CLEAN WATER ACT SECTION 319

NONPOINT POLLUTION CONTROL PROGRAM

FINAL REPORT

LEWIS & CLARK
WATERSHED IMPLEMENTATION PROJECT
SEGMENT 4

SPONSOR

JAMES RIVER WATER DEVELOPMENT DISTRICT

Project Coordinator

Rocky Knippling

JANUARY 2017

This project was conducted in cooperation with the State of South Dakota and the United States Environmental Protection Agency, Region VIII

Grant: C998185-10, C998185-11, C998185-12, C998185-14, C998185-15, and C998185-16

EXECUTIVE SUMMARY

PROJECT TITLE: Lewis and Clark Watershed Project Segment 4

PROJECT START DATE: May 5, 2014

PROJECT COMPLETION DATE: July 31, 2016

FUNDING:

Funding Sources

U.S. EPA Section 319 Grants:

C998185-10	$ 58,027.23
C998185-11	$108,994.50
C998185-12	$239,974.39
C998185-14	$900,000.00
C998185-15	$227.680.63
C998185-16	$ 64,199.55
Total 319	**$1,598,876.30**

	Original Budget	**Expended**
Section 319 Funds	$1,400,000.00	$1,598,876.30
Other State Funds	$ 13,100.00	$ 45,423.25
Consolidated Funds	$ 275,000.00	$ 366,595.00
CWSRF	$ 0.00	$ 101,194.00
EQIP/CRP	$1,593,025.00	$ 162,566.80
Local	$1,057,875.00	$2,307,401.00
Totals:	**$4,339,000.00**	**$4,582,056.35**

The Project's initial goal was to restore the beneficial uses of the Lewis and Clark Watershed through the installation of Best Management Practices (BMPs) that target sources of sediment, nutrients, and fecal coliform bacteria. Sponsorship started in this segment with Randall Resource Conservation & Development Council (RC&D) providing leadership. However, with mounting problems of an aging membership of Randall RC&D board members it was decided to transfer sponsorship to the James River Water Development District on July 14, 2015 to provide better administrative capabilities. Randall RC&D remained a co-sponsor until the end of this segment. Excellent support was also exhibited by agricultural organizations, other federal and state agencies, and local government entities to facilitate success of the project.

The Lewis and Clark Project merged with the Lower James River Implementation Project on October 2, 2015, bringing the area served by the Project to more than five million acres. The merge was made to make more efficient use of staff and administration to better serve the goals of the two Projects. The milestones, budgets, and BMPs were combined to show what was expected to be complete for the time period. The merged areas were named South Central Watershed Implementation Project and sponsorship was taken over by the James River Watershed Development District.

Waterbodies and streams now incorporated in the Project include Corsica Lake, Burke Lake, Dante Lake, Geddes Lake, Academy Lake, Rahn Lake, Roosevelt Lake, Lake Platte, Lake Andes, Choteau Creek, Emanuel Creek, Ponca Creek, Platte Creek, Pease Creek, Slaughter Creek, Dawson Creek, Pierre Creek, Firesteel Creek, Wolf Creek, and Keya Paha River.

Project goals were established through water sampling data taken from lakes and waterbody assessments beginning in 2003, for the Project's objectives. Initial studies showed high levels of Total Suspended Solids and fecal coliform/or E-Coli bacteria so objectives and goals for the Project were directed to meeting these criteria. One primary BMP selected was addressing grazing livestock in degraded riparian areas to reduce sediment loading and e-coli bacteria entrance in the streams. The Ag Waste System BMP was also used to help reduce water levels of e-coli. A study at the beginning of the Lewis and Clark Project showed there were 532 identified feeding sites with the potential of pollution based on the Agricultural Non-Point Source (AGNPS) model, leading to Animal Waste Management System practice being used extensively to address water quality. Individual practices and BMPs used in this segment are presented in detail in the Project Goals, Objectives and Activities, and Monitoring sections of this report respectively. In 2015 an application was submitted to the NRCS Regional Conservation Partners Program (RCPP) to obtain a grant to insure a steady source of EQIP funds would be available to fund some of these larger priced practices. The RCPP grant was awarded in February 2016 and will be a good addition to the Project.

A steering committee was formed in 2007 to help give guidance and track the progress of the Lewis and Clark Project. This committee was made of representatives of the Conservation Districts, USDA agencies (NRCS/FSA), water development districts, county commissioners, and other local, state, and government organizations. This committee continued to meet on a semi-annual basis during this segment as well.

Producer meetings, tours of completed projects, direct mailings, and print media were used to promote information awareness on how producers might access BMP design and installation from the Project. Partner agencies and one-on-one producer contacts were equally as important for practices installed.

Success of this segment was demonstrated by strong producer participation in installing the practices targeted for improving water quality. Tables showing milestones and load reductions from installed practices can be found later in this report; although it was just a two-year segment, we were satisfied with the amount of practices completed and amounts of load reductions achieved.

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INTRODUCTION

Figure 1. Lewis and Clark Delta Encroachment near Springfield, South Dakota.

The Lewis and Clark Watershed Project began in 2003 at the request of several local organizations that had expressed concerns about sediment deposition into Lewis and Clark Lake. Studies had placed the annual deposition at 2600 acre-feet and was creating a delta (Figure 1) that was slowly overtaking upper reaches of the lake. Their concern was that if left unchecked the delta would significantly reduce the projected 75-135 year life span of the lake.

The initial scope of the Project included activities that identified sources of sediment loading and began developing strategies to address and reduce these loadings. The South Dakota Department of Environment and Natural Resources (DENR) partnered with several agencies to complete the action. It was agreed that water quality sample results would be shared along with consideration of remedial solutions that would be required to address the concern. After the first year of the partnership, it was agreed that the determination of remedial actions could be best accomplished by:

- Inventorying and evaluation of the animal feeding operations in the watershed
- Completing water samples of the subwatersheds to the total nonpoint source loads from each of these subwatersheds
- Develop total maximum daily loads (TMDL's) based on the data
- Then install best management practices (BMPs) that would support attainment of the designated beneficial uses of waterbodies in these subwatersheds

At the completion of the above activities it was determined it would take a 10-15 year effort to see any gains in relation to the goals. The partners agreed that due to the length of time required that a segmented approach would be best. It was believed that two to three year segments would be the right approach and each segment would build on water quality data collected along with the accomplishments of the success of particular practices applied.

Segment 1 of the implementation phase of the Lewis and Clark Project began in 2006. It started in the Corsica Lake watershed and began implementing the TMDL which was approved for this waterbody in 2005. Other activities scheduled for this segment were to finish the assessment for the remainder of the east river portion of the Lewis and Clark drainage area and to complete a strategy for addressing the loadings of these waterbodies. Strategies were based on findings of the Lewis and Clark Initial Watershed Assessment and the animal feeding assessments completed using the Annualized Agricultural Nonpoint Assessment Model (AnnAGNPS) stand-alone feedlot model. After completion of the assessment report, the remainder of the east river portion of the implementation project was added in 2007. The Lewis and Clark Project was expanded once again in 2008 with the addition of the west river drainages (Ponca Creek and Keya Paha River) and the Lake Andes drainage on the east river portion, bringing the area of the project to just under two million acres. Geddes Lake, Academy Lake, and Platte Lake were added to the Project in 2010, as they weren't large enough for a stand-alone project and bordered the Lewis and Clark Project area. These additions were made in response to requests from Project stakeholders and other local groups. Partners and stakeholders had concluded that addressing NPS pollution from livestock feeding areas and grazing lands were a key element not only for water quality but for providing a sustained, profitable existence of the livestock industry in south central South Dakota.

The year 2015 found the Lewis and Clark Project being approached to expand once again and include the lower James River Watershed area due to the successes demonstrated by the Lewis and Clark Project. The BMPs offered by the current Project were deemed to be a viable option for addressing the pollutants on the tributaries of the lower James River. Later in the year, after a series of negotiations, the lower James River areas were added to the Project. At that time the project sponsorship of the Project was put in co-sponsorship between Randall RC&D and the James River Water Development District Board. This addition to the Project brought the service area to roughly 5.5 million acres.

Information follows regarding the:

- Waterbodies included in the Project as it existed at the end of Segment 4
- Status of water quality impairments to the waterbodies
- TMDL's developed to address the impairments
- Activities competed to begin remediation of the impairments
- Actions necessary to prevent impairments from developing in the future

Project Area

Lewis and Clark Lake is a man-made reservoir on the Missouri River created by the earthen Gavins Point Dam. It has a pool length of 25 miles, a maximum depth of 45 feet, and has a surface area of 31,400 acres. Major drainages into the reservoir include Emanuel Creek, Choteau Creek, Snatch Creek, and the Niobrara River (Nebraska). The western portion includes the watersheds of the Keya Paha River and Ponca Creek, which are both tributaries of the Niobrara River. Included in the Project are the 303d listed waterbodies and sub-watersheds of Corsica Lake, Dante Lake, Lake Andes, Rahn Dam, Roosevelt Dam, Academy Lake, Platte Lake, Geddes Lake, Platte Creek, Andes Creek and Pease Creek.

The Project includes South Dakota portion of four Hydrologic Unit Codes (HUCs). The HUCs with the main waterbody associated with each the HUC are listed below. An outline map showing boundaries of the major drainages in the project area is located in Figure 2.

- HUC 10150006 - Keya Paha,
- HUC 10170101 - Lewis and Clark Lake,
- HUC 10150001 - Ponca
- HUC 10140101 - Lake Andes, Platte, Geddes, Dante
- HUC 10160010 – James River

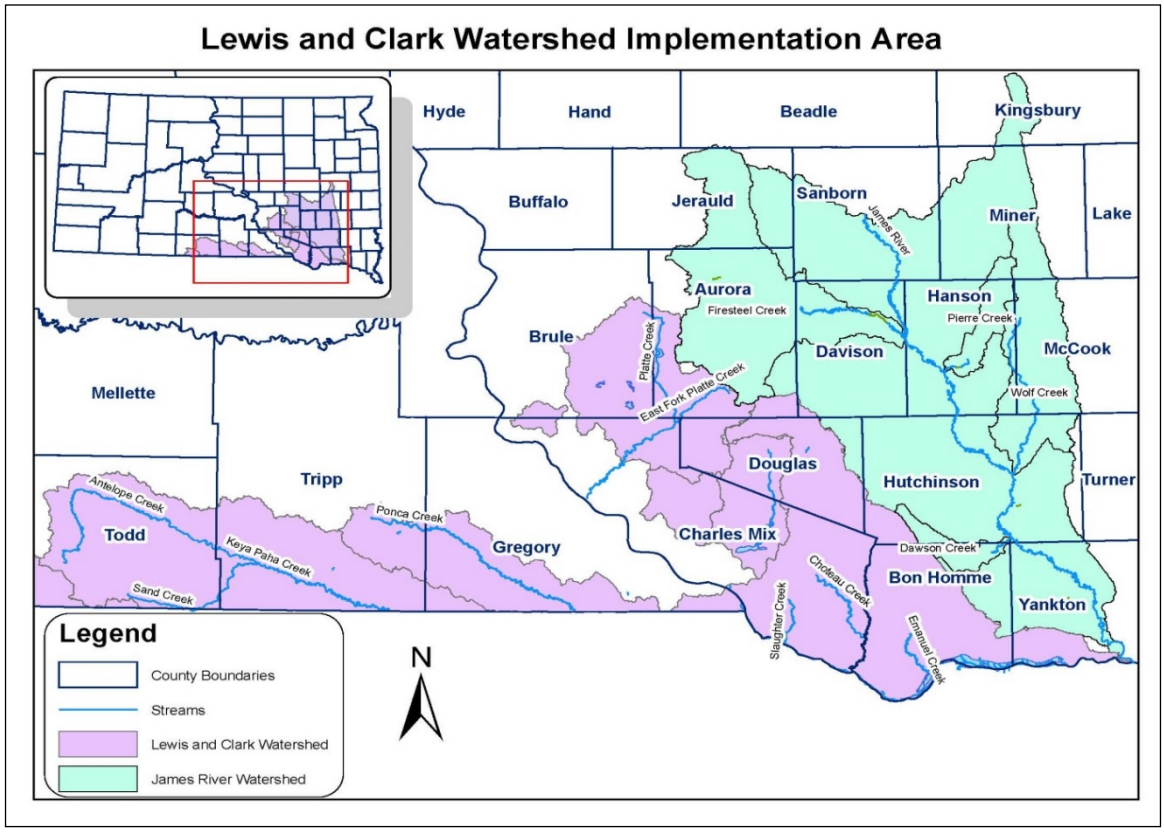

Figure 2. Lewis and Clark Project Area by Subwatersheds.

Lewis and Clark Lake has a drainage area of approximately 10,000,000 acres, with 1,900,000 acres of the total in South Dakota. Of the total, 750,000 acres are located within the portion of the Project located east of the Missouri River; 1,150,000 acres west of the Missouri River. The Lake Andes watershed and the combined Geddes, Academy and Platte Lake watersheds added 95,000 and 465,000 acres respectively to the Project bringing the total project area to nearly 2.5 million acres.

Lower James River watershed encompasses an additional 2,558,800 acres bordering on the East side of the Lewis and Clark original Project. It covers portions of 12 counties many which many have area inside the Lewis and Clark coverage area. The lower James watershed begins just south of Huron and flows southward, converging with the Missouri River near Yankton. The James River is a perennial stream with its headwaters beginning near Oakes, North Dakota crossing the state line into South Dakota and flows southward near Aberdeen and Huron, entering the lower James watershed.

It is predominantly a rural population in this watershed, however the watershed does have two larger cities in its boundaries. Mitchell is the largest and has a population of 15,254 residents, followed by Yankton with a population of 14,454.

Land use in the project area is primarily cropland and grazing. Row crops and hay are the main commodities produced on cultivated lands. Land use transitions from 70 percent cropland east of the Missouri River to 80 percent grasslands used primarily for livestock grazing and small grains west of the river. The dominant land use is cultivated cropland comprised of corn, soybeans, and sunflowers. Areas not tillable for these row crops are used as pasture, range, and hay land.

Although the makeup of land within the boundaries of the Lewis and Clark Watershed are predominantly agricultural lands, there are 20 urban sites. The largest of these cities is Springfield (1980), Antelope (1220), Armour (700), Bonesteel (271), Burke (601), Colome (284), Corsica (594), Delmont (235), Fairfax (114), Geddes (209), Gregory (1272), Harrison (55), Herrick (104), Kimball (713), Lake Andes (831), Marty (459), Mission (1221), Tabor (417), Tyndall (1060), Tripp (625), and Wagner (1487).

Average annual precipitation in the project area varies from 18 inches in the west to 24 inches in the east. Approximately 75 percent of the total is from rainfall during the months of April through September. The remainder is from melt water from the 36 inches of snow that falls on the area each winter. Tornadoes and severe thunderstorms are localized events, of short duration and occasionally produce heavy rainfall events.

Waterbody Description

Corsica Lake

Corsica Lake is a man-made impoundment created by an earthen dam across the upper section of Choteau Creek. The 56,038 acre watershed is located in south eastern Aurora County, extreme south western Davison County, and north central Douglas County, South Dakota. Agricultural lands compose the watershed with 70% being cropland and the remaining 30% being rangeland. A sediment survey for Corsica Lake was completed during the winter of 2000. Water and sediment depths were determined throughout the lake to estimate/calculate the total amount of deposited material in the lake. A mean sediment depth of 3 feet and a mean water depth of 5.7 feet were recorded during the assessment, with a maximum depth of 11 feet. Figure 3 shows the drainage area of the lake and it was the focus of the beginning of the Project Segment 1 implementation effort.

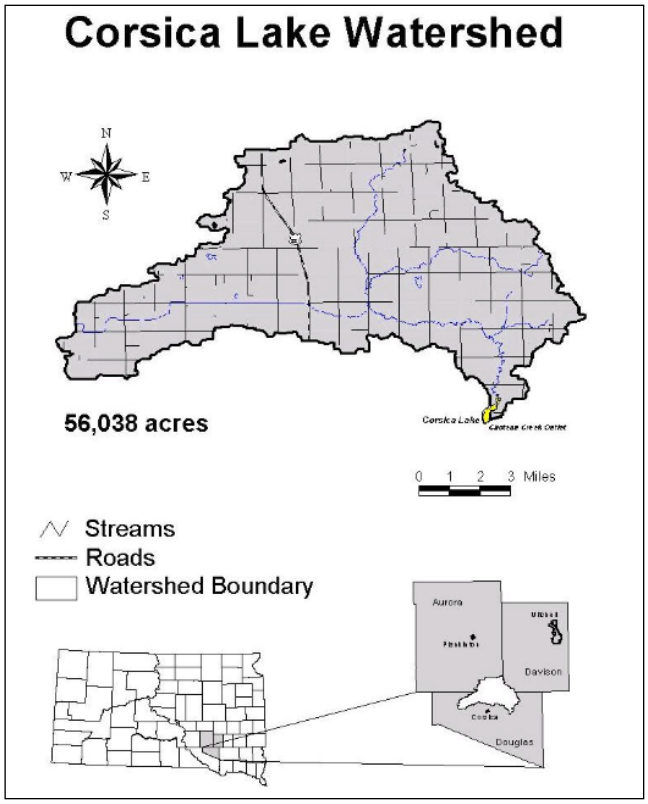

Figure 3: Corsica Lake Watershed.

Lake Andes

Lake Andes is a shallow prairie lake located in northern Charles Mix County, SD. Historically, Lake Andes was a natural lake in a bedrock valley buried by mostly glacial till. The 141,000 acre watershed consists of mainly agricultural lands which 70% is cropland and 30% rangeland. Two county roadway dikes were constructed during 1938-39 that divide the lake into three units: North Unit, Center Unit, and South Unit. The North Unit receives most of its inflow from Andes Creek and an unnamed tributary. The North Unit has a maximum depth of approximately 7 ft. at which the North Unit spills into the Center Unit through a culvert in the roadway dike. The Center Unit receives a majority of is inflow from the North Unit and two of the monitored unnamed tributaries. The Center Unit has a maximum depth of approximately 8 foot at which the Center Unit spills into the South Unit through the second roadway dike culvert. A majority of the South Unit inflow originates from the Center Unit and three monitored drainages.

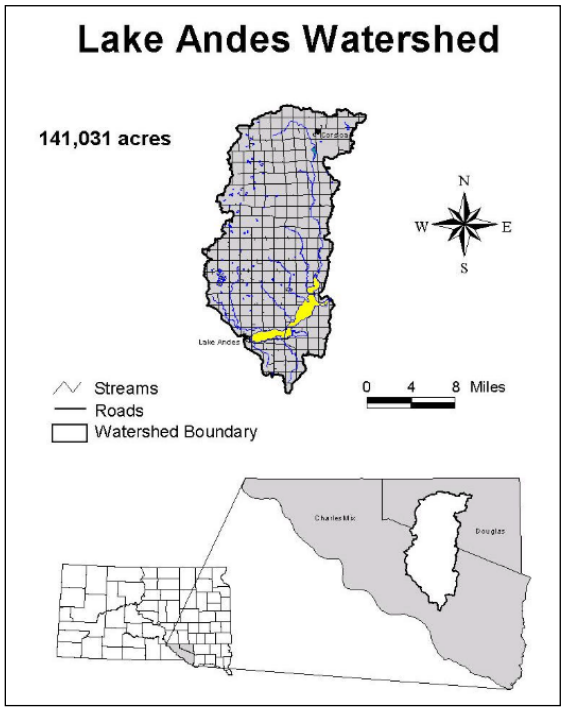

Figure 4: Lake Andes Watershed.

Keya Paha River

The Keya Paha River drains over 1 million acres in South Central South Dakota and discharges to the Niobrara River in Nebraska. The river receives runoff from agricultural operations and experiences periods of degraded water quality due to total suspended solids concentrations. The land use in the watershed is predominately agricultural consisting of cropland (42%) and grazing (57%), with the remaining 1% of the watershed composed of water and wetlands, roads and housing, and forested lands.

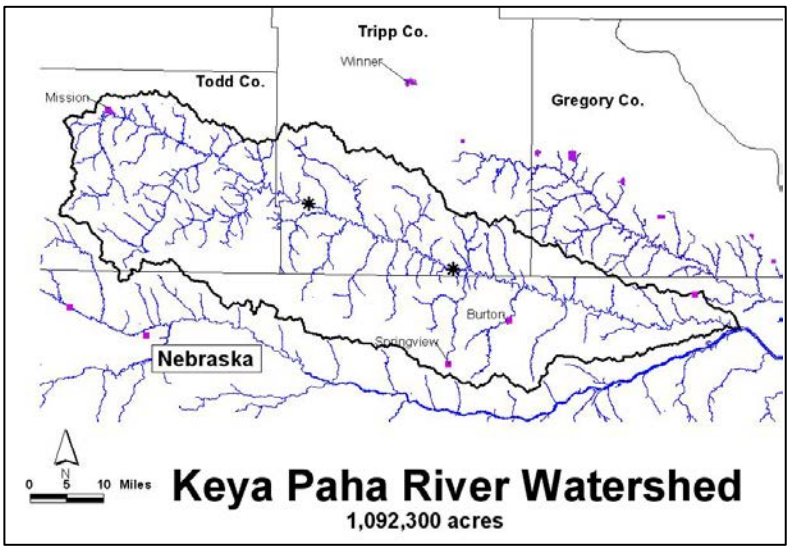

Figure 5: Keya Paha Watershed.

These percentages are considered representative of both the watershed as a whole, as well as the drainage area immediately surrounding the listed segment. The contributing drainage area is composed of 17% Nebraska Lands, 50% Tripp County Lands, and 33% Todd County Lands.

Platte Creek

Platte Creek drains 370,000 acres in Central South Dakota and discharges into the Missouri River below Platte Lake. Its drainage includes portions of four different counties: Aurora, Brule, Charles Mix, and Douglas. The land use in this watershed is mainly agricultural with 59% being cropland and 40% consisting of pasture and rangeland. Kimball and Platte are the two small communities included in the drainage area. Support from local groups and producers were the basis for adding the Platte Creek into the Lewis and Clark Implementation Project as a protective measure for the watershed.

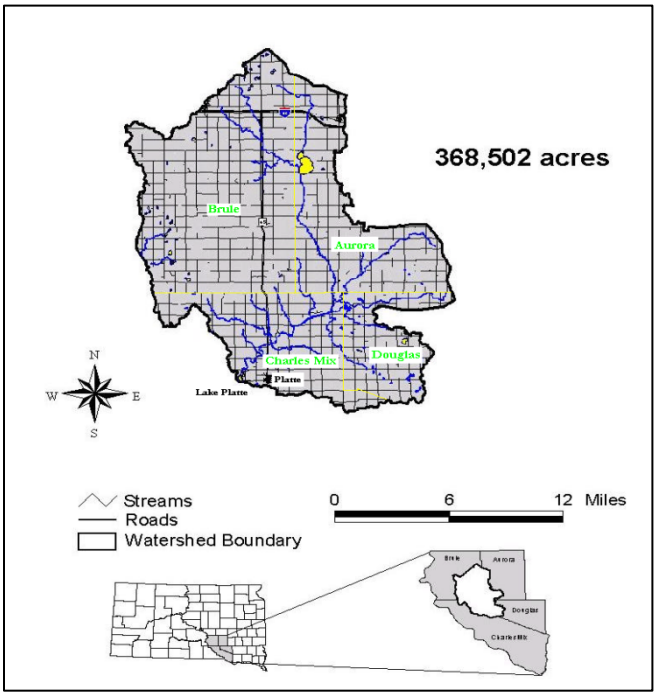

Figure 6: Platte Creek Watershed Map.

Choteau Creek

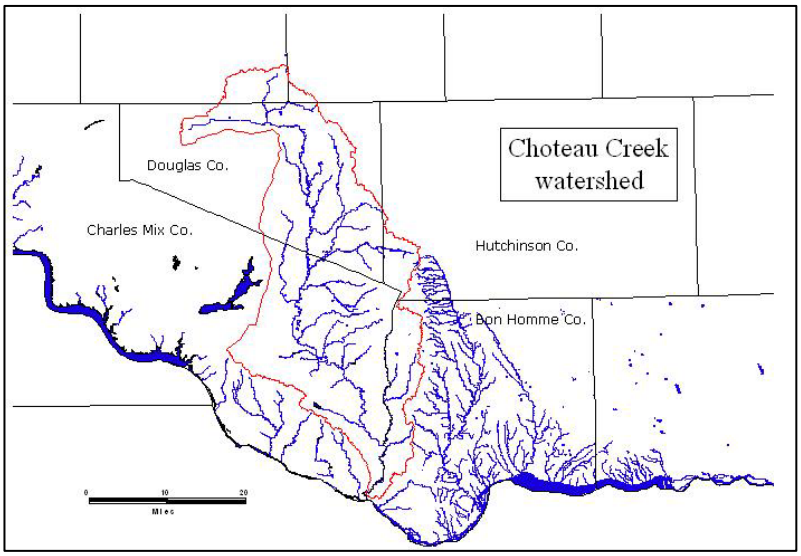

Figure 7: Choteau Creek Watershed.

Choteau Creek drains 375,000 acres in southeast South Dakota (Figure 7) and discharges to Lewis and Clark Lake on the Bon Homme and Charles Mix County line. The stream receives runoff from agricultural operations. During the assessment, data were collected indicating the creek experiences periods of degraded water quality as a result of TSS loads. The land use in the watershed is predominately agricultural consisting of 45% grass, 40% row crops, 7% small grains, 6% developed (including farmsteads, roads, and small communities), 1% forestland and wetlands. There are four small communities within the watershed they include Wagner, Delmont, Avon and Armour. Corsica Lake is an impoundment on the upper reaches of this stream.

Emanuel Creek

Emanuel Creek drains 120,000 acres in southeast South Dakota and discharges to Lewis and Clark Lake in Bon Homme County. The stream receives runoff from agricultural operations. During the Lewis and Clark Watershed Assessment, it was determined that the creek experiences periods of degraded water quality due to total suspended solids concentrations. The land use in the watershed is predominately grazing (32%), with the remaining portions of the composed of water and wetlands (2%), roads and housing (4%), and forested lands (1%). These percentages are considered representative of both the watershed as a whole, as well as the drainage area immediately surrounding the listed segment.

Emanuel Creek was assessed as an individual portion of the larger Lewis and Clark Watershed Assessment which assessed individual streams such as Emanuel Creek as well as the entire drainage basin and the cumulative effects of the individual waterbodies. Livestock feeding area analysis was conducted basin wide, with over 500 individual feeding areas examined. Ninety-seven of these feeding areas were located in the Emanuel Creek drainage.

Ponca Creek

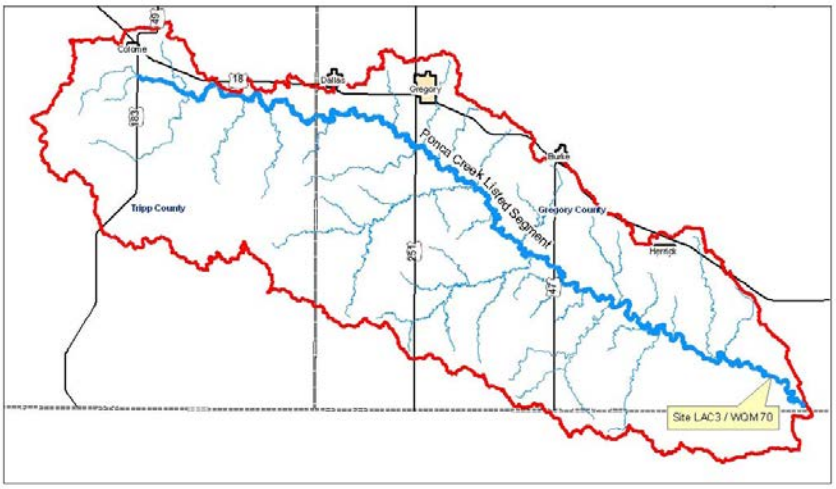

Figure 8: Ponca Creek Watershed.

The entire Ponca Creek watershed drains 520,000 acres in South Dakota and Nebraska and discharges to Lewis and Clark Lake near Verdel, Nebraska. The 303(d) listed segment that this TMDL addresses drains approximately 240,000 acres of Gregory and Tripp Counties in south central South Dakota. The communities of Burke, Colome, Dallas, Gregory and Herrick all reside within the listed segments drainage. The population of the watershed is approximately 2,900 with nearly half residing in and around the community of Gregory. Land use in the watershed is predominately agricultural in nature. Major land use categories are 78% native rangelands, 8% row crops, 6% developed (this includes road right of ways), 3% small grains, 2% hay ground, 1% forested, and 1% water and wetlands.

Ponca Creek was assessed as an individual portion of the larger Lewis and Clark Watershed Assessment, which assessed individual streams as well as the entire drainage basin and the cumulative effects of the individual waterbodies on Lewis and Clark Lake.

Dante Lake

Dante Lake is a small impoundment on Dante Creek, a tributary of Choteau Creek, near the southeastern boundary of Charles Mix County, South Dakota. The reservoir has an average depth of 11 feet and a maximum depth of 23 feet. Dante Creek is the primary tributary to Dante Lake which drains a small 2,884-acre watershed of 80% cropland and 20% grazing lands. It was listed as a degraded waterbody during 2004.

Geddes Lake

Geddes Lake is a man-made impoundment located on Pease Creek in southwest Charles Mix County. The lake has an average depth of 3.2 feet and a maximum depth of 12 feet with a drainage area of 76,000 acres. The drainage consists of agricultural lands with 79% being cropland and 21% rangeland. The outlet drains into Pease Creek and eventually empties into the Missouri River. Approximately 47 feedlots have been identified in the watershed.

Platte Lake, Burke Lake, Roosevelt Lake, Rahn Dam, Antelope Creek, Slaughter Creek and Snatch Creek.

These streams and waterbodies are listed but do not have assessments or TMDL's completed at this time. They are being treated with the same BMPs that are used on the above listed water bodies which deal with sedimentation and nutrient loading to protect the watersheds from further degradation from nonpoint sources.

Firesteel Creek/Lake Mitchell

The overall sediment loading to Lake Mitchell appears to be low. The AGNPS model predicted an annual load of 39,370 tons of sediment to Lake Mitchell which would reduce the depth of Lake Mitchell 1 foot every 61 years. Analysis of the 1993 water quality data estimated even less suspended solids entering the lake per year (14,053 tons). When a detailed subwatershed analysis was performed by AGNPS, 7 of the 40 subwatersheds analyzed appeared to have above average sediment deliverability rates. The seven subwatersheds with elevated sediment yields were found to contain 34.3% of the critical erosion cells and occupy 8.3% of the watershed area. The suspected source of elevated sedimentation is from agricultural croplands that have land slopes of 5% and greater. Water quality samples collected found elevated suspended sediment loads in the same locations as the AGNPS model.

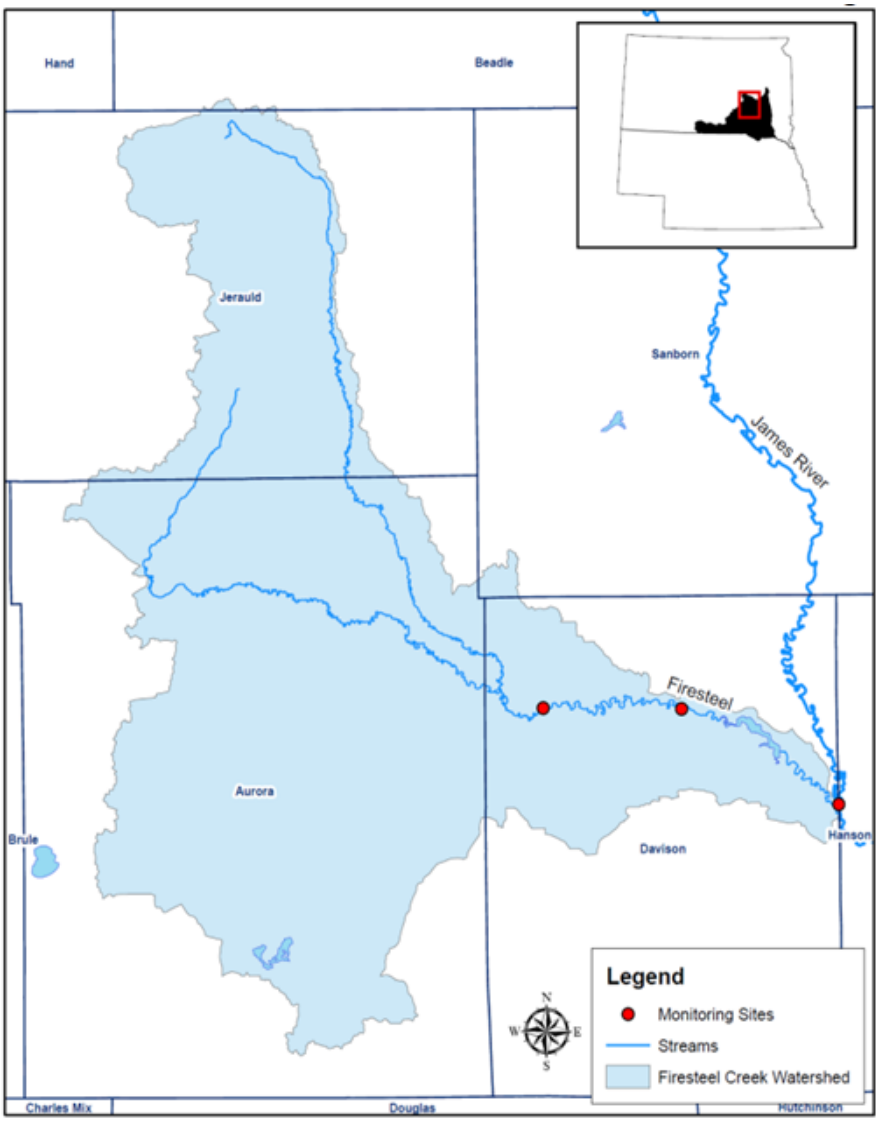

Figure 9: Firesteel Watershed Map.

The total nutrient loadings to Lake Mitchell are high. The model estimated the annual loadings to Lake Mitchell at 166 tons of nitrogen and 63.3 tons of phosphorus. Water quality monitoring in 1993 estimated annual loadings of 197 tons of nitrogen and 67.1 tons of phosphorus. It was not possible to pinpoint the sources of the nutrients with the water quality monitoring since the sites were so widely spread throughout the watershed. With the low sedimentation rate to Lake Mitchell, the most likely source of the high nutrients is from animal feeding operations within the watershed. Water quality samples did contain large concentrations of fecal coliform in many of the samples; again pointing to animal waste as a probable source.

Dawson Creek

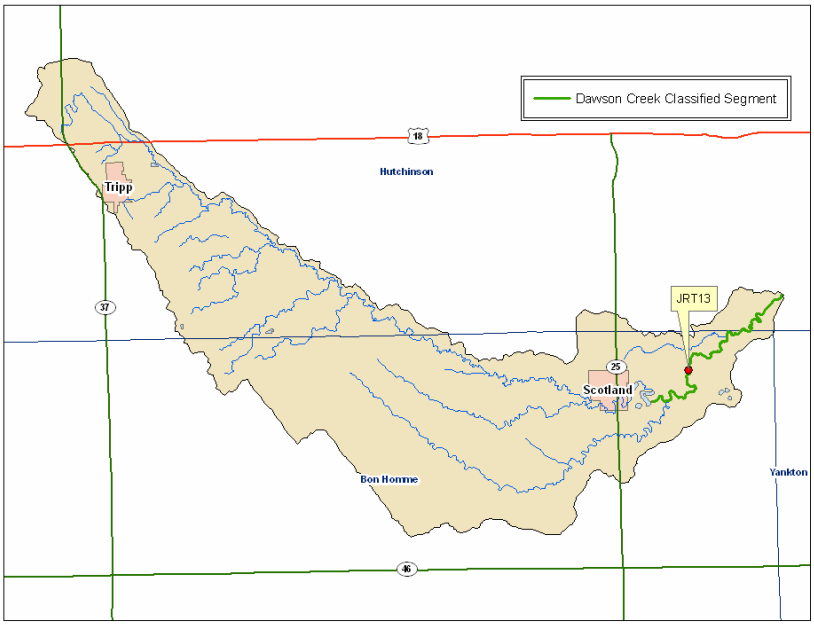

Figure 10: Dawson Creek Watershed Map.

The entire Dawson Creek watershed drains 44,768 acres in South Dakota and discharges to the James River. The 303(d) listed segment that this TMDL addresses drains portions of Hutchinson and Bon Homme Counties in southeast South Dakota. The communities of Tripp and Scotland reside upstream of the listed segments drainage. Over half of the population (1,500) within the watershed resides within these communities. The total population of the watershed is approximately 2,500. Approximately 36% of the population resides in rural agricultural areas of the watershed. The watershed climate is characterized by hot summers with temperatures occasionally reaching 100° F or greater and cold winters with temperatures dipping down below 0° F. Annual precipitation averages around 22 inches with 75% of it falling during the growing season, April through September. The average annual snowfall total is 50 inches. The most dominant soil association for the northern portion of the Dawson Creek drainage in Hutchinson County is the Clarno-Tetonka-Prosper association. The Tetonka-Prosper associations represent small wet depressions and narrow swales, respectively. The dominant soil associations for the rest of the Dawson Creek drainage located in Bon Homme County are Clarno-Bonilla, Clarno-Ethan-Bonilla and Ethan-Bon. The Clarno and Bonilla associations comprise over 80% cropland. The major crops in Bon Homme County are Alfalfa, corn, soybeans, oats and grain sorghum. About 75% of the Ethan-Bon association supports native grasses and is used for grazing (USDA, 1984). Land use in the watershed is predominately agricultural. Major land use categories include; 64% row crops, 25% native rangelands, 6% urban or developed, 3% hay ground, 1% small grains, and just over 1% forest-shrub and water.

Dawson Creek was assessed as an individual portion of the larger Lower James River Watershed Assessment, which focused on individual streams such as Dawson Creek as well as the entire drainage basin and the cumulative effects of the individual waterbodies on the lower portion of the James River.

Pierre Creek

Pierre Creek drains 78 square miles in central eastern South Dakota and discharges to the James River in Hanson County (Figure 11). The stream receives runoff from agricultural operations. The watershed is composed of 54% cropland, 37% grasslands (including pastures and hay ground), 7% developed (farmsteads and the town of Alexandria), 2% water and wetlands, and the remaining 1% trees and shelterbelts. The impaired segment of stream starts at the James River and stretches approximately two miles upstream of Lake Hanson. The watershed of the impaired section drains approximately 30 square miles. The community of Alexandria is the largest municipality located within the watershed and has a zero discharge waste treatment permit. Lake Hanson is located within the impaired reach of stream. The portions of the watershed located upstream of Lake Hanson were the target of an EPA Section 319 watershed implementation project with a goal of reducing nutrient loadings to the lake.

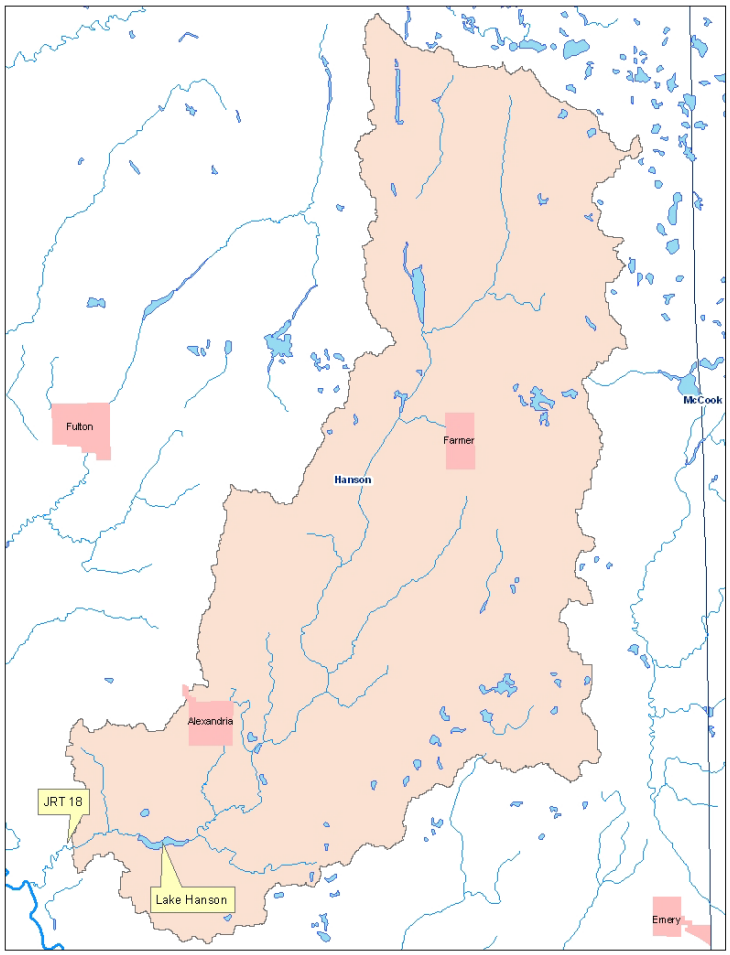

Figure 11: Pierre Creek Watershed.

Wolf Creek

Wolf Creek drains about 255,600 acres in southeast South Dakota (Figure 12) and discharges to the James River southwest of the community of Bridgewater. The stream receives runoff from agricultural operations. During the watershed assessment, data was collected indicating the creek experiences periods of degraded water quality as a result of TSS loads. The land use in the watershed is pre-dominantly agricultural consisting of 59% row crops, 23% grass, 6% developed (including farmsteads, roads, and small communities), 4% herbaceous, 4% close seeded/small grain, and 3% water and wetlands.

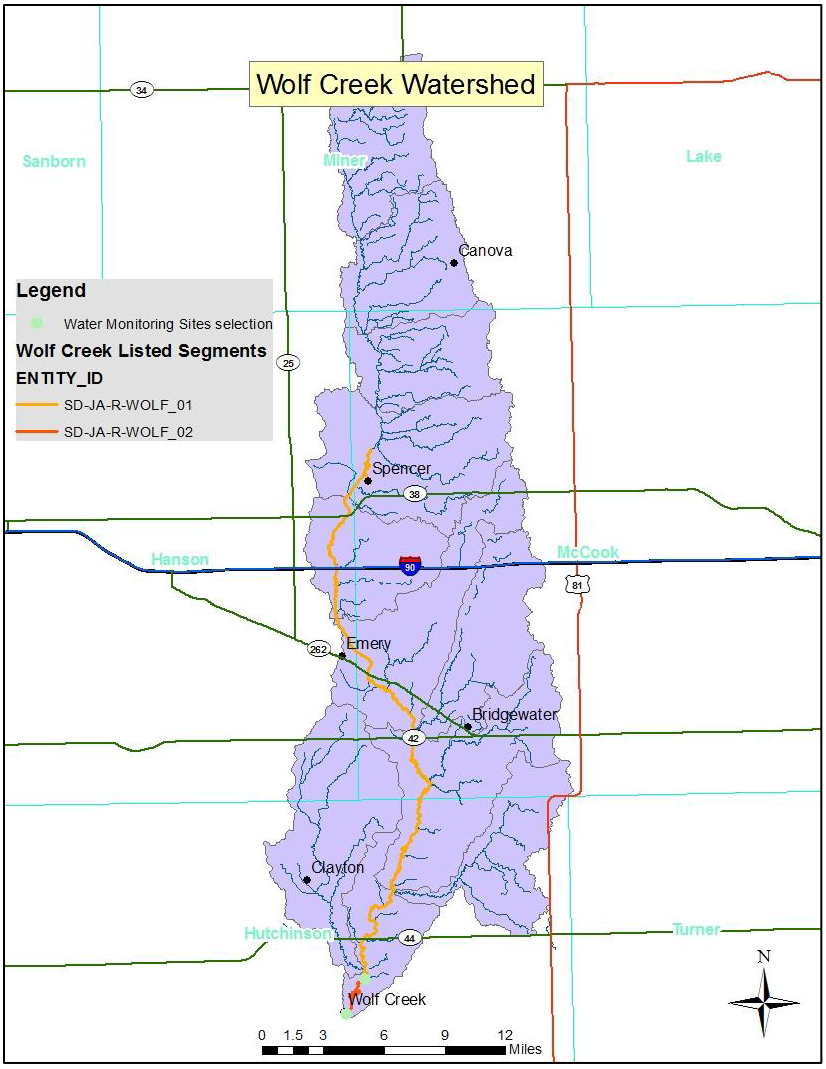

Figure 12: Wolf Creek Watershed Map.

There are four small communities within the watershed that have permitted wastewater treatment facilities. These include Canova, Spencer, Emery, and Bridgewater. None of these communities lie within the impaired reach of Wolf Creek. The impaired reach of the Wolf Creek drainage lies within Hutchinson County. Common soil associations on the uplands in this section of the drainage include the Clarno-Tetonka-Prosper and the Hand-Clarno-Davison associations. Soil associations found in the floodplain of the stream include the Ethan-Betts-Chaska association. Most areas of this association are maintained as pasture land. Some bottomland is used for agricultural production (USDA, 1978). Hutchinson County is considered humid continental and approaches semi-arid in some years. Temperatures range from over 100° to -30°. Most of the precipitation falls during the warm period, and rainfall is normally heaviest late in spring and early in summer.

Average annual precipitation is 23 inches, of this, 18 inches usually falls in April through September. Snowfall accumulations typically total 36.6 inches annually (USDA, 1978).

Wolf Creek was assessed as an individual portion of the larger Lower James River Watershed Assessment. The Lower James Watershed Assessment assessed the entire drainage basin as well as individual streams and the cumulative effects of these waterbodies. There are also two ambient water quality monitoring stations located on Wolf Creek.

Nonpoint Source Pollutants

Fecal Coliform Bacteria

The Lewis and Clark assessment report identified approximately 500 animal feeding operations that contribute fecal contamination to the tributaries of the Lewis and Clark Lake. Of the total, 125 were determined to be priority operations requiring the construction of animal waste management systems (AWMS) with accompanying nutrient management plans to reduce the fecal load. Evidence also pointed to improper spreading of manure on fields to be responsible for the levels, either by over application or by incorporating in high run off areas.

Sedimentation

Three primary sources of sediment loading identified included:

- sheet and rill erosion of cropland,
- degraded riparian areas and
- channel erosion.

1. Sheet and Rill Erosion

   Modeling indicates that in western portion of the watershed cropland erosion is not critical to the sediment load, mainly due to lower percentages of cropping land in the watershed. Modeling indicated that many tributaries of the Keya Paha and Niobrara Rivers were found not to generate significant sediment loads. Some eastern South Dakota watershed areas, particularly in Bon Homme County, may benefit from activities aimed at cropping practices such as reduced tillage, no till, and buffering systems. To a larger extent, managed grazing systems, which would improve range condition and reduce runoff, will benefit the reservoir.

2. Riparian Areas

   The AGNPS model indicated concerns regarding riparian conditions. Data indicated that degraded riparian areas and channel erosion were a significant source for sediment entering the reservoir. Complexities of some of the degraded areas will require additional site specific analysis before any BMP designs. Eroded channels appear to be the result of several different causes, and in some cases a combination of causes in various locations in the watershed. Causes of degradation are listed below:

   - Season long grazing, overstocking, and unmanaged grazing of stream banks may be one of the larger contributors to degraded channels.
   - Improper sizing and placement of culverts has resulted in channel erosion downstream from where water carried by the culvert empties into the stream and degraded ecological site.
   - Poor ecological range condition on some of the uplands has created increased runoff that has led to channel erosion.

3. Channel Erosion

   Data gained using the Annualized Agricultural Nonpoint Source (AnnAGNPS) Model and Rapid Geomorphic Assessments (RGAs) identified degraded riparian areas and channel erosion as significant sources for sediment entering the reservoir. Eroded channels appear to be related to management practices, and in some cases, a combination of practices. These include:

   - season long grazing, overstocking and grazing along streambanks appear to be associated with much of the degraded channels identified,
   - culvert sizing and placement has created some localized erosion problems downstream from their placement
   - Poor ecological range condition on some of the uplands has created increased runoff that has led to channel erosion

A summary of designated use impairments identified using ambient water quality sampling and water quality assessments completed or in progress and TMDL status are shown in Table 1. In addition to beneficial uses not supported, the parameter exceeded is identified and the TMDL(s) and TMDL implementation status are indicated. The beneficial uses are listed by number with:

1 - Domestic water supply waters
2 - Coldwater permanent fish life propagation waters
3 - Coldwater marginal fish life propagation waters
4 - Warmwater permanent fish life propagation waters
5 - Warmwater semi-permanent fish life propagation waters
6 - Warmwater 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

A TMDL status of delisted indicates either that additional water quality sampling indicated the parameter to be within established standards or there was a change in listing criteria, i.e. use of trophic state index (TSI) as an indicator of non-support. While delisting may have removed an impaired designation and identification as a priority waterbody which requires development of a TMDL, the data collected during water quality assessments will be used to target BMP installation to areas identified as sources of greater NPS loads.

Table 1: Summary of Designated Use Impairment and TMDL Status from the 2016 SD Integrated Report

Water Body – Map ID	Assessment Unit Identification (AUID)	Beneficial Use Impaired	Listed Cause
Lake Andes	SD-MI-LANDES_01	6,7,8	Oxygen, Dissolved
Burke Lake	SD-MI-L-BURKE_01	6,7,8	Chlorophyll-a Oxygen, Dissolved
Choteau Creek	SD-MI-R-CHOTEAU_01		None
Corsica Lake	SD-MI-L-CORSICA_01	6,7,8	Chlorophyll-a Oxygen, Dissolved
Dante Lake	SD-MI-L-CDANTE_01	4	Oxygen, Dissolved Temperature, water
Dawson Creek	SD-JA-R-DAWSON_01	8	Fecal Coliform, E-coli
Emanuel Creek	SD-MI-R-EMANUEL_01	5,8	Fecal Coliform, E-coli Total Suspended Solids
Firesteel Creek	SD-JA-R-FIRESTEEL_01	1,4,8	*Escherichia coli* Total Suspended Solids Temperature, water
Geddes Lake	SD-MI-L-GEDDES_01	5	Chlorophyll-a Oxygen, Dissolved
James River	SD-JA-R-JAMES_09	5	Total Suspended Solids
James River	SD-JA-R-JAMES_11	5,8	Total Suspended Solids *Escherichia coli*
Keya Paha River	SD-NI-R-KEYAPAHA_01	5,8	Fecal Coliform, E-coli Total Suspended Solids
Lake Mitchell	SD-JA-L-MITCHELL_01	1,4,7,8	Chlorophyll-*a*
Pierre Creek	SD-JA-R-PIERRE_01	8	Fecal Coliform, E-coli
Ponca	SD-MI-R-PONCA_01	5,8	Fecal Coliform, E-coli Total Suspended Solids
Rahn Lake	SD-NI-L-RAHN_01	4,7,8	Chlorophyll-a
Twin Lakes -	SD-JA-L-TWIN_01	5,7, 8	Chlorophyll-*a* Mercury in Fish Tissue
Wilmarth Lake	SD-JA-L-WILMARTH_01	4,9	pH Mercury in Fish Tissue
Wolf Creek	SD-JA-R-WOLF_01	8	Fecal Coliform, E-coli
Wolf Creek	SD-JA-R-WOLF_02	8	Fecal Coliform, E-coli

Project Segment 1 Accomplishments

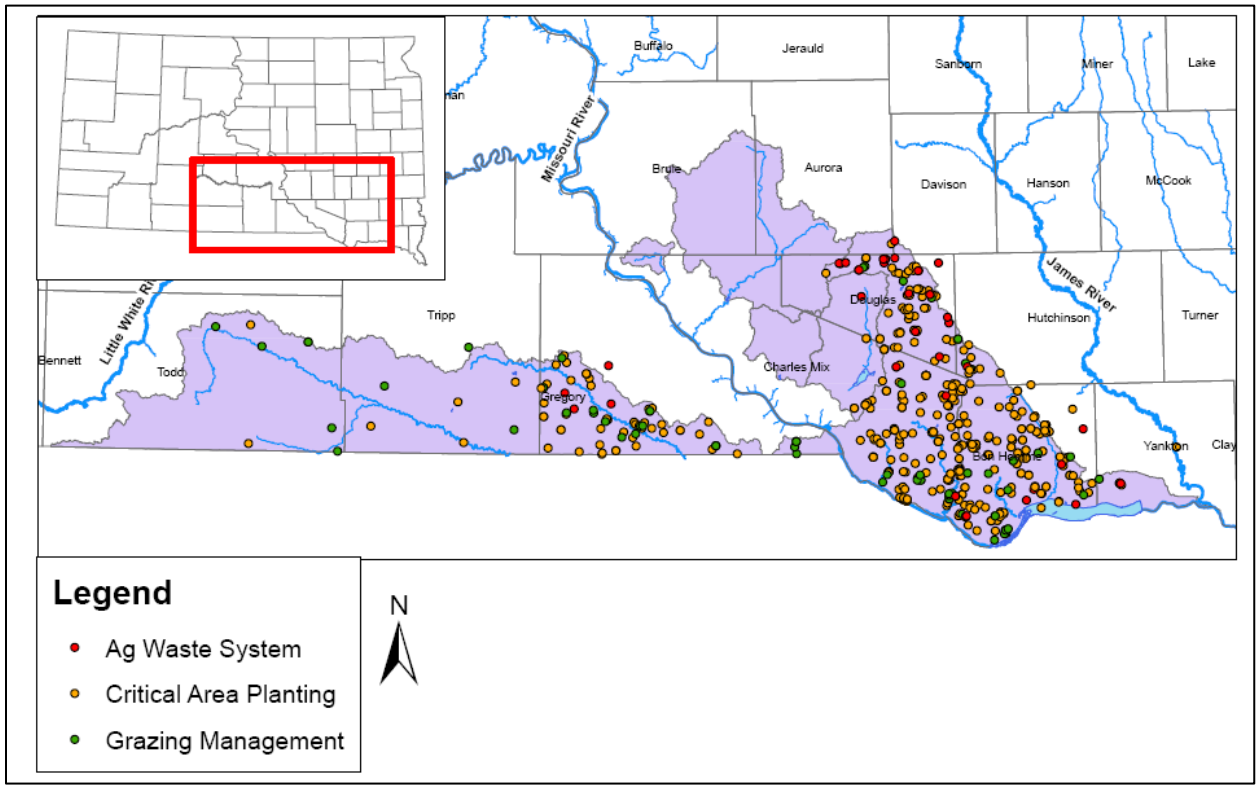

Figure 13: BMPs Installed During Project Segment 1.

Project Segment 1 was completed on September 30, 2009 with the final report submitted during November of same year. Accomplishments realized in Segment 1 were as follows:

- A steering committee was formed made up of representatives from local, state, and Federal government agencies and organizations.
- Project area was expanded to include the remainder of east river drainages into Lewis and Clark Lake and the west river portion including the Keya Paha River and Ponca Creek watersheds.
- TMDL's were completed for the east river portion of the Lewis and Clark watershed.
- BMPs were installed on 25,500 acres of cropland, 8,900 acres of grazing lands, and 18 Animal Waste Systems were built.

The Randall Resource Conservation and Development Council (RC&D), the project sponsor, accomplished the tasks included in the project PIP using the services of a project coordinator provided through an agreement with the South Dakota Association of Conservation Districts (SDACD).

The coordinator planned and installed BMPs through partnerships with local, state, and federal agencies. This conservation partnership helped facilitate:

- Matching practices that realized the best load reduction results needed to implement the TMDL with each producer's operation and management capabilities.

- Targeting cost share funds from project partners to specific practices and activities to establish more efficient use of project and partner resources.

USDA Farm Service Agency (FSA) Conservation Reserve Program (CRP) and Natural Resource Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP) were determined the best source of funds with which to provide farmers and ranchers with cost share funds to install the BMPs. Other major sources of cost share funds included the US Environmental Protection Agency Clean Water Act Section 319 and South Dakota Consolidated Water Facilities Construction Fund Grants provided through the SD Department of Environment and Natural Resources (DENR). These programs have been used throughout all of the segments in this project.

Figure 13 on page 16 illustrates the location of BMPs installed in Segment 1 of the project. Practices are broken down into grazing, critical area planting, and ag waste systems. Load reductions for the Segment, using the Step L Modeling Tool can be found in Table 5 on page 59.

Project Segment 2 Accomplishments

Project Segment 2 was initiated in June 2009 and ended in July 2011 and continued work started in the previous segment. The drainage area of Platte Lake was added in this segment, bringing the total coverage area of the project to just under two and a half million acres. To accommodate the growing project, a second project coordinator position was created. Goals of this Segment were:

- Continue BMP implementation in the Lewis and Clark project area with installation targeted toward priority BMPs identified in the watershed assessment
- Conduct a public education and outreach campaign to inform landowners, stakeholders and area residents of the water quality issues and emphasize opportunities for participation in the project.

Information presented in data from Table 2 on page 20, indicate that Segment 2 met or exceeded BMP milestones by the project and its stakeholders. Table 5 also shows the load reductions, estimated by the Step L program, for each division of practices installed. Figure 14 on the following page shows a map indicating where practices were completed in this segment. Several workshops and informational meetings were held to inform the public and stakeholders on how the project operates and on how to participate in the programs offered. Two tours were held to show producers how the finished practices function.

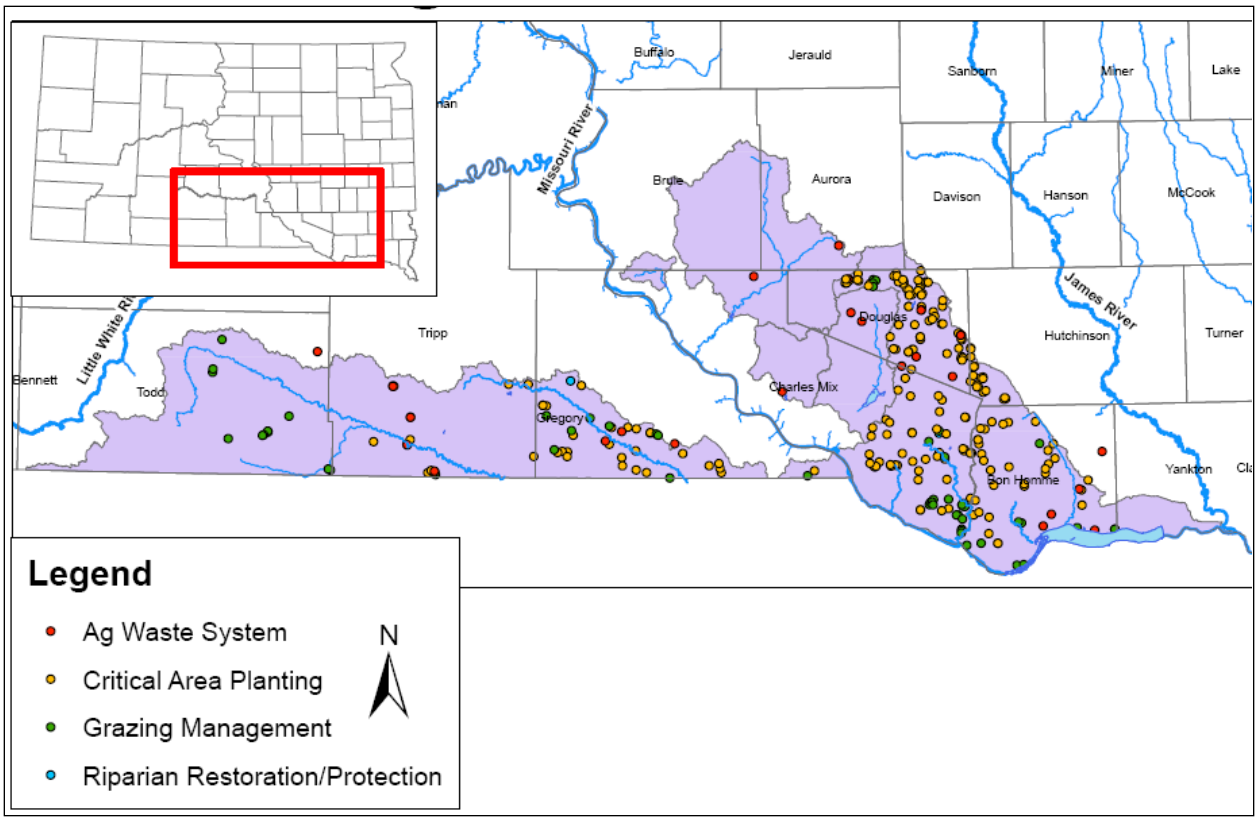

Figure 14: Location of BMPs Installed during Segment 2.

Randall RC&D Council remained an active sponsor for the project, hosting steering committee meetings and keeping stakeholders informed of project progress. Producer participation remained strong and BMPs were installed on 14,000 acres of cropland, 7,200 acres of rangeland, and 12 animal waste systems were built during Segment 2 of the project.

Project Segment 3 Accomplishments

Segment 3 of the project began in July, 2011 and ended in July, 2014. Goals to be realized in this segment were much the same as the two earlier segments and producer participation for offered practices remained strong. Milestones from conclusion of the segment showed practices funded in the grasslands demonstrated the largest amount of applied acres with 44,098 grazing acres being completed. Several drought cycles were evident in this period and led to high demand of livestock watering facilities to protect the drought stressed riparian areas. A total of 262,609 feet of pipeline and 108 tanks were installed. Available funds were used to meet this high demand and left less to be applied to the animal waste management practices. Requests for the animal waste practice were curtailed as historic high prices for feed grains and replacement feeder livestock which effected profitability for this agricultural sector. A total of eight total containment animal waste systems were installed in this segment.

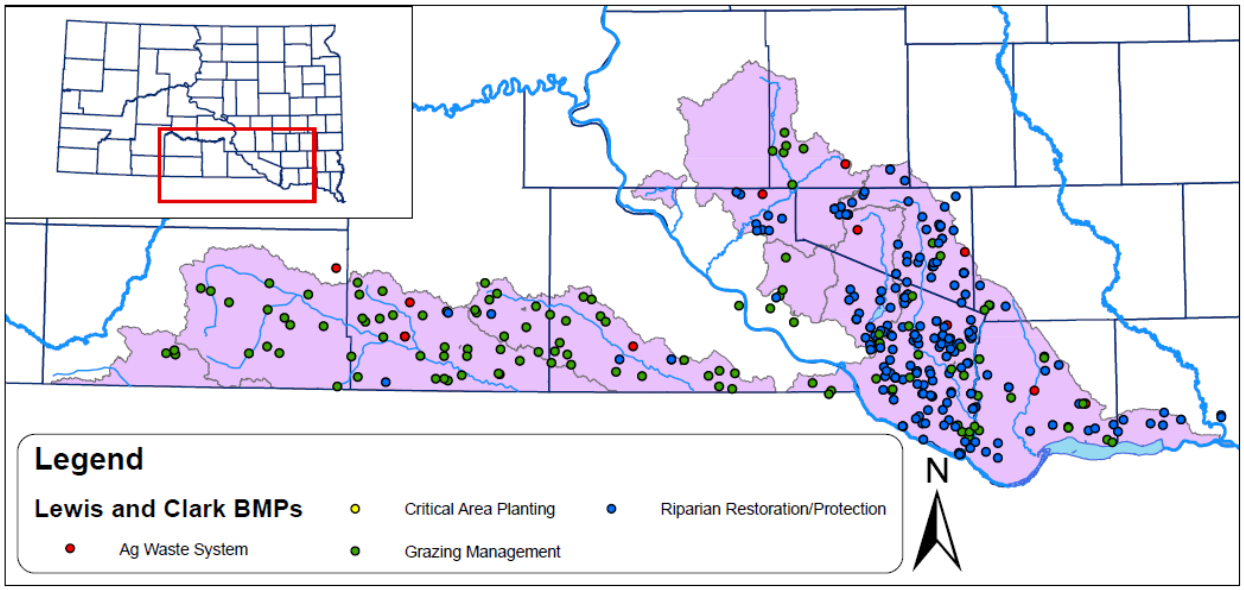

Figure 15: Locations of BMPs Installed During Project Segment 3.

Randall RC&D remained as sole sponsor during this segment and was influential in hosting the semiannual steering committee meetings. Three tours were held in this time frame for animal waste systems completed in various areas of the watershed. A website and Facebook page were developed to attract more producer participants and put out contact and practice information offered by this Project. Four news releases were printed in local news media to inform the public of progress of the project.

Project Segment 4 Accomplishments

Segment 4 of the project began on May 12, 2014 and concluded on July 31, 2016 making it a two year segment. Many of the milestones were met or exceeded during this shortened segment showing the producer involvement and demand for practices. The Project area was expanded to include the lower James River watershed and James River Water Development Board was added as a co-sponsor for the new project area totaling 5.5 million acres.

A Success Story was submitted to EPA and published recognizing that water quality standards were meeting on the Keya Paha River after intensive work done through this project during the beginning of this segment. The Keya Paha River was impaired for bacteria and total suspended solids affecting its limited contact recreation and warmwater semipermanent fish life beneficial uses. The 2014 Integrated Report published by SD DENR listed the Keya Paha River as full support for its beneficial uses. The Success Story can be found in the appendix of this report or on the internet at: https://www.epa.gov/sites/production/files/2015-12/documents/sd_keya.pdf

This report will indicate benchmarks set by the original Project Implementation Plan were met for this segment of the Project. The tasks completed during this segment to install BMPs that reduce NPS pollution from the watershed are described in the Project Goals, Objectives and Activities and Monitoring section.

PROJECT GOALS, OBJECTIVES, AND ACCOMPLISHMENTS BY TASK

The goal of the Lewis and Clark Watershed Implementation Project is to restore the beneficial uses in Lewis and Clark Lake. This will be accomplished through the installation of Best Management Practices (BMPs) in the watersheds that target sources of sediment, nutrients, and fecal Coliform bacteria. This project, Segment 4, properly addressed and targeted BMP installation in the entire South Dakota portions of the Lewis and Clark Lake Watershed.

The practices that were installed were based on information from the Lewis and Clark Watershed Assessment and are summarized in the following table:

Table 2. Estimated Best Management Practices Implementation by Acres and Project Segment for South Dakota Lewis and Clark Lake Watershed Area

Best Management Practices identified in the Watershed Assessments	Estimate of Acres/Practices to attain Project Goal (July 2006) Start	Segment 1* (Through 6/30/2009) Progress completed As of August 25, 2008	Estimate of Acres/Practices Segment 2 (2 years period) (end of year 5) (July 2011)	Estimate of Acres/Practices Segment 3 (3 years period) (end of year 8) (September 2014)	Estimate of Acres/Practices Segment 4 (3 year period) (end of year 11-September 2016)
Cropland BMPs					
Filters/Buffer Strips, Grassed Waterways, Conservation Cover, Tree Planting	42,000 acres	20,975 acres	14,000 acres	16,500 acres	10,0000 acres
Grassland BMPs					
Planned Grazing Systems, Grass Seeding, Riparian Buffers, Grassed Waterways, Riparian Area Management	161,200 acres	8,164 acres	7,200 acres	17,250 acres	14,000 acres
Animal Waste Management	100	8	10	12	10

Landowners and operators who were provided assistance were required to sign an agreement that outlined the responsibilities of both the operator and the sponsoring agency. A clause in the agreement spelled out operation and maintenance agreements as well as the life span of the practice and consequences of early abandonment.

As practices were installed on the landscape, they were entered into the South Dakota DENR Tracker database. This database keeps track of expenses, load reductions, and a map of the practice's physical location. Load reductions are figured by entering the practice into the Spreadsheet Tool for Estimating Pollutant Load (STEPL) Model. A list of the load reductions for Segment 4 can be found later in this report in the Monitoring and Evaluation section on page 32.

Objective 1: Reduce nutrient, sediment and fecal coliform loadings in the Lewis and Clark Watershed and the Lake Andes Watershed through the installation of Best Management Practices.

Task 1: Plan and implement cropland and grassland Best Management Practices (BMPs).

Provide assistance to landowners with installation of BMPs on cultivated and grassland BMPs in the watershed that reduce fecal coliform bacteria, nutrient, and sediment loadings from cultivated cropland and grasslands. BMPs will primarily be installed with landowner investments along with USDA programs (EQIP/CRP), as well as wildlife agency programs (Pheasants Forever, USF&W, and SD GF&P). Project funds for technical assistance on grassland and/or cropland BMP implementation will be targeted toward critical cells in riparian areas identified in the watershed assessment.

Product 1: 10,000 acres of cropland benefited from BMP installation by landowners.

BMPs installed by landowners will include filter strips, riparian buffers, tree plantings, conservation cropping systems, and grassed waterways on 10,000 acres of cultivated cropland to reduce nutrient and sediment loading. BMPs using 319 funds will only be located in the riparian area.

Figure 16: Wheat harvest on Crop Rotation Practice.

Figure 17: Grass Filter Strip Practice using CRP Program.

Milestones:	**Planned:**	**Completed:**
Residue Management, No/Strip Till	10,000 acres	0

Accomplishments:

Direct Funding of cropland BMPs with 319 dollars are restricted to riparian areas only, so primary funding for these BMPs were provided by USDA agencies of NRCS and FSA from their CRP and EQIP programs. Data shows that acres of cropland BMPs were adequate to meet the planned acres in the watershed implementation plan. Information on individual practices along with exact acres for each practice have not been provided for this project at the time of the writing of this report for entry into our database, but cumulative totals provided show sufficient acres to meet this goal.

Product 2: Grassland Management Systems Installed on 14,000 acres of grasslands.

Grassland management systems will be designed and installed on 14,000 acres of grassland to reduce fecal coliform, nutrient, and sediment loading. Technical assistance for system planning will be requested from the SD Grassland Management and Planning Project and Natural Resources Conservation Service (NRCS) field offices. BMPs will be implemented using funds from state and federal programs (EQIP, Continuous CRP, and Wildlife Programs). BMPs planned to be installed include: planned grazing systems, fencing, livestock exclusion, grass seeding, pipelines, tanks, ponds, rural water hook-ups, and riparian buffers. Use of 319 funds to implement grazing management systems will be for riparian grasslands along major tributaries that have been identified as critical cells, and where other sources of cost share is not available.

Figure 18: Cattle on Rotational Grazing System, Gregory County.

Figure 19: Livestock Protection Trees.

Milestones:	**Planned:**	**Completed:**
Fence (Feet)	0	142,175
Grazing Planned Systems (Acres)	30,000	40,382
Pipeline (Feet)	0	216,350

Accomplishments:

Grazing BMPs offered by this Project segment still show great demand from livestock producers as they have in previous segments. Practices offered by this Project simply try to reduce or eliminate grazing pressure on fragile riparian areas. Providing cost share on pipelines to supply fresh drinking water for livestock, and fencing to exclude or ease grazing impact on riparian areas were the backbone of this practice. Demand for these BMPs far exceeded funds available to implement them, thus funded projects were based on gaining the highest level of impact for the least amount of dollars. A large majority of producers didn't elect to receive payment from CRP or RAM for riparian areas they excluded from their pastures, so dollars spent from these programs were minimal. Demand is expected to remain high for this practice. Producers are realizing that the best path for adding pounds on livestock is by offering fresh drinking water instead of relying on waters from stagnant sources from impoundments or seasonal streams. Milestones show the planned portion was based on a three year segment, but was completed in just two years.

Figure 20: Examples of Livestock Water Practice.

The map below was developed by NRCS and funded by the Project. Three miles of the James River and a major tributary were excluded from livestock grazing.

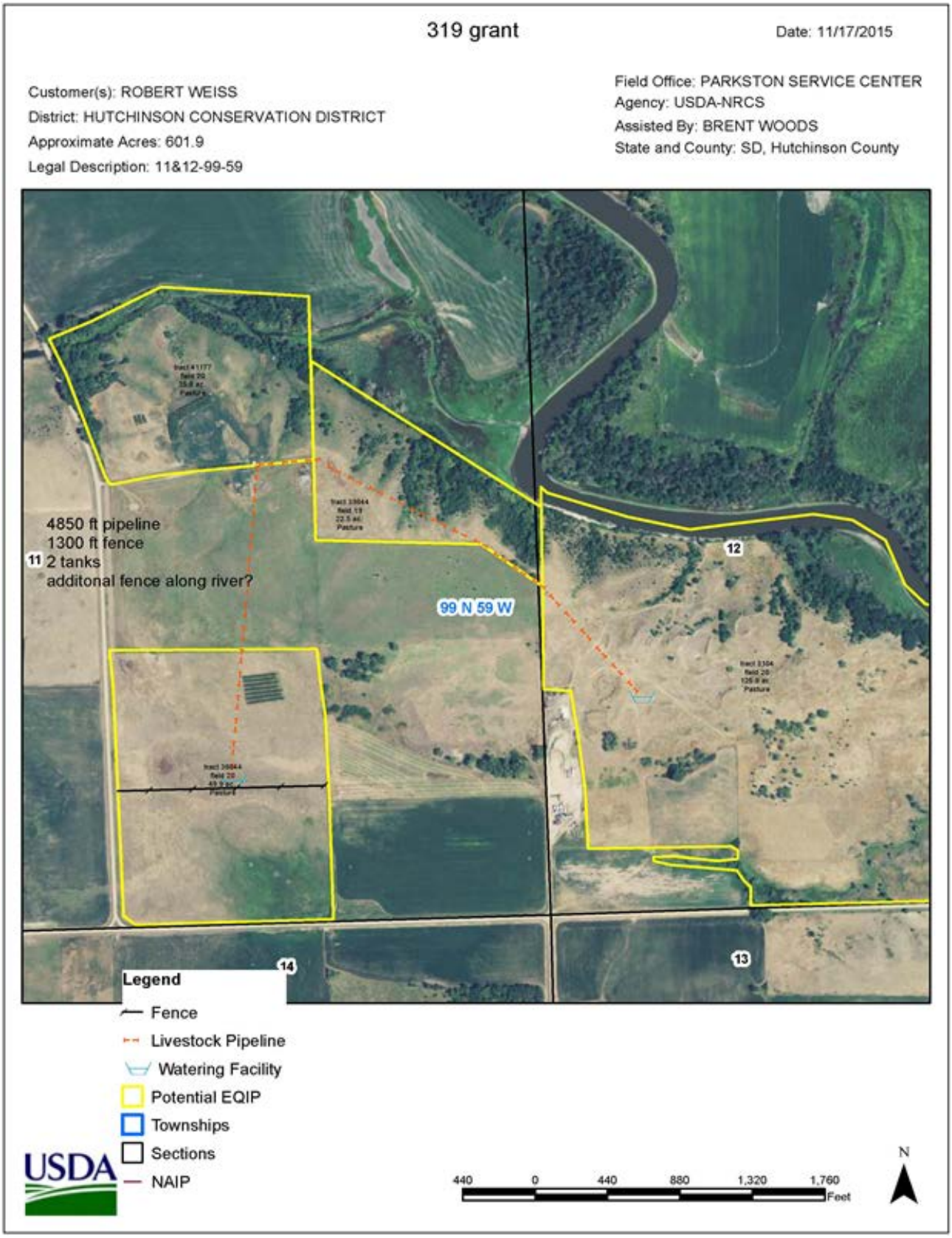

Figure 21: Grazing Plan Map.

Product 3: Riparian Area Management (RAM) will be installed on 30 acres of riparian land.

The RAM Program is a livestock exclusion set aside type program for riparian land. It is designed to reduce phosphorus, suspended solids, and fecal coliform bacteria loading by ensuring that tracts of land not eligible for the USDA Continuous Conservation Reserve Program become protected as riparian buffers. This land must be located on or in close proximity to priority stream segments. DENR RAM Program guidelines issued in May of 2012 are to be followed.

Milestones:	**Planned:**	**Completed:**
RAM acres	30	0

Figure 22: Examples of Streams after Livestock Grazing Exclusion.

Accomplishments:

RAM is used as a tool to help producers obtain funds for idled riparian grazing acres. As mentioned earlier in the report, many producers opted not to be paid for these acres and we have not used this tool to date. A five mile stretch of Firesteel Creek, immediately above Lake Mitchell, has been targeted in the past year to remove livestock from the creek. The RAM and CRP programs are major components of this effort and future demand for this practice may see an increased use.

Task 2: Reduce fecal coliform loadings originating from animal feeding operations.
Assist livestock producers with construction of ten (10) animal waste management systems, to include eight nutrient management plans to reduce loading of fecal coliform bacteria, nutrients, and total suspended solids.

Product 4: 10 Animal Waste Management Systems (AWMS)

Figure 23: Construction of Animal Waste Lagoon.

Ten animal waste management systems, to include nutrient management plans, will be installed by livestock producers. Private consultants and NRCS will design the animal waste management systems, and develop the Agricultural Nutrient Management Plan. Funding for AWMS will be from this Project's 319 funds, State Consolidated Funds, Landowners, and the NRCS EQIP program. Ten of the AWMS are anticipated to be full containment systems in feedlot situations, and two systems are anticipated to be relocation of cow/calf feeding areas from critical stream/river riparian areas. The relocation of cow/calf feeding areas used seasonally will involve a contract with the landowner that includes a required grazing plan on days of use and season of use for the riparian pasture. Practices utilized for the feeding area relocation will include required fencing, water development, and fabricated and/or tree windbreaks.

Milestones:	**Planned:**	**Completed:**
Engineering Designs	6	6
Nutrient Management Plans	8	5
Riparian Winter Feeding Areas	4	1
System Constructions	10	7

Accomplishments:

Figure 24: Cows and Calves being housed in a Hoop Facility.

All facilities installed through this Project were on a prioritized list formed during the assessment. Participation in the USDA's EQIP program was critical for this projects involvement in the construction of AWMS to help defray rising costs. USDA's EQIP program budgets are being scaled back, making it increasingly difficult to meet this requirement. The Project applied for a grant with the USDA Regional Conservation Partners Program (RCPP) to counter this trend. The Project received notification that it had been awarded this grant that will allow a large pool of EQIP dollars to be spent in this watershed, and increases producer funding opportunities for future segments.

Systems installed in this segment were split equally between traditional feedlots scenarios and the more confined building approach. Decisions to adopt the building practices were driven by an unwillingness to devote the amount of acres to the traditional feedlot approach, as land values were at historic highs for much of the watershed, and the building design required far less land use change to house the livestock being fed. High land values also caused another problem for the ag waste practice, many acres of grasslands were converted to cropland in the watershed making it more difficult for livestock producers to obtain grazing acres for their cow herds. Herds were being forced into a yearlong feedlot situation because of high grass rents, making those feeding areas required to have waste runoff collected on them as well. Two of the livestock producers opted to build less expensive hoop buildings and to have a more controlled environment for their herds to raise the young seasonally.

Below are before and after pictures of an open hog facility where runoff flowed into Snatch Creek before an AWMS was installed.

Figure 25: Before and After Hog Facility.

Objective 2: Provide project and BMP information to a minimum of 100 watershed landowners, 20 watershed organizations, and 2,500 area citizens to inform them of this project's need and progress, and the results and recommendations from the Watershed Assessment.

Task 3: Implement an Information and Education campaign to inform the public and stakeholders on project need and progress, results, and recommendations of the Watershed Assessment Final Report.

Product 5: Information and Education Campaign of informational meetings (2), tours (2), newsletters (3), steering committee meetings (5), and press releases (4) completed.

The project coordinator will provide assistance to Randall RC&D to complete an information and education campaign that includes on-farm tours, news releases, presentations to area stakeholder organizations, and an annual meeting of the project steering committee. The cost of information activities, including supplies and postage, will be provided to this 319 project and Randall RC&D and their partners.

Figure 26: Coordinators Giving Informational Talks to Producers and Groups.

Product 5: Information and Education Campaign of informational meetings (2), tours (2), newsletters (3), steering committee meetings (5), and press releases (4) completed.

Figure 27: Steering Committee Meeting.

The project coordinator will provide assistance to Randall RC&D to complete an information and education campaign that includes on-farm tours, news releases, presentations to area stakeholder organizations, and an annual meeting of the project steering committee. The cost of information activities, including supplies and postage, will be provided to this 319 project and Randall RC&D and their partners.

Milestones:	Planned:	Completed:
Tours	2	2
Informational Meetings	2	5
Steering Committee Meetings	5	4
Presentations to Partners	3	4
News Releases	4	3

Accomplishments:

Lewis and Clark hosted a feedlot tour and a tour of an alternative cropping plot. The Steering Committee met on a bi-annual basis with the group made up of conservation districts, USDA agencies, USF&W staff, and other members of local government offices from across the watershed represented. Committee offered guidance to the project for BMP installation and were influential in helping with producer contacts and planning practices.

Figure 28: Tour of Hoop Barn.

Three featured articles were printed in regional and local papers highlighting successes of the project and BMP goal information. A newsletter was sent out jointly with the Gregory County Conservation District, who offered their list of services as well, to producers within the Ponca Creek watershed emphasizing BMPs offered by the Project.

Figure 29: Booth Display at Cattlemen's Workshop in White River.

Figure 30: Gabe Brown Giving Talk to Cattlemen at Mission, SD.

The project co-sponsored a series of three informational meetings, featuring Gabe Brown, which dealt with soil health issues and holistic grazing techniques. Three sites the meetings were held at are Mission, Yankton, and Chamberlain. Booth displays were set up at various seminar events and fairs to attract attention to the goals of the Project as well. An effort was undertaken to appeal to a broader base by offering a page on Facebook which was very popular during this segment of the Project. The Project and sponsors were very satisfied with attendance and public participation at the informational events.

Objective 3: Completion of water quality monitoring, monitor project progress and complete project administration and management to document project progress towards objectives and meet grant administration policy and guidelines.

Task 4: Monitoring water quality through water sampling related to BMP installation and after storm events to assess changes in water quality from BMPs and from the initial watershed assessment sampling. Project staff will collect water samples related to installation of animal waste systems to evaluate before and after water quality changes and related to storm events at the outlets of creeks (Emmanuel, Choteau, etc.) for testing at the State Health Lab. Testing will be completed related to Total Suspended Solids, Fecal Coliform Bacteria, and *E-coli*. Sampling will be completed utilizing technical assistance from the SD DENR and following procedures established in the "Standard Operating Procedures for Field Samplers, Volumes I & II, Tributary and In-Lake Sampling Techniques", State of South Dakota, 2005.

Figure 31: Coordinator Sampling Keya Paha River.

Milestones:	**Planned:**	**Completed:**
Water Samples	24	40

Accomplishments:

Segment 4 of this Project saw a water sampling regime developed. It was decided to sample four streams every three weeks, with samples being random to give a better variability for information collected. Keya Paha River, Ponca Creek, Choteau Creek, and Emanuel Creek were selected for the program, and were tested for Total Suspended Solids and E.coli Bacteria. Samples were collected at established Water Quality Monitoring sites so flows could be determined without further effort and maintain consistency with other ongoing monitoring. The first sampling year Coordinators conducted the sampling through their normal work hours. The second year seasonal interns conducted the sampling to free up planning time for Coordinators. A good base set of samples is being assembled by this undertaking for future use and comparisons, and some analysis of these samples can be found in the monitoring section of this report beginning on page 32.

Figure 32: Pictures of Water Sampling Sites.

Task 5: Monitor progress and complete progress reports and complete grant administration to meet project requirements and guidelines.

Product 7: Annual (3), final (1) reports completed according to grant guidelines and requirements.

Milestones:	**Planned:**	**Completed:**
Annual GRTS Reports	4	2
Final Report	1	1

Accomplishments:

All required reports were completed and submitted to DENR.

Summary of Project Goals and Objectives

Planned and completed milestones from all segments of the Lewis and Clark project can be found in Table 3 with this segment milestones (Segment 4) bolded. Over all, the project met or exceeded most BMPs planned for the project.

Table 3. Milestones Planned Versus Accomplished Comparison.

BMP/Practice	**Milestones**									
	Segment 1		**Segment 2**		Segment 3		**Segment 4**		**Cumulative**	
	Planned	Completed	Planned	Completed	Planned	Completed	**Planned**	**Completed**	Planned	Completed
Cropland BMPs										
Total Acres Benefited	750	24,502	10,000	14,028	15,000	10,162	**10,000**	**6,181**	35,750	54,873
Grazing Management										
Planned Grazing (acres)	1,500	8,859	4,000	7,201	17,000	42,852	**14,000**	**40,382**	36,500	99,294
Livestock Exclusion (feet)	0	0	0	87,547	0	15,628	**0**	**1,345**	0	104,520
Riparian Area Management (RAM)/CRP (acres)	0	0	50	0	30	0	**30**	**134**	110	134
Ag Waste Systems										
Engineering Design	8	22	15	15	14	7	**6**	**6**	43	50
Nutrient Management Plan	8	32	12	11	14	8	**8**	**5**	42	56
Riparian Winter Feeding Area	0	0	2	3	6	2	**4**	**1**	12	6
System Construction	8	18	16	12	16	8	**6**	**7**	46	45
Information and Education										
Informational Meetings	4	12	2	4	8	4	**2**		12	20
Press Releases	6	8	4	4	4	0	**4**		12	12
Newsletters	0	0	4	3	0	0	**0**		4	3
Steering Committee Meetings	0	0	2	2	3	3	**5**		10	5
Tours	3	4	2	1	2	1	**2**		6	6
Water Quality Monitoring (Samples)	0	0	24	0	30	0	**24**	**40**	78	40
STEPL Load Reduction/yr.										
Nitrogen (lbs)		389,754		325,604		715,358		**210,608**		1,641,324
Phosphorous (lbs)		107,834		87,924		195,758		**52,322**		443,838
Sediment (tons)		52,340		37,067		89,407		**25,181**		203,995

MONITORING AND EVALUATION

Monitoring

Financial information, milestones, and load reductions were monitored using SD DENR's Tracker Database through the internet. Water quality monitoring was conducted through the SD DENR's ambient water quality monitoring stations and through extra samples collected by the project. Samples collected between 2007 and 2011 are considered as "Earlier Samples" and those collected between 2012 and 2016 as "Last 5 Years" for comparing purposes in the following segment.
Samples were collected at:

- Choteau Creek
- Keya Paha River
- Ponca Creek
- Emanuel Creek
- Firesteel Creek
- Wolf Creek
- Pierre Creek
- Dawson Creek

Keya Paha WQM:

Keya Paha is listed as impaired for Total Suspended Solids (TSS), Fecal Coliform, and E-coli in SD DENR's Integrated Report (IR). Water quality monitoring samples for Keya Paha were collected at LEWCLARAC2 or ambient water quality monitoring site 460815 (same location) shown in Figure 33.

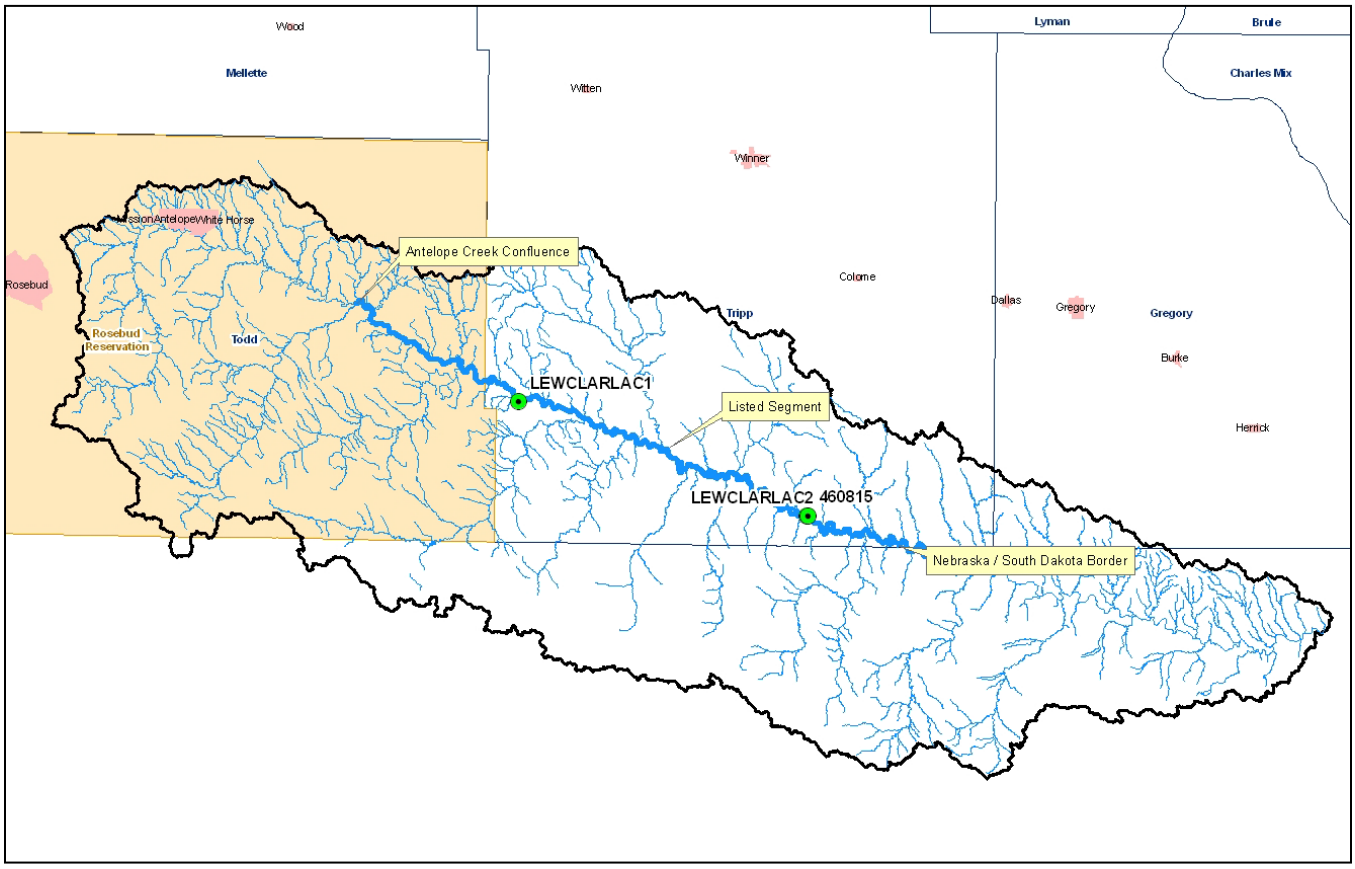

Figure 33: Keya Paha Water Quality Monitoring Site.

There is an upward trend in E-coli between the two time periods for Keya Paha with regard to E-coli sampling (Figure 34). Here the median value increased from 309 to 530 CFU/100mL. The standard for E-coli on the Keya Paha River is 1178 CFU/100mL.

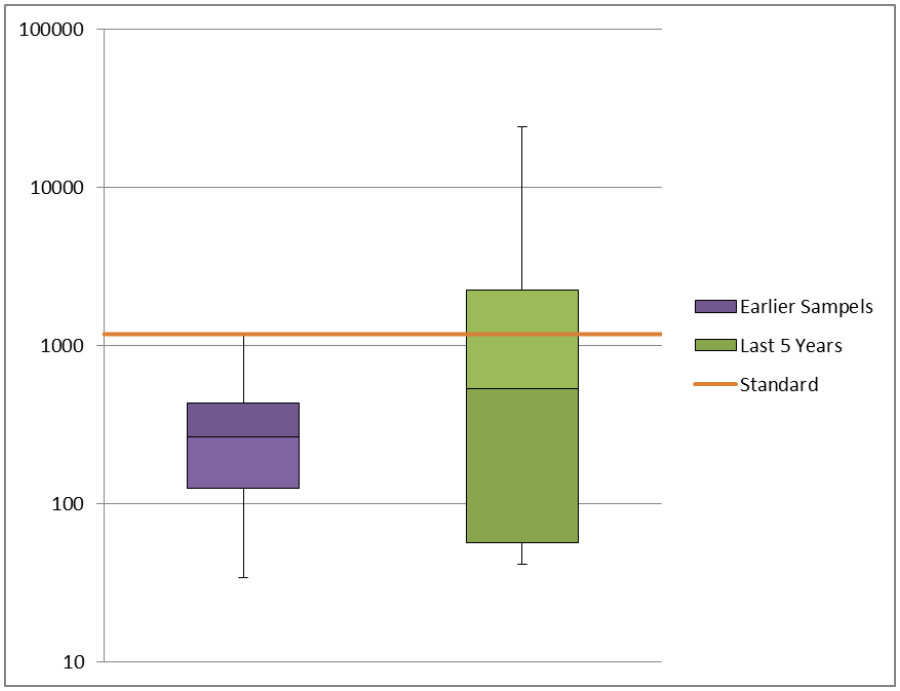

Figure 34: Keya Paha River E-Coli Box and Whisker Plot.

All E-coli samples from 2004 through July of 2016 taken at the Keya Paha WQM site are displayed below in Figure 35. There is a 39% exceedance rate for the Last 5 Years data set compared to a 12.5% exceedance rate of the Earlier Samples data set. The increase could be due to additional sampling, there are 18 samples in the Last 5 Years data set and only 8 samples in the Earlier Samples period.

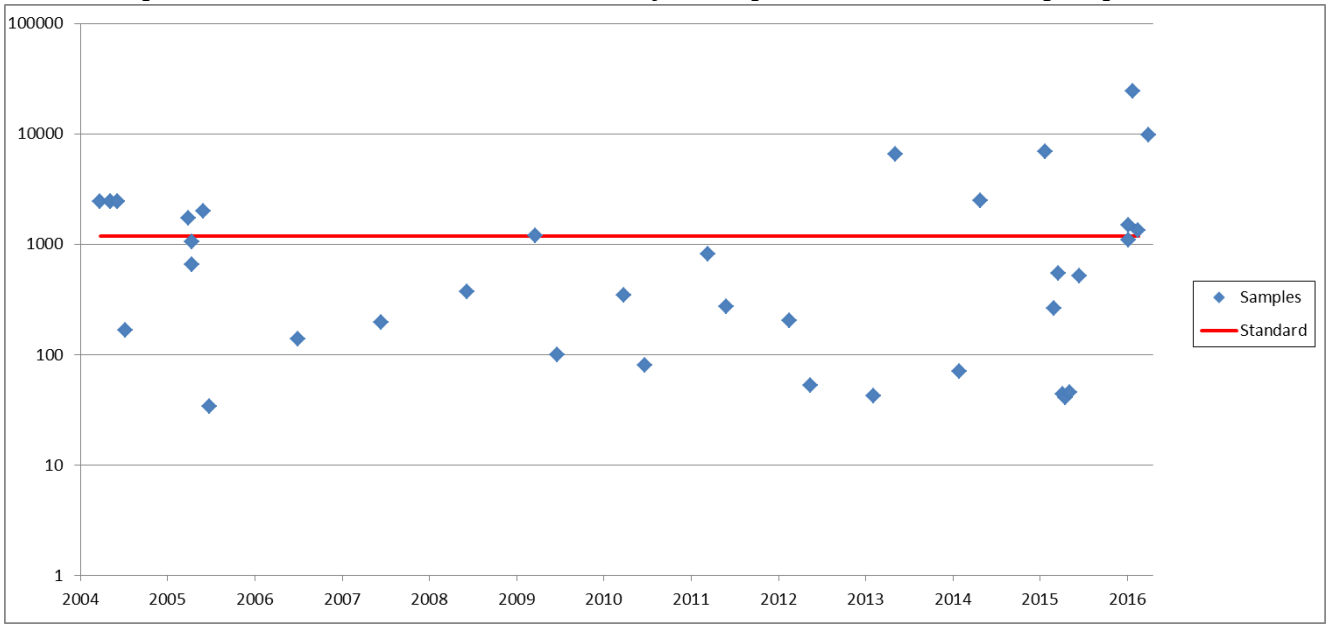

Figure 35: Keya Paha E-Coli Samples.

TSS samples show the meadian value increased from 52.5 mg/l to 98.5 mg/l comparing Eariler Samples to Last 5 Years samples. The Fecal Coliform standard on the Keya Paha River is 158 mg/l.

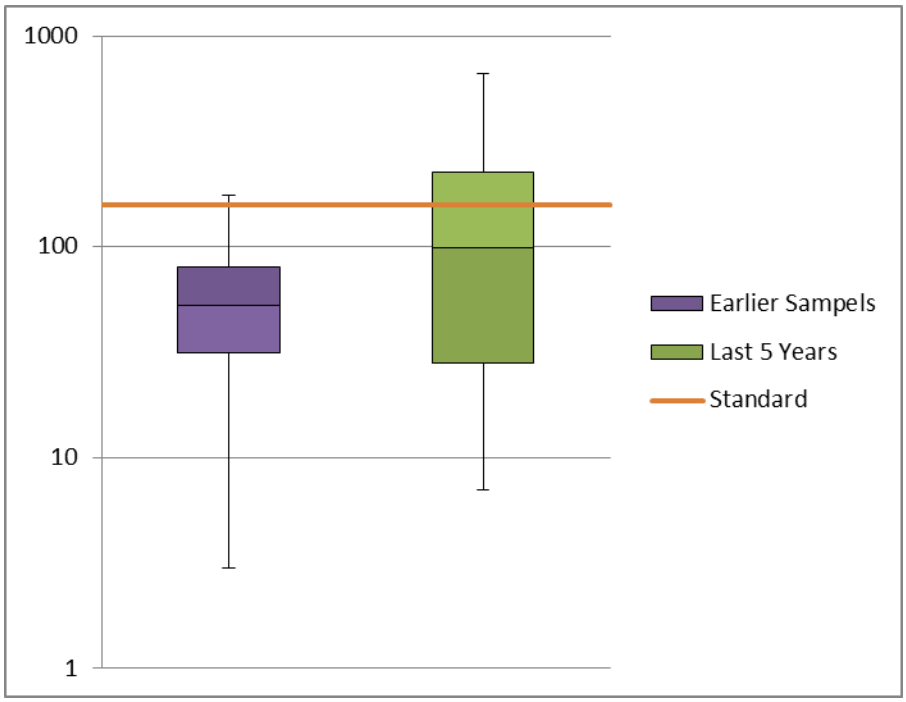

Figure 36: Keya Paha River TSS Box and Whisker Plot.

All TSS samples from 2004 through July of 2016 collected at the Keya Paha WQM site are displayed below in Figure 37. There is a 39% exceedance for the Last 5 Years data compared to a 10% exceedance of the Earlier Samples data. Part of this increase could be due to additional sampling, there are 28 samples in the Last 5 Years data set and 20 samples in the Earlier Samples data set.

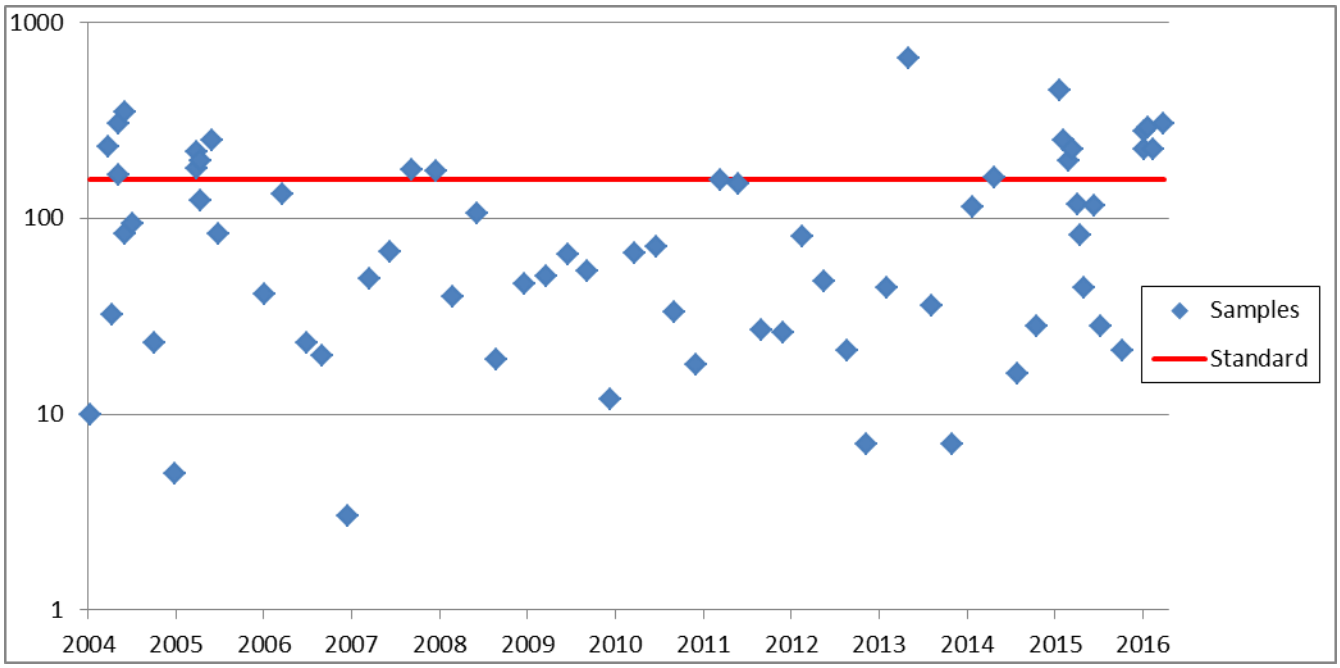

Figure 37: Keya Paha TSS Samples.

Choteau Creek WQM:
Choteau Creek was listed as threatened for Total Suspended Solids (TSS) in SD DENR's Integrated Report (IR). Water quality monitoring samples were collected at LAC5 on Choteau Creek near Avon, South Dakota (Figure 38). Results from the TSS samples are shown in Figure 39 and 41. Choteau Creek was removed from the threatened list for TSS in the SD DENR 2012 IR, and continues to remain in full support of beneficial uses as stated in the SD DENR 2016 IR.

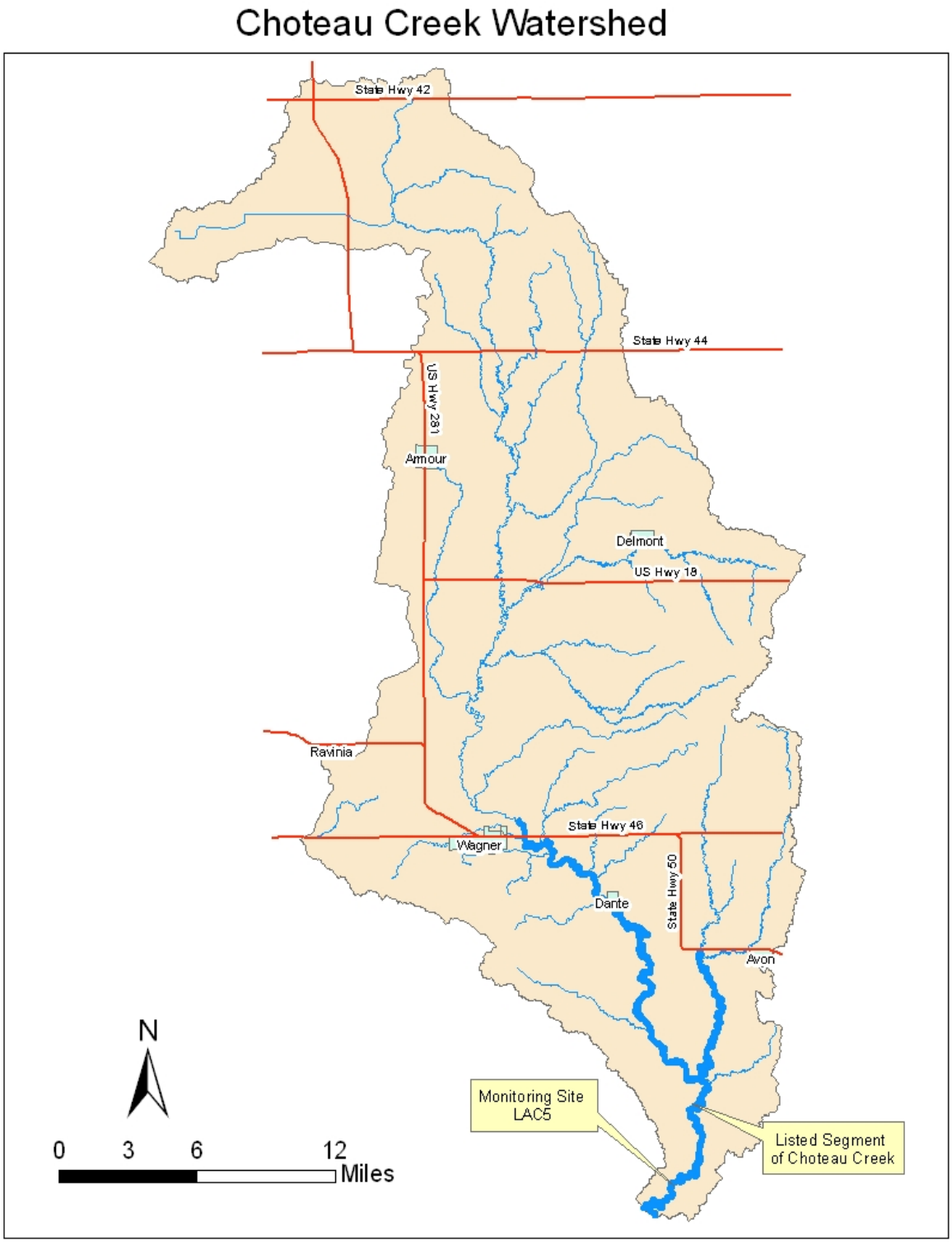

Figure 38: Choteau Creek Water Quality Monitoring Site.

Figure 38 shows that Choteau Creek's Total Suspended Solids (TSS) median value for the Last 5 Years data set increased slightly from 19 to 22 mg/l. The standard for TSS on Choteau Creek is 158 mg/l.

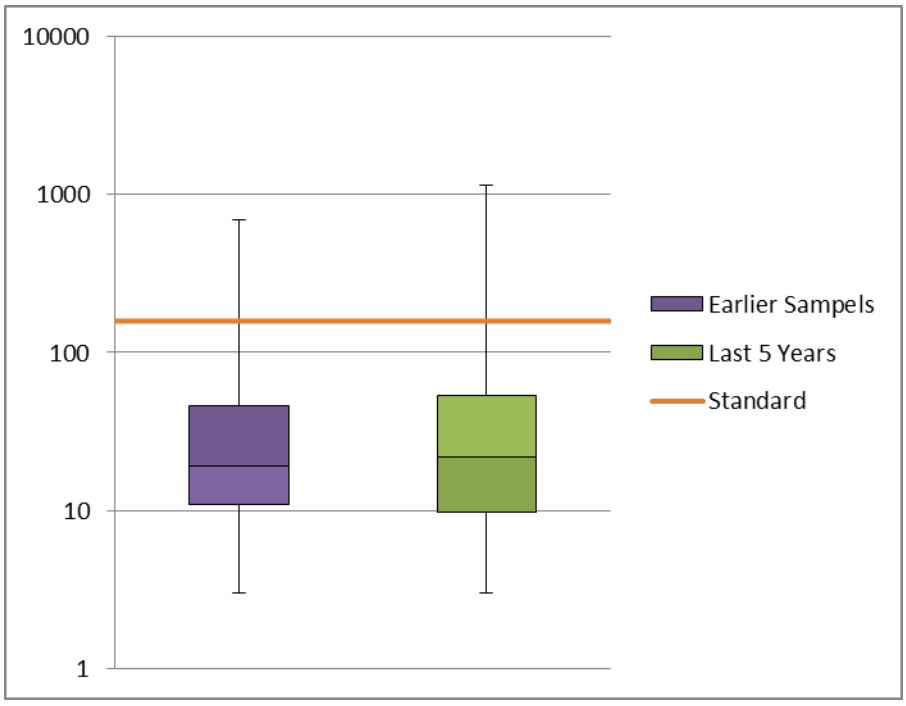

Figure 39: Choteau Creek TSS Box and Whisker Plot.

All TSS samples from 2004 through May of 2016 collected at the Choteau Creek WQM site are displayed below in Figure 40. There is a 7% exceedance for the Last 5 Years samples compared to a 5% exceedance of the Earlier Samples data set.

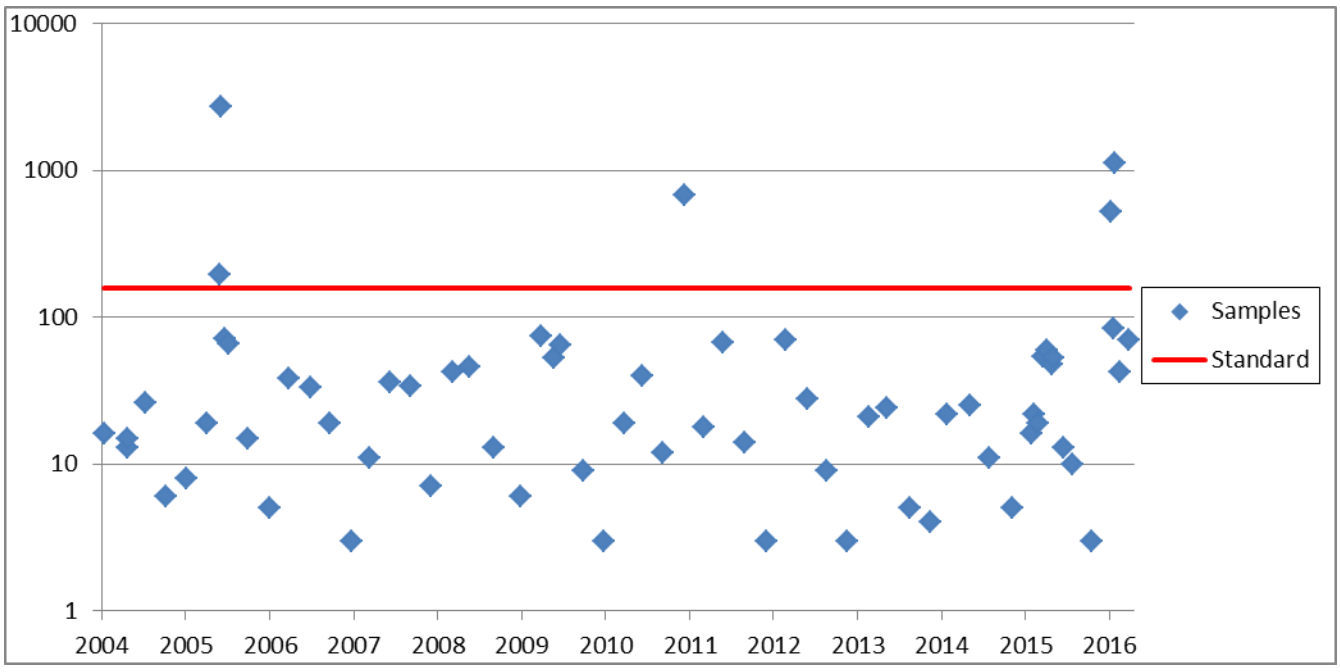

Figure 40: Choteau Creek TSS samples.

Ponca Creek WQM:
Ponca Creek was listed as impaired for TSS, E-coli, and Fecal Coliform in SD DENR's IR. Water quality monitoring samples were collected at LAC3/WQM 70 on Ponca Creek (Figure 41). Results from the TSS, Fecal Coliform, and E-coli samples are shown in Figure 42 through 45.

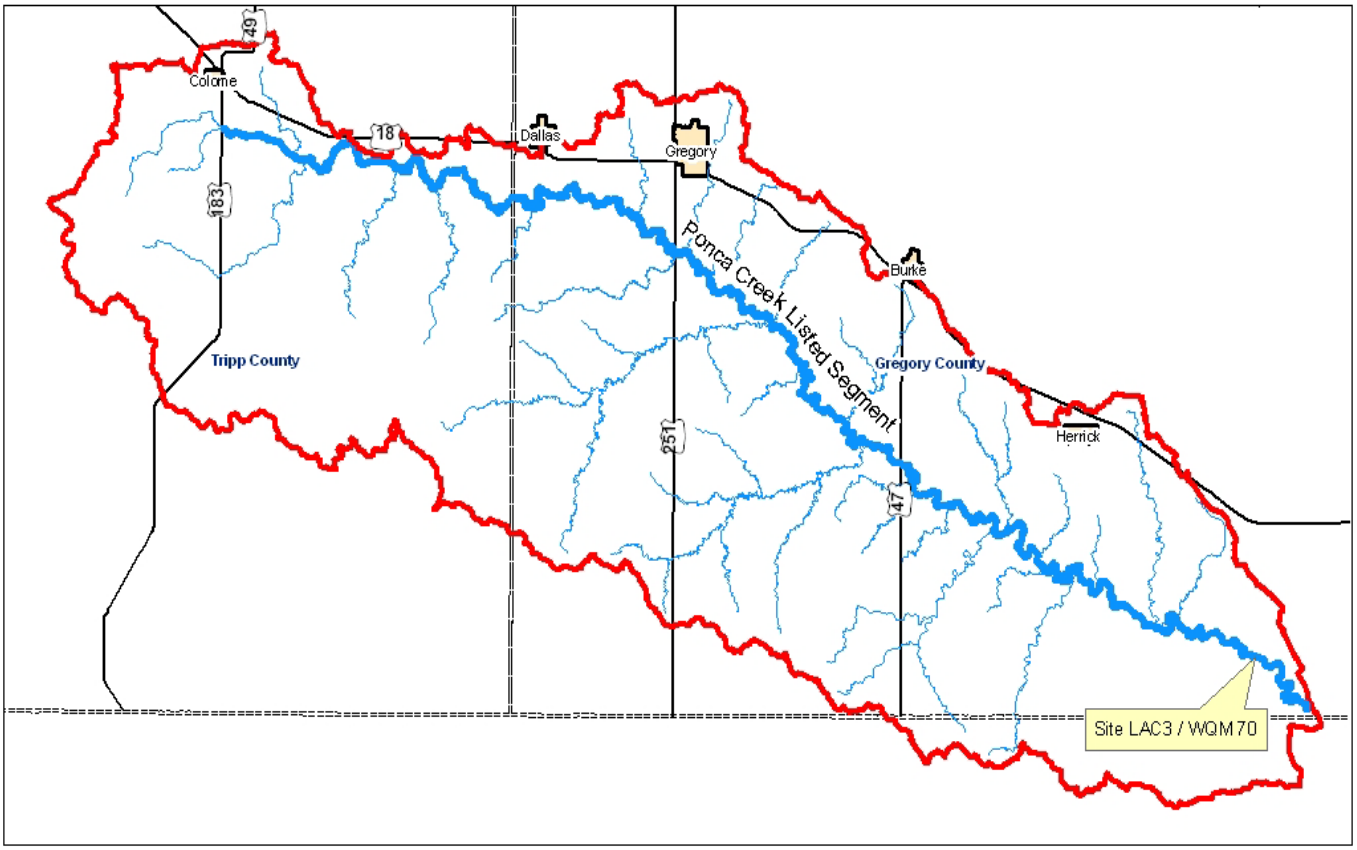

Figure 41: Ponca Creek Water Quality Monitoring Site.

E.coli samples indicate the meadian value increased from 377.5 to 1,080 CFU/100mL when comparing data sets from Earlier Samples to Last 5 Years. The E.coli standard on Ponca Creek is 1,178 CFU/100mL. There is a 50% exceedance for the Last 5 Years samples as compared to a 0% exceedance of the Earlier Samples data set.

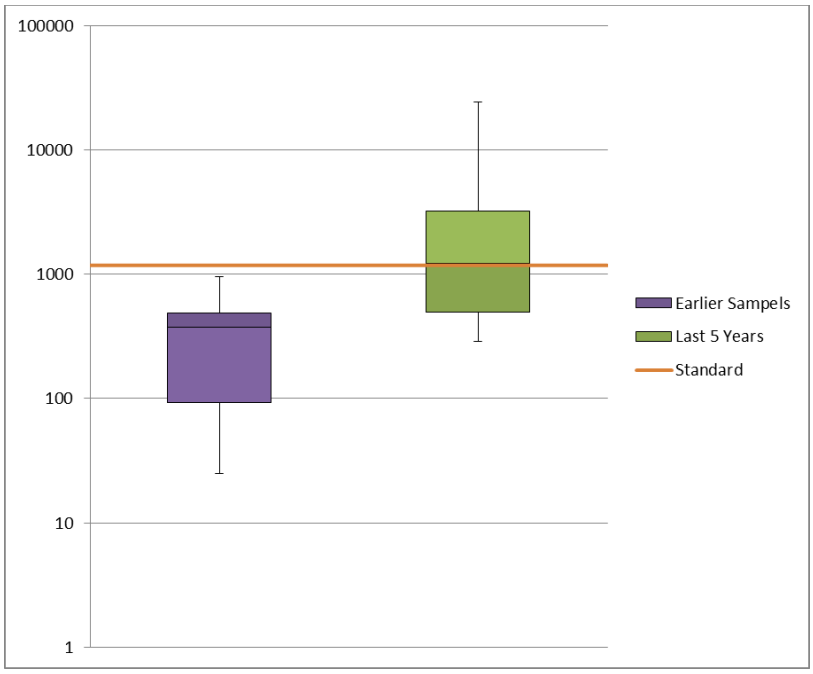

Figure 42: Ponca Creek E.coli Box and Whisker Plot.

All E.coli samples from 2004 through July of 2016 collected at the Ponca Creek WQM site are displayed below in Figure 43.

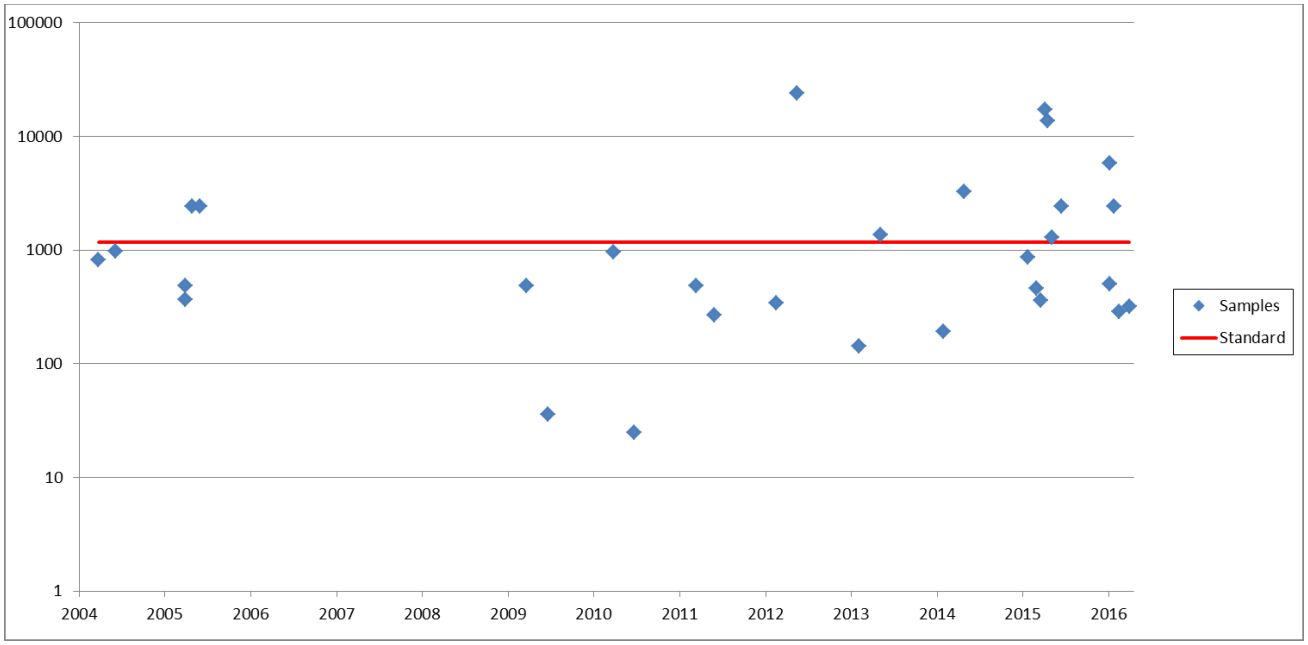

Figure 43: Ponca Creek E.coli Samples.

Figure 44 shows that Ponca Creek Total Suspended Solids (TSS) median value for the Last 5 Years data set decreased slightly from 29 to 24.5 mg/l. The standard for TSS on Ponca Creek is 158 mg/l. There is an 11% exceedance for the Last 5 Years samples as compared to a 12.5% exceedance of the Earlier Samples data set.

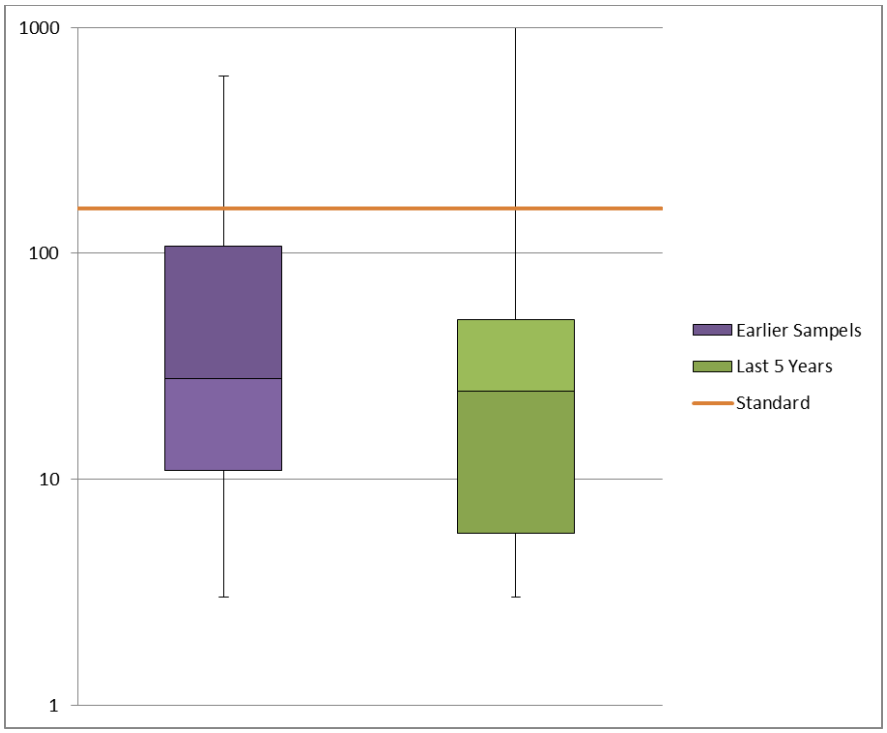

Figure 44: Ponca Creek TSS Box and Whisker Plot.

All TSS samples from 2004 through July of 2016 collected at the Ponca Creek WQM site are displayed below in Figure 45.

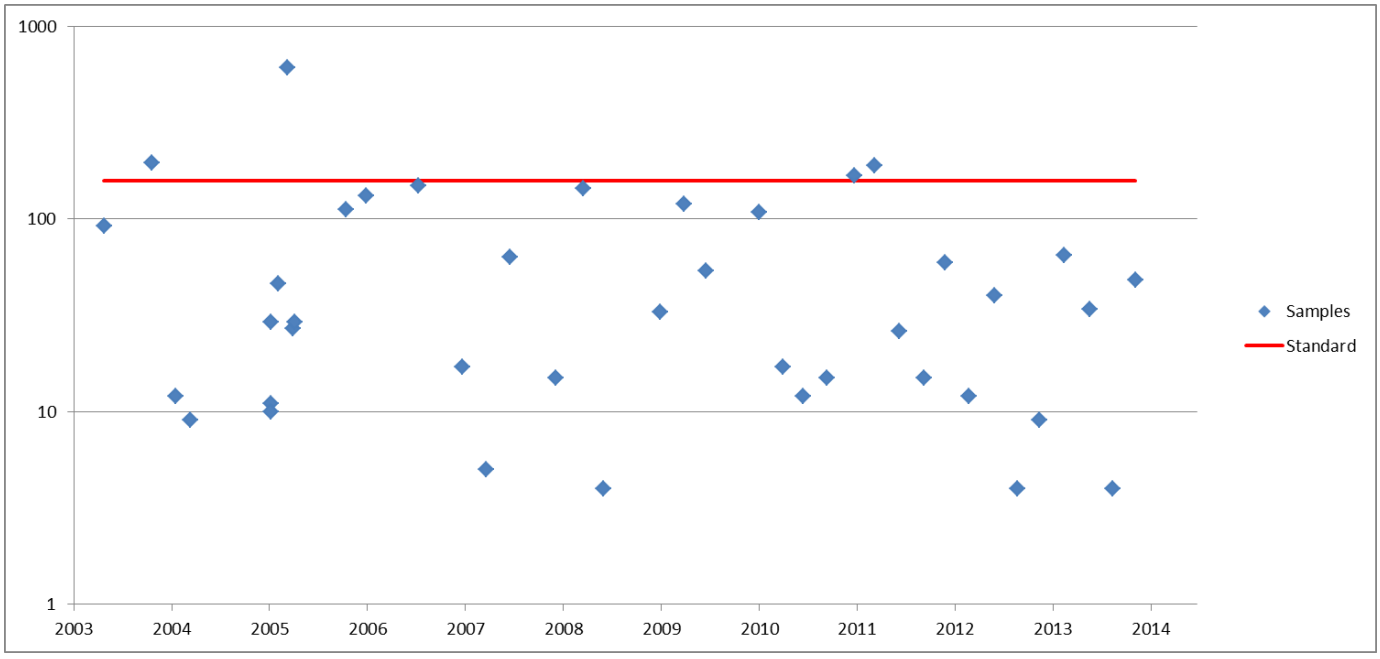

Figure 45: Ponca Creek TSS Samples.

Emanuel Creek WQM:
Emanuel Creek is listed as impaired for TSS, E-coli, and Fecal Coliform in SD DENR's IR. Water quality monitoring samples were collected near the outlet of Emanuel Creek (Figure 46). Results from the TSS, and E-coli samples are shown in Figure 47 through 48.

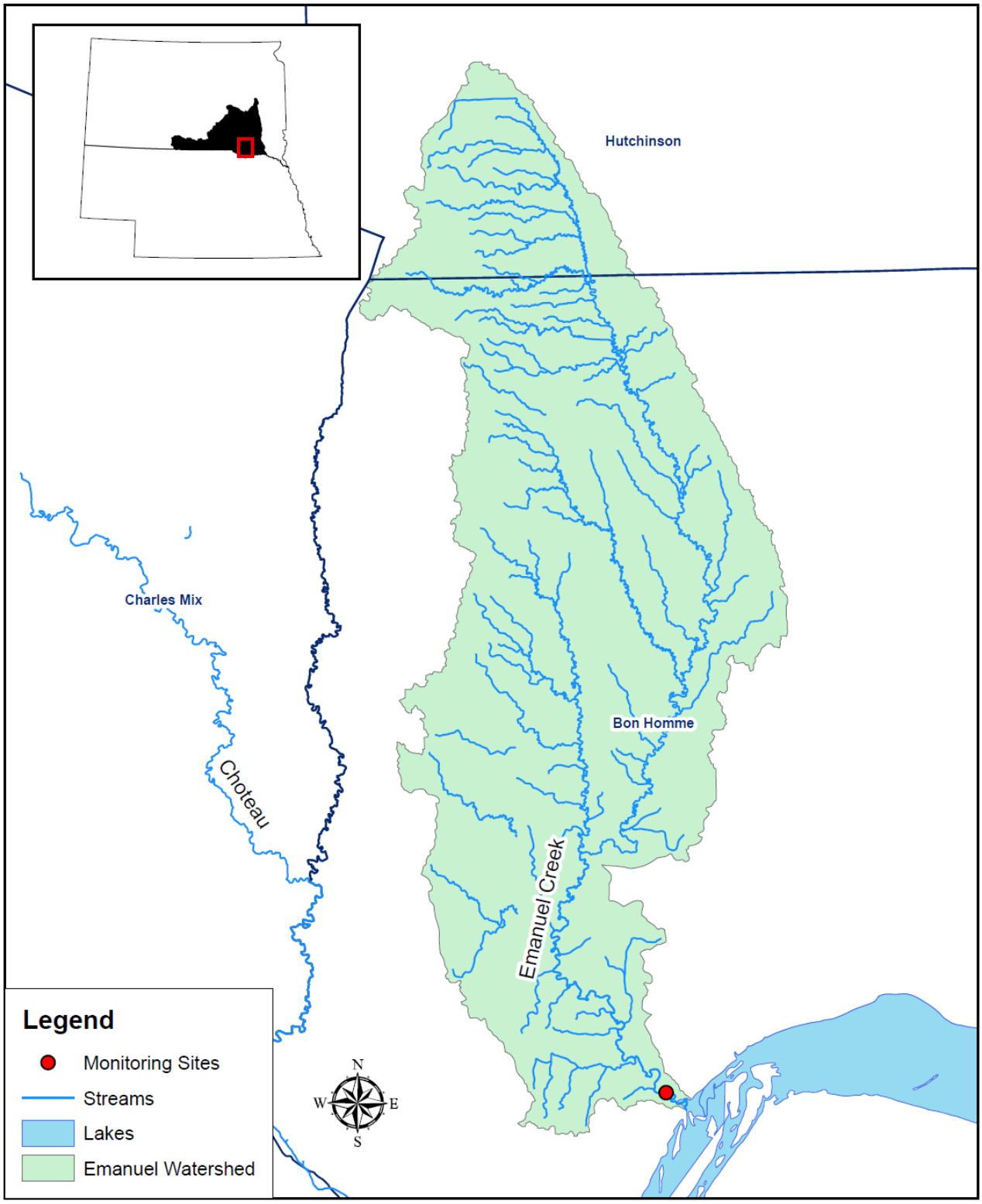

Figure 46: Emanuel Creek Water Quality Monitoring Site.

There is a nine year gap of no sampling for Emanuel Creek. Thus the Earlier Samples data set represent 2004 to 2005 and the Last 5 Years data set represent 2015 to July 2016. E-coli samples show that the meadian value decreased from 2,075 to 495 CFU/100mL comparing Earlier Samples to Last 5 Years data sets. The Fecal Colifom standard on Ponca Creek is 1,178 CFU/100mL. There is an 18% exceedance for the Last 5 Years samples compared to a 100% exceedance of the Earlier Samples data set.

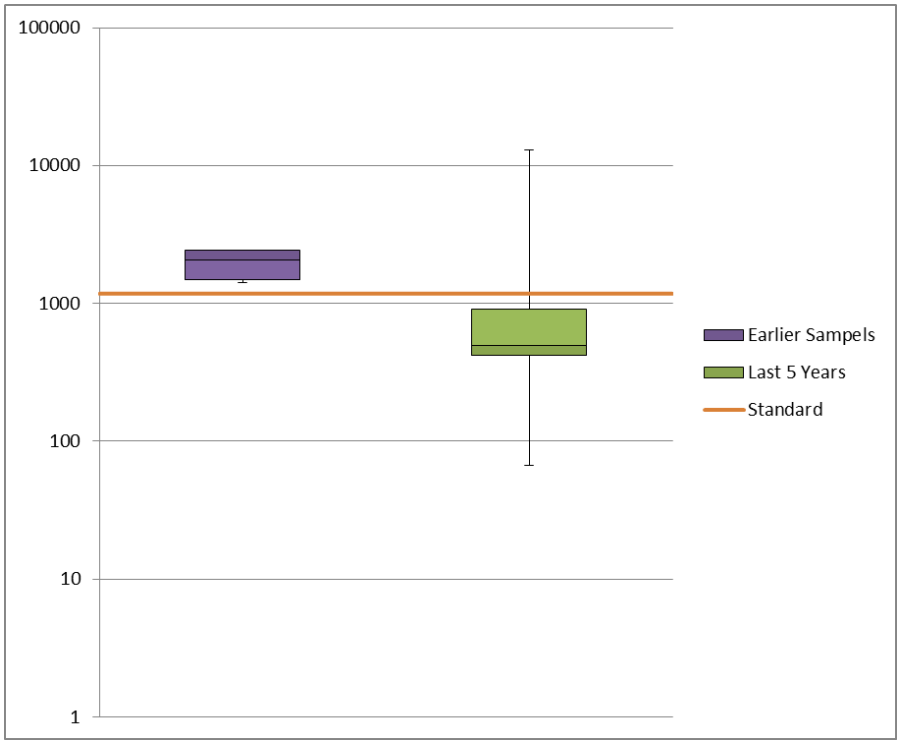

Figure 47: Emanuel Creek E.coli Box and Whisker Plot.

All E.coli samples from 2004 through July of 2016 collected at the Emanuel Creek WQM site are displayed below in Figure 48.

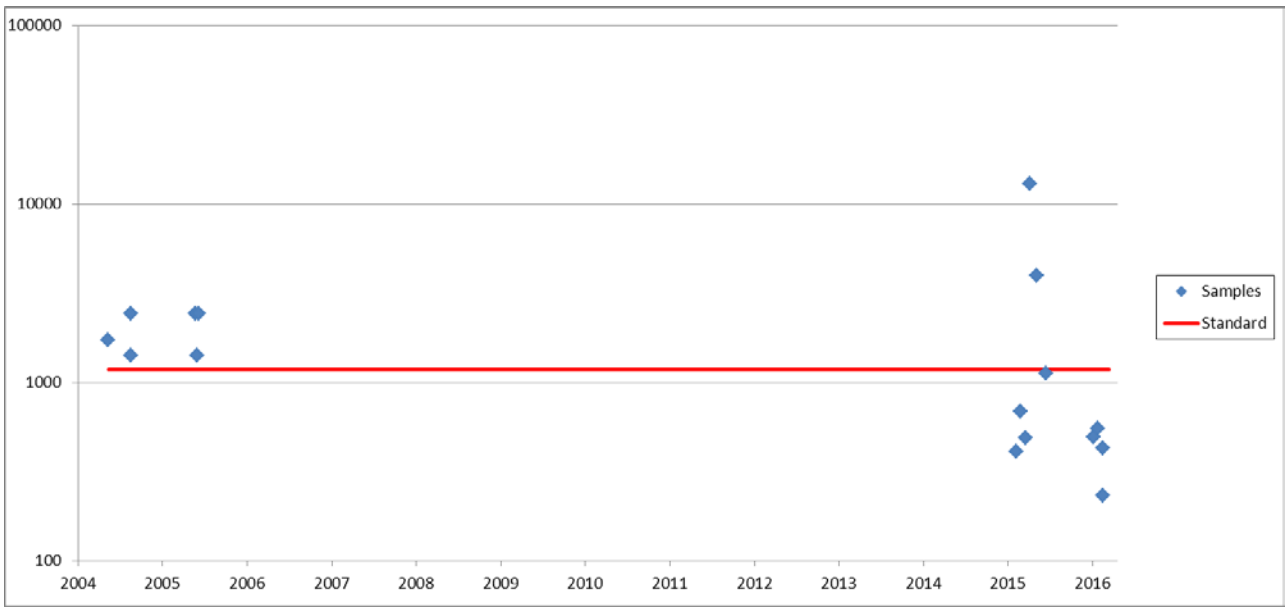

Figure 48: Emanuel Creek E.coli Samples.

Figure 49 shows that Emanuel Creek Total Suspended Solids (TSS) median value for the Last 5 Years sample set decreased slightly from 31 to 14.5 mg/l. The standard for TSS on Emanuel Creek is 158 mg/l. There is no exceedance for the Last 5 Years samples compared to a 17% exceedance of the Earlier Samples data set.

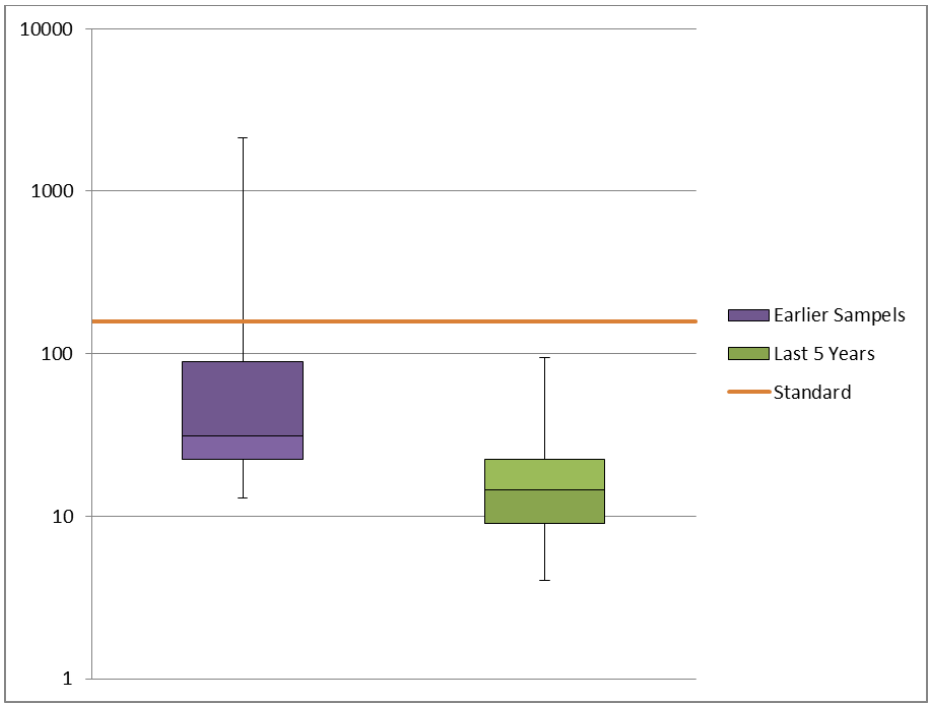

Figure 49: Emanuel Creek TSS Box and Whisker Plot.

All TSS samples from 2003 through July of 2016 collected at the Emanuel Creek WQM site are displayed below in Figure 50.

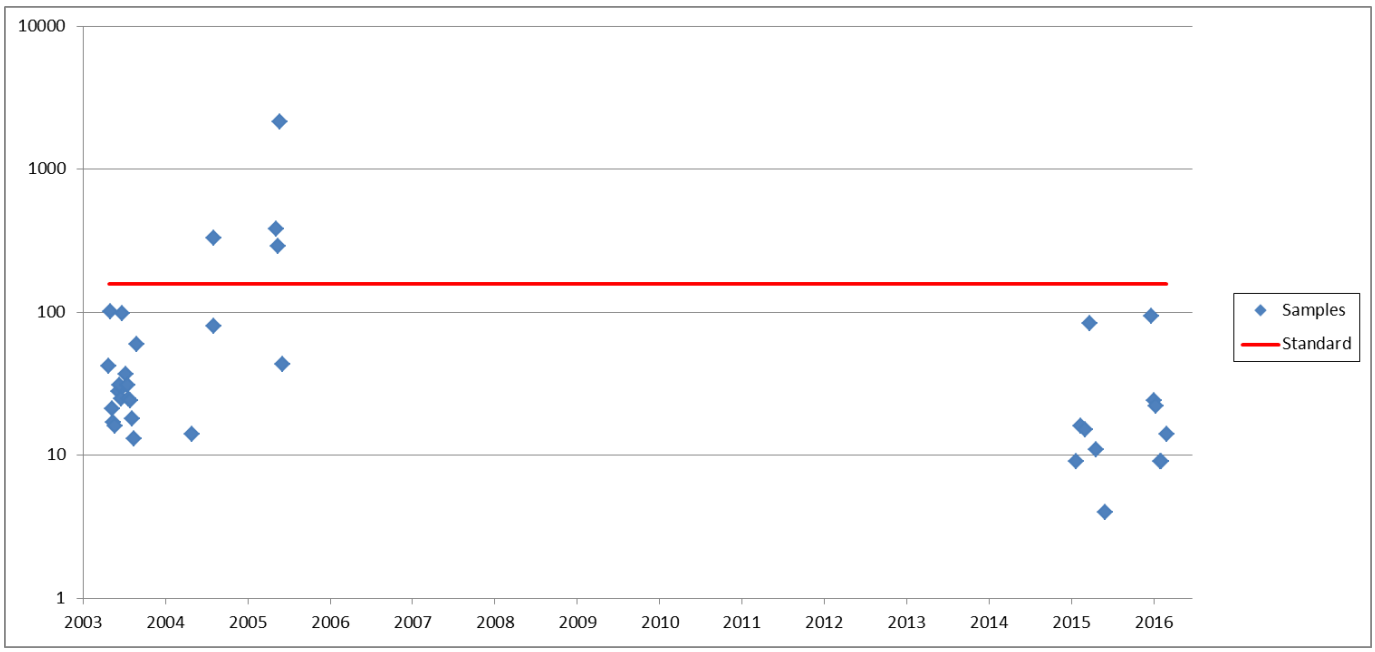

Figure 50: Emanuel Creek TSS Samples.

Wolf Creek

Wolf Creek has two water quality monitoring sites about two miles from each other near the confluence of the James River. The site nearest the mouth of the creek was dropped from the 2016 sampling season due to the likelihood that it receives backwater influence from the James River. The downstream site was impaired for bacteria and the upstream site is in full support according to the Integrated Report.

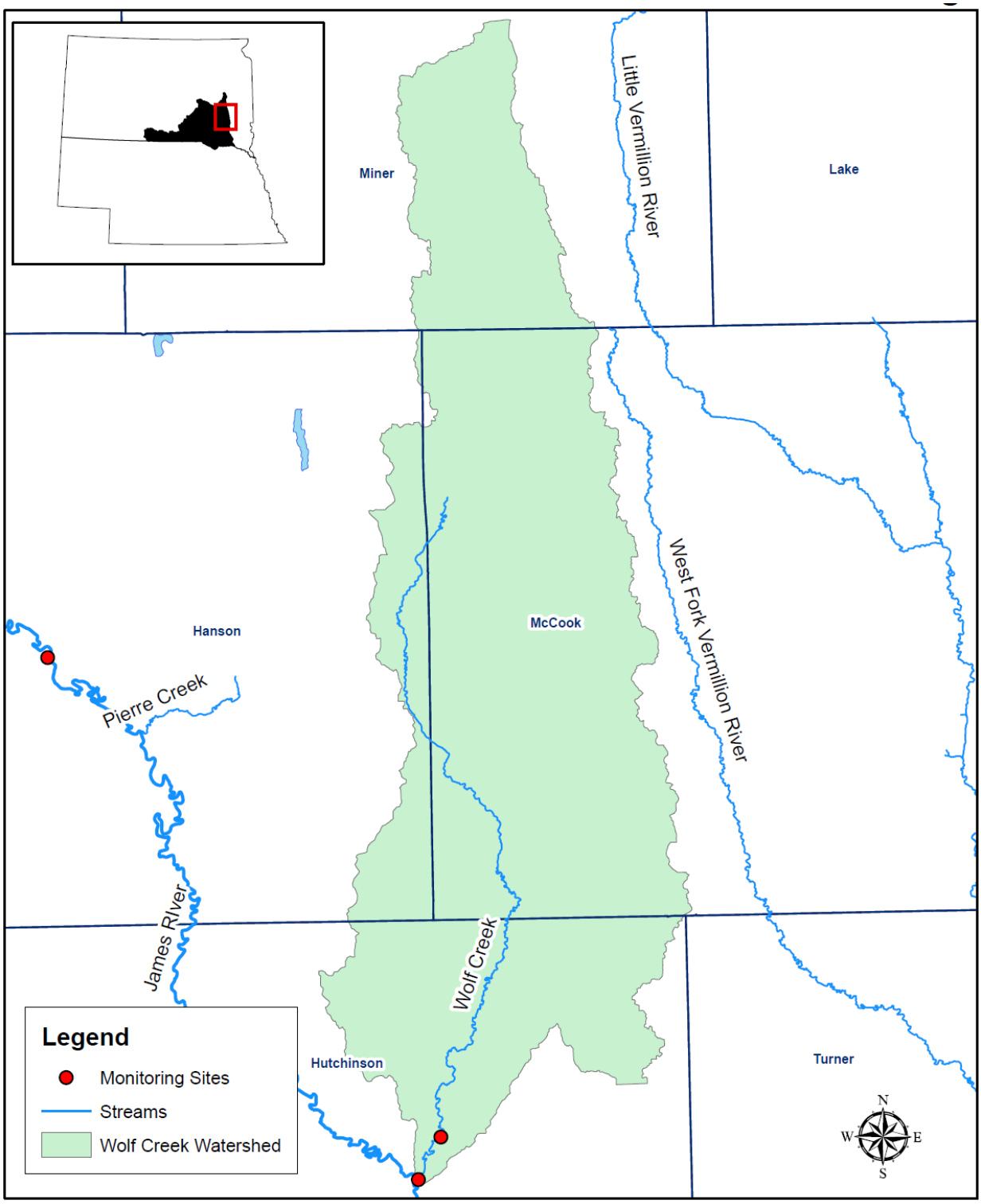

Figure 51: Wolf Creek Water Quality Monitoring Sites.

Figure 52 shows that the upstream WQM site on Wolf Creek E-coli median value for the Last 5 Years data set decreased slightly from 133 to 119 CFU/100mL. The standard for E.coli on Wolf Creek is 1,178 CFU/100mL. There is a 7% exceedance for the Last 5 Years samples compared to a 17% exceedance of the Earlier Samples data set.

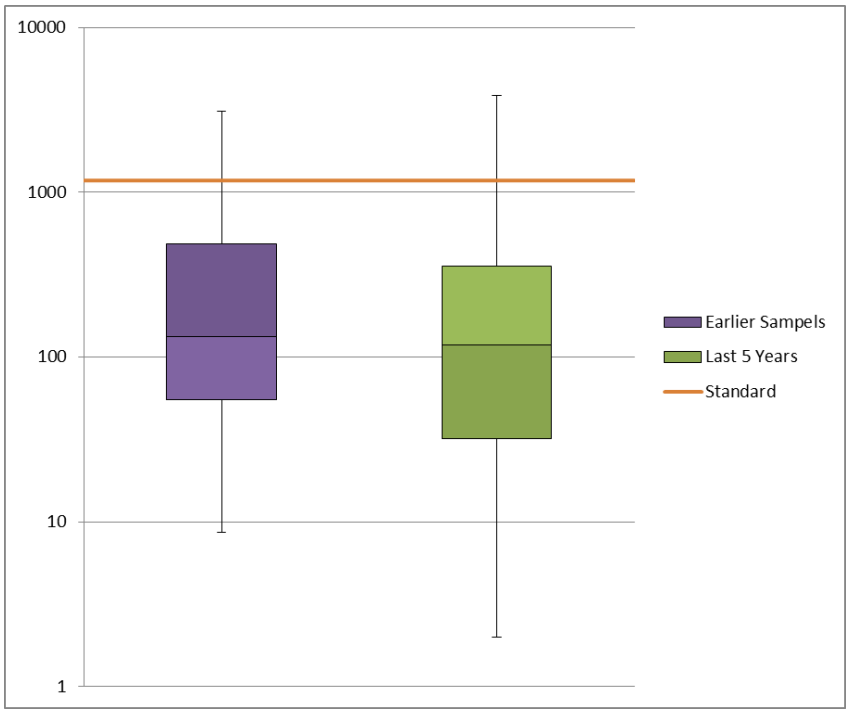

Figure 52: Wolf Creek E.coli Box and Whisker Plot.

All E.coli samples from 2007 through July of 2016 collected at the upstream site of the Wolf Creek WQM site are displayed below in Figure 53.

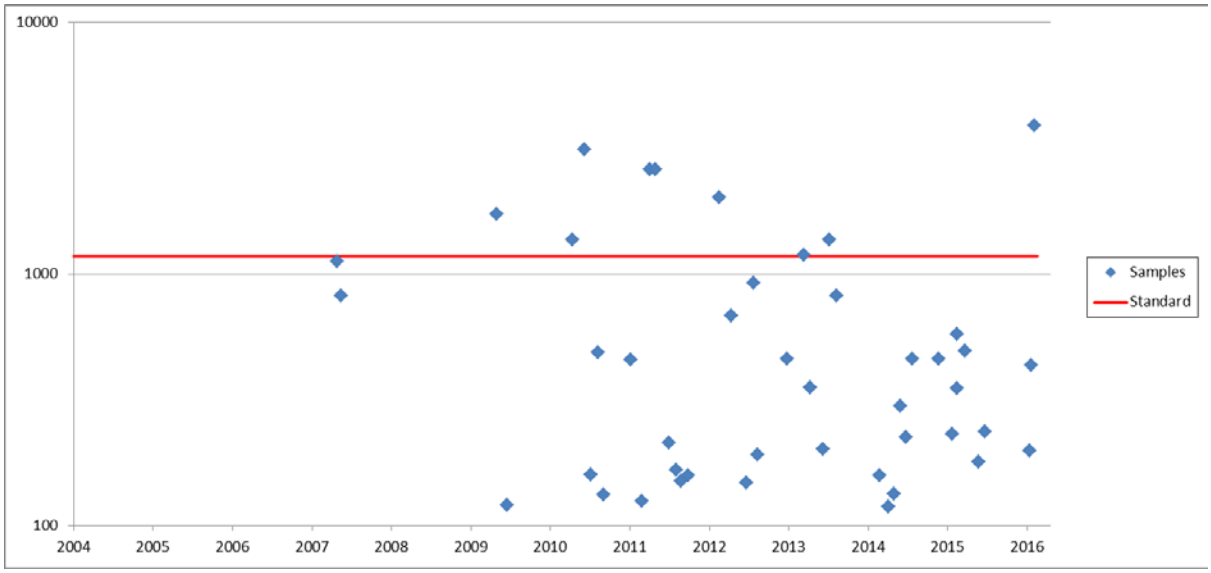

Figure 53: Wolf Creek E.coli Samples.

Firesteel Creek

Firesteel Creek has two monitoring sites above Lake Mitchell. Firesteel Creek has been listed for Total Dissolved Solids (TDS) off and on through the years in the Integrated Report, and is currently listed for TDS, E.coli, and Temperature.

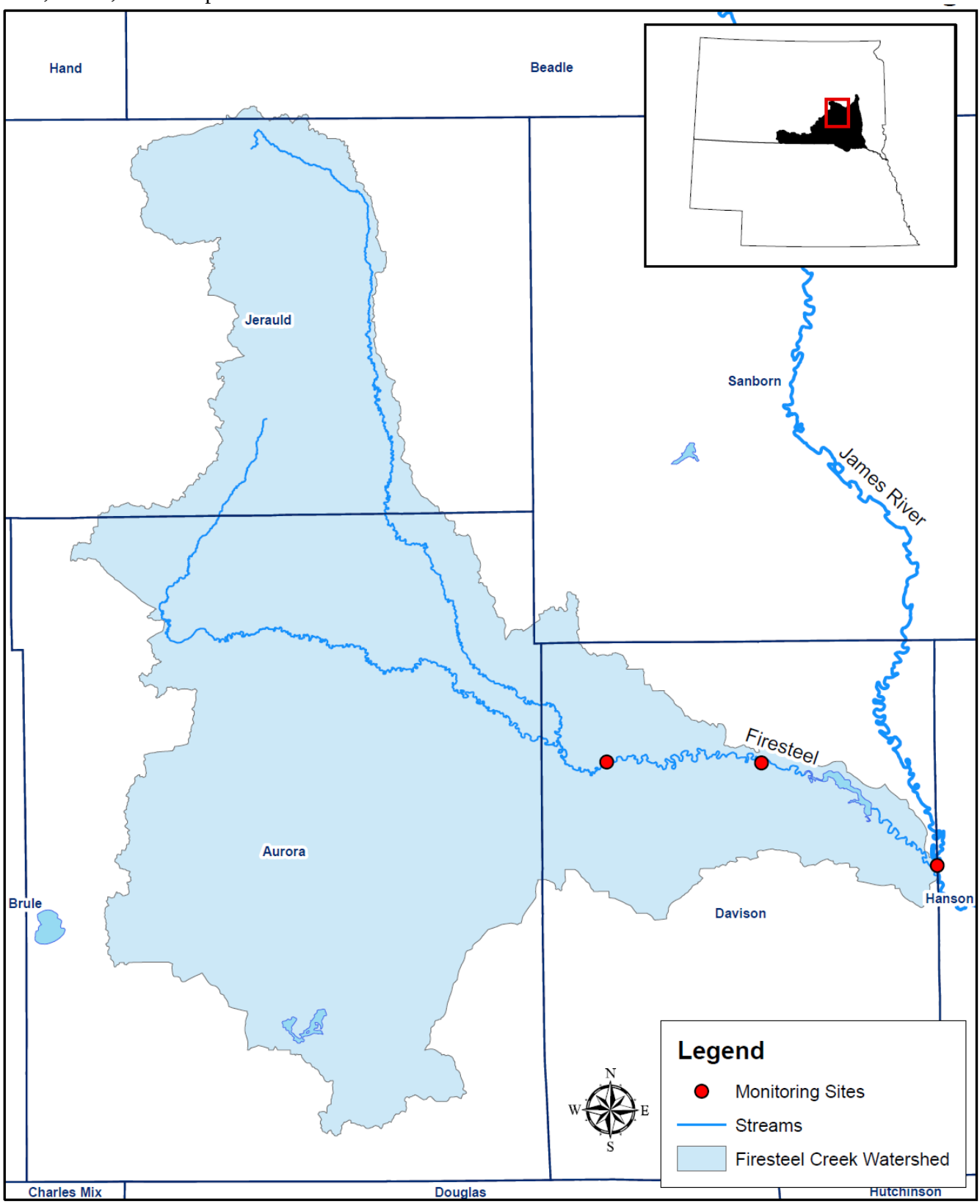

Figure 54: Firesteel Creek Water Quality Monitoring Sites.

Figure 55 shows Firesteel Creek E. coli median value for the Last 5 Years samples increased from 229 to 789.5 CFU/100mL. The standard for E.coli on Firesteel Creek is 1,178 CFU/100mL. There is a 35% exceedance for the Last 5 Years samples compared to a 15% exceedance of the Earlier Samples data set.

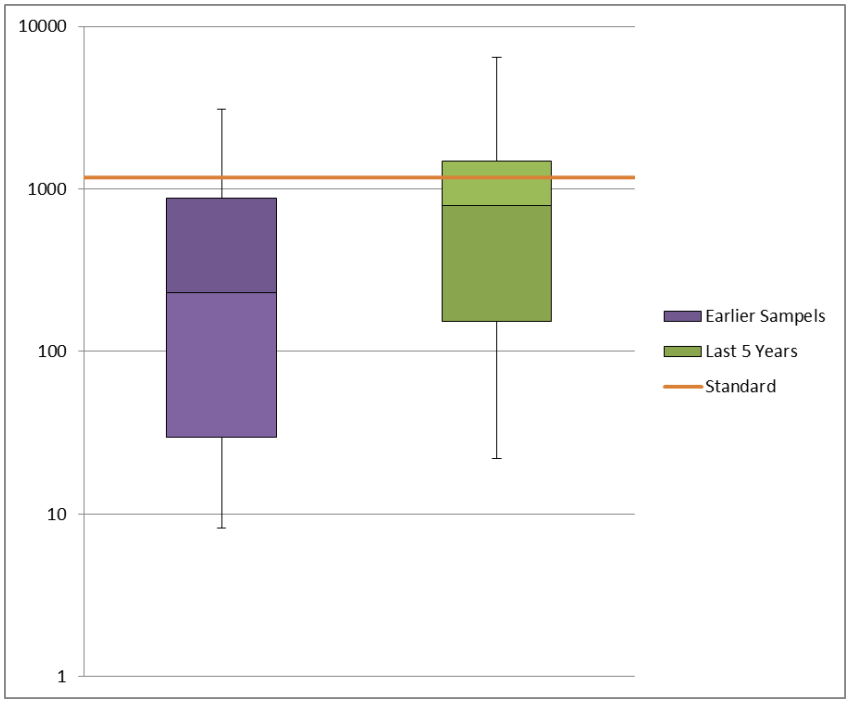

Figure 55: Firesteel Creek E.coli Box and Whisker Plot.

All E.coli samples from 2004 through July of 2016 collected at the Firesteel Creek WQM sites are displayed below in Figure 56.

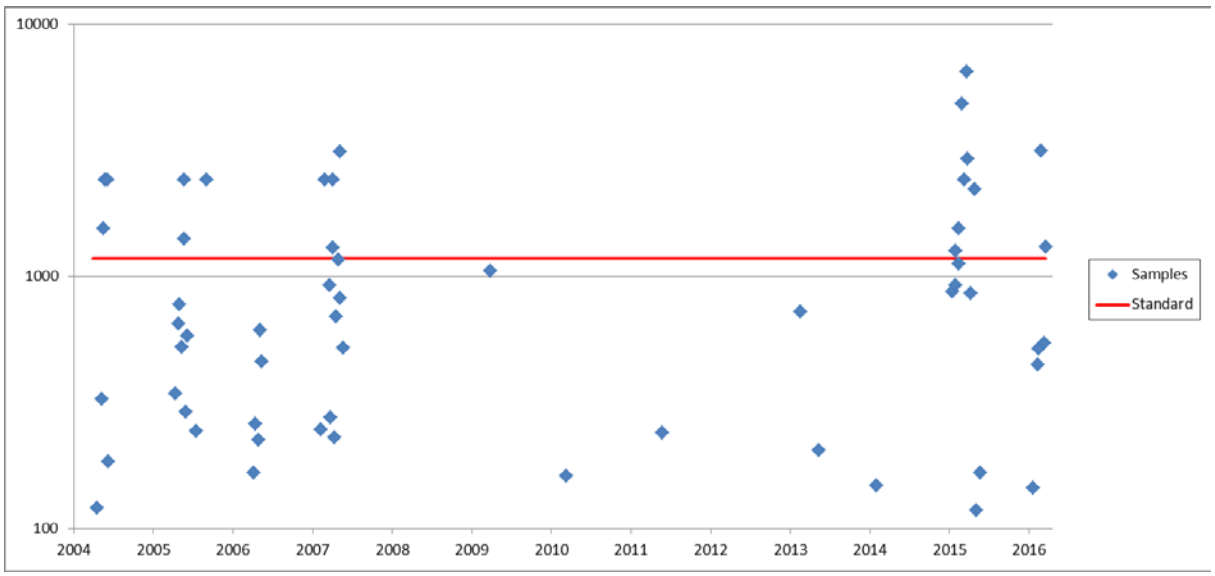

Figure 56: Firesteel Creek E.coli Samples.

Dawson Creek

Dawson Creek has one monitoring site downstream of Scotland. Dawson Creek is listed for E.coli and Fecal Coliform in the Integrated Report. Routine sampling at this site has not been consistent throughout the years and has several years with no sampling.

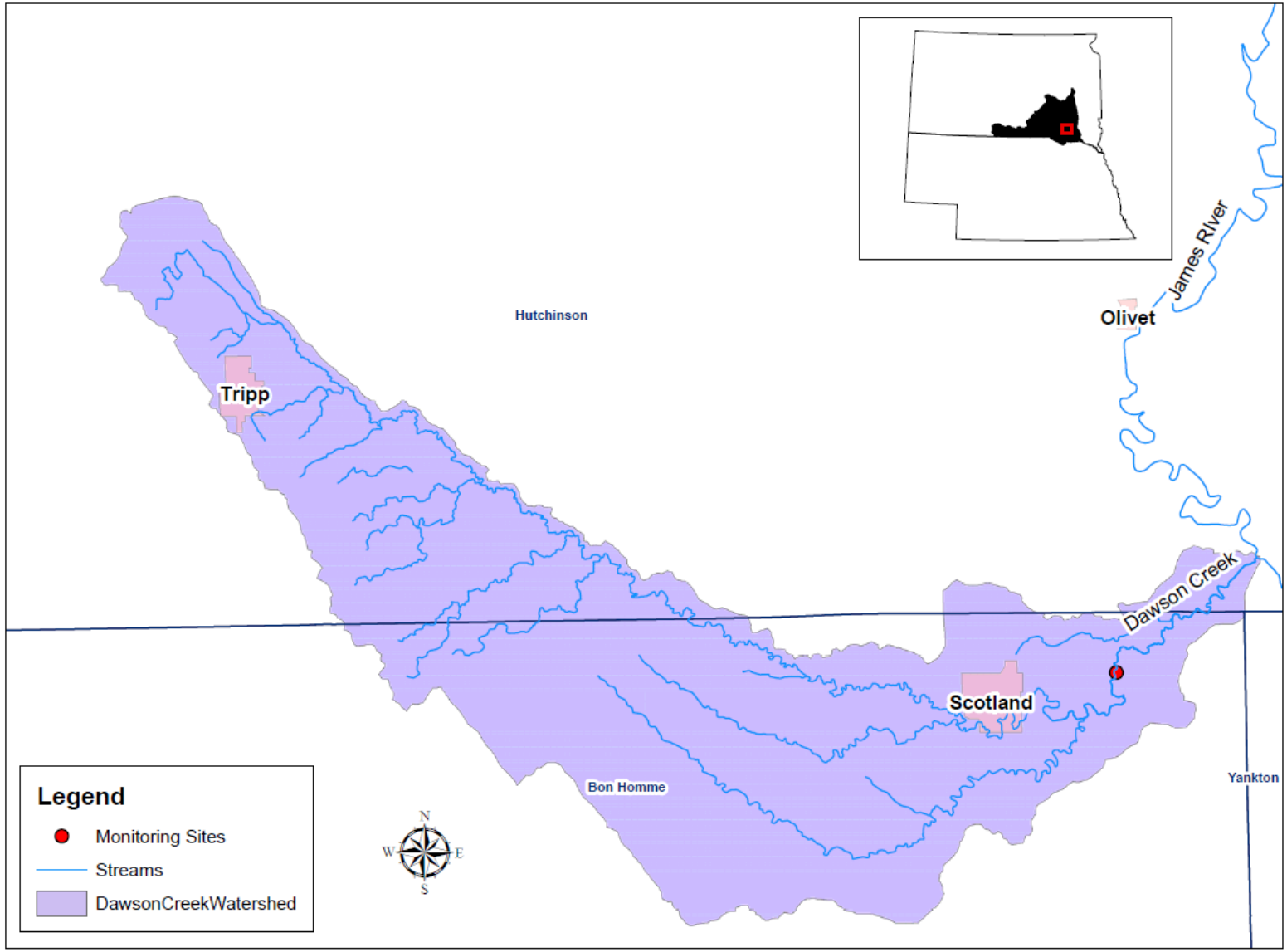

Figure 57: Dawson Creek Water Quality Monitoring Site.

Figure 58 shows Dawson Creek E.coli median value for the Last 5 Years samples increased from 2,420 to 4,840 CFU/100mL. The standard for E.coli on Dawson Creek is 1,178 CFU/100mL. There is a 92% exceedance for the Last 5 Years samples and 69% exceedance for Earlier Samples data set.

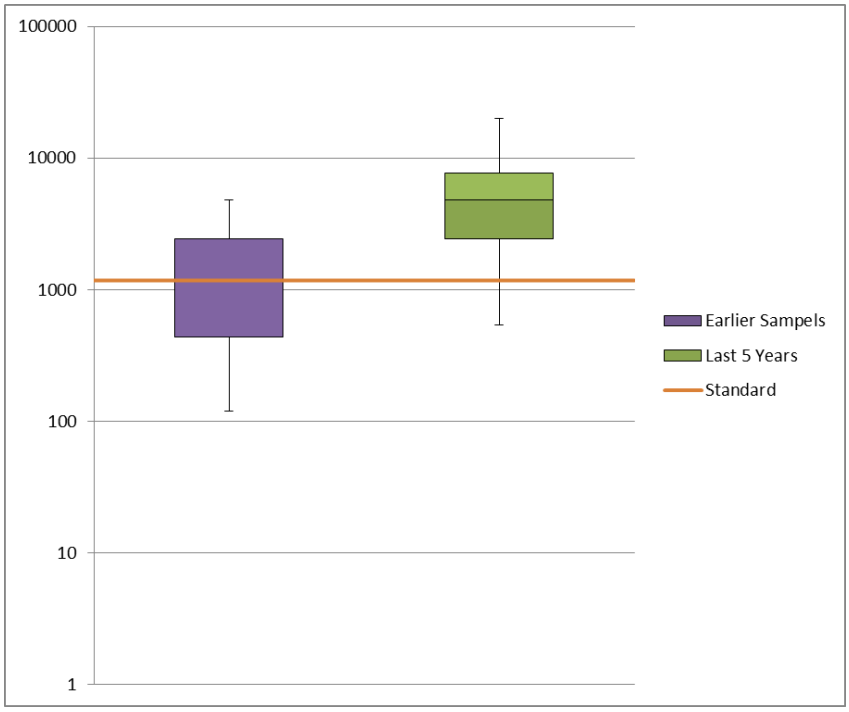

Figure 58: Dawson Creek E.coli Box and Whisker Plot.

All E.coli samples from 2006 through July of 2016 collected at Firesteel Creek WQM sites are displayed below in Figure 59.

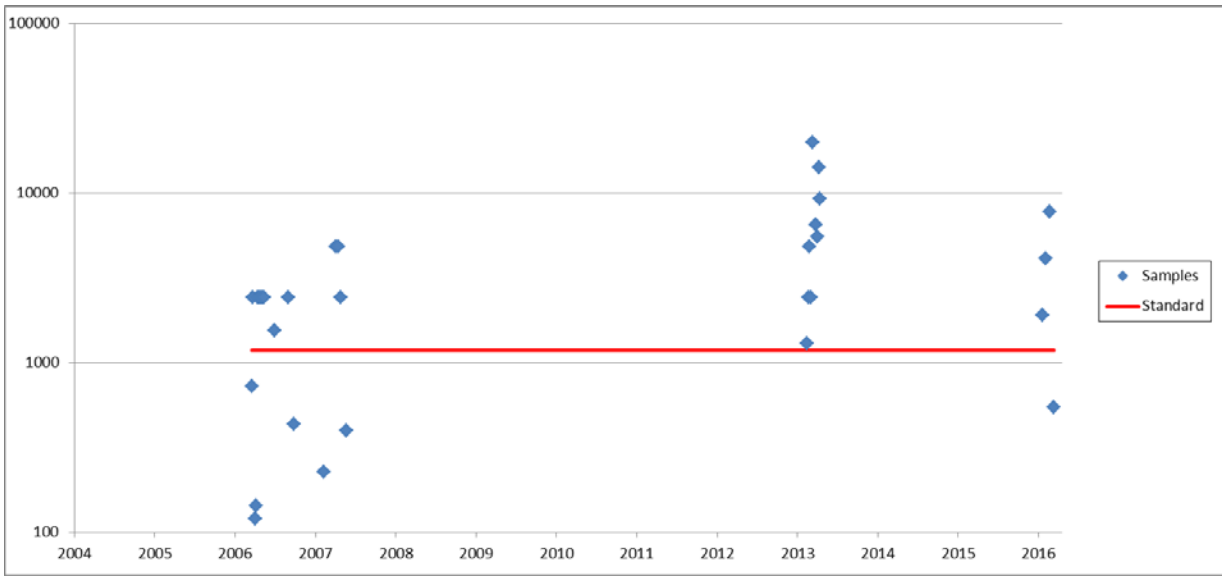

Figure 59: Dawson Creek E.coli Samples.

Pierre Creek

Pierre Creek has one monitoring site downstream of Lake Hanson. Pierre Creek is listed for E.coli and Fecal Coliform in the Integrated Report. Sampling for this site has not been consistent throughout the years and has several years of no sampling.

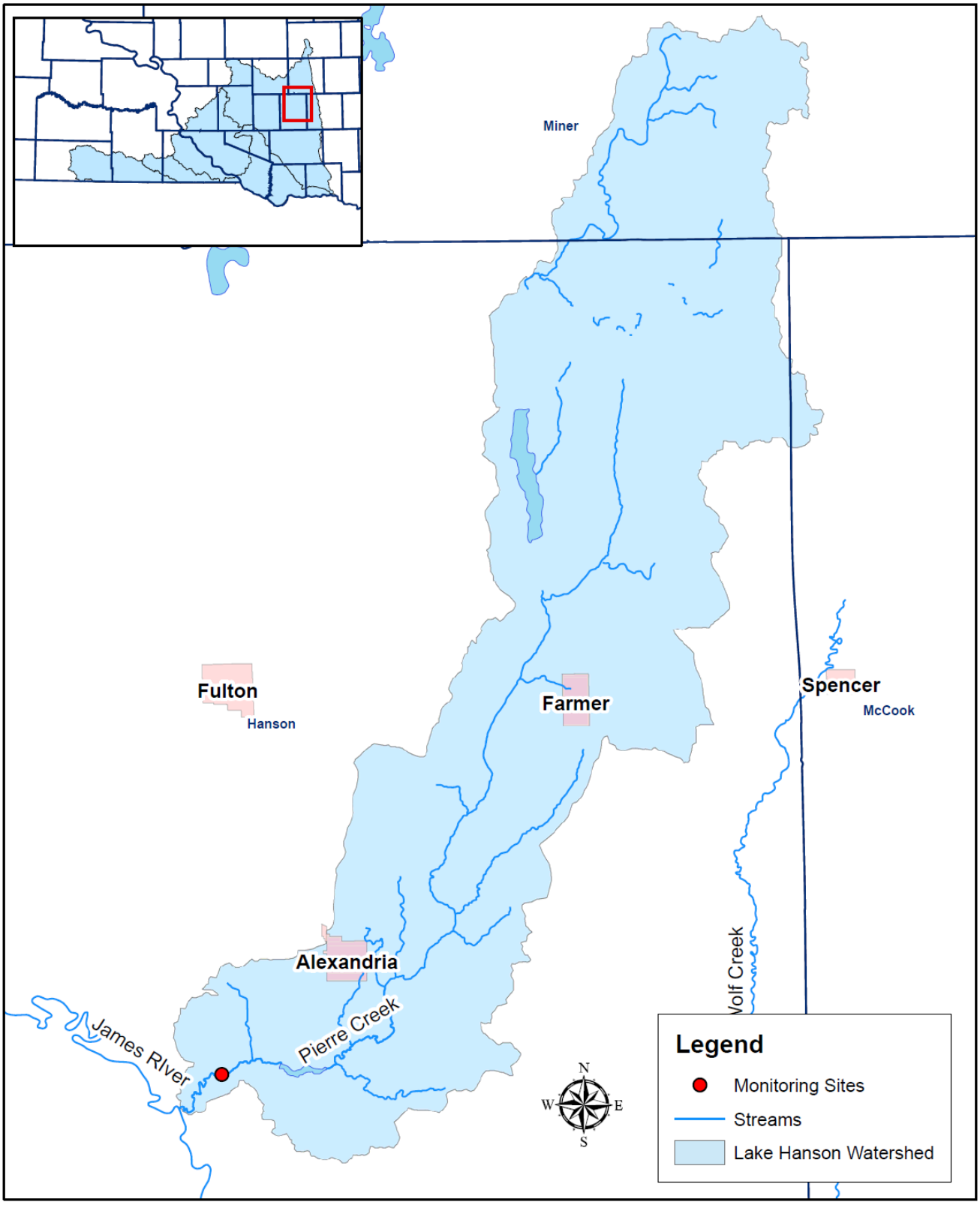

Figure 60: Pierre Creek Water Quality Monitoring Site.

Figure 61 shows Pierre Creek E.coli median value for the Last 5 Years samples decreased from 435 to 399 CFU/100mL. The standard for E.coli on Pierre Creek is 1,178 CFU/100mL. Counter to the median value decreasing, the exceedance for the Last 5 Years samples increased to 30% compared to 24% for the Earlier Samples data set. More consistent sampling may give a better idea of Pierre Creek's condition.

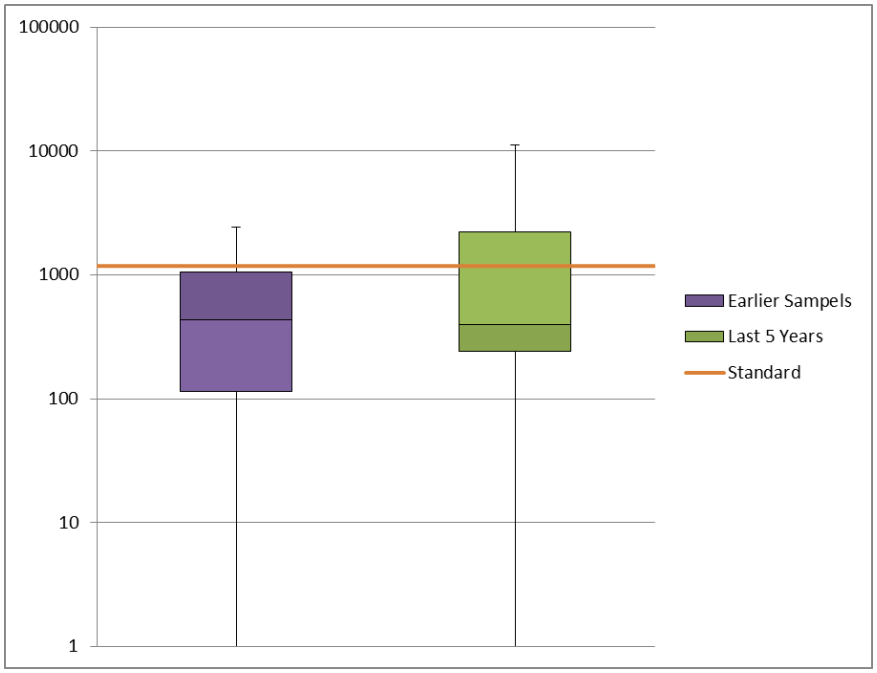

Figure 61: Pierre Creek E.coli Box and Whisker Plot.

All E.coli samples from 2006 through July of 2016 collected from Pierre Creek WQM sites are displayed below in Figure 62.

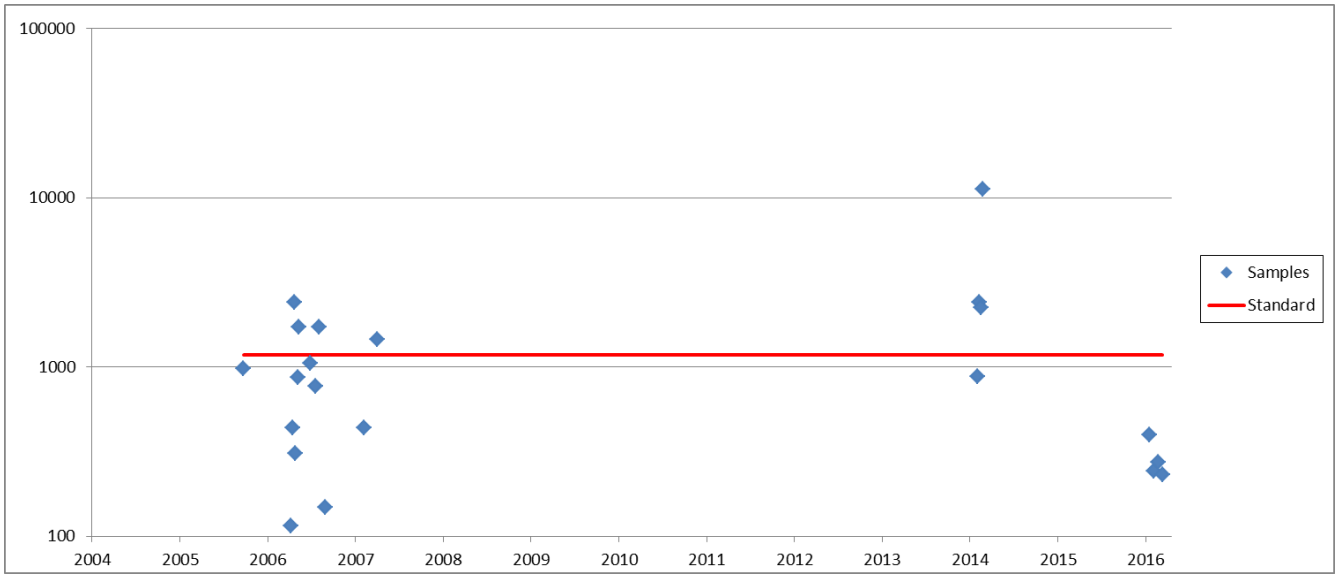

Figure 62: Pierre Creek E.coli Samples.

James River 09 Segment

James River 09 has one monitoring site near the bottom of the watershed. This segment of the James River is listed for TSS in the Integrated Report.

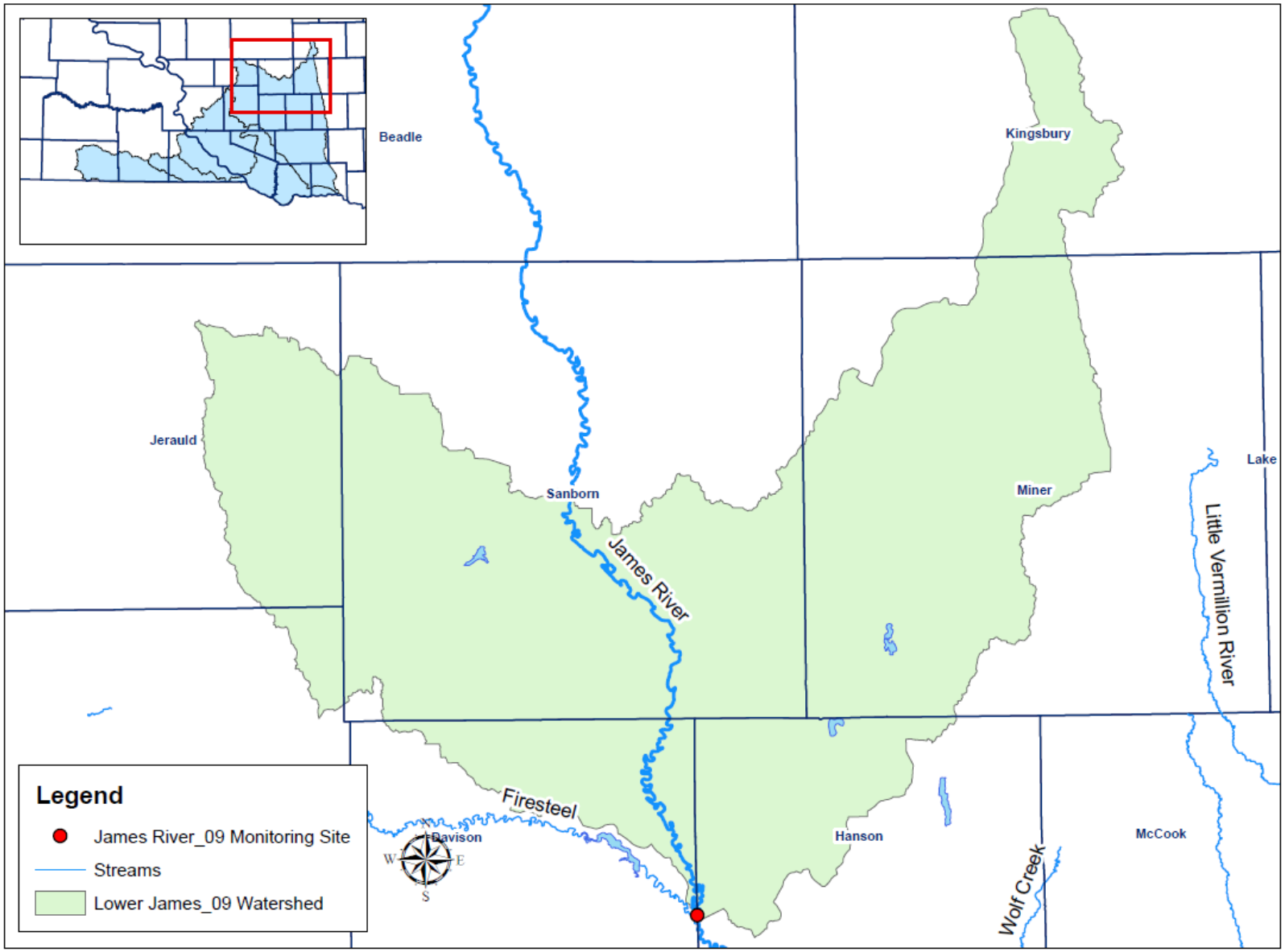

Figure 63: James River Segment 09 Water Quality Monitoring Site.

Figure 64 shows that James River segment 09 Total Suspended Solids (TSS) median value for the Last 5 Years samples increased from 56 to 92 mg/l. The standard for TSS on the James River is 158 mg/l. There is an 8% exceedance for the Last 5 Years samples compared to a 13% exceedance of the Earlier Samples data set.

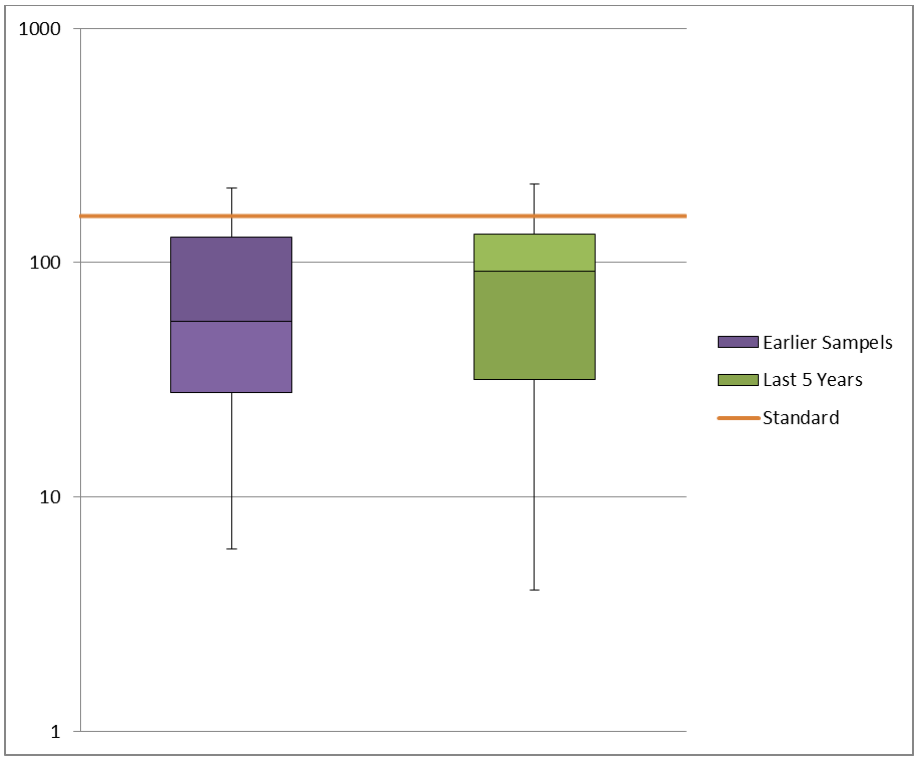

Figure 64: James River Segment 09 TSS Box and Whisker Plot.

All TSS samples from 2003 through July of 2016 collected from the James River Segment 09 WQM site are displayed below in Figure 65.

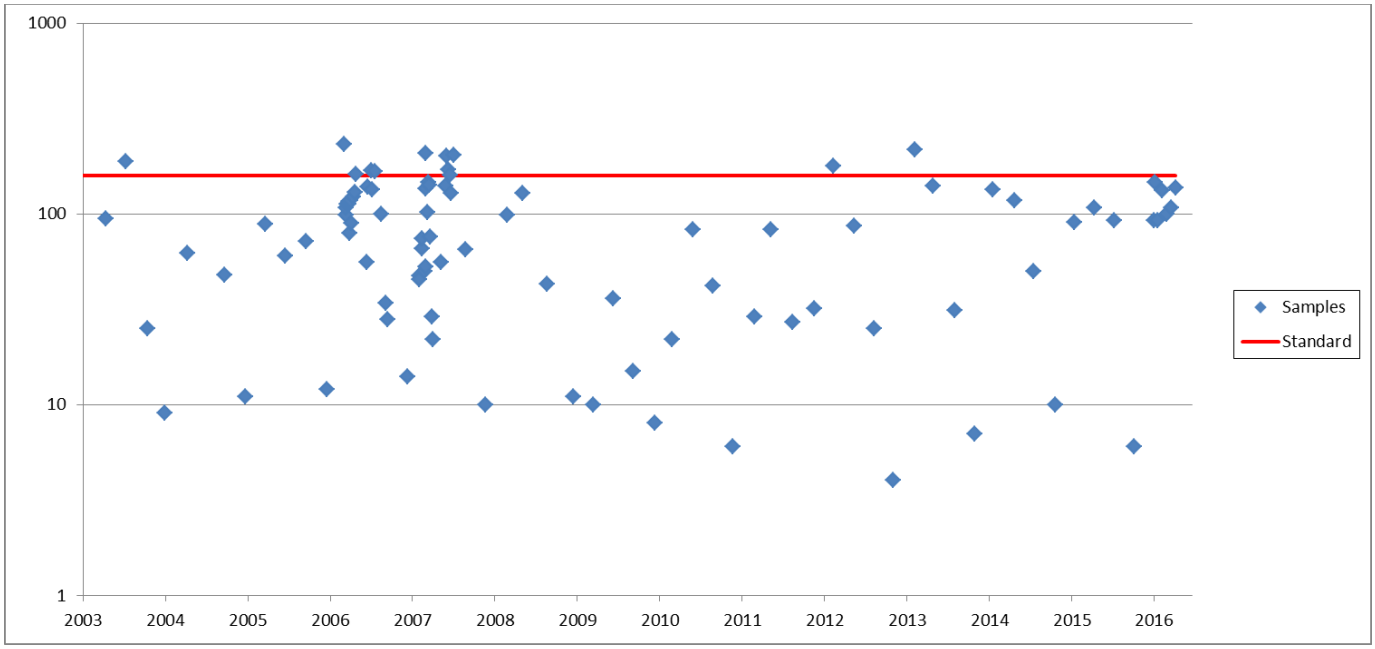

Figure 65: James River Segment 09 TSS Samples.

James River 10 Segment

James River 10 has one monitoring site down stream of its confluence with Firesteel Creek and upstream of its confluence with Pierre Creek. This segment of the James River is in full support of its beneficial uses according to the 2016 Integrated Report.

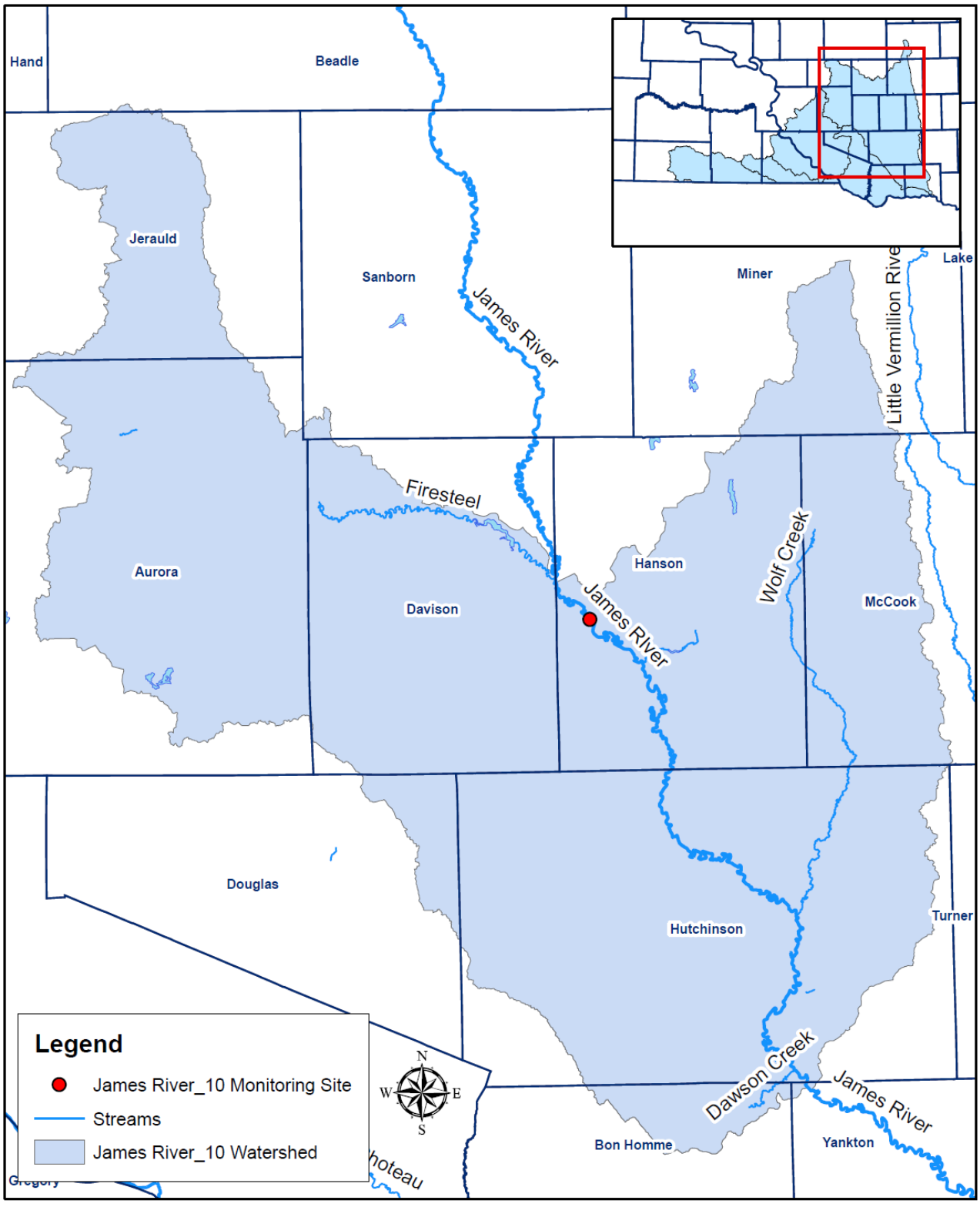

Figure 66: James River Segment 10 Water Quality Monitoring Site.

James River 11 Segment

James River 11 has one monitoring site as seen in the figure below. This segment of the James River has consistently been listed for TSS and occasionally listed for bacteria in the Integrated Report through the years, and is currently listed for both in the 2016 Integrated Report.

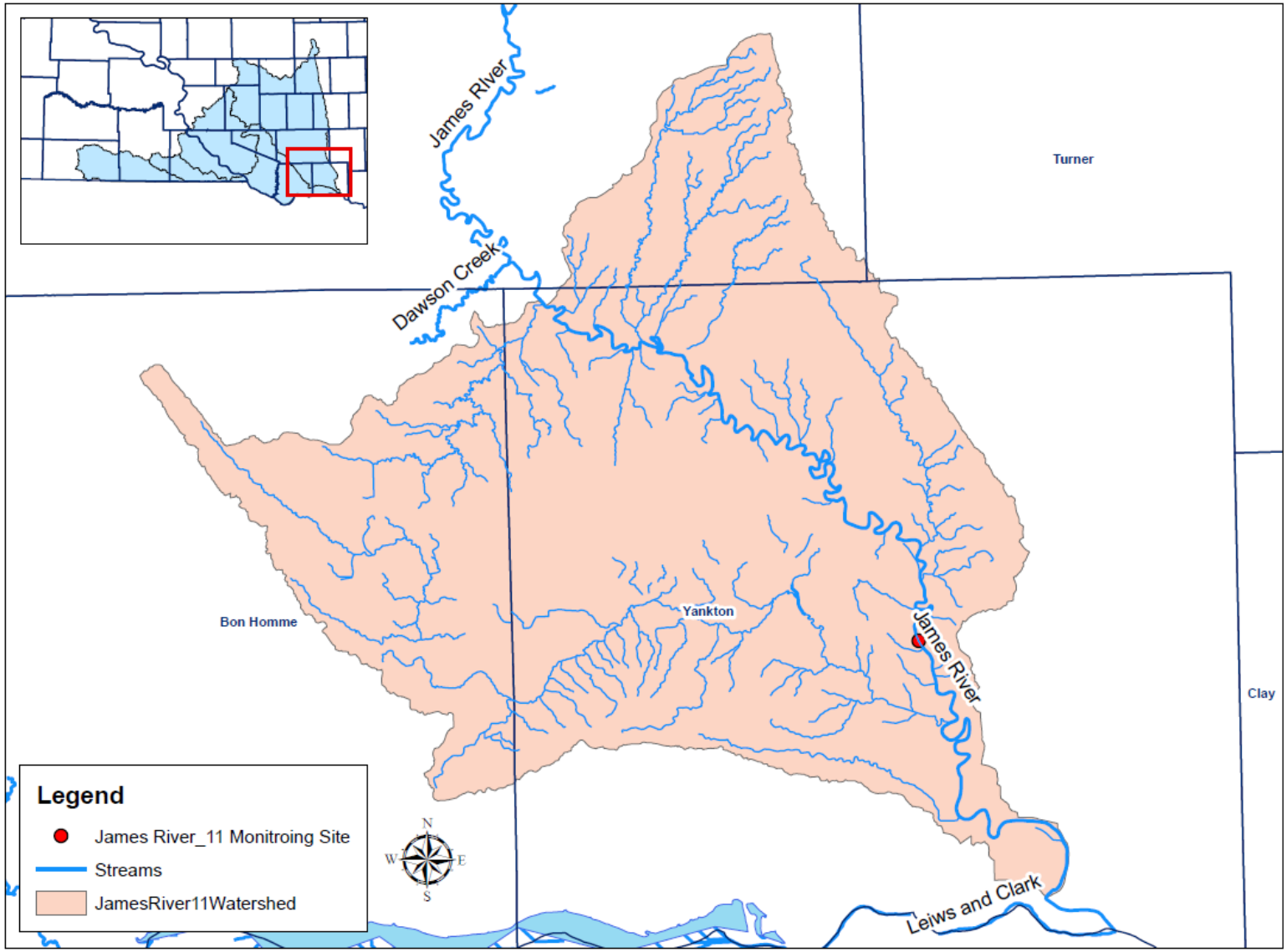

Figure 67: James River Segment 11 Water Quality Monitoring Site.

Figure 68 shows that James River Segment 11 Total Suspended Solids (TSS) median value for the Last 5 Years increased from 77 to 132 mg/l. The standard for TSS on The James River is 158 mg/l. There is a 43% exceedance for the Last 5 Years samples as compared to a 25% exceedance of the Earlier Samples data set.

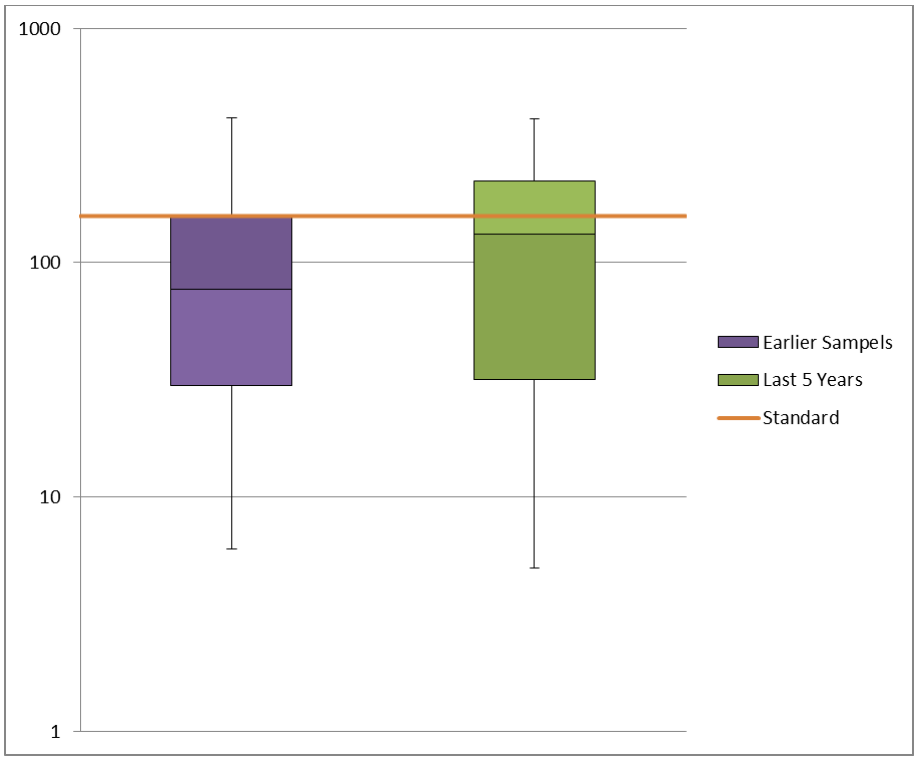

Figure 68: James River Segment 11 TSS Box and Whisker Plot.

All TSS samples from 2003 through July of 2016 collected at the James River Segment 11 WQM site are displayed below in Figure 69.

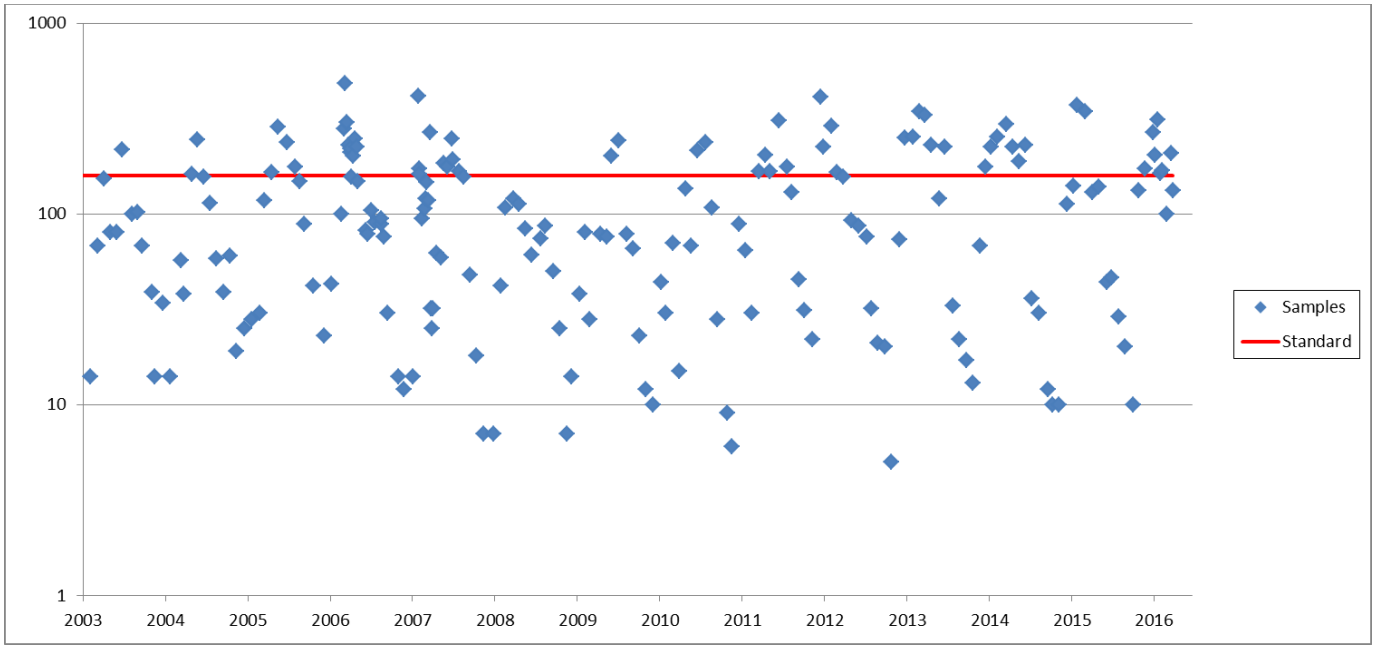

Figure 69: James River Segment 11 TSS Samples.

Figure 70 shows James River Segment 11 E-coli median value for the Last 5 Years increased from 27 to 130 CFU/100mL. The standard for E.coli on James River Segment 11 is 1,178 CFU. The exceedance for the Last 5 Years samples increased to 11% as compared to 6% of the Earlier Samples data set.

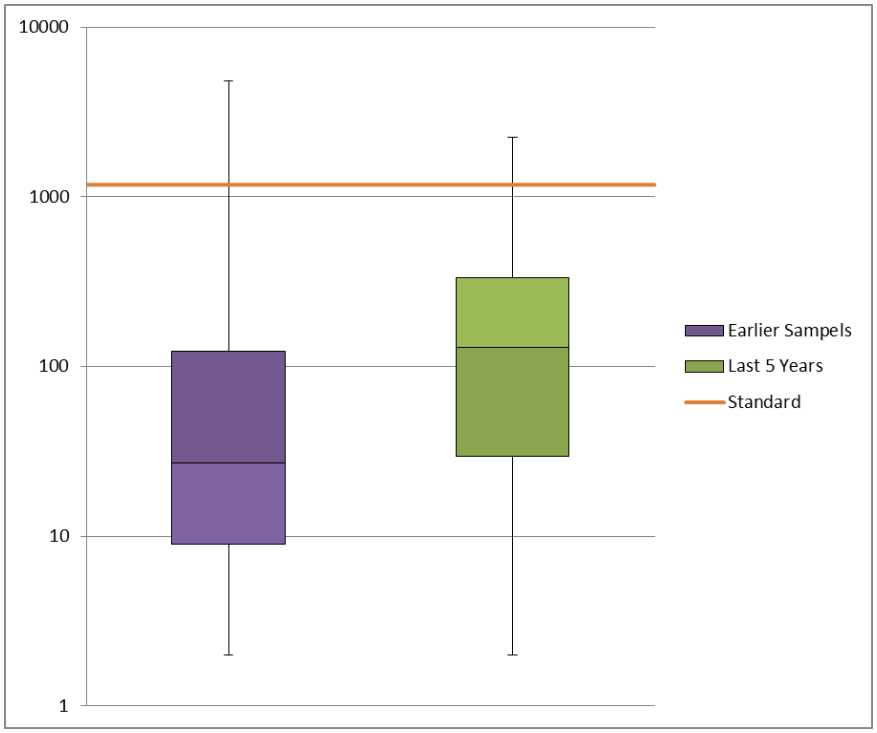

Figure 70: James River Segment 11 E.coli Box and Whisker Plot.

All E.coli samples from 2006 through July of 2016 collected for Segment 11 WQM sites are displayed below in Figure 71.

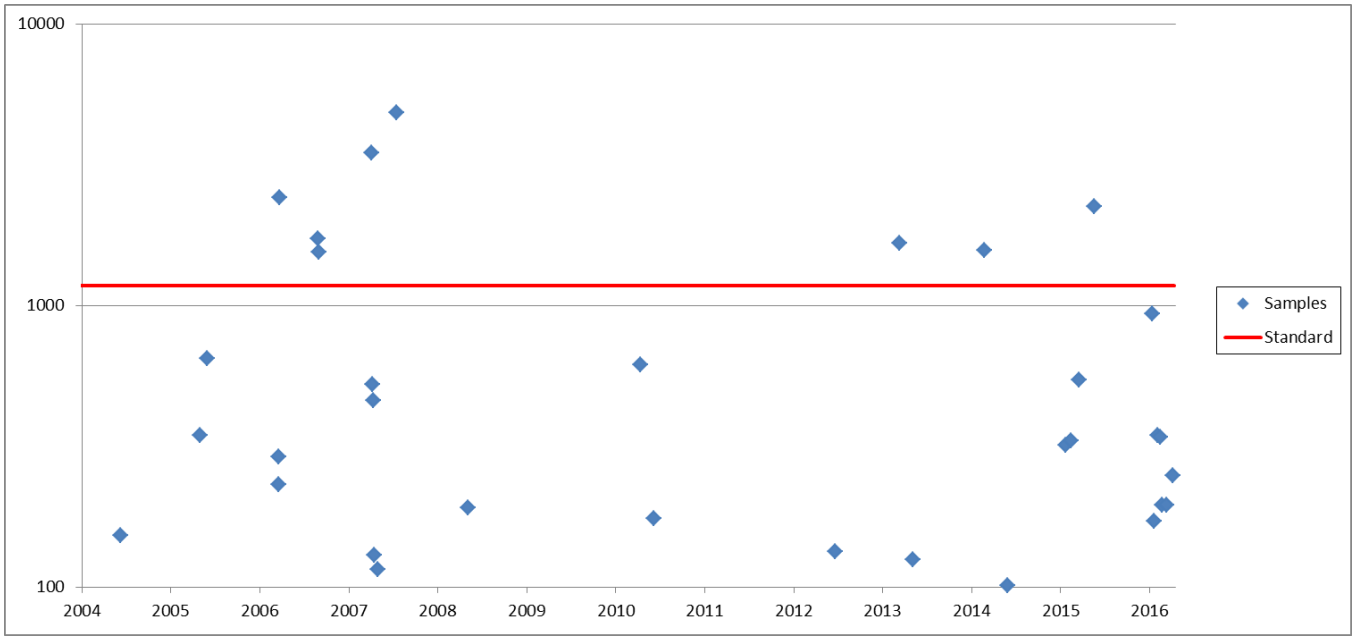

Figure 71: James River Segment 11 E.coli Samples.

Evaluation

Locations were gathered for all BMPs installed in the Project area through the DENR Tracker system. This was to assist in modeling and uploading information to the EPA GRTS website. Locations of BMPs installed during this segment are shown in Figure 72 and BMPs installed throughout all segments are shown in Figure 73. Along with the type of BMP that was installed, these maps show that several BMPs were installed throughout the watersheds. With the frequency and location of the BMPs, the Project was able to assist in improving condition of the stream reaches throughout the project area.

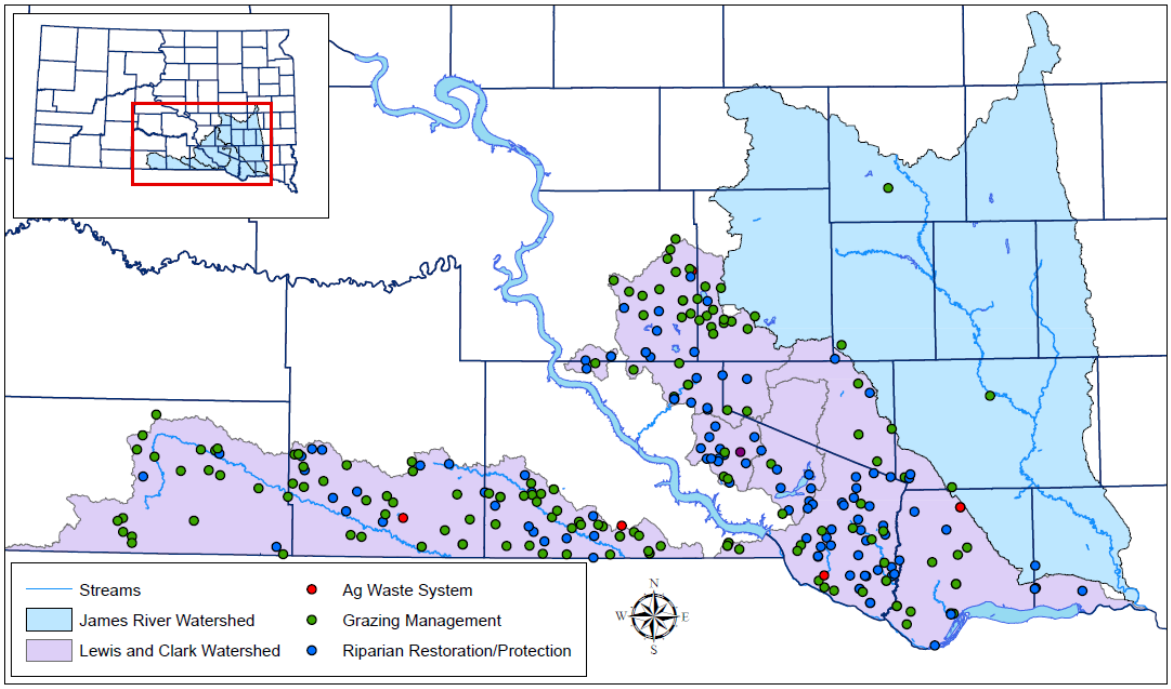

Figure 72: Locations of BMPs Installed During Project Segment 4.

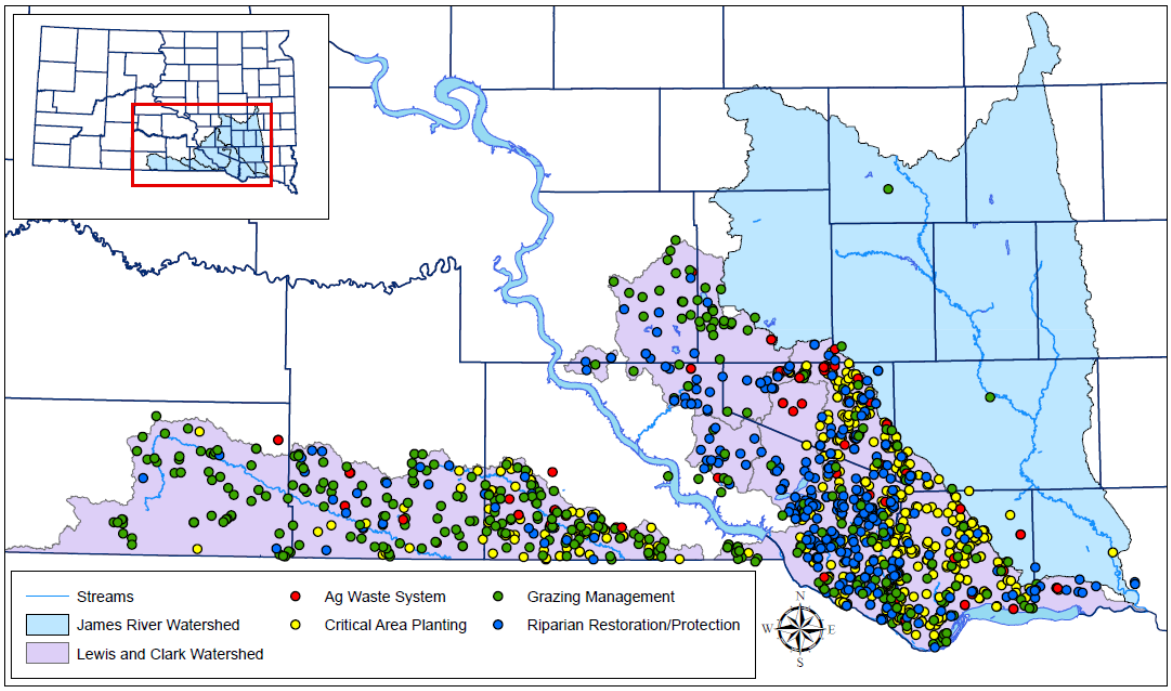

Figure 73: Locations of BMPs Installed During all Project Segments.

Annual Load Reductions

STEPL and FLGR4 Excel spreadsheets were used to calculate load reductions for all BMPs installed through all the Project segments, with the reductions recorded in DENR's Tracker for each BMP. Modeled reductions by watershed for this segment of the Project can be seen in Table 4.

Table 4: Combined Segments' Annual Load Reductions by River Segment/Lake.

Lewis and Clark Segments/Lakes	Sediment (Tons)	Nitrogen (Pounds)	Phosphorus (Pounds)
SD-JA-R-FIRESTEEL_01	14	268	34
SD-JA-R-JAMES_09	47	440	79
SD-JA-R-JAMES_10	78	1,405	183
SD-JA-R-JAMES_11		7,802	1,382
SD-MI-L-ANDES_01	194	802	261
SD-MI-L-DANTE_01	207	889	291
SD-MI-L-GEDDES_01	887	4,128	1,235
SD-MI-L-PLATTE_01	158	1,783	291
SD-MI-L-ROOSEVELT_01	154	646	201
SD-MI-R-ANDES_01_USGS	172	711	236
SD-MI-R-CHOTEAU_01	3,121	16,665	4,348
SD-MI-R-CROW_01	40	418	71
SD-MI-R-EAST_FORK_PLATTE_01_USGS	44	3,930	483
SD-MI-R-EMANUEL_01	426	3,241	678
SD-MI-R-FRANCIS_CASE_01	93	369	124
SD-MI-R-LEWIS_AND_CLARK_01	3,101	40,461	9,735
SD-MI-R-PLATTE_01_USGS	1,829	27,303	4,866
SD-MI-R-PONCA_01	9,233	47,400	14,703
SD-MI-R-SLAUGHTER_01	472	16,003	3,705
SD-MI-R-SNAKE_01_USGS	366	1,694	515
SD-NI-R-ANTELOPE_01_USGS	543	2,741	764
SD-NI-R-KEYA_PAHA_01	2,246	14,395	4,502
SD-NI-R-SAND_01_USGS	130	776	187
Other	1,626	16,338	3,448
Total Reductions:	25,181	210,608	52,322

Load reductions by segment of the Project are shown in Table 5. STEPL load reductions for each segment can be compared with the different type of BMPs installed. The total number of projects completed across all project segments for each BMP are also shown here.

Table 5: STEPL Load Reductions by Practice.

Best Management Practices		Cropland BMPs	Ag Waste Systems	Grazing Management	RAM	Total
	# of Projects:	1,021	50	361	1	1,433
N (Pounds)	Seg. 1	206,898	153,299	27,878	0	388,075
	Seg. 2	117,220	177,439	36,608	0	331,267
	Seg. 3	76,395	197,850	99,262	0	373,507
	Seg. 4	42,684	72,573	94,526	825	210,608
	Total	443,197	601,161	258,274	825	1,303,457
P (Pounds)	Seg. 1	67,916	33,256	6,037	0	107,209
	Seg. 2	40,466	39,416	9,310	0	89,192
	Seg. 3	24,003	43,672	23,434	0	91,109
	Seg. 4	14,654	16,595	20,805	268	52,322
	Total	147,039	132,939	59,586	268	339,832
Sediment (Tons)	Seg. 1	47,930	33	4,043	0	52,006
	Seg. 2	31,774	544	4,758	0	37,076
	Seg. 3	17,051	115	16,877	0	34,043
	Seg. 4	11,023	0	13,968	190	25,181
	Total	107,778	692	39,646	190	148,306

Project Budget

The Project received funds from many different state and federal sources to attain what has been accomplished. The original project budget with estimated funds that were expected to be spent in the project is shown in Table 6.

Table 6: Original Segment 4 Project Budget.

ITEM	319-EPA	Consolidated	USDA EQIP/CRP	US F&W	SD GF&P	Local	Total
Personnel Support							
Staff: Coordinator/Conservationist (2 FTE)	$241,500						$241,500
Travel	$45,600						$45,600
Office Space/Equipment/Supplies:	$36,900						$36,900
Administration:	$74,550					3000	$77,550
Subtotal: Personnel Support	**$398,550.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$3,000.00**	**$401,550.00**
Objective 1: BMP's Installation							
Task 1: Cropland/Grassland BMP installation							
Product 1: Cropland BMP's - 15,000 ac.	$42,750		$41,625			$28,125	$112,500
(Filter Strips, Grassed Waterways, Riparian plantings etc.)							
Product 2 : Grassland BMP's - 17,000 acres:	$342,000		$339,900	$8,100	$5,000	$325,000	$1,020,000
(Rotational grazing, fence, seeding, water development)							
Product 3: Riparian Area Mgt. (RAM Program) - 30 acres	$22,500					$7,500	$30,000
Task 2: Livestock Nutrient Management							
Product 4: 10 Ag Waste Systems							
Engineering Design Services - 10 @ $18,500 each	$138,750					$46,250	$185,000
System Construction - 8 @ $300,000 each	$325,000	$275,000	$1,200,000			$600,000	$2,400,000
Winter Feeding Area - 6 @ $25,000 each	$112,500					$37,500	$150,000
Nutrient Management Plans - 12 @ $2500 each	$12,000		$11,500			$6,500	$30,000
Subtotal: BMP Installation	**$995,500**	**$275,000**	**$1,593,025**	**$8,100**	**$5,000**	**$1,050,875**	**$3,927,500.00**
Objective 2: Outreach:							
Task 3: Information Campaign	$4,000					$4,000	$8,000
Product 5: (Informational meetings (2), tours (2), articles (4)							
Subtotal: Outreach	**$4,000**	**$0**	**$0**	**$0**	**$0**	**$4,000**	**$8,000**
Objective 3: Monitoring and Project Management							
Task 4: Water Quality Sampling/Evaluations							
Product 6: 24 water samples/testing/evaluation @ $65/ea.	$1,950						$1,950
Task 5: Reports And PIP Development:							
Product 7: Reports:(2- semi-annual, 2 - annual, & 1 - final)							
Subtotal: Monitoring and Reports	**$1,950**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1,950**
Total Project Cost:	**$1,400,000**	**$275,000**	**$1,593,025**	**$8,100**	**$5,000**	**$1,057,875**	**$4,339,000.00**
Match:							
Ineligible Match - Federal and/or Project Allocated			$1,593,025.00	$8,100.00			
Eligible Match - Local and State					$5,000.00	$1,057,875.00	
Match: Project Totals For Match	$1,400,000				$5,000	$1,057,875	$2,737,875
Match Percentages:	**51%**				**0%**	**39%**	**100%**

Several changes were made to the budget throughout the life of the project. The completion date for this segment of the Project was also adjusted to better accomplish tasks set for this segment. A summary of the amendments made to the Project are shown below.

Amendment 1:
March 3, 2015, the Section 319 grant award was increased by $58,027.23, increase funds available for grassland BMPs.

Amendment 2:
July 14, 2015, the Section 319 grant was increased by $300,000 and $100,000 of CWSRF-WQ State funds were awarded to the Project for additional interest in Grassland BMPs, AWMSs, and water quality sampling.

Assignment of Agreement was transferred from Randal RC&D to James River Water Development District on July 14, 2015 to better handle employment of coordinators.

Amendment 3:
October 2, 2015, Section 319 grant was increased by $179,958.35 and extended the project area to include the Lower James River watershed.

Amendment 4:
April 6, 2016, the Section 319 grant was increased by $10,890.82 to help meet the goals of the Project.

Amendment 5:
June 30, 2016, the Section 319 grant was increased by $150,000 to further increase funds available to grassland BMPs.

Funds expended throughout the Project can be viewed in Table 7. The Project was very well received by producers, and in turn the producer share of the funds spent reached over 50% of this segments total funds spent.

Table 7: Funds Expended for Segment 4

ITEM	319-EPA	Consolidated	CWSRF-WQ	USDA EQIP/CRP	Other State	Local	Total
Personnel Support							
Staff: Coordinator/Conservationist (2 FTE)	$112,825		$54,064			20322.35	$187,211
Travel	$29,180		$584				$29,764
Office Space/Equipment/Supplies:	$13,027						$13,027
Administration:	$8,847					3000	$11,847
Subtotal: Personnel Support	**$163,878.82**	**$0.00**	**$54,647.66**	**$0.00**	**$0.00**	**$23,322.35**	**$241,848.83**
Objective 1: BMP's Installation							
Task 1: Cropland/Grassland BMP installation							
Product 1: Cropland BMP's - 15,000 ac.	$23,124					$7,708	$30,832
(Filter Strips, Grassed Waterways, Riparian plantings etc.)							
Product 2 : Grassland BMP's - 17,000 acres:	$1,202,304		$46,547	$5,819	$45,423	$445,872	$1,745,965
(Rotational grazing, fence, seeding, water development)							
Product 3: Riparian Area Mgt. (RAM Program) - 30 acres							$0
Task 2: Livestock Nutrient Management							
Product 4: 10 Ag Waste Systems							
Engineering Design Services - 10 @ $18,500 each	$2,140			$17,700			$19,840
System Construction - 8 @ $300,000 each	$192,924	$362,230		$139,048		$1,819,145	$2,513,347
Winter Feeding Area - 6 @ $25,000 each	$13,380	$4,365				$11,354	$29,099
Nutrient Management Plans - 12 @ $2500 each							$0
Subtotal: BMP Installation	**$1,433,872**	**$366,595**	**$46,547**	**$162,567**	**$45,423**	**$2,284,078**	**$4,339,082.54**
Objective 2: Outreach:							
Task 3: Information Campaign							$0
Product 5: (Informational meetings (2), tours (2), articles (4)							
Subtotal: Outreach	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Objective 3: Monitoring and Project Management							
Task 4: Water Quality Sampling/Evaluations							
Product 6: 24 water samples/testing/evaluation @ $65/ea.	$1,125						$1,125
Task 5: Reports And PIP Development:							
Product 7: Reports:(2- semi-annual, 2 - annual, & 1 - final)							
Subtotal: Monitoring and Reports	**$1,125**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1,125**
Total Project Cost:	**$1,598,876**	**$366,595**	**$101,194**	**$162,567**	**$45,423**	**$2,307,401**	**$4,582,056.35**
Match:							
Ineligible Match - Federal and/or Project Allocated				$162,566.77			
Eligible Match - Local and State					$45,423.25	$2,307,400.69	
Match: Project Totals For Match	$1,598,876	$366,595	$101,194		$45,423	$2,307,401	$4,419,490
Match Percentages:	**36%**	**8%**	**2%**		**1%**	**52%**	**100%**

PUBLIC PARTICIPATION

Project area producers were informed of practice installation opportunities by press releases, fact sheets, brochures, feature articles, booths, and direct mailings found at partner agency offices and other public events. Reference back to the Project Goals, Objectives, and Accomplishments section of this report on pages 27-29, to get pictures and more detailed listings of the types of information provided to producers.

This Project initiated direct producer contact by hosting booths at local fairs and workshops by hosting guest speakers to provide technical information, and by simply making onsite visits to individual farms and ranch sites. This method appeared to be most successful for this Project and cemented the word of mouth advertising that has led to our success. Producer to producer referrals to contact us for practice information was also a leading initial contact opportunity.

In an effort to reach a broader range of participants, this Project maintained a website and social media page on Facebook to relay our message to the general public. Pictures of successful practice installations and individual producer testimonies were displayed on these sites in hope of getting our story out to as many people as possible to assist in our long range goals of reducing nutrient loading into the Projects streams and conveyances.

Charles Mix Lake Restoration Association remained vigilant in getting public awareness of the Lake Andes chain of lakes. They organized volunteers to gather weekly water samples and data collection on the lake to educate the public of the condition of the lake and ways to reverse water quality conditions of the waterbody. A class in the local high school also had involvement in the Project by collecting water samples and running tests on the samples in their lab.

BEST MANAGEMENT PRACTICES DEVELOPED OR REVISED

Original design of this Project was to use established practices for implementation purposes, thus no new practices were developed in this segment by design. Demand for existing practices during this segment far outreached the amount of dollars available to install them. This prompted the Project to put an application in for USDA funding through the Regional Conservation Partnership Program (RCPP), which is administered by the Natural Resource Conservation Service (NRCS) agency. General premise of the program is to take a pool of funds from the EQIP program and target areas within the watershed. Limited control of the funds is to remain with the sponsoring agency through the selection of targeted ranking questions for producer applications. In theory the Project developed a new funding source for existing approved practices.

A pre-application for the program was submitted in July, 2015 and was selected for a full proposal which was accepted in November of the same year. Approval of the grant was received in February of 2016 in the amount of $2,700,000 to be spent over a five year period. Project staff planned to cost share practices such as Animal Waste Systems or large livestock water development practices through this grant in an effort to stretch Project funds out over a backlog of producer applications.

Project staff wrote into the application funding for practices not traditionally or currently funded with 319 dollars due to a shortage of available funds. Practices such as planting cover crops for livestock grazing to ease riparian pressure, removal of invasive cedar trees in riparian areas, and renovation of existing livestock shelterbelts are examples that the Project hopes to implement to broaden the scope of the Project and to help reduce nutrient loading. These practices, in addition to the aforementioned feedlot and grazing practices, will hopefully have an increase in the number of completed installations in future years of this Project.

Rules of the agreement state that NRCS employees will be responsible for uploading practices into their program and also be in charge of contracting obligations that occur from these practices. This will keep project coordinators time of involvement for this program to a minimum, mainly doing producer visits and completing the associated paperwork. Administration costs will be relatively unaffected for this program, which helped in the decision to apply for this grant.

COORDINATION

Coordination protocol changed with the merger of the Lower James River watershed and the Lewis and Clark Project. One major change was the James River Water Development District became the lead sponsor of the combined project, and Randall Resource Conservation and Development Council assisting as a co-sponsor. Reasoning behind this move was prompted by not only by the physical size of the project area but also by an increase in producer count and partner involvements. Randall RC&D consisted of volunteer staff and one part time employee which would have created hardships for their board to accomplish the tasks of the large combined project, while JRWDD had full time office staff to address the increased responsibilities. One other factor for consideration was that the Project had applied for a grant with the USDA's NRCS agency Regional Conservation Partnership Program which also added staff workload on the sponsoring agency. Application for this grant was approved and funded in February, 2016. Administration costs were less for the combined project than they were for the two stand-alone individual projects so all the work resulted in a better relationship and allowed more practice implementation funds to be available to install practices for the Project.

External factors resulted in the project coordinators having their employment switched from the South Dakota Association of Conservation Districts to the James River Water Development District. This made the sponsoring agency the employer for the Lewis and Clark staff as of August 1, 2015. This move worked well for the remainder of Segment IV and into the current South Central Implementation Project.

The next page contains a table that lists the partners and their roles in this Project:

Table 8 . Contributions and Partners

Agency/Organization	Contribution
Nongovernmental	
Charles Mix Lake Association	Volunteer water quality monitoring. Organize and host meetings.
Private sector technical assistance providers (TSPs)	BMP design services, especially AWMs.
Randall Resource Conservation and Development Association Council	Project co-sponsor and assist in planning meetings
SD Association of Conservation Districts	Provided interim coordinators for a portion of segment, technical assistance for administration and BMP planning through the 319 funded 303(d) Watershed Planning and Assistance Project.
SD Discovery Center and Aquarium	Information and education activities and coordinated volunteer water quality monitoring program.
SD Grasslands Coalition	Design managed grazing systems through the 319 funded Grasslands Management and Planning Project.
Governmental	
Local	
Douglas, Aurora, Brule, Bon Homme, Hutchinson, Charles Mix, Gregory, Clearfield/Keya Paha, Todd , Hanson, McCook, Davison, Miner, Sanborn, Jerald, Yankton, Gregory Conservation Districts	BMP planning, to include maps and installation, and provide a "conduit" through which cost share funds are distributed to producers installing BMPs. Cosponsor SD Soil and Water Conservation Grant applications. Monitor compliance with BMP O & M requirements.
State	
SD Department of Agriculture	Financial assistance for BMP installation and technical assistance to conservation districts through the Conservation Commission's Soil and Water Conservation Grants Program.
SD Dept. of Game, Fish and Parks	Presentations at meeting and grassland BMP installation through the Partners for Wildlife Program.
SD DENR	Technical assistance and training with water quality sampling and data interpretation, project management and BMP installation through the 319 Program. Consolidated Water Facilities Construction Fund grant for AWMs, Section 401 and 404 and storm water permits through Surface Water Program.
SD Historic Preservation Office	Cultural Resource clearance/surveys.
Federal	
US EPA	Financial assistance through Clean Water Act Section 319 project grants.
USDA FSA	Financial assistance for BMP installation through the CRP Program.
USDA NRCS	Financial and technical assistance for BMP installation through the EQIP Program. AWMs design services through the NRCS Ag Waste Management Team.
USDA FWS	Technical assistance for grassland seeding, grazing systems, multiple purpose ponds and riparian fencing through the Partners for Fish and Wildlife Program and Annual appropriation for SD.
Special District	
James River Water Development District	Project major sponsor and took over role of employer of project coordinators during later stages of segment and provided technical assistance for administration of the Project.

ASPECTS OF THE PROJECT THAT DIDN'T WORK WELL

Positives far outnumbered negatives for this segment of the Project. Producer awareness and involvement in installation of practices ranked high on the positive list. This segment of the Project was shortened to two years and yet many of the goals of the original three year plan were met in this time frame.

A negative of this and previous segments of the Project has been retaining a second coordinator to ensure continuity for producers. The Project area is very large and seems to be intimidating for some employees. It has happened that after training is complete and coordinators are comfortable with their position, they have been offered and accept better paying jobs. Consultation with the sponsor of this Project led to some ideas of how to address this issue after losing a coordinator in the fall of 2015 to USDA's Farm Service Agency. We raised the pay level to above an entry level position, added a better benefits package, and targeted a different pool of applicants to hire from which has worked more efficiently.

Directing money to producers in a timely manner after they had submitted their bills and having duplicated administration costs associated with having a separate sponsor and employer were becoming an issue for the Project. As discussed in the Coordination section, adding James River Water Development District as the sponsor of the Project and later as the employer has reduced these duplicated costs. Reimbursement to producers is now paid directly to the producer instead of sending funds to a local entity that in turn pays the producer. This has made a more seamless and timely approach to reimburse cost share paid by producers. Administration bills coming from just one source has also led to easier tracking and comprehension of the bills.

A water sampling program began at the beginning of this segment to provide a better base of samples to draw from for determining if streams are impaired or are improving. Originally the coordinators were to be in charge of collecting these samples and sending them to the laboratory for analysis every three weeks during the recreational season. Workload of the Project and the eventual loss of one of the coordinators, led to sampling only on days that were available to the coordinator; thus not following the required schedule. This minimized the effectiveness of the sample. The summer of 2016 saw the hiring of an intern to obtain these samples for not only this Project but others as well and has led to a more timely and efficient sampling routine.

The flow of funds through the newly acquired RCPP grant has been a challenge. After almost a year from being awarded these funds, none of the funds have been spent. It is a relatively new program with new rules and regulations. Determining what documents must be used and signed have halted the progress on this grant. The next Project segment will see more meetings with NRCS to try to reach a harmonious agreement of how to make these funds work for this Project.

FUTURE ACTIVITY RECOMMENDATIONS

The Lewis and Clark Project will end and be merged with the Lower James River Project area. The name of the new merged project will be called the “South Central Watershed Implementation Project Segment 1”. This merged effort worked well in the final year of Segment 4 of the current Lewis and Clarke Project. Problems did occur and were handled in an expedient manner allowing producers in both watersheds to realize some of the water quality practices offered.

Two new coordinators have been hired, one to assist in the implementation of practices and the other to help direct coordination with the RCPP grant. They have worked well with this segment, and are planned to continue through future segments.

This Project was approached by stakeholders from the Vermillion River watershed, located east of the current project area, to see if the project sponsor was interested in adding the Vermillion watershed to the Project and conduct the same sort of watershed activities. The Vermillion stakeholders feared there was not enough interest present to support a stand-alone project at the current time. The expectation is that the South Central Implementation Project could develop interest in implementing BMPs in the Vermilion watershed, and in future years a Vermillion River watershed standalone implementation project could develop. A proposal was presented and accepted by the James River Water Development District Board and the staff of South Dakota DENR. The current plan is to develop partner relationships and producer contacts during 2017 and begin installation of practices the following year. The addition of the Vermillion River watershed puts the South Central Project area to over seven million acres, or roughly 15% of the entire state.

Water sampling is recommended to continue in the watershed area as in this segment. An intern position will be offered again by the sponsor to collect samples in the original Lewis and Clark watershed and the Lower James River watershed sites in a timely manner.

Practices and BMPs offered to producers for improving water quality concerns should remain the same as previous segments. An increased effort is recommended to be made in the next segment to get funds flowing from the newly acquired RCPP grant to assist in funding these practices and ensure the Project move forward on gains realized in water quality numbers for the watersheds.

APPENDIX

Brochures, Fact Sheets, Press Releases, and Promotional Materials

Tributaries & Lakes Involved:

Lewis & Clark Watershed

Keya Paha River
Ponca Creek
Slaughter Creek
Choteau Creek
Emanuel Creek
Corsica Lake
Dante Lake
Burke Lake
Rahn Lake
Roosevelt Lake
Snatch Creek

Lake Francis Case Watershed

Lake Andes
Andes Creek
Geddes Lake
Academy Lake
Platte Lake
Platte Creek

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Lewis & Clark
319 Watershed Project

Randall RC&D
SDACD

Lewis & Clark 319 Watershed Project

Project Goal

Reduce sediment, animal waste & nutrients that drain into the Lewis & Clark Lake.

Lewis & Clark Lake Missouri River South Dakota

~~~~~

We work with Livestock & Agriculture Producers to install voluntary Best Management Practices that will benefit the producer and have a positive impact on our lakes, streams, & rivers.


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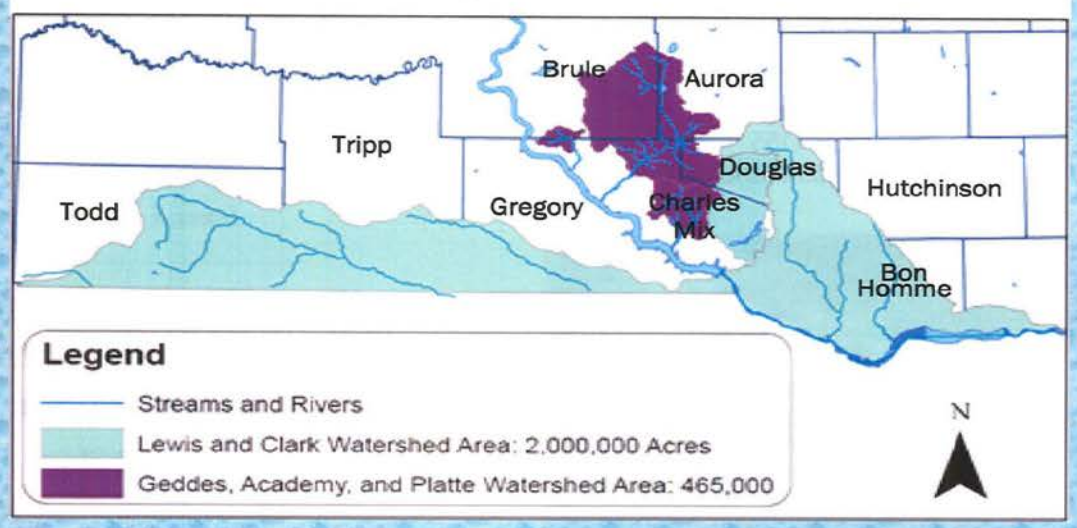
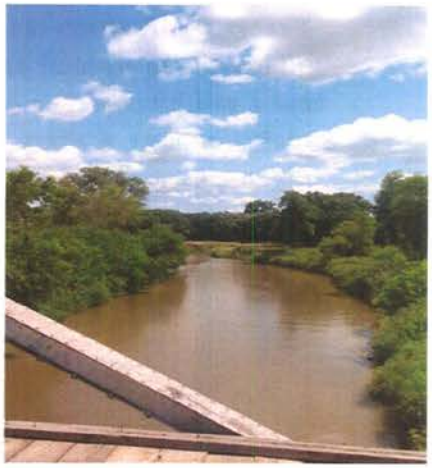
Lewis and Clark Implementation Project Area





LCWIP is Administered by:

Randall RC&D Association, Inc

SD Association of Conservation Districts

Our Partners...

Agriculture Producers Local Match

USDA—Natural Resources Conservation Service (NRCS)

Local Conservation Districts

SD Department of Environment & Natural Resources (DENR)

Major implementation funding is provided through the Clean Water Act,

EPA Section 319 Grant.

BMPs
Best Management Practices

Animal Feeding Operations

Grass Plantings

Alternative Water Sources

Tree Planting

Planned Grazing Systems

Livestock Exclusion Fencing off waterways

Water Pipelines/ Tanks

Grassland & Cropland Buffers

Riparian Restoration Areas

LEWIS & CLARK WATERSHED IMPLEMENTATION PROJECT

Protecting a National Resource — **2015 FACT SHEET**

On Average, the Six Dams of the Missouri River Provide...

- Flood control averages $500 million
- Hydropower sales by WAPA $240 million
- Irrigation value unknown
- Navigation $9 million
- Domestic water supply total value to great to calculate
- Recreation more than $200 million annually
- Fish & Wildlife Habitat
- Endangered Species & Cultural Resource Protection

Along with these benefits, these dams also trap silt & sand...

- 7% of the Missouri River's water storage is filled with sediment
- By 2045, half the Lewis & Clark Lake is expected to be filled
- Studies are being done to determine the best way to address these issues

"We work with Livestock & Agriculture Producers to install voluntary Best Management Practices that will benefit the producer and have positive impacts on our lakes, streams, & rivers."

- Lewis & Clark Watershed Coordinators

Missouri River's Lewis & Clark Lake at Running Water, SD

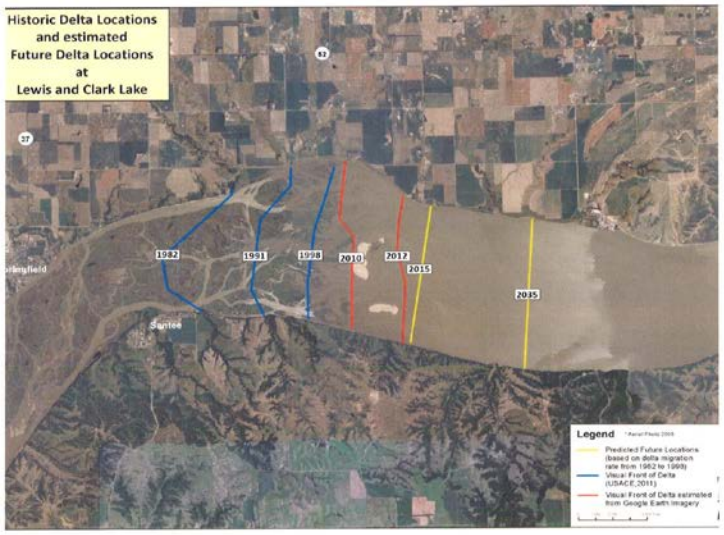
Lewis & Clark Lake

- 30% full of sediment and it continues to fill.
- Niobrara River contributes to 50% of sediment entering the lake.

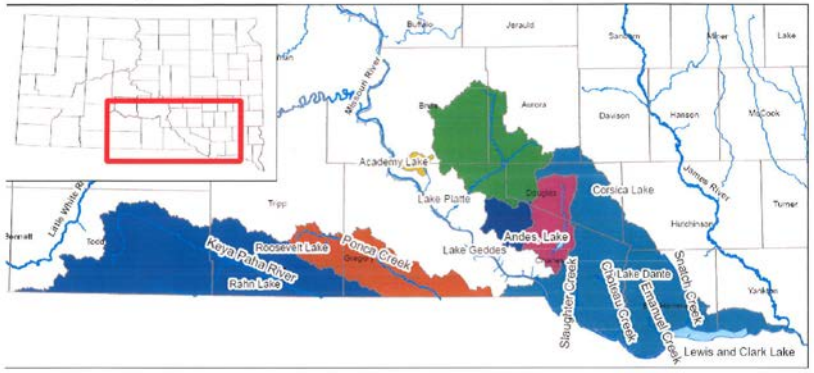
The Strangling Silt = Reaction vs. Action

Reaction:

- Elevation and moving of roads
- Relocation of drinking water intakes
- Establishment of new/longer boat launch pad
- Buy-out of homes
- Lewis & Clark Illustration Project continues to educate
- Launching Title IX Task Force
- Missouri Sedimentation Action Coalition Activity
- Lewis & Clark 319 Watershed Implementation Projects
- Sediment Management Studies by US Army Corps of Engineers
- Sediment Studies conducted by Rapid Water Assessment team



Lewis and Clark Implementation Project Area 2,500,000 Acres



Sub Watersheds

- Academy
- Lake Andes
- Ponca Creek
- Geddes
- Lewis and Clark
- Keya Phaha
- Platte Watershed

N

Action

- Beginning in 2002, concerned local organizations and citizens requested assistance from Randall & Lower James RC&D's.
- Numerous organizations came together through the assessment, development, and growth of the project with Randall RC&D taking lead in organizing & administering this implementation.

⇒ Randall RC&D, Lower James RC&D, South Central Water Development District, SD Department of Environment & Natural Resources

⇒ South Dakota Partnership—DENR, SCWDD, SD Association of Conservation Districts, NRCS, 11 local conservation districts & others

- From 2006-current the watershed project has grown from 56,300 acres to 2.5 million acres. It now expands over six watersheds and spreads within 11 counties.

Lewis and Clark Implementation Project July 2006 - January 2015

Funds	Aurora	Charles Mix	Bon Homme	Douglas	Gregory	Todd	Tripp	Brule	Yankton	Hutchinson	Davison	Total
319	$231,434.85	$239,677.97	$878,522.11	$496,078.61	$708,945.29	$389,609.08	$511,028.67	$67,629.88	$424.00	$22,091.04	$29,850.20	$3,375,291.70
Con. Com.	$0.00	$0.00	$7,478.51	$0.00	$13,713.41	$82,018.01	$0.00	$0.00	$0.00	$0.00	$0.00	$103,209.93
Consolidated	$0.00	$66,000.00	$367,930.41	$97,675.86	$0.00	$6,226.65	$50,783.81	$35,000.00	$0.00	$0.00	$0.00	$642,566.73
CWSRF	$30,546.58	$10,897.37	$8,183.24	$0.00	$5,325.42	$25,138.14	$44,202.62	$0.00	$0.00	$3,708.05	$0.00	$128,001.42
CWSRF Water Quality	$0.00	$1,560.00	$76,796.00	$78,574.71	$29,069.29	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$186,000.00
EQIP	$65,620.00	$298,336.50	$419,999.50	$342,253.68	$233,870.00	$118,690.90	$191,453.00	$0.00	$0.00	$0.00	$0.00	$1,670,223.58
Local cash	$149,038.77	$772,028.32	$1,379,900.33	$389,951.02	$387,953.43	$140,323.34	$439,646.34	$44,123.20	$0.00	$8,599.68	$9,950.06	$3,721,514.49
Local In-kind	$0.00	$4,688.40	$4,050.00	$34,137.18	$4,486.40	$237.50	$6,268.25	$0.00	$0.00	$0.00	$0.00	$53,867.73
US Dept. of Ag	$92,161.00	$0.00	$0.00	$14,174.00	$4,260.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$110,595.00
USDA/NRCS/FSA	$0.00	$0.00	$0.00	$211,537.02	$233,367.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$445,304.02
Totals:	$568,801.20	$1,392,188.56	$3,142,860.10	$1,664,332.08	$1,620,990.24	$562,243.62	$1,283,382.69	$126,753.08	$424.00	$34,398.77	$39,800.26	$10,430,774.60

Project Coordinators

Rocky Knippling
(605) 280-7768
Rocky.Knippling@sd.nacdnet.net

Lisha Bairey
(605) 730-1155
Alicia.Bairey@sd.nacdnet.net

Conservation District	Phone Number
Aurora County	(605) 942-7769
Bon Homme County	(605) 589-3232
Brule-Buffalo County	(605) 734-5413
Charles Mix County	(605) 487-7601
Davison County	(605) 996-1564
Douglas County	(605) 996-1564
Gregory County	(605) 775-9122
Hutchinson County	(605) 928-7925
Todd County	(605) 259-2238
Tripp County	(605) 842-0603
Yankton County	(605) 665-2662

LCWIP Website
Www.sdconservation.org

MSAC
msaconline.com

Randall RC&D
Sdrcd.org/main/randall-main
randallrcd@crmc.coop

Check us out on Facebook – Lewis & Clark 319 Watershed Project

This Watershed project is administered by the non-profit Randall RC&D Association, Incorporated.
Major implementation funding is provided through a Clean Water Act Section 319 Grant.
All programs and services of the Randall RC&D are offered on a non-discrimination basis.

The **South Dakota Grassland Coalition** presents:

2014 WINTER ROAD SHOW *with Gabe Brown*

December 10th, 11th and 12th
Mission • Yankton • Chamberlain

"A Producer's Perspective on Soil Regeneration"

Gabe Brown is one of the pioneers of the current soil health movement which focuses on regenerating our resources. Gabe, his wife Shelly and son Paul, own and operate a diversified 5,000 acre farm and ranch near Bismarck, ND. Their ranch focuses on farming and ranching in nature's image. The Browns holistically integrate their grazing and no-till cropping system, which includes a wide variety of cash crops along with multi-species cover crops along with all natural grass fed beef, poultry and sheep. This diversity and integration has regenerated the natural resources on the ranch without the use of synthetic fertilizers, pesticides and fungicides. **Learn more:** www.BrownsRanch.us

Winter Road Show Schedule

Wednesday, December 10
10:00 am - 3:00 pm
Sinte Gleska University ~ Mission, SD
Contact: Judge Jessop - SD Grassland Coalition
(605) 280-0127 or jjessop@sdconservation.net

Thursday, December 11
10:00 am - 3:00 pm
Jo Deans ~ Yankton, SD
Contact: Les Labahn - Randall RC&D Association, Inc.
(605) 487-7035 or leslie@cme.coop
Or Sue Schultz, randallrcd@cme.coop

Friday, December 12
10:00 am - 3:00 pm
AmericInn ~ Chamberlain, SD
Contact: Judge Jessop - SD Grassland Coalition
(605) 280-0127 or jjessop@sdconservation.net

The South Dakota Grassland Coalition's annual meeting will be held in conjunction with the Winter Road Show on December 12th, beginning at 12:35 pm.

Each event includes a presentation by Gabe Brown and an update on the Lewis & Clark Watershed Implementation Project. Lunch is provided. For planning purposes, please RSVP.

Admission

The 2014 Winter Road Show is **FREE** for all current members of the South Dakota Grassland Coalition. The cost for non-members is **$20** per person which includes a one year Coalition membership.

Contact Judge Jessop for more information, (605) 280-0127.

SOUTH DAKOTA GRASSLAND COALITION

Watershed work continues in Lewis and Clark Lake area

By Marcus Traxler on Mar 6, 2015 at 8:52 p.m.
Email Tweet News Alerts

LAKE ANDES — Work on the Missouri River watershed never really stops. But thanks to some recent funding help, that will continue to be the case.

Now in its fourth segment, the Lewis and Clark Watershed Implementation Project continues, with work being done to continue carrying out some of the objectives from the first nine years of the project and to cut down on the sedimentation issues that are related to the Lewis and Clark Lake between the Fort Randall Dam and the Gavin's Point Dam at Yankton.

Rocky Knippling, the project director for the Lewis and Clark Watershed Implementation Project, said the focus of Segment IV will be to continue best management practices for area landowners to protect the water sources in the watershed region.

"It's a matter of really educating our people in the watershed of what we need to do to restore the water quality in Lewis and Clark Lake and supporting the watershed's overall health to preserve it in the years to come," he said.

The work is targeted for the watersheds of Lewis and Clark Lake, Lake Andes, Geddes Lake and Platte Lake, which includes about 2.5 million acres and 10 counties. That will be accomplished with solving feedlot waste runoff problems and other source pollution problems.

In January, Gov. Dennis Daugaard announced that the state Board of Water and Natural Resources approved $275,000 for the work through the Consolidated Water Facilities Construction Program and that program's water quality grants. Other funding for the $3.1 million project includes a local match and contributions from the South Dakota Game, Fish and Parks, federal funding sources like the Natural Resource Conservation Service and Farm Service Agency and a Section 319 grant out of the Clean Water Act.

Knippling said some of their work includes making sure grazing management systems are in place for pastures, to make sure there's reduction in sediment lost by erosion and helping with zero-containment feedlots. Knippling said 42 of them have been installed so far, and grant money is available to offset those costs.

"The reaction from farmers has been very good," he said. "I think they see that we want to work together to a common goal because the preservation of our water sources is important to them, too."

Officials say having a clean water system in the Lewis and Clark Lake watershed is critical. The application for the funding noted that many Nebraska and South Dakota communities get their drinking water out of Lewis and Clark Lake, and more than 1 million people visit its recreation areas every year.

Knippling, of Chamberlain, works with his colleague Alicia Bairey out of the Natural Resources Conservation Service offices in Chamberlain.

The South Dakota side of the Missouri River makes up the small side of the nearby watersheds. The Niobrara River in Nebraska comprises about 8 million acres of watershed before entering the Lewis and Clark Lake near Running Water.

Other efforts in this segment include implementing cropland and grassland best management practices, such as filter strips, riparian buffers and tree plantings on about 15,000 acres to reduce nutrient and sediment impact.

Public informational meetings, presentations and watershed tours are also part of the plan in this segment to make it easier for members of the public to understand what is being done and how it impacts their lives.

"It's always going to be a battle with the sediment in the river," he said. "And it's always easier to deal with some of the issues upstream before they get down to the river, because there's little control left at that point."

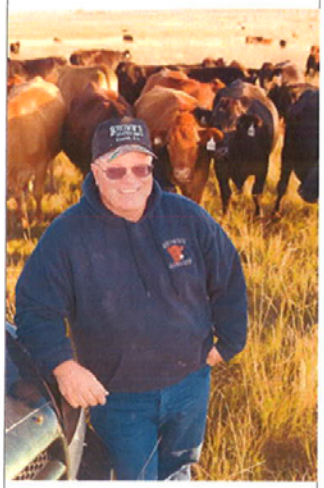
SDACD Lewis & Clark 319
Watershed Project

Volume 1, Issue 1

December 2nd, 2014

WHAT IN THE WATERSHED IS GOING ON?

INSIDE THIS ISSUE:



Workshops/Meetings:

- **Winter Road Show Featuring Gabe Brown**

Dec 10th—Mission, SD

Dec 11th—Yankton, SD

Dec 12th—Chamberlain, SD

For More Info:

Judge Jessop (605) 280-0127

Www.BrownsRanch.us

KEYA PAHA RIVER BECOMING A SUCCESS STORY

Water quality monitoring during the Lewis and Clark Lake Assessment Project (2003-2005) revealed elevated levels of bacteria within the Keya Paha. The Keya Paha also produced high total suspended solids (TSS) levels, mainly from natural sources and was listed first for TSS on the 303(d) impaired waters list in 1998. Through the Lewis and Clark Lake Implementation Project, the Randall RC&D worked with landowners to voluntarily implement best management practices in order to reduce sediment and bacteria loads. Water quality has improved markedly since best management practices (BMP) implementation began in 2008. The river was reclassified in 2010 as meeting its beneficial uses but was still listed as a threatened water. Presently the Keya Paha River meets all its beneficial uses though it is still listed as threatened for *E. coli* and fecal coliform due in part to high variability of those parameters and limited data collection. Pending the 2014 integrated report, the Keya Paha will be delisted for TSS. There are substantial reductions in nitrogen, phosphorus and sediment loads as well as reductions in *E. coli*, fecal coliform and TSS levels since BMPs were installed.

Sunset on the Keya Paha River - Tripp County, SD

FIRST HOOP BEEF SYSTEM IN BRULE COUNTY THIRY FEEDLOT, INC.

Ed & Lynn Thiry of White Lake, SD are embarking on a new adventure in their family operated livestock operation.

One year ago, a fellow producer expressed to Ed that he believed the future success of beef & corn producers depended on finding a way to feed more corn to more cattle. It was this conversation that fed Thiry's determination to find a way to make that happen. He began talking to local producers and businessmen. Through Midwest Ag Owner, Glen Dyk, he was connected with Tim Bickett from the Hoop Beef System, LLC. After visiting several existing systems, he was convinced that a Hoop Beef System

Lewis & Clark
319 Watershed Project

200 S Paul Gust Rod
Suite 111
Chamberlain SD 57325

Rocky Knippling (605) 280-7768
Lisha Bairey (605) 730-1155
Fax: (855) 256-2557

We are on the Web!
Www.sdconservation.org

Randall RC&D
SDACD

SDACD Lewis & Clark 319 Watershed Project

FUN FACTS:

Highways 1804 & 1806 were named to reflect the years of Lewis and Clark's travels through the area, and run along the southwest and northeast sides of the Missouri River, respectively.

ΩΩΩΩΩΩΩΩ

If cattle run out of water, for 2 weeks they will have trust issues and drink more.

been shown to reduce weather stress, increase feed efficiency, increase weight gain and reduce death loss. Another overlooked advantage is the value of the manure. The Thirys plan to pay for the building in the next 10 years with the return on the manure alone.

Thiry stated, "What I like about the system is the options it gives you." The barn the Thiry's are building will function as a multiple use hoop barn. The barn will be 42x400 ft. and hold 400 head of feeder cattle or 200 cow/calf pairs. They intend on weaning calves in the fall and background feeding them until January. Then in February, they plan to fill the barn with 200 pairs and run them until May. In order to run at full capacity, they plan to finish another set of heavy feeders through the summer. They expect to finish the cattle in 90-100 days—three weeks to 30 days sooner than they would have without the barn.

The hoop barn is currently under construction and is expected to be completed by the end of December 2014.

Lewis & Clark 319 Watershed Project will be cost sharing the barn with Thiry Feedlot, Inc. and is excited to watch the future unfold for our Brule County Producers.

For more information on Hoop Beef Systems you can find them on the web at www.hoopbeef.com

NEW HIRE LISHA BAIREY
WATERSHED PROJECT COORDINATOR

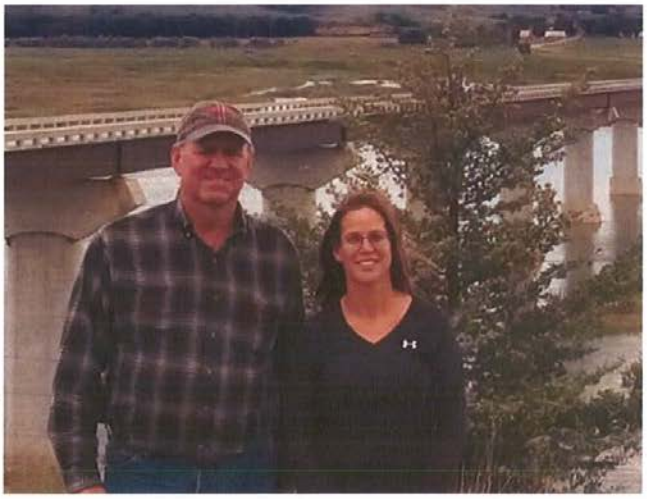
On July 1st, Lisha Bairey joined the 319 Lewis & Clark Watershed Project as a Project Coordinator.

Lisha and her husband, Blain, ranch/farm in Brule County near Ola, SD.

They have four children: Shantel—16, Alaina—12, Paden– 9, and Colton—4.

Outside of the ranch/farm life, the Baireys are involved in their church, 4H, rodeo, gymnastics, & wrestling.

Lisha not only loves their ranching lifestyle, but is also an outdoor enthusiast. She enjoys riding horse, camping, hunting, hiking, kayaking and outdoor photography.



Project Coordinators—Rocky Knippling & Lisha Bairey

Lisha is excited to be working as a project coordinator because, *"I get to work everyday with producers just like us to improve their operations while taking care of the river that I love so much."*

Lisha has been working on the social media side of the project, as well. She created a Facebook page, brochures, and is currently creating the website page. Lisha joins Rocky Knippling in the Ag Services building in Chamberlain.

LEWIS & CLARK WATERSHED IMPLEMENTATION PROJECT (LCWIP)
STEERING COMMITTEE MEETING
SEPTEMBER 10, 2014
Randall Hills Country Club, Pickstown, SD

Meeting was called to order at 10:00 AM by Les Labahn. Introductions were given. Sign-in sheet attached.

Les brought the group up-to-date on the Title IX Program. The Title IX South Dakota Task Force was organized to conduct water projects on the Missouri River through trust funds with the Corps of Engineers. Objective is to reduce sediment. Les said possibly the Corps is thinking of installing erosion control structures on the watersheds draining into the Missouri River.

Lewis & Clark Watershed Implementation Project. Rocky Knippling and Lisha Bairey reported on the project progress. Twelve counties are involved in the project area. Lisha handed out a sheet with dollars spent per county on practices in the project area. Rocky said requests really started for pipelines during the drought year(s). Lisha also presented a PowerPoint update. The Keyapaha River potentially could be "de-listed" as data shows the TMDL's are lowering. Jeremy Schelhaas said more water samples are needed before it is de-listed. Rocky said they will be starting on Ag Waste systems again.

Discussed use of artificial wetlands. There are some sites in South Dakota where animal waste runoff is being filtered through artificial wetlands – they are much lower in cost to construct and to maintain than ponds or below building pits. However artificial wetlands not capable giving zero pollution outflow consistently, thus they seldom qualify for federal and state cost share.

Jeremy said the project is going into Segment 4 now and will be getting more funding. Rocky said he is applying for Consolidated funding. Will also try to get flow-monitor devices at some sites.

RCPP (Regional Conservation Partnership Program). Kelly Tschumper reported on RCPP. This is a new program that uses partnerships with producers and landowners as participants. RCPP provides funding for installing and maintaining specified conservation activities. LCWIP has to potential to utilize the program.

Les reminded the group about the SD Grassland Coalition sponsoring Gabe Brown workshops this fall/winter at Mission, Oacoma and Yankton. The Yankton workshop is December 11th at JoDean's.

Round-the-table reports/comments were given.

Meeting adjourned at 11:50 AM.

Susan Schultz
Recording Secretary

Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
South Dakota

Implementing Best Management Practices Restores Water Quality in the Keya Paha River

Waterbody Improved

Agricultural nonpoint source pollution contributed to elevated sediment and bacteria levels in South Dakota's Keya Paha River. As a result, the river was placed on South Dakota's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters due to these pollutants. Through the Lewis and Clark Lake Implementation Project, the Randall Resource Conservation and Development (RC&D) Council worked with landowners to voluntarily implement best management practices (BMPs) to reduce sediment and bacteria levels in runoff. The river now meets the sediment standards and attains its warmwater semipermanent fish life designated use. As a result, South Dakota removed the Keya Paha River's sediment impairment from the state's list of impaired waters in 2014.

Problem

The Keya Paha River drains 1,092,300 acres in southern South Dakota before entering Nebraska and emptying into the Niobrara River (Figure 1). The watershed is comprised of 57 percent rangeland and 42 percent cropland. The Keya Paha River begins at the confluence of Antelope and Rock creeks near the Rosebud Indian reservation and flows 68 miles to the Nebraska border.

The Keya River contributes sediment and bacteria to the Niobrara River, which in turn discharges these pollutants to Lewis and Clark Lake, a reservoir on the Missouri River near Yankton, South Dakota. The reservoir provides recreational opportunities and provides drinking water to South Dakota and Nebraska residents. Sediment and bacteria loading from the Keya Paha River threaten these beneficial uses.

To meet water quality standards for sediment, the 30-day average total suspended sediment (TSS) concentration must be less than or equal to 90 milligrams per liter (mg/L) and the daily maximum must not exceed 158 mg/L more than 10 percent of the time. To meet standards for bacteria, fecal coliform must not exceed a geometric mean of 1,000 colony-forming units per 100 mL of water (cfu/100 mL) and no single sample may exceed 2,000 cfu/100 mL more than 10 percent of the time. In addition, *Escherichia coli* must not exceed a geometric mean of 630 cfu/100 mL and no single sample may exceed 1178 cfu/100 mL more than 10 percent of the time.

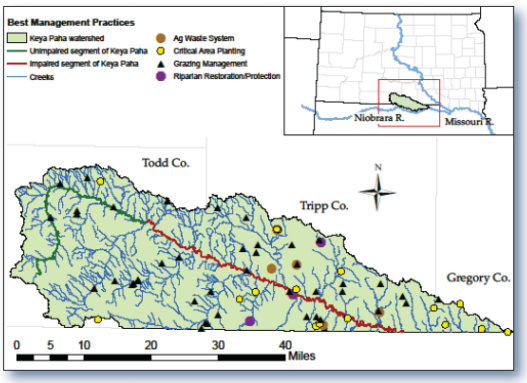


Figure 1. The Keya Paha River watershed is in south-central South Dakota. Partners installed numerous best management practices throughout the watershed.

Monitoring data indicated that the Keya Paha River failed to meet these water quality standards for TSS and bacteria (fecal coliform and *E. coli*). Therefore, the South Dakota Department of Environment and Natural Resources (DENR) placed the 68-mile-long Keya Paha River (segment SD-NI-R-KEYA _ PAHA _ 01) on the CWA section 303(d) list of impaired waters for TSS in 1998, fecal coliform in 2008, and *E. coli* in 2010. By failing to attain these water quality standards, the river was unable to support its beneficial uses for limited immersion recreation and warm water semipermanent fish life. DENR completed a TSS total maximum daily load for the Keya Paha River in 2009.

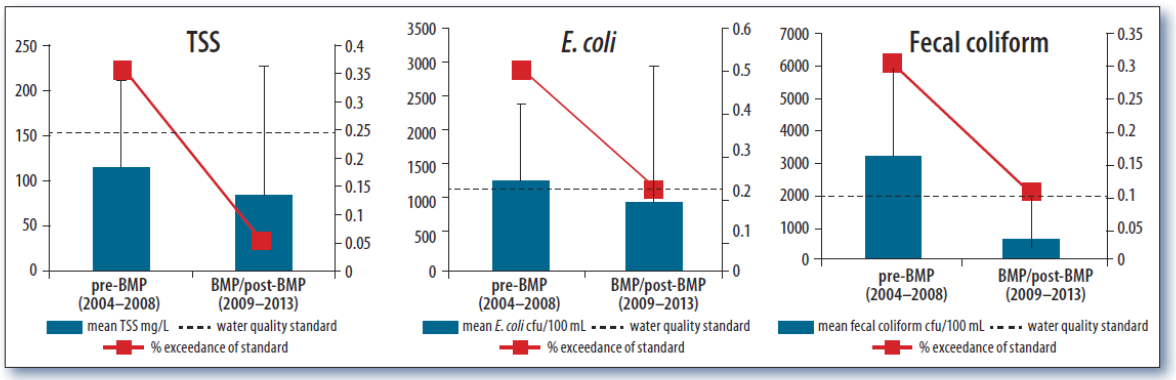


Figure 2. Pollution parameter means (left axes) and percent exceedances of beneficial use standards (right axes) before and during/after restoration. Error bars represent one standard deviation of the data. Percent exceedances of maximum allowable pollutant concentrations below 10 percent meet the standards.

Project Highlights

After a watershed assessment was conducted from 2003 to 2005, the Randall RC&D Council and its watershed partners launched the Lewis and Clark Watershed Implementation Project. The project's initial goal was to reduce the loads of sediment, nutrients and bacteria entering Lewis and Clark Lake by reducing loads in its tributaries, including the Keya Paha River. BMPs were installed from late 2008 to 2013, and additional BMPs will be installed in future years. BMPs installed in the Keya Paha watershed include agricultural waste systems, winter feeding areas, re-vegetation of critical areas, riparian restoration and protection projects, and implementation of grazing management plans that included fencing to keep cattle out of tributary creeks.

Results

After restoration, bacteria and sediment levels decreased. TSS values in the Keya Paha River are meeting water quality standards. This improvement can be seen in Figure 2, which shows the decreases in the percent exceedances of the daily maximum pollutant levels for TSS (from 35 percent in 2004–2008 down to 5 percent in 2009–2013), which meets the water quality standard. As a result, DENR removed TSS from the Keya Paha River's list of impairments in 2014.

As seen in Figure 2, data show that *E. coli* bacteria measurements are borderline, with two out of 10 samples (20 percent) exceeding the standard. Fecal coliform bacteria measurements just meet the standard (one out of 10 exceeding, or 10 percent). The Keya Paha will continue to be monitored for *E. coli* and fecal coliform to document improvements so that it can be fully evaluated for complete removal from the list of impaired waters.

Partners and Funding

Restoring the Keya Paha River was the result of hard work from committed landowners and local, state and federal agencies. The Randall RC&D Council administered the Lewis and Clark Watershed Implementation Project. Partners installing BMPs in the Keya Paha watershed included the Gregory County Conservation District (CD), Clearfield/Keya Paha CD and the Todd County CD. South Dakota DENR provided project oversight. The U.S. Department of Agriculture's Natural Resources Conservation Service, the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency contributed funds and expertise. The Rosebud Cattlemen's Association, South Dakota Grassland Coalition, the South Dakota Association of Conservation Districts, South Dakota Pheasants Forever, and South Dakota Game, Fish and Parks assisted with BMP design and construction.

BMP installation and monitoring in the Keya Paha watershed was funded through the Lewis and Clark Implementation Project from 2006 to 2014. Partners spent $1,154,457 on six agricultural waste systems, 16 critical areas, 48 grazing management plans, and three riparian restoration projects. BMP funding sources included CWA section 319 funds ($323,247), other federal funds ($247,087), and state, local and in-kind sources ($584,123).

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-15-001N
February 2015

For additional information contact:

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