

PROJECT SUMMARY SHEET

PROJECT TITLE NAME: Twin Lakes / Wilmarth Lake Assessment
NAME AND ADDRESS OF LEAD PROJECT SPONSOR:

Aurora Conservation District
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STATE: South Dakota WATERSHED: James River HUC#: 10160011

PROJECT TYPES : BASE WATERSHED GROUNDWATER I&E
WATERBODY TYPES NPS CATEGORY
 Groundwater Agriculture Hydrologic modification
 Lakes/Reservoirs Urban Runoff Other
 Rivers Silviculture
 Streams Construction
 Wetlands Resource Extraction
 Other Stowage and Land Disposal

PROJECT LATITUDE 43.861755 LONGITUDE -98.579072

SUMMARIZATION OF MAJOR GOALS:

The goal of the Twin Lakes/Wilmarth Lake assessment project is to locate and document sources of nonpoint source pollution (primarily excess nutrient loading) in the watersheds. This project will produce TMDL targets and goals for the listed lakes and also document feasible restoration recommendations that may lead to a watershed implementation project.

PROJECT DESCRIPTION:

Twin Lakes is a natural lake (252 acres) located on the border of Sanborn and Aurora Counties. The watershed for Twin Lakes is approximately 1,120 acres. Wilmarth Lake is a 104 acre man-made reservoir in northern Aurora County with a 34,800-acre watershed that reaches into Jerauld County. Both watersheds are agricultural with a mixture of pasture and crop lands. Both Twin Lakes and Wilmarth Lake were listed on the 2002 303(d) list as waterbodies impaired for nutrient enrichment. Through water quality monitoring, stream gauging, stream channel analysis and land use analysis, the sources of impairment to the lake and the reservoir will be documented and feasible recommendations for restoration will be presented in the final project report.

319 funds requested \$64,000 State Fee Funds \$23,000
Other Federal Funds \$ 0 Local Match \$19,300
Total project cost \$106,300 Full Time Employee Equivalents 1.0

2.0 STATEMENT OF NEED

- 2.1 The purpose of this assessment is to determine the sources of impairments to Twin Lakes in Sanborn County, and Wilmarth Lake in Aurora County, South Dakota. The watershed to Twin Lakes is small with very intermittent flows. The watershed to Wilmarth Lake has creeks and small tributaries that are intermittent streams with loadings of sediment and nutrients.
- 2.2 Twin Lakes and Wilmarth Lake were targeted for assessment because they were listed on the 303(d) list for impaired waterbodies.

The streams in the watershed drain predominantly agricultural lands with both cropland and grazing acres. Feedlots and winter feeding areas for livestock are present in the Wilmarth watershed. The streams carry sediment loads and nutrient loads.

The watershed area for Twin Lakes is approximately 1,120 acres and lies within Aurora and Sanborn counties. The Wilmarth Lake watershed is approximately 34,800 acres and lies within Aurora and Jerauld counties. There are no municipalities or point source discharges in either watershed.

The species listed in the federal list of threatened and endangered species are the bald eagle (*Haliaeetus leucocephalus*), which is listed as threatened and the Topeka shiner (*Notropis topeka*) and whooping crane (*Grus americana*) which are listed as endangered. These species are not likely to be impacted by the assessment work of these projects.

- 2.3 See map in Figures 1 and 2.
- 2.4 Land use in the watersheds is primarily agricultural cropland and grazing. Row crops and hay are the main crops on cultivated lands. Some animal feeding areas are located in the watersheds. The major soil associations found in the Twin Lakes watershed are Clarno-Bonilla-Ethan in Sanborn County and the Clarno-Ethan-Prosper association in Jerauld County. These are nearly level to moderately sloping loamy soils, mixed in swales and uplands. The major associations in the Wilmarth watershed are a mix of many soil associations. There are well drained to poorly drained soils in the swales, depressions and other areas on uplands (Houdek-Ethan, Houdek-Dudley-Hoven, and Dudley-Beadle-Jerauld associations in Aurora County; and the Ethan-Houdek-Eakin, and Beadle-Dudley association in Jerauld County). There are well-drained and moderately well-drained soils on rises and side slopes and in swales and other areas on uplands (Highmore-Onita-DeGrey, Eakin-DeGrey, and Eakin-Ethan associations in Aurora County). There are well drained to excessively drained soils in terraces and uplands (Delmont-Enet-Talmo association in Aurora County and the Ethan-Betts association in Jerauld County). Finally there are poorly-drained and

moderately well-drained soils in flood plains (Durststein-Bon association in Aurora County).

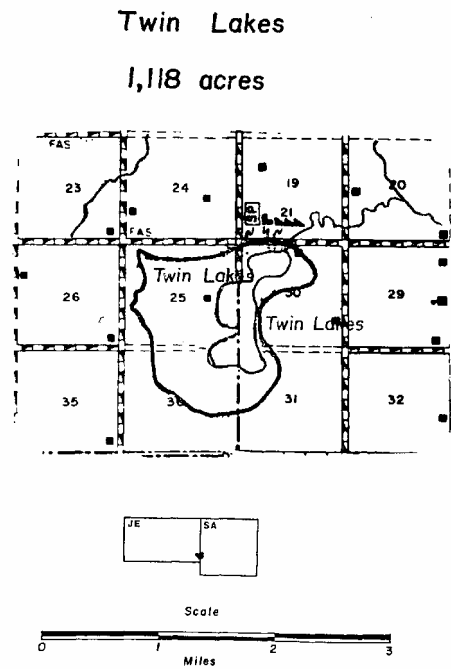


Figure 1. Twin Lakes Watershed

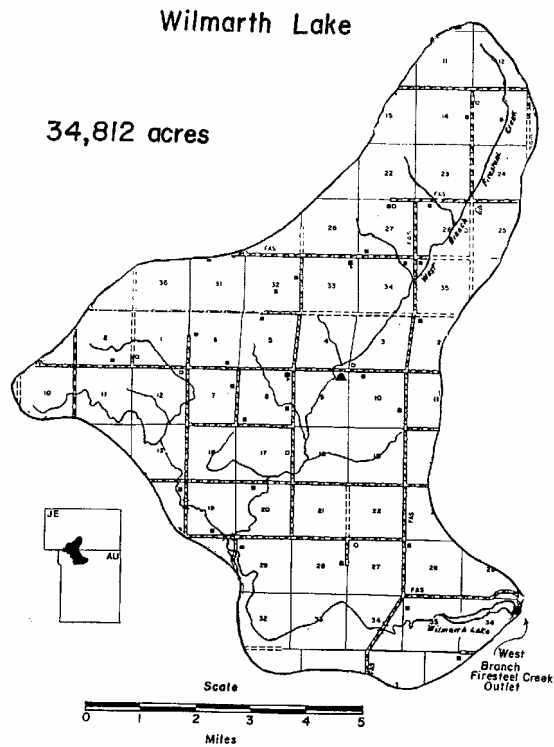


Figure 2. Wilmarth Lake Watershed

The average annual precipitation in the watershed is 20.55 inches of which 75% usually falls in April through September. In 2 years out of 10, less than 13 inches falls between April and September. Tornadoes and severe thunderstorms strike occasionally. These storms are local and of short duration and occasionally produce heavy rainfall events. The average seasonal snowfall is 29 inches per year.

- 2.5 The purpose of this assessment is to develop TMDL goals and targets and watershed restoration recommendations for both the Twin Lakes and Wilmarth Lake watershed. This assessment will serve as the foundation of a Section 319 implementation project.

ASSESSMENT WORKPLAN

- 3.0 The Twin Lakes/Wilmarth Lake project is a comprehensive assessment that will address sediment and nutrient problems in those watersheds. The overall goal is to produce TMDLs for eutrophication and improve the general water quality in the two watersheds. This may be accomplished by planning an effective implementation project and/or creating a site-specific standard that realistically reflects the natural conditions found in each watershed. Reducing nonpoint pollutants in the watersheds will improve the water quality in the watersheds and improve habitat for upland and aquatic species.

3.1 OBJECTIVES AND TASKS

OBJECTIVE 1: Determine a reference condition for comparison with the targeted monitoring sites for each watershed.

TASK 1 Selecting the reference site

Before gauging equipment is installed for the watershed project, the local sponsor and project officer will find a site in each watershed that would be considered least impacted. The sites should be representative of the other sample sites to be selected. The reference sites should be representative of the tributary running into Wilmarth Lake and Twin Lakes.

If a reference site cannot be found within the watershed the sponsoring entities may look at watersheds outside the project area but within a reasonable distance and representative of conditions in the project watershed.

Consideration for the sites should include land use, river morphology, soil type and other pertinent factors.

OBJECTIVE 1 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|------|----------------------------|--------------------|----------------|---------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | | \$1,950 | \$1,950 |
| Local Administration | \$150 | | | | | \$150 |
| Travel | \$200 | | | \$200 | | \$400 |
| Biological Analysis | | | | | | \$0 |
| Water Quality Analysis | | | | | | \$0 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | | | | | | \$0 |
| Total | \$350 | \$0 | \$0 | \$200 | \$1,950 | \$2,500 |

PRODUCTS:

- One reference site each for representing the tributaries entering Wilmarth Lake and Twin Lakes.

RESPONSIBLE AGENCIES:

Task Responsibility:

Project Coordinator
Project Sponsor

Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Meeting with various agencies to help determine a reference site in the watershed based on agreed-upon parameters.

OBJECTIVE 2:

This objective is to determine current annual load of nutrients and sediment to both Twin Lakes and Wilmarth Lake . This information will be used to help determine the target and goals of the TMDL and also be used to verify the results of the land use modeling. The information will be collected at the sites listed in Table 1 and shown in Figure 3.

TASK 1

Installation of gauging equipment

Install water level recorders at 5 tributary sites, 2 outlets and 1 reference site. The coordinator will maintain a continuous stage record for the project period, with the exception of winter months after freeze-up.

TASK 2 Determine the annual water discharge at each site.

Discrete discharge measurements will be taken on a regular schedule and during storm surges. Discharge measurements will be taken with a hand-held current velocity meter.

Discharges should be taken at different stages and frequently enough to develop a stage discharge rating curve. Discharge measurements and water level data will be used to calculate a hydrologic budget for the stream systems. This information will be used with concentrations of sediment and nutrients to calculate loadings from the watershed.

TABLE 1. TRIBUTARY SITE LOCATION DESCRIPTIONS

| Site Name | Site Description |
|------------------|--|
| TLT01 | The tributary entering Twin Lakes from the south. |
| TLT02 | The outlet of Twin Lakes. |
| WLT01 | The West Branch of Firesteel Creek approximately 7 miles directly north of Wilmarth Lake. Jerauld County Road 236 St. |
| WLT02 | The West Branch of Firesteel Creek 4 miles west and 1 miles north of Wilmarth Lake. Aurora County Road 376 Ave. |
| WLT03 | Side tributary approximately 1/3 mile west of the site WL02. Aurora County Road 242 St. |
| WLT04 | The West Branch of Firesteel Creek approximately 1.5 miles directly west of Wilmarth Lake. Aurora County Road 379 Ave. |
| WLT05 | The outlet of Wilmarth Lake. |

TASK 4 Collect water chemistry samples at the sites (Table 1) with the physical, chemical, and bacterial parameters found in Table 2.

Collect water quality samples from 5 tributary monitoring sites, two outlet sites, and the one reference site. Samples will be collected during spring runoff, storm events, and monthly base flows. Proposed water quality monitoring sites may be found in Figure 3.

TABLE 2. PARAMETERS MEASURED FOR TRIBUTARY SAMPLES:

| PHYSICAL | CHEMICAL | BACTERIAL | BIOLOGICAL |
|---------------------|---------------------------|----------------|------------------------------|
| Air temperature | Total solids | Fecal Coliform | Benthic macroinvertebrate* |
| Water temperature | Total susp. Solids | E.coli | Chlorophyll <i>a</i> * |
| Discharge | Dissolved oxygen | | Organic ash-free dry weight* |
| Depth | Ammonia | | Periphyton* |
| Visual observations | Un-ionized ammonia | | |
| Water level | Nitrate-nitrite | | |
| | TKN | | |
| | Total phosphorus | | |
| | Total dis. phosphorus | | |
| | Volatile suspended solids | | |
| | Field pH | | |

*Twice during the project if possible.

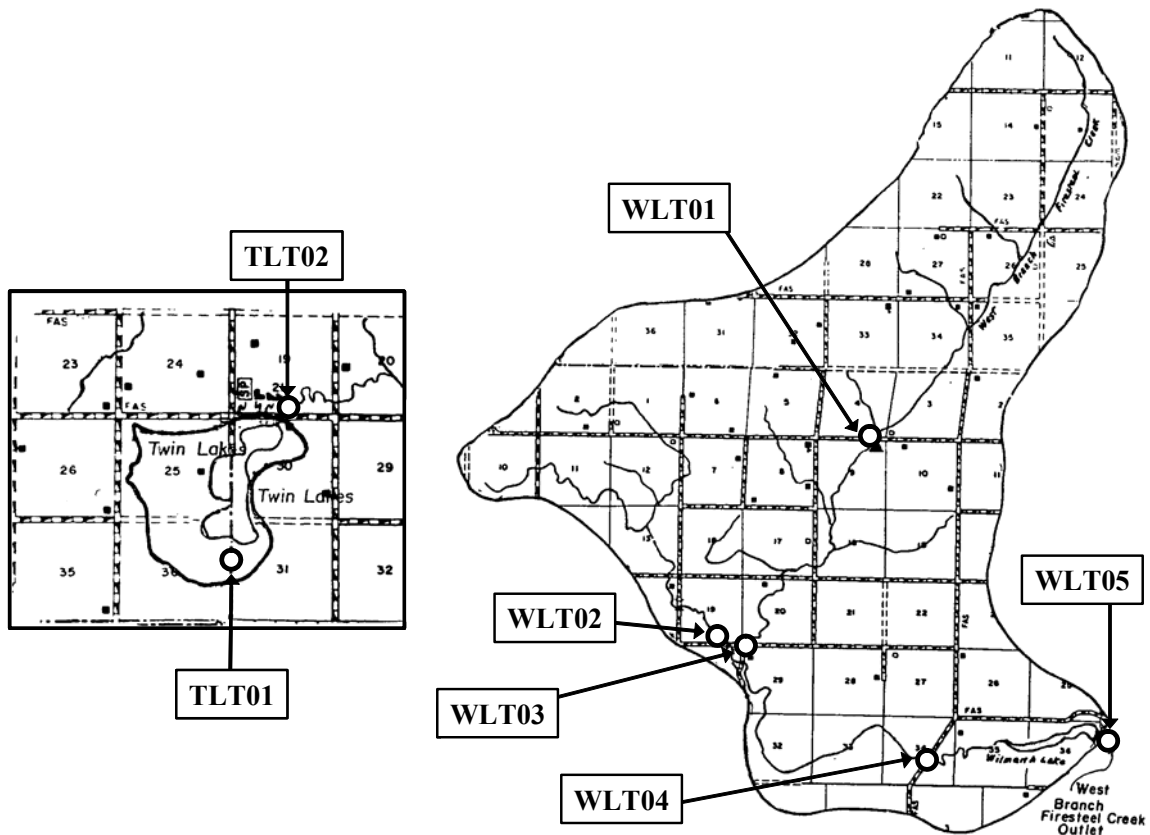


Figure 3. Location of Tributary Sites

Samples will be collected twice weekly during the first week of spring snowmelt runoff and once a week thereafter until runoff ceases. Storm events and base flows will be sampled throughout the project period. Approximately 13 samples will be collected at each site for an estimated total number of 104 samples.

TASK 4 Collection of discrete samples to help target nonpoint pollution sources

If loadings are found at the sites throughout the watershed, discrete samples will be collected to determine the source of the pollutant. An estimated 15 discrete samples will be collected for further targeting of nonpoint source pollutants.

TASK 5 Collection of biological samples at all reference and monitoring sites according to the biological parameters listed in Table 2.

Benthic macroinvertebrate samples will be collected once during the project at each of the tributary monitoring and reference sites. No samples will be collected at the lake outlet due to the influence of the lake/reservoir. Composite samples will be collected according to the department’s standard operating procedures for benthic macroinvertebrates. Samples will be collected using either a D-net or a Courtemanch sampler. All samples will be collected during a late summer to fall index period during the project and sent to a private consultant for processing.

Periphyton samples will be collected at each site during July and August. The samples will be collected using the department’s standard operating procedures for periphyton collection. Samples will be sent to a private consultant for enumeration and identification. The determination of periphyton chlorophyll *a* and ash-free dry weight will also be conducted.

OBJECTIVE 2 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|---------|----------------------------|--------------------|----------------|----------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | \$3,000 | | | \$8,700 | \$11,700 |
| Local Administration | \$900 | | | | | \$900 |
| Travel | \$2,200 | | | \$200 | | \$2,400 |
| Biological Analysis | | \$2,400 | | | \$1,000 | \$3,400 |
| Water Quality Analysis | | | | | \$17,850 | \$17,850 |
| Equipment | | | | | \$10,000 | \$10,000 |
| Supplies and Shipping | | | | \$500 | | \$500 |
| Total | \$3,100 | \$5,400 | \$0 | \$700 | \$37,550 | \$46,750 |

PRODUCTS:

- Installation of all necessary gauging equipment (5 monitoring sites, two lake outlets and 1 reference site)
- Collection of necessary discharge measurements at differing stages (minimum of 8 at each site)
- Collection of water chemistry samples (approximately 13 per site depending on discharge) 104 total
- Collection of macroinvertebrate and periphyton samples. (Approximately 6 macroinvertebrate samples and approximately 12 samples for periphyton identification, chlorophyll *a* and ash-free dry weight).

RESPONSIBLE AGENCIES:

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

The collection and organization of all discharge water quality and biological data. All samples will be collected according to the Program's Standard Operating Procedures for Field Samplers.

OBJECTIVE 3: Inlake Data Collection

TASK 6 Inlake Water Quality Sampling

For most of the project period, monthly samples will be collected at two inlake sites in both Twin Lakes and Wilmarth Lake (Figure 4). During June, July, and August, bi-weekly samples will be collected. Surface and bottom samples will be collected at all sites with depths greater than 10 feet. It is assumed both Wilmarth Lake sites and one site in Twin Lakes are more than 10 feet deep.

The list of inlake parameters is found in Table 3. Data for a depth profile will be collected at both sites each sample run. The minimum parameters to be gathered for the profile will include depth, water temperature, and dissolved oxygen. Additional parameters may also be obtained depending on the sample equipment provided by the state. Approximately 91 inlake samples will be taken in the two lakes.

TASK 7 Macrophyte survey

A macrophyte survey will be completed to determine the species and coverage of the macrophytes in the lake. The local coordinator will conduct the survey with assistance from the project office. The procedures for the macrophyte survey can be found in the Water Resource Assistance Program’s Standard Operating Procedures for Field Samplers.

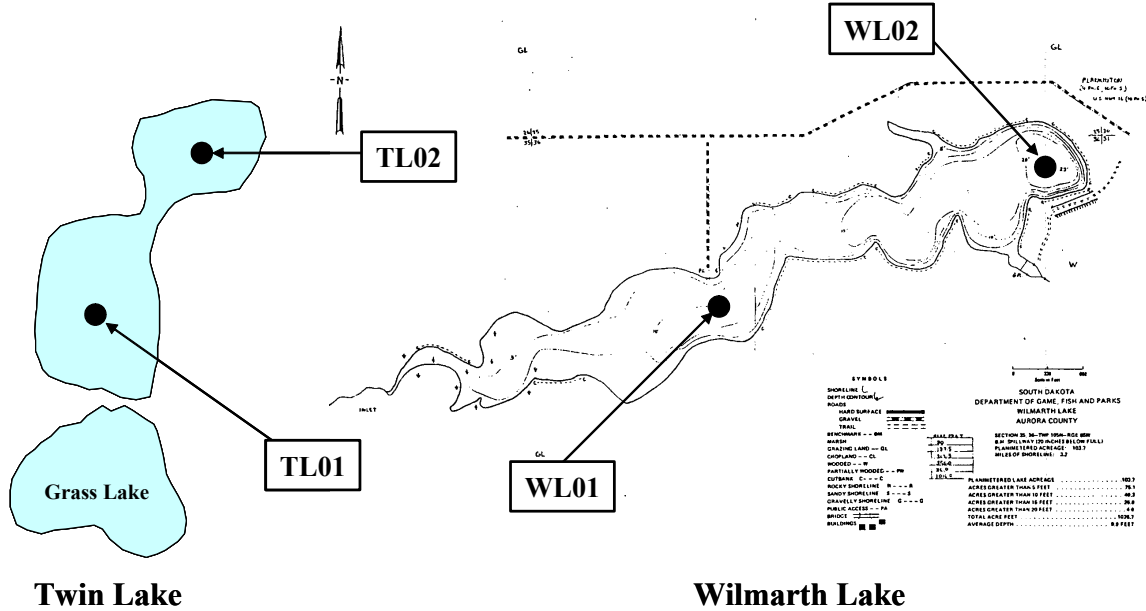


FIGURE 4. LOCATION OF INLAKE SAMPLE SITES

TASK 8 Elutriate sampling

One elutriate sample set will be collected in each lake during the project period. The sample set will consist of three composited receiving water samples and three composited mud samples. The subsample sites will be equally spaced along the longest fetch of the lake. Parameters to be analyzed for the elutriate samples will be a standard set of contaminants and metals as agreed upon between the State Health Lab and the Water Resource Assistance Program. The samples will be sent to the State Health Lab in Pierre for analysis.

TABLE 3. PARAMETERS MEASURED FOR INLAKE SAMPLES:

| PHYSICAL | CHEMICAL | BACTERIAL |
|---------------------|---------------------------|------------------|
| Air temperature | Total solids | Fecal coliform |
| Water temperature | Total susp. Solids | E.coli |
| Visual observations | Dissolved oxygen | |
| Depth | Ammonia | |
| | Un-ionized ammonia | |
| | Nitrate-nitrite | |
| | TKN | |
| | Total phosphorus | |
| | Total dis. phosphorus | |
| | Volatile suspended solids | |
| | Chlorophyll <i>a</i> | |
| | Field pH | |

TASK 9 Historical Sedimentation Determination

The project officer and the local sampler will collect water and sediment depths of the lakes to determine the accumulated sediment depths.

The state will use GIS mapping to determine the volume of sediment in the lakes. A map of the current water depth and the total water depth (sum of water and sediment) will be included in the final project report.

OBJECTIVE 3 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|------|----------------------------|--------------------|----------------|----------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | \$4,300 | \$1,550 | \$5,850 |
| Local Administration | \$450 | | | | | \$450 |
| Travel | \$600 | | | \$600 | | \$1,200 |
| Biological Analysis | | | | | | \$0 |
| Water Quality Analysis | | | | \$3,000 | \$13,650 | \$16,650 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | \$25 | | | \$500 | | \$525 |
| Total | \$1,075 | \$0 | \$0 | \$8,400 | \$15,200 | \$24,675 |

PRODUCTS:

- Collect 91 water quality samples.
- Complete a survey and map the macrophytes in the lakes.
- Collect two elutriate sample sets (each set consists of two receiving water and two sediment samples).
- Produce two up-to-date water depth maps and two total depth maps for each lake (sum of water and sediment).

RESPONSIBLE AGENCIES:

Task Responsibility:

Project Coordinator

Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Collect water quality samples, elutriate samples, and enough data to determine the original depth of the lake.

OBJECTIVE 4: QA/QC

TASK 11 QA/QC Procedures for data collection

The collection of all field water quality data will be accomplished in accordance with the Standard Operating Procedures for Field Samplers, South Dakota Nonpoint Source Program.

The number of QA/QC samples is based on a minimum of 10 percent of all samples collected. If the proposed tributary sampling schedule is met, up to 13 blank and 13 replicate QA/QC samples will be collected for water chemistry samples. One QA/QC sample will be collected for benthic macroinvertebrates. Approximately 2 samples each will be collected for periphyton identification, chlorophyll *a*, and ash-free dry weight.

If the proposed number of inlake samples are collected for the project, approximately 9 blank and 9 replicate QA/QC samples will be collected.

All QA/QC activities will be conducted in accordance with the Nonpoint Source Program Quality Assurance Project Plan.

The activities involved with QA/QC procedures and the results of QA/QC monitoring will be compiled and reported on in a section of the final project report and in all project reports.

All samples will be collected using the methods described in the Standard Operating Procedures for Field Samplers by the State of South Dakota Water Resources Assistance Program.

OBJECTIVE 4 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|---------|----------------------------|--------------------|----------------|---------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | | \$1,950 | \$1,950 |
| Local Administration | \$150 | | | | | \$150 |
| Travel | \$200 | | | \$200 | | \$400 |
| Biological Analysis | | \$600 | | | | \$600 |
| Water Quality Analysis | | \$4,800 | | | \$1,500 | \$6,300 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | \$25 | | | | | \$25 |
| Total | \$375 | \$5,400 | \$0 | \$200 | \$3,450 | \$9,425 |

PRODUCTS:

- 13 QA/QC sample sets for tributary water chemistry (a set includes one blank and one replicate)
- 1 benthic macroinvertebrate QA/QC sample
- 2 periphyton identification and enumeration QA/QC samples
- 2 periphyton chlorophyll *a* samples
- 2 periphyton ash-free dry weight QA/QC samples
- 9 inlake QA/QC sample sets will be collected (a set includes one blank and one replicate)

RESPONSIBLE AGENCIES:

Task Responsibility:

Project Coordinator
Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Approved QA/QC procedure will be utilized on all sampling and field data collected during the Twin Lakes/Wilmarth Lake Assessment Project. Please refer

to the South Dakota Nonpoint Source Program Quality Assurance Plan and the South Dakota Nonpoint Source Program Standard Operating Procedures for Field Samplers for details of the procedures to be followed.

OBJECTIVE 5: Evaluation of agricultural impacts to the water quality of the watershed through the use of the Annualized Agricultural Nonpoint Source (ANNAGNPS) model.

TASK 11 ANNAGNPS model data collection

The Twin Lakes watershed and the Wilmarth Lake watershed will be modeled using the ANNAGNPS model. ANNAGNPS is a comprehensive land use model that estimates sediment and nutrient loss and delivery and evaluates the impacts of livestock feeding areas. The watersheds will be divided into cells. Each cell will be analyzed after collecting several parameters for each cell with additional information collected for animal feeding operations.

The model will be used to identify critical areas of nonpoint source pollution to the surface waters in the watersheds. If critical areas are found the model will be used to determine attainable targets and goals for the TMDL.

OBJECTIVE 5 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|------|----------------------------|--------------------|----------------|----------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | \$11,700 | | \$11,700 |
| Local Administration | \$900 | | | | | \$900 |
| Travel | \$1,200 | | | \$1,200 | | \$2,400 |
| Water Quality Analysis | | | | | | \$0 |
| Biological Analysis | | | | | | \$0 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | \$150 | | | | | \$150 |
| Total | \$2,250 | \$0 | \$0 | \$12,900 | \$0 | \$15,150 |

PRODUCTS:

- Data collected and organized on the lakes' watersheds.
- Critical areas identified and attainable reductions calculated.

RESPONSIBLE AGENCIES:

Task Responsibility:

Project Coordinator
Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources
Natural Resources Conservation Service

OBJECTIVE 6: Public Participation

TASK 12 Public participation and involvement will be provided for and encouraged.

Informational meetings will be held on a quarterly basis for the general public and to inform the involved parties of progress on the study. These meetings will provide an avenue for input from the residents in the area.

News releases will be prepared and released to local news media on a quarterly basis. These releases will be provided to local newspapers, radio stations and TV stations.

A last meeting will be held while the watershed assessment final draft is nearing completion to get any last public input and comment into the report.

OBJECTIVE 6 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|------|----------------------------|--------------------|----------------|---------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | | \$1,950 | \$1,950 |
| Local Administration | \$150 | | | | | \$150 |
| Travel | \$200 | | | \$200 | | \$400 |
| Water Quality Analysis | | | | | | \$0 |
| Biological Analysis | | | | | | \$0 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | \$150 | | | | | \$150 |
| Total | \$500 | \$0 | \$0 | \$200 | \$1,950 | \$2,650 |

PRODUCTS:

- 4 public meetings will be held
- 4 news releases will be produced

RESPONSIBLE AGENCIES:

Task Responsibility:
Project Coordinator
Project Sponsor

Design and Technical Assistance:
South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

Informational meetings will be held on a frequent basis for the general public to inform the involved parties of progress on the study and provide a means of public input.

OBJECTIVE 7: Reporting

TASK 13 Sponsor's Reporting Duties

The sponsor will submit no more than monthly requests for payments along with documented work completed since the last voucher.

The sponsor will fulfill EPA grant requirements by submitting semi-annual updates and annual reports for input into the GRTS reporting system.

Once the field data are collected, an extensive review of the historical and project data will be conducted. The data will be organized and a final report will be submitted to the project officer including all of the data and a financial report of money expended.

TASK 14 Department's Reporting Duties

The project officer will ensure all semi-annual and annual reports are sent to the GRTS reporting officer.

The department will be responsible for a final report for each of the lakes, including hydrologic, sediment and nutrient budgets for the watershed.

The final report will also include the results of the ANNAGNPS modeling of the watershed used in conjunction with the water quality and hydrologic budget to determine critical areas in the watersheds.

The feasible management practices will be compiled into a list of recommendations for the development of an implementation project that will also be included in the final project report.

The TMDL target and goals will be included in the final report of the Twin Lakes and Wilmarth Lake Watershed Assessment document.

OBJECTIVE 7 BUDGET

| LINE ITEMS | NON-FEDERAL | | | | FEDERAL 319 | TOTAL |
|-------------------------------|-------------|------|-------------------------|-----------------|-------------|---------|
| | In-Kind | Cash | Conservation Commission | State Fee Funds | | |
| Local Coordinator (@ \$15/hr) | | | | | \$3,900 | \$3,900 |
| Local Administration | \$300 | | | | | \$300 |
| Travel | \$400 | | | \$400 | | \$800 |
| Water Quality Analysis | | | | | | \$0 |
| Biological Analysis | | | | | | \$0 |
| Equipment | | | | | | \$0 |
| Supplies and Shipping | \$150 | | | | | \$150 |
| Total | \$850 | \$0 | \$0 | \$400 | \$3,900 | \$5,150 |

PRODUCTS:

- Semi-annual and annual reports as required by the EPA grant
- Final report to the department from the sponsor
- Two final reports including the TMDL submitted to EPA by the Department of Environment and Natural Resources

RESPONSIBLE AGENCIES:

Task Responsibility:

Project Coordinator
Project Sponsor

Design and Technical Assistance:

South Dakota Department of Environment and Natural Resources

WORK ACTIVITIES:

All required GRTS reporting will be written according to EPA guidelines. An extensive review and study of the historical and current data will be done to determine the best management practices and hydrologic restoration techniques

needed to improve water quality and reduce sediment transport in the lakes' watersheds.

- 3.3 MILESTONE TABLE - see attached milestone.
- 3.4 No special permits are required to do this assessment project.
- 3.5 The Aurora Conservation District is the lead project sponsor for this project. The conservation district is important to this project because of its relationship with landowners in the watersheds. The main problem with this watershed appears to be nutrients resulting in eutrophication of the lakes.

4.0 COORDINATION PLAN

- 4.1 The following groups/agencies have agreed through an informal agreement to cooperate in the Twin Lakes/Wilmarth Lake Assessment Project. Additional entities such as the SD Department of Game, Fish and Parks may provide supplemental information.

Aurora Conservation District - Local Project Sponsor.

Sanborn Conservation District - Project Support.

Jerauld Conservation District - Project Support.

USDA Natural Resource Conservation Service – Support and technical assistance in acquiring land use data.

US Environmental Protection Agency –Financial support and technical assistance.

Department of Agriculture – Financial Support

South Dakota Department of Environment and Natural Resources – Financial support and technical assistance.

- 4.2 In 2002, the Twin Lakes and Wilmarth Lake were listed on the 303(d) list for impaired waters. The local conservation district was approached and agreed to accept the responsibility as local sponsor.
- 4.3 Local organizations as well as the SD Nonpoint Source Task Force have expressed support for the Twin Lakes/Wilmarth Lake Assessment Project.
- 4.4 This project will coordinate with frequent informal conversations with state, federal, and local government agencies and through quarterly meetings with the conservation district.

- 4.5 Currently, there are no other agencies conducting assessment project activities on the Twin Lakes or the Wilmarth Lake watersheds in Aurora, Sanborn, and Jerauld Counties.

The Wilmarth Lake watershed is within the Firesteel Creek/Lake Mitchell Implementation project. During the assessment for Firesteel Creek, a monitoring site was established at the outlet of Wilmarth Lake but no targeted monitoring sites were installed in the Wilmarth Lake tributaries. Land-use modeling was completed, however, and with the new technologies and improved models the land use data will be updated and re-modeled. Any information that would be mutually beneficial for these two watershed projects will be shared through public meetings and verbal communication between the local coordinators.

5.0 EVALUATION AND MONITORING PLAN

- 5.1 The monitoring strategy is explained in Section 3. The project will produce bi-annual progress reports. The sampling and analysis procedures required to complete the tasks within Section 3 can be located in the Standard Operating Procedures for Field Samplers for the South Dakota Nonpoint Source Program (SOP). The specific locations of these sampling methods within SOP as they pertain to each task are documented in Table 4 on the following page.
- 5.2 This assessment project consists of a combination of chemical, hydrologic, land use and biological analyses. Monitoring sites will be maintained and sampled on the Twin Lakes and Wilmarth Lake watersheds. Ambient samples will be collected along with spring runoff and storm events. Stream discharge will be routinely measured. The chemical, physical, and biological parameters to be sampled during this project can be located in Table 2 and Table 3. Loads will be calculated based on the samples and data collected with the approved methods identified in section 5.1. A TMDL report will be produced for both Twin Lakes and Wilmarth Lake.
- 5.3 All water quality monitoring will be done in accordance with the approved South Dakota Nonpoint Source Program Quality Assurance/Quality Control Project Plan and the Standard Operating Procedures for Field Samplers for the South Dakota Nonpoint Source Program.
- 5.4 Results from all water quality monitoring efforts under the Twin Lakes/Wilmarth Lake Assessment Project will be reported in the final project report. Data will be managed by the South Dakota Department of Environment and Natural Resources and maintained in a computer database. All sample data will be entered in the US EPA STORET Program by DENR. These data will be used as the foundation of a Section 319 Watershed Implementation Project proposal.

6.0 BUDGET

See attached budget pages

7.0 PUBLIC INVOLVEMENT

See Objective 6.

TABLE 4. Location of sampling and analysis procedures for each applicable task involved with the Twin Lakes/Wilmarth Lake watershed assessment projects.

| TASK NUMBER | TASK DESCRIPTION | ACTIVITY | REFERENCE IN SDWRA-2000 SOP |
|--------------------|--------------------------------------|---|---|
| Task 3 | Developing Annual Water Discharge | Collecting a discharge measurement | Section 7.1 pp. 5-9 |
| Task 4 | Collect Water Chemistry Samples | Tributary Sampling Procedures | Section 7.1 pp. 1-5 Section 7.1 pp. 9-18 |
| Task 5 | Targeting Nonpoint Source Pollutants | Discrete Sample Collection | Section 7.1 pp. 1-18 |
| Task 6 | Biological Monitoring | Macroinvertebrate Sampling | Section 15.1 |
| Task 6 | Biological Monitoring | Periphyton Sampling | Section 7.5 pp. 2 |
| Task 7 | Inlake Sampling. | Inlake Sampling. | Section 7.0 pp. 1-12 |
| Task 8 | Determine Macrophyte Coverage | Conduct a macrophyte survey | Section 7.2 |
| Task 9 | Elutriate Sampling | Elutriate Sampling | Section 7.3 pp. 1-4 |
| Task 10 | Sediment Depth Determination | Sediment Depth Determination | Section 9,0 pp. 1-9 |
| Task 11 | Quality Assurance/Quality Control | Quality Assurance Quality Control Sampling | Section 10.0 |
| Task 12 | AGNPS Model Data Collection | AGNPS Model Data Collection | Section 17.0 |

| TWIN LAKES/WILMARTH LAKE ASSESSMENT PROJECT BUDGET | | | |
|---|-----------------|-----------------|------------------|
| PART 1: FUNDING SOURCES | 2003 | 2004 | TOTAL |
| EPA SECTION 319 FUNDS | \$16,000 | \$48,000 | \$64,000 |
| NONFEDERAL FUNDS* | \$10,000 | \$32,300 | \$42,300 |
| TOTAL BUDGET | \$26,000 | \$80,300 | \$106,300 |

*INCLUDES MULTIPLE COMMUNITY ORGANIZATIONS AND AGENCIES

Twin Lakes/Wilmarth Lake Watershed Assessment Budget

| ITEM | Total | Federal | Nonfederal | EPA 319 | State Fee Funds | Local Total | Local Cash | Local In-kind |
|-------------------------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
| Local Coordinator (2,600 @ \$15/hr) | \$39,000 | \$20,000 | \$19,000 | \$20,000 | \$16,000 | \$3,000 | \$3,000 | |
| Local Administration | \$3,000 | | \$3,000 | | | \$3,000 | | \$3,000 |
| Travel | \$8,000 | \$0 | \$8,000 | | \$3,000 | \$5,000 | | \$5,000 |
| Biological Analysis * | \$4,000 | \$1,000 | \$3,000 | \$1,000 | | \$3,000 | \$3,000 | |
| Water Quality Analysis ** | \$40,800 | \$33,000 | \$7,800 | \$33,000 | \$3,000 | \$4,800 | \$4,800 | |
| Equipment | \$10,000 | \$10,000 | \$0 | \$10,000 | | | | |
| Supplies and Shipping | \$1,500 | | \$1,500 | | \$1,000 | \$500 | | \$500 |
| Total | \$106,300 | \$64,000 | \$42,300 | \$64,000 | \$23,000 | \$19,300 | \$10,800 | \$8,500 |
| | | 60% | 40% | | | | | |

*Biological Analysis

| | |
|--|----------------|
| Macro Invert 6 @ \$200 | \$1,200 |
| Periphyton ID 12 @ \$200 | \$2,400 |
| Periphyton Ash free Dry Weight 12 @ \$20 | \$240 |
| QA/QC Macro Invert 1 @ \$200 | \$200 |
| QA/QC Periphyton ID 1 @ \$200 | \$200 |
| QA/QC Periphyton Ash free Dry Weight 1 @ \$20 | \$20 |
| Subtotal | <u>\$4,260</u> |

**Water Quality Analysis

| | |
|----------------------------------|-----------------|
| 8 sites - 104 samples @ \$150 | \$15,600 |
| Inlake Analysis 91 @ \$150 | \$13,650 |
| Discrete Samples 15 @ 150 | \$2,250 |
| QA/QC Trib Samples 20 @ \$150 | \$3,000 |
| QA/QC Inlake Samples 18 @ \$150 | \$2,700 |
| QA/QC Discrete Samples 4 @ \$150 | \$600 |
| Elutriate Sample | \$3,000 |
| Subtotal | <u>\$40,800</u> |

Twin Lakes/Wilmarth Lake Watershed Assessment Projects
Aurora Conservation District
Milestone Chart
2003, 2004, 2005

| | 2003 | | | | 2004 | | | | | | | | | | | | 2005 | | |
|--|------|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|------|---|---|
| | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M |
| Objective 1 - Reference Site Selection | | | | | | | | | | | | | | | | | | | |
| Objective 2 - Tributary Sampling | | | | | | | | | | | | | | | | | | | |
| Objective 3 - Inlake Data Collection | | | | | | | | | | | | | | | | | | | |
| Objective 4 - QA/QC | | | | | | | | | | | | | | | | | | | |
| Objective 5 - ANNAGNPS | | | | | | | | | | | | | | | | | | | |
| Objective 6 - Public Participation | | | | | | | | | | | | | | | | | | | |
| Objective 7 - Reporting | | | | | | | | | | | | | | | | | | | |

SOUTH DAKOTA NONPOINT SOURCE PROGRAM
QUALITY ASSURANCE PROJECT PLAN

SUBMITTED BY:

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF FINANCIAL AND TECHNICAL ASSISTANCE
WATER RESOURCES ASSISTANCE PROGRAM

Prepared by: Robert Smith
February, 2001

Project Title: Twin Lakes/ Wilmarth Lake Assessment Projects

APPROVED BY:

South Dakota Watershed Protection Program
Environmental Senior Scientist, Assessment Section

Date

South Dakota Watershed Protection Program
Project Officer

Date

South Dakota Watershed Protection Program
Quality Assurance Coordinator

Date

South Dakota DENR Quality Assurance Officer

Date