SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM

WATERSHED PROJECT FINAL REPORT

Northeast Glacial Lakes Watershed Improvement and Protection Project

Segment 5

By

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This project was conducted in cooperation with the State of South Dakota and the United States Environmental Protection Agency, Region 8 Grant

C9-998185-19, C9-998185-21

EXECUTIVE SUMMARY

PROJECT TITLE: Northeast Glacial Lakes Watershed Improvement and Protection Project Segment 5

PROJECT START DATE:		August 30, 2021
PROJECT COMPLETION DATE:		August 31, 2023
FUNDING:	TOTAL BUDGET	$821,111.98
	TOTAL EPA BUDGET	$381,741.57
	TOTAL EXPENDITURES OF EPA FUNDS	**$136,927.73**
	TOTAL SECTION 319 MATCH ACCRUED	$327,742.42
	OTHER FEDERAL FUNDS	$409,047.79
	TOTAL EXPENDITURES	$873,717.94

SUMMARY ACCOMPLISHMENTS

The project implemented riparian buffers utilizing the Continuous Conservation Reserve Program (CCRP) implementing 156 acres. A total of 82 acres of riparian buffers utilizing EPA 319 funds have been implemented. The projects' goal was 384 acres of riparian protection. The project did not have any stabilization practices utilizing rock riprap occur during the segment, falling short of the goal of 500 feet. At the end of the segment, two bank stabilization projects were in the preliminary stages and are planned to be installed during the next segment. An additional 104 lf (three stream crossings) of streambank was stabilized during this project with the construction of three stream crossings placed where livestock had degraded streambank vegetation and erosion was occurring. The project's goal was to construct ten stream crossings.

The implementation of CCRP, CRP, stream crossings and streambank stabilization protected and improved 66,170 lf or 12.5 miles of streambank and shoreline in the project area.

The project exceeded its goal of implementing grazing management improvements by 1,431 acres, with a total of 1,987 acres. This surpassed the goal of 556 acres planned.

A total of 32 acres of cropland deemed critical for water quality was planted to grass or a combination of grass and forbs. The projects milestone was 1000 acres.

The project fell short of its goal of 5,000 lf of grassed waterways to be constructed with a total of 3,223 lf completed.

Implementation of best management practices implemented through this project resulted in a total calculated reduction of 6,690 lbs. per year of nitrogen; 1,561 lbs. per year of phosphorus; and 3,182 tons per year of sediment in the project area during Segment 5 (Table 7).

Milestones for information and education activities have been completed. An audience of 3,785 youth and adults attended presentations by project personnel at workshops, water festivals, environmental education programs, farm, and home shows. A website provided project information to the public at *www.neglwatersheds.org*. Information available from the website includes information on cost share available for implementing agricultural best management practices, best management practices for lakeshore property owners, natural history, information and educational opportunities, and attributes of project lakes and watersheds. Due to the Covid-19 pandemic most of the information and education activities planned for 2021 were canceled or at reduced participant numbers to attend.

The Covid-19 Pandemic also limited producer contacts during the first eighteen months of this project segment. Local Conservation District/USDA offices were closed to the general public during this period and had limits on the number of employees and partners that could be working in the office at any given time.

Segment 5 of the Northeast Glacial Lakes Watershed Improvement and Protection Project was amended in 2022. This amendment was the merger of the Northeast Glacial Lakes Watershed Improvement and Protection Project - Segment 5 and the Upper Big Sioux Watershed Project - Segment 7, rolling over funds from the Upper Big Sioux Watershed Project to this project. All changes in project activities and milestones are reflected in this report.

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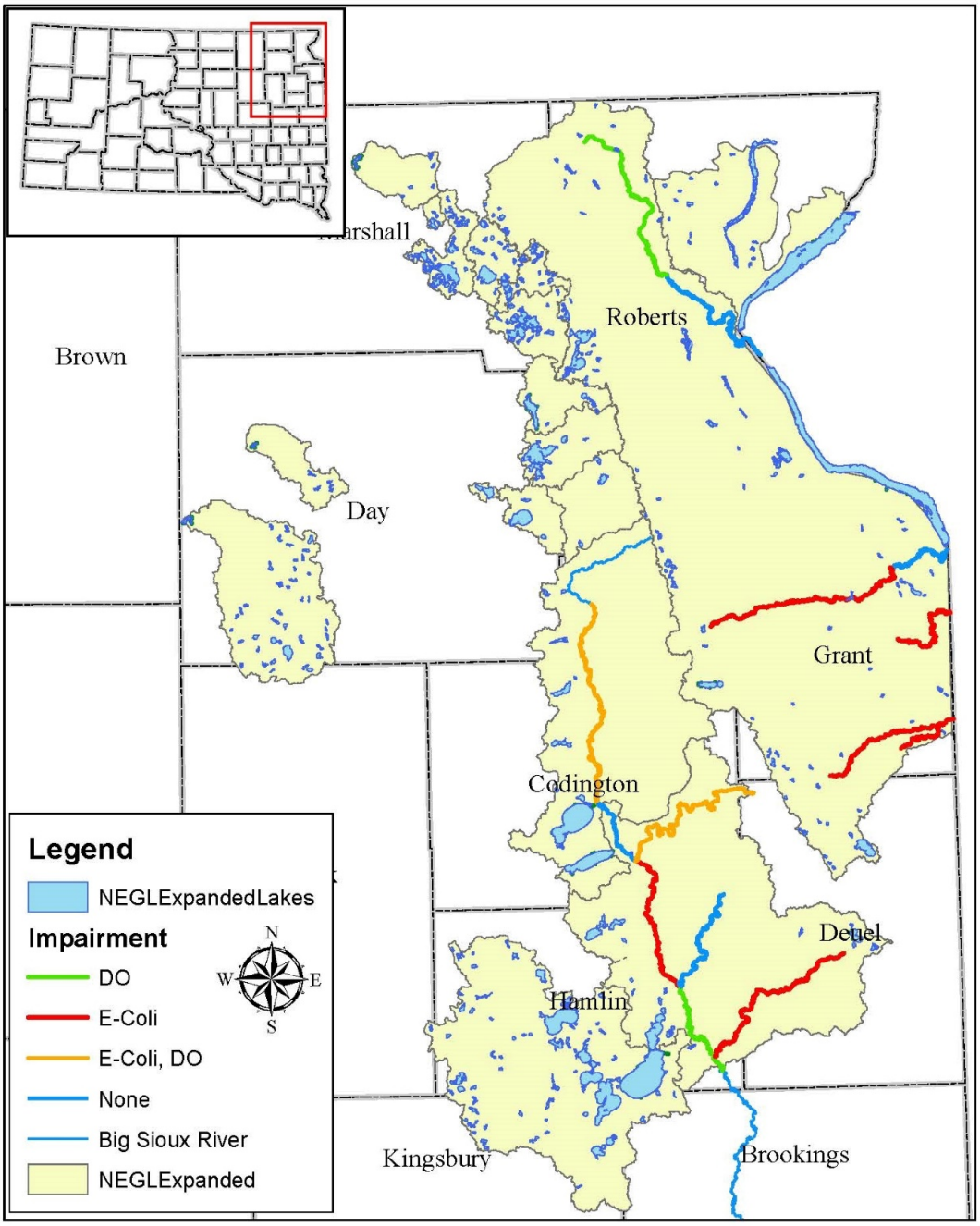
1.0 Introduction

The Northeast Glacial Lakes Watershed Protection and Improvement Project encompass eight northeast South Dakota counties: Codington, Day, Deuel, Grant, Hamlin, Marshall, and Roberts a portion of Kingsbury County, and portions of four major river basins; Big Sioux, James, Minnesota, and Red Rivers. In 2022, the project was amended to include the former Upper Big Sioux River Project, and Lake Poinsett watershed. The project name was also changed going forward as the Prairie Coteau Watershed Improvement and Protection Project. Locations of project lakes, streams, and reservoirs are shown in Figure 1.

Figure 1. Location of Project Lakes, Reservoirs, Streams and Rivers



The majority of the water bodies located in Codington, Hamlin, Day and Marshall County portions of the project area lie atop high tableland early French explorers named the Coteau Des Prairie or Hill of the Prairies. The topography of the Coteau was formed by the stagnation of glacial ice during the Late Wisconsin Glaciations that occurred approximately 12,000 years ago. As the glacier stagnated and began to fragment and melt, large blocks of ice were buried in melt water outwash. Melting of the ice blocks left depressions in the outwash of various size and depth. These depressions are the thousands of potholes, sloughs, and lakes characteristic of the modern day topography of the Coteau Des Prairie.

Melt water flowing from the top of the Coteau cut several deep channels along the eastern and western slopes. Along the eastern slope of the Coteau, these channels, called coulees, are deep enough to expose groundwater that lays above the Pierre shale bedrock. The groundwater flowing above the bedrock forms dozens of small perennial streams that are the headwaters of the Red River that flows north and the Minnesota River that flows east. East facing coulees provide cool-wet conditions that support remnants of the eastern deciduous forest community once prevalent approximately 6,000 years ago.

The much drier western slope of the Coteau supports fewer perennial streams. The few wooded coulees that exist are dominated by bur oak. Many of the perennial streams that flow from the western slope have been dammed to form reservoirs. Among these are Amsden Dam and Pierpont Lake. These two reservoirs discharge to the James River.

Many of the lakes perched atop the Coteau are situated in closed basins. The largest closed basin is called the Eastern Lakes Subsystem, or more recently the Waubay Lakes Chain. The Eastern Lakes Subsystem is comprised of eleven major lakes that include Blue Dog, Enemy Swim, and Pickerel Lakes; and several minor lakes including Minnewasta. A group of aquifers and several surface drainages surround and connect these lakes. While the Eastern Lakes Subsystem is closed, the potential exists for these lakes to eventually drain to the Big Sioux River. This potential was realized in the 1990's when greater than normal precipitation, and less than normal evaporation caused many of the lower lakes in the subsystem to rise twenty feet above historical lake level elevations.

Buffalo Lakes, Clear Lake, Roy Lake, and South Red Iron Lake lie in the Coteau Lakes Outwash Deposit. Like the Eastern Lakes Subsystem, aquifers and surface drainages connect these Marshall County lakes.

The watershed of White Lake is located at the northwest base of the Coteau. This reservoir is located on the Wild Rice River that drains into the Red River.

Lake Traverse lies in the main channel of what remains of Glacial River Warren, the major outflow channel of pro-glacial Lake Agassiz formed approximately 10,000 years ago. The South

Dakota portion of Lake Traverse's watershed is relatively small with only one tributary, Jim Creek. The majority of Lake Traverse's watershed (90%) lies in Minnesota. Lake Traverse drains into the Bois De Sioux River, a tributary of the Red River that drains north to Lake Winnipeg.

The Big Sioux River, from its headwaters near Summit, SD, south to including Kampeska and Pelican Lake drains a 245,399 acre watershed located in the Prairie Coteau region of northeast South Dakota. Waters in the Upper Big Sioux River watershed exist in linear, riverine, temporary, seasonal, semi-permanent, and permanent wetlands. Most of these wetlands have direct connection with the Big Sioux aquifer.

The Lake Poinsett watershed is in the Prairie Coteau region of the Northern Glaciated Plains Eco-region. The gently to steeply rolling landscape has a poorly defined drainage pattern that formed over cretaceous sedimentary rock overlain by approximately 500 feet of glacial drift. Many of the soils in the watershed were formed in loess that overlies the drift while others were formed in alluvium. Lake Poinsett is a 7,868-acre glacial lake with a 287,628 acre watershed, located in Hamlin, Kingsbury, and Brookings counties. Lake Norden, Albert, and St. John are in the watershed above Poinsett. Additional lakes include Marsh Lake and Dry Lake. Lake Poinsett is the last in the chain of lakes before the outlet to the Big Sioux River by the Boswell Diversion. The Diversion was constructed to route floodwaters to Dry Lake and then Lake Poinsett to prevent poor quality water from the Big Sioux entering Dry lake.

Table 1 lists the locations and attributes of the eighteen project lakes and reservoirs that were included in Segment 5. This data was retrieved from various SD Dept. DANR publications.

The South Dakota portion of the Minnesota River Basin (Figure 1) includes three major stream systems; the Little Minnesota River, Whetstone River (North and South Forks), and Yellowbank River (North and South Forks). These three rivers are the headwaters for the Minnesota River which begins near the South Dakota/Minnesota Border below Big Stone City, SD.

The Little Minnesota River, beginning near Veblen, SD and flowing into Big Stone Lake south of Browns Valley, MN, drains the majority of Roberts County and a portion of east central Marshall County. The drainage includes hundreds of small named and unnamed tributaries that begin as small cold-water spring fed streams in the forested coulees located along the east escarpment of the Coteau des Prairie, and flow into bottomlands known as the Whetstone Valley. One of the larger headwater tributaries Big Coulee Creek flows from the escarpment into the Jorgenson River, the largest tributary of the Little Minnesota River in Roberts County. Pasture and range make up the major land use along the escarpment where these small headwater tributaries begin. The major land use changes to row crops as these headwaters enter the Whetstone Valley. Tile drainage of cropland in the Whetstone Valley is becoming a common practice.

Table 1. Attributes of Targeted Project Lakes and Reservoirs

River Basin and Waterbody	County	Longitude Latitude	Watershed Area (acres)	Max. Depth (feet)	Surface Area (acres)	Shoreline Length (miles)	Watershed to Lake Ratio	Waterbody Type
Upper Big Sioux River Basin HUC # 10160010								
Blue Dog Lake	Day	45° 21'06"N 97° 17'48"W	73,811	8	1,502	8.7	49/1	Natural
Enemy Swim Lake	Day	45° 26'24"N 97° 16'00"W	22,310	26	2,146	11.8	10/1	Natural
Minnewasta Lake	Day	45° 23'24"N 97° 21'42"W	2,564	14	601	5.5	4/1	Natural
Pickerel Lake	Day	45° 30'24"N 97° 16'24"W	17,165	43	931	9.7	18/1	Natural
Upper Big Sioux River Basin HUC #10170202								
Bullhead Lake	Deuel	44°57'2.08"N 96°48'11.28"W	3,374	11	571	3.3	6/1	Natural
Clear Lake	Deuel	44°45'9.12"N 96°39'32.51"W	27,360	6	600	4.5	46/1	Natural
Lake Kampeska	Codington	44°55'52.93"N 97°12'9.97"W	212,707	16	5,250	13.5	41/1	Natural
Lake Poinsett	Hamlin	44°33'56.23"N 97° 4'55.62"W	287,628	22	7868	14.8	37/1	Natural
Pelican Lake	Codington	44.8727° N, 97.1764° W	220,000	8	2795	12	79/1	Natural
Upper James River Basin HUC # 10160005								
Amsden Dam	Day	45° 21'30"N 97° 58'06"W	31,961	27	235	5.9	136/1	Reservoir
Buffalo Lake	Marshall	45° 37'00" N 97° 16'48"W	16,781	12	1,780	27.8	9/1	Natural
Clear Lake	Marshall	45° 41'36"N 97° 21'36"W	11,682	20	1,087	7.6	11/1	Natural
Nine Mile Lake	Marshall	45° 46'04"N 97° 29'26"W	2,722	10	282	4.5	NA	Natural
Pierpont Lake	Day	45° 27'42"N 97° 49'48"W	5,885	16	77	2.2	76/1	Reservoir
Red Iron Lake	Marshall	45° 40'12"N 97° 19'06"W	9,862	15	610	7.5	16/1	Natural
Roy Lake	Marshall	45°42'06"N 97°26'06"W	9,614	21	2,054	14.5	6/1	Natural
Red River Basin HUC # 09020101								
Lake Traverse	Roberts	45° 42'12"N 97° 44'06"W	153,836	12	11,530	40.3	63/1	Natural
Red River Basin HUC # 09020105								
White Lake Dam	Marshall	45° 51'36"N 97° 36'54"W	21,184	20	187	6.3	113/1	Reservoir

The Whetstone River starts at the confluence of its major tributaries named the North and South Forks northeast of Milbank, South Dakota; and flows a short distance east where it joins the Minnesota River near the South Dakota/Minnesota border. The North Fork of the Whetstone River drains the southern third of Roberts County. The South Fork of the Whetstone River drains the north half of Grant County and begins as several small spring fed streams located along the east escarpment of the Prairie Coteau. Lake Farley located in Milbank South Dakota is a small, dammed reservoir located on the South Fork of the Whetstone River.

The North Fork of the Yellowbank River drains central Grant County and is the confluence of several small springs located along the east escarpment of the Prairie Coteau. The South Fork of the Yellowbank River begins in Deuel County and flows through the southeast corner of Grant County. The North and South Forks of the Yellowbank River join to form the Yellowbank River northwest of Bellingham, Minnesota.

These streams and rivers support several wildlife species. Forty-three species of fish occur in the rivers and streams of the Upper Minnesota River Basin, including one state endangered species the blacknose shiner, and one state threatened species the Northern redbelly dace. Several fish found in the Upper Minnesota River Basin are considered rare. These include the carmine shiner, hornyhead chub, central mudminnow, blackside darter, and the only known South Dakota population of the slenderhead darter, found only in a small segment of the Whetstone River. Twelve species of freshwater mussels occur in the Upper Minnesota River Basin. Seven of these species are considered rare.

The climate of the project area is classified as Sub-humid Continental. Mean climatic conditions of the area are:

- Winter Average Daily Minimum Temperature - 4 degrees F
- Summer Average Daily Maximum Temperature - 82 degrees F
- Total Annual Precipitation - 21 inches
- Average Seasonal Snowfall - 31 inches

Approximately 75 percent (=16 inches) of the annual precipitation falls between the months of April to September. Tornadoes and severe thunderstorms occasionally strike. These storms, usually local and of short duration, occasionally produce heavy rainfall. (Data from Webster, SD reporting station)

Agriculture is the major land-use in northeast South Dakota. Ownership and agricultural data for each county in the project area are given in Table 2.

Table 2. Land Ownership and Agricultural Data

	County						
*From USDA-National Ag Statistics Service 2017 Census	**Codington**	**Day**	**Deuel**	**Grant**	**Hamlin**	**Marshall**	**Roberts**
Population (2022 census)*	28,721	5,710	4,352	7,356	6,352	4,656	10,149
Land Area* (Acres)	458,880	658,329	407,680	436,818	344,320	536,888	704,856
Land Ownership							
Private (Acres)	442,455	626,319	398,884	431,049	333,646	484,551	627,087
Tribal (Acres)	-	10,033	-	520	-	25,166	66,448
Federal (Acres)	6,129	10,679	3,224	5,249	2,586	11,380	5,117
State (Acres)	10,296	11,298	5572	2787	8088	15,791	6,204
Agricultural Data							
Number of Farms* (2017)	481	675	634	555	476	523	887
Total Cropland Acres* (2017)	268,216	457,958	224,666	306,451	269,722	328,243	412,361
Corn/Soybeans Acres* (2017)	166,437	331,927	141,892	212,512	188,794	224,869	347,349
Small Grain Acres* (2017)	21,082	26,576	7,824	14,704	5,679	7,260	14,087
CRP (Acres) *2020	15,986	43,318	18,340	9,844	12,926	41,172	38,986
Hay Acres* (2017)	29,144	26,466	26,921	39,269	13,210	32,427	33,464
Range/Pasture (Acres)	91,960	109,910	93,890	102,150	40,303	152,387	101,183
Livestock Numbers* (2017 census)							
Cattle	47,560	38,702	65,537	70,998	50,007	92,515	36,365
Swine	-	-	54,216	1,380	15,841	51,588	16,358
Sheep	8,822	501	2,990	889	1,510	1,882	4,886

Table 3 lists the beneficial uses for the lakes and reservoirs in the project area.
Table 4 list beneficial uses for project streams and rivers

Table 3. Beneficial Uses Designated for Targeted Project Waterbodies

Beneficial Use:	Amsden Dam	Blue Dog Lake	No. Buffalo Lake	So. Buffalo Lake	Clear Lake	Enemy Swim Lake	Minnewasta Lake	Nine Mile Lake	Pickerel Lake	Pierpont Lake	Roy Lake	So. Red Iron Lake	Lake Traverse	White Lake Dam	Bullhead Lake	Clear Lake (Deuel	Lake Kampeska	Lake Poinsett	Pelican Lake
(1) Domestic water supply waters																	X		
(4) Warmwater permanent fish life propagation	X	X			X	X			X	X	X	X	X	X			X		X
(5) Warmwater semipermanent fish life propagation			X	X			X	X							X			X	
(7) Immersion recreation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(8) Limited contact recreation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(9) Fish & wildlife propagation, Recreation and stock watering	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(10) Irrigation Waters													X						

Table 4: Beneficial Uses Designated for Targeted Project Streams and Rivers

Beneficial Use:	Little Minnesota River	Big Coulee Creek	Whetstone River North Fork	Whetstone River South Fork	Yellowbank River North Fork	Yellowbank River South Fork	Big Sioux River	Hidewood Creek	Willow Creek
(3) Coldwater marginal fish life propagation						X			
(4) Warmwater permanent fish life propagation					X				
(5) Warmwater semipermanent fish life propagation	X		X				X		
(6) Warmwater marginal fish life propagation				X				X	X
(8) Limited contact recreation	X		X	X	X	X	X	X	X
(9) Fish & wildlife propagation, recreation and stock watering	X	X	X	X	X	X	X	X	X
(10) Irrigation waters	X	X	X	X	X	X	X	X	X

Table 5 lists 303 (d) listing, impaired beneficial uses and reasons for impairment for each of the nineteen lakes and reservoirs in Segment 5.
Table 6 lists 303 (d) status, impaired uses, and reason for impairment.

The most recent integrated report at the time the original project implementation plan was written "***The 2022 South Dakota Integrated Report for Surface Water Quality Assessment"***, prepared by the South Dakota Department of Environment and Natural Resources provides the basis for the values in Tables 5 and 6.

Table 5. Water Quality Data and Impaired Beneficial Uses for Lakes and Reservoirs

		Impaired Beneficial Use and Cause*						
Waterbody	**303 (d) Listed (2022**)**	**1**	**4**	**5**	**7**	**8**	**9**	**10**
Amsden Dam	Yes	NA	Non (Hg)	NA	Full	Full	Non (Hg)	NA
Blue Dog Lake	No	NA	Full	NA	Full	Full	Full	NA
Clear Lake	Yes	NA	Non (Hg)	NA	Full	Full	Non (Hg)	NA
Enemy Swim Lake	Yes	NA	Non (Hg)	NA	Full	Full	Non (Hg)	NA
Lake Traverse	Yes	NA	Non (temp)	NA	Full	Full	Full	Full
Minnewasta Lake	Yes	NA	NA	Non (Hg) (chlor-a)	Non (chlor-a)	Non (chlor-a)	Non (Hg)	NA
Nine Mile Lake	Yes	NA	NA	Non (pH)	Full	Full	Non (pH)	NA
No. Buffalo Lake	Yes	NA	Non (Hg)	NA	Full	Full	Non (Hg)	NA
Pierpont Lake	Yes	NA	Non (temp)	NA	Full	Full	Full	NA
Pickerel Lake	No	NA	Full	NA	Full	Full	Full	NA
Roy Lake	No	NA	Full	NA	Full	Full	Full	NA
So. Buffalo Lake	Yes	NA	NA	Non (Hg)	Full	Full	Non (Hg)	NA
So. Red Iron Lake	No	NA	Full	NA	Full	Full	Full	NA
White Lake Dam	Yes	NA	Non (chlor-a)	NA	Non (chlor-a)	Non (chlor-a)	Full	NA
Bullhead Lake	No	NA	Full	NA	Full	Full	Full	NA
Clear Lake (Deuel)	Yes	NA	Full	NA	Non (ECOLI)	Non (ECOLI)	Full	NA
Lake Kampeska	Yes	Full	Non (Hg)	NA	Full	Full	Non (Hg)	NA
Lake Poinsett	Yes	NA	NA	Non (Hg)	Non (chlor-a) (ECOLI)	Non (chlor-a) (ECOLI)	Non (Hg)	NA
Pelican Lake	No	NA	Full	NA	Full	Full	Full	NA

* Number corresponds to beneficial uses listed in Table 3

** Source: *The 2022 South Dakota Integrated Report for Surface Water Quality Assessment – SD Dept. of Agriculture and Natural Resources*

Ins – insufficient data, NA – not applicable, Hg – mercury, DO – dissolved oxygen, chlor-a – chlorophyll a, temp – surface water temperature

Table 6: Water Quality Data and Impaired Beneficial Uses for Streams and Rivers

		Impaired Beneficial Use and Cause*						
Waterbody	**303 (d) Listed (2022**)**	**3**	**4**	**5**	**6**	**8**	**9**	**10**
Little Minnesota River	Yes	NA	NA	Non (DO)	NA	Non (DO)	Full	Full
Whetstone River	No	NA	NA	Full	NA	Full	Full	Full
South Fork Whetstone River	Yes	NA	NA	NA	Full	Non (Bacteria)	Full	Full
North Fork Yellowbank River	Yes	NA	Full	NA	NA	Non (Bacteria)	Full	Full
South Fork Yellowbank River	Yes	Full	NA	NA	NA	Non (Bacteria)	Full	Full
Mud Creek	Yes	NA	NA	NA	Non (DO)	Non (DO)	Full	Full
Big Sioux River	Yes	NA	NA	Full	NA	Non (Bacteria)	Full	Full
Hidewood Creek	Yes	NA	NA	NA	Full	Non (Bacteria)	Full	Full
Willow Creek	Yes	NA	NA	NA	Full	Non (Bacteria)	Full	Full

* Number corresponds to beneficial uses listed in Table 4

** Source: *The 2022 South Dakota Integrated Report for Surface Water Quality Assessment – SD Dept. of Agriculture and Natural Resources*

Ins – insufficient data, NA – not applicable, DO – dissolved oxygen

Several EPA 319 funded watershed assessment and improvement projects have been completed for lakes and reservoirs located in the project area (Figure 1). Watershed assessments have been completed and published for Amsden Dam, Blue Dog Lake, Enemy Swim Lake, Lake Traverse, Minnewasta Lake, Nine Mile Lake, North and South Buffalo Lakes, Roy Lake, South Red Iron Lake, and White Lake reservoir. Watershed implementation projects were completed for Pickerel Lake in 1996, Enemy Swim Lake in 2005, and Blue Dog Lake in 2006. The town of Pierpont, South Dakota funded a two-year study of Pierpont Dam Reservoir's water quality that was completed in 2009. The Clear Lake Betterment Association paid for in-lake water quality testing on Clear Lake from 2009 thru 2010. The James River Water Development District funded water quality testing of Clear and Roy Lakes in 2018 and 2019. Since 2002, water quality studies of Enemy Swim Lake and Pickerel Lake have been funded by the Greater Pickerel Lake Association/Pickerel Lake Conservancy and the Enemy Swim Sanitary Sewer District. These

continued thru Segment 5. Final reports for most of these projects can be viewed at www.neglwatersheds.org. The project will continue working with these groups into the next segment for continued water quality monitoring.

The main non-point pollutants impairing the water quality of project lakes, reservoirs, streams and rivers are fecal coliform bacteria, nutrients, and sediments carried by runoff from agricultural lands located in their watersheds. The goal of this project is to continue protecting and improving water quality of northeast South Dakota glacial lakes by implementing best management practices (BMPs). BMPs reduce the amount of non-point source pollutants entering project water bodies, thus maintaining their assigned beneficial uses.

This was the fifth segment of a multi-year locally led effort to implement best management practices recommended by completed watershed assessments, to build on previous efforts, and protect water quality improvements realized from previous implementation projects. The project was sponsored by the Day Conservation District, with the Grant, Marshall, and Roberts Conservations Districts as co-sponsors. This report will describe the activities completed for Segment 5 of this project.

2.0 Project Goals, Objectives, and Activities

This project was the fifth segment of an area wide water quality improvement/protection strategy that began in 2007. The project goal is:

> "Restore and protect the water quality of northeast South Dakota glacial lakes."

To attain the goal, the following actions were completed:

- Establish an advisory council made up of local, state, tribal, and federal partners to oversee project activities.
- Develop a strategy that will guide activities in subsequent project segments by providing the tools needed to implement the strategy.
- Implement BMPs that reduce nutrient, fecal coliform bacteria, and sediment loads to targeted waterbodies.
- Implement a public outreach program to inform project area stakeholders about the opportunities for involvement in and progress of the project.
- Track project milestones and progress toward reducing nutrient, fecal coliform bacteria and sediment loadings to targeted waterbodies.

Objective 1: Complete activities that will lead to successful protection and restoration of the beneficial uses of lakes and reservoirs in northeast South Dakota.

Task 1: Institute the project management structure developed during Segment 1 to guide successful protection and restoration of lakes and reservoirs in northeast South Dakota.

An advisory council made-up of local, state, tribal, and federal partners will continue to manage the Prairie Coteau Watershed Improvement and Protection Project. The council was formed during the first segment of the project in 2007 and will oversee the implementation of the strategic plan completed during Segment 1, annually review the practice manual that establishes priorities for BMP implementation and develop a work plan for subsequent project segments. Revised memoranda of understanding (MOU) that define the responsibilities and obligations of each district in the support and execution of Segment 5 will be entered into between the Day, Deuel, Grant, Marshall, and Roberts Conservation Districts. The project was amended in 2022, and MOUs with the Codington, Hamlin, and Kingsbury Conservation District were added. A Project Coordinator and seasonally hired Conservation Technicians employed by the project sponsor will aid in the implementation of project activities within the eight-county project area.

Product:

1. Project management structure.

Milestones:	**Planned**	**Total Completed**
Advisory council	1	1
Memoranda's of Understanding	8	8

Resource agencies and organizations represented on the advisory council include:

Natural Resources Conservation Service (NRCS)
South Dakota Dept. of Agriculture and Natural Resources (DANR)
United States Fish and Wildlife Service (USFWS)
South Dakota Dept. of Game, Fish, and Parks (SDGFP)
East Dakota Water Development District (EDWDD)
James River Water Development District (JRWDD)
Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall and Roberts Conservation Districts
Sisseton Wahpeton Oyate
Clear Lake Betterment Association
Roy Lake Associations
Nine Mile Lake Home Owners Association
Pickerel Lake Sanitary Sewer District
Pickerel Lake Conservancy
Enemy Swim Sanitary Sewer District

Objective 2: Install best management practices (BMPs) in critical areas to protect and restore the beneficial uses of lakes, streams, rivers, and reservoirs in northeast South Dakota.

The BMPs planned are based on those recommended in the assessments and TMDLs and identified during implementation of the project work plan(s). It is anticipated that as additional studies and TMDLs are completed for water bodies in the project area, the suite of BMPs offered will change accordingly.

Task 1: Install BMPs that reduce nutrient, sediment, and fecal coliform bacteria nonpoint source pollution originating from livestock operations.

Technical and financial assistance will be provided to livestock producers to reduce nonpoint source pollution associated with livestock grazing operations.

Product:

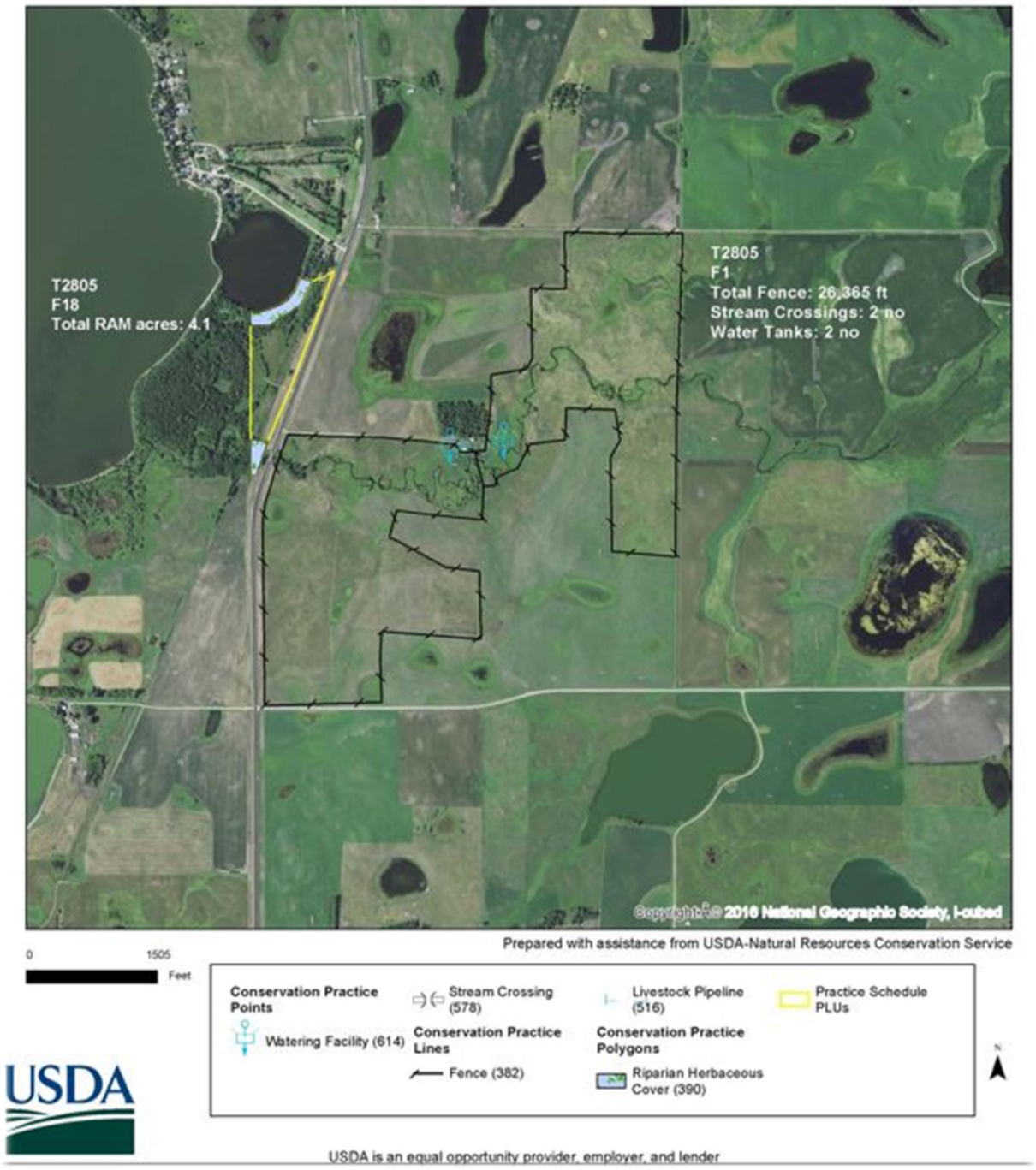
1. Grazing Management Improvements

Through conservation planning, pasture health and rangeland condition will be improved on 556 acres of pasture/rangeland. Resource technicians will work with landowners to promote and implement basic grazing management principles such as rotation, rest, grass banking, and other BMPs that sustain quality grasslands. If needed, financial assistance for implementing conservation practices like perimeter exclusion fence and water development (ponds, pipelines, tanks, wells, solar systems) will come from the EPA 319 Clean Water Grant. Additional funding may be available from the Natural Resource Conservation Service's Environmental Quality Incentive Program (EQIP), US Fish &Wildlife Service's "Partners for Wildlife" SD Department of Agriculture and Natural Resources (DANR) Riparian Buffer Initiative (RBI) Program both for the Big Sioux watershed and Statewide program, and S.D. Game, Fish, and Parks "Private Lands Programs.

Milestones:	Planned	Total Completed
Improved Pasture/Rangeland	556 acres	1,987 acres

Accomplishments: The project exceeded its goal for this product. The project received increased interest in improving water quality for livestock needs due to an influx of increased livestock market prices and dryer than normal spring and summer of 2022 and 2023. Producers were interested in improving grazing lands through conservation practices such as prescribed grazing, cross fence, water development (tire tanks, livestock water pipelines, solar pumps, ect.). Figure 2 show a planned grazing system implemented in this segment. Refer to Figure 10 for an example of livestock water.

Figure 2. Grazing Improvement Conservation Plan Map



Task 2: Install BMPs that reduce sediment loads entering project water bodies by reducing wind and water erosion from upland and riparian areas, shorelines, and streambanks.

Technical and financial assistance will be provided to producers to reduce nonpoint source pollution associated with riparian areas.

Product:

1. Riparian buffers

To reduce nutrient, fecal coliform bacteria, and sediment loads entering project water bodies from lakeshore and stream bank segments degraded by livestock, or riparian areas currently being cropped, vegetative buffers will be established. Establishment of riparian buffers may require the installation of fence and the development of alternative watering sources. The Continuous Conservation Reserve Program (CCRP) CP21 Filter Strips, CP23 and CP30 Marginal Pastureland-Wetland Buffer administered by USDA, and SD DANR RBI program will be the preferred options for providing financial assistance for this product. If a site does not qualify for CCRP, riparian BMPs will be funded using EPA 319 funds. The financial assistance from EPA 319 will follow the docket established by USDA for CCRP and requirements listed in the project's practice manual.

Milestones:	Planned	Total Completed
319 Riparian Area Management	384 acres	82 acres
Continuous CRP	0 acres	156 acres

Accomplishments: The majority of riparian buffers implemented during this project were located in the Minnesota River watershed in Grant and Roberts Counties, South Dakota (Figure 7). During this segment of the project 156 acres of CCRP were enrolled. Of these acres EPA 319 grant funds were utilized to pay an additional incentive payment on 82 acres. EPA 319 grant funds were used to fund 38 acres of buffers beyond the CCRP 120-foot maximum buffer width, 44 acres of buffers that did not qualify for CRP. Most of these buffers were Marginal Pastureland Wetland Buffers (CP30) placed on pasture and rangeland adjoining perennial streams in the Minnesota River watershed. A total of 66,170 lineal feet of streambank and shoreline have been protected with riparian buffers. Twenty-three acres of wetlands were also restored with these contracts.

The project did not meet its goals for these products. Due to increased crop and livestock market prices, interest in CRP and riparian buffer practices were not sought after by producers, as rates were not as competitive versus income in crop and livestock production.

Product:

2. Critical Area Planting

To reduce runoff from cropland adjacent to riparian areas where CRP and RAM are not applicable or established, plantings of tame grass and legumes or native grass and forbs will be established for haying or grazing purposes on critical areas adjacent to lakes and streams or other conveyances. Priority was given to land deemed by NRCS as highly erodible.

Milestones:	Planned	Total Completed
Critical Area Planting	1000 acres	32 acres

Accomplishments: The project did not meet its goal for this product. Crop market prices during this segment were close to record highs in the years 2022 and 2023, thus having low interest during this segment for critical area plantings. USDA-NRCS has a special Conservation Implementation Strategy (CIS) funds through EQIP available for the South Fork Whetstone, North Fork Yellowbank, and South Fork Yellow Bank River watersheds to address erosion concerns by implementing practices, such as Critical Area Planting, which allowed NRCS extra funding and use less of the project's funds. Three critical area seedings are in the planning process and will plan on being implemented during the next segment of the project.

Product:

3. Grassed Waterways

To reduce water erosion on cropland located on land where CRP is not applicable, plantings of tame and/or exotic grasses and legumes will be established and eroded gullies will be reshaped.

Milestones:	Planned	Total Completed
Grassed Waterways	5,000 feet	3,223 feet

Accomplishments: The project met 64% of its goal for establishing grassed waterways during Segment 5. In 2022, a special Conservation Implementation Strategy (CIS) project, sponsored by the USDA-Natural Resources Conservation Service through the Environmental Quality Incentives Program, was made available in Grant County in the South Fork Whetstone, North Fork Yellowbank, and South Fork Yellow Bank river watersheds, an area of the project that had high interest in grassed waterways in the past. The CIS targeted practices of grassed waterways, critical area seedings, water and sediment control basins (WASCBS) and secondary practices of no-till, reduced till, crop rotation, and cover crops. The project continued to address grassed waterways, as at the end of Segment 5, two grassed waterway projects were in the planning stages and will be established going into the next segment. The CIS is a 3 year project and will sunset in 2025.

Product:

4. Shoreline and Streambank Stabilization

Eroding shorelines and streambanks will be stabilized using hard (rip-rap) and/or soft (vegetative) practices, and livestock stream crossings will be constructed to provide a stabilized trail for livestock to reduce streambank erosion and promote better grazing distribution.

Milestones:	Planned	Total Completed
Shoreline/Streambank Stabilized	500 feet	0 feet
Stream Crossings	10 crossings	3 crossings

Accomplishments: No streambank stabilization projects utilizing rock rip-rap were implemented during Segment 5. Two projects utilizing soft practices (shrub and willow stake plantings) are in the planning stages at the end of Segment 5 and will plan on being implemented into the next segment. There were 104 feet of stream bank were stabilized by the implementation of stream crossings. Stream crossings reduced the impact of cattle crossing on 7,851 lf. of stream bank. Designs for an additional 11 stream crossings were completed but these crossings were not constructed during this segment due to contractor and supply shortages. At the end of this segment shortages were beginning to ease and projects were getting back on schedule. The project did not meet its goal for this product during this segment.

Objective 3: Implement a public outreach program to inform project area stakeholders about the opportunities for involvement in, and progress of the project.

Task 1: Develop and implement a multimedia outreach program to promote the project, offer opportunities for involvement, and inform the public of project progress.

Product:

1. Project web site

A project web site developed during Segment 1 will be maintained and updated to inform and educate the public on project opportunities and activities. The web site will contain information on each water body, downloadable fact sheets, calendar of events, workshops and meetings, information on BMPs available to landowners, photo gallery, project articles and news releases, and direct links to other websites useful to agricultural producers (weather, USDA, extension).

Milestones:	Total Completed
Number of times site accessed	NA

Accomplishments: Due to changes within software, numbers were not able to be obtained for visitors to the project's website. The Project Coordinator is working with the website provider on finding ways to get the data for website usage.

Figure 3. Home Page of the NEGL Project Website

Product:

2. News Releases

Local radio, television, and print media will be used to inform the public about project opportunities and activities.

Milestones:	**Planned**	**Total Completed**
News Articles	8	8

Accomplishments: Articles and announcements about the project were published in the Day, Marshall, and Robert's conservation district newsletters that are mailed to local producers, and Pickerel Lake Conservancy and Enemy Swim Sanitary District newsletters. Articles were also published in the Grant County Review, Sisseton Courier, Clear Lake Courier, and Reporter and Farmer newspapers. Announcements of upcoming project activities were posted on the NEGL website, Day and Roberts Conservation District Facebook pages, and South Dakota Science Educator's social media sites.

Product:

3. Direct personal contact with and involvement in project opportunities

Information and educational displays, programs, public meetings, and workshops will provide project area residents a direct personal contact with the project and project involvement opportunities, and students of all ages an opportunity to learn about natural resources and resource conservation in the project area. Print material will be developed and distributed at these public events.

Milestones:	**Total Completed**
Zoo Days- Bramble Park Zoo, Watertown, SD	12
Water Festivals (Brookings, Pierre)	2
Eco Ed Day Program	2
Northeast Range and Land Contest	2
South Dakota Envirothon	1
Lake and Stream Ecology Workshops	1
Environmental/Outdoor Education Camps (NeSoDak)	5

Accomplishments: Additional informational meetings and educational programs project personnel presented or participated in:

10/2/21 Sica Hollow Fall Festival – Marshall County, booth

2/25/22 Webster High School Natural Resource Class – Day County, presenter

4/23/22 Earth Day Celebration-Ft. Sisseton State Park - Marshall County - booth

4/26/22 Zoo Days (6 days) – Bramble Park Zoo – Watertown, SD – Codington County -presenter

5/4/22 Webster High School Career Day – Webster, SD – Day County - booth

5/12/22 Webster Head Start Presentation – Webster, SD – Day County - presenter

9/21/22 Sica Hollow Group – Sica Hollow State Park – Marshall County - presenter

10/1/22 Sica Hollow Fall Fest – Sica Hollow State Park – Marshall County - booth

10/5/22 Willow Lake School Presentation - Sica Hollow State Park - Marshall County - presenter

10/8/22 Sica Hollow Group – Sica Hollow State Park – Marshall County- presenter

3/21/23 Sisseton High School Ag Class Presentation – Sisseton, SD- Roberts County- presenter

4/29/23 Earth Day Celebration – Ft. Sisseton State Park – Marshall County- booth

5/10/23 Zoo Days (6 days) – Bramble Park Zoo – Watertown, SD – Codington County -presenter

5/30/23 Project WILD Training (2 days) – NeSoDak and Roy Lake State Park- presenter

A total of 3,688 persons attended the programs and presentations by NEGL personnel listed above during Segment 5 of the project. Programs were presented to a variety of age groups from preschool students (Webster Headstart), 4th grade students Central (2023 Pierre, SD, Figure 4) and Big Sioux (Brookings, SD), 5th & 6th grade students (NeSoDak Lake Ecology Classes), 7th and 8th grade students (EcoEd Day), high school and college age students and adults (Lake and Stream Ecology and Water Quality Workshops and field trips, Figure 5). Lake and Stream Ecology and Water Quality Workshop college graduate and undergraduate students could earn 1 college credit hour for completing the workshop, elementary and secondary teachers can earn 1 college credit hour or 2 Continuing Education Credits (CEUs) for completing the workshop. Project personnel also judged Envirothon Contest in Watertown, SD for 9 competing schools. Due to the Covid-19 pandemic, a majority of information and education activities planned for the years 2021 and 2022 were cancelled or at reduced numbers.

Figure 4. Central States Water Festival Participants in Pierre, SD

Figure 5. 2022 Lake and Stream Ecology Workshop Near Pickerel Lake

Objective 4: Monitor, Evaluate, and Report Project Progress
Task 1: Evaluate the effectiveness of selected past watershed efforts to determine if any BMP implementation needs to be made in future segments of this project to protect or improve water quality of selected lakes and reservoirs.

Product:

1. Water quality data

Comprehensive in-lake water quality sampling will be conducted on Enemy Swim and Pickerel. Composite surface and bottom water samples will be taken during May, June, July, August, and September from two to three sites each water body. Laboratory analysis will be conducted by RMB Laboratories located in Detroit Lakes, MN. Data from these monitoring programs is used to evaluate the effectiveness of past watershed efforts and determine if any BMP implementation needs to be made in this and future segments of the project to protect or improve water quality of these lakes.

Milestones:	**Total Samples Collected**
Enemy Swim Lake	3
Pickerel Lake	18

Accomplishments: Water quality samples were collected from Enemy Swim Lake and Pickerel Lake during this segment (Figure 6-July 2023). Water quality testing on Enemy Swim and Pickerel Lakes have been taking place since 2002, with surface and bottom samples collected from June thru August on Enemy Swim Lake, and May thru September on Pickerel Lake. Lab fees are paid for by the Pickerel Lake Conservancy and the Enemy Swim Sanitary Sewer District. RMB Laboratories of Detroit Lakes, Minnesota completed the analysis of these samples.

Figure 6. Pickerel Lake Sampling with a Van Dorn bottle

Task 2: Reports detailing project activities as required by the U.S. Environmental Protection Agency, South Dakota Department of Agriculture and Natural Resources; and participating agencies and associations will be prepared and submitted

Product:

1. **Project reports**

Milestones:	**Total Completed**
Annual Reports (GRTS)	2
Sponsor/Partner Reports	22
Final Report	1

Reports are given to the project sponsors and co-sponsors that include the Day, Grant, Hamlin, Marshall, and Roberts Conservation Districts during monthly Board of Supervisor meetings, and to other project partners including USDA-NRCS, East Dakota Water Development District, Enemy Swim Sanitary Sewer District, Pickerel Lake Conservancy and the Sisseton Wahpeton Oyate.

3.0 Best Management Practices Implemented

Best management practices (BMPs) developed and implemented during Segment 5 include riparian buffers on marginal pastureland and cropland, improved grazing management, streambank and shoreline stabilization, grass waterways and critical area plantings. Figure 7 shows the locations of BMPs implemented during this segment, and Figure 8 shows the locations of BMPs implemented during all segments of this project.

Figure 7. NEGL Segment 5 BMP Locations Map

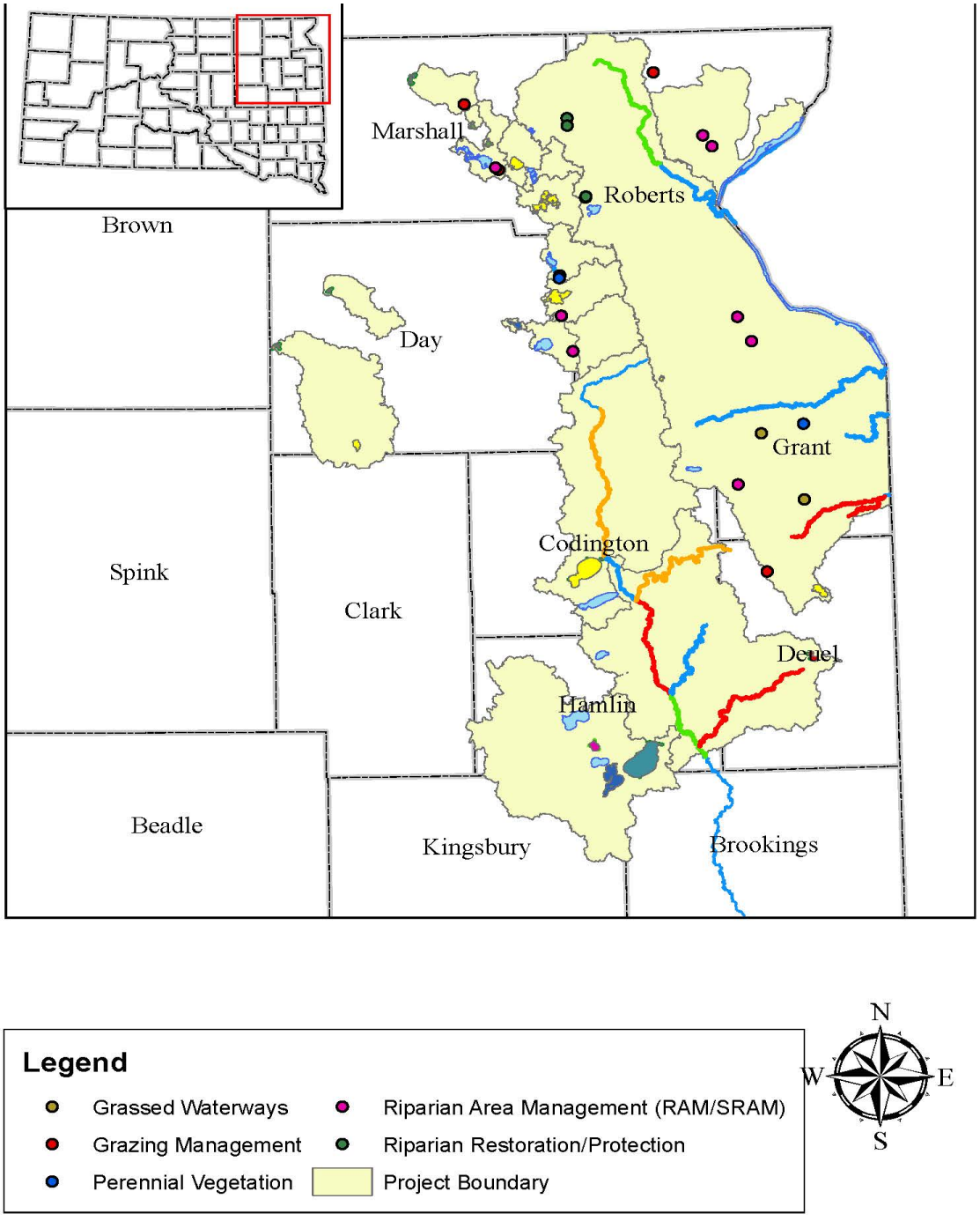
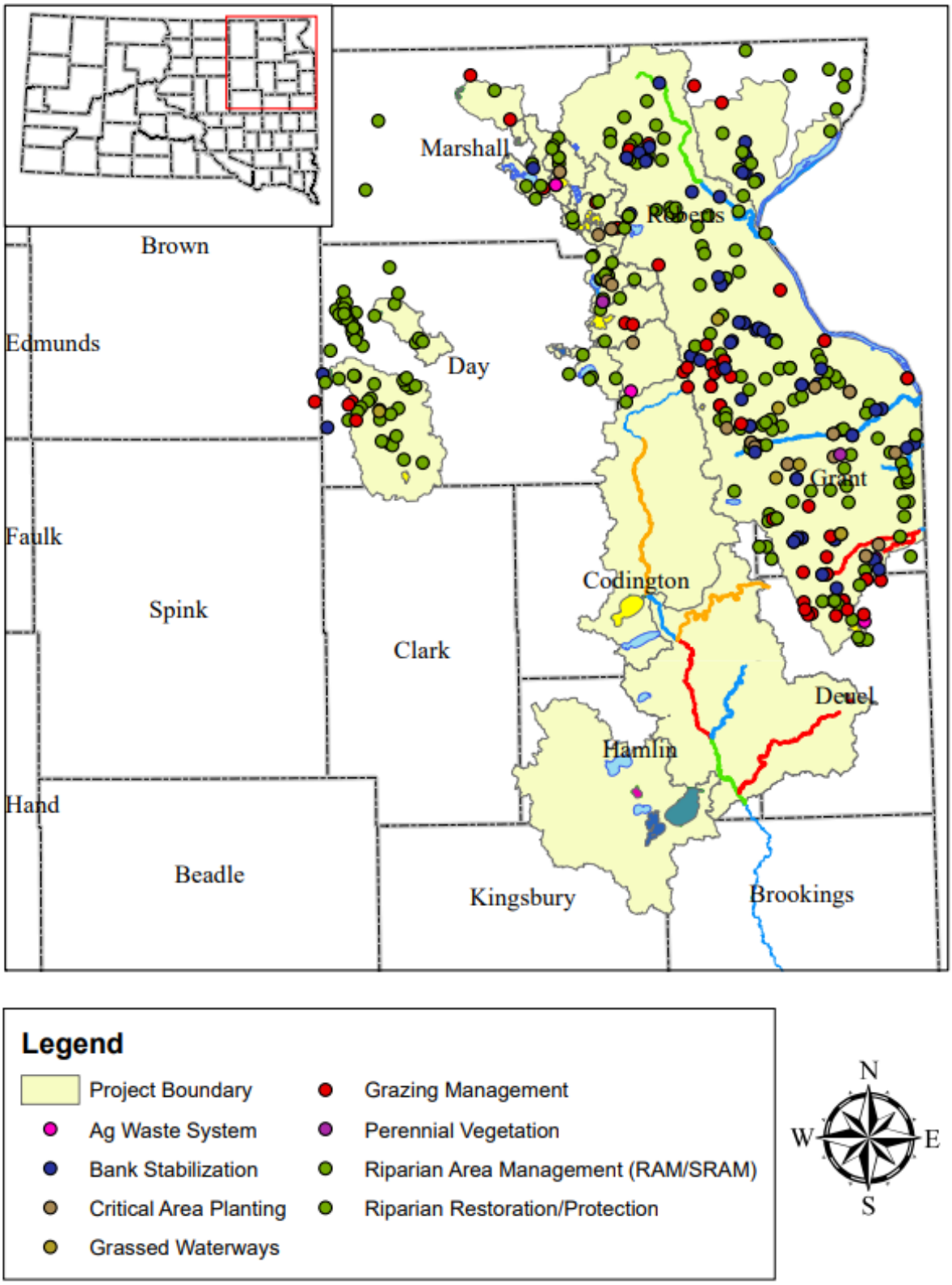


Figure 8. Segment 1 through 5 BMP Locations Map



Riparian Area Management Program (RAM)

Funding Source

The EPA 319 Clean Water Grant, and South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds were utilized to pay for additional buffer (120+) acres or ineligible CRP acres as described below. Payments for eligible CRP acres were made through the USDA Conservation Reserve Program administered by the Farm Service Agency (FSA).

Purpose

The Riparian Area Management Program was designed to reduce non-point source pollutants from entering surface waters from adjoining cropland, pastures, and animal feeding operations.

Eligibility

Eligible land must be located in a project watershed and must be adjacent to a stream or wetland draining to a project lake, or shoreline adjacent to a project lake. Priority was given to lands located along streams deemed impaired by the South Dakota Dept. of Agriculture and Natural Resources (See Table 6). This program was for agricultural land only and not available for residential or commercial properties. EPA 319 Clean Water grant funds for RAM were utilized to increase the soil rental rate for acres enrolled in the CRP program, and for land not eligible under USDA's Conservation Reserve Program (CRP) under the following conditions.

- Landowner has applied for and accepted into USDA CRP program; however, a small portion of land does not qualify and would leave this portion isolated from the main operation for cropping, haying, or grazing utilization (field corners etc.).

- Land that does not qualify for a USDA CRP program because of current land use (or allocation on USDA CRP funds have been reached) that would, however, be beneficial to water quality if utilized as a riparian buffer will be eligible for RAM funding.

Lands that are currently grazed or cropped up to the lake shore or stream bank will be a high priority. Lands that are currently maintained as a riparian area will have a lower priority.

Requirements

Proof of ownership was required for landowners. If the applicant did not own the land, a written affidavit defining the relationship between the landowner and applicant must be provided to the Conservation District covering the entire length of the contract period. The landowner must sign a contract and conservation plan with the Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall, or Roberts Conservation Districts for the RAM program that will equal the length of time of the CRP contract with USDA (10 to 15 years). As defined in the contract, failure to implement all of the required practices or maintain the buffer for the length of the contract, will require repayment of all funds and liquidated damages of twenty-five percent (25%) of the total payments disbursed to the participant. If the status of agricultural land enrolled into the RAM program changes to residential or commercial lakeshore property, all funds dispersed to the

participant must be repaid to the Conservation District unless a minimum of seventy-five percent (75%) of the buffer zone along the lakeshore is maintained under the new land-use.

Cost Share Payments

RAM soil rental rates were the same as those available for CRP programs including; CP21 – Filter Strips, CP22-Riparian Buffers, CP29-Marginal Pastureland Wildlife Habitat Buffer, CP30 Marginal Pastureland Wetland Buffer. RAM funds were used to increase the CRP soil rental rate by $10 per acre. If the RAM program was used to add adjacent acres to a USDA CRP contract, total RAM acres could not exceed forty percent (40%) of the total acres enrolled in CRP. Figure 9 shows an example of RAM combined with CRP for a producer.

RAM funds were used to pay seventy-five percent (75%) of the eligible CRP soil rental rates. The remaining twenty-five percent (25%) were considered landowner matching funds. All RAM payments were made in a lump sum to the landowner upon completion of required practices and approval of all contracts, including completion of all requirements of adjoining CRP acres.

Eligible conservation practices for implementing riparian buffers included buffer fencing, instream livestock crossings, alternative water sources (solar, stock dams, wells, pipelines, and stock tanks, see Figure 10 for an example).

Figure 9. CCRP/RAM Buffer Implemented During Segment 5

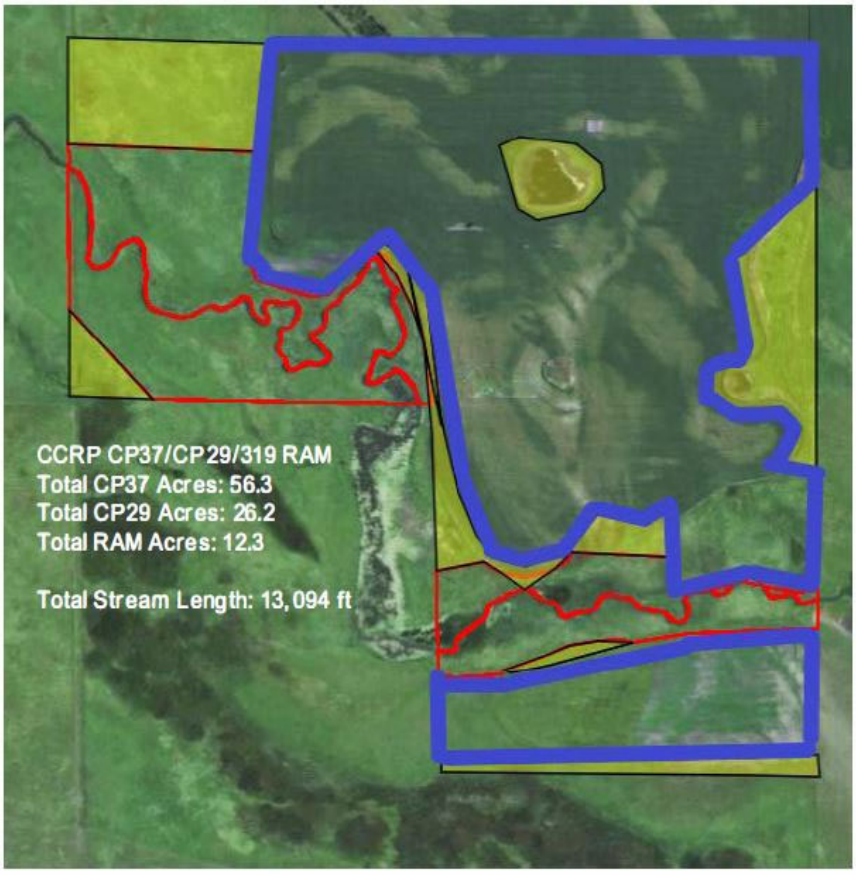


Figure 10. Livestock Water Development

Streambank and Shoreline Stabilization

Funding

Funds for stabilizing eroding streambank and shoreline were available from EPA 319 Clean Water Grant, South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds, and the Environmental Quality Incentive Program (EQIP).

Purpose

Streambank and shoreline stabilization was available for producers who wanted to implement rock riprap or vegetative practices to protect and restore eroding areas or construct livestock stream crossings to improve streambank health and also improve grazing distribution.

Eligibility

Eligible land had to be located in a project watershed. High priority was given to lands adjacent to major streams and rivers. Funding was available for protecting and restoring lake shorelines but only on agricultural or public lands. Funding was not available for private lake lots.

Requirements

Proof of ownership was required for landowners. If the applicant did not own the land, a written affidavit defining the relationship between the landowner and applicant must be provided to the Conservation District covering the entire length of the contract period. The landowner must sign a contract and conservation plan with the Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall, or Roberts Conservation Districts stating he will implement the conservation practices as described in the conservation plan in the location shown on the conservation plan map for the

life span of the practice (typically 10 to 20 years). As defined in the contract, failure to implement all of the required practices or maintain the practice for the length of the contract, will require repayment of all funds and liquidated damages of twenty-five percent (25%) of the total payments disbursed to the participant.

Cost Share Payments

EPA 319 Clean Water grant funds and South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds were available to pay up to 60% of the total cost of construction of both stream crossings and streambank stabilization. The most current NRCS docket was used to determine cost of streambank stabilization and crossings that utilized EQIP funds.

Grassed Waterways

Funding

Funds for constructing grassed waterways were available from EPA 319 Clean Water Grant, South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds, South Dakota Department of Agriculture and Natural Resources' Commission Grant, and the Environmental Quality Incentive Program (EQIP).

Purpose

Grassed waterways were available for producers to restore gullies and washouts on cropland and protect these areas by reshaping and planting a permanent vegetative cover of grass.

Eligibility

Eligible land had to be located in a project watershed.

Requirements

Proof of ownership was required for landowners. If the applicant did not own the land, a written affidavit defining the relationship between the landowner and applicant must be provided to the Conservation District covering the entire length of the contract period. The landowner must sign a contract and conservation plan with the Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall, or Roberts Conservation Districts stating he will implement the conservation practices as described in the conservation plan in the location shown on the conservation plan map for the life span of the practice (typically 10 to 20 years). As defined in the contract, failure to implement all of the required practices or maintain the practice for the length of the contract, will require repayment of all funds and liquidated damages of twenty-five percent (25%) of the total payments disbursed to the participant.

Cost Share Payments

Project grant funds were available to pay up to 60% of the total cost of construction of grassed waterways. The most current NRCS docket was used to determine cost of grassed waterways that utilized EQIP or 319 funds.

Critical Area Planting

Funding
Funds for planting areas deemed critical were available from EPA 319 Clean Water Grant, South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds, and the South Dakota Department of Agriculture and Natural Resources' Commission Grant.

Purpose
To reduce runoff from cropland adjacent to riparian areas where CRP and RAM are not applicable or established, plantings of tame grass and legumes or native grass and forbs will be established for haying or grazing purposes on critical areas adjacent to lakes and streams or other conveyances. Priority was given to land deemed by NRCS as highly erodible.

Eligibility
Eligible land had to be located in a project watershed.

Requirements
Proof of ownership was required for landowners. If the applicant did not own the land, a written affidavit defining the relationship between the landowner and applicant must be provided to the Conservation District covering the entire length of the contract period. The landowner must sign a contract and conservation plan with the Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall, or Roberts Conservation Districts stating he will implement the conservation practices as described in the conservation plan in the location shown on the conservation plan map for the life span of the practice (typically 10 to 20 years). As defined in the contract, failure to implement all of the required practices or maintain the practice for the length of the contract, will require repayment of all funds and liquidated damages of twenty-five percent (25%) of the total payments disbursed to the participant.

Cost Share Payments
Project grant funds were available to pay up to 60% of the total cost of construction of grassed waterways. The Commission Grant docket from the South Dakota Dept. of Agriculture was used to determine cost of critical area plantings.

Range and Pastureland Improvement and Grazing Management

Funding
Funds for improving range and pastureland management were available from the EPA 319 Clean Water Grant and South Dakota Clean Water State Revolving Fund (SD CWSRF) grant funds.

Purpose
To improve the management of range and pastureland by utilizing practices like cross fencing, alternate water sources, and rotational grazing.

Eligibility

Eligible land had to be located in a project watershed.

Requirements

Proof of ownership was required for landowners. Land not owned by the applicant required a written affidavit defining the relationship between the landowner and applicant provided to the Conservation District covering the entire length of the contract period. The landowners sign a contract and conservation plan with the Codington, Day, Grant, Hamlin, Kingsbury, Marshall, or Roberts Conservation Districts stating they will implement the conservation practices described in the conservation plan at the location shown on the conservation plan map for the life span of the practice (typically 10 to 20 years). As defined in the contract, failure to implement all of the required practices or maintain the practice for the length of the contract will require repayment of all funds and liquidated damages of 25% of the total payments disbursed to the participant.

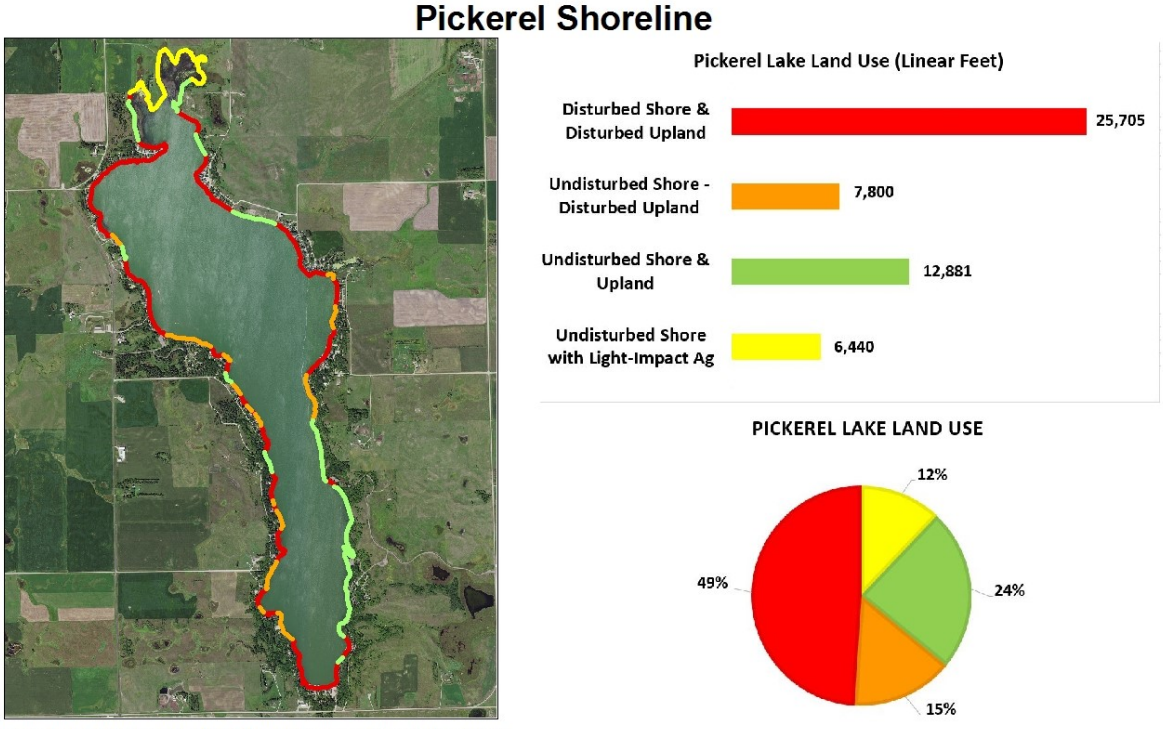
Cost Share Payments

Project grant funds were available to pay up to 60% of the total cost of practices implemented to improve range and pastureland use.

Pickerel Lake Shoreline Restoration

While not part of the original Segment 5 project implementation plan, lake shore restoration was implemented on Pickerel Lake after a 2016 survey was completed to determine the extent of shoreline alteration along the lake (Figure 11).

Figure 11. Pickerel Shoreline Survey Map



The full survey report can be viewed at;
http://neglwatersheds.org/images/Revised_Pickerel_Shoreline_Report.pdf

The South Dakota Department of Game, Fish and Parks (SD GFP) and Pickerel Lake Conservancy (PLC) applied for and were awarded a $20,000 grant from the Midwest Glacial Lakes Partnership. Both the SD GFP and PLC each contributed $5,000 toward the grant as match. The grant funds were used to purchase planting equipment and native grasses and forbs to be planted along the lake's shoreline. To date, buffers have been planted on 30 properties equaling around 2,200 feet of shoreline. Buffers range in width from 10 to 15 feet wide. Grasses and forbs are grown at the Big Sioux Nursery, Watertown, SD, from seeds collected from northeast South Dakota. NEGL project personnel, lake property owners, and SD GFP officials prepped sites and planted the buffers (Figure 12-13).

Figure 12. Project Personnel Planting Shoreline Buffer

Figure 13. Completed Pickerel Lake Shoreline Buffer

4.0 Monitoring Results

4.2 BMP Effectiveness Evaluations

The effectiveness of Best Management Practices (BMPs) installed and load reductions achieved relative to improvement in water quality were evaluated using tools available from SD Dept. of Agriculture and Natural Resources and Natural Resources Conservation Service. Reductions for BMPs implemented during this segment are given in Table 7 and were calculated using the STEPL Model.

Table 7. Load Reductions by River Basin

	Load Reductions		
	Nitrogen	Phosphorus	Sediment
Watershed	**(lbs/yr)**	**(lbs/yr)**	**(tons)**
Upper James River Basin HUC #10160005			
Roy Lake	396	60	162
Total:	**396**	**60**	**162**
Upper Big Sioux River Basin HUC #10160010			
Blue Dog Lake	381	23	11
Pickerel Lake	57	15	6
Total:	**438**	**38**	**17**
Red River Basin HUC #09020101			
White Lake Dam	1382	188	85
Total:	**1382**	**188**	**85**

Upper Minnesota River Basin HUC #07020001			
Little Minnesota River	1090	298	407
North Fork Whetstone River	447	114	28
South Fork Whetstone River	986	379	1933
North Fork Yellowbank River	1633	371	408
Total:	**4156**	**1162**	**2776**

Implementation of best management practices resulted in a total calculated reduction of 6,341 lbs. per year of nitrogen; 1,442 lbs. per year of phosphorus; and 3,037 tons per year of sediment in the hydrologic units listed above.

4.3 Surface Water Improvements

In-lake sampling of project lakes continued in Segment 5. Water quality monitoring provides data to track changes due to the implementation of best management practices in these lakes watersheds and major changes in land-use like the expiration of Conservation Reserve Program contracts, and conversion of pasture and native range to row crops. All samples collected during the project can be found on DANR's WQMAP: https://apps.sd.gov/NR92WQMAP

Water quality parameters, that were monitored included:

Total Kjeldahl - N	Total Suspended Solids
Ammonia - N	Chlorophyll a
Total Phosphorus	Total Dissolved Phosphorus

Analysis was completed at RMB Laboratories located in Detroit Lakes, MN.

Water quality parameters that were monitored by the local sampler included:

Dissolved Oxygen	Field pH	Water Temperature
Air Temperature	Field Observations	Secchi Depth

Water sampling procedures have been modified to consider aquatic invasive species. Sampling equipment including carboys used to hold sample water and VanDorn Bottles were rinsed immediately after use with distilled water before being used in the next lake. Boat plugs were pulled to follow state law, and trailers inspected at each lake for macrophytes. Two invasive species, the curly-leaf pondweed and zebra mussels, now occur in two lakes sampled during this segment.

Enemy Swim Lake

In-lake sampling of Enemy Swim Lake occurred during the months of September 2021. Composite surface and bottom samples were collected from three sites located on the lake. Water quality samples and field data collected from Enemy Swim Lake during this segment showed the lake meeting all state water quality standards for its assigned beneficial uses (Table 3).

The Enemy Swim Sanitary Sewer District provided funding to pay for in-lake water quality sample lab fees.

Pickerel Lake

In-lake sampling of Pickerel Lake occurred during the month of September 2021; June, July and August 2022; June, July and August 2023. Composite surface and bottom samples were collected from three sites located on the lake.

With aquatic invasive species (AIS) present within the project area, Project personnel monitor curly-leaf pondweed growing in Pickerel Lake(Figure 14-right), and zebra mussels and population numbers in Pickerel Lake (Figure 14-left). Curly Leaf Pondweed was first discovered in 2018 by project personnel. Zebra mussels were first discovered in 2020, the first confirmed occurrence of this invasive species in northeast South Dakota. The project has changed its water sampling protocol due to the occurrence of these aquatic invasive species.

Figure 14. Zebra Mussel Covered Rock (Left) & Curly-Leaf Pondweed (Right)

4.7 Best Management Practice Operation and Maintenance

Producers receiving cost share are required to sign a contract with the co-sponsoring Conservation District, and project sponsor. The contract lists the practices being cost shared, the life span of each practice, and whether the EPA 319 funded practice is contingent upon the successful implementation of a USDA practice like the Conservation Reserve Program. The length of the contract is based upon the longest lifespan of the implemented practices. The lengths of most contracts are ten to twenty years. Field checks to ensure the practice was properly implemented are made by project sponsor, or NRCS personnel before cost share payments are made to the producer. Producers who do not maintain practices funded by EPA 319 grant funds for the full length of the contact are required to repay the sponsoring Conservation District cost share funds, plus liquidated damages of twenty-five percent.

5.0 Coordination Efforts

The lead sponsor for this project was the Day County Conservation District. The district hired a Project Coordinator who administered grant funds and coordinated day-to-day work plan activities, and a seasonal Resource Conservation Technician who worked one-on-one with watershed producers in planning and implementing best management practices. An advisory council with representatives from the resource agencies and organizations listed below and in Sections 5.3 and 6.0 advised the project sponsor, and developed priorities, practice manuals, work plans, and strategies for this and future project segments.

5.1 Coordination from Other State Agencies

The following state agencies provided or administered funds utilized to implement this project.

- **South Dakota Department of Agriculture and Natural Resources (SD DANR)** – Administered EPA Section 319 grant funds. SD DANR personnel provided oversight of all project activities through on-site office visits, watershed tours, review/approval of reports, and approval of payment requests for 319 funds.

- **South Dakota Department of Agriculture and Natural Resources Division of Resource Conservation and Forestry** – Funding through the South Dakota Coordinated Soil and Water Conservation Commission Grant for cost share for implementation of conservation practices.

- **South Dakota Department of Game, Fish, and Parks (GFP)** – Technical advice and cost-share funds through the Department's "Private Lands Programs" for grazing improvements, wetland restoration, grass seeding. Funding for shoreline restoration on Pickerel Lake.

5.3 Federal Coordination

The following federal agencies provided or administered funds utilized to implement this project.

- **US Environmental Protection Agency (EPA)** – Provided funding through Section 319 of the Clean Water Act for nonpoint source pollution.
- **USDA Natural Resources Conservation Service (NRCS)** – Provided technical assistance for BMPs through District Conservationists, Soil and Range Conservationists, and Tribal Liaison. Provided program funds for the Environmental Quality Incentive Program (EQIP) and Conservation Collaboration Grant (CCG).
- **USDA Farm Service Agency (FSA)** – Provided program funds for the Conservation Reserve Program (CRP).
- **U.S. Fish and Wildlife Service (FWS)** – Technical advice and cost-share funds through the "Partners for Fish and Wildlife" program for grazing improvements, small dams, wetland restoration, and grass seeding.

5.4 USDA Programs

Two USDA program were utilized during this segment. The Conservation Reserve Program (CRP) administered by the Farm Service Agency paid producers to implement buffers along marginal pastureland (CP-29 Marginal Pastureland Wildlife Buffer, CP-30 Marginal Pastureland Wetland Buffer) and cropland (CP-21 Filter Strip, CP-22 Riparian Buffer) or convert cropland to grass and restore farmed wetlands (CP-37 Duck Nesting Habitat), and (CP-23 Wetland Restoration). CRP practices would be implemented for a period of ten to fifteen years. Producers received an annual rental rate dependent on soil type, or whether the buffer was adjacent to a permanent or seasonal water body. Additional incentive payments for maintenance and implementation of conservation practices like fencing and alternate livestock watering sources were also available. The Environmental Quality Incentive Program (EQIP) was also used to fund implementation of best management practices in project watersheds.

5.7 Other Sources of Funds

The project received or utilized additional federal and state funding, local cash, and in-kind contributions from a number of sources to fund project activities and generate funds to match state and federal grants as shown in Table 8. Table 9 shows expenditures per product and overall project match.

The project applied for and received one Conservation Commission Grant from the South Dakota Department of Agriculture and Natural Resources' Division of Resource Conservation and Forestry. These funds were utilized to cost share for implementation of conservation practices.

United States Department of Agriculture's Conservation Reserve Program (CRP) was utilized to protect riparian areas along project water bodies. CRP enrollment was often in conjunction with

the projects Riparian Area Management (RAM) program. CRP provided a yearly rental rate for the length of the contract and signing, maintenance, and practice implementation incentive payments.

The Pickerel Lake Conservancy and Enemy Swim Sanitary Sewer District provided local cash for water quality studies of Enemy Swim and Pickerel lakes.

The Codington, Day, Grant, Hamlin, Kingsbury, Marshall, and Roberts Conservation Districts provided both cash and in-kind match for the project. Cash match included stipends paid by the Conservation Districts for District Supervisors who attended project workgroup meetings and attended monthly board meetings where project reports and updates were given. In-kind match included the use of the project coordinators boat and other equipment utilized for lake water quality monitoring, and rental for storage of equipment utilized by the project.

Producer cash and in-kind match includes the producer's share of implemented practice costs and in-kind match for their labor and personnel equipment used to implement a conservation practice. Material costs over and above grant docket costs were also calculated from invoices provided by the producer and counted as cash match. Producer cash match ranged from 50% to 75% depending on the funding source used.

Table 8. Other Sources of Funds

Funding Source	Other Federal	State	Local Cash	Local In-Kind
USDA-NRCS and USDA-FSA (EQIP and CRP)	$409,047.79	$ -	$ -	$ -
South Dakota DANR Conservation Commission Grant	$ -	$12,505.00	$ -	$ -
Pickerel Lake Conservancy	$ -	$ -	$4,677.06	$ -
Day County Conservation District	$ -	$ -	-	$2,400.00
Producer Cost Share Match	$ -	$ -	$108,160.36	$ -
Totals:	$409,047.79	$12,505.00	$112,837.42	$2,400.00

6.0 Summary of Public Participation

Development of the project was supported by several local entities. The Codington, Day, Deuel, Grant, Hamlin, Kingsbury, Marshall, and Roberts Conservation District Board of Supervisors composed of local landowners and agricultural producers passed resolutions and signed Memorandum of Understandings with the Project Sponsor supporting the Northeast Glacial Lakes Watershed Improvement and Protection Project. These same Boards provided input on priority water quality issues identified by resource agencies and assessment projects in their respective counties as part of the project advisory council. The Pickerel Lake Conservancy, and Enemy Swim Sanitary Sewer District supported the watershed improvement and protection activities that were planned. The activities planned would protect their investments and infrastructures. Conservation District board meetings, farm and home shows, lake ecology workshops, lake association and sanitary sewer district meetings, all gave the general public a chance to participate in the development and monitor the progress of the watershed project. Local entities that participated in the planning and with monetary support of the watershed project are listed below.

- **South Dakota Association of Conservation Districts** – Provided technical assistance to local conservation districts.
- **Codington County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **Deuel County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **Grant County Conservation District –** Project partner/co-sponsor by MOU, local support and funding.
- **Hamlin County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **Kingsbury County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **Marshall County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **Roberts County Conservation District** – Project partner/co-sponsor by MOU, local support and funding.
- **East Dakota Water Development District (EDWDD)** – Local support and funding for Grant County activities.
- **James River Water Development District (JRWDD) -** Local support and funding for Marshall County activities.

- **Enemy Swim Lake Sanitary Sewer District** – Local support and funding for water quality testing.

- **Pickerel Lake Conservancy** – Local support and funding for water quality monitoring, purchasing of easements, implementing shoreline buffers.

- **Ne-So-Dak Environmental Learning Center –** Local support, campus and staff for workshops, fishing and kayak camps, and other environmental education programs.

- **South Dakota Discovery Center** –Provided grants from the South Dakota 319 Information and Education Project that funded the Lake and Stream Ecology and Water Quality Workshops held by the Northeast Glacial Lakes Watershed Improvement and Protection Project.

7.0 Aspects of the Project That Did Not Work Well

The majority of project goals, objectives, and activities were completed in an acceptable fashion without problems or delays. However, the Covid-19 Pandemic limited producer contacts during the last eighteen months of this project. Local Conservation District/USDA offices were closed to the general public had limits on the number of employees and partners that could be working in the office at any given time during the first 18 months of the segment. While some of the milestones were not met, it is nearly impossible to promote, plan and implement best management practices for an agricultural economy that is in constant change in economics. Record high commodity prices for grain and livestock were experienced during this time, resulting in reduced enrollment of Conservation Reserve Program acres and expiring contracts coming out of grass back into production. Engineering best management practices were also put on hold due to labor shortages with contractors in the area. The project was successful in setting up for segment 1 of the Prairie Coteau Watershed Improvement and Protection Project, with labor and material shortages improving, lower commodity prices, and increased interest in buffer practices and grazing improvements.

8.0 Future Activity Recommendations

The Prairie Coteau Watershed Project will continue the efforts brought about by this project. While some of the waterbodies listed as impaired during the writing of this Project's Implementation Plan in 2021 are no longer listed as so, efforts will continue to preserve the water quality of these lakes. Future project segments will continue to implement riparian buffers along pastures and cropland to reduce nutrient loading to project waterbodies.

Project Budget

Table 9. Segment 5 Budget Expenditures

ITEM	EPA 319	State	USDA EQIP/CRP	CONSERVATION DISTRICT	LOCAL	TOTAL
Objective 1: Personnel Support						
Project Coordinator	$ 69,474.23	$ 73,289.67	$ -	$ -	$ -	$ 142,763.90
Conservation Technician	$ 14,752.57	$ 19,326.09	$ -	$ -	$ -	$ 34,078.66
Administrative Support	$ -	$ -	$ -	$ -	$ -	$ -
Travel	$ 2,271.93	$ 2,271.84	$ -	$ -	$ -	$ 4,543.77
Subtotal Personnel Support	$ 86,498.73	$ 94,887.60	$ -	$ -	$ -	**$ 181,386.33**
Objective 2: BMP Installation						
Grazing Mgt. Improvements	$ 5,113.00	$ 71,517.40	$ 96,197.43	$ -	$ 56,884.50	$ 229,712.33
Riparian Buffers	$ 28,082.00	$ 28,082.00	$ 300,901.36	$ -	$ 18,719.68	$ 375,785.04
Forage/Biomass Planting Perennial Vegetation	$ 1,689.00	$ 2,505.00	$ -	$ -	$ 3,126.00	$ 7,320.00
Grass Waterway	$ 14,592.00	$ 10,000.00	$ 11,949.00	$ -	$ 25,503.75	$ 62,044.75
Shoreline/Streambank Stabilization	$ 953.00	$ 5,513.00	$ -	$ -	$ 3,926.43	$ 10,392.43
Subtotal BMP Installations	$ 50,429.00	$ 117,617.40	$ 409,047.79	$ -	$ 108,160.36	**$ 685,254.55**
Objective 3: Information and Education						
Project Website	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Information and Education	$ -	$ -	$ -	$ -	$ -	$ -
Objective 4: Water Quality Monitoring						
Water Quality Sampling	$ -	$ -	$ -	$ 2,400.00	$ 4,677.06	$ 7,077.06
Subtotal Water Quality Monitoring	$ -	$ -	$ -	$ 2,400.00	$ 4,677.06	**$ 7,077.06**
TOTAL PROJECT COST:	**$ 136,927.73**	**$ 212,505.00**	**$ 409,047.79**	**$ -**	**$ 112,837.42**	**$ 873,717.94**
MATCH						
Federal to Match	$ 136,927.73	$ -	$ -	$ -	$ -	$ 136,927.73
Eligible Match - Local and State	$ -	$ 212,505.00	$ -	$ 2,400.00	$ 112,837.42	$ 327,742.42
Percent Match:	29%	46%	0%	1%	24%	100%