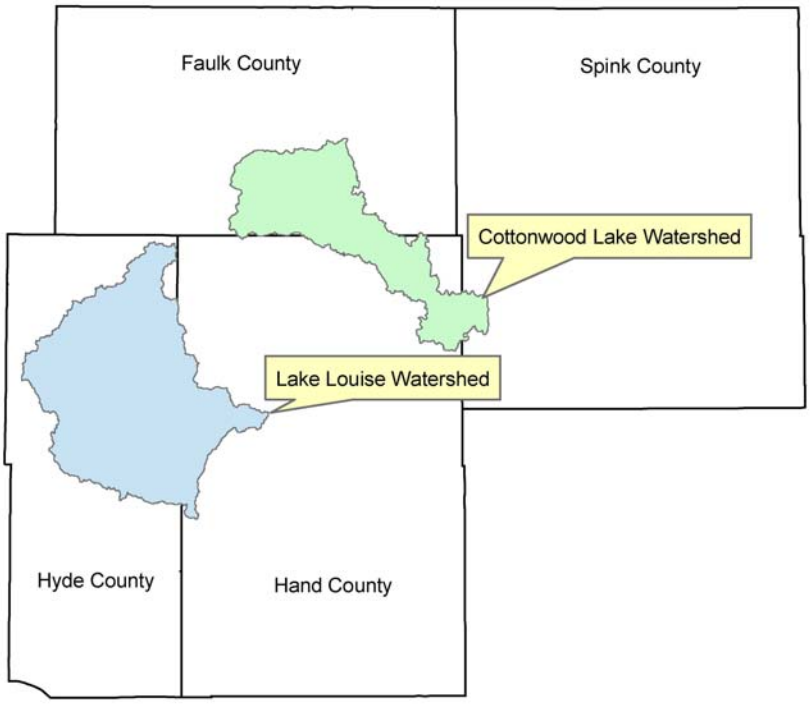
SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM

WATERSHED PROJECT FINAL REPORT

# COTTONWOOD LAKE/ LAKE LOUISE WATERSHED IMPROVEMENT PROJECT




Prepared by

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Central Plains Water Development District

For

Hand Conservation District
Project Sponsor

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

Grant #C9-99818502

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# EXECUTIVE SUMMARY

PROJECT TITLE: COTTONWOOD LAKE/LAKE LOUISE WATERSHED IMPROVEMENT PROJECT

SECTION GRANT NUMBER(S) C9-99818502

PROJECT START DATE March 6, 2002 PROJECT COMPLETION DATE September 1, 2007

| | | |
|---|---|---|
| FUNDING: | TOTAL BUDGET | 1,758,354 |
| | TOTAL EPA GRANT(S) | 471,589 |
| | TOTAL EXPENDITURES OF EPA FUNDS | 446,545 |
| | TOTAL SECTION 319 MATCH ACCRUED | 852,094 |
| | BUDGET REVISIONS | 00 |
| | TOTAL EXPENDITURES | 1,902,275 |

## SUMMARY OF ACCOMPLISHMENTS

The project goal was:

> "Improve the water quality through the reduction of phosphorus loading to Cottonwood Lake by 44 percent and Lake Louise by 10 percent".

To attain the goal, BMPS were selected to reduce loads to Cottonwood Lake from the watershed by 44 percent (=2,593 kg/yr) with the reductions coming from a four percent reduction from grazing lands, two percent from croplands, four percent from lakeside individual wastewater treatment systems, 18 percent from small animal feeding operations and an additional 16 percent from one permitted feeding operation. For the Lake Louise potion of the project, BMPs were selected to reduce loads originating from livestock feeding operation by six percent and four percent from range and crop lands (total reduction = 212.9 kg/year).

The BMPs installed in the Cottonwood Lake resulted in a 44 percent (=2,593 kg/yr) phosphorus load reduction. Much of the reduction was realized from the construction of an animal waste management system by the owner of a permitted animal feeding operation and development of grazing management systems.

The reductions in the Lake Louise watershed exceeded the TMDL goal of 212.9 kg/year. A calculated 1,331.7 kg/year reduction was achieved the installation of an animal waste management system at a feedlot increased in size by nearly four times the size that it was when the watershed assessment was completed.

## INTRODUCTION

The Cottonwood Lake and Lake Louise Watershed Improvement Project was completed to implement the TMDLs developed for the lakes.

Cottonwood Lake is a hyper-eutrophic lake located in the portion of the James River Basin that lies within Spink County, South Dakota (Figures 1a and 1b). The lake is located in the Medicine Creek watershed. Medicine Creek, the major tributary to Cottonwood Lake, enters the south end of the lake and flows out through the north.

The lake is natural in origin. However, the outlet has been modified to maintain a larger, more stable volume of water in the lake. The lake:

- has an area of 1649.6 acres (667.6 ha),
- reaches a maximum depth of 9.0 feet (2.7 m),
- holds a total volume of 10,722 acre-ft of water, and
- is not subject to stratification

Ninety-eight percent of the land in the Medicine Creek Watershed is privately owned. The remaining two percent consists of public land mainly around Cottonwood Lake. Additional information about the lake and Medicine Creek can be found by accessing the Cottonwood Lake/ Medicine Creek Watershed Assessment Report at:

http://www.state.sd.us/denr/DFTA/WatershedProtection/TMDL/TMDL_CottonwoodAll.pdf.

Lake Louise is a man-made impoundment located in central Hand County, South Dakota (Figures 1a through 1c). The lake, located 15 miles north of Ree Heights, South Dakota, was formed behind a Works Project Administration dam constructed across Wolf Creek during 1932. The lake:

- has an area of 164 acres ( 66.37 ha),
- reaches a maximum depth of 22 feet (6.7 m),
- has an average depth of 9 feet (3 meters),
- over 6 miles (9.7 km) of shoreline,
- holds 1,463 acre-feet of water, and
- is subject to periods of stratification during the summer.

The lake empties to Wolf Creek which eventually merges with Turtle Creek south of Redfield, South Dakota. Turtle Creek discharges into the James River near Redfield.

Lake Louise State Park is located on the south side of the lake. Several improvements have been made to the park since the dam was constructed during 1932. During October 1968, a boat ramp was installed to increase access to what is reputed to be one of the finest largemouth bass and bluegill fisheries in the state. During 1974, a swimming beach and maintenance shop were constructed to better accommodate the increased interest in the lake's recreational opportunities. During 1977, the campground was wired for electricity and a comfort station was added.

Ninety-five percent of the land in the Wolf Creek watershed is privately owned; five percent public. Additional information about the lake and watershed can be found by accessing the Lake Louise/ Wolf Creek Watershed Assessment Final Report at:

http://www.state.sd.us/denr/DFTA/WatershedProtection/TMDL/TMDL_LouiseAll.pdf

During spring 1999, a watershed assessment was initiated to determine the sources of nonpoint source pollution and develop restoration alternatives for the Cottonwood Lake and Lake Louise Watersheds. To complete the assessment, monitoring sites were installed in the two watersheds. Tributary water quality and flow data were collected from spring 1999 through spring 2000. Water quality samples were also collected from each lake during the same time period.

The data collected was used to:

- determine beneficial use support,
- identify sources of nonpoint source pollution to the lakes,
- develop TMDLs, and
- prepare a workplan to implement the TMDLs.

The reports for both studies are available at the previously cited URLs for the reports.

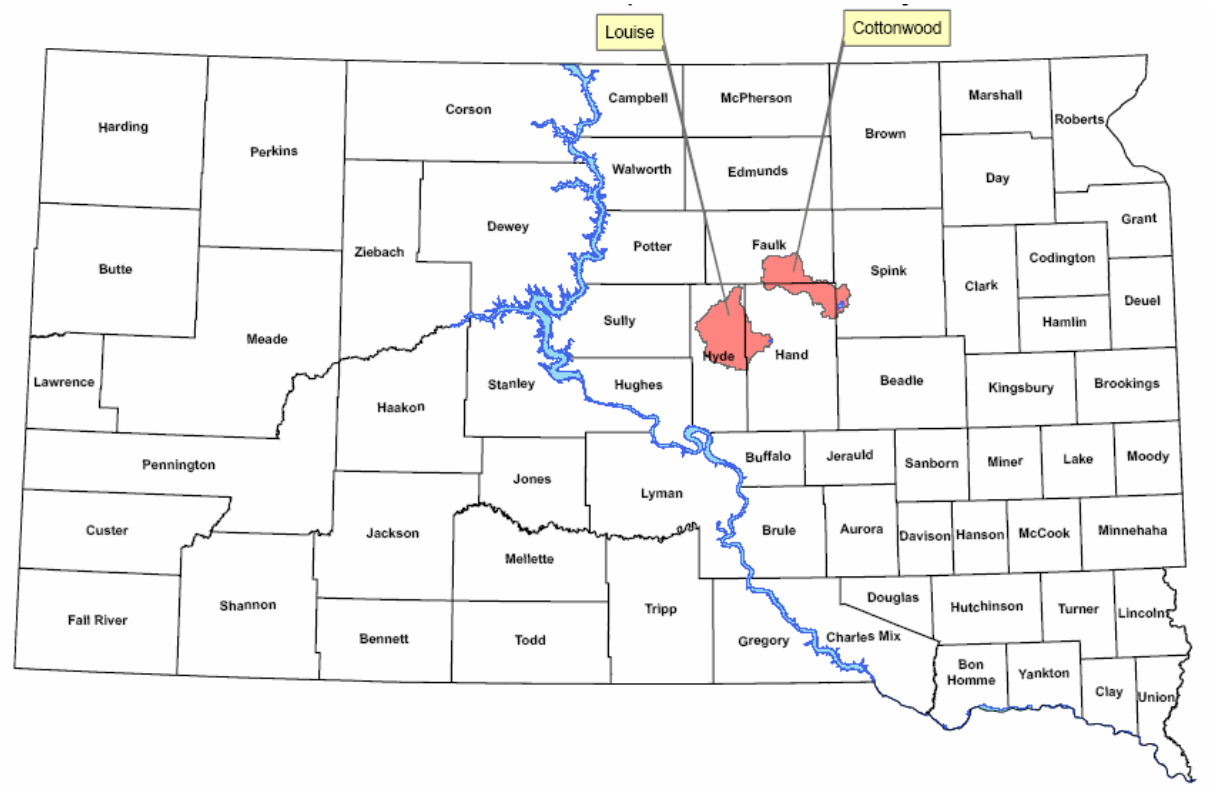



**Figure 1a. Location of the Cottonwood Lake and Lake Louise Watersheds.**

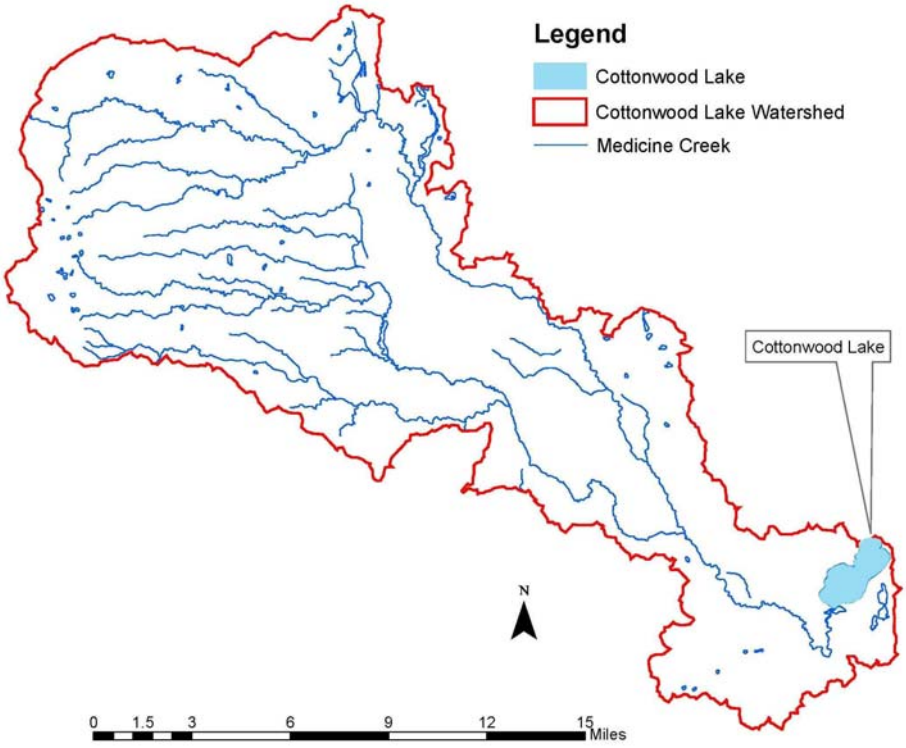



**Figure 1b. Cottonwood Lake Watershed.**

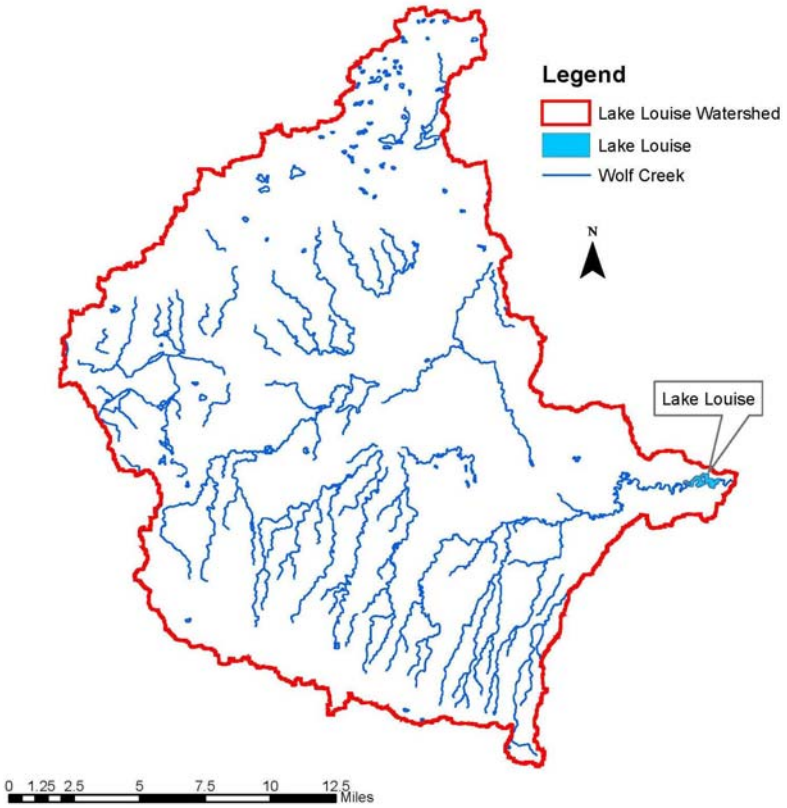



**Figure 1c. Lake Louise Watershed.**

# PROJECT GOALS, OBJECTIVES AND ACTIVITIES

Total daily maximum load (TMDL) implementation goals were established for both Cottonwood Lake and Lake Louise and their respective watersheds.

The project goal for each lake/watershed was:

Cottonwood Lakes/Medicine Creek Watershed:

- improve the water quality of Medicine Creek and Cottonwood Lake to attain an eleven percent reduction in the total sediment loading and a 44 percent reduction in the total phosphorous loading to the lake and
- implement practices that will maintain the improved water quality and support the beneficial uses of semi permanent fish life propagation, immersion and limited-contact recreation, wildlife propagation, and stock watering.

Lake Louise/Wolf Creek Watershed:

- improve the water quality of Wolf Creek and Lake Louise to attain a seven percent reduction in the total sediment loading and a 10 percent reduction in the total phosphorous loading to the lake and
- implement practices that will maintain the improved water quality and support the beneficial uses of permanent fish life propagation, immersion and limited-contact recreation, wildlife propagation, and stock watering.

**Objective 1: Establish Best Management Practices (BMPs) and other practices that will advance effort to reach the goals of the project.**

**Task 1:** The Project Coordinator will document all project activities and report to local organizations where the information is important (Conservation Board meetings, Lake Association meetings, Water Development District Board meetings and Local Producer Workshops). Other activities to be documented will include, but are not limited to: landowner/operator contacts, development/ follow-up of contracts, workshop and tour attendance, media and news releases and installation of BMPs. Contracts and conservation plans will be developed by the Project Coordinator with assistance from the local SD DENR and NRCS. All information and activities completed during the project will be compiled in a final report.

**Products:** Project activities documented and contracts with landowners/operators to develop conservation plans and install best management practices (BMPs).

**Expected Outcome:** Project activities documented and filed with the project sponsor. Contracts with landowners/operators and conservation plans for BMP installation.

**Accomplishments:** The Project Coordinator attended forty-two Conservation District board meetings, six Water Development District board meetings, and two Lake Association meetings. At the meetings, the coordinator provided information regarding project status and informed each group of the activities planned.

Of the twenty-five workshops/ area-meetings that the project coordinator attended, knowledge was acquired that could be used to better the watershed project. During the course of some of the workshops/ area-meetings, the coordinator was been able to inform individuals about the Cottonwood Lake/ Lake Louise Watershed Improvement Project.

News releases were submitted to area newspapers and articles were included in the Hand Conservation District's newsletter about the project's progress. The articles provided project updates and information regarding sign-up dates for participation in project cost share programs.

Contracts and conservation plans were developed by the Project Coordinator with assistance from SDDENR, NRCS and the Grassland Management and Planning team. BMP installation was monitored and documented by the Project Coordinator. The individuals installed BMPs that decreased the sediment and phosphorus that reaches Cottonwood Lake and Lake Louise and, at the same time, improved the value of their operation and/or property. The documentation of the BMPs installed and the load reductions achieved will aid in any future monitoring for this project.

**Task 2:** Implement planned grazing systems on 25,000 acres over a period of five years in the Medicine Creek watershed. Systems will include cross fencing (35 miles @ $.66/ ft) water development (tanks (60 @ $1,300), pipeline (25 miles 1 ¼ PVC @ $1.46/ ft), rural water hookups (15 @ $1,934 each), and dam/ dugout construction, clean-out, and repair (20 @ $2,000 each)), and incentives ($1 per acre/ year with a 3 year maximum). Recipients of grant funds will be required to sign a maintenance agreement for the anticipated life span of the BMP. Applicants will be prioritized according to the subwatershed in which the system will be located. Priority will be given to those areas in closest proximity to riparian areas. All designs will be completed by the Grassland Management and Planning team.

**Products:** Twenty-five thousand acres of planned grazing systems that improve range condition which, in turn, reduces run-off.

**Expected Outcome:** A seven percent sediment reduction and a three percent phosphorus reduction.

**Accomplishments:** A total of 17,523.6 acres of pasture were improved during the 2002-2007 project period by applying grazing management techniques and improving stock water availability. The load reduction realized from the BMP was 570.3 T/year sediment and 675.7 kg/year of phosphorus.

Reasons for this task not meeting the planned milestone include: increased materials and labor cost, weather conditions and changes in program availability. Since this project was initiated the price of materials such as fence posts and plastic pipe have increased more than was anticipated. Drought conditions prevailed in the two watershed areas during the project period. Because of the drought, many producers decreased herd size and were reluctant to install practices. Changes in sign up criteria to programs such as EQIP increased the difficulty of smaller projects being selected for funding.

The BMPs installed in both the Cottonwood and Louise watershed are listed in Table 1 and shown on thee maps in Figures 4 and 5 respectively.

**Figure 2. Managed Grazing System with Recently Installed Water Pipeline.**

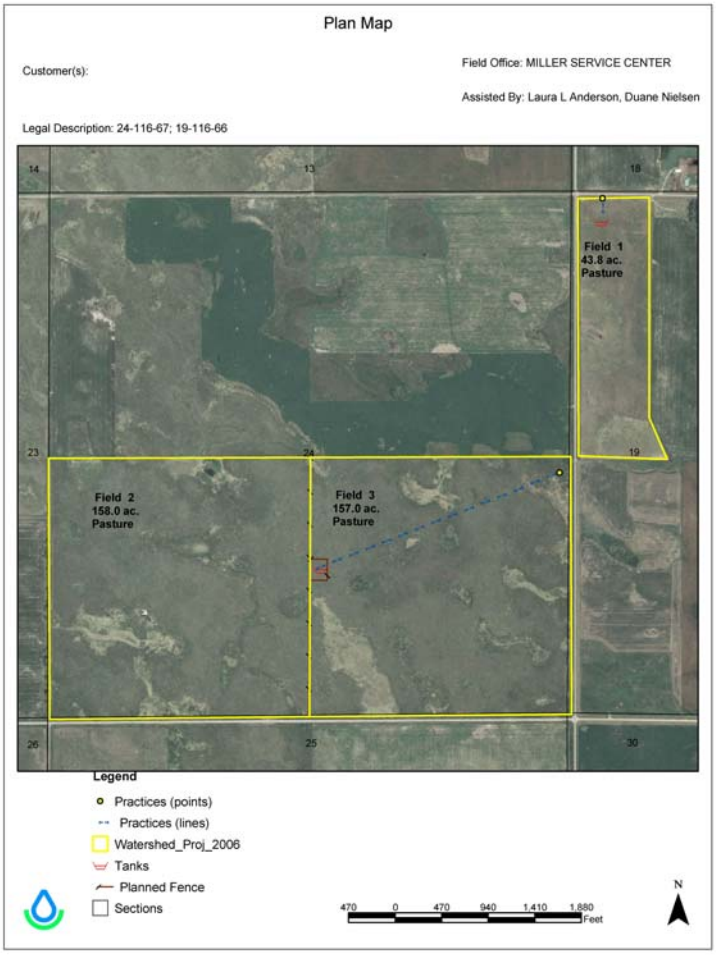



**Figure 3. Example of a Managed Grazing System Plan Map.**

**Table 1. BMPs Listed by County.**

| County | Funding Program | Practice | Number of Systems | Acres |
|---|---|---|---|---|
| Faulk | 317 Project | Grazing | 7 | 6573.8 |
| Hand | 318 Project | Grazing | 6 | 3375.9 |
| Hyde | 319 Project | Grazing | 8 | 37109.6 |
| Hand | EQIP | Grazing | 6 | 2724.9 |
| Hyde | EQIP | Grazing | 1 | 473 |
| Faulk | EQIP | Grazing | 1 | 3698.2 |
| Spink | EQIP | Grazing | 1 | 480 |
| Hand | ECP | Grazing | 22 | 4396.8 |
| Hyde | ECP | Grazing | 1 | 477 |
| Hand | CCRP | Buffer | 3 | 37.3 |
| Faulk | CCRP | Buffer | 3 | 28.7 |
| Hand | EQIP | AWS | 1 | System |
| Faulk | EQIP | AWS | 1 | System |

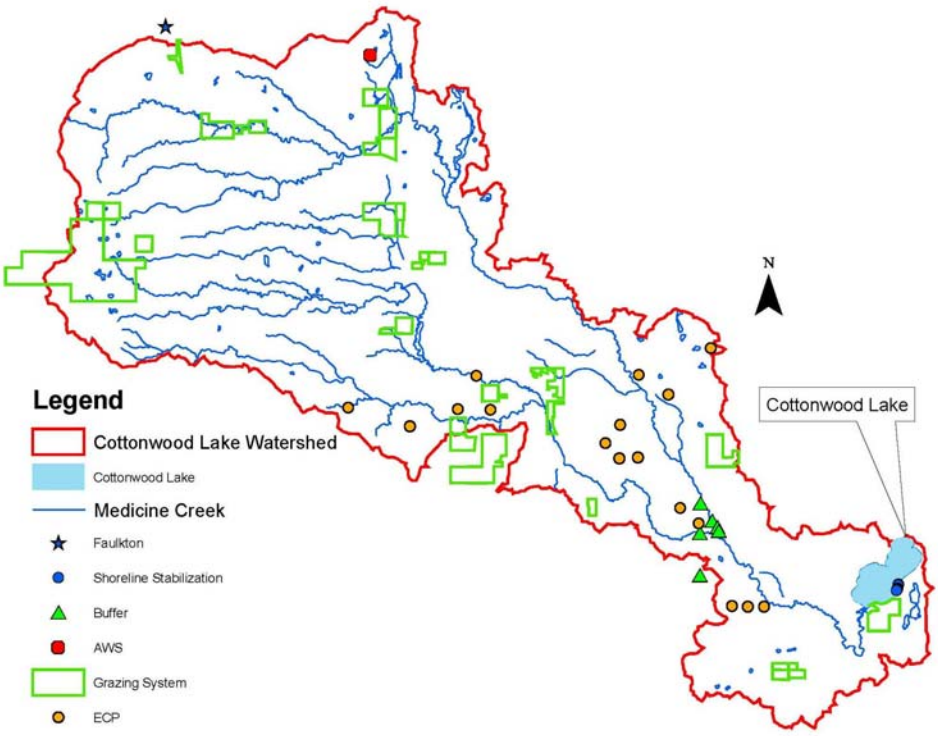



**Figure 4. BMP Location Map - Cottonwood Lake Watershed.**

**Task 3:** Implement planned grazing systems over 18,000 acres over a period of five years in the Wolf Creek watershed. Systems will include cross fencing (25 miles @ $.66/ ft) water development (tanks (40 @ $1,300), pipeline (18 miles, 1 ¼" PVC @ $1.46/ ft), rural water hookups (8 @ $1,934 each), and dam/ dugout construction, clean-out, and repair (10 @ $2,000 each)), and incentives ($1 per acre/ year with a three year maximum). Recipients of grant funds will be required to sign a maintenance agreement for the anticipated life span of the BMP. Applicants will be prioritized according to the subwatershed in which the system will be located. Priority will be given to those areas in closest proximity to riparian areas. All designs will be completed by the Grassland Management and Planning team.

**Products:** Eighteen thousand acres of planned grazing systems that improve range condition, which, in turn, reduces run-off.

**Expected Outcome:** A seven percent sediment and a four percent phosphorus load reduction.

**Accomplishments:** A total of 11,312.6 acres of pasture were improved during the 2002-2007 project period by applying grazing management techniques and improving stock water availability. These acres account for a 403 T/year sediment load reduction; 456.5 kg/year in phosphorus.

Reasons for this task not meeting the planned milestone include: increased materials and labor cost, weather conditions and changes in program availability. Since this project was initiated the price of materials such as fence posts and plastic pipe have increased more than was anticipated. Drought conditions prevailed in the two watershed areas during the project period. Because of the drought, many producers decreased herd size and were reluctant to install practices. Changes in sign up criteria to programs such as EQIP increased the difficulty of smaller projects being selected for funding.

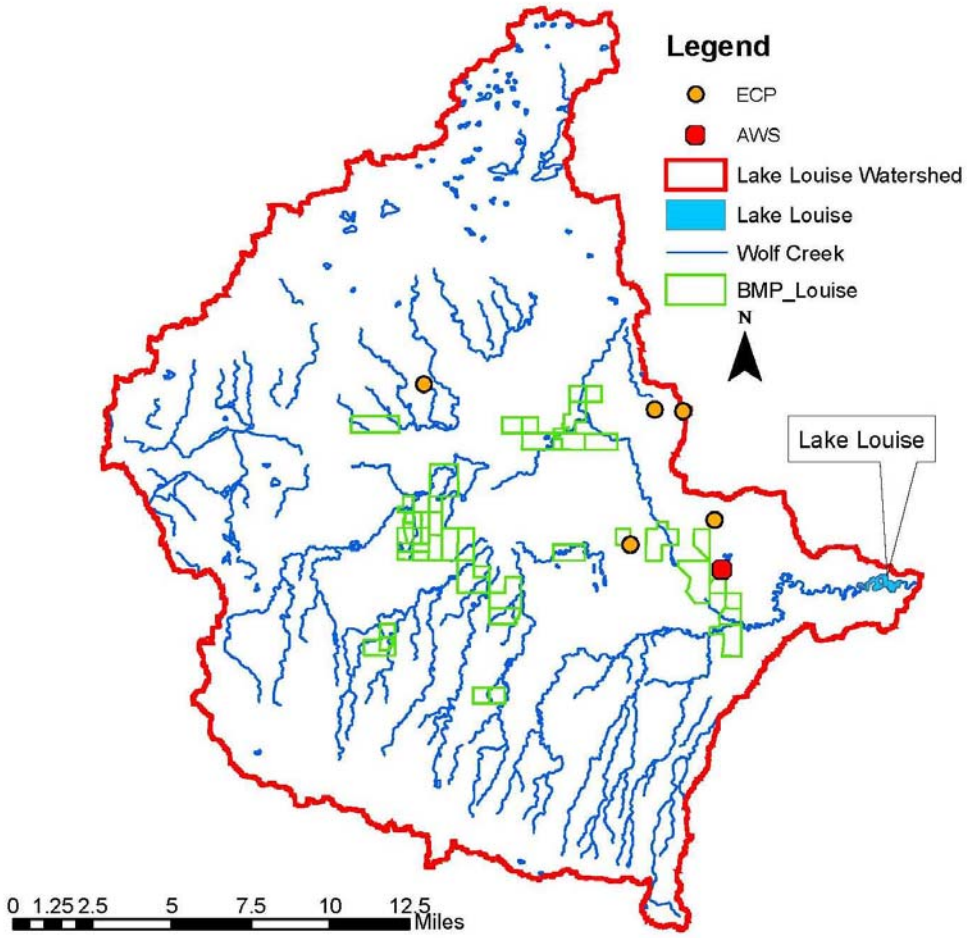



**Figure 5. BMP Location Map – Lake Louise Watershed.**

**Task 4:** Implement best management practices (BMP's) on 25 acres of cropland and grassland in the Medicine Creek watershed. BMPs will include grassed waterways and buffer strips. Candidates for these practices will be entered into a Continuous Conservation Reserve Program contract. Applicants will be prioritized according to the subwatershed in which the practice will be located with priority given to those systems located in close proximity to riparian areas.

**Products:** Increased residue on cropland and buffer strips.

**Expected Outcome:** Four percent sediment reduction and a two percent phosphorus load reduction.

**Accomplishments:** A total of 53.3 acres of buffer strips were installed during 2003-04 using the Continuous Conservation Reserve Program (CCRP). The load reductions realized from the BMP was 42.8 T/year of sediment and 29 kg/year of phosphorus. See Figure 4 for location the buffers.

**Task 5:** Implement best management practices (BMP's) on five acres of cropland and grassland in the Wolf Creek watershed. BMPs will include buffer strips. Candidates for these practices will be entered into a

Continuous Conservation Reserve Program contract. Applicants will be prioritized according to the subwatershed in which the practice will be located.

**Products:** Increased residue on cropland and buffer strips.

**Expected Outcome:** Sediment and phosphorus load reductions of 12.94 kg/yr (2 percent of annual load).

**Accomplishments:** No buffer strips were installed. This practice was not well received by producers. Some producers do not want to give up cropland acres or take on the upkeep for additional fence along streams and creeks. Even with programs such as CCRP that offer incentive payments, some producers are reluctant to install the BMPs.

**Objective 2: Develop projects and programs that will provide nutrient management throughout the watershed.**

**Task 6:** Establish 19 agricultural waste systems (AWS) in the Medicine Creek watershed in the form of lagoons, diversions, and berms. The average cost for these systems will be $35,000 each. Recipients of grant funds will be required to sign a maintenance agreement for the anticipated life span of the system. Systems will be given priority according to their ranking in the assessment final report. All designs will be completed by the Ag Waste Management Team including ag waste management plans. Additional information, including prioritization ranking, may be found in the Cottonwood Lake/ Medicine Creek Watershed Assessment Final Report referenced previously.

**Products:** Nineteen AWS with management plans that decrease runoff and reduce NPS pollution from animal feeding operations.

**Expected Outcome:** An 18 percent phosphorus reduction in addition to the 16 percent reduction stated in the project goal.

**Accomplishments:** There were no agricultural waste management systems installed as most producers were uncertain that they could recover the cost of the system before they retire. According to the National Agriculture Statistics Service (NASS) 2002 Census of Agriculture, the average age of producers in Hand County, South Dakota is 53.3 years old.

This information may be located by accessing:

http://www.nass.usda.gov/census/census02/profiles/sd/cp46059.PDF

In addition, with the drought that persisted during the project period, some producers were not sure they would remain involved with livestock production.

The funds for this task were reallocated to the grazing management tasks by an amendment to the project implementation plan.

**Task 7:** Establish an animal nutrient management plan for lot number 33 (see AGNPS section of the assessment final report) in the Cottonwood Lake Watershed. This operation, by definition, is considered a concentrated animal feeding operation (CAFO). Therefore, 319 funds will not be used to construct a nutrient management system at the operation. See Figure 4 for CAFO location.

**Products:** One agricultural waste system, with accompanying nutrient management plan that will decrease runoff and reduce NPS pollution from the animal feeding operation.

**Expected Outcome:** Sixteen percent phosphorus reduction.

**Accomplishments:** One animal nutrient management plan was developed and a waste management system was installed using cost share funds provided through the EQIP program.

**Task 8:** Establish five agricultural waste systems (AWS) in the Wolf Creek watershed in the form of lagoons, diversions, and berms. The average cost for these systems will be $35,000 each. Recipients of grant funds will be required to sign a maintenance agreement for the anticipated life span of the system. Systems will be given priority according to their ranking in the assessment final report. All designs will be completed by the Ag Waste Nutrient Team including ag waste management plans. Any additional information, including prioritization can be found in the Lake Louise/ Wolf Creek Watershed Assessment Final Report. See Figure 5 for system location.

**Products:** Five agricultural waste systems with management plans that will decrease runoff and reduce NPS pollution from animal feeding operations.

**Expected Outcome:** Six percent phosphorus reduction.

**Accomplishments:** One agricultural waste system was constructed near a main tributary that empties to Lake Louise. This system is permitted for three thousand head of cattle, but is currently at 1800 head. This number is nearly four times the number that was used for the AGNPS model during the assessment. All runoff from the feedlots is collected and pumped into a holding cell. This system accounts for a 310 kg/year load reduction.

**Figure 6. Holding Pond for a AWS at a CAFO Located Along Wolf Creek.**

**Task 9:** Contract engineering assistance for animal feeding operation design.

**Product:** Engineering assistance that helps ensure the ANMS designs remain on schedule.

**Accomplishments:** Engineering assistance was not contracted. The nutrient management systems designed and constructed were classed as CAFOs and, therefore, were not eligible for assistance through this project. The systems were funded through EQIP.

**Task 10:** A study will be conducted to assess and determine the effects of septic tank products on the water quality of Cottonwood Lake. See attached septic sampling and analysis plan for details. This topic was not fully addressed in the initial watershed assessment. A total of 84 samples (including QA/QC samples) will be collected at a cost of $150 each. The data provided by the samples collected will be used to identify problem areas and develop a remedial plan of action.

**Products:** A cost-effective plan to manage lakeside wastewater.

**Accomplishments:** Sixty-one samples were taken during the septic system study. The study was completed July 9, 2003. Table 2 shows the sites that had fecal results equal to or in excess of 10 ml/ 100 ml. Full sample results and general sample site locations can be found in Appendix D.

**Table 2. Septic Samples with Fecal Results.**

| date | time | ID | fecal (ml) | E Coli (ml) | ammonia (mg/L) | nitrate (mg/L) | TKN (mg/L) | Phosphorus, Total (mg/L) |
|---|---|---|---|---|---|---|---|---|
| 7/9/2003 | 1900 | NU4 | 70 | 3 | <0.02 | <0.1 | 2.50 | 0.432 |
| 7/9/2003 | 1900 | NU5 | 30 | 3.1 | <0.02 | <0.1 | 2.22 | 0.618 |
| 7/9/2003 | 1930 | NU6 | 30 | 1 | <0.02 | <0.1 | 2.52 | 0.474 |
| 7/9/2003 | 1700 | WC20 | 30 | 2 | <0.02 | <0.1 | 2.37 | 0.369 |
| 7/9/2003 | 1200 | EC13 | 30 | <1 | 0.10 | <0.1 | 2.86 | 0.391 |
| 7/9/2003 | 1430 | WC3 | 20 | 13.4 | <0.02 | <0.1 | 2.26 | 0.324 |
| 7/9/2003 | 1330 | SU1 | 20 | 1 | <0.02 | <0.1 | 2.54 | 0.424 |
| 7/9/2003 | 1900 | NU2 | 10 | <1 | <0.02 | <0.1 | 2.99 | 0.379 |
| 7/9/2003 | 1430 | WC2 | 10 | 12 | 0.02 | <0.1 | 3.31 | 0.366 |
| 7/9/2003 | 1430 | WC2 | 10 | 8.5 | <0.02 | <0.1 | 2.27 | 0.375 |
| 7/9/2003 | 1500 | WC5 | 10 | <1 | <0.02 | <0.1 | 2.43 | 0.344 |
| 7/9/2003 | 1600 | WC9 | 10 | 1 | <0.02 | <0.1 | 2.39 | 0.346 |
| 7/9/2003 | 1600 | WC11 | 10 | 3 | <0.02 | <0.1 | 2.22 | 0.389 |
| 7/9/2003 | 1700 | WC18 | 10 | 3.1 | <0.02 | <0.1 | 2.01 | 0.385 |
| 7/9/2003 | 1700 | WC21 | 10 | <1 | <0.02 | <0.1 | 2.34 | 0.332 |
| 7/9/2003 | 1800 | WC27 | 10 | <1 | <0.02 | <0.1 | 2.32 | 0.328 |
| 7/9/2003 | 1800 | WC28 | 10 | 1 | <0.02 | <0.1 | 2.46 | 0.322 |
| 7/9/2003 | 1400 | SU2 | 10 | 4.1 | 0.09 | <0.1 | 2.10 | 0.413 |
| 7/9/2003 | 1400 | SU4 | 10 | 4.1 | <0.02 | <0.1 | 2.59 | 0.392 |
| 7/9/2003 | 1100 | EC4 | 10 | 1 | <0.02 | <0.1 | 2.47 | 0.377 |
| 7/9/2003 | 1030 | | 10 | 3 | 0.04 | <0.1 | 2.05 | 0.352 |

**Objective 3: Repair damage to Cottonwood Lake**

**Task 11:** Stabilize 0.5 miles of shoreline with back sloping and soft practices along the eastern shore of Cottonwood Lake.

**Products:** One-half mile of stabilized shoreline that contributes less sediment to the lake.

**Expected Outcome:** Reduced inlake turbidity and decreased sediment leaving the lake.

**Accomplishments:** Six residents along the eastern shore of Cottonwood Lake stabilized 604 feet of shoreline. The stabilized shoreline reduced the amount of sediment entering the lake by accounts 49.83 T/year. A portion of the stabilized shoreline is shown in Figure 7.


**Figure 7. Stabilized Shoreline Along Cottonwood Lake.**

**Task 12:** Establish willow plantings along the stabilized shoreline at a cost of \$0.06 $ft^2$, based on plantings of two feet on center over approximately 66,000 square feet.

**Products:** Thirty three thousand willows established on the shoreline to reduce wave action.

**Expected Outcome:** Reduced shoreline erosion.

**Accomplishments:** No willows were established along the shoreline. This is was primarily because the shoreline stabilization was not completed during the optimal time to plant the trees. Because of the drought conditions the past three years, Cottonwood Lake's waters have receded and much of the shoreline has been exposed. This has allowed the scoured banks to "heal" naturally as volunteer cottonwood trees became established along much of the shoreline (Figures 8 and 9). The photographs were taken July 6, 2007.

**Figure 8. Volunteer Trees at Northern End of Cottonwood Lake.**

**Figure 9. Volunteer Trees along the East Side of Cottonwood Lake.**

**Task 13:** Establish 2000 $ft^2$ of cattails (*Typha sp.*), through transplanting, along the eastern shoreline of the lake. Cattails will be collected from a local source and transplanted along those sections of the cutbank that are to be sloped.

**Products:** Two thousand square feet of aquatic macrophytes established along the shoreline to reduce the effects of wave action.

**Expected Outcome:** Decreased inlake turbidity and a reduction in ambient phosphorous concentrations during periods of peak algal bloom.

**Accomplishments:** This practice was not well received by the cabin owners around Cottonwood Lake. Because of the drought the past three years, Cottonwood Lake has receded from its banks to the point that many residents do not have ready access to the lake. With the low lake level, Cottonwood trees have become established along the shoreline. In some areas along the eastern shore, aquatic grasses have also become established.

**Figure 10. Shoreline Vegetation along the East Side of Cottonwood Lake.**

**Objective 4: Maintain water quality and beneficial uses by providing information and education to the public in regard to progress and the outcome of the tasks being accomplished and by monitoring water quality so programs can be modified to ensure the aforementioned goals are accomplished.**

**Task 14:** Publish and distribute an informational brochure explaining the problems in the Cottonwood Lake/ Lake Louise Watersheds and the plans to correct those problems. (2,000@ $0.40 each) Produce a semi-annual newsletter updating the residents in the watershed of progress made towards the goals of the project. (10 mailings @ $170/ mailing)

**Products:** Print two thousand copies of a brochure that can be distributed to individuals, high school, alumni, visitors, and other interested parties and 10 semi-annual project newsletters.

**Expected Outcome**: Public support of the project.

**Accomplishments:** One hundred fifty copies of a brochure were printed and distributed to the public. Three articles were included in the Hand Conservation District's newsletter.

The brochure and the articles provided information about the opportunities for receiving cost share funds for the installation of BMPs in the two watershed areas. The success of this activity is not known. Those that participated in the watershed project indicated they learned of the project through their peers.

**Task 15:** Facilitate a yearly tour of the project in conjunction with a special local event and a final tour at the completion of the project. A total of six tours will be provided.

**Products:** Six project tours.

**Expected Outcome:** Project progress showcased and support for project tasks and goal.

**Accomplishments:** Three project tours were conducted during of the project. Each tour focused on the benefits of rotational grazing. The final tour was conducted at a grazing system that was installed during the watershed project period as a cooperative effort with County NRCS staff and the South Dakota Cooperative Extension Service. A tour format was developed that consisted of two speakers, an evening meal and a tour of the grazing system. Twenty-six people attended the tour. Many of them expressed, that they enjoyed learning about the different types of grasses in the pasture, the unique layout of the pastures, and how educational the tour.

**Task 16:** Publish articles in the local papers (Redfield, Faulkton, Highmore, and Miller) on a semiannual basis updating project status throughout the year. (10 articles)

**Products:** Ten articles in local papers.

**Expected Outcome**: Public provided with ongoing updates of project progress between the yearly tours.

**Accomplishments:** Four articles were written and published during the duration of the project. Three additional articles were included in the Hand County Conservation District's newsletter.

Press releases explaining the project and its progress were submitted to local newspapers. A brief explanation of the project was included on the Hand Conservation District's website:

http://www.sdconservation.org/Districts/hand.html

Examples of the articles published can be found in Appendix E.

**Task 17:** Conduct site specific monitoring of water quality. Monitoring will take place upstream and downstream from not more than five of the waste water handling systems. Selected systems will consist of those implementing clean water diversions or other systems that are not utilizing full containment. These samples will be taken before and after construction. Samples will be collected twice during the growing season from Cottonwood Lake and Lake Louise on an annual basis to monitor inlake ambient nutrient concentrations. Quality assurance/ quality control sample sets will also be collected for a grand total of 44 samples, at a cost of $150.00 per sample. See attached sampling and analysis plan for details. Long term monitoring will be conducted by the South Dakota State Wide Lakes Assessment.

**Products:** Water quality samples

**Expected Outcome:** Immediate knowledge as to the success of completed tasks and improvement of Cottonwood Lake and Lake Louise.

**Accomplishments:** No site specific monitoring was conducted as there were no run off events and both ag waste systems are full containment systems. Neither the Cottonwood Lake nor the Lake Louise watersheds have received sufficient precipitation to cause the lakes to flow over their spillways during the span of the project. Cottonwood Lake receded in excess of one hundred feet from its banks during 2006. Water quality samples under these conditions would not represent the practices that were installed during the project.

**Task 18:** Produce semi annual reports for the GRTS and all of the information will be entered into STORET. A final report will be written at the end of the project. Vouchers and salaries will be paid for through the project co-sponsor.

**Products:** Semi annual and final reports.

**Expected Outcome:** Project progress tracked and milestone and budgets adjusted to facilitate meeting the project goal and project accomplishments captured and reported.

**Accomplishments:** Eleven GRTS Progress reports summarizing project progress were completed and submitted to DENR during the project.

## MONITORING/EVALUATION

Table 3 contains a summary the planned versus actual BMPs installed and load reductions realized. The planned values reflect milestone amendments as approved by DENR.

Eleven GRTS progress reports summarizing project progress were submitted to DENR during the project.

No site specific monitoring was conducted since there were no run off events and both ag waste systems are full containment systems. Neither the Cottonwood Lake nor the Lake Louise watersheds have received enough precipitation to cause the lakes to flow over their spillways during the span of the project. Cottonwood Lake receded in excess of one hundred feet from its banks during 2006. Water quality samples under these conditions would not represent the practices that were installed during the project.

Although the TMDL was not attained, the BMPs installed and other activities completed resulted in water quality improvements in the watersheds and the lakes.

**Table 3. Cottonwood Lake/ Lake Louise Project Planned Versus Installed BMP Milestone Comparison.**

| TASK | PRODUCT | QUANTITY PLANNED | QUANTITY AMENDED | QUANTITY INSTALLED | | | LOAD REDUCTIONS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 319 | OTHER | TOTAL | Soil Loss Reduced (Tons/yr) | Phosphorus Reduced (Kg/yr) | Percent of TMDL Attained |
| **Objective 1** | | | | | | | | | |
| Establish BMP's | Planned Grazing Systems | 43,000 acres | 20,000 acres | 17,059.30 | 11,776.90 | 28,836.20 | 973.3 | 1132 | 100% |
| | Grassed Waterways | 25 acres | 0 acres | 0 | 0 | 0 | 0 | 0 | 0% |
| | Buffer Strips | 5 acres | 25 acres | 0 | 53.3 | 53.3 | 42.8 | 29 | 100% |
| **Objective 2** | | | | | | | | | |
| Nutrient Management | Ag Waste Systems | 24 | 2 | 0 | 2 | 2 | 0 | 2294 | 73% |
| | NMP for CAFO | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| | Engineer Assistance | NA | 0 | 0 | 0 | 0 | NA | NA | NA |
| | Septic Sampling | 84 samples | 84 samples | 61 | 0 | 61 | NA | NA | NA |
| **Objective 3** | | | | | | | | | |
| Repair Cottonwood Lake | Shoreline Stabilization | 0.5 miles | 0.5 miles | 0.11miles | 0 | 0.11 miles | 54.36 | 1.25 | NA |
| | Willow Plantings | 66,000 $ft^2$ | 66,000 $ft^2$ | 0 | 0 | 0 $ft^2$ | 0 | 0 | 0% |
| | Cattails Transplanted | 2000 $ft^2$ | 2000 $ft^2$ | 0 | 0 | 0 $ft^2$ | 0 | 0 | 0% |
| **Objective 4** | | | | | | | | | |
| Information & Education and Maintain Water Quality | Informational Brochure | 1 brochure | 1 brochure | NA | NA | 150 copies of brochure | NA | NA | NA |
| | Yearly Tour | 6 tours | 4 tours | 1 tours | 2 tours | 3 tours | NA | NA | NA |
| | Newspaper Articles | 10 articles | 5 articles | | | | NA | NA | NA |
| | Water Quality Monitoring | 44 samples | 0 samples | | 0 | | NA | NA | NA |
| | Semi annual and Final Reports | NA | NA | NA | NA | 11 Semi-Annual; 1 Final Report | NA | NA | NA |

# SPONSOR AND SUPPORTING AGENCIES

**Hand Conservation District**
- Project sponsor
- Project administration

**Natural Resources Conservation Service (NRCS)**
- Technical assistance for EQIP, BMP planning and installation and office space

**Farm Service Agency (FSA)**
- Technical assistance for ECP, CCRP and Specific County information

**US Fish and Wildlife (USFWS)**
- Financial assistance for grazing management BMPs

**South Dakota Game, Fish and Parks (GFP)**
- Information source for historical background and current activity of Cottonwood Lake and Lake Louise

**South Dakota Department of Environment and Natural Resources (DENR)**
- Technical assistance for water monitoring and project administration
- Financial Assistance for project administration and BMP installation

**Central Plains Water Development District**
- Project Coordination
- Financial Administration

**US Environmental Protection Agency**
- Financial assistance (CWA Section 319 Grant through SDDENR)

**South Dakota Conservation Commission**
- Financial assistance (Soil and Water Conservation Grant) for buffer strips and grassed waterways

# ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

Progress in completing the workplan was hampered during the mid point of the project because of drought conditions. This made it difficult o sell practices as producers were conserving their financial resources. Other factors that hampered the project were changes in USDA program rules and inflation in cost of materials and labor.

**Grassed Waterways**

Producers were not interested in this practice. Those producers that have installed grassed waterways did so through the Continuous Conservation Reserve Program (CCRP) before this project was initiated. There are some producers that could use this type of practice, but are reluctant to give up the acres of production.

**Buffer Strips**

This practice worked well in the Cottonwood Lake watershed, but did not do well in the Lake Louise watershed. The producers that would benefit from buffer strips are not interested because of the extra labor involved to maintain extra fence to keep livestock out of riparian areas.

**Agricultural Waste Systems**

Most producers were not interested in this practice because of the cost involved, even with cost share. Owners of smaller operations in the project area did not feel they would be able to recover the cost of the system before they retire.

**Willow plantings and Cattail Establishment**

This practice was not accepted well by the members of the Cottonwood Lake Association. Some members commented that the cattails hinder lake access and that the shoreline already has the cottonwood trees that became established when Cottonwood Lake receded over the past five years.

# RECOMMENDATIONS FOR FUTURE ACTIVITIES

It is recommend that NRCS follow up with those producers that developed grazing plans to ensure that the producer is satisfied with the plan and make any needed adjustments. The NRCS and the Hand County Conservation District will be responsible for ensuring the BMPs installed are properly operated and maintained for the duration of their life spans.

Future projects, should plan BMPs that will be accepted by the producers and take into account of inflation for materials.

It is also recommended that a follow up survey on types of septic systems are around Cottonwood Lake should be conducted. Towards the end of the project, some home owners had commented about replacing their system.

# PROJECT BUDGET/EXPENDITURES

**Table 4: Abbreviations for Funding Sources.**

| Abbreviation | Agency |
|---|---|
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| EQIP | Environmental Quality Incentive Program |
| 319 Grant | Environmental Protection Agency 319 Grant Program |
| Consolidate | Consolidated Water Facilities Construction Program |
| Commission | Conservation Commission Grants Program |
| Cons. Dist. | Hand Conservation District |
| CPWDD | Central Plains Water Development District |

## Table 5. Cottonwood Lake/ Lake Louise Project Budget Comparison.

| Item | | Total | US FWS | USDA | EQIP | 319 Grant | Consolidated | Commission | Local | * Cons. Dist. | * CPWDD | *CWLA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinator-Salary Fringe | planned | $164,583 | | | | $164,583 | | | | | | |
| | amended | $143,885 | | | | $143,885 | | | | | | |
| | expended | $133,163 | | | | $133,163 | | | | | | |
| Administrative Support | planned | $7,500 | | | | | | | | | $7,500 | |
| | amended | $15,773 | | | | | $23 | | | $6,750 | $9,000 | |
| | expended | $19,017 | | | | | $23 | | | $9,450 | $9,543 | |
| Travel | planned | $10,000 | | | | $7,500 | | | | | $2,500 | |
| | amended | $3,568 | | | | $1,068 | | | | | $2,500 | |
| | expended | $3,674 | | | | $468 | | | | | $3,206 | |
| Office Rent | planned | $9,000 | | | | | | | | $9,000 | | |
| | amended | $9,000 | | | | | | | | $9,000 | | |
| | expended | $0 | | | | | | | | $0 | | |
| Equipment/Supplies | planned | $3,000 | | | | | | | | $1,500 | $1,500 | |
| | amended | $3,000 | | | | | | | | $1,500 | $1,500 | |
| | expended | $4,356 | | | | | | | | $0 | $4,356 | |
| Planned Grazing Systems | planned | $904,048 | | | $452,024 | $113,006 | $113,006 | | $226,012 | | | |
| | amended | $1,041,769 | $19,426 | $23,558 | $241,421 | $304,191 | $133,621 | | $319,552 | | | |
| | expended | $928,100 | $30,019 | $39,918 | $163,309 | $294,999 | $133,621 | | $266,233 | | | |
| Grassed Waterways | planned | $11,200 | | $5,600 | | | | $2,800 | $2,800 | | | |
| | amended | $0 | | $0 | | | | $0 | $0 | | | |
| | expended | $0 | | $0 | | | | $0 | $0 | | | |
| Buffer Strips | planned | $1,200 | | $600 | | | | $300 | $300 | | | |
| | amended | $55,402 | | $29,501 | | | | $0 | $25,901 | | | |
| | expended | $110,891 | | $78,914 | | | | $0 | $31,977 | | | |
| Ag. Waste Systems | planned | $840,000 | | | $420,000 | $105,000 | $105,000 | | $210,000 | | | |
| | amended | $480,660 | | | $299,065 | $0 | | | $181,595 | | | |
| | expended | $680,110 | | | $291,476 | $0 | | | $388,634 | | | |
| Engineering Assistance | planned | $44,775 | | | | $44,775 | | | | | | |
| | amended | $0 | | | | $0 | | | | | | |
| | expended | $0 | | | | $0 | | | | | | |
| Septic Systems | planned | $12,600 | | | | $12,600 | | | | | | |
| | amended | $5,655 | | | | $5,655 | | | | | | |
| | expended | $5,655 | | | | $5,655 | | | | | | |
| CAFO | planned | $100,000 | | | | | $25,000 | | $75,000 | | | |
| | amended | $0 | | | | | $0 | | $0 | | | |
| | expended | $0 | | | | | $0 | | $0 | | | |
| Lakeshore Stabilization | planned | $20,800 | | | | $13,300 | $7,500 | | | | | |
| | amended | $13,300 | | | | $13,300 | | | | | | |
| | expended | $11,915 | | | | $11,915 | | | | | | |
| Willow Plantings | planned | $3,960 | | | $1,980 | $990 | | | | | | $990 |
| | amended | $1,980 | | | | $990 | | | | | | $990 |
| | expended | $0 | | | | $0 | | | | | | $0 |
| Cattail Establishment | planned | $2,000 | | | | $1,000 | | | | | | $1,000 |
| | amended | $2,000 | | | | $1,000 | | | | | | $1,000 |
| | expended | $0 | | | | $0 | | | | | | $0 |
| Informational Brochure | planned | $2,500 | | | | $1,250 | | | | $1,250 | | |
| Yearly Tour | planned | $6,000 | | | | $3,000 | | | | $3,000 | | |
| Newspaper Articles | planned | $1,250 | | | | $625 | | | | $625 | | |
| Water Quality Monitoring | planned | $6,600 | | | | $3,960 | | | | | $2,640 | |
| Informational Brochure, Newspaper Articles, Tour | amended | $3,000 | | | | $1,500 | | | | $1,500 | | |
| | expended | $100 | | | | $50 | | | $50 | $0 | | |
| Total | planned | $2,163,016 | $0 | $6,200 | $874,004 | $471,589 | $250,506 | $3,100 | $514,112 | $25,875 | $15,640 | $1,990 |
| Total | amended | $1,778,992 | $19,426 | $53,059 | $540,486 | $471,589 | $133,644 | $0 | $527,048 | $18,750 | $13,000 | $1,990 |
| Total | expended | $1,896,981 | $30,019 | $118,832 | $454,785 | $446,250 | $133,644 | $0 | $686,894 | $9,450 | $17,106 | $0 |

# APPENDIX A
# Participant Contract

**CONTRACT FOR INCENTIVE PAYMENTS FOR ROTATIONAL GRAZING SYSTEMS**

This agreement is made and entered into between the Hand County Conservation District (project sponsor of the Cottonwood Lake / Lake Louise Watershed Improvement Project) and the below landowner/ operator for the purpose or receiving cost share funds for the implementation of a rotational grazing system in the form of an incentive payment during the life of the Implementation Project.

Name: _____

Address: _____

City: _____ State: SD ZIP: _____

CONDITIONS OF CONTRACT

Cost-share funds will not be dispersed to the above named landowner/operator until the attached listed conservation practices have been implemented according to the Conservation Plan and is certified as acceptable by the Hand County Conservation District or Natural Resource Conservation Service (NRCS) personnel.

It is agreed the landowner/operator will provide to the District copies of receipts and invoices for all labor and materials used to implement the conservation practice(s) being cost shared.

It is mutually agreed that in the event the conservation practice(s) are not properly implemented or maintained for the life of the contract/ project, the landowner/operator agrees to repay the Hand County Conservation District the total amount of cost share disbursed to the landowner/operator.

This contract can be modified by mutual written agreement between the Hand County Conservation District and the above named landowner/operator if the installed practice fails or deteriorates because of conditions beyond the control of the participants, if the installed practice causes adverse impacts to significant cultural or environmental resources identified prior or those discovered during the practice installation, or if another practice will achieve at least the same level of environmental benefits. Changes to this contract may also require the concurrence of the South Dakota Department of Environment and Natural Resources (SDDENR). The Watershed Project Coordinator shall be contacted before any changes in this contract are initiated. A modified contract will be sent to all participating parties who will have ten days to approve or reject such changes.

In the event ownership of lands covered by this contract changes, installation, maintenance and utilization of cost-shared conservation practices must be continued as specified by this contract with the new owner or operator. The current landowner/ operator is responsible for informing the new landowner/ operator that this contract for grant funds is associated with the land.

The terms of this contract shall commence on _____ and end on December 31, 2007 .

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the dates indicated below.

_____

Authorized Representative (Hand County Conservation District) Date

_____

Landowner/Operator Date

# APPENDIX B
# Project Informational Brochure

# Cottonwood Lake/ Lake Louise Watershed Improvement Project

The Cottonwood Lake/ Lake Louise Watersheds are located in central South Dakota and cover parts of Faulk, Spink, Hand and Hyde Counties. The major goals of the project are to improve the water quality in Medicine Creek and Cottonwood Lake and in Wolf Creek and Lake Louise. Improvement of these waterbodies will ultimately improve the overall water quality of the Turtle Creek Watershed, which discharges in the James River near Redfield. This project was made possible through funding from the Environmental Protection Agency Section 319 funds, Natural Resources Conservation Service's Environmental Quality Incentive Program (EQIP), SD Board of Water and Natural Resources' Consolidated Water Facilities Construction Program, SD Department of Agriculture's Coordinated Soil and Water Conservation Grant Program and various local sources.

## Cost-sharing Practices

Funds have been acquired for various practices to improve the watersheds. Practices planned are:

- Planned Grazing Systems
- Grassed Waterways
- Riparian Buffer Strips
- Agricultural Waste Management Systems
- Shoreline Stabilization

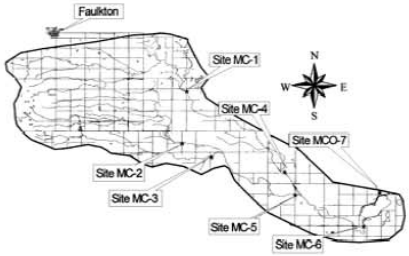
Cost-share to the Customer will be set at a maximum of 75% of the cost according to the NRCS cost list.

## Eligibility and Application

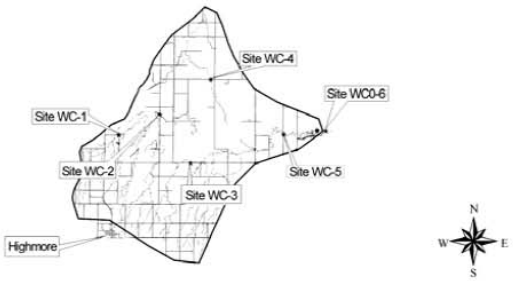
Any operator operating land within the Cottonwood Lake or Lake Louise watersheds is eligible to collect cost-share funds.

Applicants can apply for funds through the Project Coordinator located in the Hand County NRCS Field Support Office.

### Cottonwood Lake Watershed




### Lake Louise Watershed



# APPENDIX C
# Surveys

# Watershed Evaluation Survey

Name: _____

Are you currently raising livestock?

YES NO

Comments:

If YES, how do you classify your herd size compared to your 2000 herd size?

a) increased herd size

b) about the same

c) decreased herd size

Please explain:

Would you be interested in any of the cost sharable practices metioned below? (Check if interested.)

- ☐ grassed waterways
- ☐ nutrient management systems (lagoons, diversions, berms, etc.)

Comments:

Attention: Land Owners/ Operators,

Hello, my name is Duane Nielsen and I am the Project Coordinator for the Central Plains Water Development District. I am conducting the watershed implementation project on the Cottonwood Lake/ Lake Louise Watersheds including Medicine Creek and Wolf Creek.

Between June 1999 and October 2000, a watershed assessment was conducted to determine any sources of impairment to the Cottonwood Lake and Lake Louise Watersheds. Through this assessment, we provided sufficient data to conduct an implementation project. This implementation project consists of cost sharing practices that will aid in reducing the amount of sediment and nutrient loads to the lake. Some of these practices include nutrient management, grassed waterways, shoreline stabilization, and planned grazing.

As this implementation nears the end, funds are still available for the above practices. There is still an opportunity to implement these practices on your operation. However, we must dedicate these funds by December 1, 2006. Enclosed you will find a survey and an envelope in which to return the survey. We ask that you fill this out with the best of your knowledge and return it as soon as possible. The more people that take interest, the more likely this project can go on. I would like to stress that this survey and the practices previously mentioned are **voluntary** and any information that you share is kept confident. I would also like to reiterate that this project is drawing close to the end and once it is done, any funds left over will be turned back to be reallocated to projects in other areas.

Thank you for your cooperation and if there is anything that seems unclear or you have any questions, you can contact me at the Hand County NRCS office in Miller (605) 853-2410 ext.3.

Sincerely,

Duane Nielsen
Project Coordinator

# Watershed Evaluation Survey

Name: _____

Would you be interested in any of the cost sharable practices metioned below? (Check if interested.)

- ☐ grassed waterways
- ☐ buffer strips along stream channels
- ☐ nutrient management systems (lagoons, diversions, berms, buffers, etc.)

If funding could be made available, would you be interested in planned grazing?
(This will involve cross fencing, water development, rural water hookup.)
**To be eligible for cost share a grazing plan has to be developed.**

- ☐ YES
- ☐ NO

Are there any other practices that you think this project should consider?

Comments:

Any questions can be directed toward the Project Coordinator, Duane Nielsen, at 605-853-2410 ext 3.

# APPENDIX D
# Septic Sampling Results and Locations

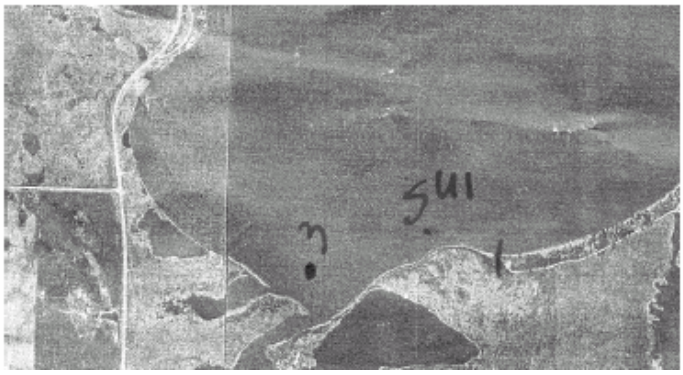
SEPTIC SAMPLING RESULTS ON COTTONWOOD LAKE NEAR REDFIELD, SD

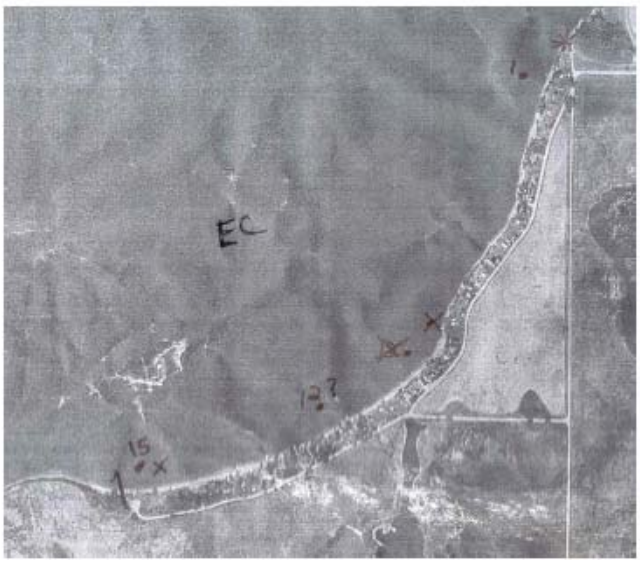
| date | time | ID | fecal (ml) | E Coli (ml) | ammonia (mg/L) | nitrate (mg/L) | TKN (mg/L) | Phosphorus, Total (mg/L) |
|---|---|---|---|---|---|---|---|---|
| 7/9/2003 | 1900 | NU1 | <10 | 1 | <0.02 | <0.1 | 2.83 | 0.381 |
| 7/9/2003 | 1900 | NU2 | 10 | <1 | <0.02 | <0.1 | 2.99 | 0.379 |
| 7/9/2003 | 1900 | NU3 | <10 | <1 | <0.02 | <0.1 | 3.01 | 0.432 |
| 7/9/2003 | 1900 | NU4 | 70 | 3 | <0.02 | <0.1 | 2.50 | 0.432 |
| 7/9/2003 | 1900 | NU5 | 30 | 3.1 | <0.02 | <0.1 | 2.22 | 0.618 |
| 7/9/2003 | 1930 | NU6 | 30 | 1 | <0.02 | <0.1 | 2.52 | 0.474 |
| 7/9/2003 | 1430 | WC1 | <10 | 4.1 | <0.02 | <0.1 | 2.80 | 0.388 |
| 7/9/2003 | 1430 | WC2 | 10 | 12 | 0.02 | <0.1 | 3.31 | 0.366 |
| 7/9/2003 | 1430 | WC2 | 10 | 8.5 | <0.02 | <0.1 | 2.27 | 0.375 |
| 7/9/2003 | 1430 | WC3 | 20 | 13.4 | <0.02 | <0.1 | 2.26 | 0.324 |
| 7/9/2003 | 1500 | WC5 | 10 | <1 | <0.02 | <0.1 | 2.43 | 0.344 |
| 7/9/2003 | 1530 | WC7 | <10 | 3.1 | <0.02 | <0.1 | 2.25 | 0.310 |
| 7/9/2003 | 1530 | WC8 | <10 | <1 | <0.02 | <0.1 | 2.33 | 0.337 |
| 7/9/2003 | 1600 | WC9 | 10 | 1 | <0.02 | <0.1 | 2.39 | 0.346 |
| 7/9/2003 | 1600 | WC9 | <10 | <1 | <0.02 | <0.1 | 2.43 | 0.351 |
| 7/9/2003 | 1600 | WC10 | <10 | <1 | <0.02 | <0.1 | 2.37 | 0.348 |
| 7/9/2003 | 1600 | WC11 | 10 | 3 | <0.02 | <0.1 | 2.22 | 0.389 |
| 7/9/2003 | 1600 | WC12 | <10 | 1 | <0.02 | <0.1 | 2.43 | 0.341 |
| 7/9/2003 | 1600 | WC13 | <10 | <1 | <0.02 | <0.1 | 2.12 | 0.365 |
| 7/9/2003 | 1630 | WC14 | <10 | <1 | <0.02 | <0.1 | 2.37 | 0.377 |
| 7/9/2003 | 1630 | WC15 | <10 | 2 | <0.02 | <0.1 | 2.19 | 0.376 |
| 7/9/2003 | 1630 | WC16 | <10 | 2 | <0.02 | <0.1 | 2.40 | 0.375 |
| 7/9/2003 | 1700 | WC17 | <10 | 2 | <0.02 | <0.1 | 2.12 | 0.360 |
| 7/9/2003 | 1700 | WC18 | 10 | 3.1 | <0.02 | <0.1 | 2.01 | 0.385 |
| 7/9/2003 | 1700 | WC19 | <10 | 1 | <0.02 | <0.1 | 2.51 | 0.369 |
| 7/9/2003 | 1700 | WC19 | <10 | 2 | <0.02 | <0.1 | 2.27 | 0.374 |
| 7/9/2003 | 1700 | WC20 | 30 | 2 | <0.02 | <0.1 | 2.37 | 0.369 |
| 7/9/2003 | 1700 | WC21 | 10 | <1 | <0.02 | <0.1 | 2.34 | 0.332 |
| 7/9/2003 | 1730 | WC23 | <10 | <1 | <0.02 | <0.1 | 1.86 | 0.327 |
| 7/9/2003 | 1730 | WC25 | <10 | <1 | <0.02 | <0.1 | 2.15 | 0.344 |
| 7/9/2003 | 1730 | WC26 | <10 | 1 | <0.02 | <0.1 | 2.18 | 0.336 |
| 7/9/2003 | 1800 | WC27 | 10 | <1 | <0.02 | <0.1 | 2.32 | 0.328 |
| 7/9/2003 | 1800 | WC28 | <10 | 1 | <0.02 | <0.1 | 2.08 | 0.333 |
| 7/9/2003 | 1800 | WC28 | 10 | 1 | <0.02 | <0.1 | 2.46 | 0.322 |
| 7/9/2003 | 1800 | WC29 | <10 | 1 | <0.02 | <0.1 | 1.88 | 0.317 |
| 7/9/2003 | 1800 | WC30 | <10 | <1 | <0.02 | <0.1 | 2.36 | 0.346 |
| 7/9/2003 | 1800 | WC31 | <10 | <1 | <0.02 | <0.1 | 2.06 | 0.312 |
| 7/9/2003 | 1800 | WC32 | <10 | <1 | <0.02 | <0.1 | 2.26 | 0.333 |
| 7/9/2003 | 1830 | WC33 | <10 | 2 | <0.02 | <0.1 | 2.28 | 0.340 |
| 7/9/2003 | 1830 | WC34 | <10 | <1 | <0.02 | <0.1 | 3.01 | 0.357 |
| 7/9/2003 | 1830 | WC35 | <10 | <1 | <0.02 | <0.1 | 2.95 | 0.377 |
| 7/9/2003 | 1330 | SU1 | 20 | 1 | <0.02 | <0.1 | 2.54 | 0.424 |
| 7/9/2003 | 1400 | SU2 | 10 | 4.1 | 0.09 | <0.1 | 2.10 | 0.413 |
| 7/9/2003 | 1400 | SU4 | 10 | 4.1 | <0.02 | <0.1 | 2.59 | 0.392 |
| 7/9/2003 | 1045 | EC2 | <10 | 2 | <0.02 | <0.1 | 2.88 | 0.406 |
| 7/9/2003 | 1100 | EC4 | 10 | 1 | <0.02 | <0.1 | 2.47 | 0.377 |
| 7/9/2003 | 1100 | EC5 | <10 | <1 | <0.02 | <0.1 | 2.410 | 0.374 |
| 7/9/2003 | 1130 | EC6 | <10 | <1 | 0.03 | <0.1 | 2.43 | 0.404 |
| 7/9/2003 | 1130 | EC7 | <10 | 2 | 0.02 | <0.1 | 2.17 | 0.369 |
| 7/9/2003 | 1130 | EC8 | <10 | 2 | 0.08 | <0.1 | 2.25 | 0.352 |
| 7/9/2003 | 1200 | EC10 | <10 | 1 | 0.02 | <0.1 | 2.12 | 0.373 |
| 7/9/2003 | 1200 | EC11 | <10 | 1 | 0.08 | <0.1 | 2.88 | 0.394 |
| 7/9/2003 | 1200 | EC12 | <10 | 2 | 0.04 | <0.1 | 2.42 | 0.382 |
| 7/9/2003 | 1200 | EC13 | 30 | <1 | 0.10 | <0.1 | 2.86 | 0.391 |
| 7/9/2003 | 1215 | EC14 | <10 | 3.1 | 0.10 | <0.1 | 2.26 | 0.403 |
| 7/9/2003 | 1230 | EC15 | <10 | <1 | 0.08 | <0.1 | 2.83 | 0.382 |
| 7/9/2003 | 1030 |  | 10 | 3 | 0.04 | <0.1 | 2.05 | 0.352 |

# Septic Survey Sample Locations

**(Labels on the maps correspond with "ID" in septic sampling results table on page 32)**



# APPENDIX E
# Project Articles

# DENR approves water projects for Lake Louise, Cottonwood

The state Board of Water and Natural Resources approved a $150,000 grant under the Consolidated program for the Hand Conservation District to improve water quality in Cottonwood Lake and Lake Louise.

Governor Bill Janklow recommended the grant, which was approved April 12 during the hoard's meeting in Pierre.

"Maintaining good water quality in South Dakota's lakes, rivers and streams is essential to the future of South Dakota," Janklow said. "These funds will help improve the water quality in Cottonwood Lake and Lake Louise."

The project includes reducing phosphorus in Cottonwood Lake and Lake Louise to meet the total maximum daily load analyses for the two lakes' watersheds. The lakes' watersheds are located in portions of Spink, Faulk, Hand and Hyde Counties. Watershed improvement practices to be implemented include planned grazing systems, shoreline stabilization, conservation tillage, grass seeding, and construction of manure management systems. The total estimated cost of the project is $2.15 1,000.

The Consolidated program provides grants and loans for water, wastewater and watershed projects.



# Hand County District receives conservation grant

The Hand Conservation District:? will get a *'$45.340* grant from the State's Coordinated Soil and Water:? Conservation Grant Fund, according to an announcement Monday from* Governor Bill Janklow.

The grant is to help establish animal waste systems, add fencing to stabilize 5.6 miles of like shoreline, and install *grass* waterways to improve the water quality in Sand Creek and Rose Hill Lake, and in Turtle Creek and Jones Lake. The grant will help pay.,: for a part of *the* project's total cost of *$497,970.*

"The Coordinated Soil and Water:, Conservation Grants Program is a great example of govemments working together," Janklowsaid. The grant money is being. matched with other. *money,* including local and federal government funds, to provide more 'than *$3,797,409* in seven projects. Overall, the grant funds are being, matched at average rates of $6.64 to $1.

Other conservation districts awarded grant funds are Brookings, Hamlin, Hughes, Hyde, Lincoln and Shannon. Money for the Coordinated Soil and Water *Conservation* Grant Fund comes from unclaimed gas tax refunds for agriculture users. The South Dakota Department of Agriculture administers the fund, from which, the South Dakota Conservation Commission awards the grants.

# Farmers Union 'Campset for. Hand County

in Redfield. Check-in time is 8 a.m. at the park, and game time is 9 a.m. Registration deadline is July 10. Call 605-472-1405 for more information.

# *SDSU alumni, friends golf outing at Miller*

Alumni and friends of South Dakota State University are invited to join coaches and staff from SDSU for an afternoon of golf at Miller Country Club Thursday, June 26. The SDSU Alumni and Friends Golf Tournament is to support athletic scholarships at SDSU.

At 1 p.m., the four-person scramble begins. Registrations can he made for either a team or singles. Dinner will be served at 5:30 p.m., and the public is encouraged to attend, even if they did not golf.

Reservations should be made by contacting Kevin or Kim Blackwell, 853-2473 (H) or 853-3964 (W).

# Water project funds available to improve County lakes

Conservation practices to be implemented by area producers will improve local watersheds.

The Cottonwood Lake/Lake Louise Watersheds cover parts of Faulk, Spink, Hand and Hyde Counties. The major goal of the projects is to improve the water quality in Medicine Lake, Cottonwood Lake, Wolf Creek and Lake Louise.

The Jones Lake/Rose Hill Lake Watersheds are both located in southem Hand County. The goal set for this project is to improve the water quality in Turtle Creek, Jones Lake, Sand Creek and Rose Hill Lake.

Improvement of these watersheds will improve the overall water quality of the James River Basin.

These projects are made possible through funding from Federal, State and local sources. Funds have been acquired for conservation practices to improve the watersheds. These practices include: grazing enhancement systems, grassed waterways, riparian buffer strips, agricultural waste management systems, and shoreline stabilization. Cost-share to the customer will be a maximum of 75 percent of the installation cost, according to the NRCS cost list.

Any person operating land within the Cottonwood Lake/Lake Louise or Jones Lake/Rose Hill Lake watersheds is eligible to apply for cost-funds prior to installation of the practice. Applicants can apply for funds through Duane Nielsen, Project Coordinator, located in the County NRCS Field 'Support Office. For more information, call 853-2410, Ext. 3.

Miller Press
June 25, 2003

1. L H Construction - 1156
2. Rude Transportation - 1151
3. American Bank & Trust - 1137
4. Del's Taxidermy - 1129
5. Bright Boys - 1129
6. Roy's Angels - 1124
7. Crystals - 1113
8. Resel Oil - 1112
9. Turtle Creek Saloon - 1103
10. Blue Yummy - 1088
11. Freddies - 855
12. Export Series - 782
13. Schutte's Crew - 688

High scores: Reed Bixler 47, Dave Marlinmaas 45. Tom Welch 43. Lyle Resel 42, Glenn Hoekman 42, Paul Kappler 41, Kevin Sowar 41. Armon Zens 40

High handicap scores: Joe Morrissette 59, Don Selbrecht 52, Tim Davis 52, Reed Bixler 52. Dave Martinmaas 51, Chad Selting 51, Kirk Diekhoff 50, Marvin Mitchell 50. Glenn Hoekman 50.

Tournament: June 26, 5 p.m. Shoot 2 rounds of 50 shots each (Must start first round by 7:15)

Summer League \
starts July 10 for 8 weeks
through August 28
3 shooter teams may have 4
and take best score

email your submissions to:

all your local control," says Vic Fischbach, the Spink County State's Attorney. "If you dissolve your township you lose your ability to appeal property taxes, it will be much more costly to maintain your roads and you will lose your

to understand the lack of local control they will have if you end up dissolving."

Those aren't comments typical of a Spink County Commissioners meeting, but indeed that is what Fischbach had to say to three representa-

meeting last Tuesday morning.

Bill Klebsch and Alan and Kathy Maddox were present at the meeting.

"We want to look into turning the township over to the county, because-no body will do anything with it. No one

The Redfield Press
Wed., July 2, 2003

Klebsch understanas, out also says that he and his wife, Zelda who has been the board clerk for more than ten years, are ready to turn control of the

See "Three Rivers" on page 14

# Cottonwood/Louise watershed project entering 2nd year

BY MITCH BEAUMONT

(COTTONWOOD LAKE)—A multi-million dollar environmental project that spans three counties and has funding from federal, state and local entities is now entering its second year of implementation.

The project coordinator says the changes already made have been positive.

The Cottonwood Lake Watershed Improvement project, officially sponsored by the Hand County Conservation District, is aimed at vastly improving the water quality Cottonwood Lake, something that Duane Nielson says is badly needed.

Since 1999 Cottonwood Lake, and Lake Louise which is also part of the watershed project, have been listed on South Dakota's Section 303(d) list of water bodies not in compliance with the standards of the Federal Clean Water Act.

"That assessment began in the spring of 1999, and through various phases with DENR we determined where the most problems were with watershed quality," says Nielson from his office in Miller. "The Section 303(d) list is an EPA listing bylaws from a big, thick book. Essentially Cottonwood Lake and Lake Louise were in violation of those bylaws."

That was the easy part. After it was determined that something had to be done, those involved in the project had to figure out what had to be done.

Deciding how to go about implementation wasn't hard.

The results of the pollution assessment indicated that a combination of the implementation of best management practices on the crop and rangeland surrounding Cottonwood Lake, the construction of 19 nutrient management systems and the repair and replacement of 50 percent of the septic systems located around the lake would create a 44 percent reduction in the amount of pollution in the lake.

Nielson says that the success of the watershed improvement project hinges partially on the willingness of local producers to adopt new conservation practices. "Participation is completely voluntary, we can't force them to take part in the project," he says.

Some of those practices include rotational grazing to prevent agricultural runoff from Cottonwood's tributaries and installing buffer zones in crop areas. "The rotational grazing helps to put more grass in the field and saves the sediment from getting into the water," says Nielson. "And buffer zones are grassed waterways that act as filters and run through pastures and crop land. The zones are effective if nothing goes within about 150 feet of it, at least to start with. That allows the root zone to place itself and reduces the chances of the grass washing away in a rainstorm."

He says the ultimate goal of the Cononwood Lake project will be to flush out the mass amounts of sediment at the bottom of the lake and to keep it from accumulating again.

The burden on local producers when they install these conservation practices would be minimal, says Nielson. "We are willing to help them install these practices through our grant money," he says. "We have the ability to cost-share with any producer up to 75 percent. That means that if a producer wants to install one of these practices I am willing to pay up to 75 percent of the cost based on the NRCS cost list."

The Cottonwood Lake Watershed Improvement Project is slated to continue for another four years, and is funded by the EPA, local conservation districts and even the Cottonwood Lake Association who contributed $1,990 for the project.

Producers interested in applying for cost-sharing funds should contact Nielson at: 605-853-2410, extension three.

**Redfield City will be spraying for mosquitos on Tuesday evenings beginning at 8:00 pm** weather permitting. Wednesday evenings will be the alternate day. See Redfield Channel 7 for details.

THE HIGHMORE HERALD
HIGHMORE, SOUTH DAKOTA
THURSDAY, JULY 1, 2004
PAGE TWO

# Watershed project reaches mid point

The Cottonwood Lake/ Lake Louise Watershed Implementation Project has reached its third year of providing assistance installing conservation practices. These practices include grazing enhancement systems, grassed waterways, riparian buffer strips, agricultural waste management systems, and shoreline stabilization.

Since the project has entered the midway point of the project, there will be a review conducted to determine if the project is meeting its goals and if not, how it can be put back on target. The review will also look at how many producers there are in the watersheds compared to when the initial assessment began in May of 1999 and lasted through December of 2000.

During the course of the project, eleven producers acquired cost sharing for grazing management systems and two individuals have received assistance with nutrient management plans. Even though funds for grazing management have been depleted, there is still cost sharing available for grassed waterways, buffer strips, agricultural waste management systems, and shoreline stabilization.

If you are interested in any of the practices that are still available, contact Duane Nielsen, Watershed Coordinator, Central Plains Water Development District in the Miller USDA Building at (605) 853-2410 extension 3.

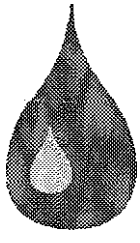
Hand County Conservation District News

July 2006

Volume 1, Issue 1



## COTTONWOOD LAKE/LAKE LOUISE WATERSHED PROJECT



Some of you may have heard about the watershed project that is taking place in the county, but for those that haven't heard yet... The Hand Conservation District is the sponsor for a 319 grant that is being used to drive the Cottonwood Lake/ Lake Louise Watershed Project. This project's goal is to decrease the amount of sediment and nutrients that enter Cottonwood Lake and Lake Louise on a yearly basis. To do this, the project has been helping producers to install grazing systems throughout the two watersheds. These watersheds cover a portion of Hand, Hyde, Faulk and Spink counties.

The Hand Conservation District recently acquired an amendment for the project to assist with more grazing projects. There are plans to create some shoreline stabilization along the shores of Cottonwood Lake this summer. If anyone is interested in this project, you can contact the project coordinator, Duane Nielsen, at 853-2410 ext **3.**

### TIDBITS

Now is the time to sign up for *2007* tree plantings and do land prep and to think about tree hand plants

Charlotte Taylor and Dan Ostrander, Service Forester gave all 3rd graders in Hand County a Black Hills Spruce for Arbor Day in April.

Trees planted in *2006--42,987*

Tree acres planted— 173.3

Miles of fabric applied to trees 43.4

Lynn Hi attended Range camp, Range training, and ATV training in June.

Hand County is declared a drought county, sign up for grazing and haying is opened on CRP acres to begin on July15th

Hand County Conservation District

# Hand County Conservation District News

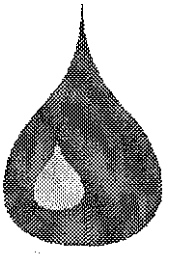
October 2006

Volume 2, Issue 1

OFFICE HOURS



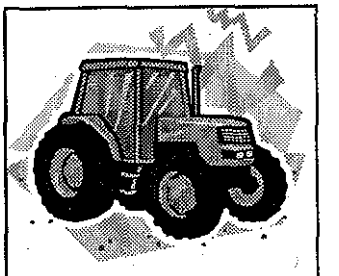
## WATERSHED NEWS



Fall is in the air. With the cooler temperatures, foliage will soon take on fall colors. This changing of the seasons has also seemed to grace us with precipitation. Pastures have gone from a dismal brown to a lush green extending grazing a little longer for some pastures and helping to ease the stress of going into the winter for others.

For those of you that are considering installing grazing practices this coming spring, time is getting short to sign up for funding assistance. The Cottonwood Lake/ Lake Louise Watershed Project is getting close to allocating all of the funds that are available. If anyone is interested in the Cottonwood Lake/ Lake Louise Watershed Project, you can contact the project coordinator, Duane Nielsen, at 605-853-2410 x3.

Although this isn't the only avenue for funding sources. The Natural Resource Conservation Service, US Fish and Wildlife Service and the Game, Fish and Parks all have programs to assist with grazing land management. I would suggest getting in touch with these partners to see what is available.



**Services available through the Conservation District:**

Truax **12 foot no-till drill for rent $8.00 per acre**

**8 foot disk for weed control in between tree rows.**

**Ripper for tearing out tree roots and rocks for tree renovations projects.**

**Tree planter** and **fabric** machine; **we also provide tractor and crew.**

HAND COUNTY CONSERVATION DISTRICT NEWS

JULY 2007 VOLUME 4, ISSUE 1

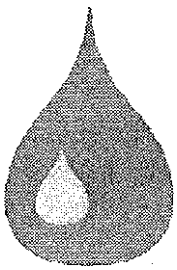
OFFICE HOURS:

8:00 AM TO 5:00PM

MONDAY THRU FRIDAY

Telephone: (605)-853-2410 *cxt* 3

## COTTONWOOD LAKE/LAKE LOUISE WATERSHED IMPROVEMENT PROJECT



Summer is upon us and harvest has begun for many producers. The spring blessed us with much needed rains to keep crops and pastures looking green. Even though this watershed project is not completely finished, it is getting closer to the end. So far this program has managed to help about twenty producers from four different counties (Hand, Hyde, Faulk and Spink) with projects and a few more are expected. Most of these projects dealt with grazing management, but some shoreline stabilization around Cottonwood Lake is being considered. I will be looking at finishing up these projects by the end of July so that there is time to process bills and such before the grant is finished.

Many of these projects would not have been possible without assistance from partners such as: NRCS, FSA, US Fish and Wildlife, SDDENR, all the Conservation Districts involved and Central Plains Water Development District. Thank you to all that participated in the Cottonwood Lake/ Lake Louise Watershed Improvement Project!

Duane Nielsen
Project Coordinator
Central Plains Water Development District