Sheyenne Watershed Sedimentation Reduction Project

Barnes County Soil Conservation District
110 Winter Show Road SW
Valley City, ND 58072

CONTACT PERSON: Lori Frank TITLE: Coordinator
PHONE: 701-845-3114 ext.3 FAX: 701-845-5605
E-MAIL: lori.frank@nd.nacdnet.net

STATE: North Dakota **WATERSHED:** Sheyenne
HYDROLOGIC UNIT NUMBER: 09020203, 09020204
HIGH PRIORITY WATERSHED: Yes
TMDL STATUS: Reaches on the Sheyenne River are listed on the 303(d) List for impaired uses for fish and aquatic biota due to sedimentation.

PROJECT TYPES	WATERBODY TYPES	NPS CATEGORY
__ STAFFING & SUPPORT	__ GROUNDWATER	X_ AGRICULTURE
X_WATERSHED	X_ LAKES/RESERVOIRS	__ URBAN UNOFF
__ I & E	X_ RIVERS	
	X_ STREAMS	
	__ WETLANDS	

PROJECT LOCATION: Barnes County, North Dakota

SUMMARIZATION OF MAJOR GOALS: The Barnes County Sheyenne Watershed Project is designed to provide technical, financial and educational assistance to all agriculture producers and landowners with riparian acreage and/or upland cropland at high risk of erosion within the county. Our goal is to restore the aquatic life and maintain the recreational uses of the Sheyenne River and its tributaries within Barnes County.

PROJECT DESCRIPTION: Project sponsors intend to 1) provide technical and financial assistance to producers and landowners within ½ mile of the Sheyenne River and its tributaries and to prioritize locations when outside the AnnAgnps priority areas 2) assist with best management practices that protect/enhance our riparian and non-crop acres in high priority areas 3) provide technical and financial assistance to producers with upland cropland acreage in high priority areas 4) develop educational programs to heighten public awareness of non-point source pollution impacts and solutions with a special emphasis on homeowners within Valley City 5) develop working partnerships in the local community to benefit natural resources.

319 Funds Requested:	$305,205.00	Outdoor Heritage Funds:	$126,000.00
State/Local Match:	$311,950.00	Total Project Cost:	$743,150.00

2.0 STATEMENT OF NEED

2.1 As the Sheyenne River is a major recreational environment for numerous communities, and drinking water resource for Valley City we feel the Sheyenne Watershed Sedimentation Reduction Project is crucial in protecting our most valued natural resource. It is our objective to provide the essential education and resources to assist our local residents with the tools to accomplish these key goals.

Barnes County has been fortunate to have had previous watershed programs in the past, but we realize the work is not done. Farmers and ranchers are by nature, a cautious breed. They take their time looking over the issue, talking with neighbors and local professionals, contemplating articles and doing research. When they have made up their mind, they want action. The short turn-around time from planning to completion of the 319 watershed practices is the foundation for its success. See attached sheet of previous accomplishments (Appendix #1).

It may take many years before landowners develop a trusting and confident relationship with watershed personnel. They must also have confidence in the 319 watershed program itself in order for them to make changes to their operations. Right now Barnes County has developed that mutual trust and confidence. Landowners now understand the benefits of the program as they have witnessed previous successes.

The Department of Health has provided the district with AnnAgnps (a watershed simulation model) maps depicting areas of high priority for cropland and non-crop acreage. Letters have been sent to these landowners informing them of these areas and of the possibility of grant dollars to address these issues if the district's proposal is accepted. Nine producers have already stopped in to discuss grazing and manure management systems, grassed waterways, cover crops, septic system failures, and concerns of riverbank erosion. These areas are our first priority. See attached AnnAgnps maps (Appendix #2).

We will introduce a comprehensive watershed farm assessment. This assessment will look at drainage patterns, producer goals and concerns, positive elements and negative aspects of current management practices. By utilizing this approach, producers will have an over-all view of their operation. See attached sample assessment (Appendix #3).

We also need to provide education to the residents and decision makers of Valley City. Urban residents must understand their contributions to water quality issues.

Our previous project focused on E. Coli levels and recreational usage. Water sample data confirms our success, but unfortunately those same water samples show high TSS concentrations. The high levels of sedimentation/siltation are impairing our macroinvertebrate communities and therefore will be the focus of our efforts. Impairments and degradation didn't happen over-night and cannot be repaired instantly. It takes countless years, determination, and patience to change people's behaviors and mind-set.

Data from the 2012 List of Section 303(d) for TMDL waters shows that fish and aquatic biota are fully supported, but threatened the entire reach south from Lake Ashtabula to the county line. Lake Ashtabula and Bald Hill Creek are not supporting and fully supporting but threatened, respectively for recreation. Downstream we find natural and man-made stressors which are most influential in the total ranking they include; urban areas, farmed wetlands, cropland, road density, animal unit density, and pasture/rangeland needing improvement. Primary pollutants identified in the 305(b) Report that may be causing the aquatic life use impairments include suspended solids, fecal coliform bacteria, nutrients, and organic material. Pathogens, as indicated by fecal coliform bacteria, are the primary causes of recreation use impairment. Sources of the elevated E. Coli concentrations include livestock feeding areas, riparian grazing, and urban runoff and too some extent municipal sewer bypasses. (Appendix #2 TMDL Waters map)

Barnes County is in the southeastern part of North Dakota. It has a total area of 956,800 acres. The Sheyenne River is entrenched in a valley about 2 miles wide and 150 feet deep, which flows south through the center of Barnes County before it eventually drains into the Red River of the North. Baldhill Dam, constructed across the Sheyenne River in 1950, is about 12 miles north of Valley City. The impounded body of water (5,430 acres) is Lake Ashtabula.

See attached Sampling Locations, AnnAgnps Cropland (25,208 acres) & Non-cropland (20,185 acres) Priority Maps (Appendix #2 AnnAgnps maps).

The Sheyenne River Watershed originates in central North Dakota and flows southeasterly about 250 miles to join the Red River of the North. Barnes County is in the Drift Prairie section of the Central Lowland province of the Interior Plains. The Drift Plains ecoregion is characterized by generally flat to occasionally rolling topography with a thick layer of glacial till left behind by the Wisconsinan glaciers. The Drift Plain grasslands, prior to cultivation, were a mixture of tall grass and short grass prairie. Seasonal and temporary wetlands are common within this ecoregion. Bedrock is exposed in the valleys of the Sheyenne River and the Bald Hill Creek. The flood plains of these and other streams are blanketed by alluvium. Elevation ranges from about 1,080 feet on the flood plain of the Sheyenne River south of Kathryn to about 1,570 feet on the crest of an end moraine north of Valley City.

Barnes County is usually quite warm in the summer and very cold in the winter, when arctic air masses frequently surge over the area. Total annual precipitation is about 18 inches. Of this, about 14 inches, or more than 75%, usually falls in April through September. The growing season also falls within this same period. Average seasonal snowfall is about 31 inches.

Natural resource management concerns are erosion control, primarily wind and water erosion on cropland, and animal unit densities. Of the 956,800 acres within the county, 82% is cropland, 13% grass and the remaining 5% urban/water. Corn and soybeans are the principal crops grown, with some wheat and sunflowers. Cow/calf production with feeder or butcher animals provides the majority of the livestock industry.

Phase II of the Sheyenne River - Barnes County Watershed Implementation Project began in the spring of 2010 with the purpose of reducing non-point source pollution input to the Sheyenne River. As of 2012 the Sheyenne River from Lake Ashtabula downstream a tributary near N.D. State Highway 46 was included in the North Dakota Department of Health's (NDDoH) Section 303(d) List of Waters Needing Total Maximum Daily Loads due to impairments caused by Sedimentation/Siltation. Additionally a 14.73 mile stream segment from a tributary above Valley City, near the railroad bridge, downstream to its confluence with a tributary below Valley City was listed as having a benthic macroinvertebrate community impairment.

To assess changes in water quality resulting from best management practices implementation, the Barnes County Soil Conservation District collected water quality samples at four locations each along the Sheyenne during the open water season (March to October) from 2009 to 2013. Weekly water samples monitored concentrations of E. coli bacteria, nutrients (nitrogen and phosphorus), and total suspended solids (TSS) at the four sites.

The NDDoH employs two E. coli bacteria sampling criteria which are used to identify bacteria impairments and to assess recreational uses of the river. Criterion 1 states that for each assessment site, the geometric mean of samples collected during any month from May 1 through September 30 should not exceed a density of 126 colony forming units (CFUs) per 100 milliliters (ml). Criterion 2 states that for each assessment unit, less than 10 percent of samples collected during any month from May 1 through September 30 should not exceed a density of 409 CFUs per 100 ml. For both criteria, a minimum of five monthly samples is required but, if

necessary, samples may be pooled by month across years. The two criteria are then applied using the following use support decision criteria:
Fully Supporting: Both criteria 1 and 2 are met.
Fully Supporting but Threatened: Criterion 1 is met, but 2 is not.
Not Supporting: Criterion 1 is not met. Criteria 2 may or may not be met.

E. coli bacteria sampling results at all site indicated there were low bacteria concentrations in the watershed and that recreational uses were Fully Supported along the entire river reach from Bald Hill Dam to ND Highway 46.

At all four monitoring sites weekly samples and annual mean total nitrogen (TN) concentrations were consistent from year to year and did not drastically deviate from each other. Dilution of TN by high spring flows resulted in yearly minimums at all monitoring sites. As Bald Hill Dam water releases decreased through the summer, a corresponding concentration increase in TN at each site is evident. Total phosphorus (TP) sampling results mirrored nitrogen in that high spring water releases resulted in minimum sample concentrations while low flows in the late summer were followed by maximum concentrations. Unlike TN, TP annual mean concentrations demonstrated a clear longitudinal gradient: as samples were collected further downstream from Bald Hill Dam, concentrations increased conspicuously. This increase may be an indication of nutrient loading from within the watershed.

As with TP samples, weekly and annual mean TSS concentrations increased the further downstream the samples were taken, that is to say, site 380153 had the lowest TSS concentrations while site 380284 consistently had the highest concentrations. Elevated spring water releases from Bald Hill Dam corresponded to greater TSS values, including maximum concentrations in most years. TSS sampling results also varied greatly with the co-located U.S. Geological Survey stream gauging station hydrograph at site 380153. Throughout the year, increases in river flow produced distinct increases in TSS. Flow decreases generally resulted in TSS concentration decreases. Sediment entering Bald Hill Dam normally settles out of suspension to the lake bottom. This settling was supported by low TSS concentrations observed at site 380153. The longitudinal increase of in-stream TSS concentrations, as samples are collected further away from Bald Hill Dam, stems from erosion within the watershed and from the Sheyenne River bed. Erosion from these two sources can be considered cause of sedimentation/ siltation and macroinvertebrate community impairments along the Sheyenne River in Barnes County. See attached maps (Appendix #2, AnnAgnps priority maps) and graphs (Appendix #4).

PROJECT DESCRIPTION

GOAL 1:
To achieve and maintain a "fully supporting" status for aquatic life uses and to maintain a "fully supporting" status for the recreational uses of the Sheyenne River and its tributaries in Barnes County.

Objective 1) To provide project administration, delivery and oversight.

Task 1: Employ a coordinator to provide conservation planning assistance to producers and landowners, coordinate education activities, and to complete all necessary contacting and reporting. Includes salary, travel, training, supplies, telephone, postage and equipment.

Product: Full time watershed coordinator

Cost – $188,700

Task 2: Guidance and oversight of the project by the local Soil Conservation District Board members. District clerk will assist with required paperwork

Product: Project support

Cost - $0 ($10,000 of In-Kind)

Objective 2) Reduce the sources of sedimentation in the AnnAgnps priority areas along the Sheyenne River and its tributaries.

Task 3: Develop riparian grazing systems within the AnnAgnps priority areas and those tributary corridors within ½ mile. (5 years)

Product: 3 riparian grazing systems. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost - $35,000

Task 4: Restore streambank stability of the Sheyenne River and its tributaries at up to 5 locations to reduce erosion and sedimentation. (5 years)

Product: 5 sites of streambank stabilization addressing sedimentation. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost - $210,000

Task 5: Develop prescribed grazing systems to protect and/or restore the stability of streambank along the Sheyenne River and its tributaries. (5 years)

Product: 45 % (9,000 acres) of AnnAgnps non-cropland (Appendix #2) priority areas will be addressed. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost – $52,000

Task 6: Design and install filter strips, buffers and/or grassed waterways to remove sediment, organic matter, and other pollutants from runoff and to convey water concentrations without causing erosion to improve water quality. (5 years)

Product: 45% (11,250 acres) of AnnAgnps cropland priority areas will be addressed. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost – $82,000

Task 7: Cover crops will also be utilized as supplemental feed and to expand grazing options, and to control erosion, add organic material to the soil, and improve infiltration, aeration, and tilth.

Product: 200 acres of cover crops will be planted within the AnnAgnps priority areas to enhance grazing systems and soil health. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost – $4,000

Task 8: Provide technical assistance and coordination to the city of Valley City with their Riparian Restoration Project. (4 years)

Product: Technical support and coordination for riparian restoration projects located within the city limits of Valley City.

Cost – $0 - Salary to be covered by the Valley City Riparian Restoration Project.

Objective 3) To establish a planning process focused on a systems approach for addressing water quality management at the farm unit level.

Task 9: Develop a Water Quality Farm Assessment Worksheet to document information for developing water quality management plans. (1 year)

Product: Water Quality Farm Assessment Worksheet

Cost: $0 – Included in coordinators salary

Task 10: Coordinate with 3 or 4 producers to test and demonstrate the planning process and to gather producer and NDDoH feedback. (5 years)

Product: 3 or 4 demonstration plans addressing approximately 4000 acres within the AnnAgnps priority areas.

Cost: $0 – Included in coordinators salary

Objective 4) Reduce E.Coli concentrations in the AnnAgnps priority areas along the Sheyenne River and its tributaries to maintain a fully supporting status for recreational uses. Target concentration per sampling site will be a geometric mean of 126 colonies/100 ml with less that
10% of the samples exceeding 409 colonies/100 ml.

Task 11: Design and install 4 partial manure management systems within ½ mile of the Sheyenne River or its main tributaries.

Product: 4 partial manure management systems within ½ mile of the Sheyenne River or its main tributaries. Refer to the attached BMP budget (Appendix #5) for the types and amount of BMPs.

Cost – $90,000

Task 12: Evaluate the potential pollutant concerns associated with failed or improperly installed septic systems along the river. Priority will be given to those 8 systems having the greatest impact. (5 years)

Product: Renovation of 8 septic systems bringing them up to code.

Cost - $47,000

Objective 5) Carry out an Information/Education Program within the entire county to increase community awareness of the impacts of non-point source pollution and means of protecting and maintaining our natural resources.

Task 13: To promote water quality awareness and best management practices to the city residents of Valley City. Materials promoting healthy riverbank practices will be distributed, as well as informational and school meetings, newspaper articles, radio spots and one-on-one contacts.

Product: Annual school programs, annual updates to the city commissioners, local decision makers, and residents, quarterly newspaper articles and radio programs, web site articles, annual ND Winter displays, poster boards to be routed to local businesses, 2,900 informational door hangers to be distributed to the households within Valley City, and one-on-one contacts when requested.

Cost - $10,000

Task 14: To promote the benefits of nutrient and manure management, proper grazing and pasture management techniques, suitable riparian management, advantages of cover crops and heightened awareness of septic system management, installation and county regulations. (5 years)

Product: Two field tours and/or workshops, quarterly newsletters and newspaper articles, radio spots when appropriate, district web site, annual ND Winter Show displays, and one-on-one contacts.

Cost - $10,000

Task 15: The SCD will continue to coordinate with NDSU Extension and USGS on the educational events and sample collections associated with the Discovery Farm. Water quality data obtained through this demonstration project may be utilized in future manure management decisions. (5 years)

Product: Two tours, water quality data, updates in the newsletter when appropriate.

Cost - $450
Sampling expenses ($4000) included in sample transport

Task 16: Continued participation and assistance to Prairie Waters Education & Research Center in workshops geared to students grades 1 through 12.

Product: Annual workshops, annual water festivals, and trainings when required.

Cost: $0 - Included in coordinators salary

3.3 Milestone Table (Appendix #7)

Not applicable

The Barnes County Soil Conservation District is the appropriate entity to coordinate and implement this project. The SCD is a locally elected volunteer conservation organization that serves all the people in the county.

The Barnes County Soil Conservation District will be responsible for auditing Operation & Maintenance Agreements (O&M) on BMP's during the project period through yearly status reviews of EPA-319 contracts. The lifespan of each BMP will be listed in the individual contracts to ensure longevity of the practices. Each producer will sign the "EPA 319 Funding Agreement Provisions" form which explains in detail the consequences of destroying a BMP before the completion of its lifespan.

COORDINATION PLAN

1) Barnes County SCD will be the lead agency liable for project administration. Conservation planning, technical assistance, educational campaigns, clerical assistance, access to equipment and supplies, and annual financial support will be provided by the SCD. The SCD will also prioritize activities, coordinate scheduling, and serve as a liaison between watershed residents and USDA program participation.

2) Coordinate with USDA Natural Resources Conservation Service (NRCS) to provide technical assistance in developing USDA Conservation Plans, to coordinate project activities, facilitate local involvement, provide technical support and participate in educational outreach programs during the project. Staff will incorporate existing USDA programs (financial and technical) and target resources to enhance efforts within the watershed. Existing office space and office equipment use will be made available to the project. An annual review will be conducted with the Field Office, DC and the SCD to reconfirm and acknowledge NRCS's commitment to the project.

3) North Dakota Health of Department (NDDoH) will oversee Section 319 funding and assist in implementing the water sampling and analysis plan. Training will be provided by the NDDoH staff for proper water quality

sample collection, preservation and transportation to ensure reliable data collection. NDDoH will also complete and cover the expenses of water sample analysis.

USDA Farm Service Agency (FSA) will provide cost-share assistance through the Conservation Reserve Program (CRP) and will serve as a local resource.

North Dakota State University Extension Service (NDSU Extension) both local and state personnel will assist the project in information and education activities. BMP publications will also be available as well as assistance with workshops, tours and training.

North Dakota Game & Fish (ND G&F), North Dakota Pheasants Forever and US Fish & Wildlife will be solicited to provide technical and financial assistance.

Barnes County Rural Water District (BCRWD) will provide financial assistance and the watershed coordinator will develop plans for producers and landowners to seal abandoned wells.

319-Eco-Ed camps will provide 6th grade students with point source and non-point source pollution education and its impacts on water quality.

Continued involvement with the State Envirothon program, which is a competitive problem-solving natural resource event for high school students to provide education on our natural resources and the environment.

NPS BMP Team will provide engineering assistance through the Sheyenne James RC&D Council. Engineers will provide assistance for Water Management, Stream Bank Restorations, Agricultural Waste Systems, Environmental Assessments and Impacts, as well as Wetland Delineations and Assessments.

Cooperation with USGS, and NDSU Extension Service at the Discovery Farm to collect and evaluate baseline data; identify feasible BMP's; and evaluate BMP effectiveness.

Outdoor Heritage Funding will be used as 60% cost-share for BMP's

Local support for this project has been confirmed by continued inquiries. The Valley City area received over 7½ inches of rain in less than 45 minutes in late May of 2013. The destruction created truly re-enforces the need for water quality practices. Letters sent out in July of 2013 to landowners within the AnnAgnps priority areas sparked nine immediate inquiries. Producers have requested assistance for grazing systems, grassed waterways, cover crops, nutrient management, possible manure management, and assistance in riverbank erosion. Response to articles in our quarterly newsletter is also showing a steady increase, and a considerable amount of interest is always expressed during the six days at the annual Winter Show booth.

Letters of Support are on file at the Barnes County Soil Conservation District office. A list of those submitting letters can be found in (Appendix #6).

The Barnes County SCD has a solid understanding of the USDA programs, such as EQIP, CRP, WRP and WHIP and works closely with FSA, NRCS and the RC&D. With the previous 319 projects, working relations with sponsors have already been established and will continue to expand and develop.

By working closely with sponsors and associated agencies the lines of communication are always open; exchanging ideas, planning, and brain-storming to meet the needs of our rural and urban county residents. By remaining in close contact with all organizations in the area, we will be enhancing and complementing other projects.

EVALUATION AND MONITORING PLAN

"The Quality Assurance Project Plan (QAPP) for the project will be developed by the NDDH after the project is fully approved"

BUDGET

See Attachments (Appendix #8)

7.0 PUBLIC INVOLVEMENT

Educational and informational meetings have been and will continue to be conducted to keep the entire community informed. Community leaders, County Commissioners, Water Resource Board members, City Council members, and District supervisors will be involved in decision-making processes involving the implementation of BMP's within the Sheyenne Watershed Sedimentation Reduction Project.

APPENDIX LIST

Previous Watershed Accomplishments

Maps

Water Quality Farm Assessment

Sheyenne River Graphs

BMP Budget Tables

Letters of Support

Milestone Table

Budget

Appendix #1

PREVIOUS WATERSHED ACCOMPLISHMENTS

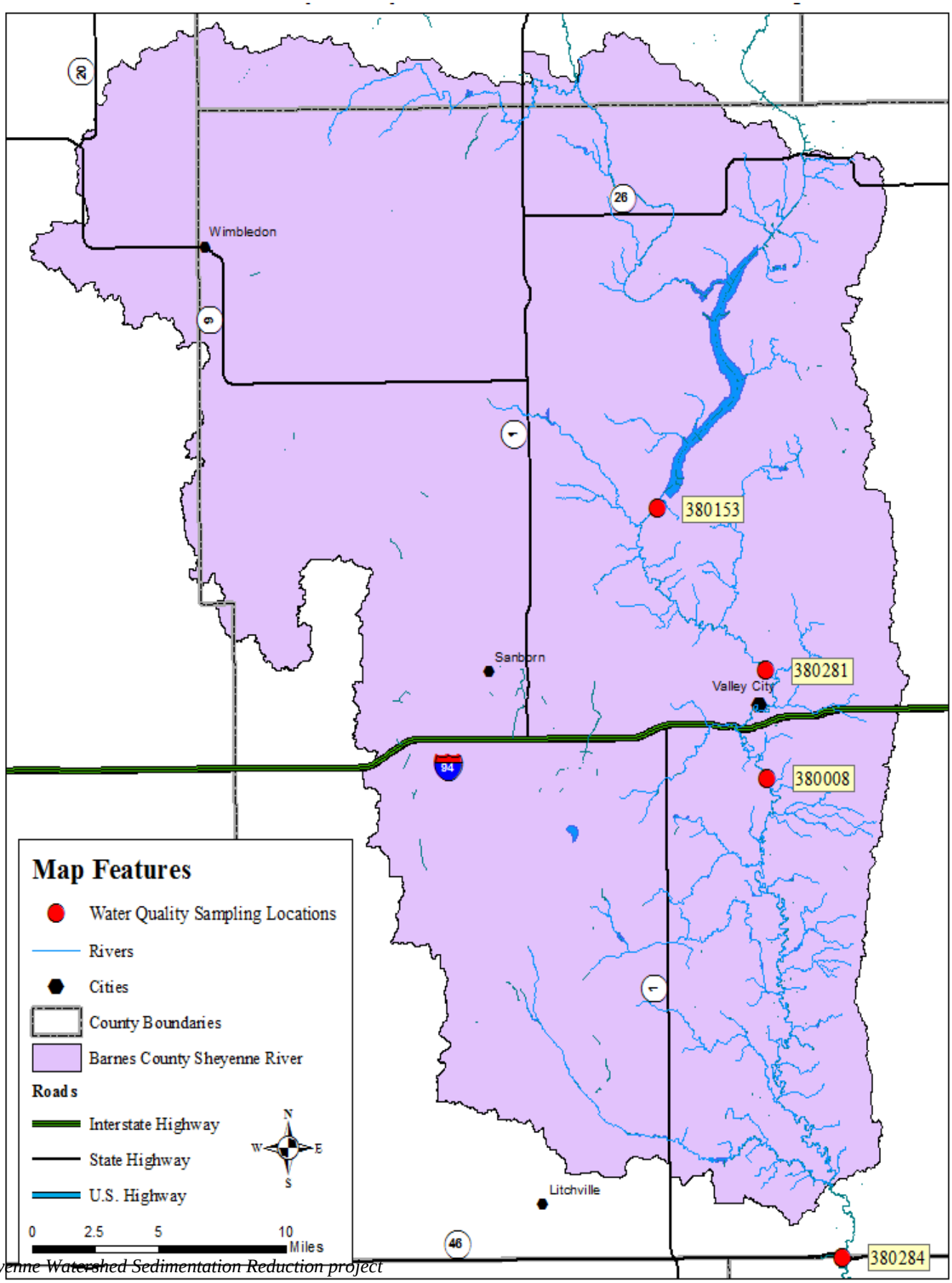
Barnes County Sheyenne Watershed Project
Summary of Accomplishments
4/1/2010 to 12/31/2013

Grazing Management:		
Fencing	25,475	ft.
Pasture/Hayland Planting	183.2	ac.
Pipelines	13,480	ft.
Prescribed Grazing	1,045.9	ac.
Spring Development	2	no.
Trough and Tank	6	no.
Well (Livestock Only)	2	no.
Cropland Management:		
Cover Crop	100	ac.
Riparian Area Management:		
Streambank Stabilization	518	ft.
Vegetative Buffers:		
Grassed Waterway	29.65	ac.
Livestock Manure Management:		
System (coordinated with EQIP)	2	ea.
Full Systems	4	ea.
Miscellaneous Practices:		
Septic System Renovation	21	no.
Educational Events:		
Winter Show Booth	18 days	
Eco-Ed (water quality session) (Valley City & Devils Lake)	45 sessions (900 Students)	
Envirothon	9 days	
Prairie Waters "Water Festival"	1 day	
Conservation Fair	1 day	
Area II Meeting	Riparian Restoration Presentation	
Aquatic Bio-Monitoring Workshop	1 day	
Nutrient Management Workshops	3 Presentations	
Discovery Farm (MN, Wisc, Ark) (Producer)	2 Tours	
Project Wet (Teachers Workshop)	1 Tour (30 Teachers)	
Cover Crop Tour	1 Tour	

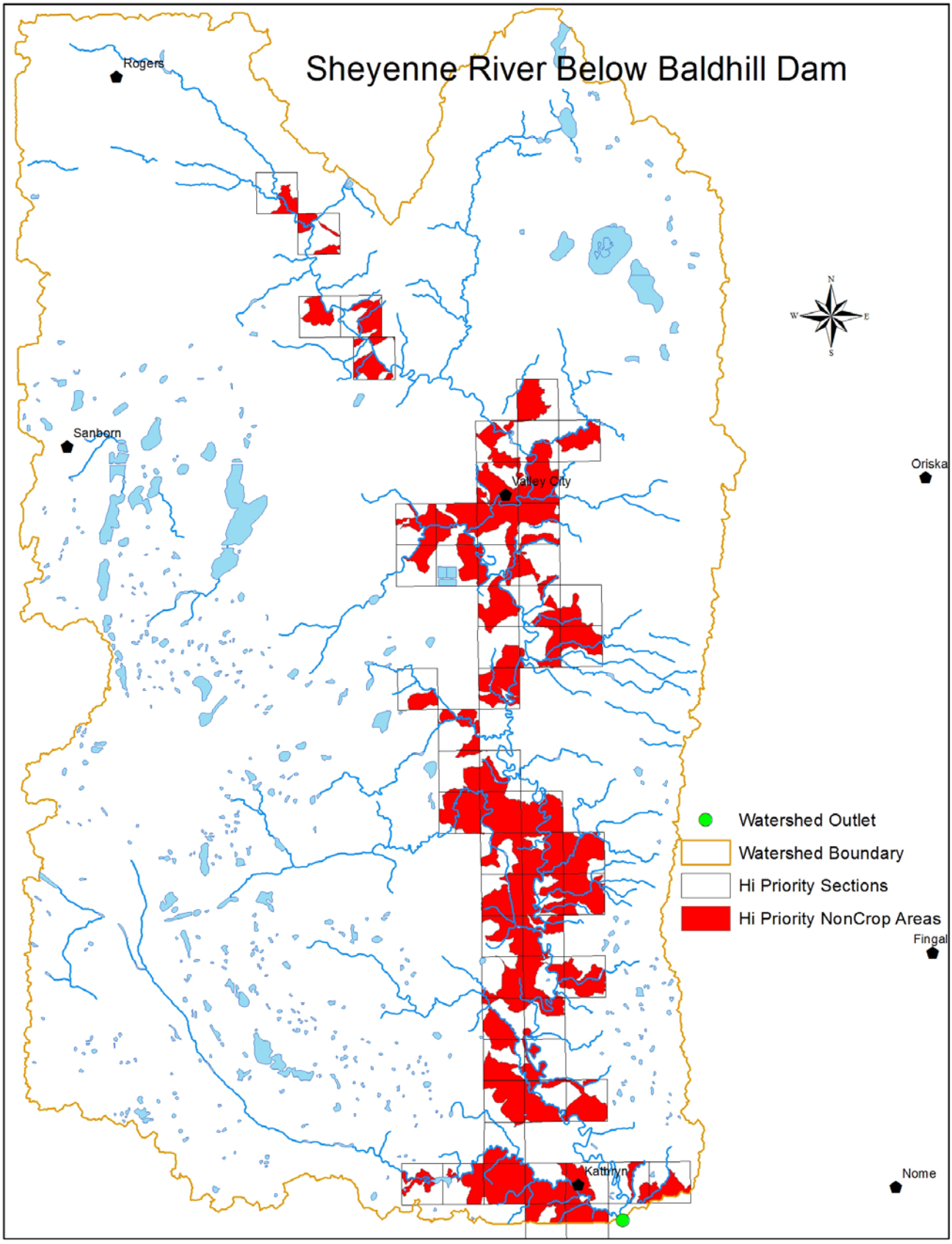
Appendix #2

MAPS

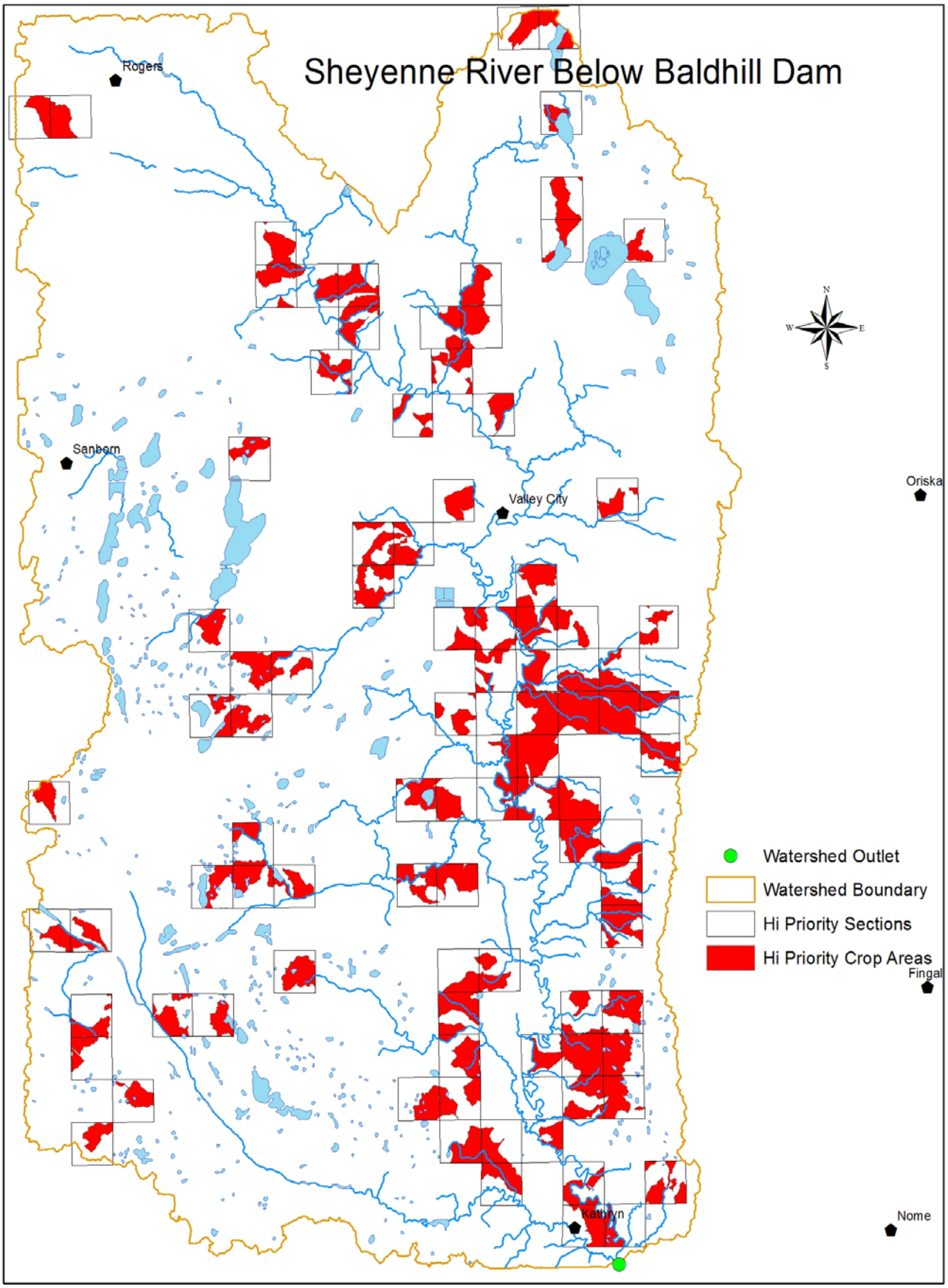
Sampling Locations on the Sheyenne River



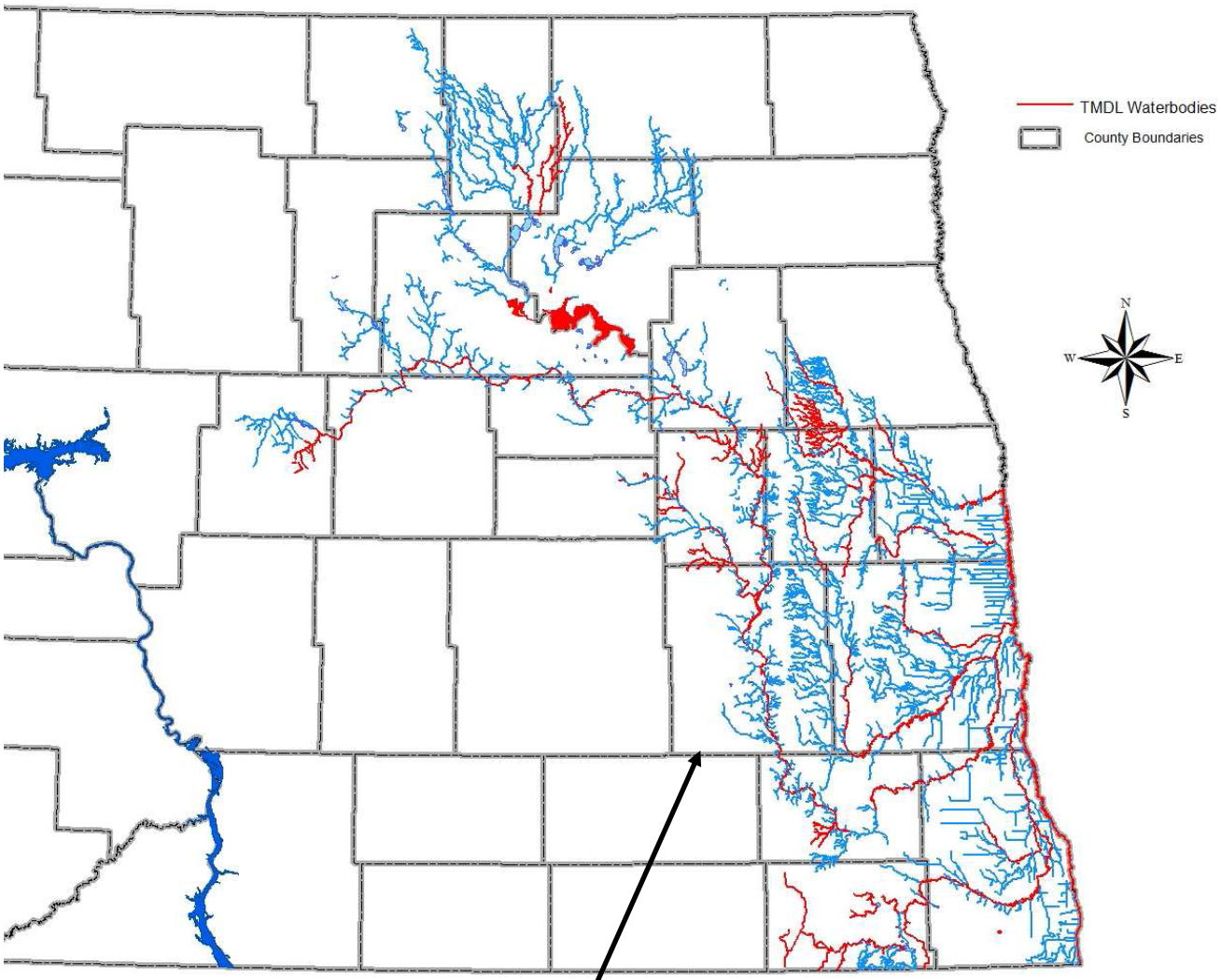
AnnAgnps High Priority Non-Crop Areas

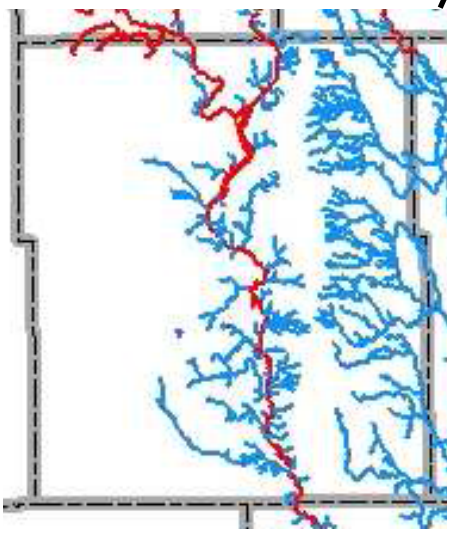


AnnAgnps High Priority Crop Areas



TMDL Waterbodies





Barnes County

APPENDIX #3

WATER QUALITY FARM ASSESSMENT

WATER QUALITY FARM MANAGEMENT ASSESSMENT WORKSHEET

Landowner: _____ Phone Number: _____ Date: _____

Address: _____ Assessor: _____

---

1) Total Acreage in AnnAgnps Priority Area: _____
Attach map showing location of these acres.

2) Cropland Fields: _____ Total Acres: _____
Current Management:

Resource Concerns:

Possible BMP's:

3) Pasture/Rangeland Fields: _____ Total Acres: _____
Current Management:

Resource Concerns:

Possible BMP's:

4) Riparian Areas: _____ Total Acres: _____

Current Management:

Resource Concerns:

Possible BMP's:

5) Livestock Feeding Areas: _____ Total Acres: _____

Current Management:

Resource Concerns:

Possible BMP's:

Notes:

Cropland Practices:

328	Cons Crop Rotation:	Planned rotation for biodiversity & to provide adequate amounts of organic material for erosion reduction, nutrient balance & sustained soil organic matter
329	Residue Mgt:	No-Till, Mulch-Tillage, Ridge-Tillage, Strip Tillage
340	Cover Crop:	Grasses, legumes, & small grain mixtures to be grown for seasonal protection
342	Critical Area Pltg:	Establish vegetation on severely eroding areas
386	Field Border:	Strip of perennial vegetation to control erosion, protect field edges, or reduce competition from adjacent woodlands
392	Field Windbreak:	Trees and/or shrub plantings to reduce soil blowing, conserve moieture, & to protect crops, livestock & wildlife
393	Filter Strip:	Strip of vegetative cover to remove sediment, organic matter & other pollutants from runoff
410	Grade Stabilization:	Structure to stabilize the grade & control erosion in natural or artifical channels, to prevent the formation or advance gullies
412	Grassed Waterway:	Shape a natural or constructed channel & establish vegetation for stable conveyance of runoff water
422	Hedgerow Pltg:	Trees to be established to provide wildlife food, cover, to delineate field boundaries, establish contour guidelines
447	Irrigation System:	Install a facility to collect, store & transport tailwater for reuse in the farm irrigation distribution system
590	Nutrient Mgt:	Plant nutrients will be applied in a manner that will promote desired crop or forage response, minimize offiste movements & improve soil condition
595	Pest Mgt:	Target pests will be identified & monitored to determine when appropiate control/suppression stratigies should be initiated
610	Toxic Salt Reduction:	Stand of salt tolerant perennial plants on discharge areas & deep rooted plants on recharge areas

Rangeland/Pasture Practices:

382	Cross Fence:	Fence(s) will be constructed to facilitate grazing rotation, improve grazing distributions, or exclude livestock
378	Pond:	Water use for wildlife &, livestock
512	Pasture/Hay Pltg:	Perennial grasses &/or legumes will be planted to reduce erosion, produce high quality forage, adjust land use, & improve water quality & quantity
513	Pipelines:	Livestock water pipeline to convey water from a source to points of
use 528A	Prescribed Grazing:	Pastures till be grazed so that no more than 50% of current year's production is removed to increase vigor & reproduction of key species
550	Range Pltg:	To prevent excessive soil & water loss & improve water quality; produce more forage; improve wildlife habitat
574	Spring Development:	To improve distribution of water or to increase the quanity or quality of water for livestock
614	Watering Facility:	To provide watering facilities that will protect vegetative cover through proper distribution of grazing, or eliminate watering livestock in streams
642	Well:	To provide proper use of vegetation on rangeland, pastures, & wildlife areas
066	Portable Wndbrk:	Protection from wind on open fields & pasture

Livestock Practices:

312	Manure Mgt System:	To manage waste to prevent or minimize degradation of air, soil, & water
356	Partial Mgt System:	Management changes to minimize water quality impacts
633	Waste Utilization:	Use organic waste in an environmentally safe manner to enrich soil
634	Manure Transfer:	A conveyance system for manure using structure, conduits, or equipment

Riparian Practices:

390	Herbaceous Cover:	Cover consisting of grasses, grass-like plants, & forbs
391	Forest Buffer:	Areas of grass, trees &/or shrubs adjacent to waterbodies
580	Streambank Protection:	Vegetation or structures to prevent scour, sediment load & erosion
057	Exclusion Fencing:	To limit usage of sensitive areas
059	Riparian Easement:	Establish & maintain permanent vegetation within the corridor

Miscellanous Practices:

350	Sediment Basin:	To preserve capacity of reservoirs, ditches, canals, diversion, waterways, & streams; to trap sediment & reduce pollution
351	Well Decommission:	To prevent entry of debris or foreign substances
656	Constructed Wetland:	To create wetlands functions& values to improve water quality

Date: 8/26/2013
Assisted By: Lori Frank

319 Watershed Planning Map

Approximate Acres: 1710.8
BARNES COUNTY SOIL CONSERVATION DISTRICT

BARNES COUNTY, ND

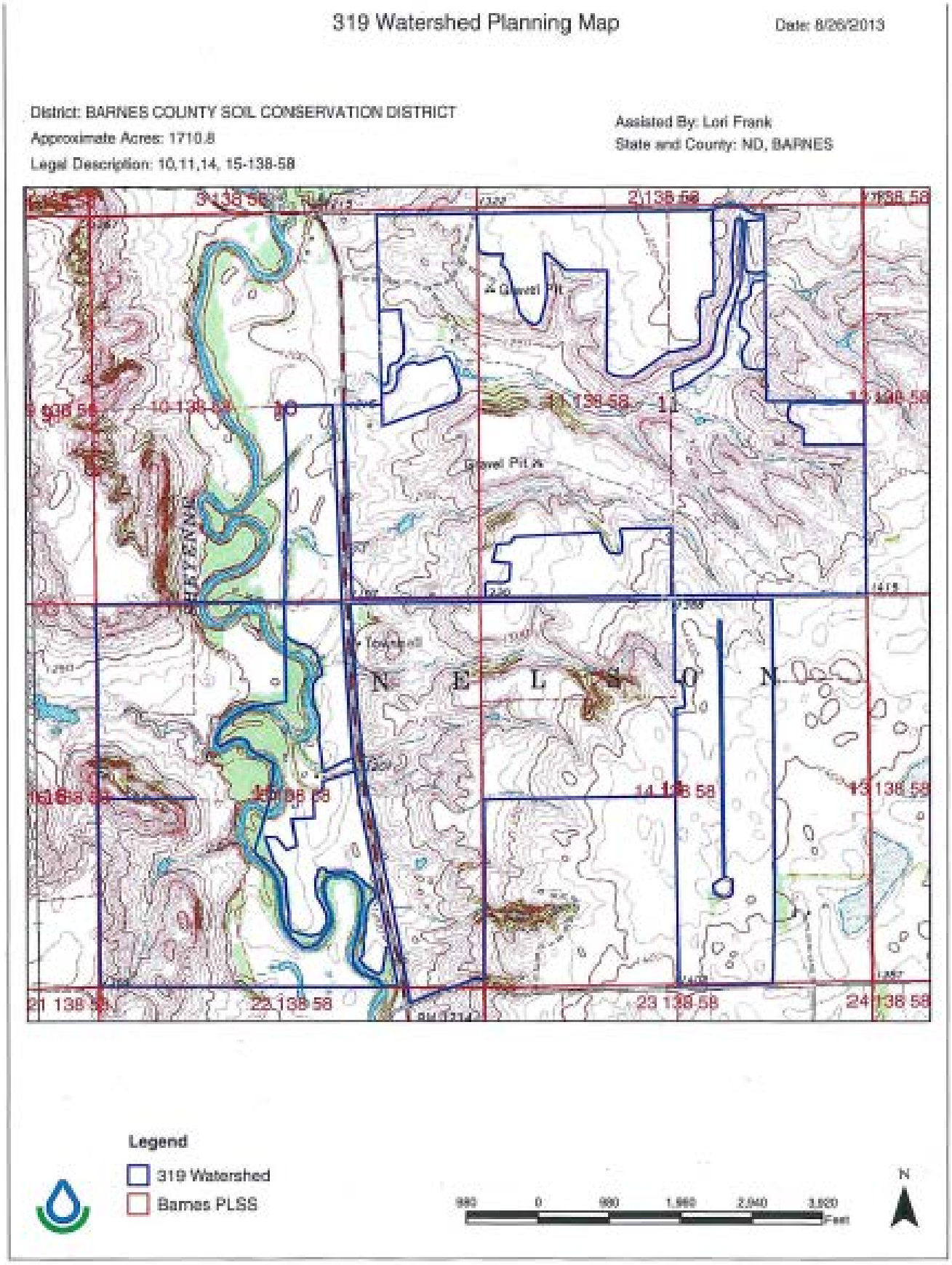
10, 11 14, 15-138-58

Legend

319 Watershed
Barnes PLSS

950 0 950 1,900 2,850 3,800 Feet

N

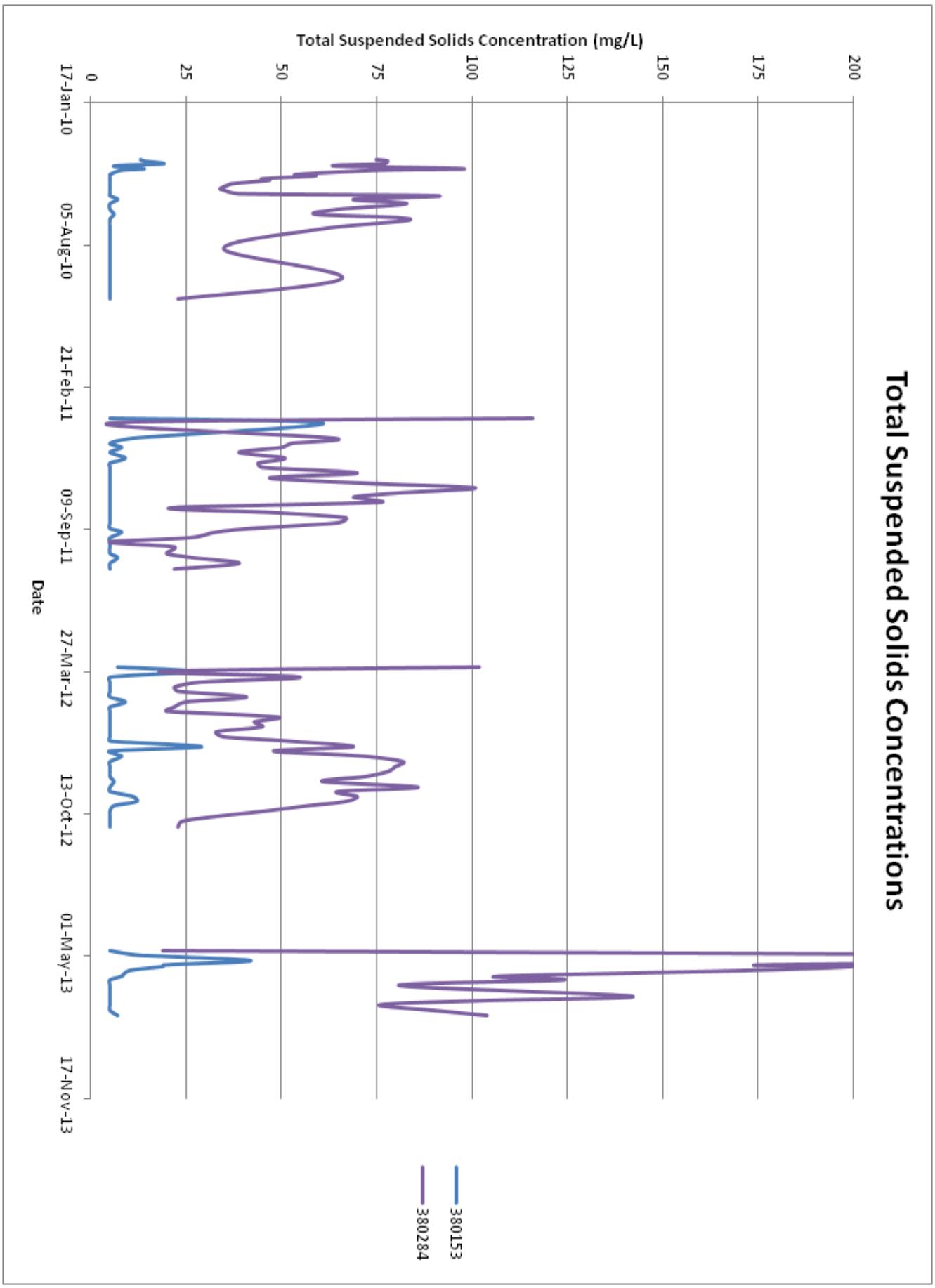

319 Watershed Planning Map
Date: 8/26/2013
District: BARNES COUNTY SOIL CONSERVATION DISTRICT
Approximate Acres: 1710.8
Legal Description: 10,11,14, 15-138-58
Assisted By: Lori Frank
State and County: ND, BARNES
Gravel Pit A
Gravel Pit
NELSON
Legend
319 Watershed
Barnes PLSS
N
Feet

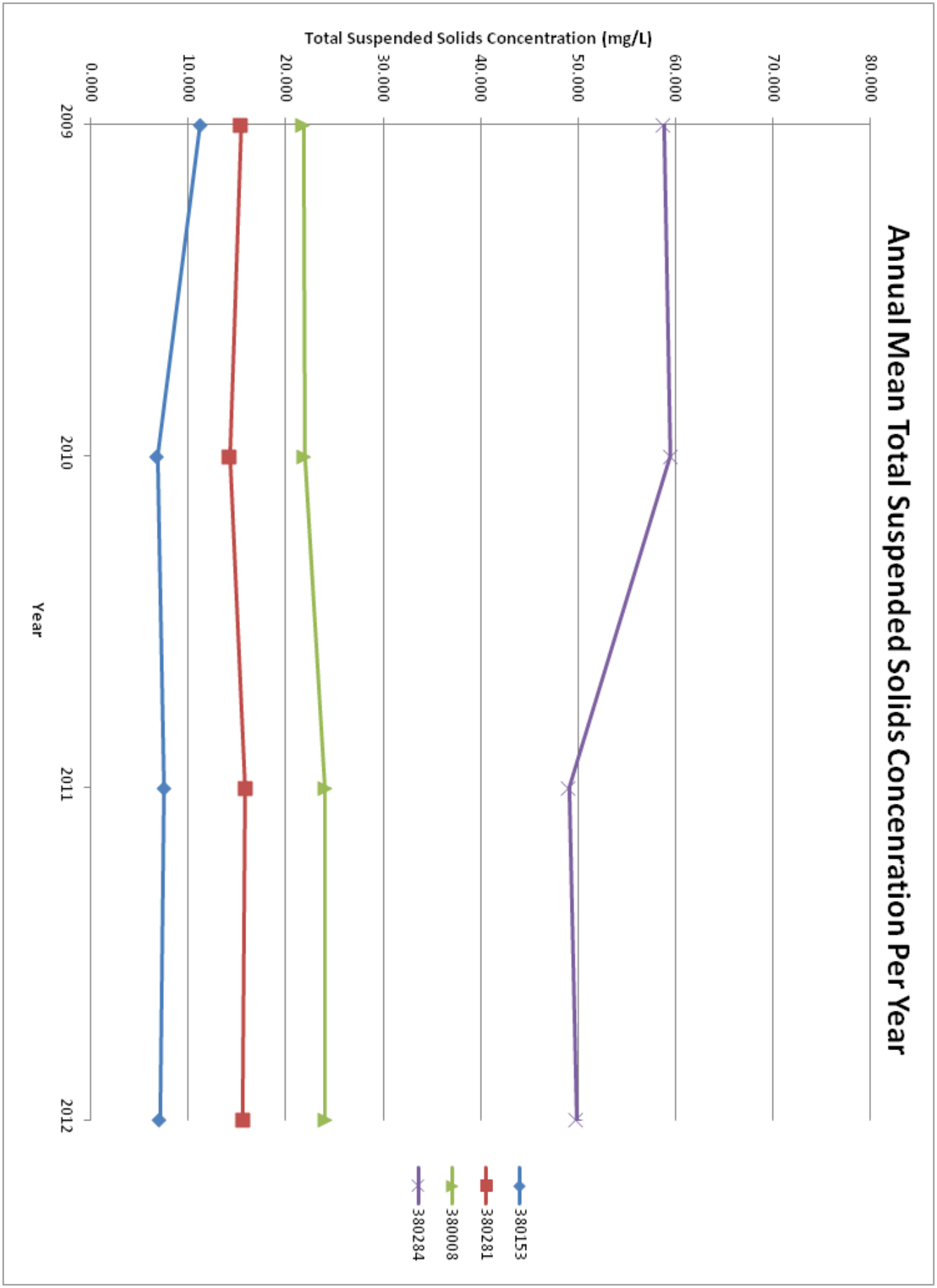
APPENDIX #4

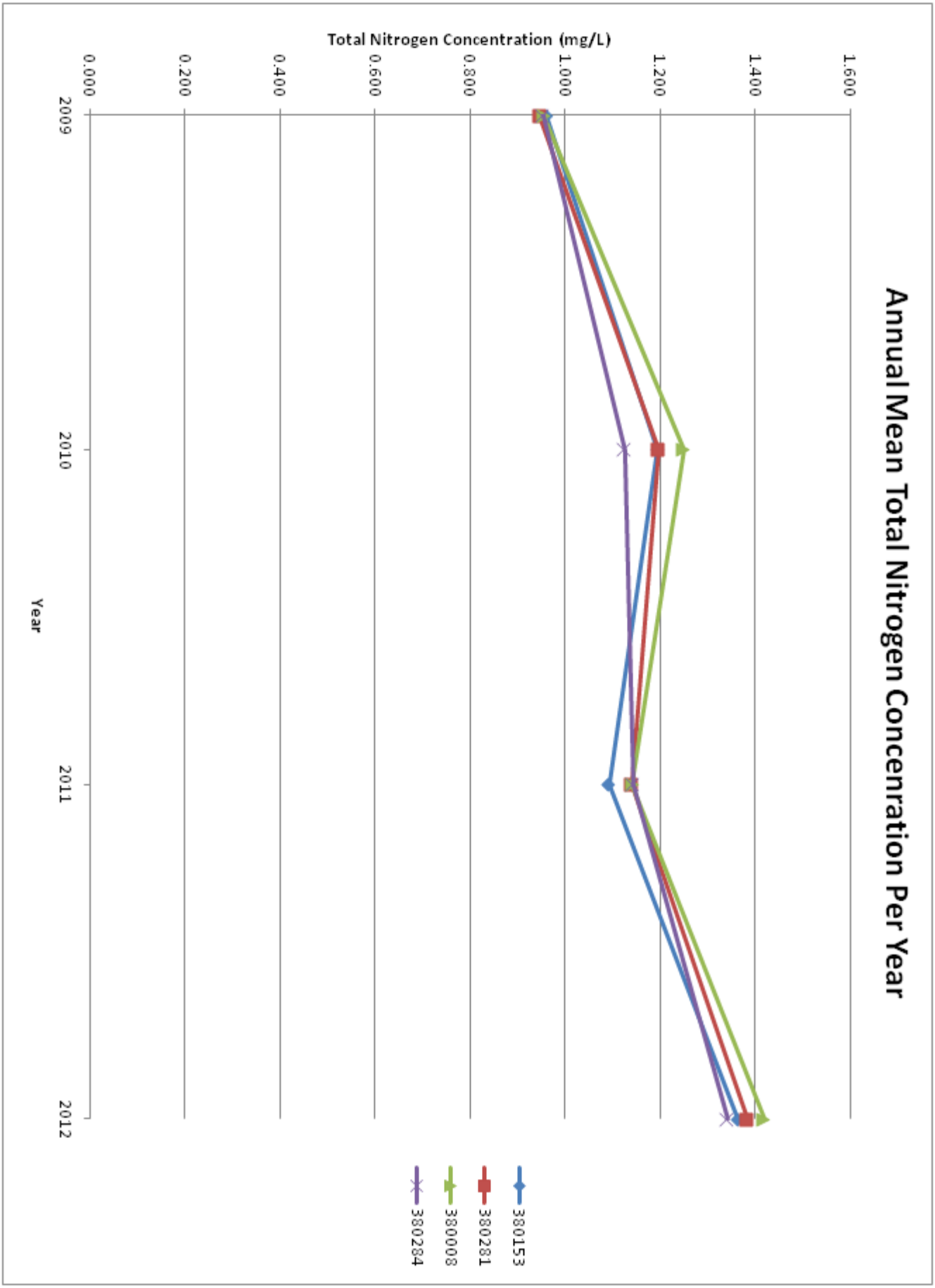
SHEYENNE RIVER GRAPHS

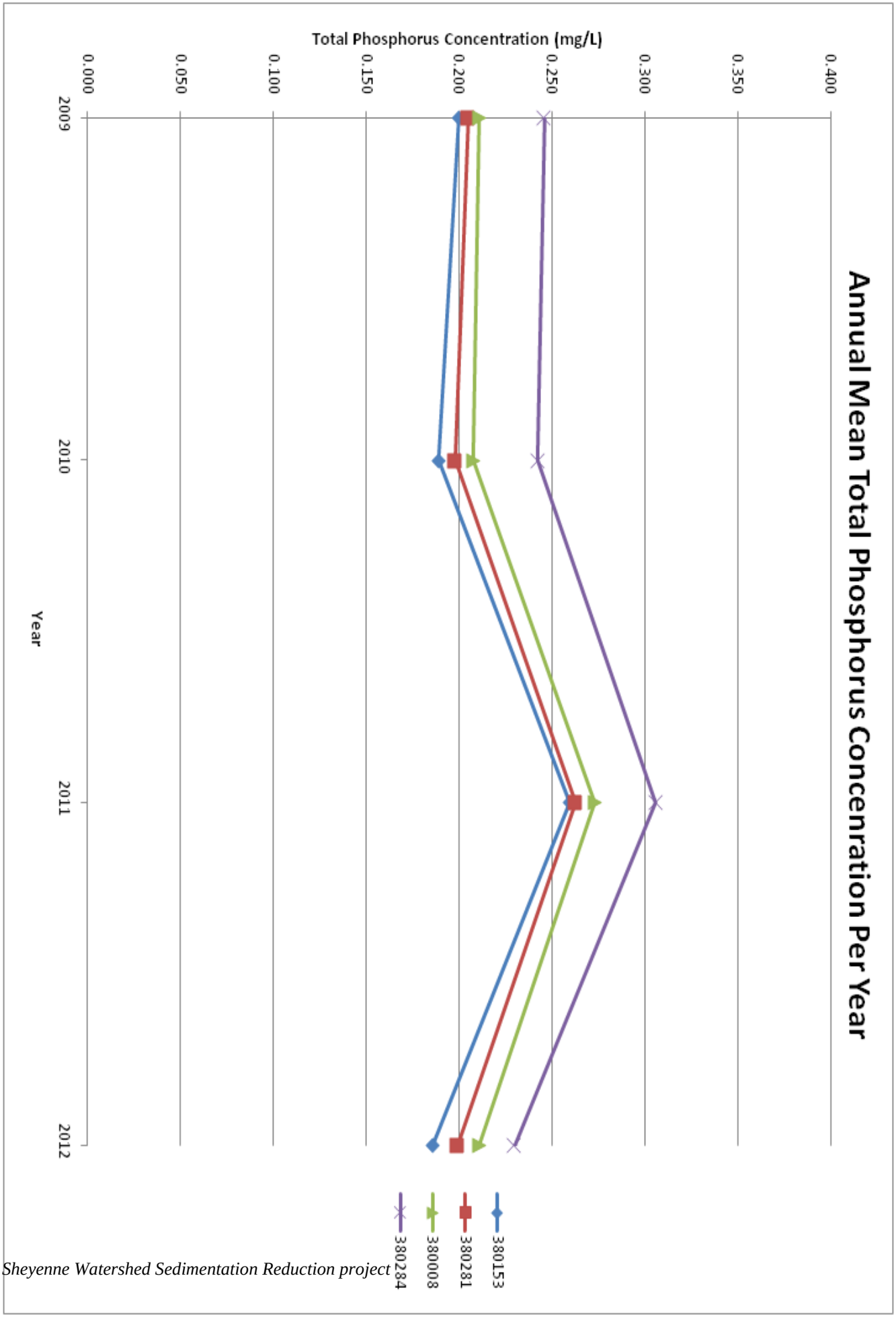
Jan. 2010 to Nov. 2013
Total Suspended Solid Concentrations

2009 to 2012
Annual Mean TSS/ Concentrations/ Year
Annual Mean Total N/ Concentrations/Year
Annual Mean Total P/ Concentrations/Year


Total Suspended Solids Concentrations
Total Suspended Solids Concentration (mg/L)
0
25
50
75
100
125
150
175
200
17-Jan-10
05-Aug-10
21-Feb-11
09-Sep-11
27-Mar-12
13-Oct-12
01-May-13
17-Nov-13
Date
380153
380284


Annual Mean Total Suspended Solids Concentration Per Year
Total Suspended Solids Concentration (mg/L)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
2009
2010
2011
2012
Year
380153
380281
380008
380284


Annual Mean Total Nitrogen Concentration Per Year
Total Nitrogen Concentration (mg/L)
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
2009
2010
2011
2012
Year
380153
380281
380008
380284


Annual Mean Total Phosphorus Concentration Per Year
Total Phosphorus Concentration (mg/L)
0.000
0.050
0.100
0.150
0.200
0.250
0.300
0.350
0.400
2009
2010
2011
2012
Year
380153
380281
380008
380284

APPENDIX #5

BMP BUDGET TABLE

BMP BUDGET TABLE

Streambank Protection:	
Critical Area Planting	$300.00/ac.
Fencing (barbed-wire)	$1.35/ft.
Fencing (multiple wire electric	$0.67/ft.
Field Border (seed cost only)	$20.00/ac.
Filter Strips (planting/establishment only)	$125.00/ac.
Grassed Waterway	$25.00/lnft.
Pasture/Hayland Planting	$35.00/ac.
Pipelines	$3.00/ft.
Portable Windbreak (limited to 2 foot/animal)	$45.00/ft.
Rangeland Planting	$40.00/ac.
Riparian Forest Buffer	$350.00/ac.
Spring Development	Engineer's Estimate
Streambank Stabilization (Rock toes, barbs, root wads, gabions, fascines, wattles, willow posts, etc.)	Engineer's Estimate
Streambank Protection	Engineer's Estimate
Trough & Tank	Local Rate/tank
Well (livestock only)	Local Rate/well
Well Decommissioning	Local Rate/well
Alternative Power Sources (solar, wind, generator)	Local Rate/system
Cropland Management:	
Cover Crop (seed costs only)	$20.00/ac.
Nutrient Management	$5.00/ac.
Field Windbreak Establishment	$25.00/lnft.
Soil Testing	$40.00/sample
Livestock Manure Management:	
Full System (Site prep, earthwork, solid separators, pipes, culverts, access roads, heavy use areas, fencing, water supply, etc.)	Engineer's Estimate
Partial System (Clean water diversions, dikes, fencing, culverts, etc.)	Engineer's Estimate
Miscellaneous:	
Septic System Repair	$6000.00/ea.
Cultural Resource Review	$1500.00/no.

APPENDIX #6

LISTING OF SUPPORT LETTERS

LETTERS OF SUPPORT
ON FILE

Natural Resources Conservation Service - Amanda Brandt, D.C.

Sheyenne James Resources Conservation & Development Council

State-Wide Eco-Ed - Karen Olstad, Coordinator

K2S Engineering Inc. - Shane Kjellberg, Professional Engineer

District 24 Representative - Dwight Kiefert

Barnes County Commissioners – Eldred Knutson, Chairman

Valley City Commissioners – Robert Werkhoven, Valley City Mayor

Past Member of the ND House of Representatives, Ralph Metcalf

APPENDIX #7

MILESTONE TABLE

MILESTONE TABLE FOR SHEYENNE WATERSHED SEDIMENTATION REDUCTION PROJECT						JANUARY 2014
Tasks/Responsible Organizations	Output	2014	2015	2016	2017	2018
Objective 1:						
Task 1: Barnes Co. SCD	Full-time Watershed Coordinator	**	**	**	**	**
Task 2: Barnes Co. SCD	SCD Support	**	**	**	**	**
Objective 2:						
Task 3: Barnes Co. SCD	3 Riparian Grazing Systems	**	1 System	1 System	1 System	**
Task 4: Barnes Co SCD	5 Streambank Stabilitization Sites	1 Site	1 Site	1 Site	1 Site	1 Site
Task 5: Barnes Co SCD	9,000 acres of Prescribed Grazing		2400 ac	2400 ac	2400 ac	1800 ac
Task 6: Barnes Co SCD	11,250 acres of Cropland Addressed	1600 ac	3200 ac	1600	3200 ac	1650 ac
Task 7: Barnes Co SCD	200 acres of Cover Crops	**	50 ac	50 ac	50 ac	50 ac
Task 8: Barnes Co SCD	Technical Assistance to Valley City		**	**	**	**
Objective 3:						
Task 9: Barnes Co SCD	Develop WQ Planning Process	**				
Task 10: Barnes Co SCD	3 or 4 Demonstration Plans		1 Plan	1 Plan	1 Plan	1 Plan
Objective 4:						
Task 11: Barnes Co SCD	4 Partial Manure Management Systems	**	1 System	1 System	1 System	1 System
Task 12: Barnes Co SCD	8 Septic Systems	2 Systems	1 System	2 Systems	2 Systems	1 System
Objective 5:						
Task 13: Barnes Co SCD	Urban Education	**	**	**	**	**
Task 14: Barnes Co SCD	Rural Education	**	**	**	**	**
Task 15: Barnes Co SCD	Assistance to Prairie Waters Education	**	**	**	**	**
Barnes County SCD as local project manager and sponsor will be responsible for project coordination of reimbursement payments, tracking and progress.						
The SCD will also provide technical assistance for planning, design and implementation.						
Landowners will make management decisions and provide cash and in-kind match for BMP's.						
NDDH will provide oversight of planning and expenditures.						

APPENDIX #8

BUDGET TABLES

BUDGET TABLE FOR SHEYENNE WATERSHED SEDIMENTATION REDUCTION PROJECT					JANUARY 2014	
PART 1:						
FUNDING SOURCES	2014	2015	2016	2017	2018	TOTALS
EPA SECTION 319 FUNDS						
1) FY2014 - 2018 (FA)	$51,422	$61,352	$70,202	$79,322	$42,902	$305,200
SUBTOTAL	**$51,422**	**$61,352**	**$70,202**	**$79,322**	**$42,902**	**$305,200**
Outdoor Heritage Funds						
1) FY 2014	$25,200	$25,200	$25,200	$25,200	$25,200	$126,000
SUBTOTAL	**$25,200**	**$25,200**	**$25,200**	**$25,200**	**$25,200**	**$126,000**
STATE/ LOCAL MATCH						
1) LOCAL SCD (TA & FA)	$20,118	$20,338	$20,238	$20,318	$20,438	$101,450
2) LANDOWNERS (FA)	$20,960	$46,960	$57,360	$49,360	$33,360	$208,000
3) NDSU EXTENSION SERVICE (TA)	$100	$100	$100	$100	$100	$500
4) BARNES COUNTY RWU (FA)	$400	$400	$400	$400	$400	$2,000
SUBTOTAL	**$41,578**	**$67,798**	**$78,098**	**$70,178**	**$54,298**	**$311,950**
TOTAL BUDGET	**$93,000**	**$129,150**	**$148,300**	**$149,500**	**$97,200**	**$743,150**
FA: Financial Assistance						
TA: Technical Assistance						
NDDoH: North Dakota State Health Department						
SCD: Soil Conservation District						
NDSU: North Dakota State University						
RWU: Rural Water Users						

BUDGET TABLE FOR SHEYENNE WATERSHED SEDIMENTATION REDUCTION PROJECT PART 2: SECTION 319/ NON-FEDERAL								JANUARY 2014	
	2014	2015	2016	2017	2018	TOTAL	CASH*	INKIND	319
PERSONNEL/SUPPORT									
1) Salary/ Fringe	$34,000	$34,500	$35,000	$35,000	$35,200	$173,700	$39,085	$39,085	$95,530
2) Travel, Food & Lodging	$2,200	$2,200	$2,200	$2,200	$2,200	$11,000	$4,000	$400	$6,600
3) Equipment/ Supplies	$100	$100	$100	$100	$100	$500	$200	$0	$300
4) Telephone/ Postage	$500	$500	$500	$500	$500	$2,500	$1,000	$0	$1,500
5) Training	$200	$200	$200	$200	$200	$1,000	$400	$0	$600
Subtotals	$37,000	$37,500	$38,000	$38,000	$38,200	$188,700	$44,685	$39,485	$104,530
APPLYING BMP'S									
1) 3 Riparian Grazing Systems	$0	$10,000	$15,000	$10,000	$0	$35,000	$7,000	$7,000	$21,000
2) 5 Streambank Restoration Sites	$30,000	$40,000	$60,000	$40,000	$40,000	$210,000	$150,000	$6,000	$54,000
3) 9,000 acres Prescribed Grazing	$0	$15,000	$15,000	$15,000	$7,000	$52,000	$10,000	$15,000	$27,000
4) 11,250 acres Cropland Protected	$10,400	$25,400	$10,400	$25,400	$10,400	$82,000	$44,800	$6,000	$31,200
5) 200 acres of Cover Crops	$0	$1,000	$1,000	$1,000	$1,000	$4,000	$1,600	$0	$2,400
6) 4 Partial Manure Systems	$0	$20,000	$30,000	$20,000	$20,000	$90,000	$44,000	$10,000	$36,000
7) 8 Septic Systems	$12,000	$6,000	$12,000	$12,000	$5,000	$47,000	$32,600	$0	$14,400
Subtotals	$52,400	$117,400	$143,400	$123,400	$83,400	$520,000	$290,000	$44,000	$186,000
INFORMATION/EDUCATION									
1) Newsletters/Radio	$3,000	$3,000	$3,000	$3,000	$3,000	$15,000	$3,000	$3,000	$9,000
2) Tours/Workshops/Public Meetings	$400	$200	$200	$200	$500	$1,500	$300	$300	$900
3) Web Site/Displays/School Programs	$1,000	$1,000	$500	$500	$500	$3,500	$700	$700	$2,100
4) Discovery Farm	$0	$250	$0	$200	$0	$450	$90	$90	$270
Subtotal	$4,400	$4,450	$3,700	$3,900	$4,000	$20,450	$4,090	$4,090	$12,270
INVENTORY/MONITORING									
1) Sample Analysis	$0	$0	$0	$0	$0	$0	$0	$0	$0
2) Sample Transport	$800	$800	$800	$800	$800	$4,000	$800	$800	$2,400
Subtotals	$800	$800	$800	$800	$800	$4,000	$800	$800	$2,400
ADMINISTRATIVE									
1) Secretary	$1,500	$1,500	$1,500	$1,500	$1,500	$7,500	$0	$7,500	$0
2) SCD Coordination Meetings	$500	$500	$500	$500	$500	$2,500	$0	$2,500	$0
Subtotals	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000	$0	$10,000	$0
TOTAL 319/NON-FEDERAL BUDGET	$96,600	$162,150	$187,900	$168,100	$128,400	$743,150	$339,575	$98,375	$305,200