

SECTION 319 NONPOINT POLLUTION CONTROL PROGRAM

WATERSHED PROJECT FINAL REPORT

**TURKEY RIDGE CREEK WATERSHED
IMPLEMENTATION PROJECT**

By

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This project was completed in cooperation with the South Dakota Department of Environment and Natural Resources and the United States Environmental Protection Agency, Region 8.

Grant # 9998185-05; 9998185-06

EXECUTIVE SUMMARY

PROJECT TITLE: Turkey Ridge Creek Watershed Project

PROJECT START DATE: 27 July, 2005

PROJECT COMPLETION DATE: 31 May, 2009

FUNDING:

Funding Sources	Original Budget	Revised Budget	Expended
U.S. EPA Section 319 Grant	\$522,690	(\$130,000)	\$240,698.66
SD Consolidated Water Grant	\$108,625		\$12,108.50
CWSRF Admin Funds	\$0	\$130,000	\$35,000.00
USDA	\$79,155		\$131,616.17
Local Cash and In-Kind Match	\$255,875		\$171,003.27
Turner Co. Conservation District	\$28,500		\$805.00
Total:	\$1,124,845	\$0.00	\$591,231.60

Summary of Accomplishments:

The project goal was “*to restore the beneficial uses of Turkey Ridge Creek through the implementation of Best Management Practices (BMPs) in the watershed that targeted sources of fecal coliform bacteria.*” These BMPs also reduced the sediment contribution from Turkey Ridge Creek to the Vermillion River below the city of Centerville, SD. This project took steps towards helping the two water bodies achieve full support status of all their beneficial uses.

The project goal was established based on the impairment information identified during the Turkey Ridge Creek Watershed Assessment completed in 2005. Water quality data indicated high concentrations of fecal coliform bacteria were present in the creek during high flow storm events. Because over 10 percent of the samples exceeded the 2,000 colony-forming units (cfus)/100-milliter daily maximum standard, a TMDL for fecal coliforms was developed. The water quality target established for Turkey Ridge Creek is a median concentration of <2,000 cfus/100ml. daily maximum. To attain the goal, a project implementation plan (PIP) was developed to install BMPs designed to reduce fecal coliform bacteria loading into the creek.

While the project cost-shared the installation of several conservation practices, the USDA Continuous Conservation Reserve Program (CCRP) was determined to be the most effective practice for reducing nonpoint source loads from the watershed. The Marginal Pastureland Program in coordination with the Lower James Critical Grasslands Program removed over 750 acres from grazing and the Farmable Wetlands Program from the CCRP removed many acres of cropland from production and restored many acres of wetlands to help filter pollutants from surface waters.

Best Management practices (BMPs) were selected and applied to attain the goal of restoring the beneficial uses of Turkey Ridge Creek. Cost-share funds for installing the practices were provided by the United States Environmental Protection Agency (U.S. EPA) Section 319 Nonpoint Source

Pollution Control Grant, the United States Department of Agriculture (USDA), United States Fish and Wildlife Service (USF&WS), and the South Dakota Consolidated Water Grant. Best management practices installed with cost-shared funds included fencing and water developments to improve grazing management, Pasture/Grassland Buffers, and Ag waste systems.

Numerous information and education (I&E) activities were completed during the project. Watershed property owners were provided with project information by using news articles, newsletters, and informational booths at community events.

Table 1 illustrates a comparison of planned verses completed project activities.

The project goal was developed based on water quality assessment results reported in the Turkey Ridge Creek Assessment Report (Wittmuss 2003). Objectives and tasks to install the BMPs that would reduce the nutrients reaching the Vermillion River were developed to support attaining the goal. Producers were encouraged to implement these BMPs through news releases, fact sheets, and direct contacts by the Project Coordinator and NRCS personnel. BMPs were cost-shared using U.S. EPA Clean Water Act Section 319 grant funds, South Dakota Department of Agriculture's Coordinated Soil and Water Conservation Commission grant funds, USDA funds and Turner Conservation District Funds.

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INTRODUCTION

Project Area

Turkey Ridge Creek is part of the Vermillion River Basin watershed, Hydrologic Unit Code (HUC) #1017010212. The 112,435 acre watershed is located mainly in the South Western portion of Turner County but does include several sections in Hutchinson and Yankton Counties in South Dakota. Eighty Three percent of the land is cropland and 13 percent of the watershed is used for pasture. The over-grazed pastures are primarily located along the creek and livestock have direct access to the stream. The major land-use in the watershed is cropland. The Beneficial Uses of Turkey Ridge Creek include Warm water marginal fish life propagation waters, Limited contact recreational waters, Fish and wildlife propagation, recreation, and stock watering waters, and Irrigation waters.

Water body Description

Turkey Ridge Creek (see Figure 1) is a perennial creek that formed at the base of Turkey Ridge; a glacial drift deposit in the Northern Glaciated Plains (46) ecoregion (Level III), (Bryce et al, 1997) in the Southwestern portion of Turner County, South Dakota. The creek flows from Northwest to Southeast and empties into the Vermillion River just to the Southwest of Centerville, SD. There are many intermittent tributaries that only carry water during spring snowmelt or rainfall events. Wetlands in the watershed are numerous (10-12% of the project area) and include small potholes, many of which have been drained, and other larger semi-permanent wetlands in addition to Swan Lake. During the course of the assessment Turkey Ridge Creek exhibited a constant base flow during the extremely dry years of 2002-2003. However, the majority of the discharge to the Vermillion River occurs during the spring snow melt and after heavy rainfall events.

The results of the watershed assessment of Turkey Ridge Creek, completed in 2005, scored, categorized, and ranked the watershed as being a watershed in need of restoration based on the unified watershed assessments. The main concerns were fecal coliform bacteria, water safety for swimming, and sediment and nutrient loadings.

Nonpoint Source Pollutants

Fecal coliform bacteria were found in all samples collected in the Turkey Ridge Creek watershed. The most likely sources of fecal coliform bacteria were identified as runoff from animal feeding areas, grazing animals standing in, crossing, or grazing along streams, and improper application of manure on cropland and/or pastures having greater slopes.

The AGNPS model identified 45 animal feeding operations (AFOs) for installing BMPs to control animal waste runoff with a resulting reduction of 17 percent of fecal coliform bacteria loading to Turkey Ridge Creek.

The project goal was established based on the impairment information identified during the Turkey Ridge Creek Watershed Assessment completed in 2005. Water quality data indicated high concentrations of fecal coliform bacteria were present in the creek during high flow storm events. Because over 10 percent of the samples exceeded the 2,000 colony-forming units (cfus)/100-milliliter daily maximum standard, a TMDL for fecal coli forms was developed. The water quality target

established for Turkey Ridge Creek is a median concentration of <2,000 cfus/100ml. daily maximum. To attain the goal, a project implementation plan (PIP) was developed to install BMPs designed to reduce fecal coliform bacteria loading into the creek.

Approximately thirteen percent (13%) of the watershed is used for pasture. The overgrazed pastures are primarily located along the creek and livestock have direct access to the creek. The Continuous Sign-up Conservation Reserve Program (CCRP), Marginal Pastureland was a widely accepted conservation practice in the Turkey Ridge Creek watershed during the project period. It was used to keep livestock out of Turkey Ridge Creek and also promote the healing of sloughing creek banks.

During the Turkey Ridge Creek Watershed Assessment there were one hundred twenty nine (129) Animal Feeding Operations (AFO) identified in the watershed. The AFOs were modeled using the Agricultural Nonpoint Source (AGNPS) stand-alone feedlot model. The model rated the AFOs relative to their pollution potential and indicated that thirty five percent (35% = 45 AFOs) of the operations rated greater than 50 on a scale of 0 (no pollution potential) to 100 (severe pollution potential).

Summary of Accomplishments:

Best Management practices (BMPs) were selected and applied to attain the goal of restoring the beneficial uses of Turkey Ridge Creek. Cost-share funds for installing the practices were provided by the United States Environmental Protection Agency (U.S. EPA) Section 319 Nonpoint Source Pollution Control Grant, the United States Department of Agriculture (USDA), United States Fish and Wildlife Service (USF&WS), and the South Dakota Consolidated Water Grant. Best management practices installed with cost-shared funds included fencing and water developments to improve grazing management, Pasture/Grassland Buffers, and Ag waste systems.

Numerous information and education (I&E) activities were completed during the project. Watershed property owners were provided with project information by using news articles, newsletters, and informational booths at community events.

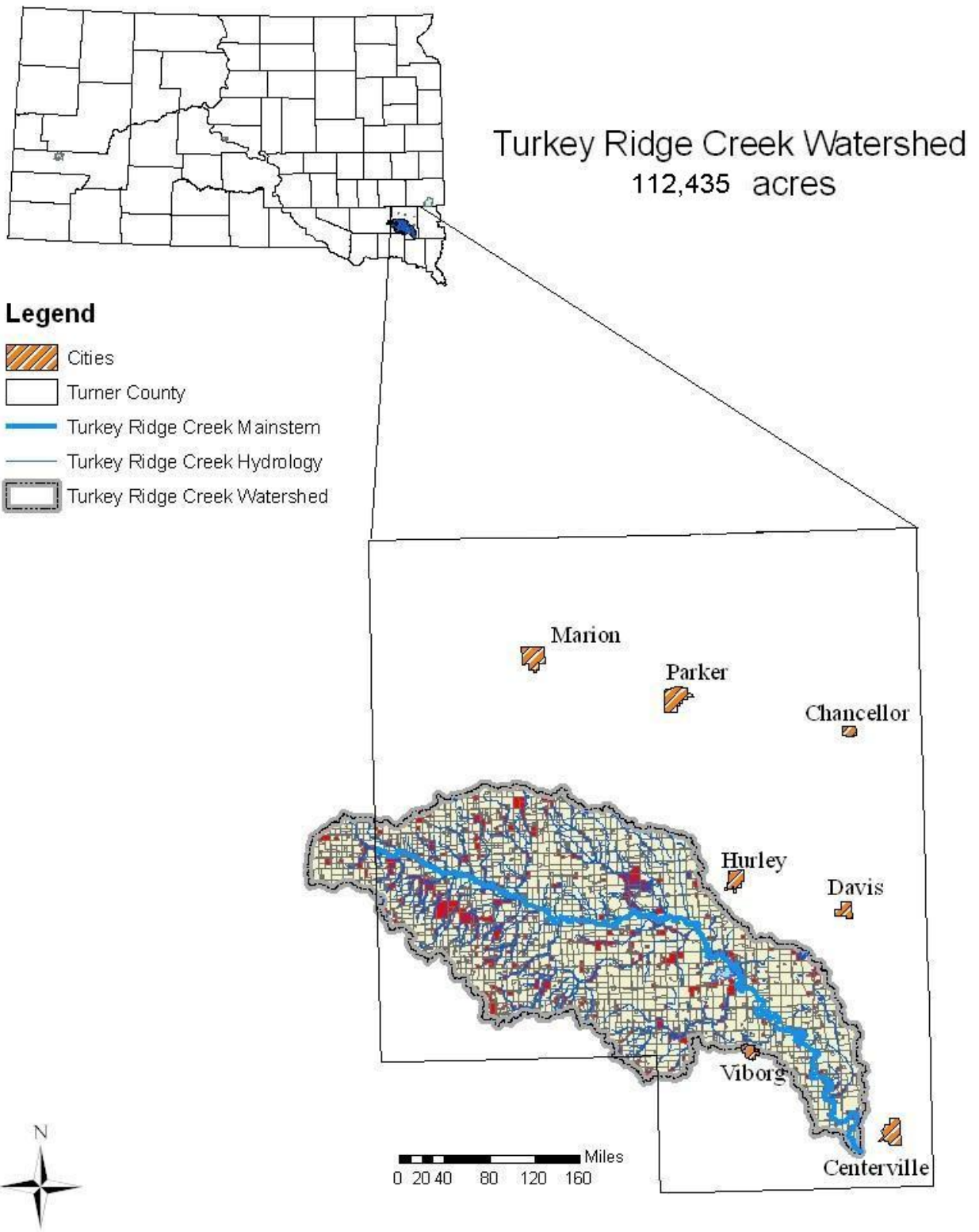


Figure 1: Turkey Ridge Creek Watershed.

PROJECT GOALS, OBJECTIVES, AND ACTIVITIES

The goal of the Turkey Ridge Creek project is:

“to restore the beneficial uses of Turkey Ridge Creek through the implementation of Best Management Practices (BMPs) in the watershed that target sources of fecal coliform bacteria.”

Objective 1: Reduce fecal coliform bacteria loadings from the Turkey Ridge Creek Watershed TMDL through the implementation of Best Management Practices.

Task 1: Grazing Management. Reduce fecal coliform loadings originating from grazing pastures. Because of the popularity of the Marginal Pastureland Continuous Conservation Reserve Program (CCRP) and the watershed being eighty three (83%) cropland, entire pastures were being enrolled in CCRP so rural water hookups, pipelines, tanks, and planned grazing systems were not needed. Those milestones were not met. Funds for these conservation practices were rolled into the Vermillion River Basin Implementation Project’s Riparian Area Management (RAM) practice.

The Conservation Reserve Program (CRP) was a widely accepted program in the Turkey Ridge Creek Watershed during the project period. Because of the CRP practice and payment structure many of the planned practices using EPA 319 grant funds were applied using the CRP program. A total of 1,202.9 acres in the watershed (1% of the watershed) were enrolled in CRP during the project implementation period (2005 – 2009). This has helped the project surpass milestones set for Pasture/Grassland Buffers. One of these areas can be seen in Figure 2.



Figure 2: CRP Riparian Buffer.

Thirteen percent (13%) of the Turkey Ridge Creek Watershed is pastureland. The overgrazed pastures are primarily located along the creek and livestock have direct access to the creek. Just over six percent (6%) of these acres were treated by total removal of livestock from Turkey Ridge Creek.

Products:	Planned	Completed
Grazing Systems	1,000 ac.	662 ac.
Fencing	30,000 lf	25,240 lf.
Pipelines	15,000 lf	0
Tanks	9	0
Rural Water hookups	9	0
Pasture/Grassland Buffers	100 ac.	777.5 ac.

Task 2: Ag Waste Management. Reduce fecal coliform load originating from animal feeding operations.

The original Project Implementation Plan (PIP) included funds for the design and construction of eight (8) Animal Waste Management Systems and eight (8) Nutrient Management Plans for agricultural producers in the watershed.

Of the 45 feedlots (AFOs) rated above 50 by the AGNPS model, seven (7) have been addressed by implementation of BMPs to reduce feedlot runoff, or have had changes in usage that reduced the fecal coliform loads. Of these, three AFOs received Ag waste treatment systems; one is no longer in use, and one reduced livestock numbers by 4,000 head. Two AFO's were dropped from the list of rated feedlots after it was found that a containment system had already been constructed at the sites.

One of the systems completed with this project was a vegetated treatment area (VTA). This system can be seen in construction and completed in Figure 3-4. Another system that participated with this project for a feasibility of a holding pond system is on schedule to be constructing their system in the summer/fall of 2010. Part of this system can be seen in Figure 5.

Products:	Planned	Completed
Ag. Waste Systems		
Feasibility	8	8
Engineering Designs	8	5
System construction	8	3
Nutrient Management Plans	8	5



Figure 3: VTA system under construction 9/25/2008.



Figure 4: VTA system completed 9/17/2009.



Figure 5: Dairy operation AWMS to be completed in next segment of the project.

Objective 2: Provide assistance to local stakeholders to complete the development of a long term project implementation plan for Turkey Ridge Creek that identifies, quantifies, and schedules needed BMP implementation to restore Turkey Ridge Creek to full support status of all its designated beneficial uses.

Task 3: Plan Development. Develop a Project Implementation Plan that Fully Implements the Turkey Ridge TMDL.

This task was not totally completed due to the early termination of the project. Technical assistance was provided to Turner Conservation District to involve local stakeholders to implement the long term project implementation plan but it was never completed. The project coordinator provided information to Turner Conservation District and they in turn provided the same to the local, regional, and state stakeholders.

Products:	Planned	Completed
Planning/workgroup mtgs.	10	7

Objective 3: Provide BMP and project information to all watershed residents, landowners, and members of stakeholder organizations to inform them on project activities and BMP installation, and to maintain local support and involvement.

Task 4: Information and Education. Implement an Information and Education Campaign.

The project funded activities that provided information and education about the goals, objectives, progress, and best management practices that were being implemented. These were targeted to the general public, watershed property owners and agricultural producers. Outreach materials included press releases, demonstration sites, and information booths at public events including the Turner County Fair.

Project information was distributed in 8 of the Farm Service Agency newsletters from July 1, 2005 through June 30, 2007 to all producers in Turner Conservation District which included the vast majority of the watershed. Informational Presentations were presented by the Project Coordinator to watershed producers, a group of Animal Feeding Operators (AFO) at a demonstration site, local governmental and legislative group meetings, and the Vermillion River Basin Development District at their board meetings. There were two news articles prepared by Turner Conservation District each year and placed in all the local newspapers (seven different newspapers) to cover the entire watershed.

The Public was notified of opportunities to participate in the project through press releases, and newsletters. Meetings and other public forums were also used to inform and educate the public about the project. Audiences were advised of the project and its goals. These included watershed landowners and producers, sportsmen, and recreational users. Many of the customers of the project resulted from the Turner Conservation District board of supervisors meeting with the project coordinator and personally accompanying him to onsite livestock producer operations in their neighborhoods.

Products:	Planned	Completed
Outreach and Reports		
Newsletters	3	3
Informational meetings	2	2
News releases	3	4

Task 5: Reporting. Prepare GRTS and a final report for the project.

The Project Coordinator produced all required GRTS semi-annual and annual reports along with the Final Report as required.

Products:	Planned	Completed
Monitoring and Reports		
Mid-year Reports	3	3
Annual Reports	4	4
Final Report	1	1

EVALUATION OF PROJECT GOALS AND OBJECTIVES

PLANNED AND ACTUAL MILESTONES

Table 1. Planned Versus Completed Project Milestones.

Activity	Milestone	
	Planned	Completed
Objective 1 – Task 1		
Grazing Systems	1,000 ac.	662 ac.
Fencing	30,000 lf	25,240 lf.
Pipelines	15,000 lf	0
Tanks	9	0
Rural Water hookups	9	0
Pasture/Grassland Buffers	100 ac.	777.5 ac.
Objective 1 Task 2		
Ag. Waste Systems		
Feasibility	8	8
Engineering Designs	8	5
System construction	8	3
Nutrient Management Plans	8	5
Objective 2 – Task 3		
Implement PIP		
Planning/workgroup mtgs.	10	7
Objective 3 – Task 4		
Outreach and Reports		
Newsletters	3	3
Informational meetings	2	2
News releases	3	4
Objective 3 – Task 5		
Monitoring and Reports		
Mid-year Reports	3	3
Annual Reports	4	4
Final Report	1	1

SUPPLEMENTAL INFORMATION

BMP costs were based on the South Dakota NRCS Technical Committee's South Dakota Cost List docket which is updated each year by the NRCS. Cost share payments ranged from forty five percent (45%) to seventy five percent (75%) of the total practice cost. Producers receiving cost share payments were required to sign contracts which contained requirements and conditions to ensure that BMPs will be properly maintained over the life expectancy of the practices. Producer participation in this project was voluntary

MONITORING RESULTS

Monitoring and evaluation efforts involved all project tasks and evaluating the quality and effectiveness of the BMPs installed utilizing tools such as AnnAGNPS, RUSLE 2, and the STEPL programs. Feedlot assessments of loadings before and after installation of the waste storage facilities and buffers and riparian vegetation improvement resulting in reduced fecal coliform loading were all evaluated.

The Turner County Conservation District entered into an agreement to monitor the BMPs implemented by the project for the life span of the BMP.

All project activities were recorded on a state sponsored system called the Tracker. This system kept track of several aspects of the project which included the location of all BMPs implemented and their respective load reductions from STPL. The reductions for the project can be seen in Table 2, and the location for the BMPs can be seen in Figure 6.

Table 2: STEPL Load Reductions by BMP.

BMP Practice	N (Pounds)	P (Pounds)	Sed (Tons)
Grazing Management	2,330	601	404
Ag Waste/Nutrient Management	132,701	27,388	119
Total Reductions:	135,031	27,989	523

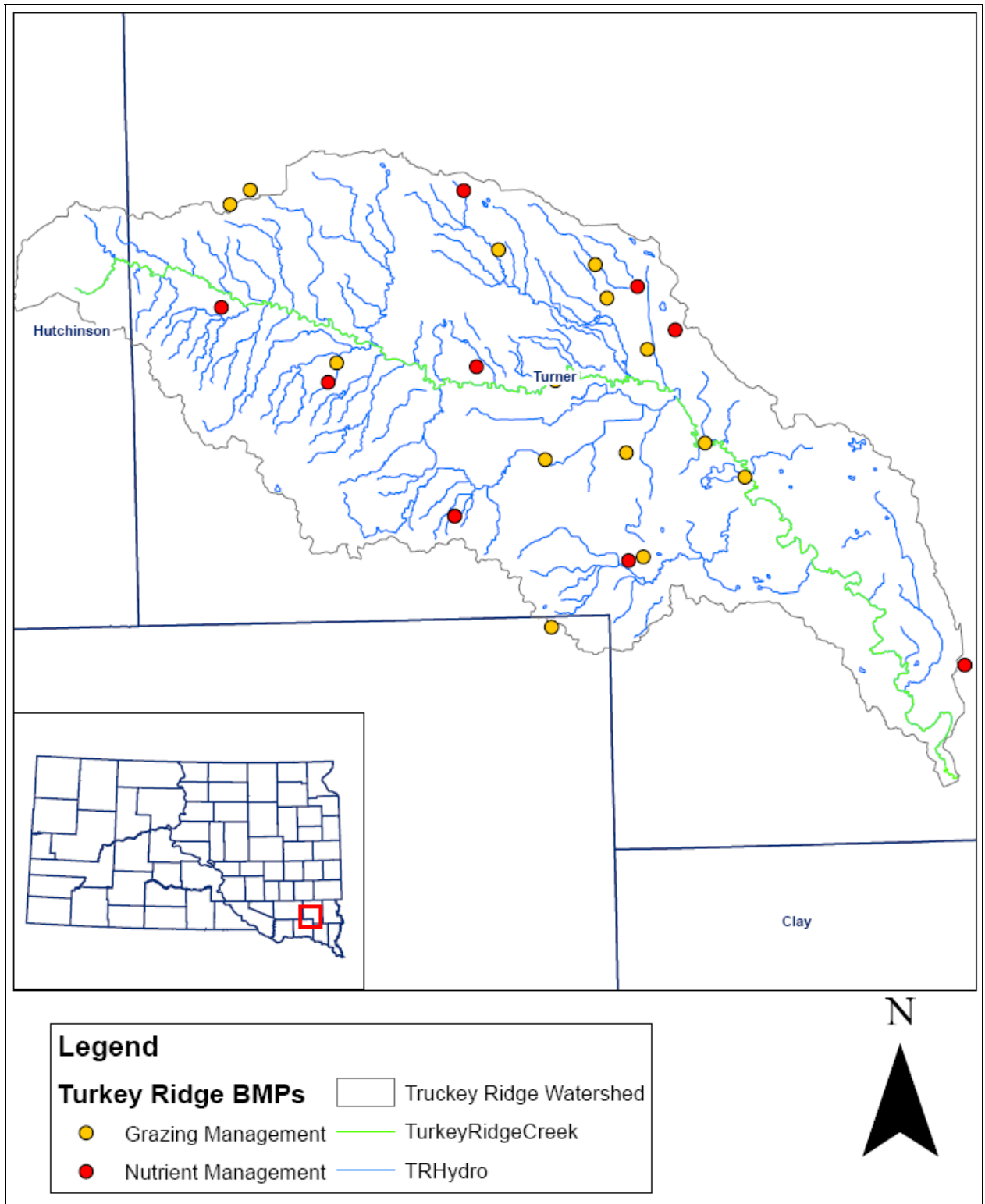


Figure 6: Location of BMPs Completed in the Watershed.

COORDINATION EFFORTS

The Turner Conservation District served as the project sponsor and also contributed funds. Numerous federal, state, and local agencies and organizations contributed funds, technical services, and cash and in kind match to attain the project goal (see Table 3). Participating agencies and their contributions to the project are summarized below.

Hutchinson and Yankton County Conservation Districts

The Hutchinson County and Yankton County Conservation Districts supported the project by allowing the Project Coordinator to disseminate information through their offices located in Parkston and Yankton, South Dakota. Both Conservation Districts were represented on the project planning committee.

South Dakota Consolidated Water Facilities Program

The Turner Conservation District obtained a Consolidated Water Facilities Construction Fund grant to provide cost-share funds for engineering services and AWMS construction.

South Dakota Department of Environment and Natural Resources

The South Dakota Department of Environment and Natural Resources (SD DENR) administered the U.S. EPA Section 319 grant and provided oversight of all project activities. Project administration included on-site office visits, watershed tours, review of reports, and approval of payment requests. The Project Coordinator attended training workshops and meetings sponsored by SD DENR.

United States Department of Agriculture – Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provided technical assistance for the design and installation of conservation practices. That NRCS staff included a soil conservationist and District Conservationist from the Parkston, Parker and Yankton, South Dakota Field offices, and a Resource Conservationist, Conservation Agronomist, and Resource Conservation and Development Coordinator from the Mitchell, South Dakota Service Center. In addition to personnel, the NRCS provided computer hardware and software to generate conservation plans, contracts, and maps. The project utilized the USDA Environmental Quality Incentives Program (EQIP), and Conservation Reserve Program (CRP) administered by the Farm Service Agency (FSA).

United States Department of Interior Fish and Wildlife Service

The USF&WS was provided their services for planned grazing systems and companion practices.

United States Environmental Protection Agency

The United States Environmental Protection Agency provided the EPA Section 319 grant, the primary funding source for the Implementation project administered by the South Dakota Department of Environment and Natural Resources. EPA officials from the Region 8 office Denver, Colorado, participated in one on-site project tour and review.

PUBLIC PARTICIPATION

The public was notified of opportunities to participate in the project through press releases, newsletters, meetings and other public events to inform and educate the public about the project. Examples of media used to inform the public are included in Appendix A, “News releases, newsletters, and public forums”. Audiences were advised of the project and its goals. These included watershed landowners, agricultural producers, lake shore property owners, sportsmen, and recreational lake users.

ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

The milestones for implementing eight animal nutrient management systems were not met as planned. This was caused by low public participation due to the poor prices being received for hogs, beef, and milk. A consolidated grant received from the state to help construct these systems was returned due to the grant expiring prior to construction of many systems. These goals of the Turkey Ridge Creek Project have been rolled into the Vermillion River Basin Implementation Project. It is believed that they will be constructed when Ag prices improve.

PROJECT BUDGET

Table 3: Turkey Ridge Creek Project Original and Actual Expenditures

Item	Original Budget by Funding Source							Actual Budget by Funding Source						
	319- EPA	CWSRF	USDA	Landowner	Turner CD	Consolidated	Total	319- EPA	CWSRF	USDA	Turner CD	Landowner	Consolidated	Total
Personnel Support														
Project Coordinator														
Salary and Benefits - ½ time	\$71,715						\$71,715	\$33,090.98						\$33,090.98
Administrative and Support	\$15,400				\$1,700		\$17,100	\$1,936.00			\$480.00			\$2,416.00
Equipment/Phone/FAX, and Supplies			\$19,950				\$19,950			\$185.72				\$185.72
Travel: Vehicle, Ins. Mileage, Lodging	\$39,000						\$39,000	\$4,225.49						\$4,225.49
Office Space (\$200/mo.)			\$10,800				\$10,800							
Internet Access (\$20/mo.)			\$1,080				\$1,080							
Objective 1: BMP's Installation														
Task 1: Grassland BMP installation														
Products: Grassland BMP's														
Planned Grazing Systems - 750 ac.														
Fencing 20,000 Lin. Ft. @ \$.85				\$12,250	\$8,500		\$20,750			\$4,935.00		\$4,935.00		\$9,870.00
Pipelines – 10,000 Lin. Ft. @ \$2.50			\$18,750				\$18,750			\$1,377.25		\$1,377.25		\$2,754.50
Tanks - 6 @ \$800 each			\$3,600	\$3,600			\$7,200							
Rural Water Hookup – 6 @ \$1500			\$6,750	\$6,750			\$13,500							
Stream Bank Protection			\$7,500	\$7,500			\$15,000			\$124,918.20				\$124,918.20
Task 2: Livestock Nutrient Management														
Product: Six (6) Ag Waste Systems														
Engineering Services - 6 @ \$15,000 each	\$66,625	\$2,000		\$28,500	\$2,150	\$14,725	\$114,000	\$6,148.69	\$1,871.10			\$1,741.23	\$567.00	\$10,328.02
System Construction - 6 @ \$100,000	\$327,400	\$128,000		\$187,500	\$13,200	\$93,900	\$750,000	\$195,297.50	\$33,128.90			\$162,949.79	\$11,541.50	\$402,917.69
Nutrient Management Plans – 6@ \$1550			\$9,225	\$3,075			\$12,300							
Objective 2: Implement PIP														
Task 3: PIP														
Planning/Work group mtgs. – 3@ \$1667			\$1,500	\$6,700	\$2,000		\$10,200			\$200.00	\$200.00			\$400.00
Objective 3: Outreach and Reporting														
Task 4:														
Newsletters - 3 @ \$400 each	\$1,800				600		\$2,400							
Information Meetings - 2 @ \$200 each	\$600				200		\$800				\$125.00			\$125.00
News Releases - 3 @ 50 each	\$150				150		\$300							
Totals:	\$522,690	\$130,000	\$79,155	\$255,875	\$28,500	\$108,625	\$1,124,845	\$240,698.66	\$35,000.00	\$131,616.17	\$805.00	\$171,003.27	\$12,108.50	\$591,231.60

FUTURE ACTIVITY RECOMMENDATIONS

During the project, the Conservation Reserve Program (CRP) most likely had the greatest effect on improving the water quality of Turkey Ridge Creek. Efforts should be maintained to keep the CRP acreages at or above the current program level. When the next general CRP signup is announced, all resource personnel should concentrate on areas identified by AGNPS as critical to enroll them into CRP.

In future projects, in regard to Animal Waste Systems, there should be a segment of the project where the coordinator would have time to get around in the watershed and meet and visit with the producers to find out the interest level of the producers in installing a system. Resource personnel should continue to work with producers having Animal Waste Systems designed but not completed during the project since this project area was incorporated into the Vermillion River Basin Watershed Project.