products:

2. Septic System Pilot Project.

- Product Cost: **\$617,897** 319 Cost: **\$280,000**
- Lead: Local Citizens, **Spring Creek Watershed Advisory Group**, Watershed Coordinator Consultants
- Other Groups: Pennington County
- Milestone: October 2011, **35 completed septic system improvement projects** (see timeline, page 13)

OBJECTIVE 2: Public Outreach and Education/Project Management

Public outreach and education is an essential part of this project. Public meetings and workshops keep the community informed and encourage involvement in the project. Local citizen 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 Spring Creek Watershed improvement efforts.

Task 3

Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing

Twelve public meetings will be held during the project. The function of the meetings will be to update the status of the project for the landowners, citizens, and stakeholders and educate and encourage them to become involved with implementing BMPs and solicit **volunteers for citizen monitoring activities**. These meetings will provide an avenue for input from the residents in the area. Notification of meetings will be made to: **local agencies, businesses, and organizations; direct mailings to 1,000+ watershed residents; and local/regional newspapers**. In addition, a public web page (www.springcreekblackhills.com) was developed to provide the public with the latest available data as well as an overview of the project and status of work activities. **Over 500 visitors have viewed and downloaded information from the Spring Creek 319 Project website, which is averaging 19 visitors per day, since its launch in late July**. Public awareness will be further enhanced by annual fall tours of the watershed along with informational booths at local events demonstrating the project's goals and accomplishments.

Implementation projects require working with the landowners, **residents**, and agriculture producers in completing applications, project planning, and reviewing practices when they are complete along with organizing and filing applications and bills. **Because of the significant demand for BMPs, increased number of applications, and the small size of a typical or average property parcel in the project area, the Spring Creek Watershed Advisory Group and the Pennington County Board of Commissioners are requesting a supplementary \$150,000 for project management to implement approximately 40 additional BMP implementation projects for Segment I under Objective 1: Task 1–Riparian Vegetation and Manure Management Improvements and Task 2–Septic System Improvements. These funds are needed to build on the current momentum and increase participation in the project.**

Grant Reporting and Track System (GRTS) Reports will be completed as required by the US EPA. A final report will be submitted to the EPA at the conclusion of the project. This report will cover all work completed during this segment of implementation and estimated effects BMPs will have on the water quality in Spring Creek. Additional grants will **continue to be written to assist in resolving water-quality issues and support the cost of implementation projects. One of those grant proposals was written in June 2010, the first month of the project. The Spring Creek Watershed Advisory Group partnered with Black Hills Resource Conservation and Development (RC&D) to submit a preproposal to the National Forest Foundation (NFF) for a volunteer citizen monitoring project on Sheridan Lake and Spring Creek. The NFF invited the RC&D to submit a full proposal for the Sheridan Lake–Spring Creek Volunteer Monitoring Project in August 2010. That proposal requested \$44,900 of NFF Matching Award Program (MAP) funds to recruit local residents to monitor watershed conditions and help assess the implementation project's effectiveness and ensure future funding is properly prioritized. Final NFF funding decision will be made in late September 2010 for that proposal. Another grant proposal is being prepared in partnership with the West Dakota Water Development District (WDWDD) for submittal to the South Dakota Discovery Center for their Watershed Information and Education Program's 319 information and education minigrants. The proposal will fund expansion of the Spring Creek Watershed Advisory Group outreach efforts to inform residents, students, local groups, civic organizations, and landowners about the status of water quality in Spring Creek and ways to improve those conditions.**

Products:

3. Public Outreach/Project Management.

Total Product Cost: **\$279,980**

319 Cost: **\$240,000**

- Lead: Pennington County, **Spring Creek Watershed Advisory Group**, Watershed Coordinator Consultants
- Other Groups: **Pennington** Conservation District, City of Hill City, Black Hills RC&D
- Milestone: June 2011, GRTS reports, one final report, **twelve** public meetings, one website, **three** watershed tours (see timeline, page 13)

are properly prioritized, the HSPF model application will be reviewed and adapted as needed to accurately predict flow, fecal coliform, phosphorus, and the resulting impact BMPs will have on the loading to the system. This adaption will include model reconfiguration and calibration with regard to the more recently collected data and any implementation projects completed after the TMDL assessment. Within the model application, BMPs will be implemented on the areas served in a spatially source-specific fashion through removal efficiency factors. The efficiency factors will be based on the previous TMDL findings, those reported in the literature, and pilot project reductions monitored. Ultimately, a system will be developed that will allow individual BMP performance to be evaluated/estimated along with the cumulative impact BMPs implemented throughout the watershed have on the system. The continual collection of water-quality data will allow predictions from this application to be verified and adapted as needed. The final component of the 10-Year Plan will be the development of a cost-share docket that will provide an impartial ranking for BMP implementation.

BMPs to be modeled will be selected based on the load duration curve flow zone analysis completed in the TMDL assessment (Table 3-1). This analysis indicated that load reductions must occur within the high (90 percent reduction), moist (16 percent reduction), and low (38 percent reduction) flow regimes. When combined with a BMP matrix (shown in Table 3-2) that identifies specific practices effective in reducing bacteria, sediment, and nutrient loads in the different flow zones (Table 3-1), BMP implementation scenarios can be developed efficiently.

Table 3-1. Load Duration Curve Flow Zone Analysis From TMDL

TMDL Component	Flow Zone (expressed as cfu × 109/day)				
	High	Moist	Midrange	Dry	Low
	48–525 cfs	14–47 cfs	6.8–13 cfs	2.2–6.7 cfs	0–2.1 cfs
Load Allocation (LA)	2,443.07	328.99	94.09	40.26	1.11
Waste Load Allocation (WLA)	3.78	3.78	3.78	3.78	3.78
Margin of Safety (MOS)	362.13	88.09	29.36	16.64	15.66
TMDL	2,808.98	420.86	127.24	60.68	20.55
Current Load	27,575.98	502.09	118.43	18.45	33.01
Load Reduction	90%	16%	0%	0%	38%

Products:

6. Spring Creek Watershed 10-Year Implementation Plan Document.

Total Product Cost: \$35,020

319 Cost: \$20,000

- Lead: Local Citizens, Spring Creek Watershed Advisory Group, Pennington County, Watershed Coordinator Consultants
- Other Groups: All participating groups and agencies
- Milestone: December 2011, Spring Creek Watershed 10-Year Implementation Plan document, cost-share docket (see timeline, page 13)

Table 3-2. Example of BMP Implementation Matrix That Assigns a Relative Ability to Reduce Bacteria Loading in a Given Flow Zone

Contributing Source Area	Flow Zone				
	High Flow	Moist	Midrange	Dry	Low Flow
Septic Systems				<i>M</i>	<i>H</i>
Stormwater: Impervious Areas		<i>H</i>	<i>H</i>	<i>H</i>	
Stormwater: Upland	<i>H</i>	<i>H</i>	<i>M</i>		
Riparian Areas/Stream Bank Stabilization	<i>H</i>	<i>M</i>			

Note: Potential relative importance of source area to contribute loads under given hydrologic condition (*H*: High; *M*: Medium).

OBJECTIVE 4: Complete Essential Water-Quality Monitoring

Task 7

Evaluation and Monitoring

Water-quality monitoring in conjunction with BMP implementation is critical in evaluating the progress toward meeting the TMDL. The purpose of water-quality sampling as part of this project segment is to (1) reestablish baseline water-quality conditions for the Spring Creek Watershed, primarily related to fecal coliform bacteria, sediment, and nutrients; (2) further identify sources of impairments in the watershed; and (3) focus BMP efforts in the future. The monitoring results collected as part of this project will be compared to previous sampling conducted during the TMDL assessment project, and as part of the state’s ambient water-quality monitoring program, to identify any recent changes in water quality related to changing watershed condition or climatic patterns. Water-quality monitoring will occur monthly during the recreation season in 2010 and 2011 and twice during the nonrecreational season; stage-recording devices will be installed at 18 locations during monitoring. Two lake profiles, with top and bottom phosphorus, will be performed during the 2011 sampling season.

Eighteen sites were selected for water-quality monitoring and are shown in Figure 3-1. These sites include background sampling sites near the headwaters of Spring Creek and key tributaries, upstream and downstream of Hill City and Rushmore Products Sawmill, and upstream/downstream of small impoundments in the watershed that potentially act as water-quality BMPs. Sites were chosen on each of the main tributaries to Sheridan Lake. Many sites were selected based on previous data collection efforts (USGS gaging, SD water-quality monitoring (WQM), and SDSM&T TMDL stations). In addition to the monthly in-stream grab sampling, stormwater runoff will be sampled at four key locations in the watershed (Figure 3-1).

Constituents to be sampled include:

- Total Phosphorus
- Nitrate+Nitrite Nitrogen
- Total Suspended Solids
- Fecal Coliform
- Total and *E. coli*.

The Spring Creek Watershed Advisory Group partnered with the Black Hills RC&D to submit the Sheridan Lake–Spring Creek Volunteer Monitoring Project proposal in August 2010. The volunteer monitoring project will recruit local residents to monitor watershed conditions. Pennington County and their partners are conducting baseline multiparty monitoring in 2010 before implementation. In 2011,

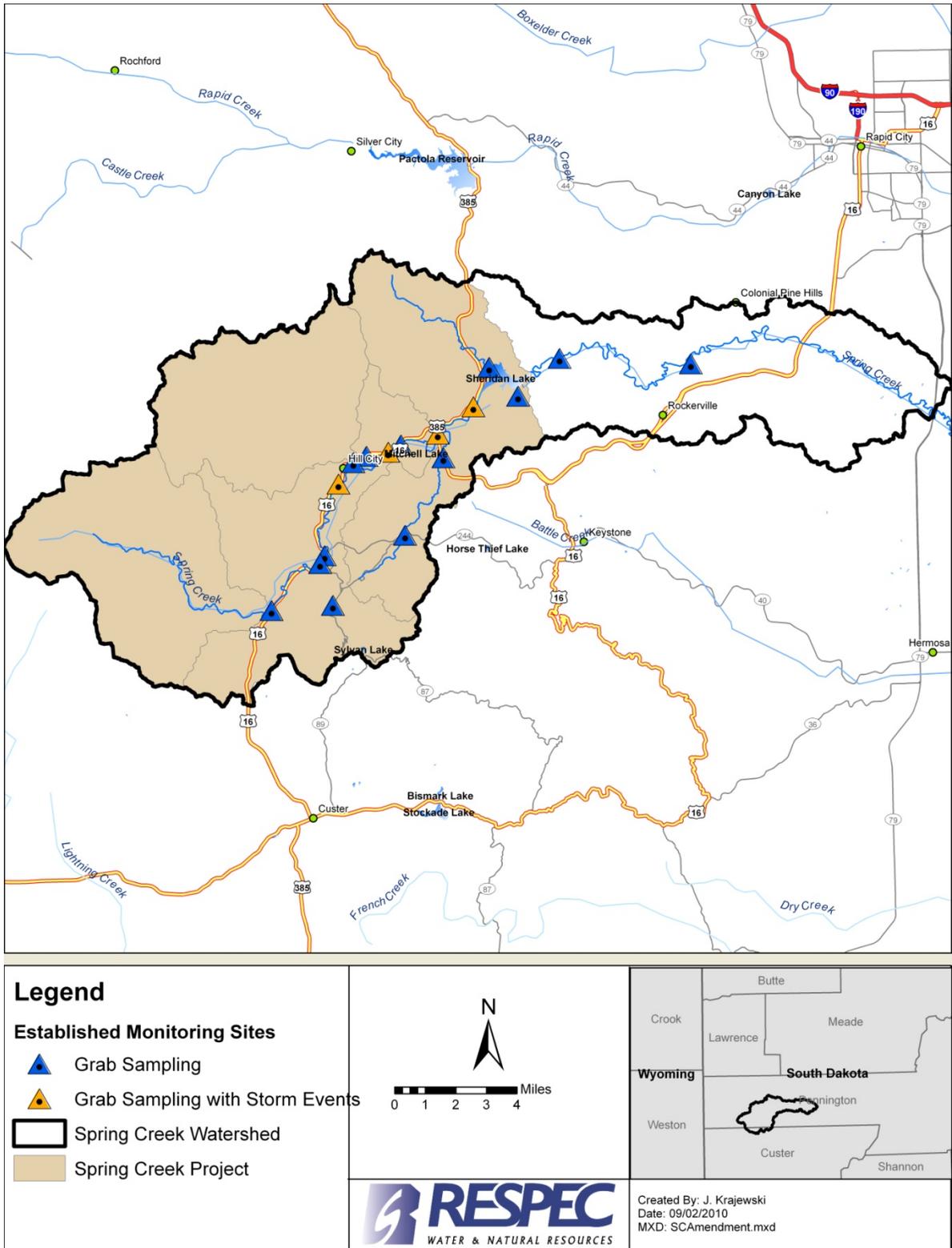


Figure 3-1. Established Implementation Water-Quality Monitoring Stations in the Spring Creek Watershed.

volunteer monitoring will help assess the implementation project's effectiveness and ensure future funding is properly prioritized. Local volunteers will take water samples from May to September and submit them for analysis of total phosphorus, nitrate+nitrogen, total suspended sediment, fecal coliform bacteria, and *E. coli*. Residents will learn about the monitoring results through e-mail, mailings, public meetings, tours, workshops, trainings, personal visits, and the project's website (www.springcreekblackhills.com). This proposal requests \$44,900 of NFF funds matched with \$44,900 nonfederal funds and \$29,500 nonfederal in-kind contributions. The community will become more involved and other residents and groups will participate in watershed monitoring and restoration because of this volunteer monitoring project.

Products:

7. Compile Water-Quality Monitoring Data.

- Total Product Cost: **\$135,515** 319 Cost: **\$30,000**
- Lead: Watershed Coordinator Consultants, Pennington County
- Other Group: City of Hill City, City of Rapid City, WDWDD, **Spring Creek Watershed Advisory Group**
- Milestone: **October** 2011, complete water-quality monitoring and analysis (see timeline, page 13)

3.3 SCHEDULE

The project milestone schedule is shown in Figure 3-2. The milestone schedule is based on work approval by June 2010 and completion by May 2012.

RSI-996-10-113

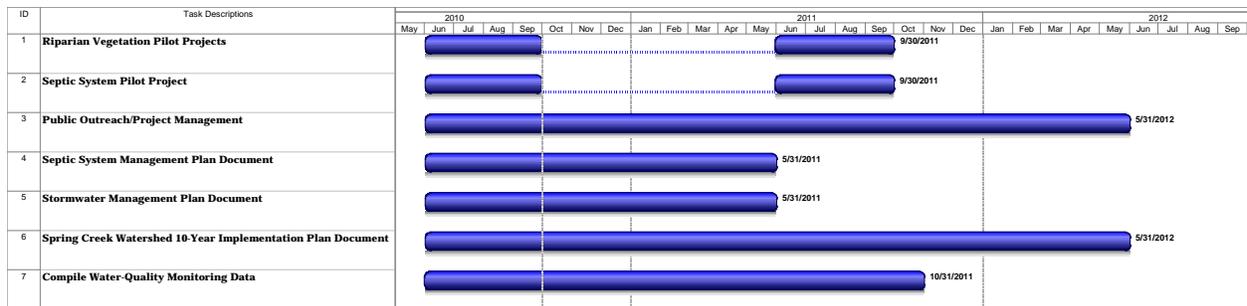


Figure 3-2. Project Timeline.

3.4 PERMITS

Before any new construction, required permits will be obtained. An example of a permit that may need to be obtained is for any stormwater or construction work. Additionally, the need for 401 and 404 stream permits will be checked for riparian work.

3.5 LEAD PROJECT SPONSOR

Pennington County, a government entity, is the lead local sponsor for this implementation project. Although the County has no experience in administering 319 implementation projects, they are actively involved in several watershed, water-quality improvement projects.

3.6 OPERATION AND MAINTENANCE QUALITY ASSURANCE

Responsibilities for operation and maintenance of 319-funded BMPs will be provided for through 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. The government-funding sponsor, if applicable, along with watershed coordinator 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 local stakeholder group and watershed consultants will be responsible for BMPs cost-shared with the EPA 319 and all systems operated and maintained. **Compliance for BMPs implemented with 319 funds will be in accordance with the applicable rules and regulations** set forth in **the NRCS' Environmental Quality Incentives Program (EQIP) Manual**, Pennington County's On-Site Wastewater Treatment System Ordinance, and provisions of Chapter 74:53:01 (and any amendments thereto) of the Administrative Rules of South Dakota. 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. Watershed consultant personnel 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.

4.0 COORDINATION PLAN

4.1 PARTICIPATING GROUPS AND AGENCIES

There has been extremely strong local support for this project. The following groups/agencies have been participating and will continue to participate in the Spring Creek Watershed implementation project:

- **Spring Creek Watershed Advisory Group**
- **Black Hills Resource Conservation and Development (RC&D)**
- **City of Hill City**
- **City of Rapid City**
- **Pennington Conservation District**
- **Pennington County**
- **South Dakota Game, Fish, and Parks (SD GF&P)**
- **South Dakota School of Mines and Technology (SDSM&T)**
- **US Natural Resource Conservation Service (NRCS)**
- **US Forest Service (USFS)**
- **West Dakota Water Development District (WDWDD)**
- **Black Hills FlyFishers**

4.2 LETTERS OF SUPPORT

Letters of support will be supplied by local organizations to the SD DENR supporting the Spring Creek Watershed Implementation project upon request.

4.3 COORDINATION WITH OTHER PROGRAMS

The local stakeholder group will continue to coordinate activities with state, federal, and local government agencies through frequent personal communication and bimonthly steering committee meetings. SD GF&P, USFWS, NRCS, DENR, local organizations, and local government agencies will provide input and involvement in this project. Extra coordination with local NRCS personnel, USFS, and SD GF&P will be necessary for riparian vegetation and **livestock access, volunteer citizen monitoring, weed/pest management, and stream bank stabilization** projects.

4.4 SIMILAR ACTIVITIES IN THE WATERSHED

All practices within the Spring Creek 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 SD DENR's *Standard Operating Procedures for Field Samplers, Tributary and In-Lake Sampling Techniques*. A minimum of 10 percent (one sample) of all samples collected will be quality assurance/quality control (QA/QC) samples. QA/QC samples will consist of field duplicates blanks and field replicate samples.

5.2 DATA

The data will be provided to SD DENR. The data and analysis for this project will be documented in a final report, and the Spring Creek Steering Committee will review and submit the final report to SD DENR.

Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) and **HSPF** were used to model the Spring Creek 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 bacteria concentrations in the streams within the Spring Creek Watershed. 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.
- Comparing water chemistry data and annual loads pre- and postimplementation.
- Developing 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 Spring Creek Steering Committee 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 as well as additional sites identified in the "evaluation and monitoring plan."

The SD DENR Surface Water-Quality Program also has two monitoring stations within the watershed, Spring Creek near Sheridan Lake (WQM 460654) and Spring Creek near Rapid City (WQM 460649). Comparisons over time will be performed using applicable sites to measure the large-scale changes in water quality.

5.3 MODELS

BASINS model Version 3.0, along with **HSPF**, were used to determine the contribution of fecal coliform bacteria from identified sources and to evaluate the implementation of BMPs to control these sources. The Spring Creek Watershed was represented using four subbasins in the model to represent the upper and lower Spring Creek and key tributaries (Palmer and Newton Fork Creeks). The nonpoint sources in the study area are modeled in **HSPF** by estimating per-acre fecal coliform accumulation rates and maximum fecal coliform storage rates for each source. The buildup and wash-off of fecal coliform is simulated based on these rates and precipitation. The values for the accumulation and storage rates were calculated using the **Bacterial Indicator Tool (BIT)**. Human sources (failing septic systems, leaking sanitary sewer lines, and leaking lagoons) and livestock in streams are nonpoint sources that are modeled as point sources because the coliform they produce cannot be adequately represented by buildup and accumulation rates. The

BIT calculates a flow rate and a fecal coliform count per hour that are used in the simulation model to represent cattle in streams and human sources.

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

The long-term O&M funding for BMPs installed will be funded and maintained by the grantees.

6.0 BUDGET

Table 6-1 identifies the funding sources and cash flow during the project. Tables 6-2 and 6-3 present the budget for the 319 funds as well as the matching funds for the project. EPA 319 funds represent approximately 55 percent of the total project budget.

Table 6-1. Cash Flow

Budget	June 2010–May 2011 (\$)	June 2011–May 2012 (\$)	Total (\$)
319 Funds	162,000	162,000	324,000
Matching Funds			
Producer	10,000	10,000	20,000
Owner	6,667	6,666	13,333
Pennington County	102,558	82,167	184,725
SDSM&T	8,559	8,559	17,118
City of Hill City	10,000	10,000	20,000
City of Rapid City	30,000		30,000
WDWDD	10,000	10,000	20,000
Subtotal	177,784	127,392	305,176
Total Budget	339,784	289,392	629,176

Table 6-1. Cash Flow

Budget	June 2010–May 2011 (\$)	June 2011–May 2012 (\$)	Total (\$)
319 Funds	162,000	652,000	814,000
Matching Funds			
Producer	10,000	228,000	238,000
Owner	6,667	152,000	158,667
Pennington County	102,558	82,167	184,725
SDSM&T	8,559	8,559	17,118
City of Hill City	10,000	10,000	20,000
City of Rapid City	30,000		30,000
WDWDD	10,000	10,000	20,000
Subtotal	177,784	490,726	668,510
Total Budget	339,784	1,142,726	1,482,510

Table 6-2. Budget of 319 Funds

Project Description	Consultants (\$)	SDSM&T (\$)	Local Citizens (\$)	Totals (\$)
Objective 1. Implement BMPs Recommended in the Spring Creek Watershed TMDL				
<i>Task 1. Riparian Vegetation and Manure Management Improvements</i>				
Product 1. Riparian Vegetation Pilot Projects			60,000	60,000
<i>Task 2. Septic System Improvements</i>				
Product 2. Septic System Pilot Project			40,000	40,000
Objective 2. Public Outreach and Education/Project Management				
<i>Task 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing</i>				
Product 3. Public Outreach/Project Management	90,000			90,000
Objective 3. Develop Project Planning Documents				
<i>Task 4. Septic System Management Plan Study and Final Document</i>				
Product 4. Septic System Management Plan Document	50,000			50,000
<i>Task 5. Stormwater Management Plan Study and Final Document</i>				
Product 5. Stormwater Management Plan Document		74,000		74,000
<i>Task 6. Spring Creek Watershed 10-Year Strategic Implementation Plan</i>				
Product 6. Spring Creek Watershed 10-Year Implementation Plan Document	10,000			10,000
Objective 4. Complete Essential Water-Quality Monitoring				
<i>Task 7. Evaluation and Monitoring</i>				
Product 7. Compile Water-Quality Monitoring Data				
Project Totals	150,000	74,000	100,000	324,000

Table 6-2. Budget of 319 Funds

Project Description	Consultants (\$)	SDSM&T (\$)	Local Citizens (\$)	Totals (\$)
Objective 1. Implement BMPs Recommended in the Spring Creek Watershed TMDL				
<i>Task 1. Riparian Vegetation and Manure Management Improvements</i>				
Product 1. Riparian Vegetation Pilot Projects			120,000	120,000
<i>Task 2. Septic System Improvements</i>				
Product 2. Septic System Pilot Project			280,000	280,000
Objective 2. Public Outreach and Education/Project Management				
<i>Task 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing</i>				
Product 3. Public Outreach/Project Management	240,000			240,000
Objective 3. Develop Project Planning Documents				
<i>Task 4. Septic System Management Plan Study and Final Document</i>				
Product 4. Septic System Management Plan Document	50,000			50,000
<i>Task 5. Stormwater Management Plan Study and Final Document</i>				
Product 5. Stormwater Management Plan Document		74,000		74,000
<i>Task 6. Spring Creek Watershed 10-Year Strategic Implementation Plan</i>				
Product 6. Spring Creek Watershed 10-Year Implementation Plan Document	20,000			20,000
Objective 4. Complete Essential Water-Quality Monitoring				
<i>Task 7. Evaluation and Monitoring</i>				
Product 7. Compile Water-Quality Monitoring Data	30,000			30,000
Project Totals	340,000	74,000	400,000	814,000

Table 6-3. EPA 319 and Matching Funds Budget by Task

Project Description	EPA 319 (\$)	Matching Funds						Sum of Matching Funds
		Producer (\$)	Pennington County (\$ and in-kind)	SDSM&T (in-kind)	City of Hill City (\$)	City of Rapid City (\$)	WDWDD (\$)	
Objective 1. Implement BMPs Recommended in the Spring Creek Watershed TMDL								
<i>Task 1. Riparian Vegetation and Manure Management Improvements</i>								
Product 1. Riparian Vegetation Pilot Projects	60,000	20,000	3,000					23,000
<i>Task 2. Septic System Improvements</i>								
Product 2. Septic System Pilot Project	40,000	13,333	1,250					14,583
Objective 2. Public Outreach and Education/Project Management								
<i>Task 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing</i>								
Product 3. Public Outreach/Project Management	90,000		119,940					119,940
Objective 3. Develop Project Planning Documents								
<i>Task 4. Septic System Management Plan Study and Final Document</i>								
Product 4. Septic System Management Plan Document	50,000							
<i>Task 5. Stormwater Management Plan Study and Final Document</i>								
Product 5. Stormwater Management Plan Document	74,000			17,118			10,000	27,118
<i>Task 6. Spring Creek Watershed 10-Year Strategic Implementation Plan</i>								
Product 6. Spring Creek Watershed 10-Year Implementation Plan Document	10,000		15,020					15,020
Objective 4. Complete Essential Water-Quality Monitoring								
<i>Task 7. Evaluation and Monitoring</i>								
Product 7. Compile Water-Quality Monitoring Data			45,515		20,000	30,000	10,000	105,515
Project Totals	324,000	33,333	184,725	17,118	20,000	30,000	20,000	305,176

Table 6-3. EPA 319 and Matching Funds Budget by Task

Project Description	EPA 319 (\$)	Matching Funds						Sum of Matching Funds
		Producer (\$)	Pennington County (\$ and in-kind)	SDSM&T (in-kind)	City of Hill City (\$)	City of Rapid City (\$)	WDWDD (\$)	
Objective 1. Implement BMPs Recommended in the Spring Creek Watershed TMDL								
<i>Task 1. Riparian Vegetation and Manure Management Improvements</i>								
Product 1. Riparian Vegetation Pilot Projects	120,000	100,000	3,000					103,000
<i>Task 2. Septic System Improvements</i>								
Product 2. Septic System Pilot Project	280,000	296,667	41,230					337,897
Objective 2. Public Outreach and Education/Project Management								
<i>Task 3. Public Outreach and Education, Implementation Record Keeping, Report and Future Grant Writing</i>								
Product 3. Public Outreach/Project Management	240,000		39,980					39,980
Objective 3. Develop Project Planning Documents								
<i>Task 4. Septic System Management Plan Study and Final Document</i>								
Product 4. Septic System Management Plan Document	50,000		39,980					39,980
<i>Task 5. Stormwater Management Plan Study and Final Document</i>								
Product 5. Stormwater Management Plan Document	74,000			17,118			10,000	27,118
<i>Task 6. Spring Creek Watershed 10-Year Strategic Implementation Plan</i>								
Product 6. Spring Creek Watershed 10-Year Implementation Plan Document	20,000		15,020					15,020
Objective 4. Complete Essential Water-Quality Monitoring								
<i>Task 7. Evaluation and Monitoring</i>								
Product 7. Compile Water-Quality Monitoring Data	30,000		45,515		20,000	30,000	10,000	105,515
Project Totals	814,000	396,667	184,725	17,118	20,000	30,000	20,000	668,510

7.0 PUBLIC INVOLVEMENT

Communication with the major stakeholders in this project is critical to success. Public involvement in the project will be continued through coordination with the Spring Creek Watershed Advisory Group, public meetings with stakeholders, newsletters, word of mouth, and by the website (www.springcreekblackhills.com) that has been developed for this project.

8.0 THREATENED AND ENDANGERED SPECIES

The black-tailed prairie dog is identified as a threatened species by the SD GF&P that is located within and/or migrating through the Upper Spring Creek Watershed in Pennington County. The implementation of this project is not expected to impact this species.

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 listed below:

- 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, GF&P, 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.

The black-tailed prairie dog is listed as a “Candidate” species with a “possibility” of occurrence in the Upper Spring Creek Watershed. 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.