

SECTION 319 NONPOINT POLLUTION CONTROL PROGRAM  
WATERSHED PROJECT SEGMENT 1 FINAL REPORT

**VERMILLION RIVER BASIN WATERSHED  
IMPLEMENTATION PROJECT SEGMENT 1**

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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 # 9998185-06, 9998185-07, 9998185-08, 9998185-09, 9998185-10, and 9998185-11

## EXECUTIVE SUMMARY

**PROJECT TITLE:** Vermillion River Basin Watershed Project (Segment 1)

**PROJECT START DATE:** 18 June 2008

**PROJECT COMPLETION DATE:** 31 December 2012

### FUNDING:

|                          |            |                    |
|--------------------------|------------|--------------------|
| Section 319 Grants:      | 9998185-06 | \$192,088.22       |
|                          | 9998185-07 | \$15,350.60        |
|                          | 9998185-08 | \$117,255.82       |
|                          | 9998185-09 | \$100,000.00       |
|                          | 9998185-10 | \$172,546.70       |
|                          | 9998185-11 | <u>\$92,000.00</u> |
| Total Section 319 Grants |            | \$689,241.34       |

| <b>Funding Sources</b> | <b>Original<br/>Budget</b> | <b>Amount<br/>Used</b> |
|------------------------|----------------------------|------------------------|
| Section 319 Grants     | \$117,250.00               | \$689,241.34           |
| Consolidated           | \$0.00                     | \$65,000.00            |
| EQIP                   | \$1,875.00                 | \$369,115.70           |
| Local and In-Kind      | \$141,750.00               | \$900,151.60           |
| Other Federal          | <u>\$0.00</u>              | <u>\$9,633.00</u>      |
| <b>Totals:</b>         | <b>\$260,875.00</b>        | <b>\$2,033,141.64</b>  |

The project goal was to “Restore the beneficial uses of the Vermillion River through the implementation of Best Management Practices (BMPs) in the watershed that target sources of fecal coliform bacteria and suspended solids of the river”.

This project was the expansion of the locally planned Turkey Ridge Creek Watershed project. This project’s BMPs were based on impairment information identified during the Vermillion River Watershed Assessment. This project includes a Fecal Coli form TMDL and Total Suspended Solids TMDL in the Vermillion River. The proposed BMPs are based on impairment information identified during the Vermillion River Watershed Assessment. The final report and establishment of TMDL was completed during 2012.

During the assessment nearly 2,000 animal feeding areas were identified in the project area. Each were evaluated and assigned a priority ranking using the AGNPS Feedlot Rating Module. The animal feeding areas assigned ratings above 50 were subject to further evaluation. Later a new ranking was developed for a tier one list that addition information was gathered for during this project to further assist in targeting feedlot priorities.

The majority of the first years work was the completion of projects that were rolled over from the Turkey Ridge Creek Watershed Implementation Project. Information and Education efforts were carried out throughout the watershed using Information Pamphlets, News Releases, Presentations, and one on one contact with producers to continue informing the residents within the watershed of what was going

on within the Project. Some of the news releases and pamphlets can be found in appendix A of this report.

A total of 9 feasibility studies, 15 cultural resources reviews, and 9 waste storage facilities were designed and completed during this segment of the project. CRP practices installed consisted of 4,772.6 acres of native grass seeding, filter strips, riparian buffers, and grassed waterways. Nutrient Management plans were written for all 9 of the systems constructed with conservation tillage being adapted on 4662 acres by these operations to comply with the NRCS 590 standard for erosion.

Coordination of producer contacts, education, awareness, and local organizations will be necessary to facilitate ongoing implementation of projects in the Vermillion River Basin. This two year project was the first of several locally lead project segments planned to implement BMPs in the watershed.

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# INTRODUCTION

## Watershed Basin

The Vermillion River is formed by the confluence of the East and West Forks of the Vermillion River near Parker, South Dakota. The East Fork, approximately 103 miles long, rises in Lake Whitewood in Kingsbury County. The West Fork, approximately 108 miles long rises in Miner County. The combined river flows southward for 96 more miles and joins the Missouri River 5 miles South of Vermillion, South Dakota.

The TMDL watershed project area is shown in Figure 3 and 4. Major perennial tributaries to the Vermillion River include Ash Creek, drainage area of 22.7 sq. miles, Clay Creek, drainage area of 72.1 sq. miles, Frog Creek, drainage area of 28 sq. miles, Little Vermillion River, drainage area of 86.3 sq. miles, Spirit Mound Creek, drainage area of 22 sq. miles, and Turkey Ridge Creek with a drainage area of 175.7 sq. miles. The meandering nature of the river creates a diversity of aquatic habitats. Agriculture, specifically row crops and livestock feeding operations with mostly open feedlots is the main land use in the watershed.

**Table 1: Vermillion River and its Basin Features.**

| <b>Water body Name</b>                              | <b>Vermillion River and 6 impaired segments</b>      |
|-----------------------------------------------------|------------------------------------------------------|
| <b>Hydrologic Unit Code:</b>                        | 10170102 and 10170103                                |
| <b>Location:</b>                                    | S31-T110N-R54W To S5-T91N-R51W                       |
| <b>Water Quality Standards and Designated Uses:</b> | See Table 2 and Table 3                              |
| <b>Major Perennial Tributaries:</b>                 | Ash Creek, Clay Creek, Frog Creek, Little Vermillion |
|                                                     | River, Spirit Mound Creek, Turkey Ridge Creek        |
| <b>Receiving Water body:</b>                        | Missouri River                                       |
| <b>Stream Segment Length:</b>                       | 96 Miles                                             |
| <b>Watershed Area:</b>                              | 2673 Sq. Miles                                       |

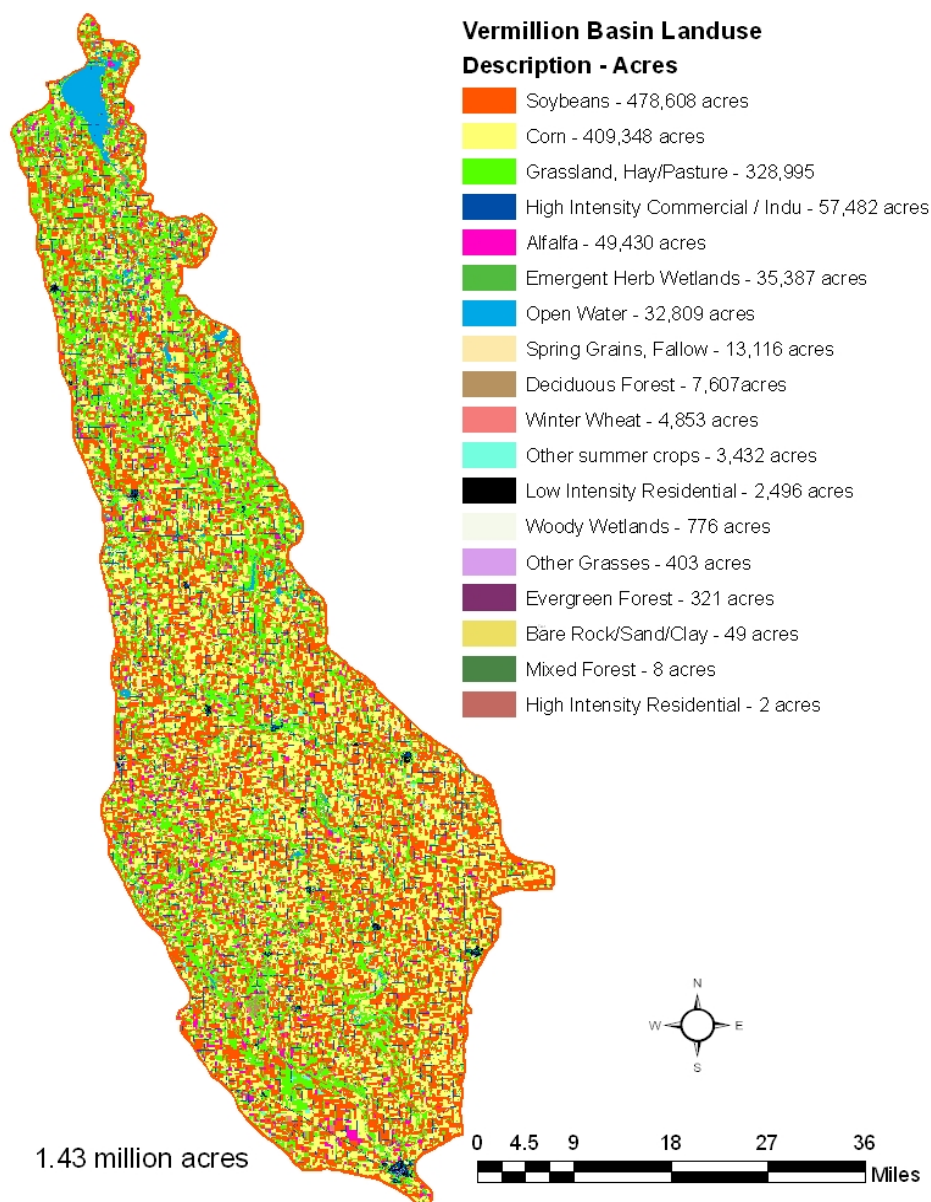
## Water Body Description

The Vermillion River drains approximately 1.43 million acres (2,233 Sq. Miles) covering portions of fourteen eastern South Dakota counties (Figure 3). The basin is about 150 miles north to south, and varies in width from 12 miles in the north to 36 in the south. Much of the lower 22 miles of the river is channelized.

An estimated 96 percent of the total surface area is devoted to agriculture (Figure 1). Cropland accounts for sixty-seven percent of the land use. The primary crops are corn, soybeans, alfalfa, and small grain. The basin has 330,000 acres (= 23 percent) of grasslands which are used primarily for livestock grazing. Grasslands are mostly concentrated on the steeper sloping lands adjacent to the Vermillion River and its tributaries.

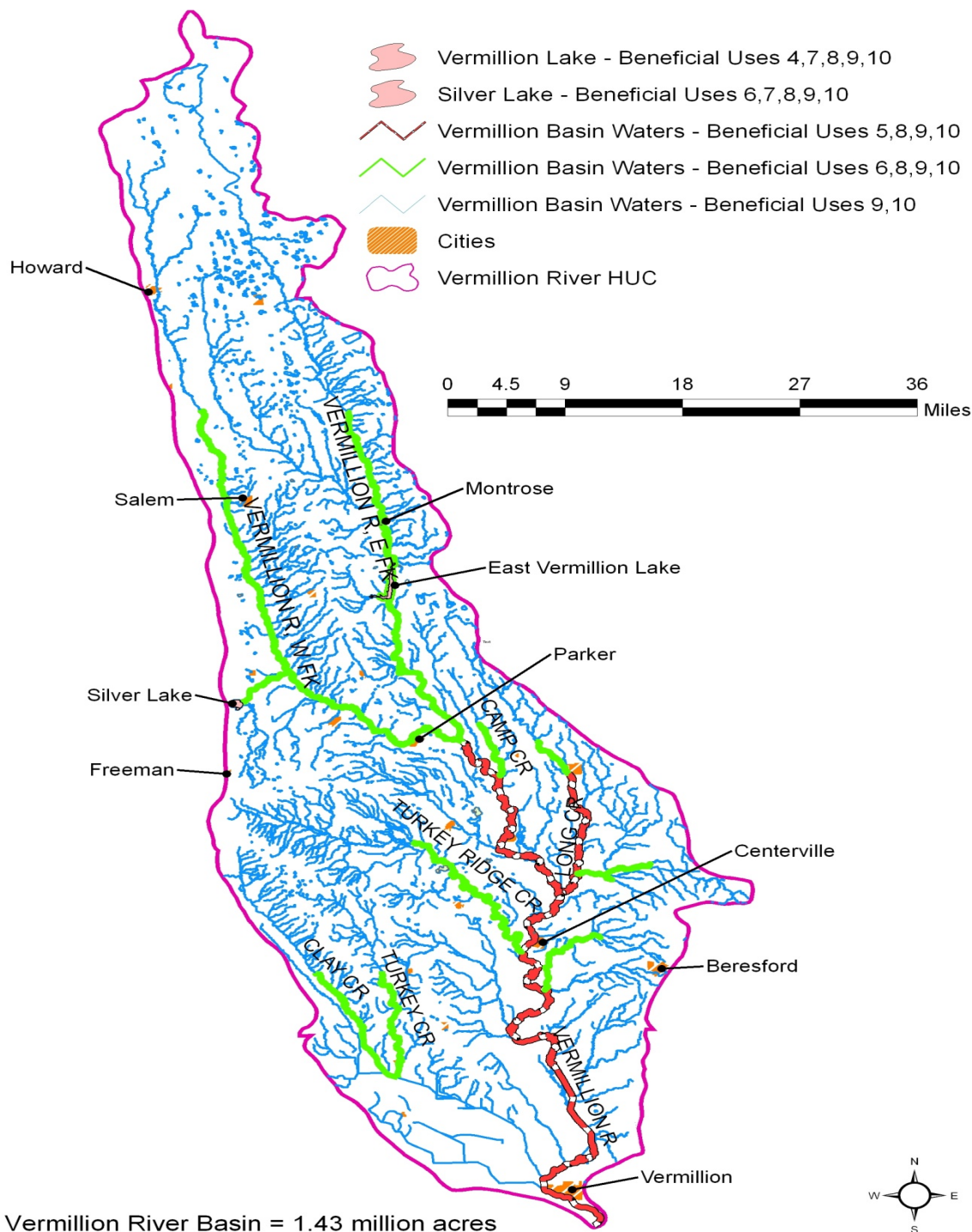
Wetlands in the watershed comprise 2 to 3 percent of the project area and include small potholes, many of which have been drained, and other larger semi-permanent wetlands in addition to Swan Lake and Silver Lake. Wildlife that inhabit the area include Whitetail Deer, Coyotes, Red Fox, Mountain Lion, Beaver, Raccoons, Wild Turkey, Ring-Necked Pheasants, and numerous other song birds, reptiles, waterfowl, and amphibians. The average annual precipitation in the Vermillion River Basin ranges from 22 to 26 inches. Approximately 74 percent of the precipitation is received in the form of rain during the months of April through September. Summer temperatures average about 69.8 degrees F; while the winter temperatures, about 22 degrees F. Tornadoes and severe thunderstorms strike occasionally. These storms are local and of short duration, and occasionally produce heavy rainfall events. The average annual snowfall is 30 inches (USDA, 1977). During the course of the watershed assessment, the Vermillion River had a constant flow, including the 2002 through 2003 drought, even though the majority of the discharge to the river occurs during the spring snow melt and after heavy rainfall events.

**Figure 1: Vermillion River Basin Land Uses.**



The Vermillion River watershed area starts at the overflow from Lake Whitewood in East Central Kingsbury County and extends to the mouth at the Missouri River South of Vermillion, South Dakota in Clay County. A large percentage of the project area is dominated by a rolling landscape used for row crop farming and livestock operations. The Southern edge of the project area is the Missouri River floodplain dominated by row crop farming. The Vermillion River watershed area is comprised of 1,430,000 acres which is 67% cropland, 23% grasslands and residential and built up land (Figure 1).

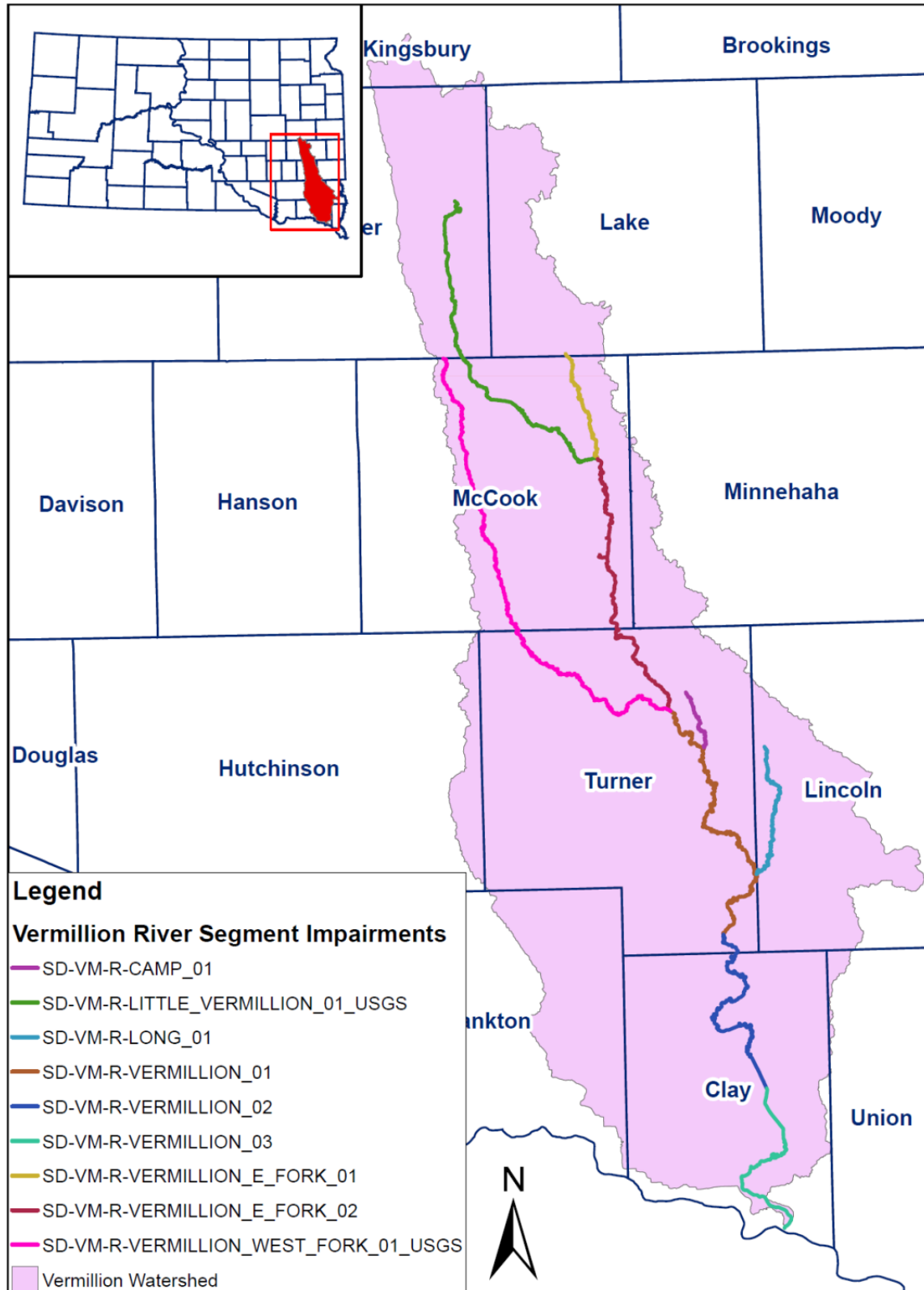
**Figure 2: Vermillion River Beneficial Use Map**





The Vermillion River Basin Implementation Project is divided into nine river reaches from Whitewood Lake to the mouth near Vermillion, SD. Figure 3 shows the location of these nine reaches, and Table 2 list each of segments beneficial uses and impairments.

**Figure 3: Vermillion River Basin Segments for TMDL**



**Table 2: Beneficial Uses and Impairments for Targeted Project Water Bodies.**

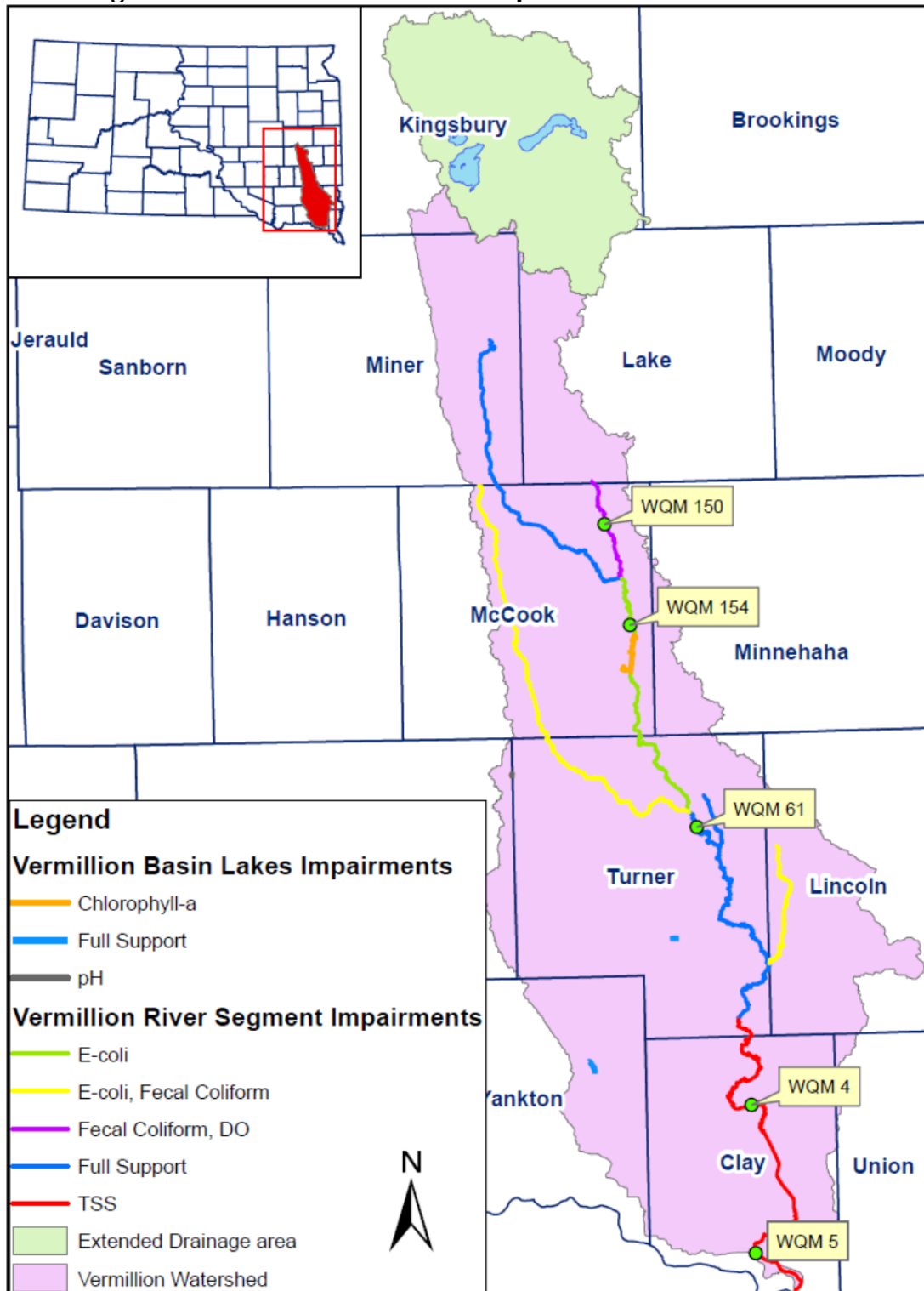
| <b>Vermillion River/Streams</b>                                   | <b>From</b>                      | <b>To</b>                     | <b>Beneficial Uses</b> | <b>Impaired Uses</b> | <b>Impairment Cause</b> |
|-------------------------------------------------------------------|----------------------------------|-------------------------------|------------------------|----------------------|-------------------------|
| Vermillion River (SD-VM-R-Vermillion_03)                          | Missouri River                   | Baptist Creek                 | 5, 8, 9, 10            | 5                    | TSS                     |
| Vermillion River (SD-VM-R-Vermillion_02)                          | Baptist Creek                    | Turkey Ridge Creek            | 5,8,9,10               | 5                    | TSS                     |
| Vermillion River (SD-VM-R-Vermillion_01)                          | Turkey Ridge Creek               | Headwaters                    | 5,8,9,10               |                      |                         |
| West Fork Vermillion River (SD-VM-R-Vermillion_West_Fork_01_USGS) | West Vermillion River Headwaters | Near Parker, SD.              | 6, 8, 9, 10            | 8                    | E-coli                  |
| East Fork Vermillion River (SD-VM-R-Vermillion_E_Fork_02)         | Mouth with West Fork             | Little Vermillion River Mouth | 6,8,9,10               | 8                    | E-coli                  |
| East Fork Vermillion River (SD-VM-R-Vermillion_E_Fork_01)         | Little Vermillion Mouth          | McCook County Line            | 6,8,9,10               | 8                    | Fecal, DO               |
| Little Vermillion River (SD-VM-R-Little_Vermillion_01_USGS)       | Headwaters                       | Near Salem, McCook County     | 9,10                   | 8                    | E-coli                  |
| Camp Creek (SD-VM-R-Camp_01)                                      | Section 56, T99N, R52W           | Vermillion River              | 6,8,9,10               |                      |                         |
| Long Creek (SD-VM-R-Long_01)                                      | Highway 44, Lincoln Co.          | Vermillion River              | 6,8,9,10               | 8                    | Fecal, E-coli           |
| <b>Lakes: Vermillion Watershed</b>                                |                                  |                               |                        |                      |                         |
| East Vermillion Lake (SD-VM-L-E_Vermillion_01)                    | McCook Co.                       |                               | 4, 7, 8, 9             | 4,7,8,9              | Chlorophyll-a           |
| Lake Henry (SD-VM-L-Henry_01)                                     | Kingsbury Co.                    |                               | 6, 7, 8, 9             |                      |                         |
| Marindahl Lake (SD-VM-L-Marindahl_01)                             | Yankton Co.                      |                               | 4, 7, 8, 9             |                      |                         |
| Silver Lake Creek (SD-VM-L-Silver_01)                             | Hutchinson Co.                   |                               | 6, 7,8,9               | 6                    | pH (high)               |
| Swan Lake (SD-VM-L-Swan_01)                                       | Turner Co.                       |                               | 5,7,8,9                |                      |                         |
| Lake Thompson (SD-VM-L-Thopson_01)                                | Kingsbury Co.                    |                               | 4, 7, 8, 9             |                      |                         |
| Whitewood Lake (SD-VM-L-Whitewood_01)                             | Kingsbury Co.                    |                               | 6, 7, 8, 9             |                      |                         |
| North Island Lake                                                 | Minnehaha Co.                    |                               | 5,7,8,9                |                      |                         |

Numerical Key to Beneficial Uses listed in Table 2:

- (1) Domestic water supply waters;
- (2) Coldwater permanent fish life propagation waters;
- (3) Coldwater marginal fish life propagation waters;
- (4) Warm water permanent fish life propagation waters;
- (5) Warm water semi-permanent fish life propagation waters;
- (6) Warm water marginal fish life propagation waters;
- (7) Immersion recreation waters;
- (8) Limited contact recreation waters;
- (9) Fish and wildlife propagation, recreation, and stock watering waters;
- (10) Irrigation waters; and
- (11) Commerce and industry waters.

There is a difference of 74,000 acres between the TMDL watershed and the implementation project watershed because of the shared area of the Kingsbury Lakes Project. Since the Kingsbury Lakes Project addressed the overlapping land in its implementation project it was not included in the Vermillion River Basin Implementation Project. BMPs completed in this area after the completion of the Kingsbury Implementation project were still tracked for this project. The Extended Drainage Area in Figure 4 shows the Kingsbury Lakes Project portion of the Vermillion basin.

**Figure 4: Vermillion River Basin Impairments**



## Nonpoint Source Pollutants

The load reduction goals for TMDLs of several segments are listed in Table 3. The TMDLs are categorized by flow regimes. The flow for each reach segment will be different, but represent the described regime.

**Table 3: Vermillion River Basin Implementation Project TMDL Reaches Reductions Needed.**

|                               | Flow Regimes |         |            |         |           |         |          |         |          |         |
|-------------------------------|--------------|---------|------------|---------|-----------|---------|----------|---------|----------|---------|
| Fecal/E-coli TMDLS Segments   | Extreme      |         | High Range |         | Mid Range |         | Low      |         | Dry      |         |
|                               | CFUs/day     | Percent | CFUs/day   | Percent | CFUs/day  | Percent | CFUs/day | Percent | CFUs/day | Percent |
| Long Creek                    | 5.78E+13     | 90.1%   | 3.40E+13   | 97.3%   | 2.47      | 38.4%   | 0        | 0.0%    | 0        | 0.0%    |
| West Fork Vermillion River    | 0            | 0.0%    | 2.10E+11   | 12.4%   | 0         | 0.0%    | 1.77E+10 | 52.3%   | 0        | 0.0%    |
| East Fork Vermillion River-01 | 0            | 0.0%    | 0          | 0.0%    | 1.32E+13  | 93.8%   | 2.35E+13 | 98.7%   | 1.39E+11 | 67.5%   |
| TSS TMDL Segments             | Extreme      |         | High Range |         | Mid Range |         | Low      |         | Dry      |         |
|                               | t/day        | Percent | t/day      | Percent | t/day     | Percent | t/day    | Percent | t/day    | Percent |
| Vermillion River-02           | 35.82        | 8.7%    | 14.83      | 21.2%   | 0         | 0.0%    | 0        | 0.0%    | 0        | 0.0%    |
| Vermillion River-03           | 900.98       | 59.0%   | 91.02      | 53.0%   | 0         | 0.0%    | 0        | 0.0%    | 0        | 0.0%    |

The most likely sources of the impairments were identified as runoff from:

- Confined animal feedlots
- Feeding areas in close proximity to drainages
- Grazing livestock standing in, crossing, or heavily grazed riparian areas
- Improper application and handling of manure
- Intense row cropping practices

This project was developed to plan and install BMPs designed to reduce loading into the Vermillion River. The list of BMPs included:

- Animal waste management system feasibility studies
- Animal waste management system designs
- Nutrient management plans
- Conservation Tillage
- Cropland BMPs
- Grazing -Management
- Riparian Restoration

During the assessment 2,000 plus animal feeding areas were identified in the project area. Each has been evaluated and assigned a priority ranking, using the AGNPS feedlot Rating Module. Geographic Information System Arc-Map was used to further refine the list of operations to target those on or near the major tributaries in the watershed. This generated a “Tier One” listing that is to be used as a “look here first” starting point for determining producers to visit with about the project.

Cost-share funds for installing the practices were provided by the United States Environmental Protection Agency (U.S.EPS) Section 319 Nonpoint Source Pollution Control Grant, the United States Department of Agriculture (USDA) Continuous Conservation Reserve Program (CCRP) and the Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP), SD Coordinated Soil and Water Grant (SDCWSRF).

Watershed awareness was also accomplished by information and education (I&E) activities during the project. News articles, newsletters, posters, information pamphlets, and public meetings were used to inform producers about the project and how it could help them with future BMP planning.

## **PROJECT GOALS, OBJECTIVES, TASKS, AND ACTIVITIES**

**Objective 1: Provide assistance to local stakeholders to complete a long term project implementation plan for the Vermillion River Basin Watershed that identifies, quantifies, and schedules needed BMP implementation to restore the Vermillion River to full support status of all its beneficial uses.**

**Task 1: Develop a project implementation plan for the Vermillion River Basin.**

**Product 1:** Implementation plan for the Vermillion River Basin.

The McCook Conservation District will involve local stakeholders in the development of the implementation plan for the Vermillion River Basin. A steering committee made up of local, state, and Federal partners will advise and assist McCook Conservation District with management of the Vermillion River Basin Watershed Project. The steering committee will:

- be formed during the first year of the project
- provide input into the development of a strategic plan for future project segments, a practice manual that will establish priorities for BMP implementation, and a work plan for the second project segment. A memorandum of understanding that defines the responsibilities and obligations of each district in the support and execution of the project will be entered into between the conservation districts and other
- project partners. The project coordinator will provide assistance to the McCook Conservation District to keep the local, regional, and state stakeholders in the project implementation plan informed and updated through personal contacts, and planning and steering committee meetings. The cost to complete the implementation plan will primarily be salary costs of project staff and stakeholders, and is included in personnel costs.

**Milestones:**

Steering committee/planning group meetings - 3  
Practice Manual - 1  
Memoranda of Understanding -11  
Project segment 2 PIP - 1

**Accomplishments:** A steering committee/planning group was formed by having a representative from each of the Conservation Districts and one member of NRCS staffs servicing these Conservation Districts. There were four meetings held during this segment of the project. The first meeting was to help the board become aware of their duties and what was happening within the project. The second meeting was to review the BMPs being implemented and to add any if the board felt it was necessary. The board decided to add the Riparian Area -Management (RAM) program. The third meeting was to tour some Ag. Waste facilities so the Board members knew how they function and their effectiveness in improving the water quality of the Vermillion River. The RAM applications were reviewed and ranked at the fourth meeting. Of the 17 applications requesting \$158,611.50, only one was accepted. After being accepted, the operator decided to not participate so no RAM program applications were implemented during this project segment.

A practice manual was not drafted during this segment of the project due to the fact the NRCS list of practices, installation guidelines, standards and specifications are so extensive and refined that these were adopted as the manual.

A formal agreement between the 11 Conservation Districts within the TMDL watershed was signed with McCook Conservation District being the lead project sponsor. The agreement was made with the intent to cooperatively assist the project through working relationships they had already created with the producers within the watershed.

During segment 1 of this project, a Project Implementation Proposal was completed and approved by the SD DENR for the extension of the project and for a segment 2 continuation of the project. The Vermillion River Basin Watershed Project Segment 2 started May 15, 2012.

**Objective 2: Install best management practices in critical areas to reduce sediment, nutrient, and fecal coliform bacteria loading to the Vermillion River.**

It is anticipated that the suite of BMPs selected to implement the recommendations contained in the completed report and TMDLs and experience with producer acceptance of the practices during the early stages of the projects will require revisiting the practices offered in subsequent project applications.

**Task 2: Cropland Management BMPs.**

Provide technical assistance to landowners for the installation of BMPs on 2,500 acres of cropland to reduce sediment and nutrient loads from critical areas identified during the watershed assessment. The BMPs are expected to include but are not limited to filter strips, grassed waterways, conservation tillage, grass seeding, terraces, and wetland restoration.

**Product 2:** Implementation of 2,100 acres of Conservation Tillage on Cropland.

Technical assistance for the adoption of conservation tillage, no-till, reduced-till, etc., will be provided to landowners through educational and outreach activities. The assistance will be provided by the

project coordinator in partnership with NRCS, SDSU Cooperative Extension Service, farmers in the area who have adopted the practice, and conservation district staff.

| <b>Milestones:</b>   | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
|----------------------|-----------------------|-------------------------|
| Conservation Tillage | 2,100 Ac.             | 4,662 Ac.               |

**Accomplishment:** Conservation tillage has been implemented by several producers on 4,662 acres of cropland. Tillage operations were converted from conventional and minimum tillage to minimum and no-till and/or a conservation crop rotation.

**Product 3:** Establish perennial vegetation on 350 acres of cropland.

Technical and financial assistance will be provided to landowners to establish permanent vegetative cover by seeding erodible cropland to a grass-alfalfa mix; native grass seed mix; an introduced grass seed mix; or a mixture of native grasses and forbs. Funding for BMP installation will be provided by state and federal wildlife conservation agency programs, state conservation programs, and USDA conservation programs such as EQIP, WHIP, and CRP.

| <b>Milestones:</b>                 | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
|------------------------------------|-----------------------|-------------------------|
| Grasslands established on cropland | 350 Ac.               | 2,364.2 Ac.             |

**Accomplishment:** Technical assistance was provided to multiple producers with CRP contracts for establishment of native grasses. This resulted in enrolment of 2,364.2 acres.

**Product 4:** Establish 25 acres of filter strips and 27,000 LF (25 acres) of grassed waterways on cropland.

BMPs installed will be funded by the landowner, USDA conservation programs (EQIP) and by state conservation programs.

| <b>Milestones:</b> | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
|--------------------|-----------------------|-------------------------|
| Filter Strips      | 25 Ac.                | 1,479.1 Ac.             |
| Grassed Waterways  | 25 Ac.                | 512 Ac.                 |

**Accomplishment:** Technical assistance and conservation planning assistance were provided to producers wanting to apply filter strips and grassed waterways using the Continuous Conservation Reserve Program (CCRP).

**Task 3: Provide assistance to landowners for the installation of BMPs on 1,500 acres of grassland to reduce fecal coliform bacteria, nutrient, and sediment loading through reduced water runoff, and improve stream bank and riparian area vegetation.**

BMPs planned include but are not limited to planned/rotational grazing systems, riparian management, riparian buffers, riparian land use agreements, and stream bank/shoreline stabilization.

**Product 5:** Provide assistance to landowners to plan and install 1,000 acres planned/rotational grazing systems.

The implementation of rotational grazing systems on grasslands requires the installation of practices that support the landowner grazing management changes which include water development (pipelines, tanks, rural water hook-ups, wells, ponds, etc.) and fencing. Technical assistance for planning will be requested from the SD Grassland Planning and Implementation Project and NRCS Field Offices. Practices installed will be funded by the landowner with financial assistance from South Dakota and Federal conservation and wildlife programs such as Soil and Water Conservation Grants, Partners for Wildlife programs, and USDA conservation programs such as EQIP.

|                            |                       |                         |
|----------------------------|-----------------------|-------------------------|
| <b>Milestones:</b>         | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
| Rotational Grazing Systems | 1,000 Ac.             | 4,405 Ac.               |

**Accomplishment:** The rotational grazing systems installed during this segment varied by system. Some were existing pastures that just needed a dependable water source for each pasture, some applied cross fencing, pipelines and tanks, and a rural water hook-up, some did not need any additional practices but just started the management part by not allowing the livestock to graze all the pastures all the time.

This BMP was applied using CCRP and EQIP acres. As a rule, the northern portion of the watershed is responsible for the larger acreages using EQIP. The CCRP acres are more scattered throughout the watershed. Livestock producers are finding that this is the best way to get more pounds of beef per acre.

**Product 6:** Provide assistance to landowners for the installation of 500 acres of riparian BMPs to reduce sediment and nutrient loading that result from livestock grazing in riparian areas.

The implementation of grassland management systems requires the installation of practices that support landowner grazing management change. The practices include stream bank stabilization, livestock water developments (pipelines, tanks, rural water hook-ups, wells, ponds, etc.), stream crossings, livestock exclusion, and fencing. Technical assistance for BMP installation will be requested from the SD Grassland Planning and Implementation Project and NRCS Field Offices. Practices installed will be funded by the landowner with financial assistance from South Dakota and Federal conservation and wildlife programs such as Soil and Water Conservation Grants, the Partners for Wildlife programs, and USDA conservation programs such as EQIP and CCRP.

|                                      |                       |                         |
|--------------------------------------|-----------------------|-------------------------|
| <b>Milestones:</b>                   | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
| Riparian Restoration Grazing Systems | 500 Ac.               | 204 Ac.                 |

**Accomplishment:** The Riparian Buffers installed were all applied using the CCRP throughout the watershed even though the RAM program is available to add additional acres to the producer. Initially the RAM program had a lot of interest but with the reduction of acres eligible the BMP has not had a single applicant since early in segment 1. In order to participate in the RAM program, the producers land had to be on an impaired reach, or within 2 miles of one for full funding and within 5 miles for partial funding. In the first round (and only round) there was 17 applicants, of which six qualified for participation in the program, and only one of them was eligible for full funding. None of the six producers accepted offers made by the project, and no producers applied for the program since.

There is still interest in CCRP especially where operators have gotten out of or are planning to get out of the cattle business. In Figure 5 is an example of a riparian grazing buffer. This shows a sharp difference in buffering by fencing out the creek.



**Figure 5: Riparian Buffer and Fence Line Grazing Contrast**



**Task 4: Provide assistance to landowners to complete three animal waste feasibility studies and three animal waste management system designs for installing systems that reduce fecal coliform, nutrient loading, and complement the producer’s operational needs.**

**Product 7:** Complete five feasibility studies which include preliminary site assessment and geological review, conceptual plan and preliminary cost opinion, work plan, soils and topographic studies, and designs for five Ag Waste Management Systems (AWMS).

Assistance will be provided using the services of private consultants and/or the Ag Nutrient Management Team. The assistance providers will complete feasibility studies that provide alternative systems to include a cost estimate for each alternative. The alternative selected by the landowner will have a system design completed. Funding for feasibility studies/designs will be from this project and the landowner.

| <b>Milestones: Waste Storage Facilities</b> | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
|---------------------------------------------|-----------------------|-------------------------|
| Feasibility Studies                         | 5                     | 13                      |
| Designs                                     | 5                     | 9                       |
| Constructed                                 | 4                     | 9                       |

**Accomplishment:** Thirteen (13) Animal waste storage feasibility studies, nine (9) designs, and nine (9) animal waste storage facilities were completed during this segment of the project. There was enough interest in Animal Waste Systems that financial assistance monies had to be moved around within the project to allow the project to assist these producers. All of these systems also had cultural resources studies and nutrient management plans completed. Table 4 lists system types and distance to the nearness water body. Two systems that were started in this segment were completed in the second segment of this project.

**Table 4: Feedlot Information.**

| Feedlot Type                       | Animal        |        | Distance to Water Network |
|------------------------------------|---------------|--------|---------------------------|
|                                    | Type          | Number |                           |
| Open Feedlot                       | beef          | 475    | <100 ft.                  |
| Open Feedlot                       | beef          | 999    | 3.5 miles                 |
| Open Feedlot                       | beef          | 999    |                           |
| Monoslope Barn/VTA                 | beef          | 999    | <100 ft.                  |
| Barn                               | Feeder Pigs   | 1,020  | 0.5 miles                 |
| Barn/VTA                           | Dairy heifers | 300    | 330 ft.                   |
| Open Feedlot/Clean Water Diversion | Dairy cows    | 500    | 1.5 miles                 |
| Two barns                          | Turkey        | 45,000 | 1.75 miles.               |

**Figure 6: Established Feedlot VTA**





**Figure 7: Completed Open Lot Sediment Basin and Pond**



**Figure 8: Completed Hoop Barn**



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

**Task 5: Complete an outreach and information campaign.**

**Products 8:** Outreach/information campaign.

Assistance will be provided to the McCook Conservation District and project partners to develop and implement an outreach/information campaign that informs project residents of opportunities for involvement in and progress of the project.

| <u>Milestones:</u>     | <u>Planned</u> | <u>Completed</u> |
|------------------------|----------------|------------------|
| Newsletters            | 5              | 2                |
| Press Releases         | 4              | 7                |
| Meetings and Workshops | 5              | 6                |
| Presentations          | 3              | 5                |

**Figure 9: Information and Education Display Setup at Conference**



**Accomplishments:** During segment 1 two newsletters were prepared and sent to each Conservation District for publishing in their local newspaper and/or the FSA newsletter. Information presentations were made at the Clay Rural Water System annual meeting, County Fairs, Schools, and the Vermillion Basin Water Development District annual meetings. Two editions of an information pamphlet were printed and distributed to all Conservation Districts in the watershed for distribution to producers in the watershed within their respective Conservation Districts.

The pamphlets, along with other outreach information, are attached to this report in Appendix A.

**Objective 4: Monitor, evaluate and report project progress.**

**Task 6: Prepare and submit reports using the prescribed format(s) as required by the project sponsor and partners.**

**Products 9:** Semi-annual, annual, monthly and final project reports.

| <b>Milestones:</b>  | <b><u>Planned</u></b> | <b><u>Completed</u></b> |
|---------------------|-----------------------|-------------------------|
| Semi-annual reports | 2                     | 3                       |
| Monthly reports     | 24                    | 24                      |
| Final Report        | 1                     | 1                       |

**Final Report:**

The final report was prepared following a format provided by DENR and includes a narrative summary of progress towards reaching project objectives to improve water quality in the Vermillion River Basin Watershed, milestone and budget comparisons pictures of project activities, and maps showing the locations of completed BMPs. Annualized AGNPS, STEPL, RUSLE2, and GIS will be used to show estimated project load reduction accomplishments, and current land use status in the watershed.

**Accomplishments:** With the completion of this Final Report all reports have been completed and submitted for Segment 1 of the Vermillion River Basin Watershed Implementation Project. Table 5 is a summary of all project milestones for Segment 1.

## Summary of Project Goals and Objectives

**Table 5: Planned Versus Completed Project Milestones.**

| OBJECTIVES/TASKS/PRODUCTS                                       | PLANNED MILESTONES | COMPLETED MILESTONES |
|-----------------------------------------------------------------|--------------------|----------------------|
| <b>OBJECTIVE 1: Project Implementation Plan Development</b>     |                    |                      |
| Task 1: PIP Development                                         |                    |                      |
| Product 1: Project, Extension, and Segment 2 PIP                | 2                  | 3                    |
| Steering Committee Meetings                                     | 3                  | 4                    |
| Practice Manual                                                 | 1                  | 0                    |
| Memorandums of Understanding                                    | 11                 | 11                   |
| <b>OBJECTIVE 2: BMP Implementation:</b>                         |                    |                      |
| Task 2: Cropland BMPs (2500 Ac.)                                |                    |                      |
| Product 2: Conservation Tillage                                 | 2,100 Ac.          | 4,662 Ac.            |
| Product 3: Seeding                                              | 350 Ac.            | 2,364.2 Ac.          |
| Product 4: Filter Strips/Grassed Waterways                      | 50 Ac.             | 1991.1 Ac.           |
| Task 3: Grassland BMPs (1500 Ac.)                               |                    |                      |
| Product 5: Rotational Grazing Systems                           | 1000 Ac.           | 4,405 Ac.            |
| Product 6: Riparian Rotational Grazing Systems                  | 500 Ac.            | 204 Ac.              |
| Task 4: Animal Waste -Management Systems                        |                    |                      |
| Product 7: Feasibility Studies/Preliminary Designs/Construction | 3                  | 9                    |
| <b>OBJECTIVE 3: Information Outreach</b>                        |                    |                      |
| Task 5: Information Campaign                                    |                    |                      |
| Product 8:                                                      |                    |                      |
| - Website Maintenance                                           | 1                  | 1                    |
| - Newsletter                                                    | 3                  | 2                    |
| - Presentations                                                 | 2                  | 5                    |
| - Press Releases                                                | 3                  | 7                    |
| <b>OBJECTIVE 4: Project Reports</b>                             |                    |                      |
| Task 6: Semi-annual, annual, final, and monthly reports         |                    |                      |
| Product 9: Reports                                              |                    |                      |
| Semi-annual reports                                             | 4                  | 0                    |
| Annual report                                                   | 2                  | 4                    |
| Final report                                                    | 1                  | 1                    |
| Monthly Reports                                                 | 24                 | 24                   |

## MONITORING RESULTS

Stream water quality monitoring for the Vermillion River was completed through SD DENR's ambient water quality monitoring stations throughout the river basin. Results for the two stream segments impaired for Total Suspended Solids are shown in the two tables below. Other sites that were monitored throughout the watershed for E-coli/Fecal did not have significant samples taken since the completion of the assessments segments were completed, and therefore not shown here.

**Table 6: Vermillion River-02 TSS TMDL vs Monitoring Samples (tons/year).**

| Flow Regime        | Extreme | High  | Mid  | Low  |
|--------------------|---------|-------|------|------|
| TMDL               | 378.5   | 55.2  | 19.8 | 7.6  |
| Samples Assessment | 414.3   | 70.0  | 13.3 | 3.8  |
| Samples 2008-2012  | 523.6   | 139.7 | 5.7  | 7.6  |
| Reductions         | -109.3  | -69.7 | 7.6  | -3.8 |

**Table 7: Vermillion River-03 TSS TMDL vs Monitoring Samples (tons/year).**

| Flow Regime        | Extreme | High  | Mid   | Low  |
|--------------------|---------|-------|-------|------|
| TMDL               | 626.6   | 80.7  | 31    | 13.9 |
| Assessment Samples | 1527.6  | 171.7 | 26.3  | 7.6  |
| Samples 2008-2012  | 806.4   | 198.4 | 39.1  | 5.5  |
| Reductions         | 721.2   | -26.7 | -12.8 | 2.1  |

The red negative amounts in Table 6 and 7 represent an increase in load for the given flow regime. This shows sedimentation has increased in some flow regimes and decreased in others for both segments. This doesn't mean the BMPs that were installed with assistance from this project failed, but could need more time before results can be seen in the water monitoring samples, or conditions in other areas may have changed. Typically it will take a few to several years for BMPs to take full effect.

Evaluation tools were utilized to measure reductions of non-point sources of pollution for the various BMPs implemented. Models such as AnnAGNPS and STEPL were used to measure the effectiveness of the BMPs and capture load reductions in relation to location in the watershed.

The AnnAGNPS model gives a prediction of a load that will be seen at selected points in a watershed. An AnnAGNPS model was created for the Vermillion Basin, not including the extended area seen in Figure 10. It was calibrated to the water load and sediment load near the outlet for the assessment years of 2005-2006. The results were then compared to different locations in the watershed that were sampled during the assessments.

**Table 8: WQM Samples vs AGNPS Predictions for 2005-2006**

| WQM Sample Site | Sediment Loading |        | P Loads   |           | N loads   |           |
|-----------------|------------------|--------|-----------|-----------|-----------|-----------|
|                 | Samples          | AGNPS  | Samples   | ANPS      | Samples   | ANPS      |
| 5               | 67,956           | 69,520 | 349,874.0 | 377,472.7 | 807,803.8 | 790,746.6 |
| 4               | 54,051           | 49,892 | 345,651.0 | 332,505.4 | 748,102.8 | 710,907.5 |
| 61              | 12,055           | 18,343 | 131,337.1 | 127,070.1 | 277,965.1 | 300,143.3 |
| 154             | 11,322           | 15,057 |           |           |           |           |
| 150             | 3,809            | 6,433  |           |           |           |           |



Table 8 shows the results of Sediment, Phosphorus (P), and Nitrogen (N) loadings for Water Quality Monitoring (WQM) sites vs loadings predicted by AGNPS. The WQM sites listed here can be found on Figure 10 of this report. The loadings at the northern sites deviate greater from the sampling data than the southern sites. The WQM samples and AGNPS predictions for P and N for the sites calculated in Table 8 are within 10%.

Instead of a delivered reduction, the STEPL model was used as a prediction of what may be seen at the site of the installed BMP. With these different approaches it is expected that the STEPL load reduction will be significantly higher than AnnAGNPS at the outlet. A summary of these reductions are shown in Table 9. The AGNPS reactions here are predictions for at the watershed outlet. Feedlots were not included in the AGNPS results.

**Table 9: Annual Load Reductions by BMPs.**

| Best Management Practices                         | Sum       | N (Pounds) |         | P (Pounds) |         | Sediment (Tons) |       |
|---------------------------------------------------|-----------|------------|---------|------------|---------|-----------------|-------|
|                                                   |           | STEPL      | AGNPS   | STEPL      | AGNPS   | STEPL           | AGNPS |
| Conservation Tillage                              | 4662 ac   | 35,870.0   | 1,960.3 | 10,716.0   | 1,326.0 | 7,437.0         | 285.0 |
| Continuous Conservation Reserve Program-Buffers - | 204 ac    | 724.0      | 90.2    | 319.0      | 99.4    | 264.0           | 264.0 |
| Sediment Traps                                    | 4355.3 ac | 26,353.0   | 765.2   | 9,172.0    | 926.4   | 6,072.0         | 129.7 |
| Grazing Planned Systems                           | 4405 ac   | 6,488.0    | 156.5   | 3,253.0    | 335.8   | 4,006.0         | 31.9  |
| Waste Management System                           | 9 units   | 103,093.0  |         | 22,888.0   |         | 2,427.0         |       |
| Total                                             |           | 172,528.0  | 2,972.2 | 46,348.0   | 2,687.6 | 20,206.0        | 710.6 |

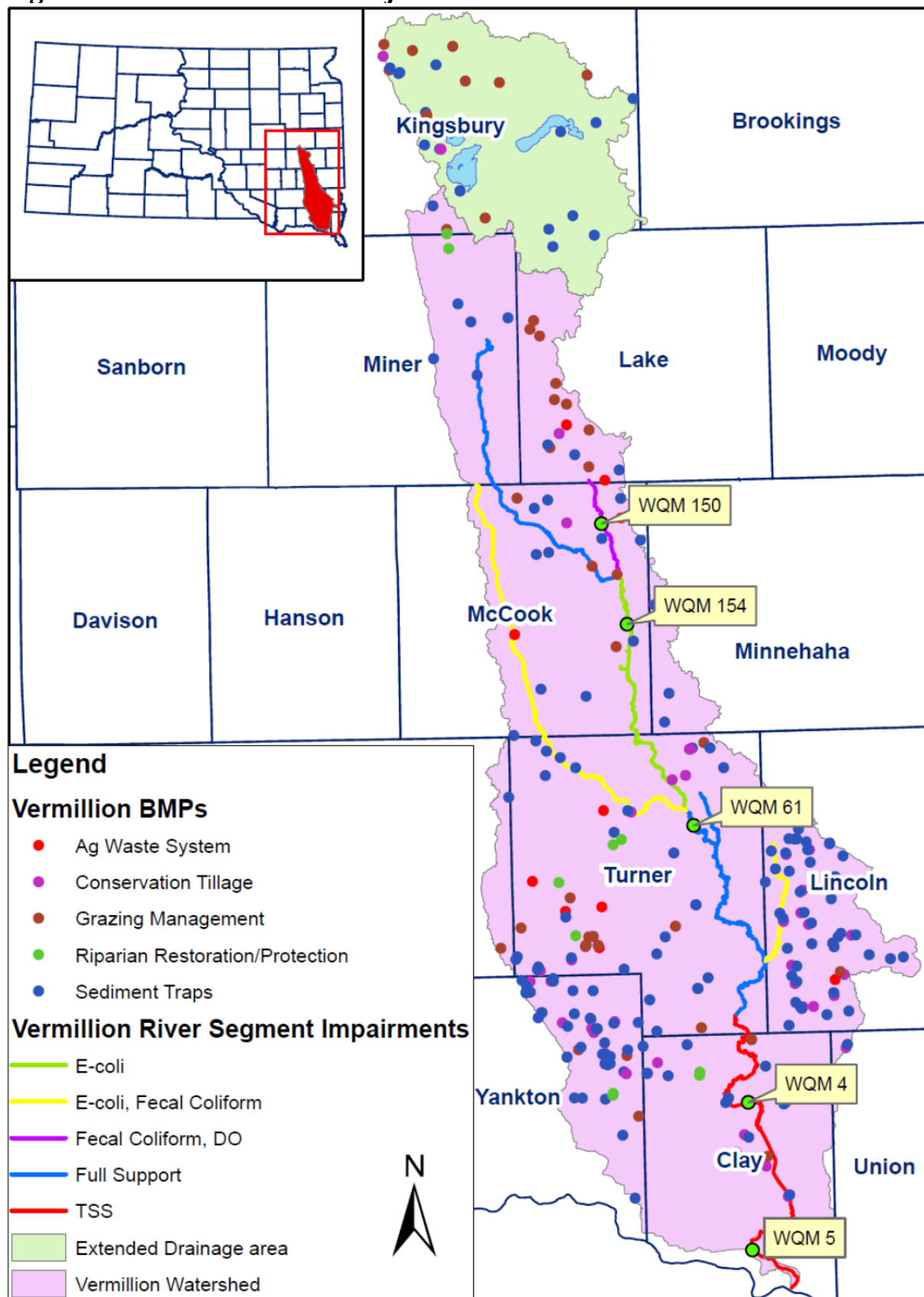
Another approach used to track BMPs was by their proximity to a water body or stream reach. STEPL reductions were summed for the nearest stream reach or water body. These reductions are only taken into account at the first stream or water body encountered and not transferred downstream for the STEPL reductions in Table 10. The AGNPS reductions are also show in this table for comparison as reductions delivered to the given location. The location of each BMP can be found in Figure 10.

**Table 10: Annual Load Reductions by River Segment/Lake.**

| Vermillion River Segments/Lakes      | Sediment (Tons) |       | N (Pounds) |         | P (Pounds) |         |
|--------------------------------------|-----------------|-------|------------|---------|------------|---------|
|                                      | STEPL           | AGNPS | STEPL      | AGNPS   | STEPL      | AGNPS   |
| SD-VM-L-HENRY_01                     | 851             |       | 2,300      |         | 1,014      |         |
| SD-VM-L-SILVER_01                    | 14              |       | 69         |         | 21         |         |
| SD-VM-L-SWAN_01                      | 1,219           |       | 38,608     |         | 8,025      |         |
| SD-VM-L-WHITEWOOD_01                 | 377             |       | 972        |         | 435        |         |
| SD-VM-R-CAMP_01                      | 95              | 58.3  | 466        | 1,147.1 | 138        | 374.0   |
| SD-VM-R-LITTLE_VERMILLION_01_USGS    | 179             | 0.6   | 641        | 12.5    | 241        | 7.2     |
| SD-VM-R-LONG_01                      | 2,663           | 8.8   | 11,303     | 173.0   | 3,846      | 80.9    |
| SD-VM-R-VERMILLION_01                | 2,027           | 295.8 | 33,193     | 4,840.0 | 7,949      | 2,166.9 |
| SD-VM-R-VERMILLION_02                | 1,442           | 334.7 | 6,510      | 5,211.8 | 2,048      | 2,428.6 |
| SD-VM-R-VERMILLION_03                | 7,373           | 459.0 | 27,997     | 6,736.6 | 9,401      | 3,302.9 |
| SD-VM-R-VERMILLION_E_FORK_01         | 2,387           | 39.6  | 38,050     | 603.4   | 9,860      | 420.4   |
| SD-VM-R-VERMILLION_E_FORK_02         | 514             | 80.6  | 1,927      | 1,344.1 | 676        | 716.7   |
| SD-VM-R-VERMILLION_WEST_FORK_01_USGS | 1,065           | 16.9  | 10,492     | 362.1   | 2,694      | 241.1   |



**Figure 10: Location of 319 Project BMPs**



## **COORDINATION EFFORTS**

One fourth of the watershed coordinator's salary is paid by the statewide 303.d water quality project. This has allowed more flexibility of available BMPs and funding to producers within and outside of the project area. The load reductions and BMPs installed during Segment 1 for the state 303.d project were entered into a separate Tracker database. The 319 BMP locations were mapped along with the 303.d BMP locations to show how the two projects complemented each other (Figure 10). Some of the 303.d implementation projects were within the Vermillion River Basin project area, but most of them were located outside the watershed and throughout the eastern half of the state.

The McCook County Conservation District was the lead sponsor of the Vermillion River Basin Watershed Project. The District Secretary and the Conservation District board provided input and direction for the project through monthly meetings and serving on the steering committee. Federal, state, local agencies and organizations contributed funds, technical services, cash and in kind match to accomplish goals of the project (Table 9). The agencies and their roles are summarized below.

### **McCook County Conservation District**

The McCook County Conservation District agreed to be the lead project sponsor. They supported the project by appointing members to serve on the steering committee and allowing the project coordinator access to landowner information through their office. The McCook County Conservation District set aside time during each board meeting to approve project implementation activities and funds being spent. The District Secretary assisted the project coordinator with cost-share reimbursement, file maintenance and other financial transactions.

### **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 visits, watershed tours, reviews, approval of payment requests, and attendance of steering committee meetings. Training workshops and meetings were sponsored by the SD DENR to keep the watershed coordinator current with implementation activities and funding procedures. A project officer was appointed to the project to assist in managing funds, setting up and maintaining the Tracker system and reviewing all implementation activities and reporting.

### **United States Department of Agriculture – Natural Resources Conservation Service**

The Natural Resources Conservation Service (NRCS) provided technical assistance for the planning, design and installation of conservation practices. Personnel included: NRCS staff from Clark, Hamlin, Kingsbury, Brookings, Miner, Lake, Minnehaha, Hutchinson, Turner, Lincoln, Yankton, Clay and Union County field offices. Access to the NRCS system enabled the watershed coordinator to generate conservation plans, contracts and maps for BMP implementation activities. Programs utilized, but not limited to, include the USDA's Environmental Quality Incentives Program (EQIP), and Conservation Reserve Program (CRP) administered through the Farm Services Agency (FSA).

### **South Dakota Association of Conservation Districts**

The South Dakota Association of Conservation Districts (SDACD) provided budgetary administration of salary funding for the watershed coordinator. One half of the coordinator salary administered for the

project was generated from the statewide 303.d watershed project and Farm Bill Implementation Technical Assistance fund. These funds were specifically used for projects either outside of the watershed or projects not listed in the Project Implementation Proposal in order to expand the number of BMP's offered.

### **United States Environmental Protection Agency**

The United States Environmental Protection Agency (U.S. EPA) provided the Clean Water Act Section 319 Grant which was the primary funding source of the project. EPA officials from the Region 8 office in Denver, Colorado participated in one on site tour and review of the project.

### **PUBLIC PARTICIPATION**

The public was notified of opportunities to participate in the project through press releases, newsletters, and other public events to inform and educate them about the project. Audiences were given a presentation of the project, its goals, and funding opportunities for implementation activities in the watershed. A majority of the attendants were agricultural producers with a few in town property owners and sportsmen.

### **ASPECTS OF THE PROJECT THAT DID NOT WORK WELL**

The milestone for Riparian Area -Management was not met. This may have been caused by the actual make-up of the qualifying areas and acreage altogether. Since a large percentage of the land use is intensive row crop production the small riparian areas that exist are highly sought after by cow calf operations. Due to the geographic nature of the watershed, those areas tend to be slender tracts of undeveloped rangeland and are highly utilized for grazing. In many cases buffering out the stream would essentially remove the majority of the grazing acres for their livestock. The easement portion of this program was especially unpopular.

Due to the popularity of construction of AWMS, funding for this BMP became limited for a time. This was resolved when additional funds were made available to the project.

## PROJECT BUDGET

**Table 11: Vermillion River Basin Implementation Project Original Budget.**

| ITEM                                                                                                               | 319-EPA            | Cons. Comm.         | USDA              | SD GF&P            | Local               | Total            |
|--------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|-------------------|--------------------|---------------------|------------------|
| <b>Personnel Support</b>                                                                                           |                    |                     |                   |                    |                     |                  |
| Project Coordinator                                                                                                | \$51,925           |                     |                   |                    |                     | \$51,925         |
| Travel:                                                                                                            | \$7,850            |                     |                   |                    |                     | \$7,850          |
| Administration:                                                                                                    | \$11,650           |                     |                   |                    |                     | \$11,650         |
| Computer Support:                                                                                                  | \$5,950            |                     |                   |                    |                     | \$5,950          |
| <b>Personnel Support Total:</b>                                                                                    | <b>\$77,375</b>    |                     |                   |                    | <b>\$0</b>          | <b>\$77,375</b>  |
| <b>Task 1: PIP Development:</b> (Watershed and Segment 2 PIP's)<br>(Cost of this task included in Personnel Costs) |                    |                     |                   |                    |                     |                  |
| <b>Objective 2: Best Management Practice (BMP) Implementation</b>                                                  |                    |                     |                   |                    |                     |                  |
| <b>Task 2: Cropland BMP's (2500 acres)</b>                                                                         |                    |                     |                   |                    |                     |                  |
| Product 2: Conservation Tillage - 2100 acres @ \$0.00/ac.                                                          |                    |                     |                   |                    |                     |                  |
| Product 3: Seeding: Perennial Vegetation: 350ac. @ \$100/ac.                                                       |                    | \$17,500            |                   | \$8,750            | \$8,750             | \$35,000         |
| Product 4: Filter Strips (25 ac.) and Grassed Waterways (25ac.)                                                    |                    | \$22,950            | \$1,875           | \$0                | \$23,575            | \$48,400         |
| Subtotal                                                                                                           | \$0.00             | \$40,450.00         | \$1,875.00        | \$8,750.00         | \$32,325.00         | \$83,400         |
| <b>Task 3: Grassland BMP's (1,500 acres)</b>                                                                       |                    | \$14,425.00         |                   | \$7,125.00         | \$19,050.00         | \$40,600         |
| Product 5: Grassland Management (1000)                                                                             |                    |                     |                   |                    |                     |                  |
| Rotational Grazing Systems: 1000 ac. @ \$0.00                                                                      |                    |                     |                   |                    |                     |                  |
| Fencing: 5000 LF @ \$1/LF                                                                                          |                    |                     |                   | \$2,500            | \$2,500             | \$5,000          |
| Water Developments:                                                                                                | \$0.00             | \$5,150.00          | \$0.00            | \$3,375.00         | \$8,525.00          | \$17,050         |
| Product 6: Riparian Area Grassland Management (500 ac.)                                                            |                    |                     |                   |                    |                     |                  |
| Rotational Grazing Systems: 500 ac. @ \$0.00                                                                       |                    |                     |                   |                    |                     |                  |
| Fencing: 5000 LF @ \$1/LF                                                                                          |                    | \$2,500             |                   | \$1,250            | \$1,250             | \$5,000          |
| Water Developments:                                                                                                | \$0.00             | \$6,775.00          | \$0.00            | \$0.00             | \$6,775.00          | \$13,550         |
| Subtotal                                                                                                           | \$0.00             | \$14,425.00         | \$0.00            | \$7,125.00         | \$19,050.00         | \$40,600         |
| <b>Task 4: Animal Waste Management Systems (AWMS)</b>                                                              |                    |                     |                   |                    |                     |                  |
| Product 7: Feasibility Studies: 3 @ \$17,500 each                                                                  |                    |                     |                   |                    |                     |                  |
| Feasibility studies: 3 @ \$14,500 each                                                                             | \$32,625           |                     |                   |                    | \$10,875            | \$43,500         |
| Nutrient Management Plans: 3 @ \$2500                                                                              | \$5,625            |                     |                   |                    | \$1,875             | \$7,500          |
| Cultural Resources Studies: 3 @ \$500 each                                                                         | \$1,125            |                     |                   |                    | \$375               | \$1,500          |
| AWMS Construction                                                                                                  |                    |                     |                   |                    |                     |                  |
| Subtotal                                                                                                           | \$39,375.00        | \$0.00              | \$0.00            | \$0.00             | \$13,125.00         | \$52,500         |
| <b>Objective 3: Informational Outreach (web site/newsletters)</b>                                                  |                    |                     |                   |                    |                     |                  |
| <b>Task 5: Information Campaign (9000 watershed residents)</b>                                                     |                    |                     |                   |                    |                     |                  |
| Product 8: Newsletters, Press Releases, web site and presentations                                                 |                    |                     |                   |                    |                     |                  |
| Web Site: Maintenance                                                                                              | \$500              |                     |                   |                    | \$1,500             | \$2,000          |
| Newsletters: 3 @ 1000 printed/newsletter @ \$.50/mailling (\$500)                                                  |                    |                     |                   |                    | \$1,500             | \$1,500          |
| Subtotal                                                                                                           | <b>\$500.00</b>    |                     |                   |                    | <b>\$3,000.00</b>   | <b>\$3,500</b>   |
| <b>Objective 4: Project Reports</b>                                                                                |                    |                     |                   |                    |                     |                  |
| <b>Task 6: Project Reports for EPA, DENR, and Partners.</b>                                                        |                    |                     |                   |                    |                     |                  |
| (Cost of this task included in Personnel Costs)                                                                    |                    |                     |                   |                    |                     |                  |
| <b>Total Project Cost:</b>                                                                                         | <b>\$77,375.00</b> | <b>\$124,175.00</b> | <b>\$3,750.00</b> | <b>\$38,875.00</b> | <b>\$154,050.00</b> | <b>\$398,225</b> |
| <b>Match:</b>                                                                                                      |                    |                     |                   |                    |                     |                  |
| Ineligible Match - Federal and/or Project Allocated                                                                |                    |                     | \$3,750.00        |                    |                     | \$3,750          |
| Match: Project Totals For Match                                                                                    |                    | \$124,175.00        | \$0.00            | \$38,875.00        | \$154,050.00        | \$317,100        |

**Table 12: Vermillion River Basin Implementation Actual Budget**

| ITEM                                                                                                               | 319-EPA             | Consolidated       | USDA                | Local               | Total                 |
|--------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|---------------------|---------------------|-----------------------|
| <b>Personnel Support</b>                                                                                           |                     |                    |                     |                     |                       |
| Project Coordinator                                                                                                | \$80,977.39         |                    |                     |                     | \$80,977.39           |
| Travel:                                                                                                            | \$22,868.58         |                    |                     |                     | \$22,868.58           |
| Administration:                                                                                                    | \$6,197.47          |                    |                     |                     | \$6,197.47            |
| Computer Support:                                                                                                  | \$1,213.59          |                    |                     |                     | \$1,213.59            |
| <b>Personnel Support Total:</b>                                                                                    | <b>\$111,257.03</b> | <b>\$0.00</b>      | <b>\$0.00</b>       | <b>\$0.00</b>       | <b>\$111,257.03</b>   |
| <b>Task 1: PIP Development: (Watershed and Segment 2 PIP's)</b><br>(Cost of this task included in Personnel Costs) |                     |                    |                     |                     |                       |
| <b>Objective 2: Best Management Practice (BMP) Implementation</b>                                                  |                     |                    |                     |                     |                       |
| <b>Task 2: Cropland BMP's (2500 acres)</b>                                                                         |                     |                    |                     |                     |                       |
| Product 2: Conservation Tillage - 2100 acres @ \$0.00/ac.                                                          |                     |                    |                     |                     |                       |
| Product 3: Seeding: Perennial Vegetation: 350ac.@ \$100/ac.                                                        |                     |                    |                     |                     |                       |
| Product 4: Filter Strips (25 ac.) and Grassed Waterways (25ac.)                                                    |                     |                    | \$9,538.00          | \$8,732.00          | <b>\$18,270.00</b>    |
| <b>Subtotal</b>                                                                                                    | <b>\$0.00</b>       | <b>\$0.00</b>      | <b>\$9,538.00</b>   | <b>\$8,732.00</b>   | <b>\$18,270.00</b>    |
| <b>Task 3: Grassland BMP's (1,500 acres)</b>                                                                       |                     |                    |                     |                     |                       |
| Product 5: Grassland Management (1000)                                                                             |                     |                    |                     |                     |                       |
| Rotational Grazing Systems: 1000 ac. @ \$0.00                                                                      |                     |                    |                     |                     |                       |
| Fencing: 5000 LF @ \$1/LF                                                                                          | \$213.85            |                    |                     | \$71.28             |                       |
| Water Developments:                                                                                                | \$3,155.50          |                    |                     |                     |                       |
| Product 6: Riparian Area Grassland Management (500 ac.)                                                            |                     |                    |                     |                     |                       |
| Rotational Grazing Systems: 500 ac. @ \$0.00                                                                       |                     |                    |                     |                     |                       |
| Fencing: 5000 LF @ \$1/LF                                                                                          |                     |                    |                     |                     |                       |
| Water Developments:                                                                                                |                     |                    |                     |                     |                       |
| Filter Strip                                                                                                       |                     |                    | \$95.00             | \$94.00             |                       |
| <b>Subtotal</b>                                                                                                    | <b>\$3,369.35</b>   | <b>\$0.00</b>      | <b>\$95.00</b>      | <b>\$165.28</b>     | <b>\$3,629.63</b>     |
| <b>Task 4: Animal Waste Management Systems (AWMS)</b>                                                              |                     |                    |                     |                     |                       |
| Product 7: AWMS                                                                                                    |                     |                    |                     |                     |                       |
| Engineering                                                                                                        | \$75,481.03         | \$1,034.74         |                     | \$24,253.48         | \$100,769.25          |
| AWMS Construction                                                                                                  | \$499,128.69        | \$63,965.26        | \$369,115.70        | \$863,887.63        | \$1,796,097.28        |
| <b>Subtotal</b>                                                                                                    | <b>\$574,609.72</b> | <b>\$65,000.00</b> | <b>\$369,115.70</b> | <b>\$888,141.11</b> | <b>\$1,896,866.53</b> |
| <b>Objective 3: Informational Outreach (web site/newsletters)</b>                                                  |                     |                    |                     |                     |                       |
| <b>Task 5: Information Campaign (9000 watershed residents)</b>                                                     |                     |                    |                     |                     |                       |
| Product 8: Newsletters, Press Releases, web site and presentations                                                 |                     |                    |                     |                     |                       |
| Web Site: Maintenance                                                                                              |                     |                    |                     |                     | \$0.00                |
| Newsletters: 3 @ 1000 printed/newsletter @ \$.50/mailling (\$500)                                                  | \$75.00             |                    |                     | \$790.00            | \$865.00              |
| WorkShops                                                                                                          | \$94.68             |                    |                     |                     |                       |
| <b>Subtotal</b>                                                                                                    | <b>\$169.68</b>     | <b>\$0.00</b>      | <b>\$0.00</b>       | <b>\$790.00</b>     | <b>\$959.68</b>       |
| <b>Objective 4: Project Reports</b>                                                                                |                     |                    |                     |                     |                       |
| <b>Task 6: Project Reports for EPA, DENR, and Partners.</b><br>(Cost of this task included in Personnel Costs)     |                     |                    |                     |                     |                       |
| <b>Total Project Cost:</b>                                                                                         | <b>\$689,405.78</b> | <b>\$65,000.00</b> | <b>\$378,748.70</b> | <b>\$897,828.39</b> | <b>\$2,030,982.87</b> |
| <b>Match:</b>                                                                                                      |                     |                    |                     |                     |                       |
| Ineligible Match - Federal and/or Project Allocated                                                                |                     |                    | \$378,748.70        |                     | \$378,748.70          |
| Match: Project Totals For Match                                                                                    |                     |                    | \$0.00              | \$897,828.39        | \$897,828.39          |

## **FUTURE ACTIVITY RECOMMENDATIONS**

Future segments of the Vermillion River Basin Implementation Project should continue to work closely with the project sponsor and partners to address the resource concerns in high priority areas of the watershed. Personal contacts and public meetings should continue in order to inform and educate landowners of opportunities available as the project evolves. Project personnel should work together with landowners to develop a shared interest in restoring the beneficial uses of the watershed. Existing programs such as CRP and EQIP need to be used, along with 319 monies to accomplish the overall goals of the project.

Additional effort and time should be used to create an interest in riparian grassland buffers and when permissible, rotational grazing systems to go along with them. The creation of a database of producers that own land along the Vermillion River and its tributaries within 2 miles of the river would be a valuable tool for informing these producers of project opportunities. Levels of riparian activities should be monitored in order to aid in the development of new ideas to improve and enhance riparian health.

During the Assessment of the Vermillion River Basin it was noted that the levels of Total Suspended Solids (TSS) increased as you go downstream and exceeding levels listed to support the beneficial uses of the last 2 segments. BMPs that reduce sediment transport should be considered for this portion of the watershed. A project monitoring the water levels in the river due to increasing levels of tiling throughout the watershed should also be considered. If that monitoring project shows increased water levels the project may need to add/change some of its BMPs to decrease levels of TSS.

Animal feeding operations should remain a high priority. Waste storage, waste handling, and waste utilization are very much a part of the pollution problems of the Vermillion River. Nonpoint sources of runoff should be targeted for implementation activities along and near tributaries and the Vermillion River itself. Installation of BMPs in these sensitive areas will provide the largest benefit to water quality in the watershed.

# Appendix A



The two main methods to be used are Riparian Buffers or Filter Strips along the tributaries of, and the Vermillion River, and improving livestock feeding areas.

A public information campaign will also be carried out to help both urban and rural folks do their part in improving the water quality in their own Vermillion River.

#### Contact Information

Clay County  
Name  
Address  
Phone, e-mail

Yankton County  
Name  
Address  
Phone, e-mail

Other agencies

## Vermillion River Basin Watershed Project



**An option to cleaner, safer water**



## **Water Quality is everyone's responsibility.**

The Vermillion River meanders its way in a Southerly direction through it's watershed, containing portions of 14 counties, from Southern Clark County through Clay County and into the Missouri River at Vermillion, SD.

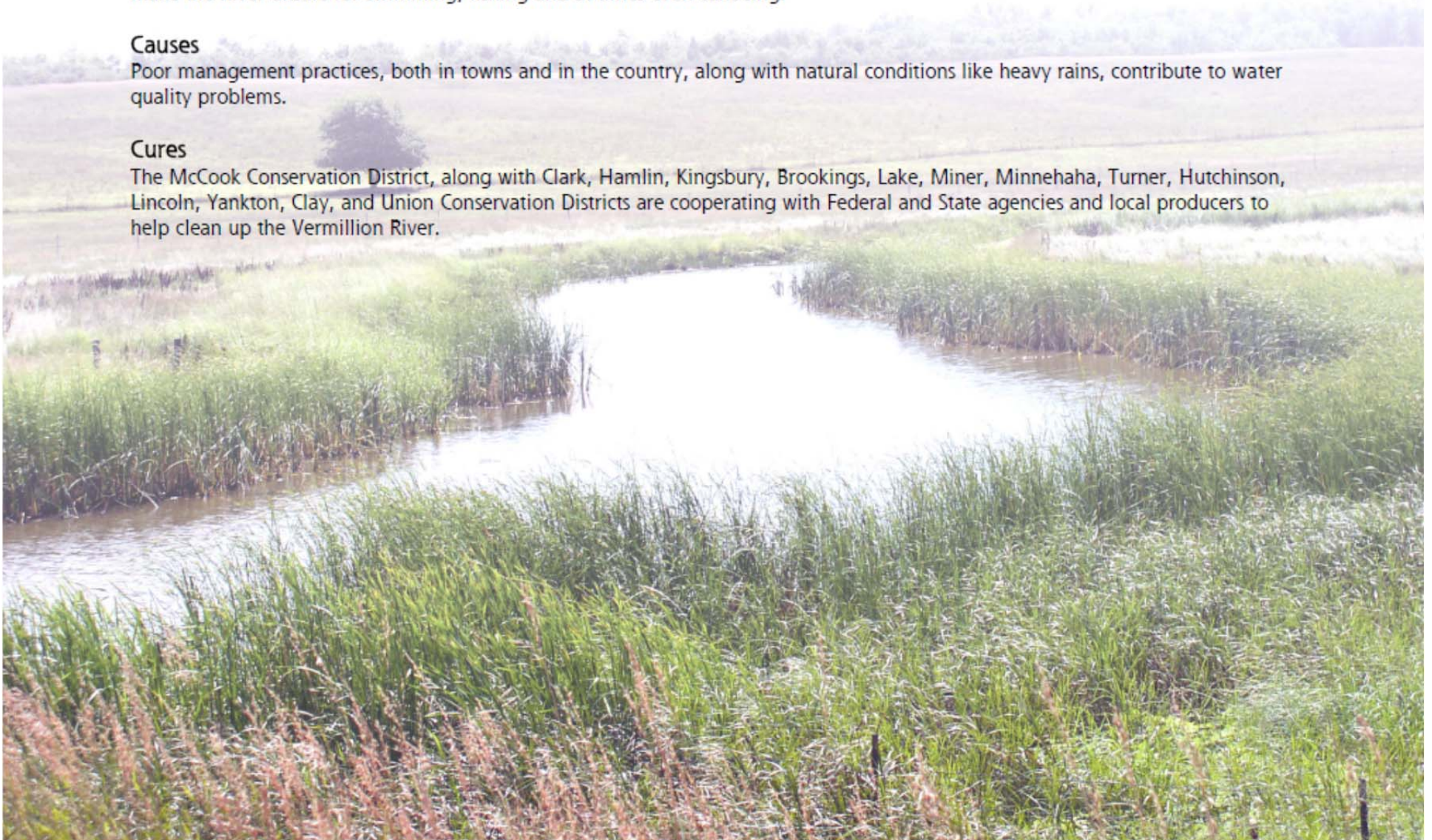
The lower portion of the watershed, involving parts of 6 counties, is the portion of the watershed that contributes excessive amounts of sediment to the "River" while the remaining 8 counties contribute mainly fecal coli form bacteria. These bacteria make the River unsafe for swimming, fishing and at times even canoeing.

### **Causes**

Poor management practices, both in towns and in the country, along with natural conditions like heavy rains, contribute to water quality problems.

### **Cures**

The McCook Conservation District, along with Clark, Hamlin, Kingsbury, Brookings, Lake, Miner, Minnehaha, Turner, Hutchinson, Lincoln, Yankton, Clay, and Union Conservation Districts are cooperating with Federal and State agencies and local producers to help clean up the Vermillion River.





## Solutions

The McCook Conservation District—sponsor—along with the remaining 13 Conservation Districts and the Vermillion River Basin Development District are cooperating with Federal, State, and local producers to help clean up the Vermillion River.

The two main practices selected by the advisory board to help control water quality issues in the Vermillion River mainstem are:

- Grass buffers along the high priority drainages to filter out sediment and nutrients from Watershed runoff.
- Properly designed animal waste storage facilities with nutrient management plans to properly store and apply the nutrients to cropland and keep nutrients and e-coli out of the River and its tributaries. These facilities are designed to protect both shallow aquifers (ground water) and surface waters throughout the Vermillion River Basin.

A public information campaign is being carried out to help "everyone" do their part in improving the water quality in their own Vermillion River.



## Contact Information

Vermillion River Basin Watershed sponsor  
McCook County CD/NRCS  
605-425-2483 X 3

CD/NRCS Agencies  
Brookings County  
605-692-8003 X 3

Clark County  
605-532-3797 or 605-532-3686 X 3

Clay County  
605-624-7060 X 3

Hamlin County  
605-783-3353 or 605-783-3642 X 3

Hutchinson County  
605-387-5539 or 605-928-7925 X 3

Kingsbury County  
605-845-3183 or 605-854-9123 X 3

Lake County  
605-256-2571 or 605-256-6674 X 3

Lincoln County  
605-987-2624 X 3

Miner County  
605-772-5642 X 3

Minnehaha County  
605-336-1527 or 605-330-4515 X 3

Turner County  
605-297-5564 X 3

Union County  
605-356-3308 X 3

Yankton County  
605-665-6704 or 605-665-2662 X 3

## Vermillion River Basin Watershed Project



**An option to cleaner, safer water**



### **Protecting Water Quality – It's Everyone's Responsibility.**

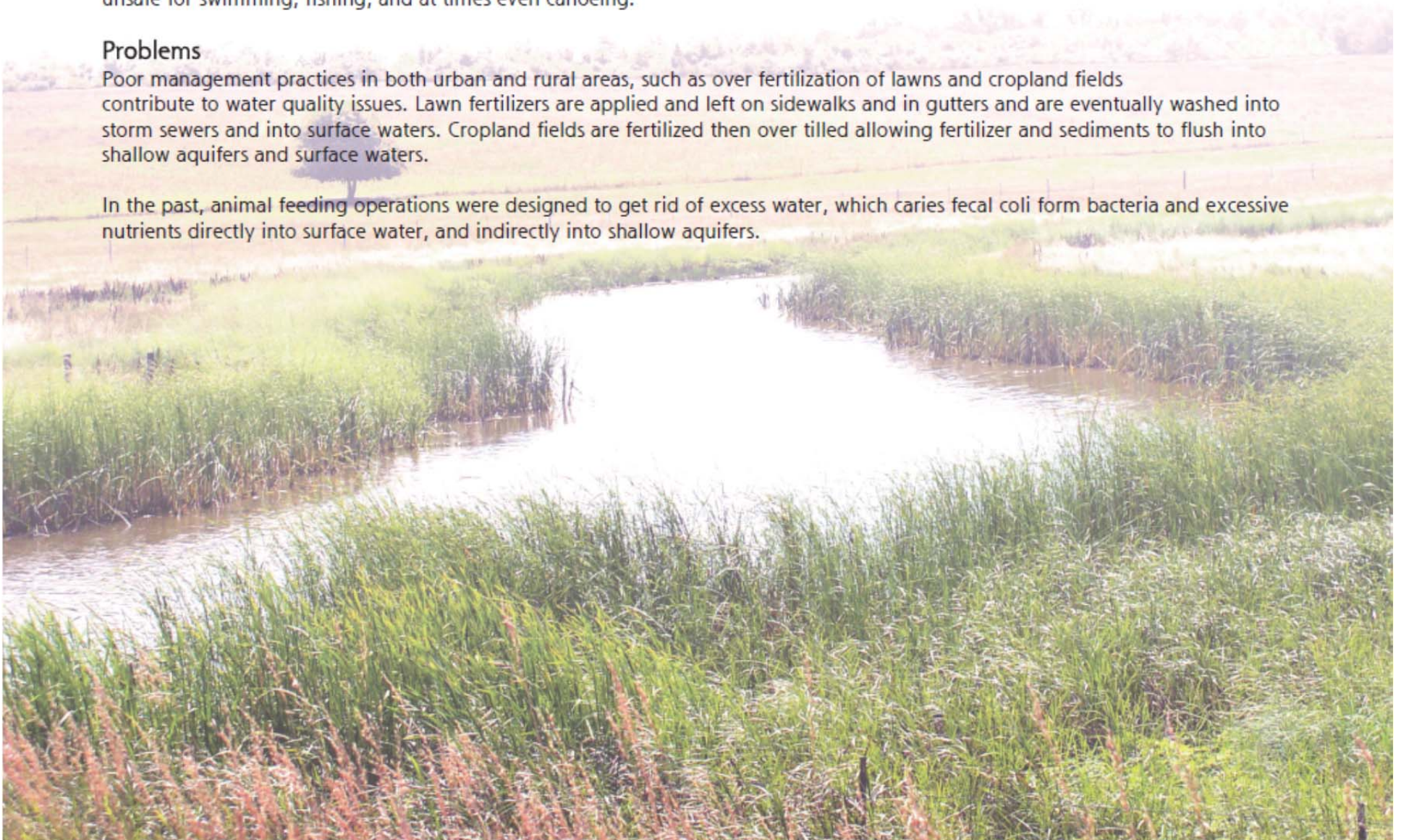
The Vermillion River meanders its way, in a southerly direction, through the watershed. The watershed contains portions of 14 counties, from Southern Clark County through Clay County and into the Missouri River near Vermillion, SD.

The lower portion of the watershed, involving parts of six counties, contributes excessive amounts of sediment and nutrients to the "River" while the remaining eight Northern counties contribute mainly fecal coli form bacteria. These bacteria make the River unsafe for swimming, fishing, and at times even canoeing.

### **Problems**

Poor management practices in both urban and rural areas, such as over fertilization of lawns and cropland fields contribute to water quality issues. Lawn fertilizers are applied and left on sidewalks and in gutters and are eventually washed into storm sewers and into surface waters. Cropland fields are fertilized then over tilled allowing fertilizer and sediments to flush into shallow aquifers and surface waters.

In the past, animal feeding operations were designed to get rid of excess water, which carries fecal coli form bacteria and excessive nutrients directly into surface water, and indirectly into shallow aquifers.





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**NRCS Natural Resources Conservation Service**

**Conservation Districts**

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- SOIL QUALITY
- WATER QUALITY AND QUANTITY
- GRAZING SYSTEMS
- FENCING
- MONITORING TECHNIQUES
- DROUGHT MANAGEMENT
- BETTER GRASSES

**Curved Grasshopper**

**Bullgrass**

**Hard Monocot**

**Big Monocot**

**Small Monocot**

**Polka-dot grass**

**Monocot Monocot**

**Bullgrass**

**Bullgrass**





Turner Conservation District  
655 East Fourth Street  
Parker, South Dakota 57053-0416  
Phone: (605)-297-5564, Ext. #3  
Fax: (605)-297-4332  
e-mail: fran.ingalls@sd.nacdn.net

TO: TURNER COUNTY NEWSPAPERS

FROM: TURNER CONSERVATION DISTRICT

SUBJECT: FOR YOUR INFORMATION - SOMETHING TO READ

#### DORMANT SEEDINGS

We all know that spring is the most desirable time for seeding most grasses and forbs. BUT – late summer and dormant seedings are options for some cool season species and forbs, but should be used with caution. Dormant seedings should be used when you have no other choice. If you have a dormant seeding planned now is the time to be making preparations. The good seedbed is a must for planting any time of the year. Perennial weeds and grasses are not killed by frost so must be killed by chemicals or tillage. Tall annual weeds must be mowed and excessive litter managed so there is a good seed to soil contact when planting but enough residues should remain on the surface to protect the seed over winter from desiccation, germination, washing, blowing, birds, insects, rodents, etc. Purchase high quality seed and make sure is ready when you need it. The district can handle that for you. The seed should have current germination tests. In South Dakota seed laws require test be no older than nine months if purchased within the state or six months of purchased out of state. Don't rush your dormant seeding. The soil must be cool enough to prevent seed from germinating until spring. Generally, soil temperature must be below 40 degrees Fahrenheit to prevent germination.

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#### VERMILLION RIVER BASIN WATERSHED PROJECT - REMINDER

The Turkey Ridge Creek watershed Project in Southwestern Turner County has been rolled in to the Vermillion River Basin Watershed Project which now includes portions of 14 counties and conservation districts along the Vermillion River from Clark County on the North end to Clay County on the South end. As it was with the Turkey Ridge creek Project, the goal of the Vermillion River Basin Project is to improve the quality of the river. Cost share monies are available through the South Dakota Department of Environment and Natural Resources, the Project and USDA to assist in installing conservation practices that will help improve the water quality in the Vermillion River. These practices include Animal Waste Management Systems, Continuous Conservation Reserve Program (CRP), Riparian Buffers and the Riparian Area Management (RAM) program. If you are interested in participating in or have questions about this voluntary program please contact your local conservation district office at (605) 297-5564 or Elmer Ward – the project coordinator at (605)-665-6704 or (605)-280-8518.

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## **Vermillion River Basin Watershed Project**

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