SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM
IMPLEMENTATION PROJECT

FINAL REPORT, SEGMENT 5
December 31, 2012

CONTINUATION OF THE UPPER BIG SIOUX RIVER WATERSHED PROJECT

City of Watertown, SD, Grant Sponsor
P O Box 910, 23 2nd St. NE
Watertown, SD 57201-0910

Roger Foote, Project Coordinator

Watershed Advisory Board Officers

John R. Little, Chairman
Jeff DeVille, Vice-Chairman
Jim Madsen, Secretary

Project Period: April 1, 2008 – December 31, 2012

This project was conducted in cooperation with the South Dakota Department of Environment and Natural Resources and the U.S. Environmental Protection Agency, Region 8**.**
Grant #9998185-05-08-10

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Appendices

EXECUTIVE SUMMARY

PROJECT TITLE: Segment 5 Continuation of the Upper Big Sioux River Watershed Project

Grant #9998185-05-08-10

Initiation Date: September 13, 2007; Completion Date December 31, 2012

FUNDING REQUESTED

Total EPA Grant: Cash	$970,000
Total Local Match	$1,035,202
TOTAL FUNDING	**$2,209,202**

ACTUAL EXPENDITURES

Expenditures EPA Funds	$701,820
Expenditures – Other Federal	$3,050
Expenditures Local Funds	$1,230,162
ACTUAL TOTAL EXPENDITURES	**$1,935,032**

Project Activities Completed.

Best Management Practice	Milestones	Accomplished
Animal Nutrient Management	12 systems	9 systems
Manure Application Management	7 units	2 units
Grassed Waterways	8,400 linear feet	10,603 linear feet
Small Ponds	30 units	13 units
Riparian Grazing Management (revised)	640 acres	425 acres
Lake Shoreline Stabilization	844 linear feet	3,571 linear feet
Water Quality Testing	68 samples	84 samples
Alternate Livestock Water	3 units	8 units
Information Education Activities	137 units	173 units

This segment continued the restoration effort initiated in 1994 for the Upper Big Sioux River Watershed and the immediate Lakes Kampeska and Pelican sub-basins. As shown in the project activities completed table, most milestones were surpassed by great margins. The milestones that were not reached can be attributed to numerous circumstances. Wet weather, changes in incentives, and changes in production practices combined to limit participation in the project.

As the weather changed in the watershed area, so did attitudes and perceptions on water quality. Future efforts will continue increased information and education activities, more local media exposure, and more opportunities with partners to promote the practices.

NPS PROJECT SUMMARY SHEET

AWARD FISCAL YEAR: FY2005, FF 2008, FF2010 **PROJECT TITLE:** CONTINUATION, UPPER BIG SIOUX RIVER WATERSHED PROJECT SEGMENT 6

NAME: CITY OF WATERTOWN **ADDRESS**: 23 2ND ST NE, P O BOX 910

CITY WATERTOWN, SD **ZIP** 57201-0910

PHONE 605-882-5250 **FAX** 605-882-5251 **EMAIL** rfoote@iw.net

PROJECT TYPE: WATERSHED
WATERSHED NAME: UPPER BIG SIOUX RIVER WATERSHED, LAKES KAMPESKA AND PELICAN SUBWATERSHEDS

LATITUDE: 44.9317 N **LONGITUDE**: -97.2033 W
HYDROLOGIC UNIT CODE: 10170201

HIGH PRIORITY WATERSHED: YES

POLLUTANT TYPE NUTRIENTS, SEDIMENT,AND BACTERIA

WA CATEGORY CATEGORY 1, WATERSHEDS IN NEED OF RESTORATION

TMDL DEVELOPMENT YES

TMDL IMPLEMENTATION YES

TMDL PRIORITY HIGH

WATERBODY TYPES: LAKES, RIVERS, STREAMS, WETLANDS

ECOREGION: NORTHERN GLACIATED PLAINS

PROJECT CATEGORY: AGRICULTURE

PROJECT FUNCTIONAL CATEGORY: BMP IMPLEMENTATION/DESIGN

GROUNDWATER PROTECTION: NO

§**319 FUNDED FULL TIME PERSONNEL** 1.75

GOALS: Segment 5 is a continuation program. The goal of the project segment was to improve the quality of the water entering the Big Sioux River and Lakes Kampeska and Pelican, and to continue restoration of the full beneficial uses of the lakes and river by reducing phosphorus and sediment loads.

PROJECT DESCRIPTION: The project was designed to continue to improve water quality of the Big Sioux River and Lakes Kampeska and Pelican by reducing nutrient and sediment loads originating from grazing and animal feeding operations, from crop ground and pasture lands caused by inappropriate application of manure or holding pond water, and from stream/river banks and lake shoreline erosion.

INTRODUCTION

Water quality monitoring done in 2011 by the SD DENR showed low oxygen levels in the Big Sioux River from Ortley, near the river headwaters, to Lake Kampeska. The 2010 SD Integrated Report for Surface Water Quality Assessment (SDIRSWQA, Table 1) indicated that *Warm Water Semi-Permanent Fish Life Propagation* was impaired in Lake Pelican. The Upper Big Sioux River had an impaired *Warm Water Semi-permanent Fish Life Propagation* use and *Limited Contact Recreation* nonsupported designation. The Big Sioux River and Lake 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 implementation. Current status of designated uses listed in the 2010 SDIRSWQA shows project effectiveness by having uses removed from impaired status. Table 1. Source: http://denr.sd.gov/documents/10irfinal.pdf.)

Table 1. Designated Beneficial Uses of Lake Kampeska, Pelican Lake and the Big Sioux River

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

This segment was a continuation of a project to reduce phosphorus and sediment loads entering the Big Sioux River, Lakes Kampeska and Pelican. The goal was consistent with meeting targets set by the 1994 SD DENR Diagnostic/Feasibility Study, the 1995 Pelican Lake Assessment and the 2000 NRCS PL 566 River Basin Study.

Based on the studies, best management practices (BMPs) were recommended to help reduce sediment, nutrients and bacteria loads entering the Big Sioux River, Lakes Kampeska and Pelican from priority areas before attempting in-lake restoration activities such as sediment 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
- Streambank 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 Diagnostic/Feasibility Study (DENR, 1994) and the PL 566 River Basin Study (NRCS, 2000) identified two nonpoint source (NPS) pollutants, sediment and phosphorus, which became the project's focus. Sediment and phosphorus are in surface water runoff and also come from in-channel bank erosion in the watershed upstream from the receiving waters. Some coliform bacteria loading was found near animal feeding operations. While the bacteria were found most often in close proximity to livestock operations, they were periodically found in Lakes Kampeska and Pelican.

The Big Sioux River, from its headwaters near Summit, SD, south to and including Pelican Lake, drains a 245,399-acre watershed (USDA/NRCS 10/1996) 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 the Big Sioux shallow aquifer (Appendix 3) and water moves back and forth. Storm event runoff carries with it quantities of sediment, phosphorus and coliform bacteria. The origin of the pollutants has been identified as farming practices and livestock production in the watershed. (NRCS PL 566 Study, 2000)

Runoff drains to four tributaries on the eastern side of the watershed: Mud Creek, Mahoney Creek, Soo Creek and Indian River; and Still Lake on the west, through temporary or seasonal linear wetlands before entering the Big Sioux River. (Appendix 1 –Watershed and Subwatershed Maps)

Lake Pelican is located three miles south of Lake Kampeska. The major tributary to both lakes is the Big Sioux River.

Watershed General Information (Appendix 1—Watershed and Subwatershed Maps)
The entire Prairie Coteau, including Lakes Kampeska and Pelican, are of glacial origin. Groundwater moves to and from the lakes by gravel channels that were formed by the retreating glacier melt. These gravel channels form the shallow Big Sioux Aquifer, which is exposed to the surface in some areas. The Big Sioux River, as it winds through the watershed, directly connects the surface water and the aquifer and gathers the drainage from the subwatersheds. **(**Appendix 3—Aquifer)

During flood periods the lakes receive water from the Big Sioux River via their inlets/outlets, when the level of the river is higher than that of the lakes. When the water level of the river drops below that of the lakes, the reverse occurs and the lakes discharge water back into the river. The river high flow periods carry volumes of sediment and nutrients. These pollutants settle out and remain in the lakes while the cleaner water is discharged back into the river. Thus the pollutants accumulate in the lake. Both lakes have weir structures that divert low flow events downstream past the lakes.

The watershed contains mostly small- to medium-sized family farms. Many operators farm all available property, even in environmentally sensitive areas. At the beginning of the project, most cultivated lands were planted to wheat; currently these same fields are planted mostly to row

crops of corn and beans. Producers who have enrolled in CRP programs in the past now farm the land as those contracts expire.

Average annual precipitation is 21-23 inches per year with an average evaporation of 41 inches per year. (http://efotg.sc.egov.usda.gov/references/public/SD/averageannlprecip.pdf) Actual rainfall amounts vary widely. Irrigation systems within the watershed area are center pivot systems that pump out of the shallow Big Sioux aquifer. As an example of how intimately connected the river and aquifer are, it is possible to watch the river levels drop over a couple of days when the irrigation pumps are running.

Animal agriculture is a large part of the business in the watershed area. Cattle producers are mostly cow/calf enterprises with background feeding of calves and some finishing operations. The producers who feed cattle exclusively tend to be in the 300-500 animal range; however, the trend is to increase numbers up to and exceeding the 999 Concentrated Animal Feeding Operation (CAFO) animal unit threshold. With the current market value of lamb, the expectation is a rise in numbers of the few sheep operations in the watershed. Equine trends are mainly recreational with a few specific training and breeding facilities. (Appendix 2—Tier 1 Feeding Operations and Water Sampling Sites)

Range condition is a concern in the watershed area. Currently conditions can be rated fair to poor with a few excellent exceptions. The rental price of pasture acres is driving the decline of range conditions. Producers are unsure whether they will be outbid for the rental of pastures in the following year; as a result, they over-utilize pastures to recoup perceived value. Conversion of pasture to row crops is increasing, driven by commodity prices.

Table 2. Project Area Land Ownership (NRCS PL 566 Study, 2000)

Subwatershed	Total Acres	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	1,558	2,476	1,148

Table 3. Land Use (NRCS PL 566 Study, 2000)

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.

Type of Watershed Quality Problem

Sediment and phosphorus were identified as the major pollutants of the Big Sioux River and Lakes Kampeska and Pelican ((D/F Study, DENR, 1994 and PL 566, NRCS, 2000). The reports stated that lake loads were largely the result of agricultural activities in the watershed.

Subwatersheds Contribution (Appendix 1 Maps—Subwatersheds) According to 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 inlet/outlet. However, Mud Creek flows have an impact on Lake Pelican. The Middle Sioux subwatershed contributes the highest sediment and nutrient load which reaches Lake Kampeska. Mahoney Creek, Soo Creek, Indian River and the Upper Sioux subwatersheds are all confluent in the Middle Sioux subwatershed.

Water quality monitoring during 2011 showed dissolved oxygen levels in the Big Sioux River often at low to impaired levels. Work is continuing to identify the sources of this low oxygen, so that best management practices can be developed to correct impairments.

Phosphorus currently trapped in Lake Kampeska has no natural escape from the lake. As the flood waters advance and recede in the spring, the lake acts as a large settling basin for the river system. This process causes nutrients and sediment to build up within the lake. The phosphorus that is not dissolved is trapped in the sediment layer or is utilized by the naturally-occurring algae. As wind churns the lake, as low oxygen levels occur and as the algae die, much of the

phosphorus becomes available again and the cycle repeats. Along with changes in concentrations due to water volume changes the cycles can be seen on the Kampeska phosphorus concentration trend graph (Appendix 5—Phosphorus Trends).

PROJECT GOALS, OBJECTIVES AND TASKS

Environmental

Restore and/or maintain beneficial uses of Lakes Kampeska, Pelican and the Upper Big Sioux River by reducing nutrient and sediment loads that contribute to their over-enrichment.

Programmatic (BMPs)

This project is a continuation of a project to reduce phosphorus and sediment loads entering the Big Sioux River, Lakes Kampeska and Pelican. The goal is consistent with meeting targets for recommended BMPs in the 1994 SD DENR Diagnostic/Feasibility Study, the 1995 Pelican Lake Assessment and the 2000 NRCS PL 566 River Basin Study.

Table 4 Planned v. Implemented Milestones

Best Management Practice	Unit	Total Planned	Total Implemented
Ag Nutrient Mgt. System	units	12	9
Nutrient Management	units	7	2
Grassed Waterways	feet	8,400	10,603
Small Ponds	units	30	13
Riparian Grazing Management	acres	640	425
Shoreline Stabilization	feet	844	3,571
Water Quality Monitoring	samples	68	84
Alternate Livestock Water	Units	3	8
Information & Education	units	137	173

OBJECTIVES AND TASKS

Objective 1. Reduce nutrient loads entering Lake Kampeska and Pelican Lake

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

Products

1. Animal Nutrient Management Systems - 12 systems (Amendment #3 January 2010). Priority construction sites were selected from those systems with a 50+ AGNPS feedlot rating in the Upper Big Sioux River Watershed. Landowners were responsible for 25% of the total cost of the systems.
Total Cost: $891,863 319 Funds: $437,241

SRF Funds: $89,952 Local Cash/In-kind: $454,621.54

Milestones:	Planned	12 Systems
	Completed	9 Systems
	Outcome	Costs rose considerably during this grant period. Additionally, higher feed costs and low animal value combined with a reduction of cost share virtually eliminated the number of willing volunteer participants toward the end of the grant period.

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2. Manure Application Management - 7 units. Priority was given to producers innovative in using animal waste application practices in environmentally sensitive areas. Landowners applied nutrients based on plant uptake needs to avoid over application. Tools and training were provided to help landowners best apply animal nutrients, using nutrient soil tests and heavy-duty scales

Total Cost: $144.60 319 Funds: $0 Local Cash/In-kind: $144.60

Milestones:	Planned	7 landowners
	Completed	2 landowners
	Outcome	Most new manure application machinery have built-in scales, so the producer has more accurate information on applying manure. Scales were used annually by SDSU for yield measurement at the research farm.

Objective 2. Reduce Sediment Loadings to Lake Kampeska and Pelican Lake

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

Products

1. Grassed Waterways - 8,400 linear feet. Priority was given to critical cells identified by AnnAGNPS producers who are integrating other erosion control measures on contributing cropland fields, and sites where gully erosion and ephemeral erosion were evident on cropland in the priority subwatersheds. Focus was especially on withdrawn CRP fields.

Total Cost: $29,928 319 $0 Local Cash/In-kind: $29,928

Milestones	Planned	8,400 linear feet
	Completed	10,603 linear feet
	Outcome	A combination of wet weather and compliance applications through the US Corps of Engineers delayed construction toward the end of the grant. 3 years of waterways were completed in one summer.

2. Small Ponds - 30 units. This practice intent was to 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 serve as silt traps and also provide livestock and wildlife watering facilities.

Total Cost: $34,292 319 Funds $ 0 Local Cash/In-kind: $34,292

Milestones	Planned	30 units
	Completed	13 units
	Outcome	Dugouts and dams were in demand during dry seasons or years. During wet years (most of the last three) there was minimal demand.

3. Streambank Stabilization – (Eliminated 2nd Amendment 2009).

4. Riparian Grazing Management - 640 acres. This practice was to buffer waterways, riparian zones and lands between cropland and wetlands. Its purpose was to contain silt and nutrients from sheet erosion as an alternative for landowners who did not want to participate in the NRCS Continuous CRP program. The North Central Big Sioux Watershed and Northern Prairies Land Trust have shown that there is interest in riparian management if there is incentive provided. This was an attempt to see how much interest might be shown.

Total Cost: $49,706 319 Funds: $23,078 Local Cash/In-kind: $26,628

Milestones	Planned	640 Acres
	Completed	425 acres
	Outcome	Because of low financial inducement, landowners were not inclined to retire crop or pasture land (even in riparian zones) from production. The switch (Amendment Four, 2010) to the 'Riparian Area Management' approach in conjunction with CRP, is a new program and interest is developing

5. Lake Shoreline Stabilization - 844 linear feet. This practice cost shared at the rate of rock riprap with landowner options for abutments. Additional costs per foot for abutments were the responsibility of the property owner. Priority was based on assessments of high erosion areas. $75,000 in additional funding was granted to the project by the Lake Kampeska Water Project District.

Total Cost: $326,857 319 Funds: $0; SRF Funds: $50,000
Local Cash/In-kind: $276,857

Milestones:	Planned	844 linear feet
	Completed	3,571 linear feet
	Outcome	High spring runoff for several years combined with strong wind/wave action eroded about 5,000 feet of shoreline on Kampeska. A lot of erosion took place above the shoreline protection. As a result, a publication was developed for alternatives to bluegrass lawns. Demand far exceeded funding and will continue to do so in the foreseeable future.

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.

Scheduled project in-lake testing and major runoff events were monitored at the lake inlet structure and the Big Sioux River at the Florence gauging station. (Appendix 2—Water Sampling Sites) Analytical measurements were: pH, dissolved oxygen, suspended solids, total Kjeldahl nitrogen, total phosphorus, total dissolved phosphorus and E. coli bacteria. Analysis was completed by the South Dakota State Health Lab located in Pierre, South Dakota. Local funds were spent purchasing replacement and upgraded water monitoring equipment.

Total Cost $15,033 319 Funds $12,000 Local Cash/In-Kind Match $3,033

Milestones:	Planned	68 samples
	Completed	84 samples
	Outcomes	7 years of water sampling (current and previous segments) document that the Big Sioux River and Lake Kampeska show a progressive decline in nutrients in the water. (Appendix 5—P Trends)

7. Alternate Livestock Water Facilities. The ten 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. Alternate water facilities allowed the landowner to restrict access to the streams and the river along with prescribed grazing management.

Total Cost $42,744 319 funds $0 Local/Inkind $42,744

Milestones:	Planned: 3 facilities
	Completed: 8
	Outcomes: Dugouts, rural water, and wells combined with crossings helped to move livestock away from the streams and rivers.

Objective 3. Information and Education

Task 3. 173 units of Information and Education activities took place to keep watershed stakeholders, taxpayers, residents and others informed on progress of and educated about the water quality improvement in the Upper Big Sioux River Watershed.

Products

1. Three newsletters. The project newsletters chronicled project progress with cooperating producers in the watershed. A fourth publication, *Beyond Bluegrass: soft alternatives for soil stabilization,* was distributed in 2012.

2. One hundred fifty-five student education events. 5 public and 4 private elementary school sixth grade classes participated annually in a riparian education outdoor education format. Ongoing partnership with the Bramble Park Zoo brought many more opportunities for education, including Roots ‘N Shoots groups, Conservation Connection Saturday, 4th Grade Students and

individual tours which included an introduction to the watershed and water quality issues. The RiverQuest program was held once in conjunction with the Watertown Boys & Girls Club.

3. Six group tours. Bus or van tours of the watershed practices were completed. These were targeted to urban taxpayers who provide the local match for the Environmental Protection Agency Section 319 Project, along with volunteer board members and interested landowners from the watershed.

4. Signs. No new signs were needed to show progress. Previous signage was adequate.

5. Project notices. Included news releases, updates, advertisements, pamphlets, presentations. Service club presentations and partnership activities were given in partnership with other agencies such as the SD Association of Conservation Districts. Winter Farm Shows and the Mike Williams Lecture Series were included in this practice. An informational pamphlet *Beyond Bluegrass: soft practice alternatives for bluegrass lawns around lakes, storm sewers, creeks, or drainage areas* received the largest number of contacts/responses to any publication in the history of the project.

6. Outreach. Purchased ads in news service agencies included newspapers, radios and television.

Total Cost $27,637 319 Funds $12,000 Local Cash/In-kind Match $15,637

Objective 4. Reports

1. GRTS (Government Report Tracking System) Reports were made annually
2. Final GRTS report and this final Narrative Summary will be submitted to SD DENR.

EVALUATION OF GOAL ACHIEVEMENTS

As shown by the outcomes of each task, the overall achievements of this segment show a mixed result. The shortfall of animal nutrient management system milestones was driven by market conditions and a perceived need for increased incentives. The success of grassed waterways was the result of producers need to access the fields. While the numbers of Best Management Practices were not reached in all tasks, progress has been made in *all* tasks of the project.

LONG TERM RESULTS IN TERMS OF BEHAVIOR MODIFICATION, STREAM/LAKE QUALITY, GROUND WATER AND/OR WATERSHED PROTECTION CHANGES

Strength of local support is manifest in the seventeen plus years of this continuing locally-sponsored watershed project. Program staff at SD Department of Environment and Natural Resources has cited (promoted) the Upper Big Sioux River Watershed Project as an example of strong local sponsorship, which included local coordination, project development and implementation accomplished through the project advisory committee.

Project staff developed and implemented outreach programs that conveyed information and participation opportunities to targeted segments of the area's population through partnerships, the project website and local radio and TV channels. A mini-grant through SD Discovery Center 319 Information & Education Project enabled outreach to a larger regional area which included seven area lakes.

Behavior Modification: the most striking was shown by the interest in planting alternative turf grasses and native plants instead of bluegrass. The project promoted the widespread use of filter fabric for erosion control and is now common practice and a "known" thing to use. A livestock producer contact helped him realize animals in the drainage were causing pollution and worked with the project to find a solution even though his site would not accommodate a full animal nutrient management system.

BEST MANAGEMENT PRACTICES (BMPs) DEVELOPED/REVISED

- Streambank stabilization eliminated due to lack of interest/lack of compensation
- Riparian Area Management developed to replace streambank, in cooperation with NRCS CP30 program
- Manure application management discontinued; improved landowners' equipment replaced the need for the practice
- In Lake Bio-Manipulation load reduction developed by calculating .05 lb. of phosphorus per 10 lbs. of carp removed from the lakes.
- Modification of a vegetated treatment system into a re-circulating bio-filter/constructed wetland, to remove nutrients and promote the importance of wetlands, using natures systems to advantage

PUBLIC INVOLVEMENT AND COORDINATION

Public involvement in the project has been a driving factor for many of the best management practices that were installed. Every contact, whether for shoreline stabilization or cleaning out a stock pond, provided the opportunity to expand the conversation beyond the immediate need to the overall goals of the project. Many calls received from the public were for news and information regarding watershed issues and advice on installing practices and impacts to the area water quality. Contact and outreach came by way of volunteer advisory board members, from invitations by the area service groups, and visibility at public events. The public wants to know what is being done for water quality and how they can help.

STATE INVOLVEMENT

- The SD Discovery Center: I&E Minigrant promoting information about land stabilization
- The SD Department of Environment and Natural Resources: project administration and funding resources

- The SD Game, Fish and Parks: permits, educational opportunities and project partners
- South Dakota State University: project design, consultation, and educational opportunities

FEDERAL AGENCY INVOLVEMENT

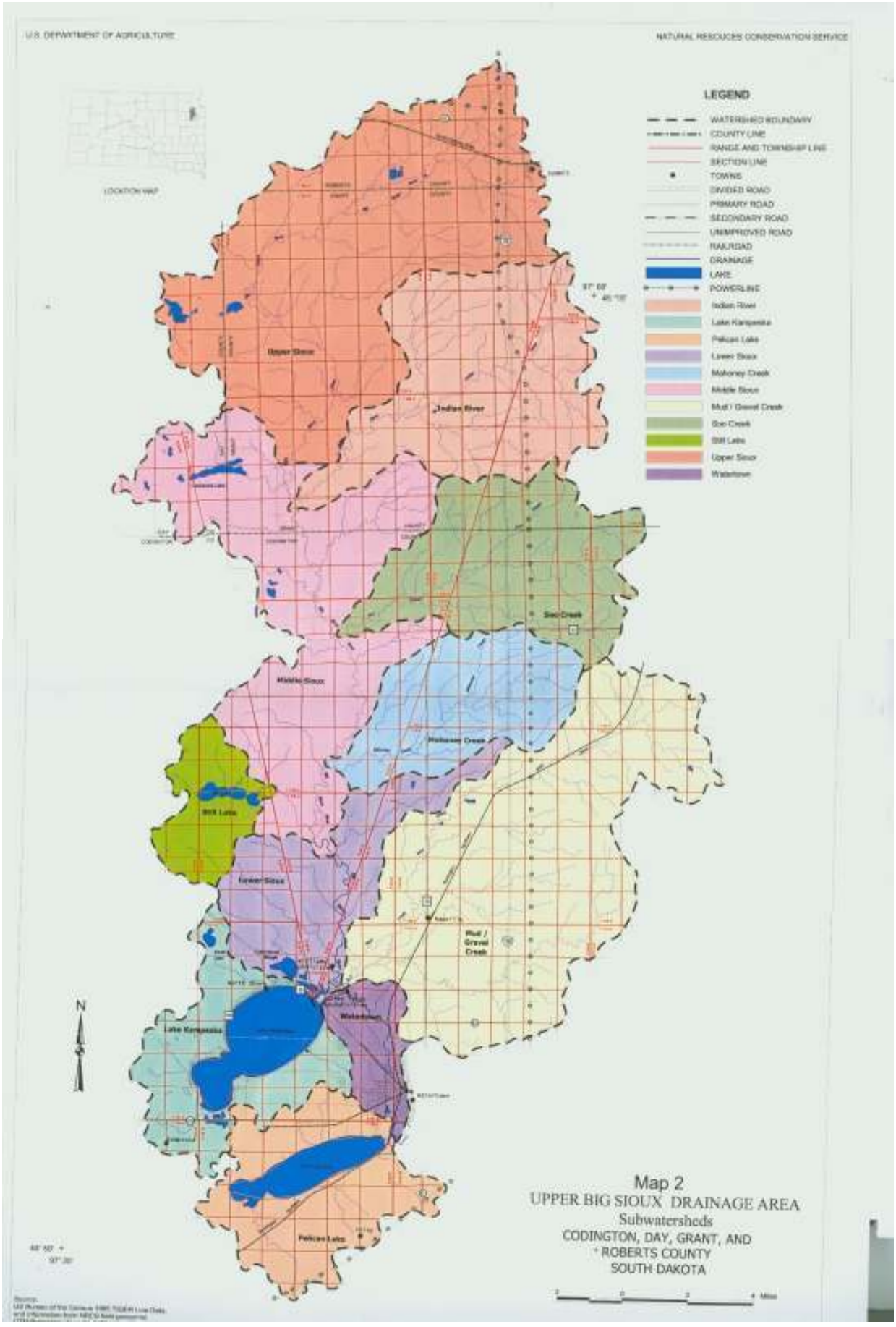
Partnerships with the USDA Natural Resources Conservation Service for developing CRP contracts in conjunction with the Riparian Area Management program, and for cooperative work for practices such as grassed waterways (in conjunction with CRP) and animal nutrient management systems as the opportunities arose.

LOCAL GOVERNMENT, ENVIRONMENTAL AND OTHER GROUPS

The Upper Big Sioux River Watershed Project has enjoyed strong local support from the outset, and continues to build on that support. Support is evident in the upcoming Phase 6 continuation segment by the willing and generous support of the three local financial partners: City of Watertown, Watertown Municipal Utilities and Kampeska Water Project District. Other groups that took an active interest in the project included the Lake Pelican Water Project District through financial assistance for small ponds and dams, Lake Area Technical Institute through student interns and consultation on environmental technologies. Lake Pelican Preservation Society provided input and research on an in-lake treatment removing bio-mass to reduce overabundant phosphorus. Kampeska Water Project District continued to be a prime sponsor, but also has been involved with other water quality projects such as selective dredging and phosphorus removal. The Codington Conservation District partnered on education activities such as the education prairie garden and the production and distribution of *Beyond Bluegrass*, an informational pamphlet on soft erosion control practices. Local chapter involvement of the Isaac Walton League of America continued through educational seminars for the public and opportunities for hands-on outdoor experiences for area youth.

Appendix 1

Watershed Maps


U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
LEGEND
WATERSHED BOUNDARY
COUNTY LINE
RANGE AND TOWNSHIP LINE
SECTION LINE
TOWNS
DIVIDED ROAD
PRIMARY ROAD
SECONDARY ROAD
UNIMPROVED ROAD
RAILROAD
DRAINAGE
LAKE
POWERLINE
Indian River
Lake Kampeska
Pelican Lake
Lower Sioux
Mahoney Creek
Middle Sioux
Mud / Gravel Creek
Sac Creek
Bill Lake
Upper Sioux
Watertown
LOCATION MAP
Upper Sioux
Indian River
Sac Creek
Middle Sioux
Mahoney Creek
Bill Lake
Forest Sioux
Mud / Gravel Creek
Watertown
Lake Kampeska
Pelican Lake
N
Map 2
UPPER BIG SIOUX DRAINAGE AREA
Subwatersheds
CODINGTON, DAY, GRANT, AND
ROBERTS COUNTY
SOUTH DAKOTA
Miles

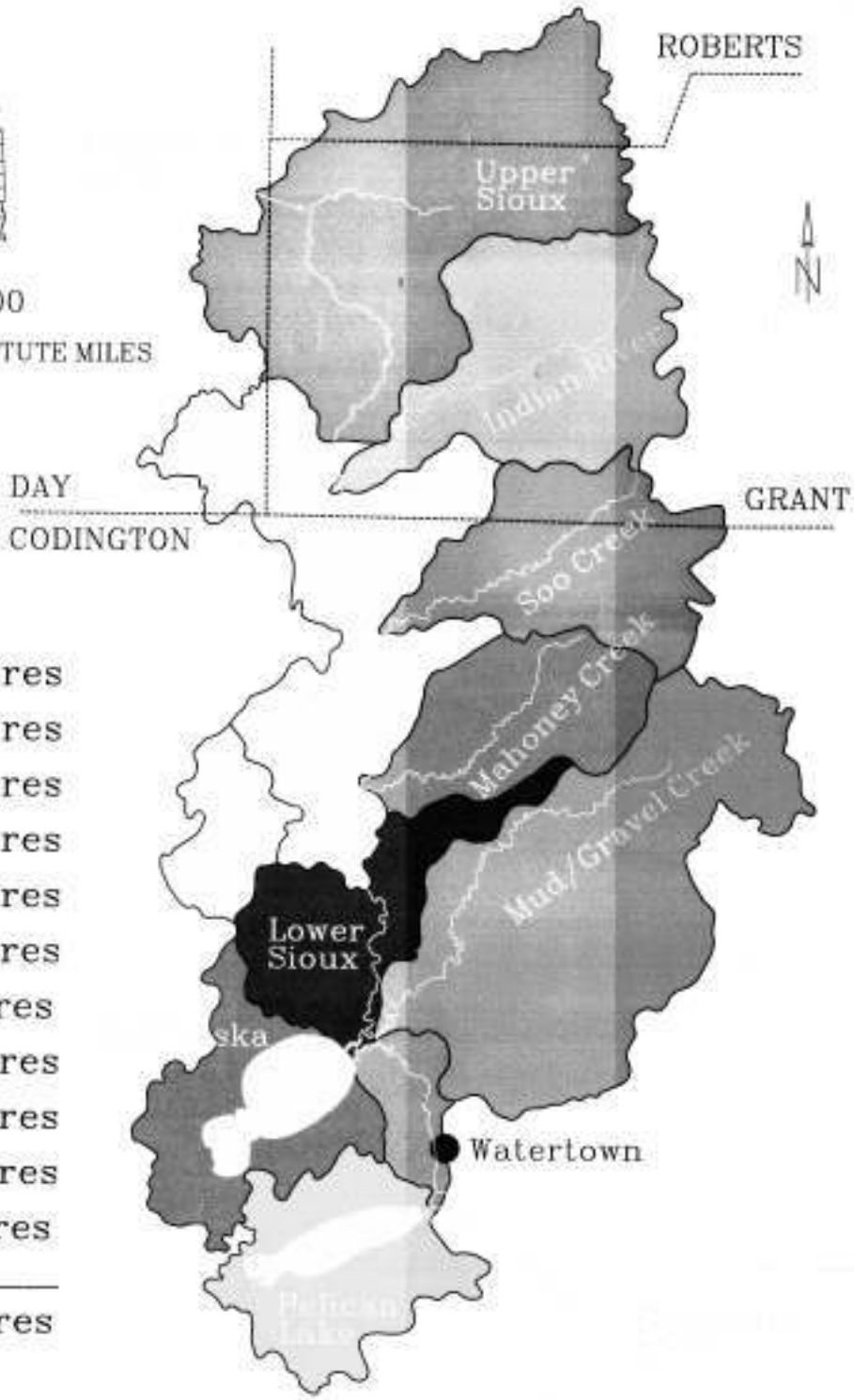
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

UPPER BIG SIOUX RIVER WATERSHED

SOUTH DAKOTA

SCALE 1:150000

0 1 2 3 4 5 STATUTE MILES



LEGEND

	43,911 Acres
	24,972 Acres
	19,811 Acres
	15,206 Acres
	44,763 Acres
	34,774 Acres
	6,940 Acres
	15,351 Acres
	17,278 Acres
	17,326 Acres
	5,067 Acres
	245,399 Acres

SOURCE:
USDA/NRCS 1:24000 & 1:250000 DATA
AND INFORMATION FROM NRCS PERSONNEL.
ALBERS EQUAL AREA PROJECTION.
OCTOBER 1996.

MAP PRODUCED BY
USDA/NRCS
SOUTH DAKOTA STATE OFFICE
GEOGRAPHIC INFORMATION SYSTEM

U.S. DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

LOCATION MAP

LEGEND

- WATERSHED BOUNDARY
- COUNTY LINE
- RANGE AND TOWNSHIP LINE
- SECTION LINE
- TOWNS
- DIVIDED ROAD
- PRIMARY ROAD
- SECONDARY ROAD
- UNIMPROVED ROAD
- RAILROAD
- DRAINAGE
- LAKE
- POWERLINE
- Uplands
- Valleys
- Water

97° 00'
45° 15'

44° 50'
97° 20'

N

Map 4
UPPER BIG SIOUX DRAINAGE AREA
Land Form
CODINGTON, DAY, GRANT, AND ROBERTS COUNTY
SOUTH DAKOTA

2 0 2 4 Miles

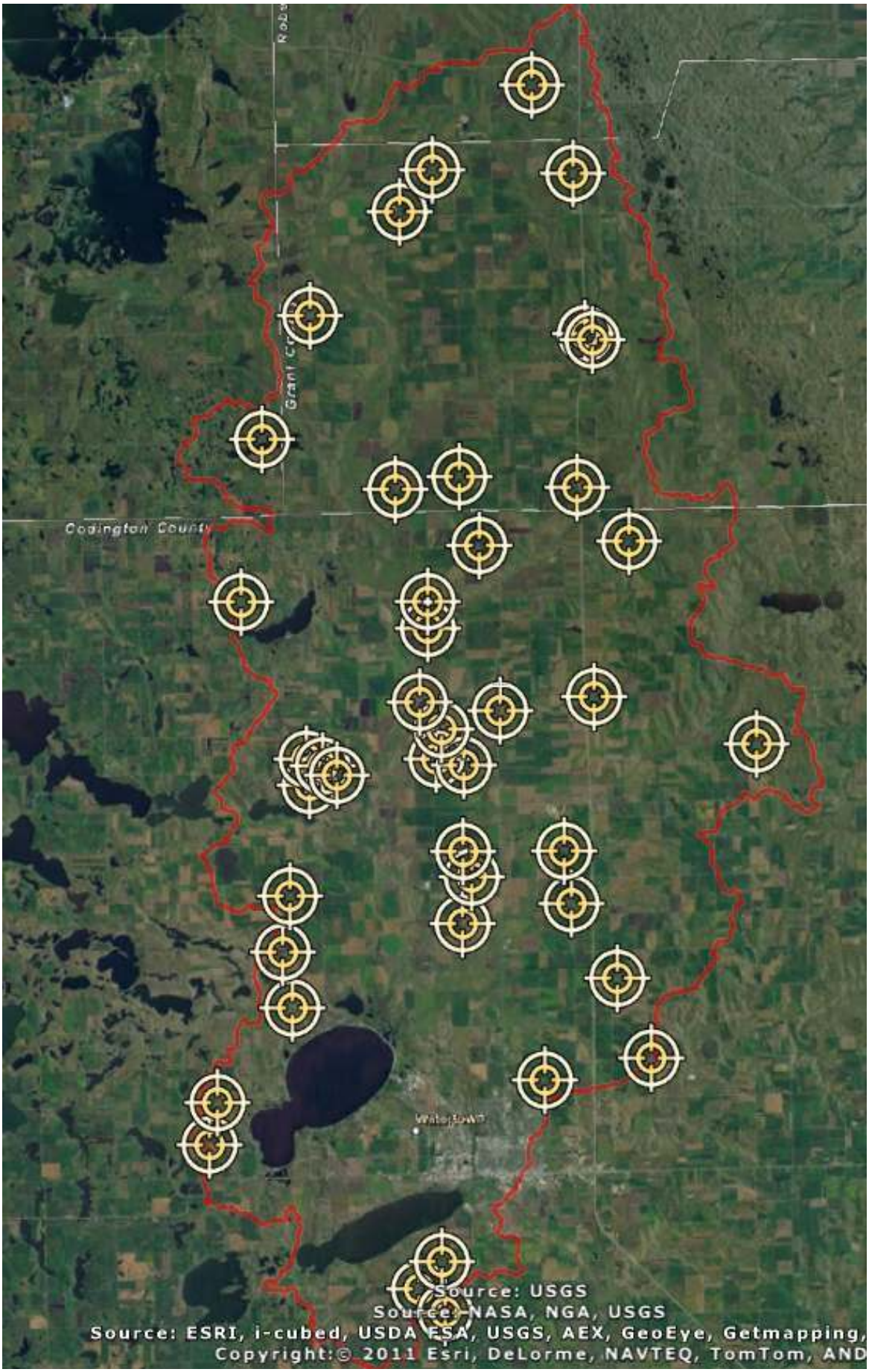
Source:
US Bureau of the Census 1995 TIGER Line Data
and information from NRCS field personnel.
UTM Projection, Zone 14, NAD27

June 1999 1038506

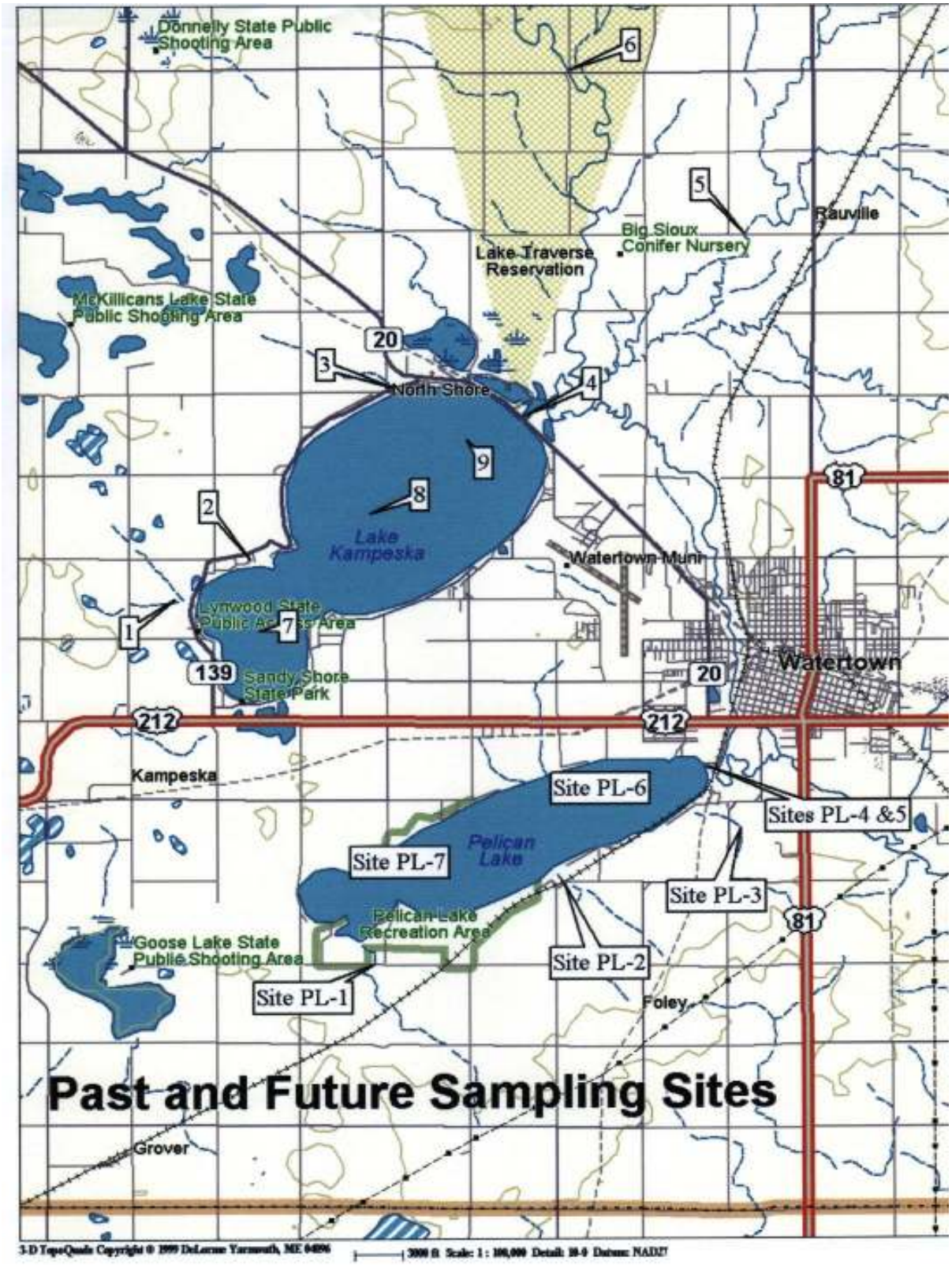
Appendix 2

Sites

Upper Big Sioux River Watershed Project (Red Outline)
Distribution of Tier 1 Feeding Operations
Source: SD DENR 2011 , ESRI, USDA, USGS

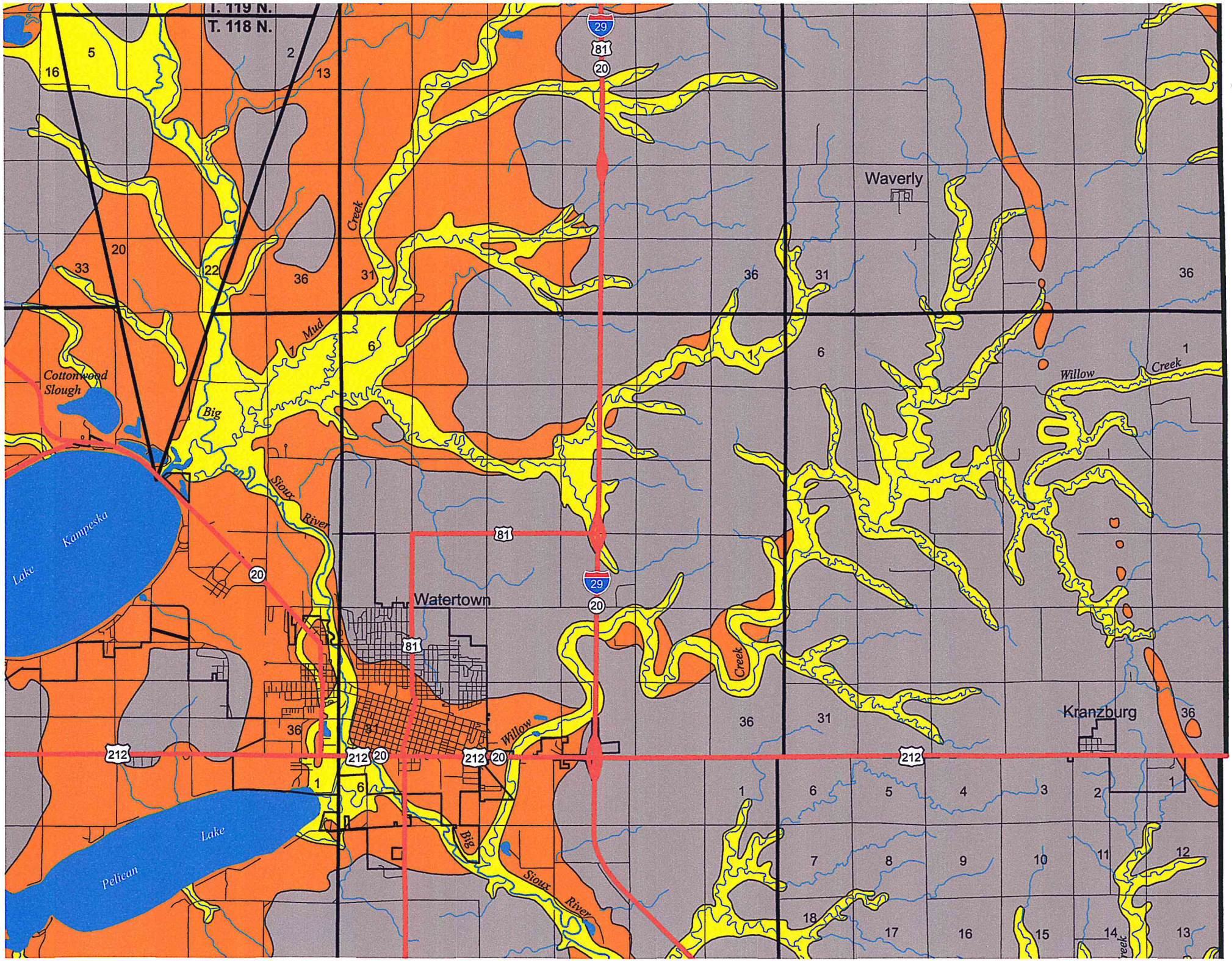


Upper Big Sioux and Kampeska/Pelican Sampling Sites



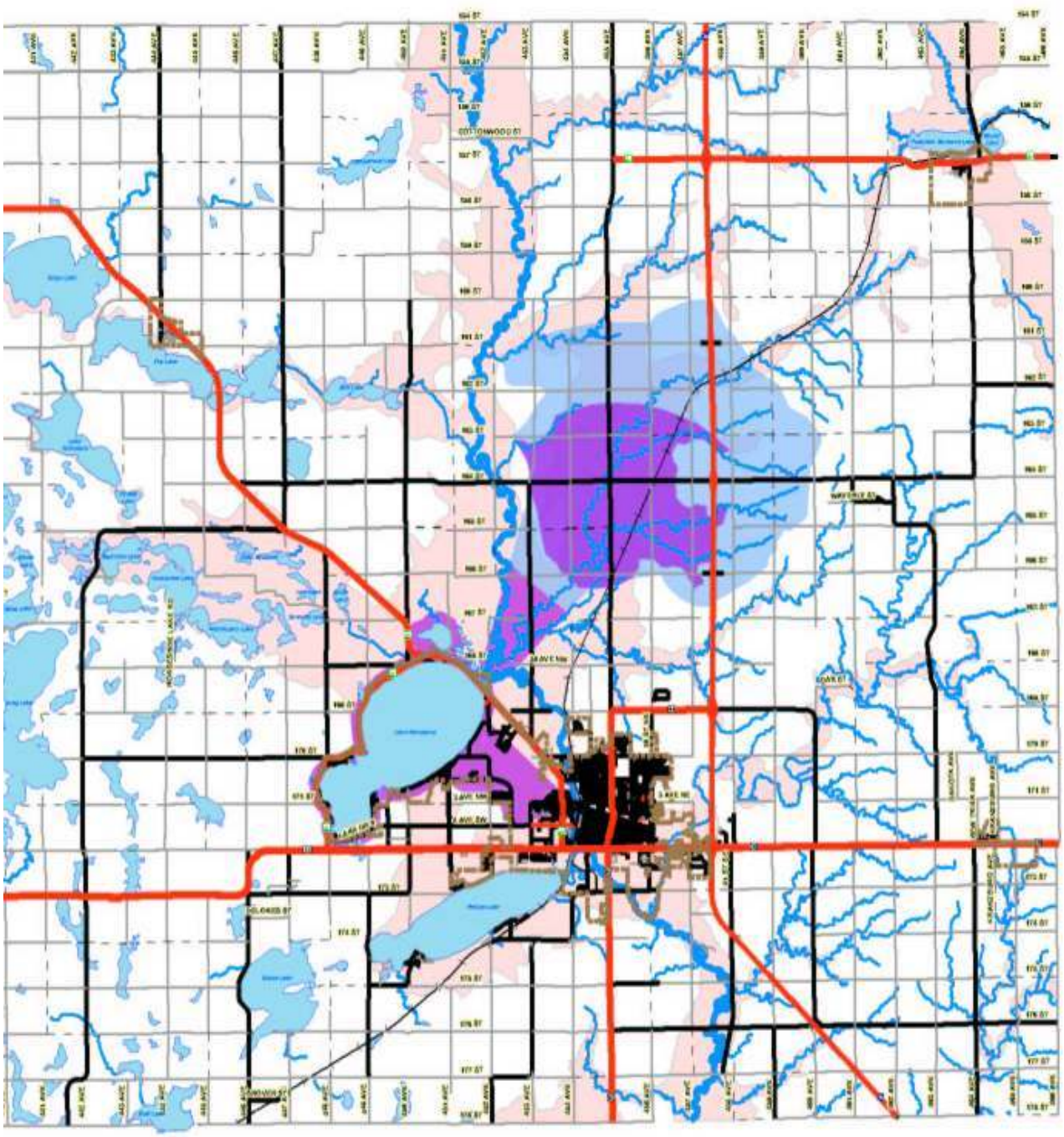
Appendix 3

CODINGTON AQUIFER


T. 119 N.
T. 118 N.
Waverly
Watertown
Kranzburg
Cottonwood Slough
Kampeska Lake
Pelican Lake
Big Sioux River
Mud Creek
Willow Creek
29
81
20
212
5
16
2
13
20
33
22
36
31
1
6
36
31
1
6
1
36
31
36
1
6
1
36
31
36
1
6
1
2
3
4
5
6
7
8
9
10
11
12
18
17
16
15
14
13

Appendix 4

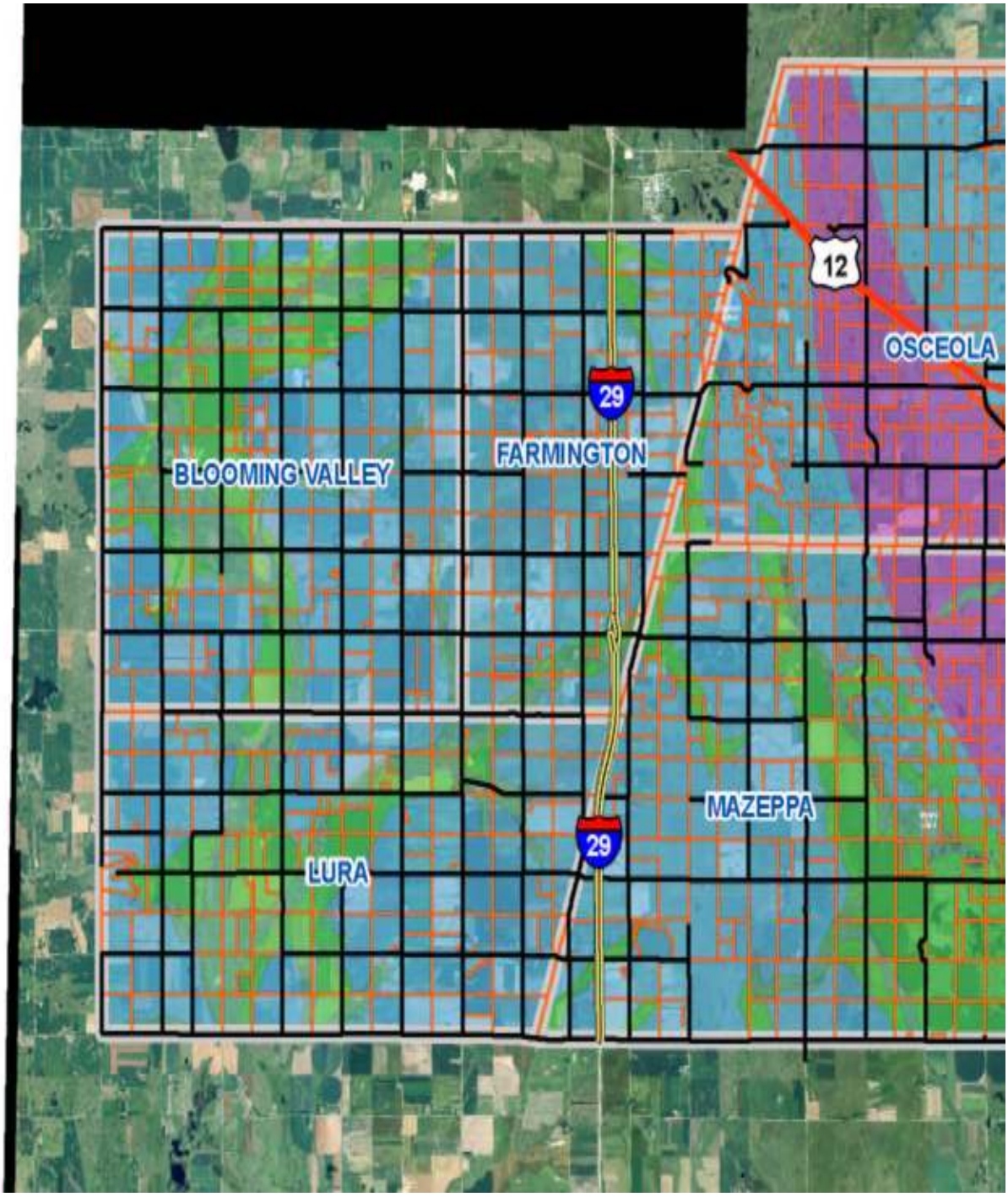
Wellhead Protection Zones



Codington County
Wellhead Protection
Source: First District
Watertown, SD 2011

Legend

- Municipal Boundaries
- WHPA 5-Year Time of Travel
- WHPA 10-Year Time of Travel
- Shallow Aquifer



Grant County Wellhead Protection Area in the project area

Source: Grant County Zoning Department

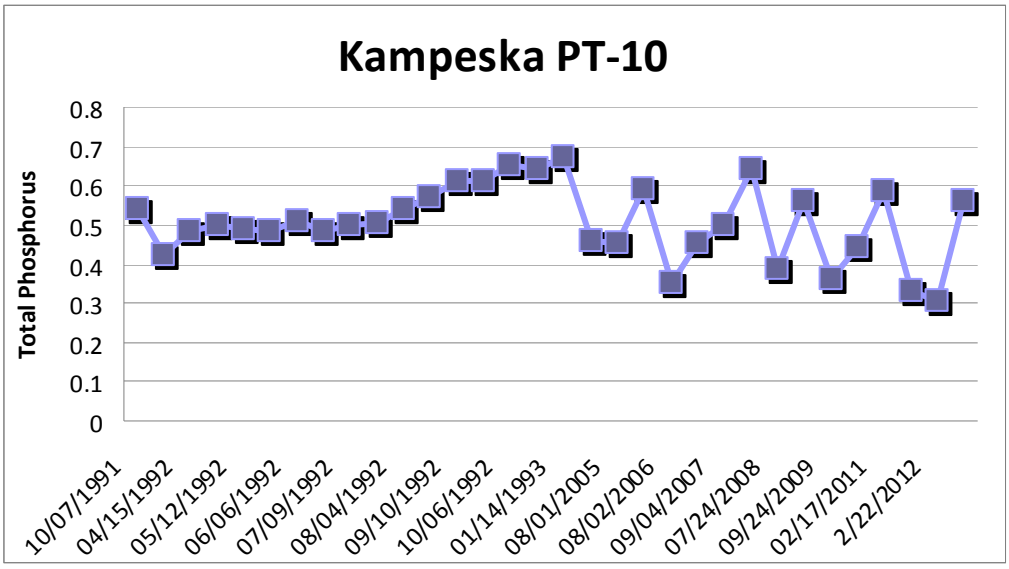
Appendix 5

Water Monitoring

Phosphorus Levels in Lake Kampeska

Water Monitoring
Total Phosphorus Lake Kampeska

Progress shown at one monitoring point (kampesk10) from 1991 through the assessment of the project in 1994. Sampling resumed in 2005 up until the winter of 2012, toward the end of Segment 5. although the peaks and valleys vary in pattern, the overall downward trend beginning around 2005 indicated a reduction of total phosphorus in the lake.



APPENDIX 6

EXPENDITURE DETAIL

UPPER BIG SIOUX RIVER WATERSHED PROJECT
Segment 5 FY 05

TOTAL EXPENDITURES

12/20/2012

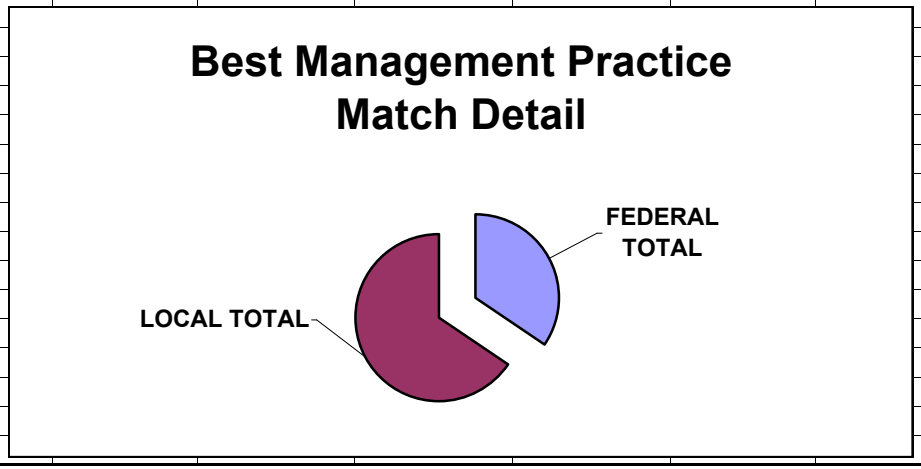
FUND TYPES	EPA 319	US FISH & WILDLIFE	USDA EQIP	SD STATE REVOLVING FUND	CITY OF WATERTOWN	MUNICIPAL UTILITIES	KAMPESKA WATER PROJ DISTRICT	OPERATOR CASH	OPERATOR IN KIND
PRACTICE									
ALT LIVESTOCK WATER	$ -	$ -	$ -	$ -	$ 20,811.99	$ 11,246.08	$ -	$ 10,001.02	$ 685.00
ANIMAL NUTRIENT MGT	$ 437,241.49	$ -	$ -	$ 89,952.00	$ (9,092.43)	$ 83,000.00	$ 42,701.68	$ 220,234.79	$ 27,825.50
GRASSED WATERWAYS	$ -	$ -	$ -	$ -	$ 8,460.05	$ 13,993.81	$ -	$ 7,473.74	$ -
GRAZING MGT - RIPARIAN	$ 23,078.16	$ -	$ -	$ -	$ -	$ 14,836.99	$ -	$ 6,635.73	$ 5,155.35
INFO/ED	$ 12,000.00	$ -	$ -	$ -	$ 4,721.30	$ 10,452.56	$ 463.27	$ -	$ -
INSURANCE	$ 729.14	$ -	$ -	$ -	$ 238.69	$ 706.61	$ -	$ -	$ -
MANURE APP MGT	$ -	$ -	$ -	$ -	$ -	$ 144.60	$ -	$ -	$ -
MISC OPERATING EXP	$ 5,156.07	$ -	$ -	$ -	$ 2,064.37	$ 7,734.65	$ -	$ -	$ -
PHONE - MONTHLY	$ 698.02	$ -	$ -	$ -	$ 612.66	$ 1,024.64	$ -	$ -	$ -
PHONE - LONG DISTANCE	$ 48.80	$ -	$ -	$ -	$ 59.94	$ 52.04	$ -	$ -	$ -
PICKUP FUEL	$ 1,643.65	$ -	$ -	$ -	$ 850.37	$ 1,581.64	$ -	$ -	$ -
SALARY	$ 96,750.00	$ -	$ -	$ -	$ 93,736.96	$ 41,287.34	$ -	$ -	$ -
SHORELINE	$ -	$ -	$ -	$ 50,000.00	$ 12,102.50	$ -	$ 119,744.25	$ 144,912.37	$ 97.41
SMALL PONDS	$ -	$ 3,050.00	$ -	$ -	$ 1,388.66	$ 20,521.37	$ 2,145.83	$ 7,114.20	$ 72.00
STREAMBANK	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TECH (ENGR)	$ 79,500.00	$ -	$ -	$ -	$ 40,967.61	$ 39,750.00	$ -	$ -	$ -
TECH (ADMIN)	$ 30,000.00	$ -	$ -	$ -	$ 44,743.56	$ 15,000.00	$ -	$ -	$ -
UTILITIES	$ 2,950.27	$ -	$ -	$ -	$ 1,119.64	$ 7,674.09	$ -	$ -	$ -
VEHICLE MAINTENANCE	$ 24.05	$ -	$ -	$ -	$ 82.05	$ 41.58	$ -	$ -	$ -
WATER TESTING	$ 12,000.00	$ -	$ -	$ -	$ -	$ -	$ 3,032.66	$ -	$ -
TOTAL	$ 701,819.65	$ 3,050.00	$ -	$ 139,952.00	$ 222,867.93	$ 269,048.00	$ 168,087.69	$ 396,371.84	$ 33,835.26
BUDGET	$ 701,819.65	$ 20,000.00	$ 184,000.00	$ 139,952.00	$ 150,000.00	$ 270,000.00	$ 168,087.69	$ 301,250.00	
						TOTALS ON FOLLOWING PAGE			

FUND TYPES	FEDERAL TOTAL	LOCAL TOTAL	TOTAL
PRACTICE			
ALT LIVESTOCK WATER	$ -	$ 42,744.09	$ 42,744.09
ANIMAL NUTRIENT MGT	$ 437,241.49	$ 454,621.54	$ 891,863.03
GRASSED WATERWAYS	$ -	$ 29,927.60	$ 29,927.60
GRAZING MGT - RIPARIAN	$ 23,078.16	$ 26,628.07	$ 49,706.23
INFO/ED	$ 12,000.00	$ 15,637.13	$ 27,637.13
INSURANCE	$ 729.14	$ 945.30	$ 1,674.44
MANURE APP MGT	$ -	$ 144.60	$ 144.60
MISC OPERATING EXP	$ 5,156.07	$ 9,799.02	$ 14,955.09
PHONE - MONTHLY	$ 698.02	$ 1,637.30	$ 2,335.32
PHONE - LONG DISTANCE	$ 48.80	$ 111.98	$ 160.78
PICKUP FUEL	$ 1,643.65	$ 2,432.01	$ 4,075.66
SALARY	$ 96,750.00	$ 135,024.30	$ 231,774.30
SHORELINE	$ -	$ 326,856.53	$ 326,856.53
SMALL PONDS	$ 3,050.00	$ 31,242.06	$ 34,292.06
STREAMBANK	$ -	$ -	$ -
TECH (ENGR)	$ 79,500.00	$ 80,717.61	$ 160,217.61
TECH (ADMIN)	$ 30,000.00	$ 59,743.56	$ 89,743.56
UTILITIES	$ 2,950.27	$ 8,793.73	$ 11,744.00
VEHICLE MAINTENANCE	$ 24.05	$ 123.63	$ 147.68
WATER TESTING	$ 12,000.00	$ 3,032.66	$ 15,032.66
TOTAL	$ 704,869.65	$ 1,230,162.72	$ 1,935,032.37
BUDGET			

APPENDIX 7

Best Management Practice Match Comparison

PRACTICE	EPA 319	US FISH & WILDLIFE	SD REVOLVING FUND	CITY OF WATERTOWN	MUNICIPAL UTILITIES	KAMPESKA WATER PROJ	OPERATOR CASH	OPERATOR IN KIND	FED TOTAL	LOCAL TOTAL	TOTAL
ALT WATER	$ -	$ -	$ -	$ 20,811.99	$ 11,246.08	$ -	$ 10,001.02	$ 685.00	$ -	$ 42,744.09	$ 42,744.09
ANIMAL NUTRIENT MG	$ 437,241.49	$ -	$ 89,952.00	$ (9,092.43)	$ 83,000.00	$ 42,701.68	$ 220,234.79	$ 27,825.50	$ 437,241.49	$ 454,621.54	$ 891,863.03
GRASS WATERWAYS	$ -	$ -	$ -	$ 8,460.05	$ 13,993.81	$ -	$ 7,473.74	$ -	$ -	$ 29,927.60	$ 29,927.60
RIPARIAN	$ 23,078.16	$ -	$ -	$ -	$ 14,836.99	$ -	$ 6,635.73	$ 5,155.35	$ 23,078.16	$ 26,628.07	$ 49,706.23
INFO/ED	$ 12,000.00	$ -	$ -	$ 4,721.30	$ 10,452.56	$ 463.27	$ -	$ -	$ 12,000.00	$ 15,637.13	$ 27,637.13
MANURE APP MGT	$ -	$ -	$ -	$ -	$ 144.60	$ -	$ -	$ -	$ -	$ 144.60	$ 144.60
SHORELINE	$ -	$ -	$ 50,000.00	$ 12,102.50	$ -	$ 119,744.25	$ 144,912.37	$ 97.41	$ -	$ 326,856.53	$ 326,856.53
SMALL PONDS	$ -	$ 3,050.00	$ -	$ 1,388.66	$ 20,521.37	$ 2,145.83	$ 7,114.20	$ 72.00	$ 3,050.00	$ 31,242.06	$ 34,292.06
STREAMBANK	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
WATER TESTING	$ 12,000.00	$ -	$ -	$ -	$ -	$ 3,032.66	$ -	$ -	$ 12,000.00	$ 3,032.66	$ 15,032.66
TOTAL	$ 484,319.65	$ 3,050.00	$ 139,952.00	$ 38,392.08	$ 154,195.41	$ 168,087.69	$ 396,371.84	$ 33,835.26	$ 487,369.65	$ 930,834.28	$ 1,418,203.93



Appendix 6

PICTORIAL

Upper Big Sioux River Watershed Project

Final Report
Segment 5 Pictorial

Animal Nutrient Management Systems

Grassed Waterways

Information / Education Activities

Riparian Area Management

Shoreline Stabilization

Small Ponds

Water Testing