Exhibit F

Begin here by typing in the year. Then tab or place your cursor in each gray shaded field as desired.

Federal Fiscal FY: 2005/2008/2010 **Today's Date**: 10/01/2009

Select project type from the drop-down box below:

Project Type: WATERSHEDS

PROJECT TITLE: Expansion-Continuation of the Upper Big Sioux River Watershed Project (Amendment)

PROJECT SPONSOR

NAME: City of Watertown

ADDRESS: City Hall

ADDRESS: 23 2nd St NE, PO Box 910

CITY: Watertown **STATE**: SD **ZIP**: 57201-0910

PHONE: 605-882-5250 **EXT:**

FAX: 605-882-5251 **E-MAIL**: mikewill@iw.net

PRIMARY CONTACT

NAME: Mike Williams **PHONE**: 605-882-5250 **EXT**:

SIGNATORY NAME: **PHONE:** **(OPTIONAL)**

STATE CONTACT PERSON:

NAME: Ken Madison

PHONE: 605-882-5113 **EXT**:

FAX: 605-882-5066

E-MAIL: Ken.Madison@state.sd.us

CATEGORY & FUNCTIONAL CATEGORY

Drop-down lists. Please select up to 4 categories below.

NPS Category and Percent

The primary category of pollution is intended to identify the principal or main pollutant(s) the project is attempting to correct. The selections are obtained from drop-down list associated with the data element.

NPS CATEGORY	Percent
AGRICULTURE	50
ANIMALFEEDING OPERATIONS	40
OTHER NPS POLLUTION	10

NPS Functional Category

These activities are intended to identify the principal or main approach, remedy, or solution to achieve the objective of the project. Selections are obtained from the drop-down list associated with the data element.

NPS FUNCTIONAL CATEGORY OF ACTIVITY
BMP IMPLEMENTATION/DESIGN
RESTORATION/PROTECTION/PREVENTION
TECHNICAL ASSISTANCE
EDUCATION/INFORMATION PROGRAMS

WATERSHED NAME: Upper Big Sioux River Watershed

USGS HYDROLOGICAL UNIT CODE: 10170202

LATITUDE/LONGITUDE

Use degrees and decimals only. Do not put in degrees, minutes, seconds. For example: put in **45.55** rather than 45 deg 30 min 30 sec.

PROJECT LOCATION **LATITUDE: 44.9317 N** **LONGITUDE: -97.2033 W**

EXHIBIT F

WATERBODY TYPE

A name indicating the type of waterbody/watershed associated with the NPS project.

LAKES
RIVERS/STREAMS
WETLANDS
PONDS

TMDL AND CLEAN LAKES INFORMATION

A field that identifies the relationship of the given nonpoint source project's funding to total maximum daily load (TMDL) activities.

TMDL PRIORITY: HIGH

TMDL DEVELOPMENT?: YES

TMDL IMPLEMENTATION?: YES

CLEAN LAKES PROJECT?: NO

POLLUTANT TYPE

The name of the pollutant that the particular nonpoint source project is attempting to address. Selection of the pollutant is made from drop-down list.

POLLUTANTS:

PATHOGENS (COLIFORM)

PHOSPHORUS

TURBIDITY

Pollutants not listed in POLLUTANTS box if needed. Selection of the pollutant is made from the drop-down list.

ADDITIONAL POLLUTANTS:

SUSPENDED SOLIDS

FUNDING

PLEASE TAB OUT OF THE FIELD AFTER ENTRY

FY§319(h) BUDGET FUNDS: $1,090,000 ($50,000 FFY 2005; $500,000 FFY 2008; $540,000 FFY 2010)

NON-FEDERAL MATCHING FUNDS: $1,221,202

OTHER FEDERAL FUNDS: $204,000

STATE FUNDS: $139,952 (SRF)

LOCAL FUNDS: $1,081,250

TOTAL BUDGET: $2,515,202.00

OTHER FUNDS:

STATE 319(h) FTE's FUNDED UNDER THIS GRANT: 2.5

GOALS AND PROJECT DESCRIPTION

Narrative fields used to provide the anticipated benefits and goals of the project and the project description.

GOALS: This project segment is a portion of the twenty-year program to reduce phosphorus and silt loads entering Lake Kampeska and Pelican Lake by 50 percent. The goal of this project segment is to improve the quality of the water entering the lakes and continue restoration of the full beneficial uses of the lakes by decreasing both nutrient and sediment loading by 15 percent.

PROJECT DESCRIPTION: The project is designed to continue reducing nutrient and sediment loads entering Lake Kampeska and Pelican Lake and continue a pollution prevention (P2) program for the entire project area. Reduction of nutrient loads from the watershed will be accomplished through the installation of Animal Nutrient Management Systems and Innovative Manure Application. Sediment loads from the watershed will be reduced by installing riparian area repair practices, grassed waterways and small dams/basins, stabilizing streambanks and lakeshore.

EXHIBIT F

PROJECT SUMMARY SHEET

PROJECT TITLE NAME:
Expansion-Continuation of the Upper Big Sioux River Watershed Project **(AMENDMENT)**

NAME AND ADDRESS OF LEAD PROJECT SPONSOR

City Of Watertown, City Hall
23 2nd St NE, P O Box 910
Watertown, SD 57201-0910
mikewill@iw.net

STATE CONTACT PERSON: Jim Feeney
TITLE: Natural Resources Administrator
EMAIL: jim.feeney@state.sd.us
PHONE: 605-773-4254 **FAX:** 605-773-4068
STATE: SOUTH DAKOTA **WATERSHED**: Big Sioux River north of Pelican Lake and Lake Kampeska and Pelican Lake Sub-basin

HYDROLOGIC UNIT CODE: 1017020
HIGH PRIORITY WATERSHED (yes/no) YES .

PROJECT TYPES: [ ] BASE [X] WATERSHED [ ]GROUNDWATER [ ] I&E

WATERBODY TYPES
[ ] GROUNDWATER
[X] LAKES/RESERVOIRS
[X] RIVERS
[X] STREAMS
[X] WETLANDS
[ ] OTHER

NPS CATEGORY
[X] AGRICULTURE
[ ] URBAN RUNOFF
[ ] SILVICULTURE
[ ] CONSTRUCTION
[ ]RESOURCE EXTRACTION
[ ] HYDRAULIC MODIFICATION
[ ] OTHER

Latitude: 44.9317 N **Longitude:** -97.2033 W

SUMMARIZATION OF GOALS: This project segment is a portion of the twenty-year program to reduce phosphorus and silt loads entering Lake Kampeska and Pelican Lake by 50 percent. The goal of this project segment is to improve the quality of the water entering the lakes and continue restoration of the full beneficial uses of the lakes by decreasing both nutrient and sediment loading by 15 percent.

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FY 05 & 08 & 10 **319 FUNDS:** $1,090,000 ($50,000 FFY 2005; $500,000 FFY 2008; **$540,000 FFY 2010)**

OTHER FEDERAL FUNDS: $204,000 **MATCH**: $1,221,202 **SRF:** $139,952

TOTAL PROJECT COST: $2,515,202 **319 FUNDED FULL TIME PERSONNEL:** 2.5

EXHIBIT F

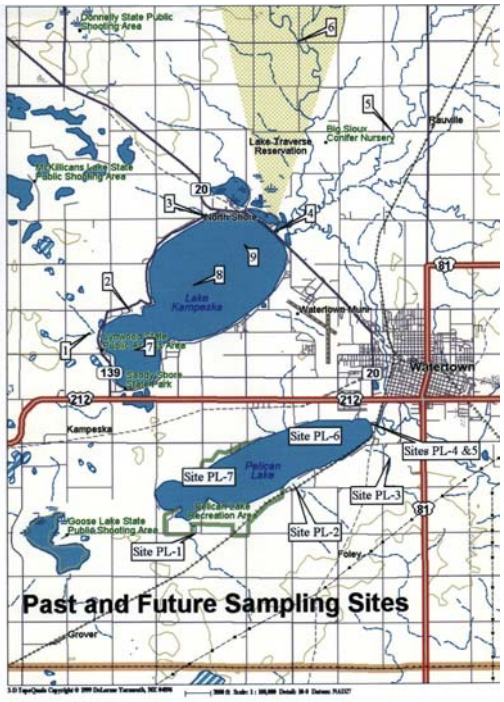
2.0 STATEMENT OF NEED

2.1 The Big Sioux River from its origin to Pelican Lake drains a 245,399-acre watershed in the Prairie Coteau Region of northeast South Dakota. Waters in the Upper Big Sioux River Watershed exist in linear, riverine, temporary, seasonal, semi-permanent and permanent wetlands. Most of these wetlands have a direct connection with a shallow aquifer (Big Sioux) and trade water back and forth regularly. Storm events of 10, 25, 50 and 100-year intensity occur within the watershed boundaries. A 25-year, 24-hour event produces 4.4 inches of rain. When this occurs in the project area, which is in one of the youngest geologic formations in South Dakota, the runoff carries with it quantities of silt, phosphorus and fecal coliform bacteria. The origin of the pollutants has been identified as farming practices and livestock production in the watershed. (See Table 4 and Figure 6 for land use)

Runoff drains to four tributaries (Mud Creek, Mahoney Creek, Soo Creek and Indian River) on the eastern side of the watershed and Still Lake on the west, through temporary or seasonal linear wetlands before entering the Big Sioux River. These waters flow to the larger permanent wetlands where they release sediment, nutrients and fecal coliform bacteria collected during the overland flow. This results in degraded water quality in the permanent wetlands that ultimately affects human health, recreation and livelihood.

Water quality monitoring of tributaries, sampling sites as shown in Figure 1, to the Big Sioux River shows high concentrations of phosphorus and sediment. Nitrogen concentrations in surface waters were not considered to be a major factor in nonpoint source pollution. During major runoff events these pollutants are carried to tributaries and downstream to Lake Kampeska, Pelican Lake and other lakes located along the Big Sioux River in the area south of the project.

Figure 1. Past and Future Sampling Sites



2.2 This proposal continues the restoration effort initiated during 1994 in the Upper Big Sioux River Watershed and the immediate Lake Kampeska and Pelican Lake sub-basins. Information in this proposal justifies the continuation of the project and helps insure that all beneficial uses of the three waterbodies will be realized. The three waterbodies are located in the USGS hydrologic unit 10170202.

Pelican Lake is located three miles south of Lake Kampeska. The major tributary to both lakes is the Big Sioux River. The Big Sioux River and Lakes Kampeska and Pelican are included on the South Dakota Nonpoint Source Priority Waterbody List. Designated beneficial uses and impairment status of Lake Kampeska, Pelican Lake and the Big Sioux River have changed during the Upper Big Sioux River Watershed Project. Current status of designated uses listed in the 2006 SD Integrated Report for Surface Water Quality Assessment (SDIRSWQA) shows project effectiveness by having many of the uses removed from impaired status.

Current water quality monitoring by the SD DENR shows low oxygen levels in the Big Sioux River from Ortley near the river headwaters to Lake Kampeska. Water quality samples to prepare a TMDL to address this impairment will be collected as part of this project. (Objective 2, Task 2, Product 6). Excess nutrients and silt loads contribute to this condition. The SDIRSWQA indicates that *Immersion Recreation* and *Warm Water Permanent Fish Life Propagation* are still impaired in Lake Kampeska. Pelican Lake and the Upper Big Sioux River continue to have an impaired *Warm Water Semi-permanent Fish Life Propagation* use designation. See Table 1. Under the direction of the SD DENR water quality samples will be gathered during this proposed project segment to prepare a new TMDL to address this impairment.

Table 1. Designated Beneficial Uses of Lake Kampeska, Pelican Lake and the Big Sioux River
(Source: http://www.state.sd.us/denr/Documents/04IRFinal.pdf)

Designated Use	Lake Kampeska	Impaired	Pelican Lake	Impaired	Big Sioux River	Impaired
Wildlife Propagation, Stock Water, Irrigation	YES	NO	YES	NO	YES	NO
Immersion Recreation	YES	YES	YES	NO	N/A	N/A
Limited Contact Recreation	YES	NO	YES	NO	YES	NO
Domestic Water Source	YES	NO	N/A	N/A	YES	NO
Warm Water Permanent Fish Life Propagation	YES	YES	N/A	N/A	N/A	N/A
Warm Water Semi-Permanent Fish Life Propagation	N/A	N/A	YES	YES	YES	YES

2.3 Monitoring of the watershed began during 1989 with studies of the Lake Kampeska in-lake silt load and continued with a South Dakota Department of Environment and Natural Resources (SD DENR) Diagnostic/Feasibility (D/F) Study completed at the request of the Kampeska Chapter of the Izaak Walton League. The study included use of the Universal Soil Loss Equation (USLE) for analysis of the watershed. USLE was used to estimate soil losses from subwatershed areas in the Lake Kampeska Watershed. Nutrient monitoring was accomplished using in-lake as well as in the watershed sampling. Samples were analyzed at the SD State Health Laboratory in Pierre, SD. Lake Kampeska was determined to have a

mean Carlson Trophic State Index (TSI) Rating of 95 during 1993; Pelican Lake a mean index of 71.34 during 1995. The Lake Kampeska sediment survey found an average sediment depth of more than 9 feet. This value represents over 52 million cubic yards of measurable silt that occupies 36 percent of the measurable lake depth. The Lake Pelican survey found a mean sediment thickness of 8 feet and a total volume of 36 million cubic yards. See Figures 1-3 for watershed delineation, major soil formations, land use, and aquifer depths.

Based on the results of the study and DENR recommendations, priority areas were chosen to protect city domestic drinking water and designated recreational uses of the lakes in and near the city limits. See Figure 4 for past and future sampling sites. Based on the studies, best management practices (BMPs) were recommended to help reduce sediment, nutrients and bacteria loads entering Lakes Kampeska and Pelican from priority areas before attempting in-lake restoration activities such as silt removal. The BMPs included:

- Lake shoreline stabilization/management
- Construction of small ponds
- Construction/repair of grassed waterways
- Filterstrips/grass seeding in riparian areas
- Construction of animal nutrient management systems
- Streambanks stabilization,
- Information/education programs
- Wetland restoration
- Promotion of Conservation Reserve Programs
- Identification of failing septic systems at Pelican Lake
- Investigation of feasibility of river flow control structures
- Investigation of feasibility of new lake outlet
- Consideration of selective in-lake sediment removal

The Lake Kampeska Watershed Implementation Project which began during 1994 was expanded to include Pelican Lake and became the Upper Big Sioux River Watershed Project during 1996. The project has continued since that time with BMPs approved by the SD DENR and the Environmental Protection Agency (EPA) Region 8.

PL 566 River Basin Study

During 1996, a PL 566 River Basin Study requested by the Codington Conservation District was authorized by the United States Department of Agriculture in conjunction with the SD DENR.

The purpose of the study was to evaluate cost-effective alternatives for the development of water and related land resources that would:

- Identify and quantify areas needing treatment for sediment reduction and water quality improvement.
- Enhance the water quality and aesthetics of the Big Sioux River, Lake Kampeska and Pelican Lake through the reduction of sediment and nutrients.

- Increase economic and environmental stability through improved conservation application.
- Improve economic development of the area by enhancing wildlife and fish habitat.
- Improve recreation use and increase productivity of depleted agricultural lands.

The study was designed to assess the water quality of Lake Kampeska, Pelican Lake and the watercourses bringing surface water to them. The study also identified sources of nutrients and sediment that were causing the degradation of the lakes and outlined restoration alternatives to improve water quality in the watershed and the lakes. Predictions were made using the results of models of current conditions and with recommended proposed BMPs in place.

Soil erosion reduction during this segment was evaluated using two methods:

- Annual Agricultural Nonpoint Source Pollution modeling (ANNAGNPS) was used to estimate the sediment and phosphorus from cropland sheet and rill erosion delivered to the mouth of Lake Kampeska.
- RUSLE2 was used to estimate predicted sediment totals from all sources

Estimates of sediment and phosphorus levels determined using the three methods were routed through the Upper Big Sioux River Watershed to compare alternative sets of conservation practices and their effect on annual sediment yields.

The PL 566 River Basin Study confirmed the results of the D/F study. Based on the results, the twenty-year goal for the Upper Big Sioux River Watershed Project to reduce loadings by a minimum of fifty percent was established. After 10 years, the AGNPS model shows that the BMPs have reduced phosphorus and silt loads to the Big Sioux River. The BMP recommendations in the PL 566 River Basin Study support the workplans of the 319 project. The recommendations included in the 566 study call for a 30 percent reduction in sediment and phosphorus over a ten-year period by reducing sheet and rill erosion on cropland with no-till, minimum till, and filterstrips; reducing runoff of animal feeding operations with manure confinement systems and nutrient management; reducing erosion on rangeland with small ponds and prescribed grazing; reducing streambank erosion with stabilization and riparian restoration; and reducing gully erosion with critical area shaping and seeding along with grassed waterways. (See Tables 2, 3, 4 relative to reductions attained to 2005.)

The Upper Big Sioux River Watershed Project D/F report contains few differences from the recommendations in the PL 566 River Basin Study. The main differences were: 1. The Upper Big Sioux River Watershed recommendations included shoreline stabilization and nutrient management to decrease phosphorus levels that were not part of the PL-566 River Basin Study. After shoreline soil loss was measured during major storm events, silt loads from the shoreline were determined to be a significant contribution to the silt load entering the lakes. 2. The 566 study did not include alternate livestock water sources installed to reduce animal contact with the Big Sioux River. 3. Manure application management as a component of animal nutrient management plans required by the NRCS were recommended practices not included in the D/F study.

Completion of the 20-year program is needed to protect the drinking water source of the City of Watertown and to restore Lake Kampeska and Pelican Lake to designated recreational and ecological functions.

The Diagnostic/Feasibility Study and the PL-566 River Basin Study identified two nonpoint source (NPS) pollutants (sediment and phosphorus) that need to be controlled. Sediment and phosphorus are contained in surface water runoff and also come from in-channel bank erosion in the watershed upstream from the receiving waters. RUSLE 2 and AnnAGNPS estimates of load reduction indicate the project has reached an annual reduction of 3,604 pounds of Phosphorus and 14, 400 tons of sediment from the watershed. Some fecal coliform bacteria loading has been found near animal feeding operations. While the bacteria are found most often in close proximity to livestock operations, they are periodically found in Lake Kampeska. Recent water quality monitoring has shown that the sources of fecal coliform bacteria in Lake Kampeska are primarily animal species rather than human sources.

2.4 Lakes Kampeska and Pelican are located in the Prairie Coteau region of eastern South Dakota. This land form was caused by glacial action twelve to fifteen thousand years ago. The topography of the watershed ranges from nearly flat, well-drained and gently undulating to rugged, poorly-drained knob and kettle. Maximum relief in the project area is 150 feet. Land elevation ranges from 1860 MSL in the northwest portion of the project area to 1710 MSL in the southeast. This high plains area is drained by the Big Sioux River and four streams on the eastern slopes north of Watertown. The Big Sioux River controls both surface and shallow groundwater movement. As the river travels south it enters Lake Kampeska and Pelican Lake. Both are natural glacial lakes. When the river is higher than the lakes, water flows in and remains there until the lakes become higher than the river. During that time, silt settles to the bottom and is retained in the lakes. The lakes become silt sinks and flood water storage pools because both use the inlet as the outlet when river levels drop.

2.5 Some of the maps provided are copied from the Upper Big Sioux PL 566 River Basin Study Final Report. Figure 2 shows the location and size of the watershed; Figure 3, the land formation and major water resources; Figure 4, obtained from Codington County, the well-head protection zones of the City of Watertown.

Silt and phosphorus are identified as the major pollutants of the Big Sioux River and Lakes Kampeska and Pelican. Nearly all river and lake loads are the result of agricultural activities in the watershed.

EXHIBIT F

Figure 2. Upper Big Sioux Drainage Area

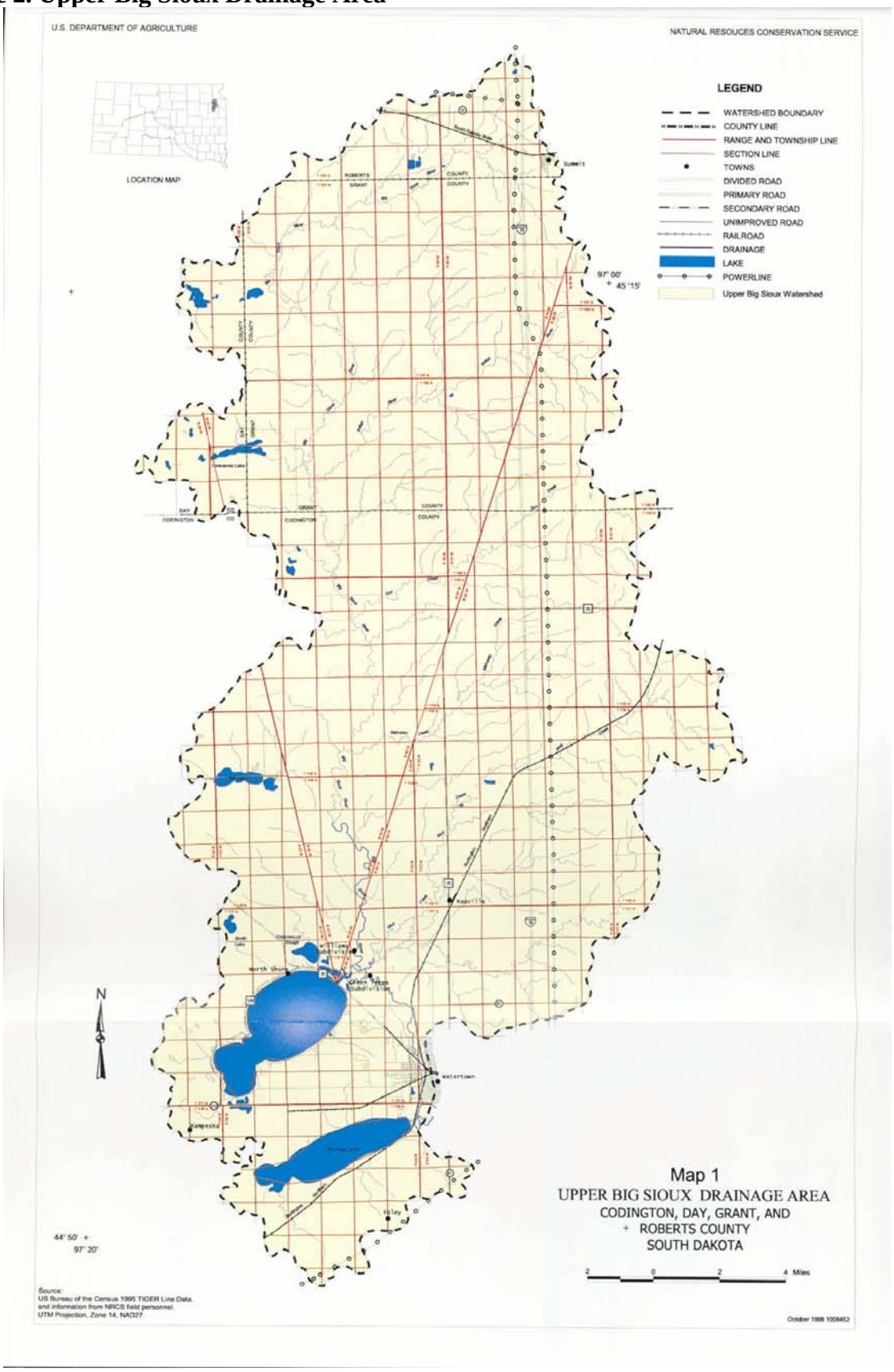


Figure 3. Upper Big Sioux Land Form

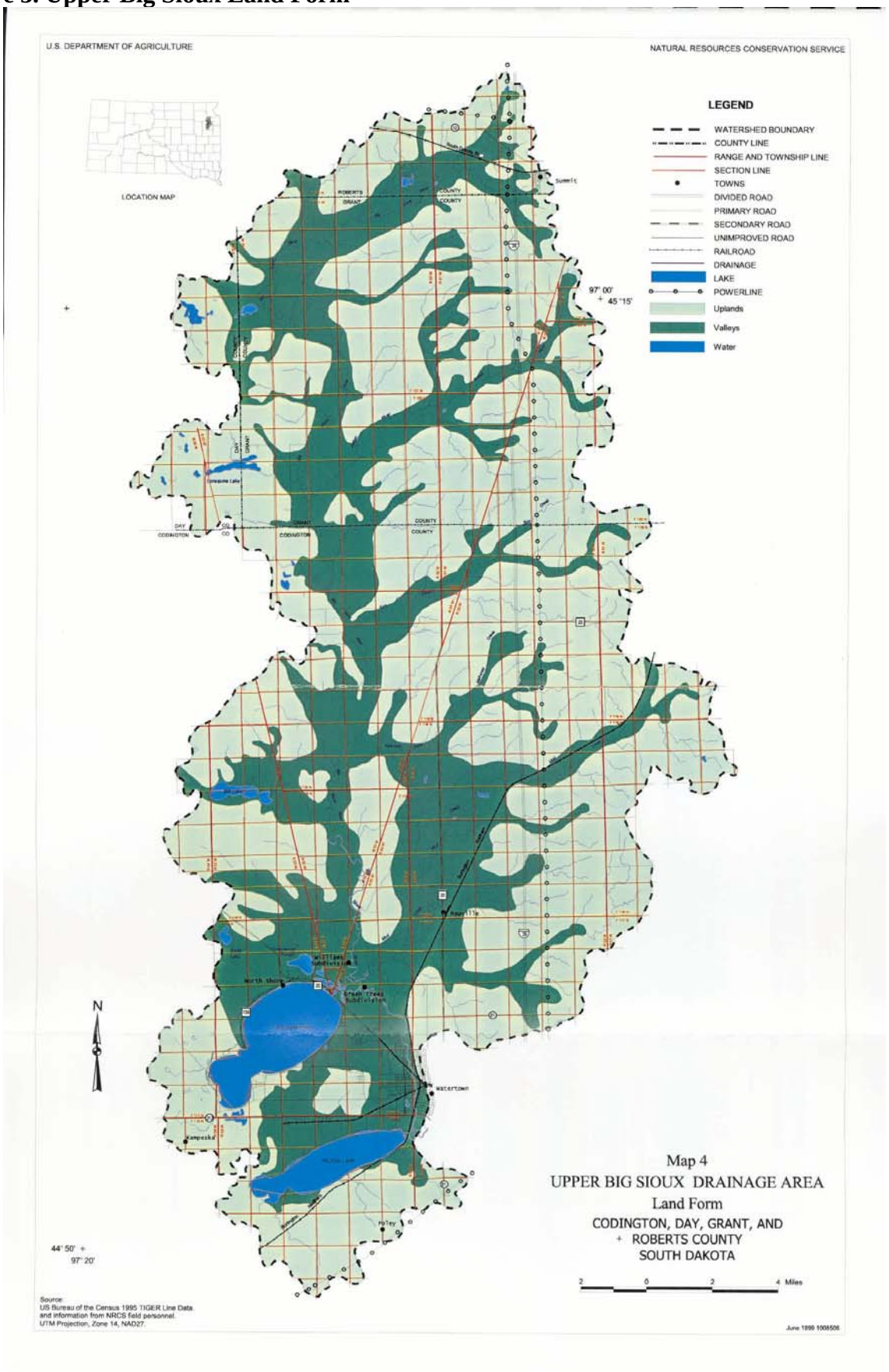
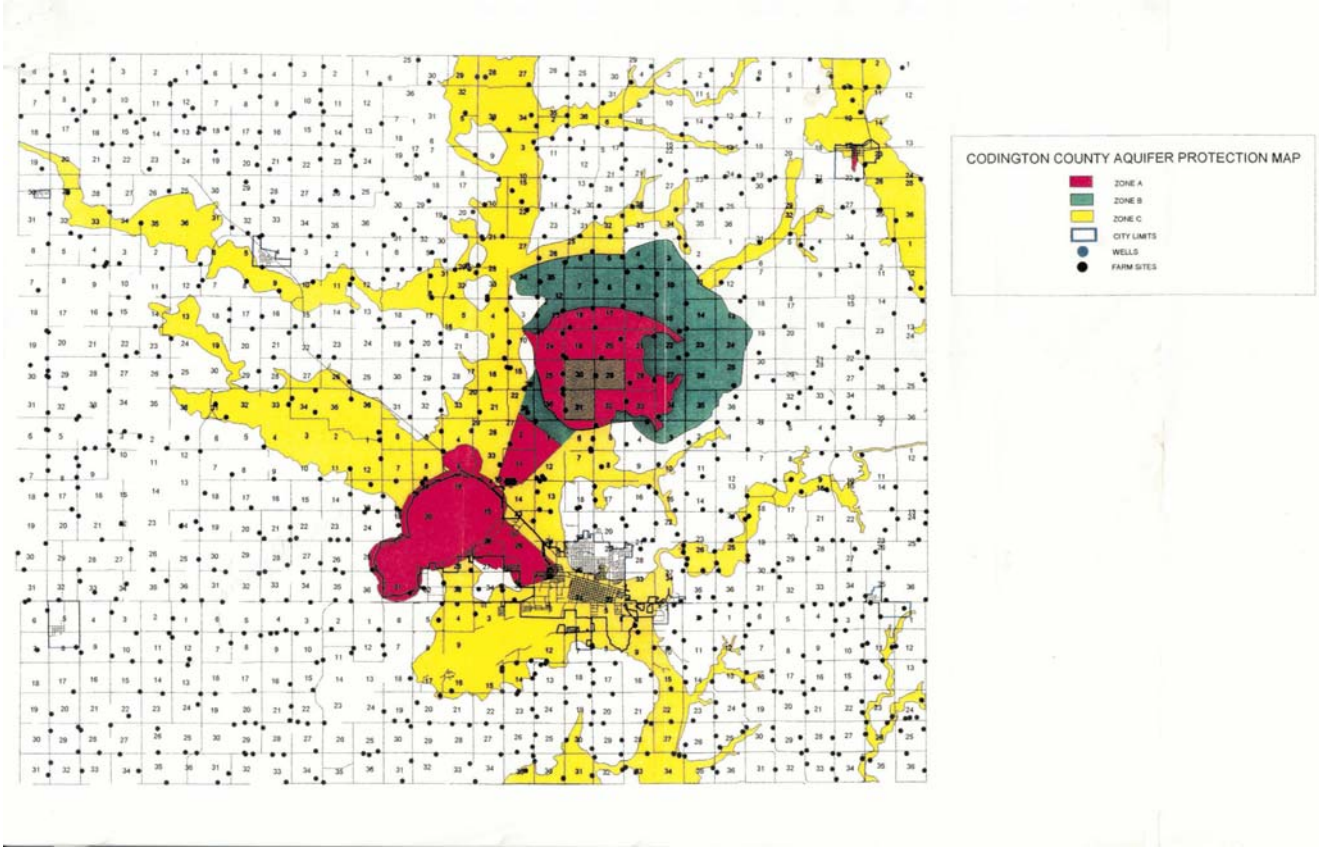


EXHIBIT F

Figure 4. Codington County Aquifer Protection Map



According to the watershed analyses completed during the 1989-2006 time period, the Upper Sioux River Subwatershed contributes the greatest suspended solids load. However, because of its distance from the lake, it was not identified as a high priority subwatershed for restoration efforts. The analyses also indicated large loadings of suspended sediment from the Mud Creek Subwatershed. A majority of these loadings do not enter Lake Kampeska, because Mud Creek joins the Big Sioux slightly below the Kampeska outlet. However, flows have an impact on Pelican Lake. The Middle Sioux Subwatershed contributes the greatest sediment and nutrient load to Lake Kampeska. Mahoney Creek, Soo Creek, Indian River and the Upper Sioux are all confluent in the Middle Sioux Subwatershed. Every effort is made to enroll producers from the Middle Sioux Subwatershed. The Middle Sioux subwatershed is the priority area identified by the 1992 D/F Study and confirmed by the PL 566 River Basin Study. (See Table 3 for land ownership and subwatershed sizes)

Because of the size of the watershed, it has taken an extended time period to produce significant incremental changes in water quality in the Big Sioux River and Lakes Kampeska and Pelican. Analyses completed during earlier segments of the project show improvements downstream from individual practices, but until 2006 total watershed improvements were not measured.

During the progress of this project several measured improvements in water quality were noted. The first, done by staff, took many hours to log each of the practices installed to determine load reductions. Each subwatershed was run independently. Improvements to AGNPS critical cells were identified and the model was re-run to determine the effects of the BMPs installed on sediment and phosphorus loading from the watershed. Sediment yields were lower by 32.7% and Phosphorus yields indicated a 20.46% reduction. (See

Table 2) The newest version of AGNPS 3.32 was run by staff at the DENR headquarters. They reported their findings indicate a 27.5% reduction in sediment and an 18.6% Phosphorus reduction. (See Table 3) DENR staff during 2006 used RUSLE2 1.25.5 with AGNPS delivery to determine that 14,398.06 tons of soil have been saved along with 3,604.27 pounds of Phosphorus. (See Table 4)

Table 2. Comparison of Original AGNPS and 2003 Summary

Original AGNPS 1994				**2003 Comparison**			
Subwatershed	Drainage Area (Acres)	25 Yr Event Sediment Yield (Tons)	25 Yr Event Phosphorous (lbs/acre)	25 Yr Event Sediment Yield (Tons)	Percentage Reduction	25 Yr Event Total Phosphorous lbs/acre	Percentage Reduction
Upper Sioux	43,560	4,775.69	0.42	4,687.87	1.8%	0.42	0.00%
Indian River	24,560	3,754.44	0.51	3,477.09	7.4%	0.49	3.92%
Middle Sioux	35,520	3,858.14	0.46	3,753.36	2.7%	0.44	4.35%
Soo Creek	20,200	3,229.20	0.52	3,111.13	3.7%	0.51	1.92%
Mahoney Creek	14,640	3,029.33	0.70	2,974.17	1.8%	0.69	1.43%
Mud/Gravel Creek	45,200	5,010.27	0.47	4,899.32	2.2%	0.45	4.26%
Still Lake	6,600	338.13	0.34	312.03	7.7%	0.33	2.94%
Lower Sioux	15,560	2,074.51	0.61	2,024.33	2.4%	0.60	1.64%
Immediate Kampeska	17,160	96.76	0.11	93.92	2.9%	0.11	0.00%
Pelican Lake	17,000	1,842.90	0.71				
TOTAL % Reductions					**32.7%**		**20.46%**

Table 3. 2005 Conditions and Comparisons (Straight AGNPS Version #3.32)
(Due to size of file, watershed separated into upper and lower portions)

Phosphorous Load Reductions

	Before (lbs/acre)	**After (lbs/acre)**	**Percentage Reduction**	**Total Reduced (lbs/acre)**
Upper Watershed	**31,797.05**	**25,878.62**	**18.6%**	**5,918.43**
Lower Watershed	**45,819.30**	**42,440.30**	**7.4%**	**3,379.0**
	77,616.35	**68,318.92**	**12.0%**	**9,297.434**

Sediment Load Reductions

	Tons/acre	**Tons/acre**		**Total Reduced (Tons/acre)**
Upper Watershed	**18,567.68**	**13,461.57**	**27.5%**	**5,106.11**
Lower Watershed	**Incomplete**	**Incomplete**	**Incomplete**	

Table 4. BMP Deliveries through 2005
(RUSLE2 Version 1.25.5) Erosion with AGNPS delivery

	Sediment/Tons	**Phosphorous/Pounds**
Results of Sediment and Phosphorous Reduced	**14,398.06**	**3,604.27**
Target Levels of Sediment and Phosphorous	**236,250.00**	**20,000.00**
Percent Complete	**6%**	**18%**

2.6 Lakes Kampeska and Pelican are of glacial origin. Surficial deposits in the study area can be divided into two main groups, till and outwash. During the Pleistocene Epoch, ice moved into the project area and deposited glacial drift. Drift exists as till and outwash. Till consists of a heterogeneous mixture of boulders, pebbles and sand in a matrix of clay and silt,

directly deposited by the ice. Outwash is a sorted deposit consisting of mostly sand and gravel and minor amounts of clay deposited by meltwater streams. Glacial drift is the parent material of the soils in the watershed. Many of the watershed soils were formed in loess that overlies the drift while some others were formed in alluvium. Three gravel channels were formed by retreating glacier melt and were covered by newly formed soils. These channels provide groundwater to the lakes. The only aquifer channel that is still partially on the surface is the Big Sioux River. Subwatersheds provide groundwater that surfaces near the Big Sioux.

Surface water recharges from the Big Sioux River at the inlet/outlet occur when levels of the river are higher than the lakes and discharges occur when river levels drop. During normal conditions the lakes are recharged by the groundwater. The river recharge that carries large volumes of sediment and nutrients causes the pollutants to settle in the lakes while the cleaner water leaves through the inlet/outlet area. Both lakes have new weir structures that divert low-flow river events downstream, but neither has been subjected to a major river-flow event.

The watershed contains mostly small to medium family farms that are experiencing economic hardships. Many operators feel they must use all available property to earn a living. This results in environmentally sensitive areas being used for crop production. At the beginning of the project, most cultivated lands were planted to wheat; currently these same fields are planted mostly to row crops - corn, beans and sunflowers.

2.7 One hundred thirty-one animal livestock feeding operations (AFOs) are located in the watershed project area. The AFOs range in size from 50 to 1,500 head. Most are cattle operations. The average operation feeds about 300 animals. There are two hog operations housing fewer than 4,000 animals each. Both of the hog operations have approved manure containment systems and are using a comprehensive nutrient management plan. Three feedlots are classified as CAFOs because of total livestock numbers; two are permitted; the third is in the process of obtaining a permit. Two livestock sales pavilions are in the process of complying with CAFO rules.

The PL 566 River Basin Study identified 37 systems that had AGNPS Feedlot Model ratings of 50 or above. To date, many of these producers have elected not to participate in the project. Demographics and economic health of the watershed are the most commonly cited reasons. Thirty-one nutrient management systems have been constructed. One is planned for 2007 and two have applied for assistance. Many of the less expensive systems have been built. The many difficult to protect feeding areas will need to be constructed using new systems and methods and will be built at a much higher cost. During this project segment, five new animal nutrient management systems will be constructed to reduce over-all phosphorus loading.

Sheet and rill erosion have decreased during the project. However, tillage methods are less land disturbing than ten years ago. Early goals of no-till recruitment were met. More landowners are switching to minimum and no till without incentives from the project. This change allows more emphasis on critical area seeding and filterstrip establishment between cropland and waterways. To meet minimum requirements for a 30 percent reduction of sheet and rill erosion in the next 10 years, 9,000 acres need to be enrolled in these practices. This

segment total includes 2,500 acres to be enrolled in the Continuous Conservation Reserve Program and 500 in critical area seeding.

Nutrient management remains a high priority for operations that feed livestock and distribute the manure on the cropped fields along with commercial fertilizers. To obtain maximum safe use of manure-related nutrients, a comprehensive nutrient management plan should be adopted by all animal feeding operations. Only 25 percent of the watershed is used for grazing and hay land. Less than one percent is in CRP. However, almost all producers include livestock in their operation. To meet the remaining goal of a twenty percent reduction of phosphorus during the next eight years, 15 more animal waste management systems need to be installed and forty Comprehensive Nutrient Management Plans developed/implemented. During this project segment, five Comprehensive Nutrient Management Plans will be developed for the five animal waste systems installed. Two additional innovative manure application management plans will be implemented using a cost/benefit ratio analysis.

An additional 21,000 acres of rangeland management is needed to reach the nutrient/sediment reduction goals by the end of the twenty-year project. Funds to install grazing management practices will be from programs offered by United States Fish and Wildlife Service, South Dakota Game Fish and Parks and the Natural Resources Conservation Service. This Project will assist those agencies in enrolling as many acres as possible. Practices used to develop the management systems include livestock watering facilities to move livestock out of the river and streams, cross-fencing and pipelines to facilitate water delivery to the new paddocks. Local funds will be used to match other federal funding.

A recent silt re-assessment at Pelican Lake showed a high rate of shoreline contribution compared to loadings from the Big Sioux River during the last ten years, which included two major runoff flood events. More than 40 percent of the Big Sioux River and tributaries has damaged banks that continue to erode into the river. Most of the banks along the four main tributaries are overgrazed. All suffer some form of bank erosion and riparian damage. While much of the Lake Kampeska shoreline has been stabilized, some areas are still in need of repair. Lake Pelican still has more than 25,000 linear feet of shoreline needing stabilization. Of this amount, 20,000 linear feet is rated as minimal to moderate in severity. This project continuation segment will stabilize 1,516 linear feet of severe lake shoreline damage and 500 linear feet of streambank.

The 1996 PL 566 River Basin Study identified 114,000 linear feet (21.5 miles) of gullies and linear wetlands that require shaped waterways to meet a ten-year 30 percent load reduction goal. To date, the project has installed 69,000 feet of these BMPs. An additional 8,400 linear feet will be installed during this project segment. This practice includes both critical area seeding and grass cover maintenance.

Land ownership and use was calculated to determine estimates of long-term costs to implement BMPs for this project (See tables 5 & 6). Figures 5 and 6 are maps that delineate land ownership and land use to determine concentrations of grassland and cropland.

EXHIBIT F

Table 5. Project Area Land Ownership for Subwatersheds and the Entire Project Area

Subwatershed	Total	Private	Federal	State	Tribal
Upper Sioux	43,911	41,767	979	280	885
Indian River	24,972	24,872	100	0	0
Soo Creek	19,811	19,771	0	40	0
Mahoney Creek	15,206	15,072	0	134	0
Mud/Gravel	44,763	44,658	0	105	0
Middle Sioux	34,774	33,858	399	277	240
Still Lake	6,940	6,741	80	119	0
Lower Sioux	15,351	14,822	0	506	23
Lake Kampeska	17,278	17,223	0	55	0
Pelican Lake	17,326	16,426	0	900	0
Watertown	5,067	5,007	0	60	0
Totals	245,399	240,217	1558	2476	1148

Table 6. Land Use

Subwatershed	Acres	Crop Land		Range Land		Pasture Hay		CRP*		Wood Land		Other	
		%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres
Upper Sioux	43,911	55.5	24,371	25.7	11,286	4.8	2,107	7.6	3,337	0.9	395	5.5	2,415
Indian River	24,972	56.4	14,084	27.3	6,817	4.9	1,224	6.1	1,523	0.7	175	4.6	1,149
Soo Creek	19,811	63.4	12,560	24.7	4,893	5.5	1,090	0.3	59	1.3	258	4.8	951
Mahoney Creek	15,206	74.6	11,344	12.2	1,855	6.5	988	0.3	46	1.2	183	5.2	790
Mud/Gravel	44,763	62.7	28,066	23.8	10,654	5.5	2,462	1.0	448	2.0	895	5.0	2,238
Middle Sioux	34,774	65.9	22,916	17.4	6,051	5.7	1,982	5.1	1,773	1.0	348	4.9	1,704
Still Lake	6,940	59.7	4,143	18.3	1,270	5.2	361	4.9	340	0.8	56	11.1	770
Lower Sioux	15,351	69.1	10,608	14.4	2,211	6.0	921	0.4	61	1.0	153	9.1	1,397
Lake Kampeska	17,278	52.8	9,123	24.8	4,284	4.6	795	1.1	190	1.3	225	15.4	2,661
Pelican Lake	17,326	64.4	11,158	15.0	2,599	5.6	970	2.0	347	1.0	173	12.0	2,079
Watertown	5,067	26.6	1,348	31.7	1,608	2.3	117	1.0	52	1.4	70	37.0	1,872
Totals	245,399	61.0	149,721	21.8	53,528	5.3	13,017	3.3	8,176	1.2	2931	7.4	18,026

Land use in the study area was inventoried for each subwatershed and the entire study area.

EXHIBIT F

Figure 5. Land Ownership

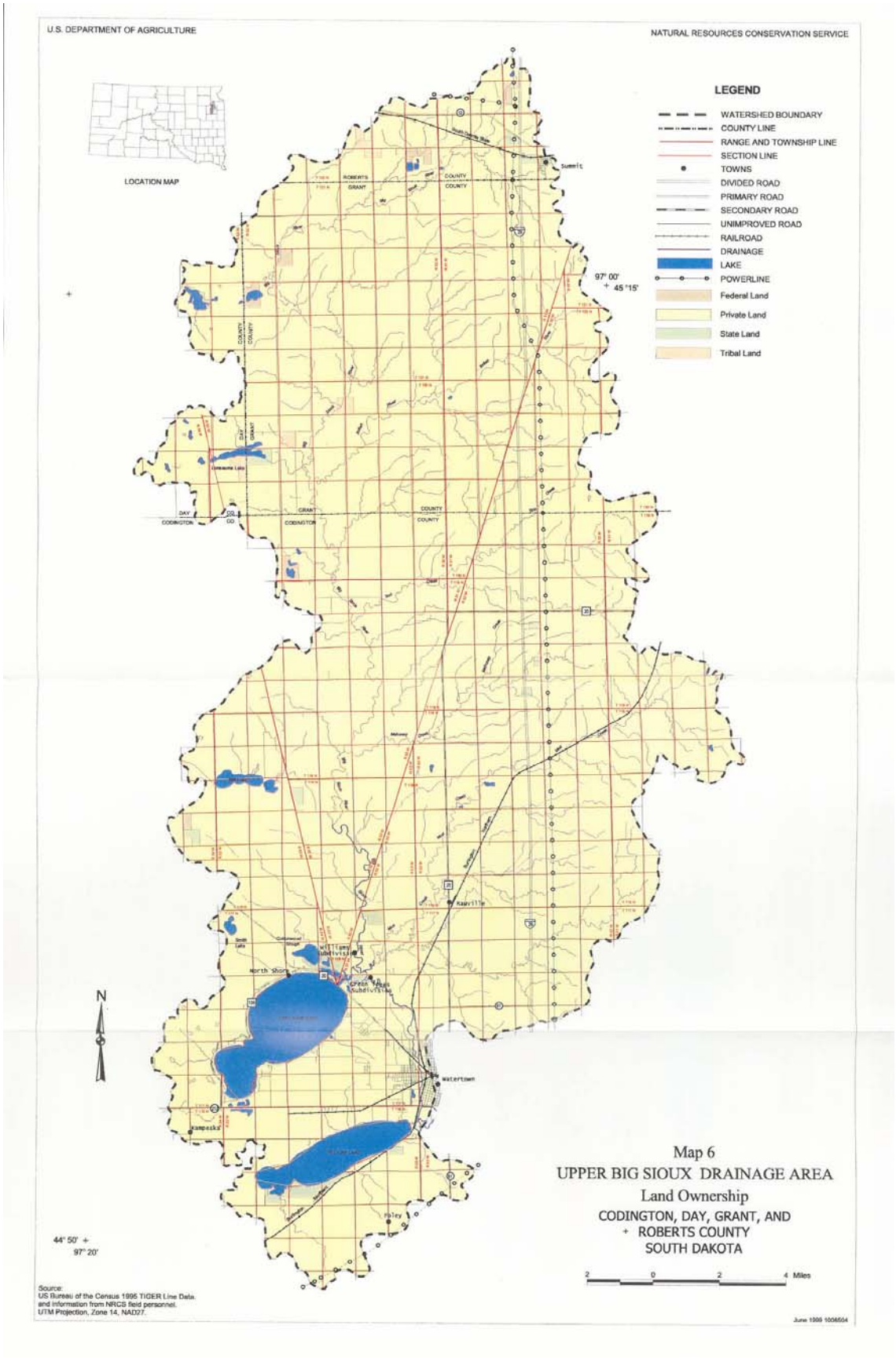


EXHIBIT F

Figure 6. Land Use

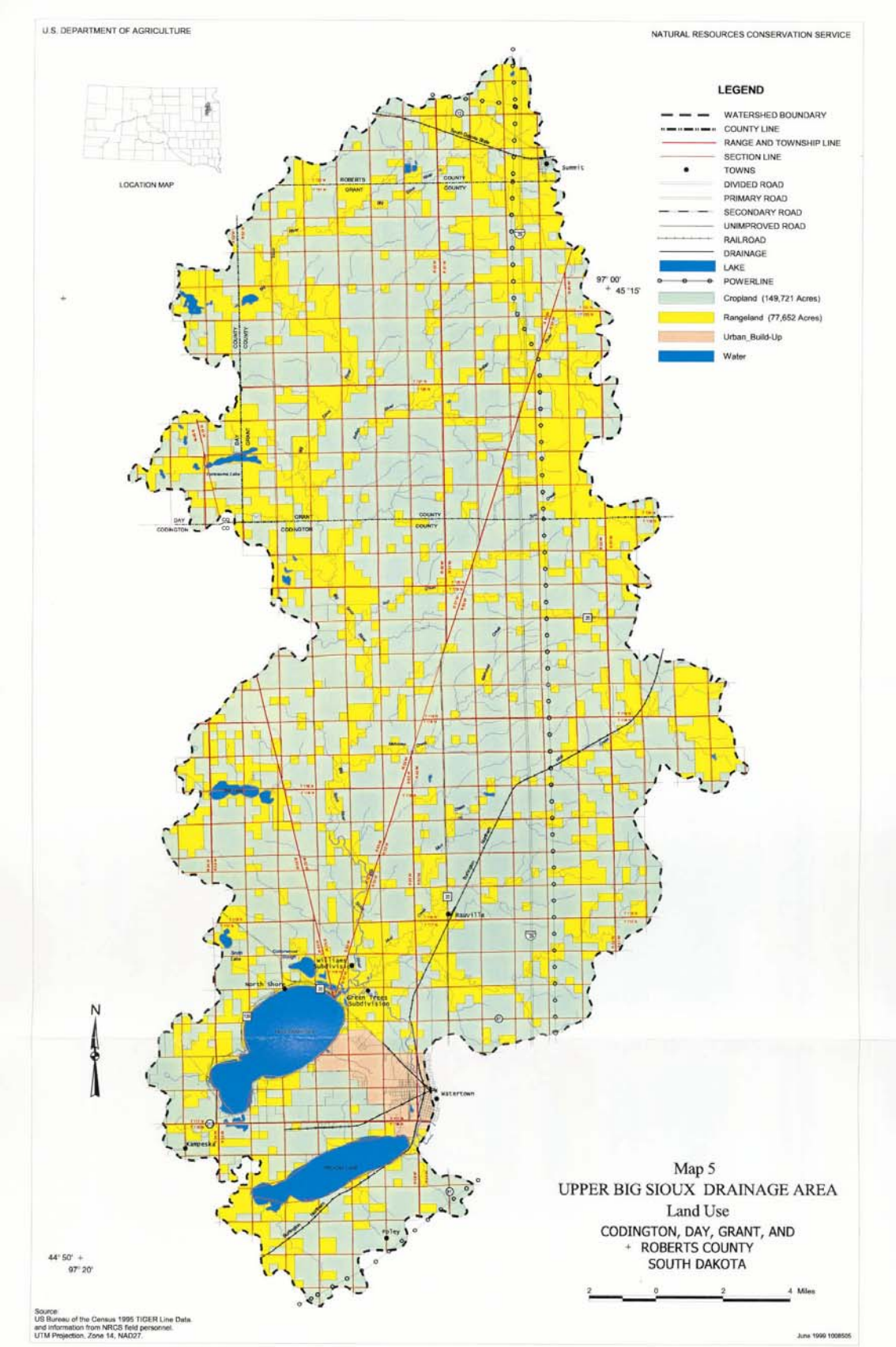


Table 7. Mean Lake and Watershed Loadings by Site During Diagnostic Studies

SITE	SUSPENDED SOLIDS KG/YEAR	TOTAL NITROGEN KG/YEAR	TOTAL PHOSPHORUS KG/YEAR	HYDRAULIC INPUT IN LITERS/YEAR
Lake Pelican PL 1 STATE PARK	29,424	1,692.58	347.50	APPROX. 754 MILLION LITERS
Lake Pelican PL2 AIR HAVEN	3,109	2,214.52	480.32	APPROX. 189 MILLION LITERS
Lake Pelican PL 3 FOLEY ROAD	8,808	1,412.03	171.51	APPROX. 190 MILLION LITERS
Lake Pelican PL 4 INLET Big Sioux River	141,525	20,496.80	2,090.13	APPROX. 8 BILLION LITERS
Lake Pelican PL 5 OUTLET Big Sioux River	56,250	8,495.51	465.24	APPROX. 4 BILLION LITERS
Lake Kampeska KAM 4 INLET Big Sioux River	429,849	18,196.41	3,241.95	APPROX. 15 BILLION LITERS
Lake Kampeska KAM 4 OUTLET Big Sioux River	7,541	318.12	66.54	APROX. 277 MILLION LITERS

3.0 Project Description

3.1 Project Goal

This project is a segment of a twenty-year program to reduce phosphorus and sediment loads entering Lake Kampeska and Pelican Lake by 50 percent. The goal is consistent with meeting targets set by the 1992 SD DENR Diagnostic/Feasibility Study and the 1995 Pelican Lake Assessment and the USDA PL 566 River Basin Study. Loads to the lakes during the D/F studies are listed in Table 5.

In this continuation project segment, critical cells will be targeted to reduce both sediment and nutrient loading by 15 percent. Critical cells targeted for BMP installation are those identified by AGNPS as yielding loads greater than 3 tons of sediment per acre and/or 3 parts per million of phosphorus in a 25-year storm event. This segment's reduction milestones will be met by installing land treatment practices that address the identified resource concern.

Many of the studies conducted over the past 25 years on the efficiency of BMPs for reducing various pollutants, primarily silt and associated nutrients, have focused on those listed in this project segment. Standard terminology and procedures for measuring the efficiency have resulted in generic evaluations and measuring variations. Based on this information a reduced number of BMP categories will be used during this project segment. Measurable load reductions are expected from the completions of these BMPs in this segment that will contribute to the planned improvement of the waterbodies involved.

Manure containment prior to application greatly reduces high fecal coliform levels and nutrient quantities downstream from livestock feeding areas. Manure application plans and increased user management will greatly reduce phosphorus and other nutrients being released into surface waters. The animal nutrient management system milestone for this project segment is to construct five animal nutrient management operations with an AGNPS feedlot rating of 50 or above, the initial criteria for identifying targeted systems.

Phosphorus transport, both dissolved and attached, is similar to Sediment Transport. Average soil tests for Phosphorus (STP) levels of manured soils in South Dakota have increased 22 parts per million over the past 15 years. Results of research by the SD State University Department of Agriculture indicate a linear relationship exists between Average Soil Tests (STP) and runoff for most major South Dakota soils. The greater the concentration of phosphorus in the soil, the greater the associated loss that occurs in surface water runoff. The milestone target for this project segment goal is 7 new manure application management plans, which will balance commercial fertilizer with manure in locations that have high concentrations of phosphorus and topography that carries surface water runoff to streams in the watershed.

Cropland sheet and rill erosion in the project area has been found to exceed acceptable rates. The cause has been linked to farming practices, planting low residue crops and not installing needed conservation practices. To decrease this impact, the milestones for this project segment are: install 8,400 linear feet of grassed waterways, seed 500 acres of critical areas to filter strips, and encourage the enrollment of 2,500 acres of highly erodible lands in the Conservation Reserve Program.

Rangeland resources are being impacted by overgrazing and livestock access to riparian areas. Damage to streambanks and wetland areas is a major factor in the sediment and nutrient loading of the receiving waters. To address these sources, the project will share funding with the Natural Resources Conservation Service, US Fish and Wildlife Service, and SD Game, Fish & Parks.

Streambank and shoreline erosion is also a major contributor to sediment loads. More than 40 percent of the Big Sioux River has damaged banks and 25,000 linear feet of Pelican Lake can be classified as seriously eroded. These concerns will be addressed using a combination of hard and soft practices which include riprap, exclusion fencing and plantings. The milestones for this project segment include installation of 844 linear feet of lake shoreline stabilization and 500 linear feet of streambank stabilization.

The project will adhere to all requirements of the Clean Water Act, local zoning requirements, Phase II of the Storm Water Pollution Prevention Plan, cultural heritage searches and the Threatened and Endangered Species Act. The project also requires participating landowners to practice nutrient and pesticide management consistent with the NRCS Field Office Technical Guide as appropriate to their operation.

The following table summarizes the practices that will be implemented in this segment of the Upper Big Sioux River Watershed Project.

Table 8. Participation Alternatives (revised 200909522

Sediment or Nutrient Source	Practice	Units	Treated
Animal Nutrient Management	Ag Waste System	Each	5
	Manure Application Mgt	Each	7
Critical Area Seeding	Grassed Waterway	Linear Feet	8,400
Water Retention	Small Ponds	Each	30
Bank Erosion (eliminated)	Streambank Stabilization	Linear Feet	0
Riparian Grazing	Riparian Management	Acres	640
Shore Erosion	Lakeshore Bank Stabilization	Linear Feet	844
Water Quality Monitoring	Water Analysis	Each	68

3.2 OBJECTIVES AND TASKS

Objective 1. Reduce nutrient loads entering Lake Kampeska and Pelican Lake by 15 percent.

Task 1. Reduce nutrient loads to Lake Kampeska and Pelican Lake by 15 percent by reducing loads originating from grazing and animal feeding operations.

PRODUCTS

1. Animal Nutrient Management Systems - 8 systems (Revised May 22, 2009 Amendment #2). Priority construction sites will be selected from those systems with a 50 plus AGNPS feedlot rating in the Upper Big Sioux River Watershed. If more than five animal feeding operations are found willing to implement animal nutrient management systems, the operations will need to have a high priority ranking for completion as part of the watershed project. If AFOs with a 50 plus feedlot rating elect not to participate, then feedlots with a rating of 40 plus will be considered. Landowners will be responsible for 25% of the total cost of the systems.

Total Cost: $799,952 319 Funds: $308,500; Other Federal: $161,500,
SRF Funds: $89,952; Local Cash/In-kind: $240,000

Milestones: Project – 8 Animal Nutrient Management Systems
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Technician
	NRCS Technical Assistance Team
IMPLEMENTATION	Project Coordinator
	Contractual Assistance
	Landowner

Monitoring
Operation and maintenance monitoring as well as functional success will be done by annual inspection by project staff. Reductions in phosphorus loads from changes to the identified cell will be calculated each year using STEPL.

Related Projects and Sponsors
1) FSA EQIP Practice (Diversion)
EQIP Practice (Animal Waste Control Facilities)
2) NRCS 319 Animal Waste Technical Assistance Team (AWMS Design)

1A. Animal Nutrient Management-4 systems (Amendment #3, September 2009). Priority construction sites will be selected from those systems with a 50 plus AGNPS feedlot rating in the Upper Big Sioux River Watershed. If more than five animal feeding operations are found willing to implement animal nutrient management systems, the operations will need to have a high priority ranking for completion as part of the watershed project. If AFOs with a 50 plus feedlot rating elect not to participate, then feedlots with a rating of 40 plus will be considered. Landowners will be responsible for 25% of the total cost of the systems.

Total Cost: $700,000 319 Funds: $420,000; Local Cash/In-kind: $280,000

Milestones: Project – 4 Animal Nutrient Management Systems
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Technician
	NRCS Technical Assistance Team
IMPLEMENTATION	Project Coordinator
	Contractual Assistance
	Landowner

Monitoring
Operation and maintenance monitoring as well as functional success will be done by annual inspection by project staff. Reductions in phosphorus loads from changes to the identified cell will be calculated each year using STEPL.

Related Projects and Sponsors
1) FSA EQIP Practice (Diversion)
EQIP Practice (Animal Waste Control Facilities)
2) NRCS 319 Animal Waste Technical Assistance Team (AWMS Design)

2. Manure Application Management - 7 units. Priority will be given to producers who are innovative in using animal waste application practices in environmentally sensitive areas. Landowners will apply nutrients based on plant uptake needs to avoid over application. Tools and training will be provided to help landowners best apply animal nutrients. A coordinated effort with the NRCS Ag Nutrient Team and South Dakota State University Water Resources Institute will help landowners

establish new practices such as methane digesters, heavy duty scales, and no till injection methods.

Total Cost: $10,000 319 Funds: $0 Local Cash/In-kind: $10,000

Milestones: Project – 7 landowners (3,000 acres)
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
	NRCS Animal Nutrient Management Team
IMPLEMENTATION	Project Coordinator
	Operator

Monitoring

Soil testing and manure sampling will be used to match fertilizer needs. Samples will be collected using South Dakota State University Extension and Natural Resources Conservation Service guidelines. Comparisons of annual soil testing to monitor nutrient levels in the soil will determine success of this practice.

Related Projects and Sponsors

1) NRCS Animal Nutrient Management Technical Assistance Team

Objective 2. Reduce Sediment Loadings to Lake Kampeska and Pelican Lake by 15 percent.

Task 2. Reduce sediment loading from the watershed by 15 percent by reducing sediment originating from crop and grazing lands, stream/river banks and lake shoreline.

PRODUCTS

1. Grassed Waterways - 8,400 linear feet. Priority will be given to critical cells identified by AnnAGNPS and 1. producers who are integrating other erosion control measures on contributing cropland fields; and, 2. sites where gully erosion and ephemeral erosion are evident on cropland in the priority subwatersheds. As CRP is withdrawn the project will offer cost sharing to the most critical areas that are prone to erosion.

Total Cost: $45,000 319 $0 Other Federal $22,500 Local Cash/In-kind: $22,500

Milestones: Project – 8,400 linear feet of grassed waterways
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Technician
	Natural Resources Conservation Service
IMPLEMENTATION	Project Coordinator

Landowner

Monitoring
Monitoring will include photopoints before and after installation. STEPL will be used to assess project success and provide estimates of loads reduced.

Related Projects and Sponsors
1) Pheasants Forever – Food Plots
2) SD Game, Fish and Park – M.A.R.S.H.
3) US Fish and Wildlife Service
4) Ducks Unlimited – Upland Nesting Program
5) FSA EQIP Practice (Sod Waterways)

2. Small Ponds - 30 units. This practice will help contain sediment runoff as well as provide water sources to keep livestock from direct contact with the Big Sioux River and its tributaries. The ponds will serve as silt traps and also provide livestock and wildlife watering facilities. Priority will be placed on pastureland where the topography is compatible with these structures. If ponds are installed in cropland areas, grassed waterways with ample filterstrips will be required.

Total Cost: $90,000 319 Funds $ 0 Local Cash/In-kind: $90,000

Milestones: Project – 30 Small ponds
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Technician
	US Fish and Wildlife Service

Monitoring
Load reductions will be measured using STEPL analysis of cell changes and resulting improvements to silt loading will be documented.

Related Projects and Sponsors
1) US Fish and Wildlife Service – Private Lands Program
2) NE Conservation Districts

3. Streambank Stabilization – (Eliminated 2nd Amendment). This practice will consist of hard (riprap) and/or soft practices (i.e. willow, other plants). Priority will be placed on the primary tributaries of the Upper Big Sioux River Watershed where cut banks and rill erosion are evident. Hard (riprap) practices will be used only after consideration of options that can work with the stream system. Based on previous project segments about 50 percent of bank protection will use hard practices.

4. Riparian Grazing Management - 640 acres. This practice will be used to buffer waterways, riparian zones and lands between cropland and wetlands. Its purpose is to contain silt and nutrients from sheet erosion. Annual maintenance using haying and

grazing will be required. This practice will provide an alternative to those who do not want to participate in the NRCS Continuous CRP program.

Total Cost: $20,000 319 Funds: $0 Local Cash/In-kind: $20,000

Milestones: Project – 640 Acres filterstrips
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Coordinator
	Project Technician
	US Fish and Wildlife Service
	SD Game, Fish and Parks
IMPLEMENTATION	Project Coordinator
	Landowner

Monitoring
STEPL with a 25-year storm event will be used to measure load reductions from the cells where the BMPs are installed and in the subwatershed.

Related Projects and Sponsors
1) US Fish and Wildlife Service – Private Lands Program
2) Pheasants Forever

5. Lake Shoreline Stabilization - 844 linear feet. This practice will be primarily rock riprap with landowner options for abutments. Additional costs per foot for abutments will be the responsibility of the property owner. Priority will be based on assessments of high erosion areas.

Total Cost: $100,000 319 Funds: $0; SRF Funds: $50,000
Local Cash/In-kind: $50,000

Milestones: Project – 844 linear feet
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Project Technician
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Coordinator
	Project Technician
IMPLEMENTATION	Project Coordinator
	Landowner

Monitoring
Over a ten-year period (1992-2002) the average annual soil loss per linear foot of unprotected shoreline in the project area was 2.25 cubic yards. Phosphorus load reductions will be estimated by multiplying the potential soil loss protection realized

from installing the BMPs by the number of linear feet of lakeshore stabilized and the watershed average phosphorus levels of 1.8 lbs. per cubic yard. In-lake silt load reduction will be estimated based on the weight of a cubic yard of soil.

Related Projects and Sponsors
1) SD Game, Fish and Parks

5A. Lake Shoreline Stabilization – 2,000 linear feet. (Amendment 3 September, 2009) This practice will be primarily rock riprap with landowner options for abutments. Additional costs per foot for abutments will be the responsibility of the property owner. Priority will be based on assessments of high erosion areas.

Total Cost: $200,000 319 Funds: $120,000; Local Cash/In-kind: $80,000

Milestones: Project – 2,000 linear feet
Annual – See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator
	Project Technician
	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Coordinator
	Project Technician
IMPLEMENTATION	Project Coordinator
	Landowner

Monitoring
Over a ten-year period (1992-2002) the average annual soil loss per linear foot of unprotected shoreline in the project area was 2.25 cubic yards. Phosphorus load reductions will be estimated by multiplying the potential soil loss protection realized from installing the BMPs by the number of linear feet of lakeshore stabilized and the watershed average phosphorus levels of 1.8 lbs. per cubic yard. In-lake silt load reduction will be estimated based on the weight of a cubic yard of soil.

Related Projects and Sponsors
1) SD Game, Fish and Parks

6. Water Quality Monitoring - 68 tests. SD Game, Fish and Parks routinely tests one public beach on Lake Kampeska and one public beach on Pelican Lake to determine safety levels for swimming. On Lake Kampeska, the City of Watertown tests one public beach and Codington County tests one public beach. The Upper Big Sioux River Watershed Project will continue to work cooperatively with the department when levels exceed state regulations. Results of positive bacteria cultures with excessive levels will be submitted to the SD Department of Health for fecal coliform strain identification tests to determine the source of the bacteria.

Major runoff events, if any during this segment, will be monitored at the lake inlet structure and the Big Sioux River at the Florence gauging station. Analytical measurements will be pH, dissolved oxygen, suspended solids, total Kjeldahl nitrogen, total phosphorus, and total dissolved phosphorus and fecal coliform and E

coli bacteria. As referenced previously, additional water quality samples will be collected to prepare a TMDL which will address beneficial use impairments. Sample collection and handling will be accomplished in accordance with the South Dakota Department of Environment and Natural Resources Standard Operating Procedures for Field Samplers (June 2003) and analysis will be completed by the South Dakota State Health Lab located in Pierre, South Dakota. Some local funds will be spent purchasing replacement and upgrade water monitoring equipment.

Total Cost $20,000 319 Funds $12,000 Local Cash/In-Kind Match $8,000

Milestones: Project - 68 tests
Annual – See Milestone Table 9

Responsible Agencies

PRIORITIZATION / SITE SELECTION	Project Coordinator Upper Big Sioux River Watershed Advisory Board

Related Projects and Sponsors

1) City of Watertown Storm Water Protection Program
2) City of Watertown Municipal Utilities Department
3) SD Game, Fish and Parks
4) SD Dept Environment and Natural Resources

7. **Alternate Livestock Water Facilities.** The eight subwatersheds include small streams and/or the Big Sioux that travel through the heart of the main watershed. The animals break down the banks and stand in the water during the day. The water facilities will allow the landowner to restrict access to the streams and the river along with prescribed grazing management.

Total Cost $ 40,000; Other Federal $20,000 Local/Inkind $20,000

Milestones: Project: 3 facilities
Annual--See Milestone Table 9

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator US Fish and Wildlife Game Fish and Parks NRCS
DESIGN	Project Coordinator Staff
IMPLEMENTATION ACTION	Landowner

Monitoring

Photopoints of the healing stream banks and the resting pastures will serve to determine project effectiveness. Exposed Banks have been determined to relase silt and the corresponding phosphorus directly to the streams leading to the Upper Big Sioux River.

Related Projects and Sponsors
The Northern Prairies Land Trust, US Fish and Wildlife Service, SD Game Fish and Parks and NRCS have funds that can be used to cost share this program.

Objective 3. Information and Education

Task 3. Sixty units of Information and Education will be produced to keep watershed stakeholders, taxpayers, residents and others informed on progress of the water quality improvement in the Upper Big Sioux River Watershed.

PRODUCTS

1. **Newsletter: 3 newsletters**. The project newsletters will continue to chronicle project progress with cooperating producers in the watershed.

2. **Student education: 24 presentations/tours** All 6 elementary school sixth grade classes participate annually in a riparian education outdoor education format. The middle school hosts an annual watershed geology presentation on the formation and alteration of the Upper Big Sioux River Watershed.

3. **Conservation tours: 3 tours** An annual tour of the watershed practices that have been completed is targeted to urban taxpayers who are providing the local match for the Environmental Protection Area 319 Project, along with interested landowners from the watershed.

4. **Signs: 5 signs** New signs will be made to show progress toward project goals.

5. **Project notices: 12 news releases, updates, advertisements, pamphlets, slide shows, and sound productions.** Service club presentations and partnership activities with other agencies such as the SD Association of Conservation Districts and seminars will be included in this practice.

6. **Outreach: 90 ads.** Purchase ads in news service agencies that include newspapers, radios and television.

Total Cost $29,120 319 Funds $12,000 Local Cash/In-kind Match $17,120

Milestones: Project – See Individual Products Above
Annual – See Milestone Table 9

Responsible Agencies

PRIORITIZATION	Upper Big Sioux River Watershed Advisory Board
DESIGN	Project Coordinator
	Project Technical Assistant
	Upper Big Sioux River Watershed Advisory Board
	SD Department of Environment and Natural Resources
IMPLEMENTATION	Project Coordinator

Project Technical Assistant
Upper Big Sioux River Watershed Advisory Board

Objective 4. Reports

Task 4. Develop and submit progress and final reports

PRODUCTS

1. Semi-annual (April), and annual (September) reports will be submitted electronically to DENR to fulfill GRTS reporting requirements of the US Environmental Protection Agency. Required load reduction estimates will be determined using the STEPL model and other methods as described in the monitoring section which accompanies each product described in Section 3 of this workplan. A GIS-layered land use and location mapping system will be developed and updated continuously to provide geo-location BMP tracking information.

2. A final report and narrative summary of the historical water quality and changes in land use will be prepared and submitted to the DENR at the end of the grant period.

Responsible Agencies

SITE PRIORITIZATION	Project Coordinator Upper Big Sioux River Watershed Project Advisory Board
DESIGN	Project Technician SD Department of Environmental and Natural Resources

EXHIBIT F

3.3 Milestones

Table 9. Upper Big Sioux River Watershed Project Milestones

Milestone Table for Upper Big Sioux River Watershed Project

Goal/Objective/Task	Quantity	Year 1				Year 2				Year 3			
		Months 1-3	Months 4-6	Months 7-9	Months 10-12	Months 1-3	Months 4-6	Months 7-9	Months 10-12	Months 1-3	Months 4-6	Months 7-9	Months 10-12
Objective 1 Reduced the Nutrient Load Entering into Lake Sub-basins.													
Task 1. Reduce Nutrient Loadings to Lake Kampeska and Pelican Lake by 15%													
Product 1 Animal Nutrient Mgt	8 systems		**2**				1				5		
Product 2 Manure Application Mgt	7 units	2				3				2			
Objective 2. Reduce the Sediment Load Entering into Lake Sub-basins.													
Task 2. Reduce Sediment Loadings to Lake Kampeska and Pelican Lake by 15%													
Product 1 Grassed Waterway & Critical Seeding	8,400 feet			2,800				2,800				2800	
Product 2 Small Ponds/Dams	30 units			5	5			5	5			5	5
~~Product 3 Streambank Stabilization~~	~~500 Feet~~												
Product 4 Riparian Grazing	640 acres		110	110			105	105			105	105	
Product 5 Shoreline Stabilization	844 feet		134		144		134		144		144	144	
Product 6 Water Monitoring	68	6	6	5	5	6	6	5	5	6	6	5	5
Product 7 Alternate Livestock Water	3 units			1				1				1	
Objective 3. Information and Education													
Task 3. Information and Education													
Product 1 Newsletter	3 Units					1				1			1
Product 2 Student Education	24 Units		7		1		7		1		7		1
Product 3 Conservation Tours	3 Units			1				1				1	
Product 4 Signs	5 signs							5					
Product 5 Public notices, presentations, updates, seminars	12 Units	2	1	1		2	1	1		2	1	1	
Product 6 Outreach	90 Units	9	7	7	7	9	7	7	7	9	7	7	7
Objective 4. Reports													
Task. 4. Reports													
1) Annual STEPL	3 Reports	1				1				1			
2) GRTS Semi, Annual Reports	6 Reports		1	1			1	1			1	1	
3) Final Report	1 Report												1
4) GIS location mapping	Continuous	1	1	1	1	1	1	1	1	1	1	1	1

3.4 Section 404, 401 and US Fish and Wildlife Service permits will be secured to construct Animal Nutrient Management systems, small ponds/dams and streambank/shoreline. When more than one acre of land will be disturbed during construction, a Storm Water Pollution Prevention Plan will be filed with the SD DENR. The project will also comply with historic preservation requirements

3.5 **Local Sponsor** The City of Watertown is the local project sponsor. Lake Kampeska is completely within the city limits and Lake Pelican is adjacent to the current city limits. The city has served as the sponsor for previous project segments.

3.6 **Review and Oversight** The relative change from current conditions to predicted conditions is used as a basis for selecting alternatives for implementation. The project coordinator will be responsible for oversight on operation and maintenance of any project using technical assistance from NRCS. NRCS provides oversight on construction practices that use their technicians. These projects are reviewed at least annually. BMPs such as animal nutrient management systems require a signed O&M contract. BMPs and their components will be maintained by landowners based on the NRCS Field Office Technical Guide for length-of-life practice guidelines. (NOTE: The City of Watertown has a legal department that can be used if a violation occurs, but currently it is done in civil court. Water quality rule violations will be referred to DENR.)

4.0 COORDINATION PLAN

4.1 Project Management and Administration.

The City of Watertown (sponsor) provides coordination and administrative support for the project staff.

The project coordinator provides technical coordination and administrative functions to the Upper Big Sioux River Watershed Project by educating and informing landowners about water quality programs. The coordinator will administer conservation programs, keep accounting and progress records, establish public relations programs, continue fundraising for the twenty-year project goal, provide regular news releases, represent the City of Watertown to organizations interested in project progress and supervise technical assistants. The coordinator will work with government agencies and non-governmental groups to maximize full utilization of available cost share dollars.

A full-time technical assistant position provides planning and oversees installation of BMPs. The technician will assist in informing farmers about water quality programs cost shares, design construction plans, supervise construction activities, conduct field surveys and assist the Project Coordinator as needed.

A part-time administrative and technical assistant provides support for project administration through accounting and record keeping, assisting with daily correspondence with landowners and the city finance office. The assistant keeps the database information current, assists in field surveys and helps with education and information activities.

The Upper Big Sioux River Watershed Project works with the wildlife biology director of the newly organized Freshwater Institute to provide information and education concerning clean water to landowners and others in the watershed. The project shares valuable information with this separate but parallel objective.

4.2 COOPERATING ORGANIZATIONS:

The Department of Environment and Natural Resources (DENR) will administer the project grant and provide technical assistance on matters pertaining to water quality.

Groundwater data will be obtained from EDWDD, SD DENR, and USGS.

The Natural Resource Conservation Service may provide technical assistant for project implementation. Additional technical assistance will be provided by the US Fish and Wildlife Service, SD Game, Fish and Parks and other identified sources to complete proposed BMP implementation.

The SD Animal Nutrient Management Team, Grassland Planning and Management Team, US Fish & Wildlife Service, and the SD Game, Fish and Parks Department will be utilized for design assistance.

Program coordination will occur through monthly meetings of the Upper Big Sioux River Watershed Advisory Board that serves at the pleasure of the City Council.

Cost Share funding will be in partnership with: the City of Watertown, Watertown Municipal Utilities, Kampeska Water Project District, USDA Farm Service Agency Farm Bill programs, and landowners.

4.3 LOCAL SUPPORT FOR THE PROJECT: Local support for the project has been positive. Letters of support have been submitted to SD DENR.

The Upper Big Sioux River Watershed Advisory Board consists of stakeholders of the project area and includes federal, state and private conservation agencies, local taxing authorities and concerned landowners in the project area. Current members include

- City of Watertown
- Codington & Grant County Commissions
- Grant & Codington Conservation Districts
- East Dakota Water Development District
- Lake Kampeska Water Project District
- Kampeska Chapter Izaak Walton League
- Pelican Preservation Society, and area townships

The residents of the Upper Big Sioux River Watershed are committed to continuous efforts to restore the watershed to its designated uses and protect drinking water. The current project is a part of a twenty-year plan to reduce sediment and nutrient loading to surface water that drains to Lake Kampeska and Pelican Lake.

4.4 COORDINATION WITH PERTINENT PROJECTS: The Upper Big Sioux River Watershed Project will coordinate activities with other programs and projects in the area. Every effort will be made to avoid replication of 319 activities in the watershed that may be undertaken by other organizations. Information Education programs will be coordinated with the SD DENR NPS Information and Education Program, the Redlin Freshwater Institute, and the SD Grasslands Planning and Management Project.

4.5 **PRIORITIES:** Priorities will be given to farms that will implement whole farm conservation plans over the life of the project. For example, rotation grazing management and riparian protection can be included in an alternate livestock water BMP. Other priorities will be determined by critical cell identification using the AGNPS model.

5.0 EVALUATION AND MONITORING PLAN

5.1 **Monitoring and Evaluation** will be continued from the approved Upper Big Sioux River Watershed Project Implementation Plan. Sampling will be completed in accordance with the EPA-approved "SOUTH DAKOTA NONPOINT SOURCE PROGRAM QUALITY ASSURANCE PROJECT PLAN" (QAPP) and the "STANDARD OPERATING PROCEDURES FOR FIELD SAMPLERS", SD DENR, June, 2003. See Objective 2, Task 2, Product 6, and Appendix I, Upper Big Sioux River Watershed Project Sampling And Analysis Plan. Water quality analysis will be completed at the SD State Health Lab.

5.2 **Indicators of Success**
Water quality sampling and analysis will be conducted in conjunction with the SD DENR, City of Watertown, Lake Kampeska Water Project District, SD State University Water Resources Institute, and East Dakota Water Development District. An annual AGNPS will be run adding each year's practices. Determination of whether TMDLs have been met will be made in cooperation with DENR using the STEPL model.

5.3 All data collected will be identified with latitude and longitude for GPS location information. Water quality data will be submitted to DENR for entry into STORET

5.4 The Agricultural Nonpoint Source Model (AGNPS) has been run on the watershed to determine product placement, priority ranking and to determine future needs. Updated practice placement will be entered to determine load reductions achieved.

5.5 Options for long-term funding of the operation and maintenance (O&M) of restoration activities will be evaluated by the project sponsor. Each cooperator receives information on maintenance requirements for the intended life-span of each practice

6.0 Budget

The project budget is shown in Tables 8 and 9. The SRF funds are the proceeds from the NPS portion of the City of Watertown's SRF Loans numbers 7 and 8.

Other federal funds listed are the project's best estimate based on experience. The primary source is expected to be NRCS. US Fish & Wildlife Service and SD Game, Fish and Parks funds are not included so they are not listed in the Practice/Year Match in Table 11.

EXHIBIT F

Table 10. Funding Sources

PART 1. FUNDING SOURCES				
	2008	**2009**	**2010**	**TOTAL**
EPA SECTION 319 FUNDS				$-
1) FY Funds (FA)	$183,000	$183,000	$184,000	$550,000
2) Other Federal	$68,000	$68,000	$68,000	$204,000
SUBTOTAL	**$251,000**	**$251,000**	**$252,000**	**$754,000**
				$-
STATE AND LOCAL MATCH				$-
2) City of Watertown	$140,000	$140,000	$140,000	$420,000
3)SRF	$81,205	$58,747	$-	$139,952
4) Owner	$100,000	$100,000	$101,250	$301,250
SUBTOTAL	**$321,205**	**$298,747**	**$241,250**	**$861,202**
TOTAL	**$572,205**	**$549,747**	**$493,250**	**$1,615,202**

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Table 11. Practice Year/Match **SECTION 319 NONFEDERAL BUDGET**	**2008**	**2009**	**2010**	**TOTAL COST**	**LOCAL MATCH**	**SRF**	**319 FUNDS**	**OTHER FED**	**OWN**	**TOTAL**
PERSONNEL / ADMIN										
1) Salary/Benefits	$64,000	$64,500	$65,000	$193,500	$96,750		$96,750			$193,500
2) Tech Engr / Benefits	$52,500	$53,000	$53,500	$159,000	$79,500		$79,500			$159,000
3) Tech Admin / Benefits	$20,000	$20,000	$20,000	$60,000	$30,000		$30,000			$60,000
4) Supplies Utilities Repairs and Maintenance	$10,000	$10,000	$2,425	$22,425	$12,675		$9,750			$22,425
5) Equipment	$6,055	$11,000	$6,000	$23,055	$23,055					$23,055
6) Insurance	$1,050	$1,050	$1,050	$3,150	$1,650		$1,500			$3,150
SUBTOTAL	**$153,605**	**$159,550**	**$147,975**	**$461,130**	**$243,630**	**$-**	**$217,500**			**$461,130**
OBJECTIVE 1 REDUCE NUTRIENT LOAD										
1) Animal Nutrient Management Systems	$300,000	$200,000	299,952	$799,952	$40,000	$89,952	$308,500	$161,500	$200,000	$799,952
1A) Animal Nutrient Management Systems			$700,000	$700,000	$105,000		$420,000		$175,000	$700,000
2) Manure Application Management	$2,000	$4,000	$4,000	$10,000	$7,500		$-		$2,500	$10,000
SUBTOTAL	**$302,000**	**$204,000**	**303,952**	**$809,952**	**$47,500**	**$89,952**	**$308,500**	**$161,500**	**$202,500**	**$809,952**
OBJECTIVE 2 REDUCE SEDIMENT LOAD										
1) Grassed Waterways	$15,000	$15,000	$15,000	$45,000	$11,250		$-	$22,500	$11,250	$45,000
2) Small Ponds	$30,000	$30,000	$30,000	$90,000	$67,500		$-		$22,500	$90,000
3) Streambank Stabilization	~~$40,000~~	~~$30,000~~	~~$30,000~~	~~$100,000~~	~~$25,000~~		~~$50,000~~		~~$25,000~~	~~$100,000~~
4)Riparian Grazing	$8,000	$6,000	$6,000	$20,000	$15,000				$5,000	$20,000
5) Shoreline Stabilization	$40,000	$30,000	$30,000	$100,000		$50,000			$50,000	$100,000
5A) Shoreline Stabilization			$200,000	$200,000	$30,000		$120,000		$50,000	$200,000
6) Water Testing	$6,000	$6,000	$8,000	$20,000	$8,000		$12,000			$20,000
7)Alt. Stock Water	$15,000	$15,000	$10,000	$40,000	$10,000		$-	$20,000	$10,000	$40,000
SUBTOTAL	**$114,000**	**$102,000**	**$99,000**	**$315,000**	**$111,750**	**$50,000**	**$12,000**	**$42,500**	**$98,750**	**$315,000**
OBJECTIVE 3 INFORMATION AND EDUCATION										
1) Newsletter	$1,500	$1,500	$1,500	$4,500	$1,125		$3,375			
2) Student Education	$1,000	$1,000	$1,000	$3,000	$1,260		$1,740			
3) Tours	$600	$600	$600	$1,800	$450		$1,350			
4) Signs	$1,000	$1,000	$1,000	$3,000	$750		$2,250			
5) Seminars, Presentations, Updates	$1,000	$1,000	$1,000	$3,000	$535		$2,465			
6) Outreach	$5,000	$5,000	$3,820	$13,820	$13,000		$820			
SUBTOTAL	**$10,100**	**$10,100**	**$8,920**	**$29,120**	**$17,120**		**$12,000**			**$29,120**
TOTAL	**$619,705**	**$505,650**	**$489,847**	**$1,615,202**	**$420,000**	**$139,952**	**$550,000**	**$204,000**	**$301,250**	**$1,615,202**
TOTAL			**$900,000**	**$900,000**	**$135,000**		**$540,000**		**$225,000**	**$900,000**

7.0 Public Involvement

The volunteer Upper Big Sioux River Watershed Project Advisory Board meets monthly and serves the City of Watertown in an advisory capacity. This volunteer board represents townships, counties, non governmental organizations, agencies and the City Council. Other volunteers will be used for water sample collection, survey assistance, information and education programs and as workshop tour assistants. See Objective 3., Task 3.

8.0 Threatened and Endangered Species

The following procedures will be followed to ensure the project will promote recovery of threatened and endangered species and will not adversely affect these species.

A. Bald Eagle. The project is expected to have no effect on the bald eagle. The eagle is a transient and travels the watershed in spring and fall before and after the construction season. If any actions become necessary during the project that might impact bald eagles that are in or visit the area, the project will contact DENR for approval to complete the action before proceeding.

B. Piping Plover. The project is expected to have no effect on the piping plover. This species is found primarily on the Missouri River. This project is anticipated to significantly contribute to improved water quality and restored shallow water areas in wetlands should the bird ever choose to inhabit this area.

C. Whooping Crane. This project is anticipated to significantly contribute to: 1) improved water quality, including improvements in aquatic life species; and 2) improved quality of shallow water areas in wetlands, tributary streams and lakes. Additional shallow water areas will be created. The Project is not expected to significantly increase or expand the level of human activity in the area. However, the project sponsor (City of Watertown) has agreed to stop work should a Whooping Crane appear onsite where a particular BMP is being installed.

D. Western Prairie Fringed Orchid. The Upper Big Sioux River Watershed Project will include improvements to native prairie including improvements to several riparian area sites where livestock grazing will be excluded. Thus, the project will result in improved density and composition of native prairie vegetation because of the management systems to be installed. Every effort will be made to keep activities that could affect the flower out of its location.

E. Topeka Shiner. The project proposal gives priority to improving grazing management on grasslands within two miles of major riparian waterways in the watershed. Planned riparian buffers and streambank stabilization will improve stream channel and habitat conditions at several locations. There may be some short-term increases in suspended solids concentrations during streambank stabilization activities. However, no Topeka shiners have been known to inhabit the Upper Big Sioux River Watershed Project Area. In the event that Topeka shiners are found in the Upper Big Sioux River drainage appropriate measures directed by the US Fish and Wildlife Service and the South Dakota Topeka Shiner Management Plan will be followed. Should the fish be found, under no circumstances will instream construction be carried out during the spawning period from May15 to July 31. Other BMPs to be implemented on cropland and animal feeding areas will improve water quality should the shiner appear.

EXHIBIT F

APPENDIX I
UPPER BIG SIOUX RIVER WATERSHED PROJECT
SAMPLING AND ANALYSIS PLAN

Water quality in the Upper Big Sioux River has been monitored since 1991 for EPA 319 Assessment and Implementation Projects. The early data collected led to the implementation phase of the Upper Big Sioux River Watershed Project. A comprehensive water quality analysis is underway for the entire Big Sioux River. The East Dakota Water Development District is studying the Upper Big Sioux and Middle Sioux River portions. It was discovered that the portion of the River through Watertown had been omitted from that study. Water quality in the Big Sioux River above and below Lake Kampeska will be compared. Lake Pelican lies downstream from Lake Kampeska and the City. Nonpoint sources and total loadings to that waterbody need to be learned. Water quality in the Big Sioux River above Watertown will be monitored for the development of a TMDL to address impairments. Water quality in Lake Kampeska and Lake Pelican will be monitored to address impairments in the lakes.

The objective of this monitoring is to conduct sufficient activities to assure complete, accurate, representative and comparable data that are of known quality, technically sound, statistically accurate, properly documented, and representative of the media being measured.

The City of Watertown will join the South Dakota State University Water Resources Institute, the Lake Kampeska Water Project District, East Dakota Water Development District and the Municipal Utilities to monitor water in the Big Sioux River, Lake Kampeska, and Lake Pelican. The purpose of this practice will be to better trace loading sources.

TASK	ACTIVITY	REFERENCE
Event Driven Water Quality Monitoring Objective 2 Task 2 Product 6	River Monitoring (above town) River Monitoring (in town) In-Lake Monitoring	Standard Operating Procedures for Field Samplers-SD DENR South Dakota Nonpoint Source Program/Quality Assurance Project Plan- SD DENR

The laboratory parameters will be as follows:

Fecal Coliform, E Coli, Enterococci	Ammonia
Total Alkalinity	Nitrate - Nitrite
Total Solids	Total Volatile Suspended Solids
Total Kjeldahl Nitrogen	Total Suspended Solids
Total Phosphorus	Total Dissolved Phosphorus

Water quality parameters that will be calculated from the above parameters include:

Total Dissolved Solids	Organic Nitrogen
Total Solids	Total Nitrogen

The samples will be collected in four separate bottles with appropriate preservatives. The bottles will be packed in ice for shipment to the State Health Laboratory in Pierre, SD.

Field parameters to be collected will include:

Water Temperature	Dissolved Oxygen
Air Temperature	Field pH

Visual Observation by sample collection personnel will include, but not be limited to, these:

Precipitation	Dead Fish
Wind	Surface Film on Water
Odor	Turbidity
Septic Conditions	Water Color

Documentation and record collection is an integral part of maintaining proper Quality Assurance protocols. The local samplers will keep an accurate field log of all occurrences in the watershed. The field log will help the Project Coordinator reach a conclusion on what is happening in the watershed to affect water quality.

Water quality data will be returned to the Project Coordinator directly from the health lab. This data will be compiled to show a profile for nonpoint source pollution inputs in the Upper Big Sioux River above and through Watertown, as well as in Lake Kampeska and Lake Pelican.

“Standard Operating Procedures for Field Samplers” established by the South Dakota Department of Environment and Natural Resources will be used. The “South Dakota Nonpoint Source Program / Quality Assurance Project Plan” (SD DENR) will also be followed.