

SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM
WATERSHED PROJECT FINAL REPORT

**Northeast Glacial Lakes Watershed Improvement and Protection
Project
Segment 1**

By
Dennis Skadsen
Project Coordinator
Day Conservation District

December 2010

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

Grant # C9-99818507-0

EXECUTIVE SUMMARY

PROJECT TITLE: Northeast Glacial Lakes Watershed Improvement and Protection Project
Segment 1

PROJECT START DATE: May 25, 2007

PROJECT COMPLETION DATE: December 31, 2010

FUNDING: TOTAL BUDGET \$655,925.00

TOTAL EPA BUDGET \$390,000.00

TOTAL EXPENDITURES
OF EPA FUNDS \$157,220.81

TOTAL SECTION 319
MATCH ACCRUED \$105,910.63

TOTAL EXPENDITURES \$263,131.44

SUMMARY ACCOMPLISHMENTS

Segment 1 of the Northeast Glacial Lakes Watershed Improvement and Protection Project was amended to extend grant funding from March 31, 2009 to December 31, 2010. Milestones were revised for all remaining tasks.

The project exceeded its goal for implementing riparian buffers by 54%. The project milestone was 100 acres, however a total of 153.5 acres of riparian buffers were implemented utilizing project funds and the Conservation Reserve Enhancement Program (CREP) funded by USDA and the South Dakota Game, Fish, and Parks and Pheasants Forever. A total of 1,756 acres of pasture and rangeland have been improved by the implementation of grazing management practices. This was approximately 70% of the projects goal of 2,500 acres. Cost share for this task was provided by a SD Resource Conservation and Forestry Commission Grant, and U.S. Fish and Wildlife Service's Partners for Wildlife Funds. Little interest was shown by producers for implementing animal nutrient waste systems. Preliminary designs were completed for one system, however, due to a weak cattle market and system cost, this contract has been cancelled. A large shoreline restoration project for Amsden Dam is planned, however, delayed due

to permitting issues. This project will now be completed late summer 2011 during Segment 2 of the project.

Milestones for information and education activities have been completed. The second of a two-year water quality assessment of Pickerel Lake's tributaries was completed November 2009, and a watershed land use map has been completed for the Clear Lake watershed. A website is now providing 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, and information on project lakes and watersheds.

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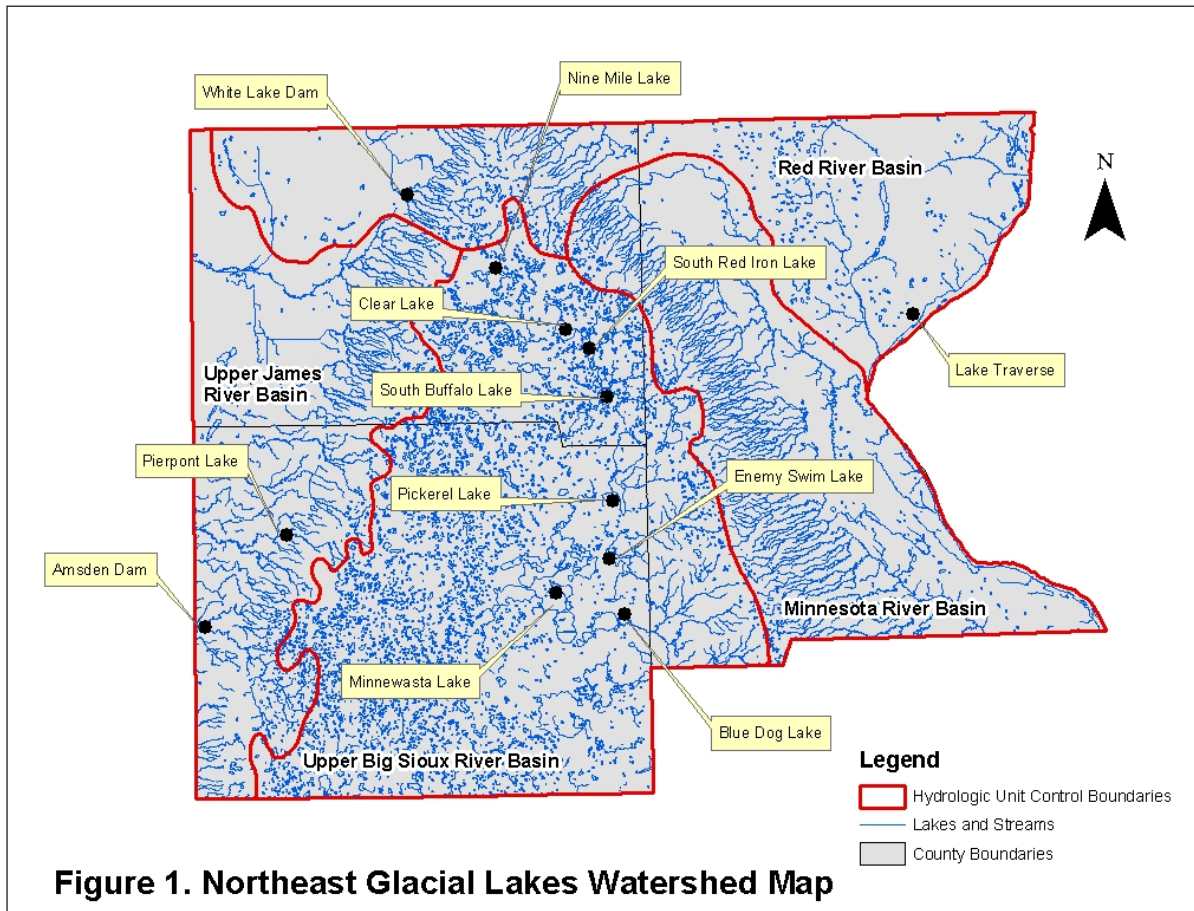
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1.0 Introduction

The Northeast Glacial Lakes Watershed Protection and Improvement Project encompasses three northeast South Dakota counties: Day, Marshall, and Roberts, and portions of three major river basins; Big Sioux, James, and Red Rivers (Figure 1). Table 1 lists project water bodies and their attributes.



The majority of the water bodies located in 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.

Table 1

River Basin and Waterbody	County	Longitude Latitude	Watershed Area (acres)	Maximum Depth (feet)	Surface Area (acres)	Shoreline Length (miles)	Watershed to Lake Ratio	Waterbody Type
<u>Upper Big Sioux River Basin</u> HUC # 10160010								
1. Blue Dog Lake	Day	45° 21'06"N 97° 17'48"W	73,811	8	1,502	8.7	49/1	Natural
2. Buffalo Lake	Marshall	45° 37'00"N 97° 16'48"W	16,781	12	1,780	27.8	9/1	Natural
3. Clear Lake	Marshall	45° 41'36"N 97° 21'36"W	11,682	20	1,087	7.6	11/1	Natural
4. Enemy Swim Lake	Day	45° 26'24"N 97° 16'00"W	22,310	26	2,146	11.8	10/1	Natural
5. Minnewasta Lake	Day	45° 23'24"N 97° 21'42"W	2,564	14	601	5.5	4/1	Natural
6. Nine Mile Lake	Marshall	45° 46'04"N 97° 29'26"W	NA	10	282	4.5	NA	Natural
7. Pickerel Lake	Day	45° 30'24"N 97° 16'24"W	17,165	43	931	9.7	18/1	Natural
8. Red Iron Lake	Marshall	45° 40'12"N 97° 19'06"W	9,862	15	610	7.5	16/1	Natural
<u>Upper James River Basin</u> HUC # 10160005								
9. Amsden Dam	Day	45° 21'30"N 97° 58'06"W	31,961	27	235	5.9	136/1	Reservoir
10. Pierpont Lake	Day	45° 27'42"N 97° 49'48"W	5,885	16	77	2.2	76/1	Reservoir
<u>Red River Basin</u> HUC # 09020101								
11. Lake Traverse	Roberts	45° 42'12"N 97° 44'06"W	729,005	12	11,530	40.3	63/1	Natural
12. White Lake Dam	Marshall	45° 51'36"N 97° 36'54"W	21,184	20	187	6.3	113/1	Reservoir

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 lies above the Pierre shale bedrock. The groundwater flowing above the bedrock forms dozens of small perennial streams. These streams 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 remnant eastern deciduous forest communities.

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, which 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 One Road, Hurricane, and Minnewasta lakes. 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 Basin. 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 normal lake level elevations.

Buffalo Lakes, Clear Lake, and Red Iron Lakes 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 to the Red River Basin system.

Lake Traverse lies in the main channel of what remains of the Glacial River Warren, the major outflow channel of pro-glacial Lake Agassiz formed approximately 10,000 years ago. The South Dakota watershed of Lake Traverse is relatively small with 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 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 the each county in the project area are given in Table 2.

Table 2

	County		
	<u>Day</u>	<u>Marshall</u>	<u>Roberts</u>
*Data from South Dakota Agricultural 2006 Bulletin No. 66			
Population (2002 census)*	6,267	4,576	10,016
Land Area* (Acres)	658,329	536,888	704,856
Land Ownership			
Private (Acres)	626,319	483,944	627,087
Tribal (Acres)	10,033 acres	26,363	66,448
Federal (Acres)	10,679 acres	11,180	5,117
State (Acres)	11,298 acres	15,401	6,204
Agricultural Data			
Number of Farms*	704	529	936
Total Cropland* (Acres)	375,052	339,758	449,241
Corn/Soybeans* (Acres)	180,500	176,000	233,500
Small Grain* (Acres)	80,200	27,500	77,100
CRP (Acres)	91,209	55,629	61,341
Hay* (Acres)	45,000	39,000	68,000
Range/Pasture (Acres)	155,900	170,000	139,000
Livestock Numbers* (2002 census)			
Cattle	43,159	88,141	55,181
Swine	1,055	10,810	16,862
Sheep	3,023	3,644	8,798

Table 3 lists the beneficial uses for the lakes and reservoirs in the project area. Table 4 gives Trophic State Indexes (TSI), status of Total Maximum Daily Loads (TMDL), 303 (d) listing, and impaired beneficial uses and reasons for impairment for each lake or reservoir. The *2006 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 Table 2.

Several EPA 319 funded watershed assessment and improvement projects have been completed for lakes and reservoirs located in the project area (Figure 2). 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. On-going water quality studies of Clear Lake, Enemy Swim Lake, and Pickerel Lake have been funded by local lake associations and sanitary sewer districts. Final reports for these projects can be viewed at www.neglwatersheds.org.

Table 3

Beneficial Use:	Amsden Dam	Blue Dog Lake	So. Buffalo Lake	Clear Lake	Enemy Swim Lake	Minnewasta Lake	Nine Mile Lake	Pickerel Lake	Pierpont Lake	So. Red Iron Lake	Lake Traverse	White Lake Dam
(1) Domestic water supply												X
(4) Warmwater permanent fish life propagation	X	X		X	X			X	X	X	X	X
(5) Warmwater semipermanent fish life propagation			X			X	X					
(7) Immersion recreation	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
(9) Fish & wildlife propagation, Recreation and stock watering	X	X	X	X	X	X	X	X	X	X	X	X
(10) Irrigation waters											X	

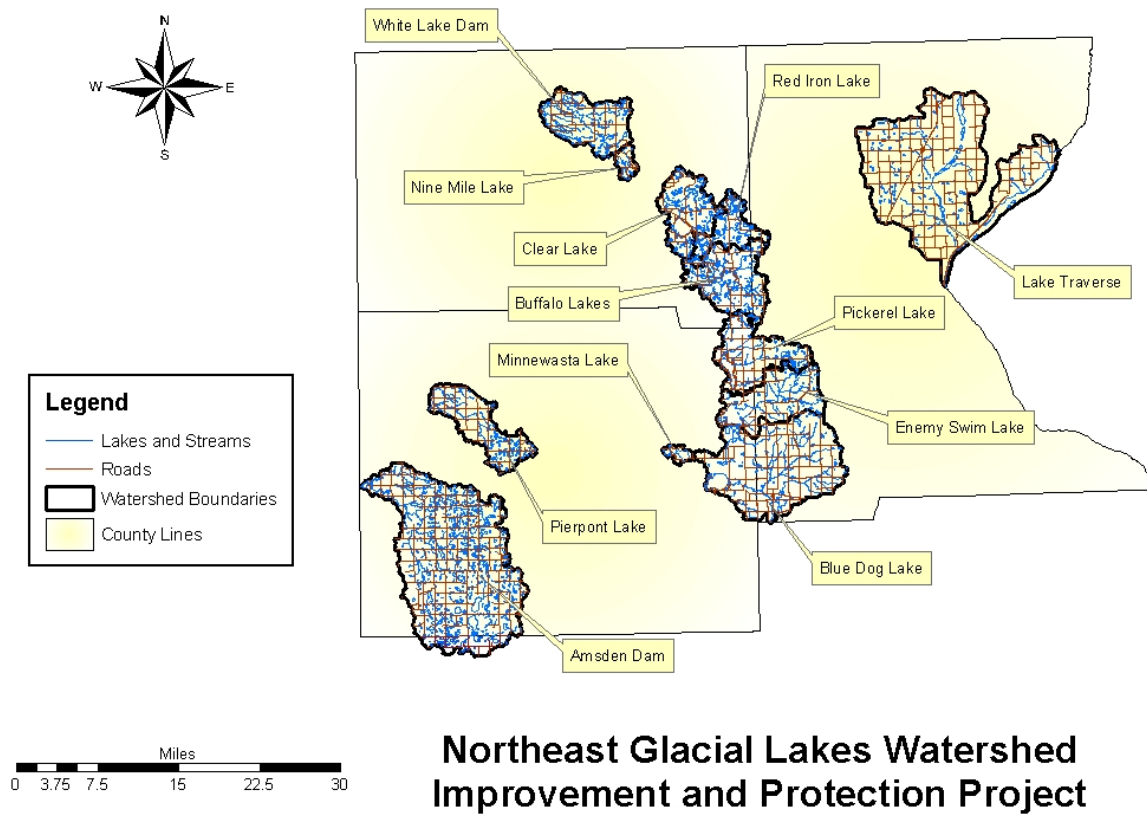
The main non-point pollutants impairing the water quality of project lakes are fecal coliform bacteria, nutrients, and sediments carried by runoff from agricultural lands located in their watersheds. The goal of this project is to continue protecting and improving water quality of northeast South Dakota 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 first 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 Marshall and Roberts Conservations Districts as co-sponsors. This report will describe the activities completed for the first two-year project segment.

Table 4

Waterbody	Mean TSI (Sec- Chl)	TMDL	303 (d) Listed (2006)	Impaired Beneficial Use and Cause*						
				1	4	5	7	8	9	10
Amsden Dam	54.1	In Progress	Yes	NA	Non (TSI)	NA	Unknown	Unknown	Full	NA
Blue Dog Lake	66.4	Approved	No	NA	Non (TSI)	NA	Non (Fecal coliform)	Full	Full	NA
So. Buffalo Lake	58.0	In Progress	Yes	NA	NA	Non (pH, TSI)	Unknown	Unknown	Full	NA
Clear Lake	50.4	No TMDL Required	No	NA	Full	NA	Unknown	Unknown	Full	NA
Enemy Swim Lake	51.1	Approved	No	NA	Full	NA	Full	Full	Full	NA
Minnewasta Lake	56.6	In Progress	Yes	NA	NA	Non (TSI)	Unknown	Unknown	Full	NA
Nine Mile Lake	54.2	In Progress	Yes	NA	NA	Non (TSI)	Unknown	Unknown	Full	NA
Pickrel Lake	51.1	No TMDL Required	No	NA	Full	NA	Unknown	Unknown	Full	NA
Pierpont Lake	50.9	No TMDL Required	No	NA	Full	NA	Unknown	Unknown	Full	NA
So. Red Iron Lake	61.3	In Progress	Yes	NA	Non (pH, TSI)	NA	Unknown	Unknown	Full	NA
Lake Traverse	61.3	In Progress	Yes	NA	Non (TSI)	NA	Unknown	Unknown	Full	Unknown
White Lake Dam	64.2	Approved	Yes	Full	Non (TSI)	NA	Unknown	Unknown	Full	NA

Figure 2



2.0 Project Goals, Objectives, and Activities

This project was the first segment of an area wide water quality improvement/protection strategy. 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: Develop and institute the project management structure needed 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 manage the Northeast Glacial Lakes Watershed Improvement and Protection Project. The council will be formed during the first year of the project (2007) and will oversee the development of a strategic plan for future segments, a practice manual that will establish priorities for BMP implementation, and a work plan for the second and subsequent project segments. Memoranda of understanding that define the responsibilities and obligations of each district in the support and execution of the project will be entered into between the Day, Marshall, and Roberts Conservation Districts.

Product:

1. Project Management Structure.

Milestones for activities included in the management structure are listed below.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Advisory Council	1	1
Strategic Plan	1	1
Practice Manual	1	1
Memoranda of Understanding	2	2
Project segment 2 work plan	1	1

There were no amendments or changes to Task 1, all products and milestones were completed. Segment 2 of the Northeast Glacial Lakes Watershed Improvement and Protection Project was funded in 2009 based on the strategic plan developed during this segment.

OBJECTIVE 2:

INSTALL BEST MANAGEMENT PRACTICES (BMPS) IN CRITICAL AREAS TO PROTECT AND RESTORE THE BENEFICIAL USES OF LAKES AND RESERVOIRS IN NORTHEAST SOUTH DAKOTA.

Task 2: Install BMPs that reduce nutrient, sediment, and fecal coliform bacteria non-point source pollution originating from livestock operations.

Product:

2. Animal Waste Management Systems

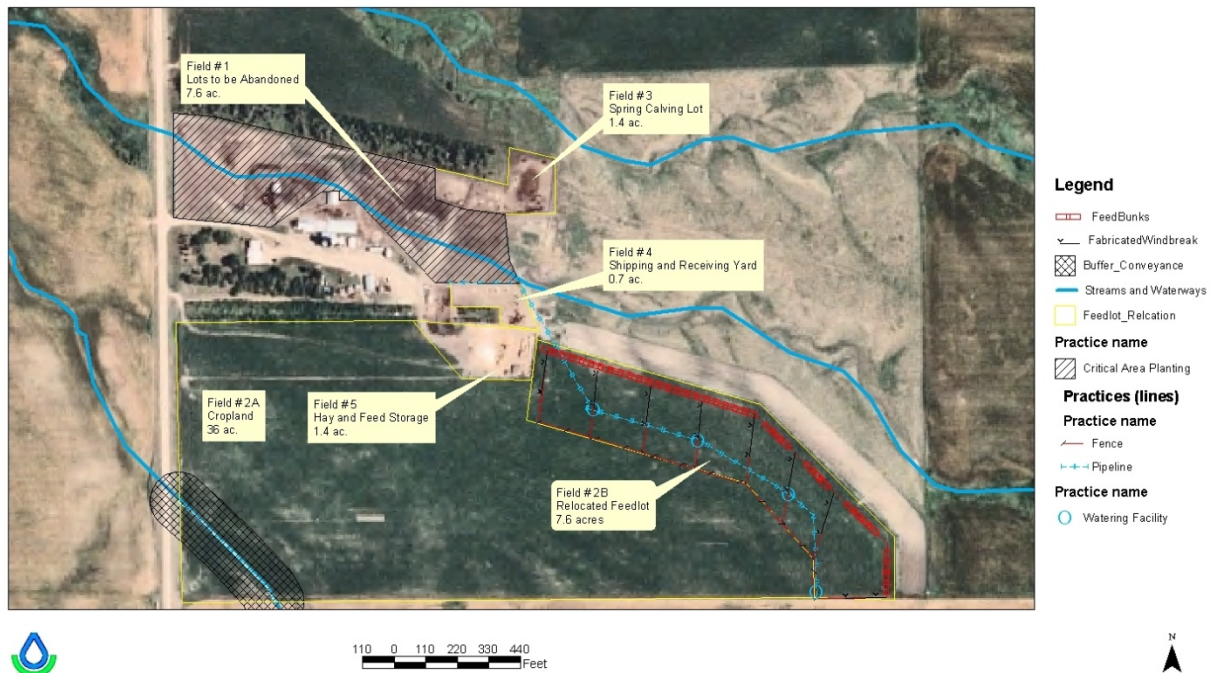
Four (4) animal waste management systems (AWMS) will be designed and installed in the project area to reduce nutrient, fecal coliform bacteria, and sediment loading to water bodies located in the project area. The systems planned include both conventional (zero-discharge) and alternative systems with the type of system being dependant on site conditions and operator preference. Operations targeted for implementation will be those with AnnAGNPS ratings of 50 or higher or located in close proximity to receiving water bodies.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Engineering Services	4	1
Conventional AWMS	1	0
Alternative AWMS	3	1

One feedlot was relocated during the project (Figure 3). This feedlot was located on Mud Creek, the main tributary to Amsden Dam, and was determined to be a major source of nutrients to the reservoir during the Amsden water quality assessment project. The project cost shared relocation of the feedlot to a more suitable location. The original feedlot location was reclaimed and planted to hay. As a result of relocating this feedlot, the StepL model estimated load reductions of 1,724 lbs per year of phosphorus (90%), and 7,663 lbs per year of nitrogen (80%).

One design of an animal waste management system was cost shared, however the producer chose not to implement the design due to the systems cost. Milestones for this task were not met due to a weak cattle market and the high construction costs of these systems.

Figure 3



Product:

3. Riparian Buffers

Riparian buffers will be established to reduce nutrient, fecal coliform bacteria, and sediment loads entering project water bodies from lakeshore and stream bank segments degraded by livestock. Establishment of the buffers will require the installation of fence and the development of alternative watering sources. The Continuous Conservation Reserve Program (CCRP) administered by USDA will be the preferred option for providing financial assistance for this product. Marginal Pastureland Wetland Buffer (CP-30) or Filter Strips (CP-21) are two CCRP programs that are ideal for riparian buffer implementation. If a site does not qualify for CCRP, riparian BMPs will be funded using 319 funds. The financial assistance will follow the docket established by USDA for CCRP.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Riparian Buffers	100 Acres	153.5 Acres

All milestones for this task have been completed. A total of 68.9 acres of buffers were funded utilizing the projects 319 Riparian Area Management (RAM) funds, and an additional 76.6 acres were enrolled into USDA's Continuous Conservation Reserve Program (CCRP). One 8 acre riparian buffer was implemented to reclaim a relocated feedlot (Figure 3). Completed acres of riparian buffers exceeded the planned amount by 54%. Three of the completed riparian buffers were located in the Amsden and Pierpont Dam watersheds. These producers received additional rental rates from the South Dakota Dept. of Game, Fish, and Parks and Pheasants Forever's Conservation Reserve Enhancement Program (CREP) for allowing public hunting access to these areas. Load reductions for these buffers are given in Table 5.

Product:

4. Grazing Management Plans

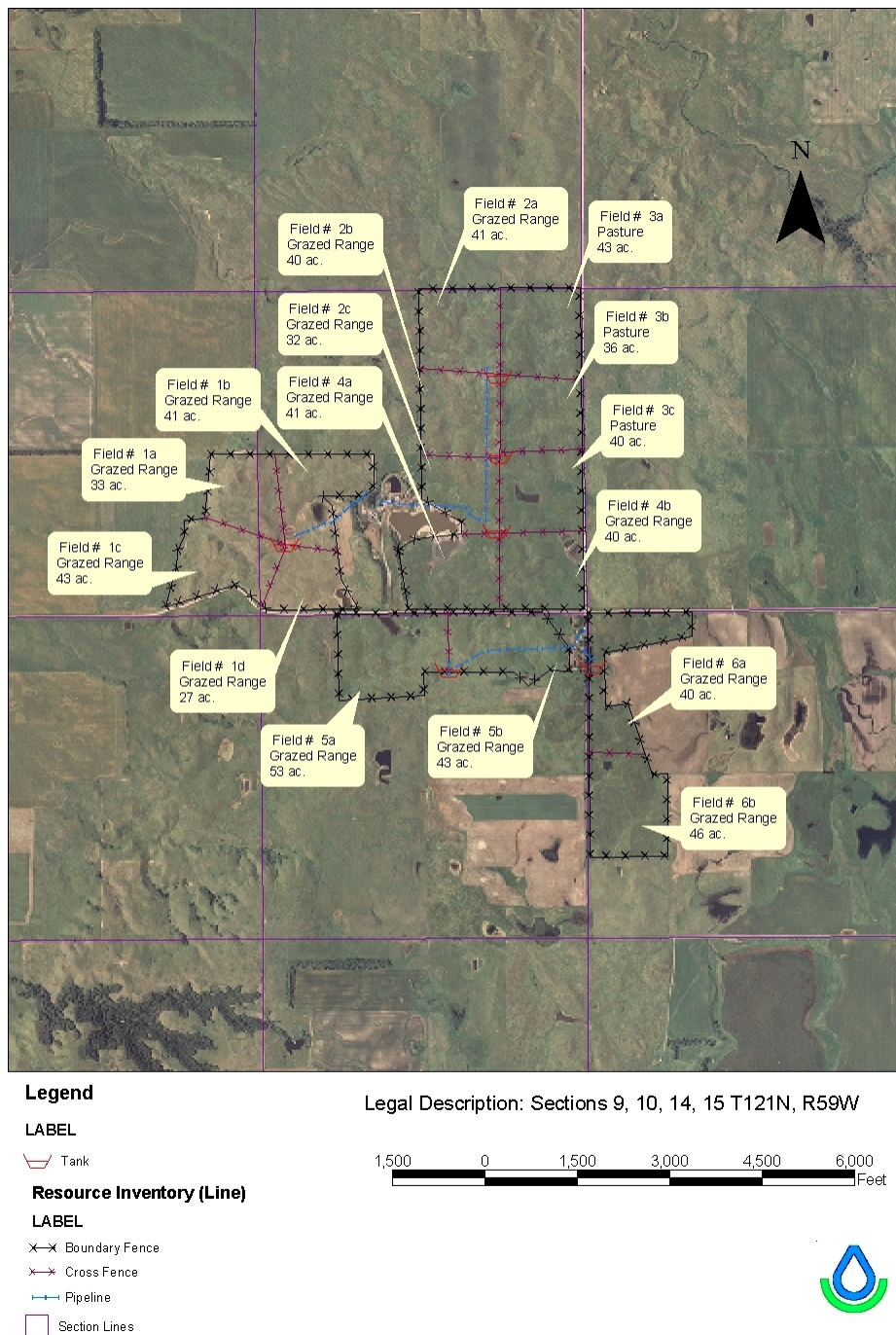
Through conservation planning, pasture health and rangeland condition will be improved on 2,500 acres of grassland. Resource technicians will work with landowners to promote and implement basic grazing management principles such as rotation, rest, grass banking, and other BMPs that sustain quality grasslands. If needed, financial assistance for implementing conservation practices like cross fence and water development will come from the NRCS Environmental Quality Incentive Program (EQIP), FWS "Partners for Wildlife" program, GFP "Private Lands Program", and SD Coordinated Soil and Water Conservation grant funds.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Grazing Management	2,500 acres	1,756 acres

Cross fencing and water development improved grazing management on 1,545 acres of existing range and pastureland, 51 acres of cropland were planted to pasture, and cross fence and water development on 160 acres of retired CRP converted to pastureland. Seventy percent of the projects goal of 2,500 acres of grazing improvements was reached. Funding for this product was provided by a conservation grant from the South Dakota Department of Agriculture which was combined with Partners for Wildlife funds from the United States Fish and Wildlife Service. Figure 4 shows one of the larger systems implemented during the project located in the Amsden Dam watershed. A number of programs in recent years have addressed grazing management including USDA's Environmental Quality Incentive Program (EQIP) and Wildlife Habitat

Incentive Program (WHIP); and several multi-county grants from the SD Dept. of Agriculture's Resource Conservation grants in conjunction with the US Fish and Wildlife Service's "Partners for Wildlife" funds. Even though this project milestone was not met, this resource has received much attention and a majority of producers willing to implementing grazing management improvements have been served by these various programs.

Figure 4



Task 3: Reduce sediment loads entering project water bodies by reducing shoreline and stream bank erosion.

Products:

5. Shoreline and Stream Bank Stabilization

Shoreline and stream bank erosion will be stabilized using hard (rip-rap) and soft (vegetative) practices.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Shoreline Stabilized	300 LF (hard)	0 LF
	2000 LF (soft)	0 LF

No milestones were completed for this task. Plans for stabilizing 900 lineal feet of shoreline along the banks of Amsden Dam (Figure 5) were completed during Segment 1. Implementation of this plan will be completed during Segment 2, and will utilize most of the funds dedicated to this task.

Figure 5



OBJECTIVE 3:

IMPLEMENT A PUBLIC OUTREACH PROGRAM TO INFORM PROJECT AREA STAKEHOLDERS ABOUT THE OPPORTUNITIES FOR INVOLVEMENT IN, AND PROGRESS OF THE PROJECT.

Task 4: Develop and implement a multimedia outreach program to promote the project, offer opportunities for involvement, and inform the public of project progress.

Product:

6. Project Website

A project web site will be developed and maintained to inform and educate the public on project opportunities and activities. The web site will be developed and maintained through a cooperative agreement with South Dakota Association of Conservation Districts (SDACD). 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).

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Website	1	1
Site Accessed (Per year)	200	0

A project website (Figure 6) is now online at www.neglwatersheds.org . Visitors can download or view all completed water quality assessment and implementation reports for project lakes, project fact sheets, and watershed and lake contour maps. Details about agricultural programs offering cost share to implement best management practices, project information and education programs, and information on the area's natural history are available on the website. Existing pages will be updated and new pages added during future segments of this project. The capability to track site access is not yet available from the webhost, so this milestone was unable to be completed. SDACD was not used as the website host.

Figure 6



Product:

7. News Releases

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

Milestones:	Planned	Total Completed
New Articles (1 per quarter)	8	8
Radio/Television Interviews	4	4

Eight news articles describing and promoting the project were published in the sponsoring Conservation District's newsletters, lake association newsletters, and local newspapers. The

Project Coordinator appeared on radio station KBWS FM's "Conservation Report" program on four separate occasions to promote and discuss Northeast Glacial Lakes Watershed project activities. The radio station is located in Sisseton, SD, and its broadcast coverage includes the entire project area.

Product:

8. Direct Personal Contact With and Involvement in Project Opportunities

Displays, public meetings, forums, and workshops will provide project area residents a direct personal contact with the project and project involvement opportunities. The project or project partners will sponsor public meetings. Print material will be developed and distributed at these public events. Financial assistance for area schools to attend the "Lakes Are Cool" program will be provided through the South Dakota Watershed Information and Education Mini-Grant program.

Financial assistance for area schools to attend the "Lakes Are Cool" program will be provided through the South Dakota Information and Education Grant program. The program offers 5th and 6th grade students a chance to experience hands-on testing and assessment of a lake ecosystem, and an opportunity to learn water based recreational skills (sailing, canoeing). School districts located in the project area invited to attend include: Britton/Hecla, Enemy Swim Day School, Groton, Langford, Rosholt, Roslyn, Sisseton, Summit, Tiospa Zina, Veblen, Waubay, and Webster. The program will be held at the Ne-So-Dak Environmental Learning Center located on Enemy Swim Lake.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Day Co. Farm Show	2	2
Sisseton Winter Show	2	2
Britton Winter Festival	2	2
Fact Sheets	8	8
Project Brochure	1	1
Lakes Are Cool Classes	24	5

A Project Brochure (Figure 8) was published and handed out to producers at USDA Field Offices located in Britton, Sisseton, and Webster, South Dakota. Eight project fact sheets were written or revised for this project and included the following titles; Shoreline Restoration Procedures and Permits; Riparian Buffers for Lakes, Streams & Rivers; On-Site Septic Systems

along Shoreline Property; Surface Water Pollution from Livestock; Reducing Nonpoint Source Pollution – Protection Tips for Lake Property Owners; WaterWise Boating – Tips for Reducing Nonpoint Source Pollution from Boats and Jet Skis; and facts on Pickerel and Enemy Swim Lakes. All of these fact sheets are available to download from the project’s website. Project brochures and fact sheets were handed out at six county farm and home type shows in 2008 and 2009. The Day, Marshall, and Roberts Conservation Districts paid for booths at each of these shows to promote district activities like the Northeast Glacial Lakes Watershed project.

Only five schools participated in the Lakes Are Cool Program (Figure 7), Enemy Swim Day School, Britton-Hecla, Veblen, Sisseton, and Roslyn Elementary schools. Many schools contacted by the project could not attend due to budget restraints.

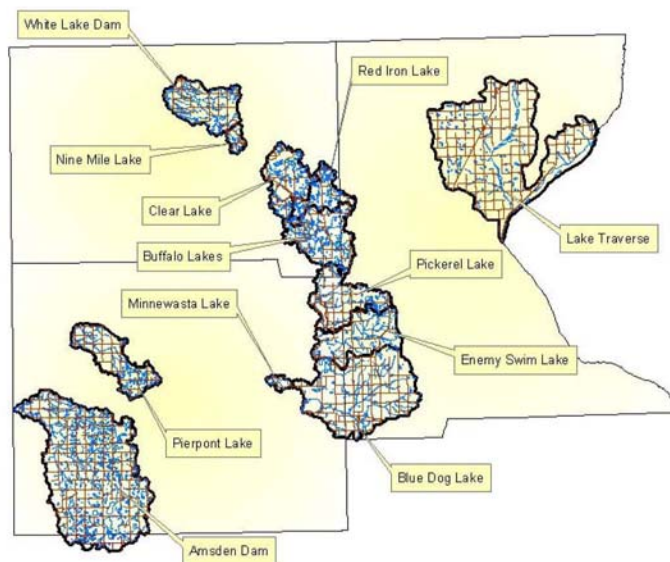
Figure 7



Lakes are cool participants learning how to collect and identify aquatic invertebrates.

Figure 8

NORTHEAST GLACIAL LAKES WATERSHED IMPROVEMENT AND PROTECTION PROJECT



The goal of the Northeast Glacial Lakes Watershed Improvement and Protection Project is to improve and protect the water quality of northeast South Dakota lakes through the implementation of best management practices that reduce bacteria, nutrient, and sediment loads to these lakes.

The Northeast Glacial Lakes Watershed Improvement and Protection Project is a cooperative venture between the Day, Marshall, and Roberts County Conservation Districts. Grants from the Environmental Protection Agency and the South Dakota Division of Resource Conservation and Forestry, as well as funds from the Natural Resource Conservation Service and Farm Service Agency will provide monies for cost share and incentive payments to agricultural producers and landowners who implement best management practices on their lands. These bmps are designed to reduce non-point source pollution in the twelve watersheds located within the three county project area. Funds are available to implement animal waste management systems, riparian area management, rotational grazing systems, and shoreline and streambank stabilization. Cost share rates vary from 30% to 75% depending on funding source and practice.

OBJECTIVE 4: MONITOR, EVALUATE, AND REPORT PROJECT PROGRESS

Task 5: 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:

9. Water Quality Data

In-lake water quality sampling will be completed during the first two project years at Clear Lake, Enemy Swim Lake, Pickerel Lake, and Pierpont Lake. Composite surface and bottom water samples will be taken during May, June, July, August, and September from two to three sites in each water body. Laboratory analysis will be conducted at the Water Resources Institute Laboratory and the South Dakota State Health Laboratory. This data will be used to evaluate the effectiveness of past watershed efforts, and to determine if any BMP implementation efforts are needed in this, and future segments of the project to protect or improve water quality of these lakes and reservoirs.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Clear Lake	10 sample sets	10
Enemy Swim Lake	6 sample sets	6
Pickerel Lake	6 sample sets	10
Pierpont Lake	6 sample sets	6
QA/QC	4 sample sets	0

All milestones for in-lake water quality testing have been completed. Additional samples were collected from Pickerel Lake when the Pickerel Lake Association decided to fund an additional two months (May, Sept.) of in-lake sampling. No QA/QC samples were collected due to the limited funding provided by the two lake associations and sanitary sewer districts for laboratory analysis of samples. A final report was presented in January 2010, to the Pierpont Town Board for the Pierpont Reservoir Study. Final reports will be completed for all other lakes listed above during Segment 2.

A water quality study of Pickerel Lake's tributaries began in March 2008 and was completed late fall 2009.

Product:

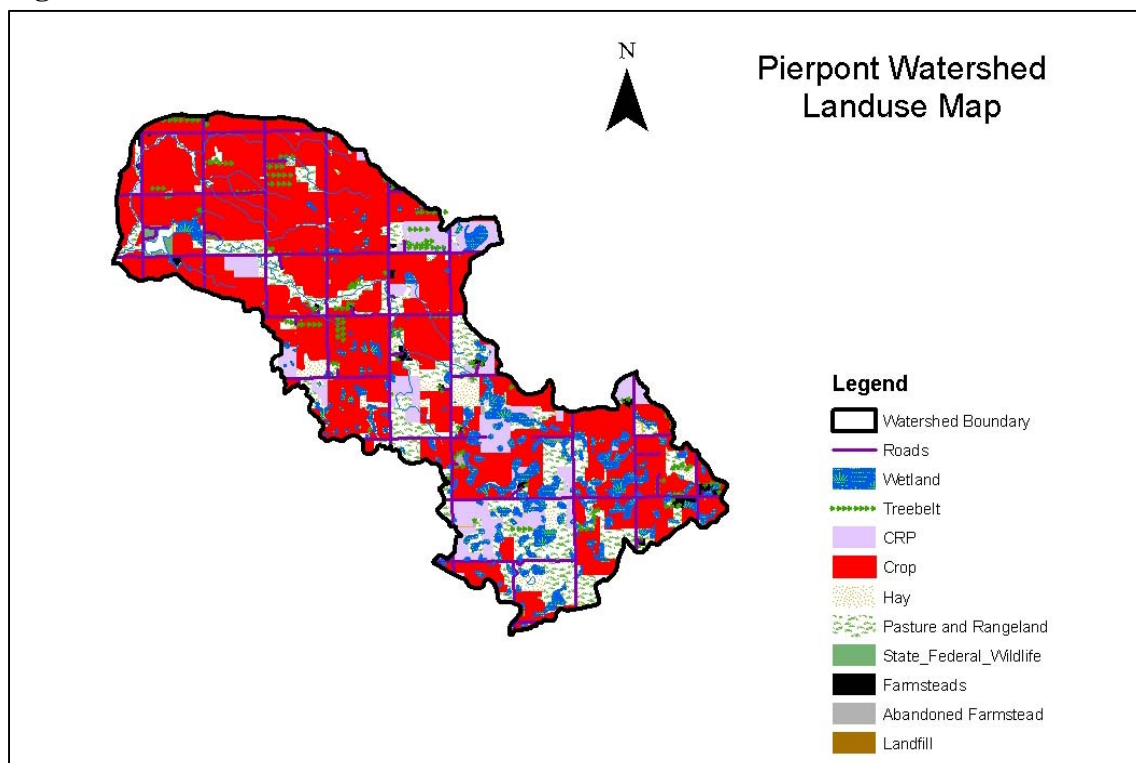
10. Updated and New Watershed Maps

Existing watershed land-use maps will be updated and new maps will be developed to identify current land-uses which include expiring CRP acres. The maps will be used to identify areas in need of riparian buffers, and other BMPs beneficial to water quality that will be implemented in the project's second segment.

<u>Milestones:</u>	<u>Planned</u>	<u>Total Completed</u>
Land-Use Maps	Clear Lake	completed
	Pickerel Lake	completed
	Pierpont Lake	completed

All milestones for this task have been completed. Land-use maps for these three watersheds will be used to locate priority areas for implementing riparian buffers and other conservation practices. The land use map developed for Pierpont Lake is shown below in Figure 9.

Figure 9



3.0 Best Management Practices Implemented

Best management practices developed and implemented during this segment include riparian buffers on marginal pastureland and cropland, improved grazing management, and planting highly erodible cropland to hay. BMP program descriptions are given below. Total acres implemented during this segment and load reductions for each are given in Table 5.

Riparian Area Management Program (RAM)

Funding Source

EPA 319 clean water funds were utilized to pay for additional buffer acres or ineligible Continuous Conservation Reserved Program (CCRP) acres as described below. Payments for eligible CCRP were made through the USDA Conservation Reserve Program administered by the Farm Service Agency (FSA).

Purpose

The Riparian Area Management Program is 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. This program is for agricultural land only and not available for residential or commercial properties. RAM funding is to be utilized 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 is required for landowners. If the applicant does 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. Multiple or shared payments to landowners and renters will not be made. The landowner must sign a contract and conservation plan with the Day, 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 and Incentive Payments

RAM soil rental rates will be the same as those available for CCRP programs including; CP21 – Filter Strips, CP22-Riparian Buffers, CP29-Marginal Pastureland Wildlife Habitat Buffer, CP30 Marginal Pastureland Wetland Buffer. If the RAM program is used to add adjacent acres to a USDA CCRP or CRP contract, total RAM acres cannot exceed thirty-five percent (35%) of the total acres enrolled in CRP or CCRP.

Example:

- If a landowner is applying to enroll 7 acres into a USDA CCRP program and has an adjacent 5 acres of land not eligible under CCRP; only 2.5 acres (rounded) could be enrolled with the RAM program funding. If the number of acres is below thirty-five percent (35%), all acreage will be eligible for RAM payments.

If the RAM program is used to enroll land ineligible for USDA CRP programs because of current land use or allocation on USDA CRP funds have been reached, CCRP payments will be made utilizing RAM funds.

RAM funds will pay seventy-five percent (75%) of the eligible CCRP soil rental rates for the site in each county. The remaining twenty-five percent (25%) will be considered landowner matching funds. Additional acres like field corners can be added to the RAM contract, but will be capped at thirty-five percent (35%) of the total RAM buffer acres. Refer to the example above. Unlike the CCRP program, all payments will be made lump sum to the landowner upon

completion of required practices and approval of all contracts; including completion of all contract requirements of adjoining USDA CRP or CCRP acres.

Eligible conservation practices for implementing riparian buffers include buffer fencing, in-stream livestock crossings, alternative water sources (nose pumps, solar, stock dams, wells, pipelines, and stock tanks).

In addition, the South Dakota Dept. of Game, Fish and Park's Conservation Reserve Enhancement Program added additional cash incentives if the landowner allowed public hunting on enrolled CRP and CCRP acres located in the James River Basin. This included all project watersheds in Marshall County, and the Amsden and Pierpont watersheds in Day County.

Range and Pastureland Improvement and Grazing Management

Funding Source

Cost share for implementing practices to improve grazing management were made possible through a Coordinated Soil and Water Conservation Commission Grant from the South Dakota Dept. of Agriculture – Division of Resource Conservation and Forestry.

Purpose

The Range and Pastureland Improvement and Grazing Management program is available for producers who want to improve the current utilization and condition of their native range and/or pastureland.

Eligibility

Eligible land must be located in a project watershed. High priority will be given to lands adjacent to streams and wetlands draining to a project lake; or adjacent to project lake shores. Lands that are currently grazed up to the lake shore or stream bank will be of high priority and will require the implementation of a riparian buffer funded by USDA CRP or project funds.

Requirements

Proof of ownership is required for landowners. If the applicant does 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. Multiple or shared payments to landowners and renters will not be made. The landowner must sign and implement

a grazing plan defining stocking rates and days. The landowner must sign a contract and conservation plan with the Day, Marshall, or Roberts Conservation Districts where the land is located before receiving cost share. As defined in the contract, failure to implement all of the required practices or maintain the practices and grazing plan 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 and Incentive Payments

Conservation Commission Grant funds will be utilized for grazing improvement practices at the following rates set in the Commission's docket;

- General livestock needs – 30% of the Commission grant docket costs, 30% minimum landowner cash match
- Riparian protection – 50% of the Commission grant docket costs, 25% minimum landowner cash match

Eligible conservation practices for grazing improvements include cross fencing, wells, pipelines (above and below ground), stock tanks, rural water hookups, nose pumps, stock ponds, and alternative energy sources (solar, wind and propane generators). Stock ponds require fencing on a minimum of three sides, or complete protection and use of nose pumps, or alternate energy sources like solar, and stock watering tanks. Stock ponds cannot be placed in perennial or ephemeral streams with defined bed and bank. New rural water hook-ups or wells that serve both domestic and livestock purposes will only be covered for the livestock portions at a maximum of 50%.

Additional cost share may be available through the United States Fish and Wildlife Service's "Partners for Wildlife" program for perimeter fence, and an additional 25% to 40% cost share for watering facilities. Use of USFWS funds will require the landowner to sign a cooperative agreement with the agency, in addition to the contracts required by the Conservation District.

Pasture and Hayland Plantings for Critical Areas

Funding

Cost share for converting cropland to pasture/hayland were made possible through a Coordinated Soil and Water Conservation Commission Grant from the South Dakota Dept. of Agriculture – Division of Resource Conservation and Forestry.

Purpose

The Pasture and Hayland Planting for Critical Areas program is available for producers who want to convert existing cropland to grass and/or grass alfalfa mix for utilization as pasture or hay.

Eligibility

Eligible land must be located in a project watershed. High priority will be given to lands adjacent to streams and wetlands draining to a project lake; or adjacent to project lake shores, and/or highly erodible land. Pasture plantings adjacent to streams and lake shores will require the implementation of a riparian buffer funded by USDA CRP or project funds.

Requirements

Proof of ownership is required for landowners. If the applicant does 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. Multiple or shared payments to landowners and renters will not be made. The landowner must sign and implement a grazing plan defining stocking rates and days for pasture utilization. The landowner must sign a contract and conservation plan with the Day, Marshall, or Roberts Conservation Districts where the land is located before receiving cost share. As defined in the contract, failure to implement all of the required practices or maintain the practices and grazing plan 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 and Incentive Payments

Conservation Commission Grant funds will be utilized for pasture and hayland plantings at fifty-percent (50%) of the Commission grant docket costs, with a minimum landowner cash match of twenty-five percent (25%). Eligible practices include seedbed preparation, seeding operation, and cost of seed based on type or mix. Cost share is also available for additional conservation practices for pasture utilization including; cross fencing, wells, pipelines (above and below ground), stock tanks, rural water hookups, nose pumps, stock ponds, and alternative energy sources (solar, wind, propane generators). Stock ponds require fencing on a minimum of three sides or complete protection and use of nose pumps, or alternate energy sources like solar, and stock watering tanks. Stock ponds cannot be placed in perennial or ephemeral streams with defined bed and bank. New rural water hook-ups or wells that serve both domestic and livestock purposes will only be covered for the livestock portions at a maximum of 50%.

Additional cost share may be available through the United States Fish and Wildlife Service's "Partners for Wildlife" program for perimeter fence, and an additional 25% to 40% cost share for watering facilities. Use of USFWS funds will require the landowner to sign a cooperative agreement with the agency, in addition to the contracts required by the Conservation District.

Table 5.

Watershed	Best Management Practice (BMP)	Practices	Acres	Load Reductions		
				Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Sediment (tons)
Amsden Dam	Grazing Management	pipelines, tanks, cross fence	639	313	52	29
	Riparian Buffer - Pasture	exclusion fence	64.6	243	85.7	62.5
	Riparian Buffer - Pasture	exclusion fence	27.5	70.4	14.3	8.4
	Animal Waste Management	feedlot relocation, riparian buffer	8	7663.6	1724.3	0
			<i>Total:</i>	<i>8290</i>	<i>1876.3</i>	<i>99.9</i>
Buffalo Lake	Grazing Management	pipelines, tanks	384	154.8	28.5	17
	Grazing Management	pipeline, tank	522	868.4	143	65.9
			<i>Total:</i>	<i>1023.2</i>	<i>171.5</i>	<i>82.9</i>
Enemy Swim	Pasture Planting	grass seeding	51	256.2	96.5	68.5
	Grazing Management	cross fence, solar power, tank	160	*	*	*
Pickerel	Riparian Buffer - Cropland		13.6	425.7	138.4	96.1
Pierpont Dam	Riparian Buffer - Cropland		39.8	225.2	36.7	20
* No reductions converted CRP to pastureland						

4.0 Monitoring Results

4.2 BMP Effectiveness Evaluations

The effectiveness of BMPs installed and load reductions achieved relative to improvement in water quality were evaluated using tools available from SD DENR and NRCS. Reductions for BMPs implemented during this segment are given in Table 5 and were calculated using the StepL Model.

4.3 Surface Water Improvements

In-lake sampling of Clear Lake and Pierpont Lake was completed to identify possible water quality impairments. The data will be used to identify BMPs needed to establish priorities for use during segment 2 of the project and subsequent segments as may be needed. In-lake sampling of Enemy Swim Lake and Pickerel Lake was conducted to monitor possible water quality changes due to the expiration of Conservation Reserve Program acres located in these watersheds.

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 the Water Resources Institute located at SDSU in Brookings, SD.

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

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

Clear Lake

In-lake sampling of Clear Lake occurred during the months of May through September. Composite surface and bottom samples were collected from three sites located on the lake. Water quality samples and field data collected from Clear Lake during this segment showed the lake meeting all state water quality standards for its assigned beneficial uses (Table 3). The lake's trophic state is eutrophic based on chlorophyll *a* (Figure 10) and Secchi depth (Figure 11) samples taken from 2007 to 2009, with little change observed from year to year. The average TSI based on Secchi depths was 51.7 and 49.6 based on chlorophyll *a*.

Some heavy growths of filamentous algae observed growing along the lake's shorelines in past years may indicate nutrients are reaching the lake from leaching shoreline septic systems. A survey of soil types around the lake's shoreline found most soils along developed areas of the lake to be unsuitable for septic drain fields. Most shoreline property has gone from small seasonal cabins to year-round homes connected to a rural water system. Thus, septic system influent has increased with a majority of lake homes now having multiple bathrooms, laundry facilities, dishwashers, and hot tubs. A fluorescent dye slug test is planned for the summer of 2010;

several property owners along the lake have given permission to place the dye in their septic systems. The Clear Lake Betterment Association has been working to form a sanitary sewer district around the lake for several years, but to date, have been unsuccessful in procuring enough votes for the districts formation. The lake association provided funding to pay for in-lake water quality sample lab fees.

Figure 10.

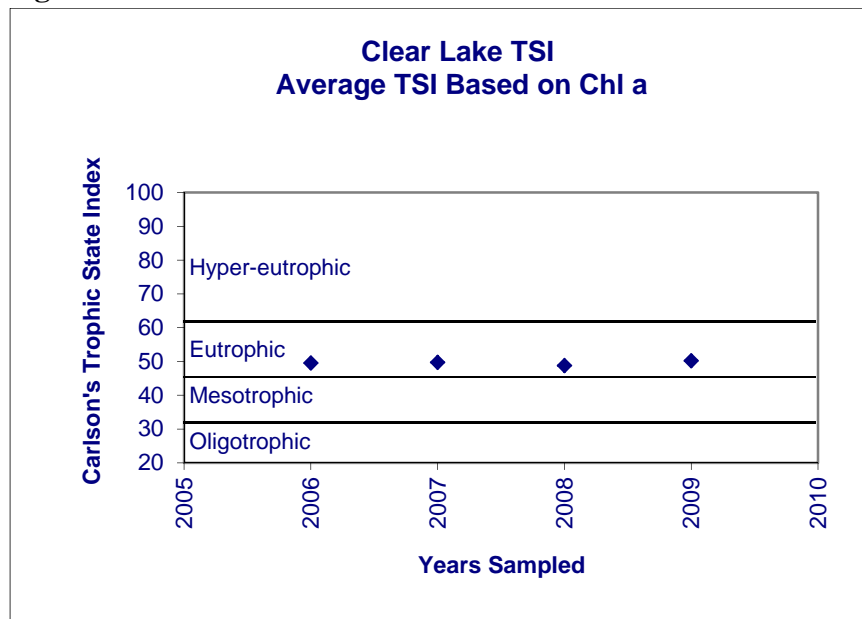
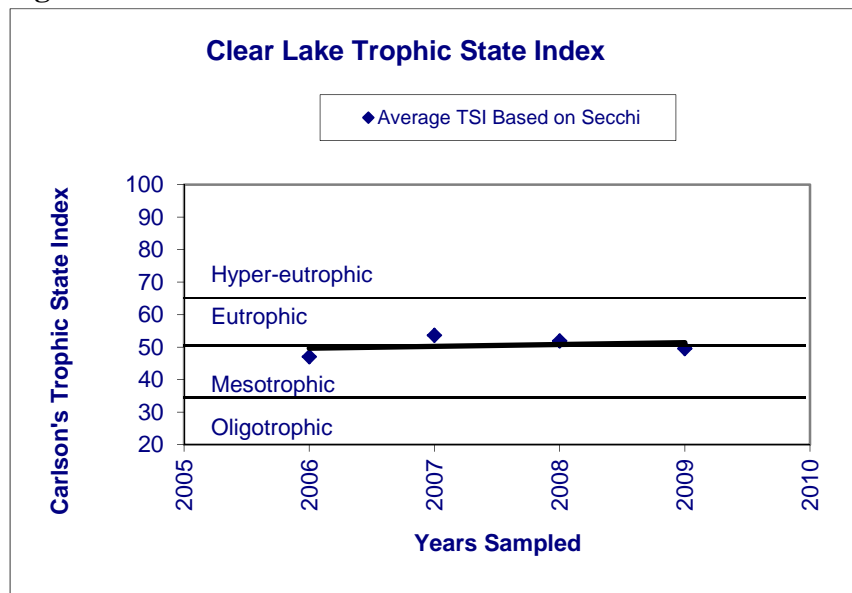


Figure 11.

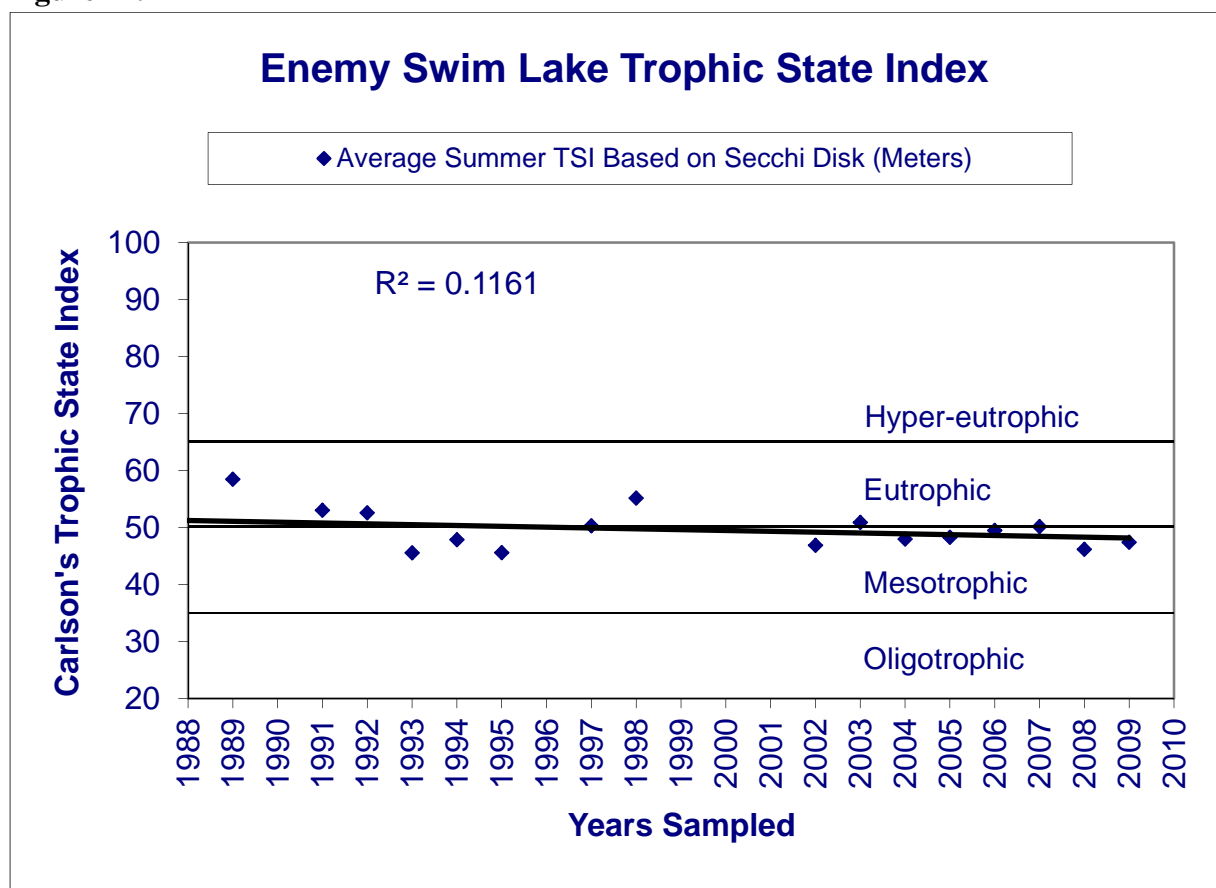


Enemy Swim Lake

In-lake sampling of Enemy Swim Lake occurred during the months of June through August. 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 lakes trophic state improved slightly becoming more mesotrophic based on Secchi depths (Figure 12) taken from 2007 to 2009. The average TSI based on Secchi depths during this period was 47.9.

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

Figure 12.



Pickerel Lake

In-lake sampling of Pickerel Lake occurred during the months of May through September. Composite surface and bottom samples were collected from three sites located on the lake.

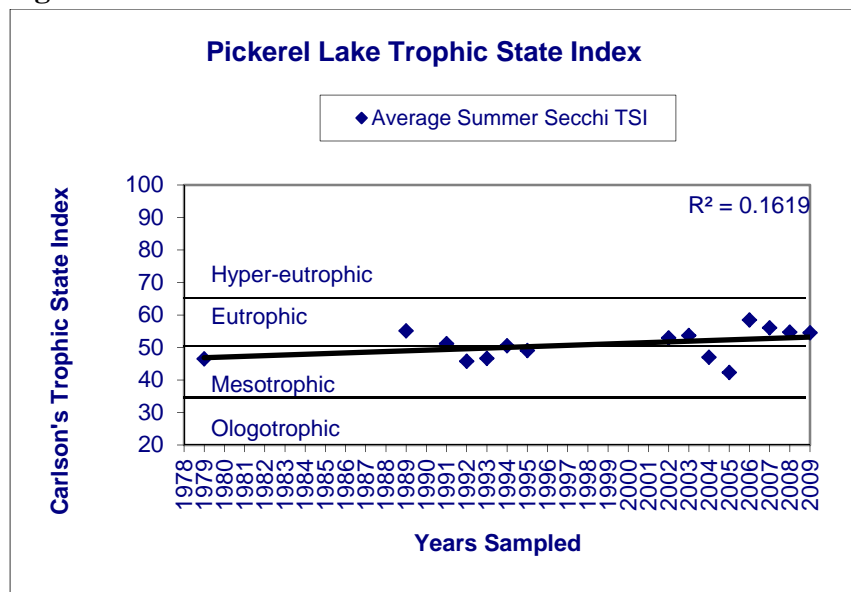
Water quality samples and field data collected from Pickerel Lake during this segment showed the lake meeting all state water quality standards for its assigned beneficial uses (Table 3). The lakes trophic state had improved in 2004 and 2005 based on Secchi depths (Figure 13), however sharp decline in water quality was noted in 2006 after several large shoreline developments were undertaken and several hundred acres of retired Conservation Reserve Program were converted back to cropland in the lakes watershed. The TSI began to improve in 2007. The average TSI based on Secchi depths during this period was 55.1.

Unrestricted shoreline development led the Greater Pickerel Lake Association to lobby the Day County Commission to implement zoning ordinances around developed shores of Day County lakes. (The County implemented zoning ordinances in 2010 forming a special Lake Front Residential Zone that restricts disturbance of native shoreline vegetation within 40 feet of the Ordinary High Water Mark.) These ordinances can be viewed at:

<http://day.sdcounties.org/planning-zoning/>.

The Greater Pickerel Lake Association provided funding to pay for in-lake water quality sample lab fees.

Figure 13.



Pierpont Dam

In-lake sampling of Pierpont Dam occurred during the months of June through August. A surface and bottom sample was collected from one site located on the lake. Water quality samples and field data collected from Pierpont Dam during this segment showed the lake

meeting all state water quality standards for its assigned beneficial uses (Table 3). The lakes trophic state is in the lower eutrophic range based on Secchi depths (Figure 14) taken from 2007 and 2008. The average TSI based on Secchi depths during this period was 50.0. The lakes TSI based on phosphorus is hypereutrophic (Figure 15) with an average TSI of 84.1 for the two years of sampling. The reason the two Trophic State Indices shown do not agree is that the phosphorus is being utilized by macrophytes rather than algal species resulting in a heavy growths of aquatic macrophytes (mainly *Ceratophyllum demersum*). These macrophytes are impeding recreational use of the reservoir.

The full Pierpont Dam water quality study report can be viewed at;

<http://www.neglwatersheds.org/waterqualityreports.html>

Figure 14.

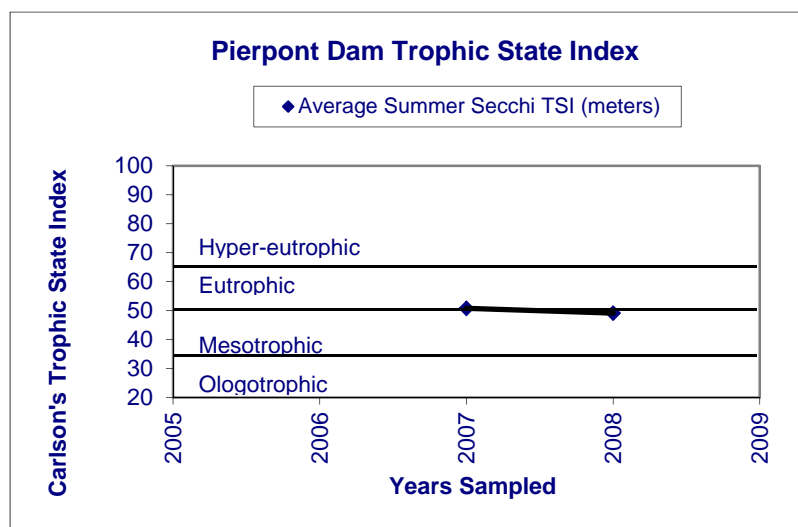
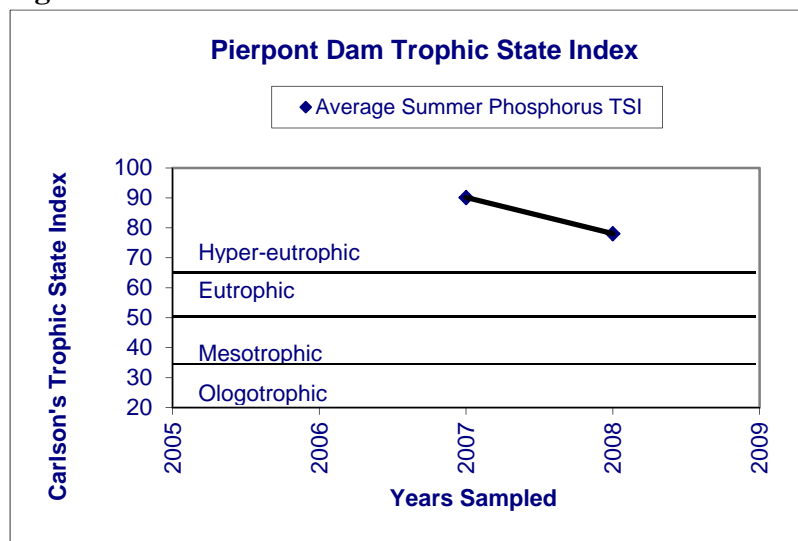


Figure 15.



4.7 Best Management Practice Operation and Maintenance

Producers receiving cost share are required to sign a contract with the sponsoring Conservation District. 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 contract 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. 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 Environment and Natural Resources (SD DENR)** – Administered EPA Section 319 grant funds and provided oversight of all project activities. Project administration included on-site office visits, watershed tours, review/initial approval of reports, and approval of payment requests for 319 funds.
- **Department of Agriculture** – Funding through the South Dakota Coordinated Soil and Water Conservation Commission Grant for technical assistance and conservation practice implementation that included grazing improvements and pasture/hayland grass planting.
- **South Dakota 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, and funding and technical help for the Conservation Reserved Enhancement Program (CREP), which provided additional rental payments for producers participating in the Continuous Conservation Reserve Program in the James River Watershed.

- **South Dakota State University, Water Resources Institute (WRI)** – Technical advice for water quality testing and reporting, analysis of water samples, personnel for water sampling and Lakes Are Cool program, funding of water festivals and ecology workshops.

5.3 Federal Coordination

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

- **Natural Resources Conservation Service (NRCS)** – Provided technical assistance for BMPs through District Conservationists, Soil and Range Conservationists, and Tribal Liaison. Provide program funds for Environmental Quality Incentive Program (EQIP).
- **Farm Service Agency (FSA)** – Provided program funds for Conservation Reserve Program (CRP) and Continuous Conservation Reserve Program (CCRP).
- **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

The only USDA program utilized during this segment was the Conservation Reserve Program (CRP) and Continuous Conservation Reserve Program (CCRP) administered by the Farm Service Agency. These programs paid producers to implement buffers along marginal pastureland (CP-30 Marginal Pastureland Wetland Buffer) and cropland (CP-22 Riparian Buffer), or convert cropland to grass and restore farmed wetlands (CP-37 Duck Nesting Habitat), and (CP-23 Wetland Restoration). CCRP and 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. In addition to USDA funds, South Dakota Department of Game, Fish and Parks provided an additional rental payment for producers located in the James River Basin, which included several project watersheds, if the producer allowed public hunting on enrolled CCRP and CRP acres.

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 6.

The United States Fish and Wildlife Service's Partners for Wildlife program funded the implementation of livestock watering facilities and fencing to improve grazing management or implement grazing on retiring Conservation Reserve Program fields. Practices cost shared included pipelines, livestock watering tanks, wells, solar panels and pumps, perimeter and cross fencing, rural water hookups, and seeding cropland to pasture. These funds cost shared 50% of the cost for water development and were used in conjunction with Conservation Commission Grant funds described below.

The project applied for and received a Conservation Commission Grant from the South Dakota Department of Agriculture's Division of Resource Conservation and Forestry. These funds were utilized to pay project personnel wages and benefits, administrative costs, and provide agricultural producers cost share for implementing best management practices. Practices implemented included pipelines, livestock watering tanks, wells, solar panels and pumps, and rural water hookups to improve grazing management, and seeding cropland to hayland or pasture. Commission Grant funds paid for 20% of the practice costs for livestock water development, and combined with Partners for Wildlife funds described above paid a total cost share of 70% for these practices. The Conservation Commission Grant required producers to pay a minimum of 30% cash for each practice implemented. Cost share rates and practice costs were based on a docket set by the Conservation Commission.

USDA'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.

Conservation Reserve Enhancement Program (CREP) funds were provided to producers by the South Dakota Dept. of Game, Fish, and Parks who enrolled in USDA's CRP program and allowed public hunting on these CRP acres. CREP funds paid an additional 40% of the base CRP rental rate paid to producers by USDA.

The James River Water Development District provided a one to one match for local cash generated by the Marshall Conservation District on project activities and producers located in project watersheds in Marshall County who paid cash match for implemented practices.

The Greater Pickerel Lake Association, Clear Lake Betterment Association, Enemy Swim Sanitary Sewer District, and the City of Pierpont provided local cash for water quality studies of Clear, Enemy Swim and Pickerel lakes, and Pierpont Dam.

The Day, 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. Producers were credited with \$11.55 per hour for their time spent constructing new fence, tanks, laying pipeline, etc. Producer cash match ranged from 25% to 50% depending on the funding source used.

Table 6. Other Sources of Funds				
Funding Source	Other Federal	State	Local Cash	Local In-Kind
United States Fish and Wildlife Service - Partners for Wildlife	\$ 15,448.01	\$ -	\$ -	\$ -
USDA - Conservation Reserve Program (CRP)	\$ 50,465.00	\$ -	\$ -	\$ -
SD Dept. of Agriculture Conservation Commission Grant	\$ -	\$ 20,678.65	\$ -	\$ -
SD Game, Fish, and Parks	\$ -	\$ 5,107.81	\$ -	\$ -
James River Water Development District	\$ -	\$ -	\$ 4,539.05	\$ -
Greater Pickerel Lake Association	\$ -	\$ -	\$ 7,037.50	\$ 60.00
Clear Lake Betterment Association	\$ -	\$ -	\$ 1,845.00	\$ -
Enemy Swim Sanitary Sewer District	\$ -	\$ -	\$ 1,230.00	\$ 130.00
Pierpont Town Board	\$ -	\$ -	\$ 1,230.00	\$ -
Day Conservation District	\$ -	\$ -	\$ 614.25	\$ 7,124.66
Marshall Conservation District	\$ -	\$ -	\$ 992.14	\$ 1,107.00
Roberts Conservation District	\$ -	\$ -	\$ -	\$ 839.50
Producer Cost Share Match	\$ -	\$ -	\$ 35,105.10	\$ 18,269.97
Totals:	\$ 65,913.01	\$ 25,786.46	\$ 52,593.04	\$ 27,531.13

6.0 Summary of Public Participation

Development of the project was supported by several local entities. The Day, Marshall, and Roberts Conservation District Board of Supervisors composed of local landowners and agricultural producers passed resolutions during the project development 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. The Pierpont Town Board, Clear Lake Association, Greater Pickerel Lake Association, Pickerel Lake Sanitary Sewer District, and Enemy Swim Sanitary Sewer District all supported the watershed improvement and protection activities that were planned. The activities planned would protect their investments and infrastructures. Conservations 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.

- **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.
- **James River Water Development District (JRWDD)** – Local support and funding for Marshall County activities.
- **Pickerel Lake Sanitary Sewer District** – Local support and funding for water quality testing.
- **Enemy Swim Lake Sanitary Sewer District** – Local support and funding for water quality testing.
- **Pierpont Town Board** – Local support and funding for water quality testing.
- **Greater Pickerel Lake Association** – Local support and funding for water quality monitoring and land-use mapping.
- **Clear Lake Association** – Local support and funding for water quality testing.
- **Ne-So-Dak Environmental Learning Center** – Local support, campus and staff for workshops and Lakes Are Cool program.

7.0 Aspects of the Project That Did Not Work Well

The majority of the project goals, objectives, and activities were completed in an acceptable fashion. While some milestones were not met, it is nearly impossible to promote, plan, and implement best management practices in a two year period. The six month project extension allowed some milestones to be completed; however, for some activities such as the shoreline restoration of Amsden Dam, it took nine months to receive archeological clearance from state and federal agencies. The project was successful for setting the stage for Segment 2.

8.0 Future Activity Recommendations

Segment 2 will continue the efforts brought about by this project. While a majority of waterbodies listed as impaired during the writing of this Project's Implementation Plan in 2006 are no longer listed as so, efforts will continue to preserve the water quality of these lakes. Future project segments will concentrate on implementing riparian buffers along pastures and cropland to reduce nutrient loading to project waterbodies.