Spring Creek Watershed
Project Implementation Plan
Phase Two

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State: North Dakota
Hydrological Unit Code: 1013020109
1013020108

Watershed: Spring Creek Watershed
High Priority Watershed: Yes

TMDL Development and/or Implementation (check any that apply)

Project Types	**Waterbody Types**	**NPS Category**
[ ] Staffing and support	[ ] Groundwater	[x] Agriculture
[x] Watershed	[ ] Lakes/Reservoirs	[ ] Urban Runoff
[ ] Groundwater	[ ] Rivers	[ ] Silviculture
[ ] I&E	[x] Streams	[ ] Construction
	[ ] Wetlands	
	[ ] Other	

Project Location: LATTITUDE: 47° 34' LONGITUDE: 102° 61'
to
LATTITUDE: 47° 15' LONGITUDE: 101° 48'

Major Goal: The Spring Creek Watershed Project is designed to provide technical, financial and educational assistance to landowners within the watershed. The areas targeted for assistance are designated from the assessment phase of the project. The goal of the project is to improve the water quality of Spring Creek and its tributaries and restore the riparian habitat of the Spring Creek Watershed by implementing BMPs.

Project Description: The project sponsors intend to 1) prioritize technical and financial assistance to lands that have the most impact on water quality, 2) track water quality trends over the life of the project to rectify any concerns as they surface, and 3) develop working partnerships with other agencies to aid in the effort of refurbishing our natural resources.

Spring Creek Funding Allocations

FY 2015	$450,000
Producer Cost and Match:	$403,175
Other federal funds:	$375,000
Total Project Cost:	**$1,228,175**

2.0 Statement of Need

2.1

The Spring Creek Watershed received funding in FY12, $475,933, to provide cost share to meet our goals. This funding expires in FY16 (November 2015). The watershed has been very successful at working towards achieving the goals that were previously set. The Spring Creek Watershed has cost shared over 33,000 feet of pipeline, 15 tanks and over 19,000 feet of fence, and several other practices to improve water quality and riparian areas. We have educated producers about the importance of removing cattle watering from the streams to improve water quality and riparian areas with informational meetings and tours. As of 8/31/2014, $308,219 in expenditures have been paid, with several practices scheduled to be installed in 2015. These practices directly impact the Spring Creek by providing alternative water sources, which improve water quality. A list of applied and planned practices is attached in Appendix G.

The Spring Creek Watershed is located in the eastern half of Dunn County and the western half of Mercer County. The Spring Creek Watershed is 375,351 acres in size and this project will address 293,849 acres of the watershed below Lake Ilo, with 175,837 acres in Dunn County and 118,012 acres in Mercer County. Water quality and maintenance of rivers and streams are a valuable resource in Mercer and Dunn Counties. Based on the *Standards of Water Quality for the State of North Dakota* (NDDoH, October 2006), the Spring Creek has a stream classification of IA. Water quality standards for North Dakota state that all tributaries not specifically mentioned in the state standards are designated as Class III streams; therefore, the tributaries to the Spring Creek are identified as Class III streams. As Class III streams, the beneficial uses of these tributary streams are aquatic life, recreation, industrial, and agricultural. As a class IA stream, designated beneficial uses for the Spring Creek are also aquatic life, recreation, industrial, and agricultural. In addition, the quality of Class IA streams shall be such that they can be used for a municipal water supply after treatment. It should be noted that Spring Creek flows into the Knife River south of Beulah, ND.

The Spring Creek Watershed is listed on the 303(d) list of impaired and threatened waters (pages 140,141, and 146 of the 2010 Integrated Report, Appendix C) as fully supporting but threatened due to E. coli. Data was collected at each sample site in the Spring Creek Watershed during the recreation season of May 1 to September 30. Data was compared to the North Dakota water quality criteria for the pathogen indicator, fecal coliform and E. coli bacteria, to the data collected at each site. From the assessment data, all three sites on Spring Creek and one site on Goodman Creek are not supporting recreational uses due to elevated fecal coliform and E. coli bacteria levels, (The Spring Creek Watershed Assessment Report, Appendix H) The beneficial uses impaired of these tributary streams are the aquatic life and recreation due to runoff of

manure and direct deposit of manure, replacement of native vegetation with crops, stream bank erosion and land use change.

The Spring Creek Watershed was selected to be part of NRCS's (Natural Resource Conservation Service) NWQI (National Water Quality Initiative). NWQI provides additional financial and technical assistance to priority watersheds. Two small watersheds with in the Spring Creek Watershed were chosen, Upper and Lower Goodman Creek (maps in Appendix D). This program has been very successful with producers in that area. Since 2012, $200,000 in BMPs have been planned and implemented. These are additional funds to the Spring Creek Watershed. NRCS is working with the ND Dept. of Health to implement a monitoring plan for the Upper and Lower Goodman Creek Watershed. The Spring Creek Watershed Coordinator will be responsible for sampling.

2.2

The Spring Creek Watershed is within the Knife River Basin. The Hydrological unit codes for the Spring Creek Watershed have been updated to 12 digit codes, 1013020109 and 1013020108. The Spring Creek Watershed will address the portion of Spring Creek that flows out of Lake Ilo and across the Dunn County in an east direction into Mercer County and meets up with the Knife River on the southwest side of Beulah. According to the analysis of the Rapid Geomorphic Assessment (where 50 sites were sampled), Spring Creek bed material is mainly sand and silt clay, 90% of the sites where moderately or deeply incised, and 76% of the banks were observed to be moderately to severely unstable.

Macro invertebrate sampling completed in 2009 in Spring Creek was given a rating of Fair. An acceptable rating would be a Good rating. Macro invertebrate samples will be taken again in 2015.

Water samples in 2008 and 2009 showed unacceptable levels of E.coli. E.coli levels were over the acceptable 409 cfu per sample. A few water samples were labeled too numerous to count, over 8,000 cfus. Water Samples were taken again in 2012-2014. These samples show that we need to continue work with the Spring Creek Watershed and continue to install BMPs. Additional information follows in section 2.5.

The AnnAGNPS model has been updated and new maps have been created. This model shows priority cropland and non-cropland areas. These areas will be given priority when planning future contracts. Maps are attached in Appendix D.

Interest in the project has been shown for many different types of BMPs. We have seen a large demand for livestock watering systems and improvement to the riparian areas with grazing systems. There are currently 14 contracts active in the Spring Creek Watershed, five completed contracts and interested producers for future contracts.

2.3 Maps

See Appendix D

2.4

The Spring Creek Watershed's topography is characterized by rolling hills. Elevation ranges are from 2,454 feet in the northwest portion of the watershed, 2,167 feet where Spring Creek flows out of Lake Ilo to 1,780 feet in Beulah. Soils vary greatly in different areas of the county and range from soft shale plains to extreme sand. Unique to Mercer County and Dunn County is the Knife River Flint used by the early Native Americans and early settlers. Dunn County contains the flint quarries that provided the flint that was traded all over the United States. Annual precipitation for the counties is 17" on average. Important artesian aquifers are in the Fox Hills and Hell Creek Formations of Late Cretaceous age and the Tongue River Formations of Tertiary age. Most of the water used as domestic and livestock water for farms is derived from the lignite coal veins in Ft. Union shale. There are large amounts of Lignite coal in Mercer County being mined. Dunn County is actively being drilled for oil, with many established wells.

The primary natural resource management concern is the degradation of the riparian areas. Other concerns include range practices for summer grazing, cropland erosion and water erosion on rangelands and confined areas for feeding livestock. Of the 293,849 acres in the Spring Creek Watershed an estimated 55% are cropland and hayland, 40% are pasture, rangeland and CRP and 5% are industrial coal mining, oil drilling, wildlife, water, farms, etc. When you look at land use next to the creek, 72% is pasture, 13% hayland, 9% cropland, 5% farmstead/feedlot, and 1% other.

2.5

Two streams were monitored, Spring Creek and Goodman Creek in 2008 and 2009. From those samples, Recreational and aquatic life use targets were set for the streams for Macroinvertebrates and E coli bacteria. The targets set are North Dakota state standards. The two streams were again monitored in 2012 through 2014.

Beneficial Uses	Indicator	Target Value
Aquatic Life	Macroinvertebrate Index of Biotic Integrity Rating	Good
Recreation[1]	Geometric Mean E. Coli Bacteria (CFU/100ml)	126
Recreation[1]	Percent of E. Coli Bacteria Samples > 409 CFU/100ml	10%

1 – Target values limited to samples taken during the recreational period (May 1 – September 31).

Table 1. Summary of Water Quality Target Values Chosen for Beneficial Use Restoration.

The 2010 List of Section 303(d) TMDL Waters has Spring Creek listed as a high priority TMDL (See Appendix C for the 2010 List of Section 3039(d) TMDL Waters, page VI-32,33). The TMDL was written by the ND Department of Health, and is available on the NDDoH's web page on the surface Water Quality Program page. Spring Creek's designated use is recreation and listed as fully supporting, but threatened, with the threat coming from E. coli

Dunn County **Mercer County**

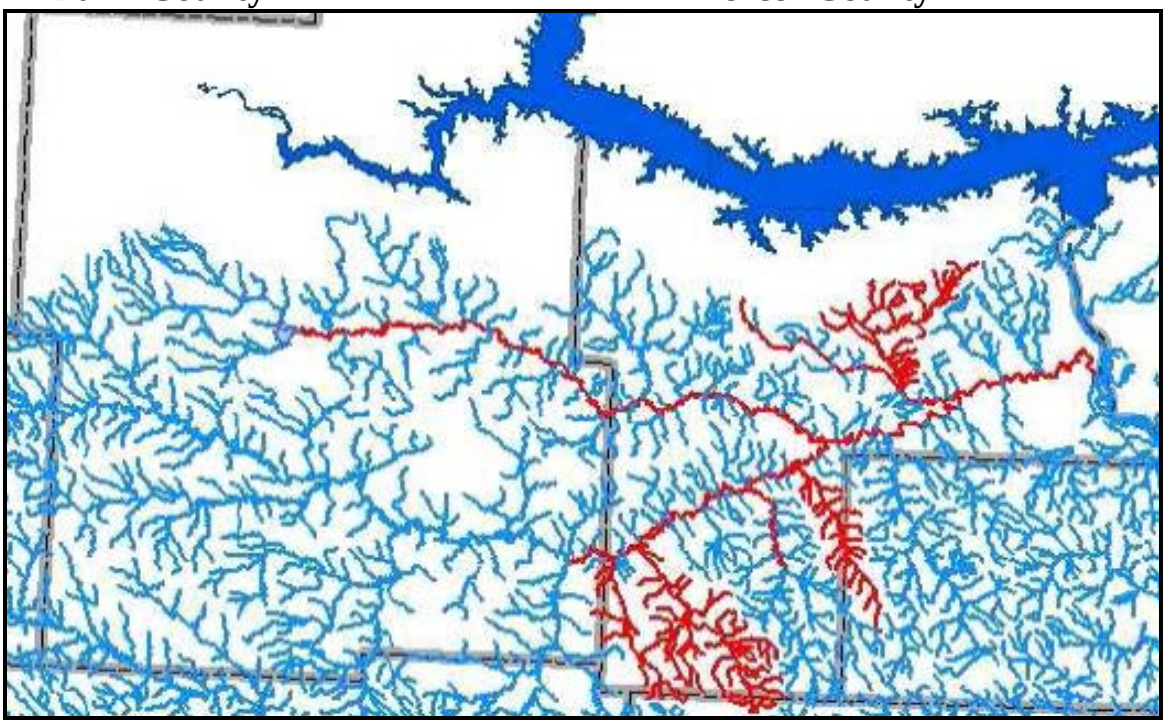


Figure 1. TMDL Listed Spring Creek in Dunn and Mercer Counties.

Spring Creek, highlighted in red flows west to east across Dunn County and in to Mercer County where it flows into the Knife River.

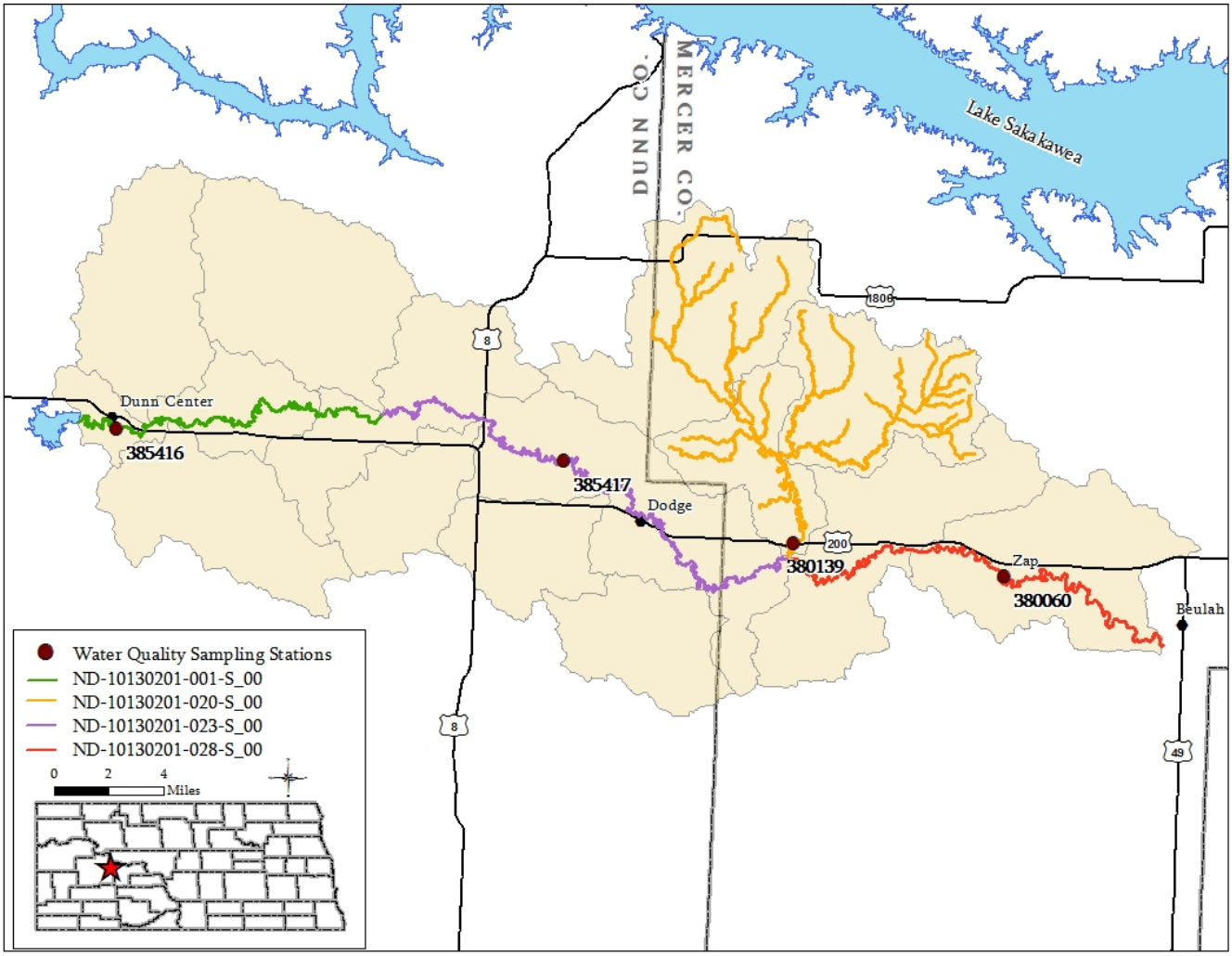


Figure 2. Spring Creek and the Water Quality Sampling Sites.

This map should be used for referencing the water quality sampling site results on the next four pages.

Table 2. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 385416

385416	May		June		July		August		September	
	5/4/2008	10	6/2/2008	10	7/8/2008	380	8/4/2008	90	9/2/2008	260
	5/12/2008	10	6/9/2008	10	7/15/2008	50	8/12/2008	10	9/9/2008	40
	5/19/2008	10	6/16/2008	10	7/22/2008	20	8/18/2008	60	9/15/2008	60
	5/20/2008	30	6/23/2008	30	7/28/2008	360	8/25/2008	10	9/22/2008	10
	5/27/2008	800	6/30/2008	10	7/29/2008	10	8/4/2009	10	9/29/2008	70
	5/6/2009	10	6/1/2009	30	7/15/2009	800	8/12/2009	40	9/8/2009	80
	5/11/2009	30	6/9/2009	30	7/21/2009	70	8/18/2009	10	9/16/2009	10
	5/26/2009	410	6/16/2009	10	7/28/2009	1700	8/25/2009	10	9/22/2009	10
	5/27/2009	40	6/22/2009	30	7/10/2012	140	8/31/2009	10	9/30/2009	10
	5/8/2012	60	6/29/2009	800	7/16/2012	90	8/8/2012	40	9/12/2012	20
	5/23/2012	150	6/4/2012	30	7/23/2012	50	8/14/2012	40	9/17/2012	10
	5/30/2012	130	6/6/2012	5	7/24/2012	320	8/15/2012	80	9/18/2012	30
	5/13/2013	40	6/26/2012	20	7/25/2012	290	8/21/2012	5	9/24/2012	10
	5/14/2013	120	6/27/2012	200	7/31/2012	130	8/27/2012	5	9/26/2012	10
	5/21/2013	40	6/4/2013	140	7/15/2013	160	8/29/2012	5	9/3/2013	50
	5/12/2014	5	6/10/2013	70	7/16/2013	220	8/5/2013	120	9/18/2013	100
	5/20/2014	40	6/12/2013	50	7/17/2013	350	8/14/2013	140	9/23/2013	70
	5/20/2014	5	6/18/2013	90	7/30/2013	100	8/19/2013	40	9/25/2013	90
	5/21/2014	10	6/25/2013	360	7/31/2013	50	8/21/2013	30	9/30/2013	90
	5/28/2014	220	6/3/2014	120	7/1/2014	220	8/26/2013	130		
			6/9/2014	20	7/8/2014	140	8/27/2013	80		
			6/16/2014	150	7/9/2014	90				
			6/18/2014	260	7/15/2014	120				
			6/23/2014	180	7/22/2014	300				
					7/29/2014	100				
Geo Mean 08-09	38		24		175		19		30	
% over	22%		10%		25%		0%		0%	
Status	FST		FS		NS		FS		FS	
Geo Mean 12-14	41		74		144		35		33	
% over	0%		0%		0%		0%		0%	
Status	FS		FS		FST		FS		FS	
Overall Geo Mean	39		47		142		26		33	
% over	10%		4%		8%		0%		0%	
Status	FS		FS		NS		FS		FS	

Table 3. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 385417

385417	May		June		July		August		September	
	5/4/2008	10	6/2/2008	70	7/8/2008	70	8/4/2008	20	9/2/2008	50
	5/12/2008	70	6/9/2008	40	7/15/2008	100	8/18/2008	50	9/9/2008	40
	5/19/2008	10	6/16/2008	10	7/22/2008	70	8/25/2008	10	9/15/2008	10
	5/20/2008	10	6/23/2008	20	7/28/2008	800	8/4/2009	210	9/22/2008	360
	5/27/2008	10	6/30/2008	50	7/29/2008	140	8/12/2009	80	9/29/2008	10
	5/4/2009	10	6/1/2009	390	7/6/2009	800	8/18/2009	30	9/8/2009	380
	5/6/2009	50	6/9/2009	1100	7/15/2009	60	8/25/2009	10	9/16/2009	10
	5/11/2009	90	6/16/2009	100	7/21/2009	20	8/31/2009	60	9/22/2009	30
	5/26/2009	380	6/22/2009	160	7/28/2009	40	8/8/2012	10	9/30/2009	10
	5/27/2009	140	6/29/2009	50	7/10/2012	30	8/14/2012	120	9/12/2012	40
	5/8/2012	310	6/4/2012	120	7/16/2012	30	8/15/2012	40	9/17/2012	30
	5/16/2012	100	6/6/2012	30	7/23/2012	50	8/21/2012	40	9/18/2012	80
	5/23/2012	600	6/26/2012	10	7/24/2012	50	8/27/2012	40	9/24/2012	10
	5/30/2012	160	6/27/2012	20	7/25/2012	40	8/29/2012	10	9/25/2012	30
	5/13/2013	20	6/4/2013	370	7/31/2012	20	8/5/2013	130	9/26/2012	30
	5/14/2013	90	6/10/2013	340	7/10/2013	270	8/14/2013	270	9/3/2013	20
	5/21/2013	2900	6/12/2013	180	7/15/2013	270	8/19/2013	90	9/18/2013	80
	5/12/2014	60	6/18/2013	120	7/16/2013	170	8/21/2013	90	9/23/2013	760
	5/20/2014	20	6/24/2013	5	7/17/2013	320	8/26/2013	170	9/24/2013	30
	5/21/2014	5	6/25/2013	100	7/30/2013	330	8/27/2013	130	9/25/2013	40
	5/27/2014	1000	6/3/2014	210	7/31/2013	370			9/30/2013	40
	5/28/2014	4200	6/9/2014	170	7/1/2014	200				
			6/16/2014	160	7/8/2014	110				
			6/18/2014	60	7/9/2014	150				
			6/23/2014	160	7/15/2014	40				
					7/22/2014	50				
					7/29/2014	30				
Geo Mean 08-09	33		79		105		33		35	
% over	0%		10%		22%		0%		0%	
Status	FS		FS		FST		FS		FS	
Geo Mean 12-14	164		82		91		64		44	
% over	33%		0%		0%		0%		8%	
Status	NS		FS		FS		FS		FS	
Overall Geo Mean	80		81		96		51		40	
% over	18%		4%		7%		0%		5%	
Status	FST		FS		FS		FS		FS	

Table 4. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380139

380139	May		June		July		August		September	
	5/4/2008	10	6/2/2008	260	7/8/2008	10	8/4/2008	40	9/2/2008	170
	5/12/2008	10	6/9/2008	110	7/15/2008	10	8/12/2008	10	9/9/2008	10
	5/19/2008	30	6/16/2008	100	7/22/2008	200	8/18/2008	10	9/15/2008	10
	5/20/2008	10	6/23/2008	20	7/28/2008	800	8/25/2008	50	9/22/2008	10
	5/27/2008	10	6/30/2008	30	7/29/2008	220	8/4/2009	110	9/29/2008	10
	5/4/2009	10	6/1/2009	50	7/6/2009	140	8/12/2009	240	9/8/2009	250
	5/6/2009	10	6/9/2009	800	7/15/2009	1100	8/18/2009	110	9/16/2009	40
	5/11/2009	10	6/16/2009	230	7/21/2009	800	8/25/2009	10	9/22/2009	50
	5/26/2009	310	6/22/2009	8000	7/28/2009	270	8/31/2009	10	9/30/2009	30
	5/27/2009	250	6/29/2009	150	7/10/2012	90	8/8/2012	30	9/12/2012	80
	5/8/2012	70	6/4/2012	570	7/16/2012	160	8/14/2012	50	9/17/2012	10
	5/16/2012	70	6/6/2012	8000	7/23/2012	60	8/15/2012	160	9/18/2012	20
	5/23/2012	10	6/26/2012	210	7/24/2012	130	8/21/2012	50	9/24/2012	10
	5/30/2012	150	6/26/2012	300	7/25/2012	330	8/27/2012	40	9/25/2012	5
	5/13/2013	20	6/27/2012	130	7/31/2012	30	8/29/2012	140	9/26/2012	5
	5/14/2013	110	6/4/2013	240	7/10/2013	210	8/5/2013	270	9/3/2013	5
	5/21/2013	4200	6/10/2013	180	7/15/2013	2500	8/14/2013	130	9/18/2013	80
	5/12/2014	20	6/12/2013	80	7/16/2013	3200	8/19/2013	90	9/23/2013	230
	5/21/2014	5	6/18/2013	120	7/17/2013	5300	8/21/2013	140	9/24/2013	170
	5/27/2014	1600	6/24/2013	60	7/30/2013	270	8/26/2013	180	9/25/2013	110
	5/28/2014	480	6/25/2013	300	7/31/2013	410	8/27/2013	50	9/30/2013	70
			6/3/2014	160	7/1/2014	210				
			6/9/2014	420	7/8/2014	500				
			6/16/2014	160	7/9/2014	680				
			6/18/2014	330	7/15/2014	450				
			6/23/2014	1300	7/22/2014	220				
					7/29/2014	210				
Geo Mean 08-09	22		169		170		34		31	
% over	0%		20%		33%		0%		0%	
Status	FS		NS		NS		FS		FS	
Geo Mean 12-14	94		278		325		99		30	
% over	27%		25%		39%		0%		0%	
Status	FST		NS		NS		FS		FS	
Overall Geo Mean	47		230		262		59		30	
% over	14%		23%		37%		0%		0%	
Status	FST		NS		NS		FS		FS	

Table 5. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380060

380060	May		June		July		August		September	
	5/4/2008	10	6/2/2008	70	7/8/2008	60	8/4/2008	90	9/2/2008	90
	5/12/2008	20	6/9/2008	90	7/15/2008	80	8/12/2008	100	9/9/2008	30
	5/19/2008	100	6/16/2008	160	7/22/2008	150	8/18/2008	10	9/15/2008	40
	5/20/2008	120	6/23/2008	20	7/28/2008	800	8/25/2008	20	9/22/2008	30
	5/27/2008	160	6/30/2008	10	7/29/2008	240	8/4/2009	130	9/29/2008	380
	5/4/2009	10	6/1/2009	60	7/6/2009	50	8/12/2009	250	9/8/2009	90
	5/6/2009	10	6/9/2009	1100	7/15/2009	20	8/18/2009	60	9/16/2009	120
	5/11/2009	20	6/16/2009	1700	7/21/2009	40	8/25/2009	60	9/22/2009	100
	5/26/2009	1400	6/22/2009	2400	7/28/2009	40	8/31/2009	40	9/30/2009	30
	5/27/2009	100	6/29/2009	60	7/10/2012	140	8/8/2012	130	9/12/2012	130
	5/8/2012	240	6/4/2012	410	7/16/2012	70	8/14/2012	100	9/17/2012	250
	5/16/2012	250	6/6/2012	400	7/23/2012	60	8/15/2012	70	9/18/2012	140
	5/23/2012	240	6/26/2012	90	7/24/2012	190	8/21/2012	150	9/24/2012	20
	5/30/2012	360	6/27/2012	70	7/25/2012	30	8/21/2012	90	9/25/2012	5
	5/13/2013	20	6/4/2013	280	7/31/2012	10	8/29/2012	160	9/26/2012	20
	5/14/2013	110	6/10/2013	230	7/10/2013	3100	8/5/2013	100	9/3/2013	10
	5/21/2013	1300	6/12/2013	90	7/15/2013	350	8/14/2013	90	9/18/2013	150
	5/12/2014	10	6/18/2013	20	7/16/2013	260	8/19/2013	90	9/23/2013	350
	5/20/2014	10	6/24/2013	50	7/17/2013	370	8/26/2013	80	9/24/2013	50
	5/21/2014	5	6/25/2013	120	7/30/2013	80	8/27/2013	30	9/25/2013	230
	5/27/2014	770	6/3/2014	240	7/31/2013	140			9/30/2013	30
	5/28/2014	1100	6/9/2014	800	7/1/2014	400				
			6/16/2014	210	7/8/2014	160				
			6/18/2014	70	7/9/2014	150				
			6/23/2014	160	7/15/2014	170				
					7/22/2014	4300				
					7/29/2014	130				
Geo Mean 08-09	50		142		78		56		70	
% over	10%		30%		10%		0%		0%	
Status	FS		NS		FS		FS		FS	
Geo Mean 12-14	117		147		179		92		59	
% over	25%		13%		11%		0%		0%	
Status	FST		NS		NS		FS		FS	
Overall Geo Mean	80		145		139		75		63	
% over	18%		20%		11%		0%		0%	
Status	FST		NS		NS		FS		FS	

The tables above show the levels of E. coli bacteria throughout the watershed. All four sites exceeded the state guidelines where more than 10% of the samples above 409 CFU/100ml for E. coli bacteria in one or more months of the year. It is clearly visible that concentrations in June and July can be extremely high, reaching in to the thousands. May levels are also visibly high. The reason for these levels may be directly related to the riparian grazing above these sites. Riparian grazing upstream from the water sampling sites will become a priority in Phase 2 of this project. Please refer to Figure 2 above for reference. More information can be found in the Water Quality Monitoring Results for the Spring Creek Watershed Implementation Project, Appendix F.

The Assessment Tool for new or existing Animal Feeding Operations was completed using the Open Lot Evaluation Worksheet and the North Dakota Animal Feedlot Runoff Risk Index Worksheets. These assessments were valuable in understanding how producers handle their feeding operations. Four assessments completed were within ½ mile from Spring Creek and one of its tributaries. Both worksheets averaged a score of medium, a medium risk level for runoff and a medium risk for water quality impacts. One producer's Feedlot did rank out as a high risk level for runoff. This site has been addressed and needs additional assistance in Phase 2. Because of the degradation of the riparian area, I believe this site does influence the high e.coli levels at site 385417 in May.

To address the fecal, e. coli and high risk level feedlots, BMPs are needed to remove cattle that are wintering on Spring Creek and its tributaries. By providing alternative wintering areas on crop land, producers will be able to better utilize manure as it would be directly placed on the crop.

Stream assessments were completed in the fall of 2008. The Stream Visual Assessment protocol and the Rapid Geomorphic Assessment were completed, and are in the Spring Creek Watershed Assessment in Appendix H. It was noted that the riparian areas are in need of a management plan and funding should be requested. Impacts of major concern are the riparian health and excessive grazing adjacent to the river. 46 of 50 sites were rated poor in the Stream Visual Assessment Protocol. According to the Rapid Geomorphic Assessment, only 11 of the 98 riparian areas assessed had good to excellent riparian health.

With the implementation of BMPs, such as prescribed grazing with alternative water away from the riparian areas and riparian restoration BMPS, the riparian areas in poor health will be able to improve.

Macro collection was completed at 10 sites in 2008. Data results were rated 23-32, which is Fair, and the target value is good, greater than 38. By applying BMPs to the riparian areas, it will benefit the macroinvertebrates. BMPs that will improve that quality of the riparian areas include tree planting, filter strips and herbaceous cover. Macro collection will be completed again in September, 2015.

IBI Rangeland Plains Cut-offs	
> 38	Good
≥ 23 - ≤ 38	Fair
< 23	Poor

Table 6: Macroinvertibrate IBI Scale for Spring Creek Watershed

3.0 Project Description

Goal 1:

The primary goal of this watershed project is to restore and/or maintain the aquatic life and recreational uses of the Spring Creek and its tributaries within the project area.

Objective 1:
Reduce monthly geometric mean concentrations for E. coli to levels below 126 cfu/100ml with less than 10% of the samples exceeding 409cfu/100 ml and achieve an IBI score of Good, or greater than 38 (Table 6, above), at all established monitoring sites.

Task 1:
Employ one full time watershed conservationist in Mercer County and one quarter time watershed conservationist in Dunn County to provide one on one conservation planning assistance to producers in the project area.

Product: Two watershed conservationists to administer contracts in the Spring Creek Watershed and provide technical assistance.

Cost: $ 148,590 (319 Funds)

Task 2:
Minimize livestock impacts to the riparian corridor by improving grazing management on 8,000 acres in the watershed and installing 5 miles of vegetative buffers that will enhance stream bank stability. Priority will be given to the areas being grazed upstream of the sampling sites listed above. Acres in the AnnAGNPS model and NWQI will also be a focus.

Product
8,000 acres of prescribed grazing systems and 5 miles vegetative buffers including livestock and crop production. See Supplemental BMP Table in Appendix B for details on specific BMPs related to grazing management.

Land management upstream from the sampling sites will be a priority area in the Spring Creek Watershed. These acres will be carefully looked at for the best BMP management.

AnnAGNPS acres will be targeted to apply BMPs, both cropland and non-cropland acres

The NWQI will be a focus area in the Spring Creek Watershed. Producers will be able to seek financial and technical assistance through both the NRCS and the Spring Creek Watershed's 319 funds.

The Spring Creek Watershed Project is partnering with the Mercer County Water Resource Board to provide additional cost share for filter strips and forage biomass plantings along creeks. Producers have been reluctant to add plantings to their operations when it involves taking land out of crop production and pay 40 percent of the seeding. The Mercer County Water Resource Board will cover the producer's cost of 40%

Cost: $298,410 (319 Funds)

Task 3:
Improve manure management in livestock feeding areas through the implementation and the development of manure management systems for five small winter feeding areas within ½ mile of the creek and/or its tributaries. These systems will be focused on the areas upstream from the sampling sites.

Product, Five small Feeding Areas with Manure Management plans. See Supplemental BMP Table in Appendix B.

Cost: $84,000 (319 Funds) (This cost is figured into Task 2, separated here to show the cost for manure management)

During Phase 1 of the Spring Creek Watershed Project, the watershed cost shared one winter feeding area. The Goodman Creek NWQI contracted five winter feeding areas. These winter feeding areas are developed with fabricated windbreak panels and have proven to be very beneficial to the producers with manure management.

The Spring Creek Watershed consists of mostly stock cow operations with the majority of the feeding being done on open range. These operations have a more direct need of being moved away from water and drainage sources. This can be accomplished by establishing alternative water sources other than streams and establishing a grazing management plan.

Objective 2: Educational

Task 4:
Conduct follow-up contacts to assist with conservation plan updates, and monitor O&M of 319 cost shared practices.

Product: Database of applied BMP's.

Cost: Included in Task 1

During phase 1, an excel spread sheet was also developed to allow for easier viewing off all producer and planned and installed practices. A summary of these practices is attached in Appendix G.

Task 5: Continue to inform the producers and land managers of the Spring Creek Watershed Project and the benefits of implementing BMPs though meetings and tours. Present at other agency meetings in the area.

Product: Successful meetings and tours that inform producers and landowners about the Spring Creek Watershed Project. Show producers examples of implemented practices. Discuss which BMPS are available and the benefits of implementing them. Inform producers and landowners of the Spring Creek Watershed through newsletters from Dunn and Mercer Counties

The Spring Creek Watershed teamed up with the Mercer and Dunn County Soil Conservation Districts, NDSU Ext Mercer County Office and NRCS to provide informational meetings to producers and land owners. We plan to have future meetings with FSA to include the new Farm Bill information

Cost: $3,000 (319 Funds) for meetings, tours, and newsletters/publications

Objective 3:
Secure additional cost share opportunities for Spring Creek producers to improve water quality and riparian areas.

Task 6: Work with other agencies to seek out additional cost share dollars for producers. Look for other grant opportunities to provide additional cost share.

Product: Additional funding for producers cost. Producers are reluctant to install BMPs that can take land out of production. Additional funding will provide more of an initiative to install BMPs, such as filter strips and riparian buffers.

Cost: Included in Task 1

3.3
See attached Milestone Table, Appendix A

3.4 Permits
All necessary permits will be acquired. These may include COE section 404 permits and ND State Water Commission permits. Project will work with the NDDH to determine if National Pollution Elimination System permits are needed for proposed livestock waste systems. Cultural Resource concerns and issues will be addressed by following the procedures of the NDDH in consulting with the North Dakota State Historical Preservation Officer.

3.5 Appropriateness of the lead sponsors
The Mercer and Dunn County Soil Conservation District will act as the lead sponsors on the project. The sponsors will work with the North Dakota State Health Department (NDDH) and Natural Resource Conservation Service (NRCS) to determine the need for any environmental permits, such as livestock waste management systems. Project staff will consult with the NDDH to determine applicability of current ND livestock waste regulations.

The Mercer and Dunn County Soil Conservation Districts will be responsible for auditing Operation & Maintenance agreements on BMP's. After completion of projects, yearly status reviews will be conducted on all 319 contracts. The life span of each BMP will be listed with each individual contract to ensure longevity of the practice. The producer will be required to sign the "EPA 319 Funding Agreements Provision" form, which explains in detail the consequences of destroying a BMP before its life span is up. The SCDs are locally elected volunteer conservation organizations that serve all people of their counties.

4.0 Coordination Plan

1) Mercer County SCD will partner with Dunn County SCD. The Mercer County SCD will be the lead agency liable for project administration. Conservation planning, technical assistance, educational campaign, clerical assistance, access to equipment and supplies, and annual financial support will be provided by the Mercer County SCD and the Dunn County SCD. The Mercer County SCD and the Dunn County SCD will prioritize scheduling, coordinate activities and ideas and request letters of support. District personnel will serve as a liaison between watershed residents and USDA program participation.

2) USDA Natural Resources Conservation Service (NRCS). The NRCS will provide technical assistance by coordinating project activities, facilitating local involvement, providing technical support and participating in educational outreach programs during the project. Staff will incorporate existing USDA programs (financial and technical ex. EQIP) 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. Annual review is currently in progress.

3) North Dakota Department of Health. The NDDH will oversee Section 319 funding and develop the quality assurance project plan, QAPP. Training will be provided by the NDDH for proper water quality sample collection, preservation and transportation to ensure that reliable data is obtained. NDDH will also complete and cover the expense of analysis of water samples.

4) USDA Farm Service Agency (FSA). The FSA will provide cost-share assistance through the Conservation Reserve Program and will serve as participants on the Local Work Group.

5) North Dakota Cooperative Extension Service (NDSU). The NDSU Extension Service will assist in project information and education activities.

6) Water Resource Board. The Mercer County Water Resource Board will provide technical assistance. They have also committed yearly financial assistance to the project in the amount of $15,000. The Dunn County Water Resource Board will provide technical assistance and have committed to providing financial assistance. Exact funding amount has not been set.

7) ND State Forest Service (NDFS). The NDFS has been solicited for financial and technical assistance with riparian areas.

8) Dakota Prairies RC&D. The RC&D will provide technical assistance through managerial processes.

9).US Army Corps of Engineers. The US ACOE will provide technical assistance on flood related matters.

4.1
Local support for the project is displayed through the response during the assessment phase and informational meetings. Producers are pushing hard for water lines and technical assistance for better ways to provide fresh water to their cattle. Producers are becoming aware of the importance of water quality and riparian areas, and looking for ways to improve them. Currently 70% of NRCS and 319 contracts are for water and grazing BMPs. The other 30% have contracts for tree plantings, cover crops and grass seedings. They have shown great interest in using 319 dollars. A huge amount of support from local producers and sponsors is behind this project.

4.3
See attached letters of support.
Appendix E

5.0 Evaluation and Monitoring Plan
The Quality Assurance Project Plan will be developed by the ND Department of Health after the draft proposal has been approved and revised, accordingly, to complete the final project implementation plan. The Quality Assurance Project Plan will be included in the final PIP and submitted to the EPA

6.0 Budget
Part I, Part II and Supplemental Budgets attached, Appendix B

7.0 Public Involvement
Public will be kept informed of new, tours and meetings through newsletters and personnel contacts. Dunn and Mercer County personnel have and plan to continue door to door stops throughout the watershed. To get producers involved, phone calls will be made to personally invite producers to meetings and tours. A monthly update is given to Mercer County Water Resource Board, which is printed in the local papers. Monthly updates will also be given to the Dunn County Water Resource Board.

Appendix A

MILESTONE TABLE FOR SPRING CREEK WATERSHED PROJECT

Task/Responsible Organization	Output	Qty	SFY 15				SFY 16				SFY 17				SFY 18				SFY 19			
			Quarter*				Quarter*				Quarter*				Quarter*				Quarter*			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
OBJECTIVE 1: Improve Water Quality																						
Task 1 - Employ two watershed conservationists	Conservation Planning	2 employees			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Group 1,2,3,5																						
Task 2 - Implement BMP's	Landowner Asssistance	20contracts			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Group 1,2,3,4,5,6	and implement BMPs																					
Task 3 - Manure Management Systems	Install 5 winter feeding areas	5 systems					x	x			x	x			x							
Group 1,2,3,4,5,6																						
OBJECTIVE 2: Education																						
Task 4 - Follow- up, monitoring	Contacts & assistance	20contracts			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Group 1,2,3,4,5,6																						
Task 5- Informational Meetings and Tours	informational meetings, tours	6meetings					x	x			x		x		x		x					
Group 1,2,3,4,5,6	Newsletters	12 newsletters			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
OBJECTIVE 3: Additional Funding																						
Task 6 - Secure addional cost share dollars	Additional cost share	4 sources			x	x		x	x	x		x	x	x		x	x					
Group 1,2,3,4,5																						

Group 1: Mercer County & Dunn County Soil Conservation District - Provides administration, supplies and financial support for the project

Group 2: Mercer County & Dunn County Water Resource Board - Provides techinical and financial assistance for the project

Group 3: Natural Resources Conservation Service - Provides technical assistance in the planning, design and installation of BMP's

Group 4: Dakota Prairies Resource Conservation and Development - Provides assistance in the development and completion of the project

Group 5: North Dakota Department of Health - Oversees Section 319 funding, monitoring and overall evaluation of the project

Group 6: Spring Creek Watershed Landowners - Make land management decisions and provide both cash and in-kind match for installed BMP's

* Quarter 1 - July/September Quarter 2 - October/December Quarter 3 - January/March Quarter 4 - April/June

Appendix B

BUDGET TABLE FOR SPRING CREEK WATERSHED PROJECT

Part I: Funding Sources	SFY15	SFY16	SFY17	SFY18	SFY19	inkind	Totals
Total EPA Section 319 Funds	$72,045.00	$100,470.00	$104,730.00	$106,305.00	$66,450.00		$450,000.00
Subtotals	$72,045.00	$100,470.00	$104,730.00	$106,305.00	$66,450.00		$450,000.00

Other Federal Funds	SFY12	SFY13	SFY14	SFY15	SFY16		Totals
1) Natural Resources Conservation Service (TA)[1] and EQIP[2]	$60,000.00	$60,000.00	$60,000.00	$60,000.00	$60,000.00		$300,000.00
2) Dakota Prairies Resource Conservation & Development (TA)	$1,000.00	$5,000.00	$5,000.00	$3,000.00	$3,000.00		$17,000.00
3) Farm Services Agency (FA)[3] and CRP[4]	$5,500.00	$7,500.00	$7,500.00	$7,500.00	$0.00		$28,000.00
4) ND Department of Health (TA)	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00		$5,000.00
5) ND State Forest Service (TA and FA)	$5,000.00	$5,000.00	$5,000.00	$5,000.00	$5,000.00		$25,000.00
Subtotals	$72,500.00	$78,500.00	$78,500.00	$76,500.00	$69,000.00		$375,000.00

State and Local Match	SFY12	SFY13	SFY14	SFY15	SFY16		Totals
1) Mercer County Soil Conservation District (TA and FA)	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$1,500.00	$16,500.00
2) Dunn County Soil Conservation District (TA and FA)	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$1,000.00	$16,000.00
3) Mercer County Water Resource Board (TA and FA)	$15,000.00	$15,000.00	$15,000.00	$15,000.00	$7,500.00	$5,500.00	$73,000.00
4) Dunn County Water Resource Board (TA and FA)	$14,975.00	$15,000.00	$15,000.00	$15,000.00	$7,500.00	$500.00	$67,975.00
5) Landowners (FA)	$28,600.00	$44,550.00	$43,290.00	$42,060.00	$20,600.00	$49,600.00	$228,700.00
7) NDSU Extension Service (TA)	$200.00	$200.00	$200.00	$200.00	$200.00		$1,000.00
Subtotals	$64,775.00	$80,750.00	$79,490.00	$78,260.00	$41,800.00	$58,100.00	$403,175.00

Total Project Budget:	**$1,228,175.00**

[1] TA - Technical Assistance

[2] EQIP - Environmental Quality Incentive Program

[3] FA - Financial Assistance

[4] CRP - Conservation Reserve Program

*SFY - State Fiscal Year

Part II: Section 319 Non-Federal Budget							Funding			
	SFY15	SFY16	SFY17	SFY18	SFY19	Total	Cash	In-Kind	319 Match	Total
Personnel/Support										
1) Salary Mercer	$36,000.00	$37,000.00	$39,000.00	$41,000.00	$33,000.00	$186,000.00	$74,400.00		$111,600.00	$186,000.00
1a)Salary Dunn	$7,000.00	$8,500.00	$8,750.00	$9,250.00	$7,250.00	$40,750.00	$16,300.00		$24,450.00	$40,750.00
2) Administration	$2,750.00	$2,750.00	$2,750.00	$2,750.00	$1,500.00	$12,500.00	$5,000.00	$1,500.00	$7,500.00	$14,000.00
3) Travel/training	$200.00	$400.00	$400.00	$400.00	$0.00	$1,400.00	$560.00		$840.00	$1,400.00
4) Equipment/Supplies	$750.00	$750.00	$750.00	$750.00	$0.00	$3,000.00	$1,200.00		$1,800.00	$3,000.00
5) Telephone/postage	$875.00	$875.00	$875.00	$875.00	$500.00	$4,000.00	$1,600.00		$2,400.00	$4,000.00
Subtotals	$47,575.00	$50,275.00	$52,525.00	$55,025.00	$42,250.00	$247,650.00	$99,060.00	$1,500.00	$148,590.00	$249,150.00
Objective 1: Improve Land Management (BMPs)[1]										
Cropland Mgt Systems	$1,550.00	$1,600.00	$1,700.00	$1,600.00	$1,550.00	$8,000.00	$3,200.00		$4,800.00	$8,000.00
Rangeland Mgt. Systems	$29,000.00	$73,000.00	$75,250.00	$72,850.00	$31,000.00	$281,100.00	$112,440.00		$168,660.00	$281,100.00
Pasture & Hayland Mgt. System	$5,000.00	$5,000.00	$6,000.00	$5,000.00	$0.00	$21,000.00	$8,400.00		$12,600.00	$21,000.00
Manure Management	$28,000.00	$28,000.00	$28,000.00	$28,000.00	$28,000.00	$140,000.00	$56,000.00		$84,000.00	$140,000.00
Riparian Buffers	$7,950.00	$8,575.00	$10,075.00	$13,700.00	$6,950.00	$47,250.00	$18,900.00		$28,350.00	$47,250.00
Prescribed Grazing (Inkind)		$4,800.00	$12,800.00	$16,000.00	$16,000.00	$49,600.00	$19,840.00	$49,600.00		$49,600.00
Subtotals	$71,500.00	$116,175.00	$121,025.00	$121,150.00	$67,500.00	$546,950.00	$218,780.00	$49,600.00	$298,410.00	$546,950.00
Objective 2: Educational Events										
Tours	$750.00	$750.00	$750.00	$750.00	$750.00	$3,750.00	$1,500.00		$2,250.00	$3,750.00
Newsletters/Publications	$250.00	$250.00	$250.00	$250.00	$250.00	$1,250.00	$500.00		$750.00	$1,250.00
Subtotals	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$5,000.00	$2,000.00		$3,000.00	$5,000.00
Total 319 Non-Federal Budget	$120,075.00	$167,450.00	$174,550.00	$177,175.00	$110,750.00	$801,850.00	$322,240.00	$51,100.00	$450,000.00	$801,100.00

[1]BMPs: Cropland Management Systems: Conservation Cropping Sequence, Conservation Tillage, Critical Area Plantings, Diversions, Field Windbreaks, Grassed Waterways, Waste Management Systems. Rangeland Management Systems: Planned Grazing Systems, Proper Grazing Use, Fences, Pipelines, Range Seeding, Tanks, Wells. Pasture and Hayland Management Systems: Pasture and Hayland Management, Pasture and Hayland Plantings. Manure Management: Waste Storage Pond, Water Treatment Lagoon, Well, Manure Transfer, Pond Sealing or Lining. Refer to Supplemental BMP Table for more detailed information on costs and amounts of BMP's.

SUPPLEMENTAL BMP BUDGET TABLE

Part II

Appendix- page 5

BMP Practice	Cost per unit		Estimated # of units	319 cost	Producer Cash In kind Match	Total Cost
340- Cover Crop	$20/ac		400 ac	$4,800.0	$3,200.0	$8,000
380- Windbreak/Shelterbelt Est.	$24/100ft		25000ft	$3,600.0	$2,400.0	$6,000
060- Weed Barrier	$58/100ft		17000/ft	$5,916.0	$3,944.0	$9,860
391- Riparian Forest Buffer	$350/ac		85 ac	$17,850.0	$11,900.0	$29,750
516- Pipelines	$3.00/ft.		35137	$63,246.60	$42,164.40	$105,411
614- Trough/Tank	$1500/unit		20	$18,000.0	$12,000.0	$30,000
642- Well	$9000/unit		9	$48,600.0	$32,400.0	$81,000
382- Fencing	$1.15ft.		22000	$15,138.00	$10,092.0	$25,230
001- Cultural Resources	$1800/unit		13	$12,960.0	$9,360.0	$23,400
550- Range Planting	$40/acre		50ac	$1,200.00	$800.0	$2,000
512- Pasture & Hayland Planting	$35/acre		600 ac	$12,600.0	$8,400.0	$21,000
390- Riparian Herbaceous Cover	$300/acre		50ac	$9,000.0	$6,000.0	$15,000
393- Filter Strip	$125/acre		20 ac	$1,500.0	$1,000.0	$2,500
Winter Feeding areas	$28,000		5	$84,000.0	$56,000.0	$140,000
528APrescribed Grazing		$5.00/acre			$49,600	$49,600
		Total BMP Costs:		$298,410.6	$249,260.4	**$499,151**

Appendix C

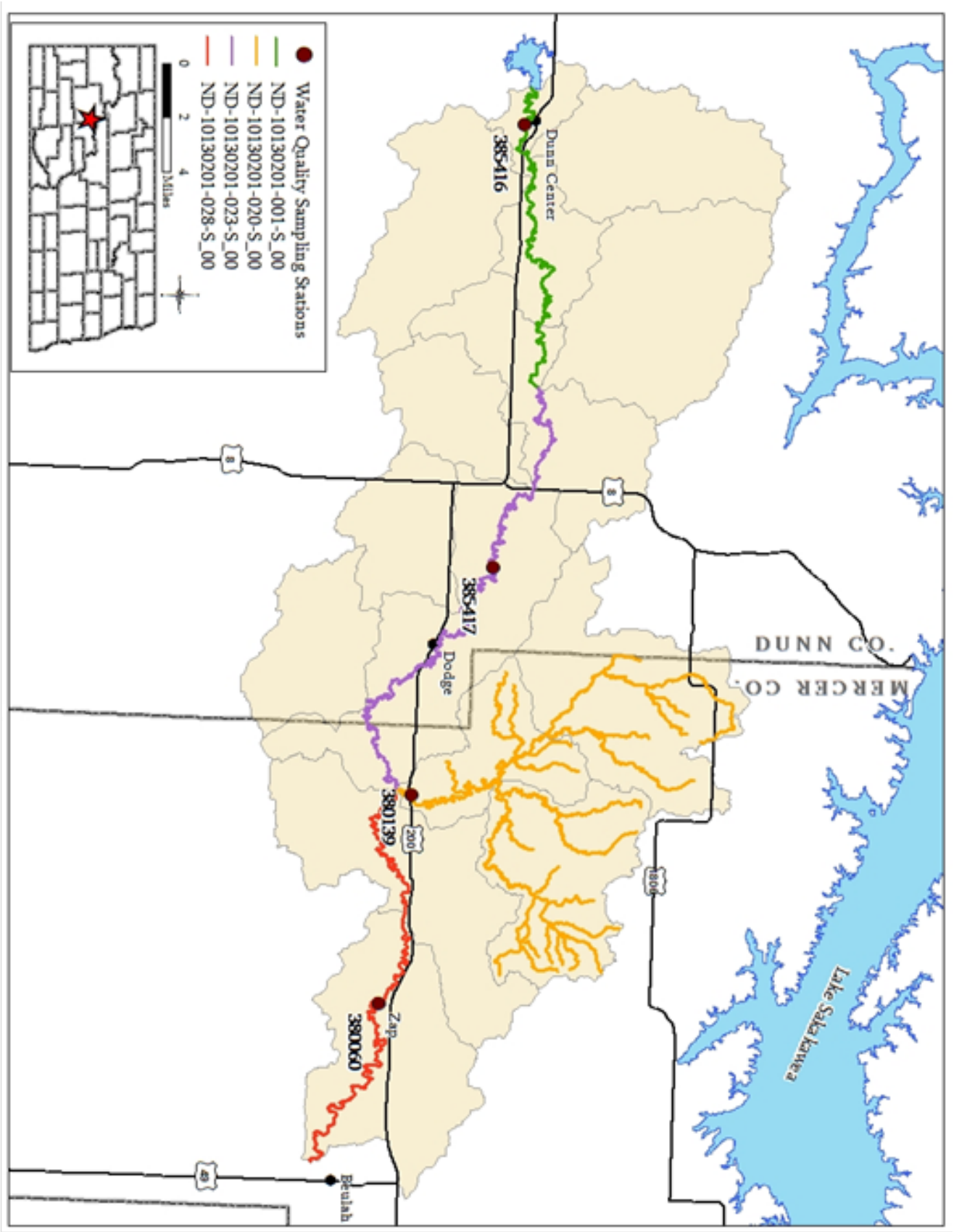
Table VI-3 (cont.). 2010 List of Section 303(d) TMDL Waters for the Missouri River Basin in North Dakota.

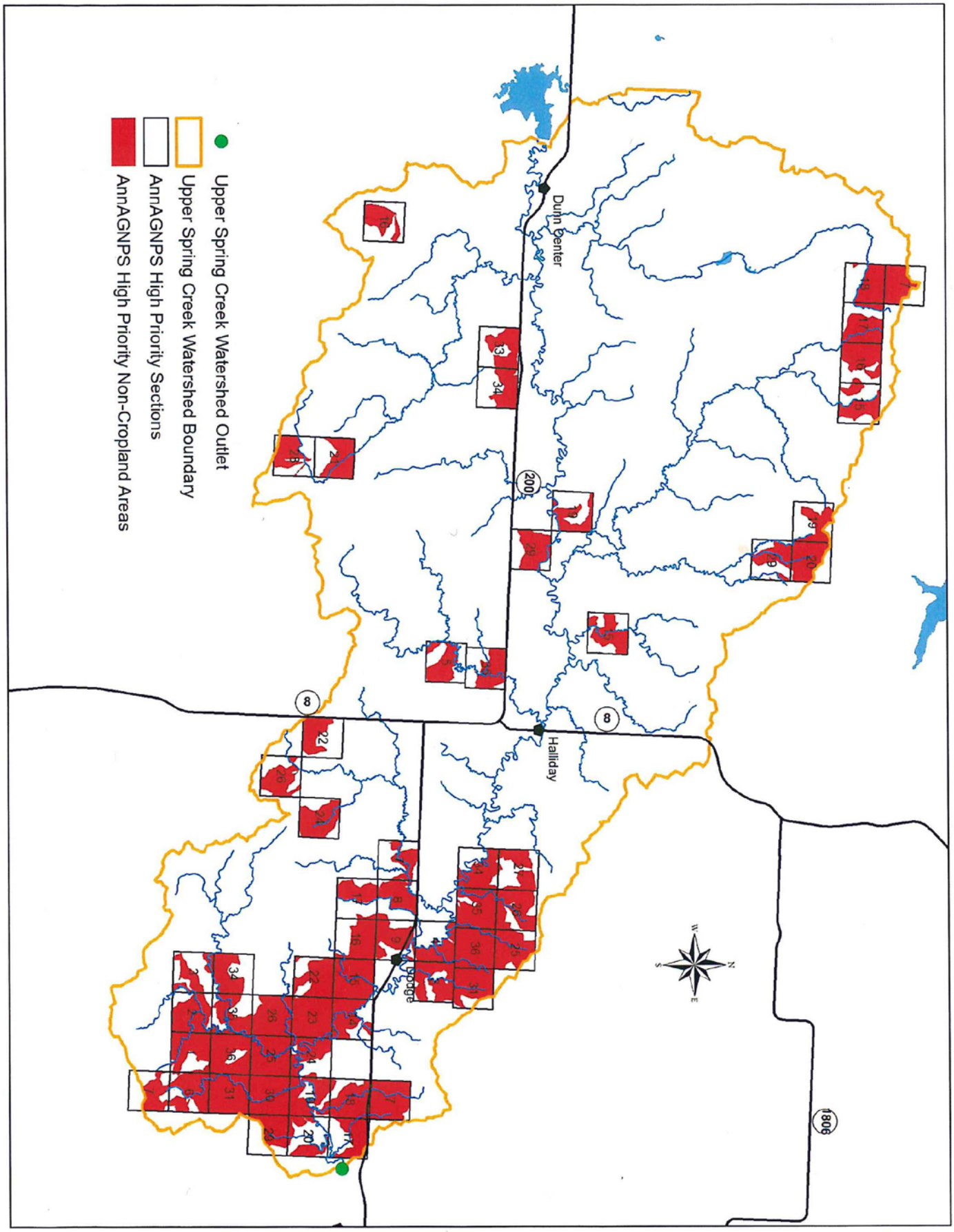
Assessment Unit ID	AU Description	AU Size	Designated Use	Use Support	Impairment	TMDL Priority	5A
ND-10130104-005-S_00	Spring Creek and tributaries, located in Emmons County.	63.14 Miles					
			Recreation	Not Supporting			
					Fecal Coliform	H	No
ND-10130104-007-S_00	Beaver Creek from its confluence with the South Branch Beaver Creek downstream to its confluence with Spring Creek. Located in Emmons County.	37.68 Miles					
			Recreation	Fully Supporting But Threatened			
					Fecal Coliform	H	No
ND-10130104-008-S_00	Clear Creek and tributaries, located in Emmons County.	108.95 Miles					
			Recreation	Fully Supporting But Threatened			
					Fecal Coliform	H	No
ND-10130104-010-S_00	Beaver Creek from Beaver Lake downstream to its confluence with the South Branch Beaver Creek. Located in Emmons and	38.92 Miles					
			Recreation	Not Supporting			
					Fecal Coliform	H	No
ND-10130104-012-S_00	Unnamed tributary on the south side of Beaver Lake, Logan and McIntosh Counties.	158.02 Miles					
			Recreation	Fully Supporting But Threatened			
					Fecal Coliform	H	No
ND-10130104-014-S_00	South Branch Beaver Creek from its confluence with the South Branch Beaver Creek Watershed (ND-10130104-015-S) downstream to its confluence with Beaver Creek. Located in McIntosh and Emmons	43.45 Miles					
			Recreation	Fully Supporting But Threatened			
					Fecal Coliform	H	No
ND-10130201-001-S_00	Spring Creek from its confluence with Goodman Creek downstream to its confluence with the Knife River. Located in Mercer County.	28.56 Miles					
			Recreation	Fully Supporting But Threatened			
					E. coli	H	No
ND-10130201-002-S_00	Knife River from its confluence with Antelope Creek downstream to its confluence with the Missouri River. Located in Mercer	19.83 Miles					
			Recreation	Not Supporting			
					Fecal Coliform	H	No
ND-10130201-003-S_00	Knife River from its confluence with Spring Creek downstream to its confluence with Antelope Creek. Located in Mercer County.	17.83 Miles					
			Recreation	Not Supporting			
					Fecal Coliform	H	No

Table VI-3 (cont.). 2010 List of Section 303(d) TMDL Waters for the Missouri River Basin in North Dakota.

Assessment Unit ID	AU Description	AU Size	Designated Use	Use Support	Impairment	TMDL Priority	5A
ND-10130201-014-S_00	Antelope Creek from its confluence with East Branch Antelope Creek Watershed (ND-10130201-016-S) downstream to its confluence with the Knife River. Located in Mercer County.	8.57 Miles					
			Recreation	Not Supporting	Fecal Coliform	L	No
ND-10130201-016-S_00	East Branch Antelope Creek upstream from Antelope Creek, including tributaries. Located in Mercer County.	83.04 Miles					
			Recreation	Not Supporting	Fecal Coliform	L	No
ND-10130201-017-S_00	Antelope Creek main stem downstream to its confluence with East Branch Antelope Creek Watershed (ND-10130201-016-S). Located in Mercer County.	21.32 Miles					
			Recreation	Not Supporting	Fecal Coliform	L	No
ND-10130201-023-S_00	Spring Creek from its confluence with North Creek downstream to its confluence with Goodman Creek. Located in Mercer and Dunn Counties.	36.36 Miles					
			Recreation	Fully Supporting But Threatened	E. coli	H	No
ND-10130201-028-S_00	Spring Creek from Lake Ilo downstream to its confluence with North Creek. Located in Dunn County.	23.3 Miles					
			Recreation	Fully Supporting But Threatened	E. coli	H	No
ND-10130201-035-S_00	Knife River from its confluence with Coyote Creek downstream to its confluence with Spring Creek. Located in Mercer County.	14.65 Miles					
			Recreation	Fully Supporting But Threatened	Fecal Coliform	H	No
ND-10130201-036-S_00	Brush Creek and tributaries, located in Mercer and Oliver Counties.	61.06 Miles					
			Recreation	Fully Supporting But Threatened	Fecal Coliform	H	No
ND-10130201-037-S_00	Coyote Creek from its confluence with Beaver Creek downstream to its confluence with the Knife River. Located in Mercer	17.24 Miles					
			Recreation	Fully Supporting But Threatened	Fecal Coliform	H	No

Appendix D


Water Quality Sampling Stations
ND-10130201-001-S_00
ND-10130201-020-S_00
ND-10130201-023-S_00
ND-10130201-028-S_00
0
2
4
Miles
385416
Dunn Center
385417
Dodge
380139
Zap
380060
Beulah
DUNN CO.
MERCER CO.
Lake Sakakawea
8
200
1806
49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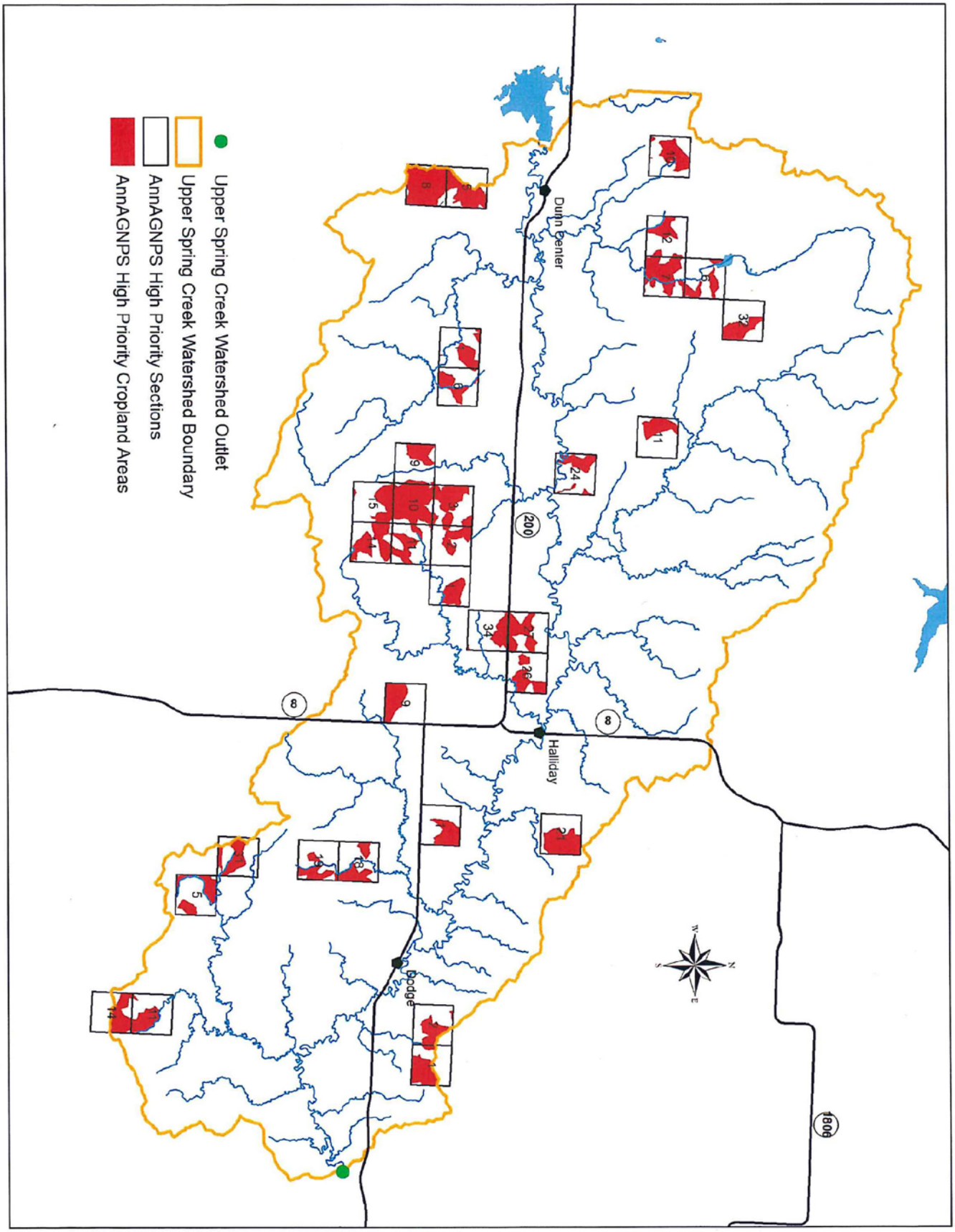
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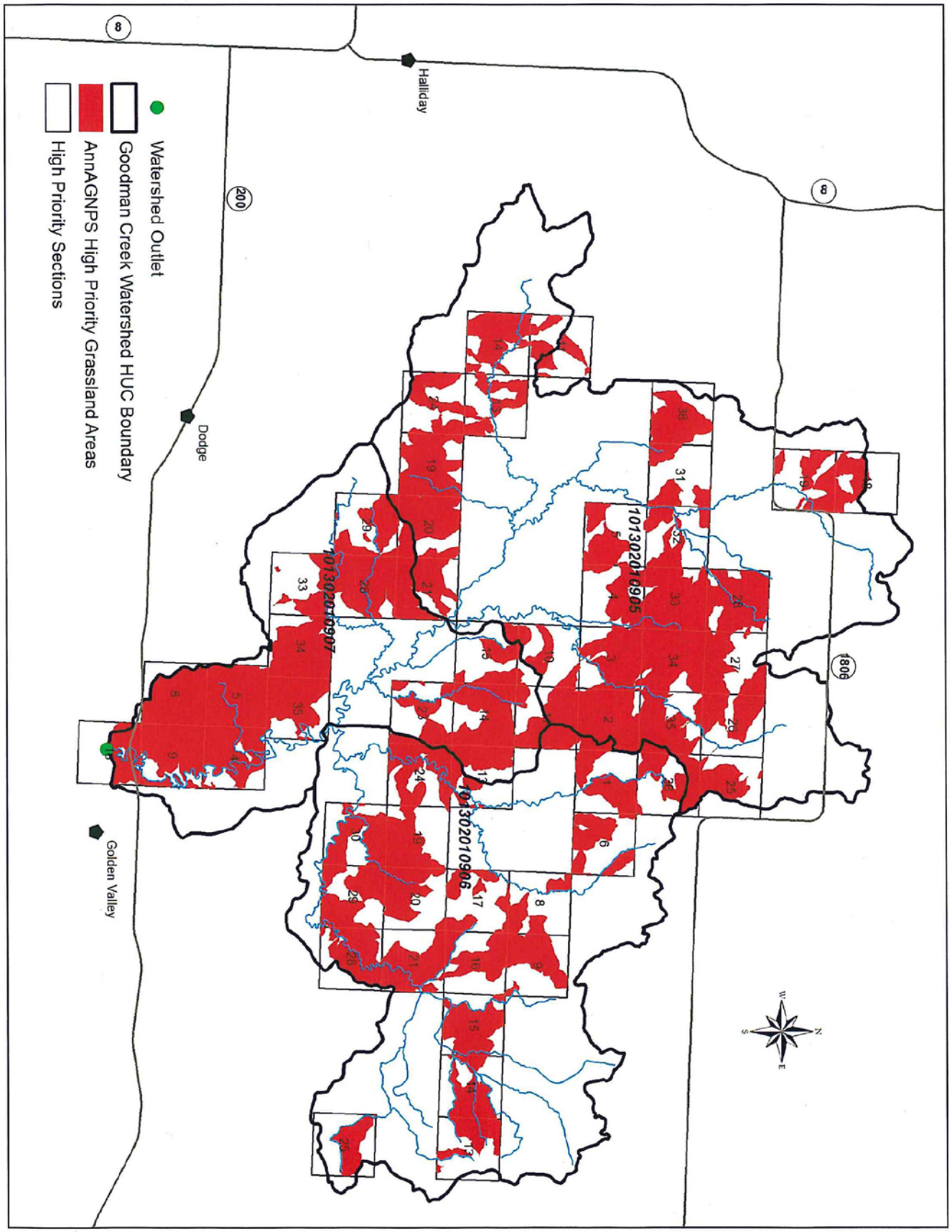
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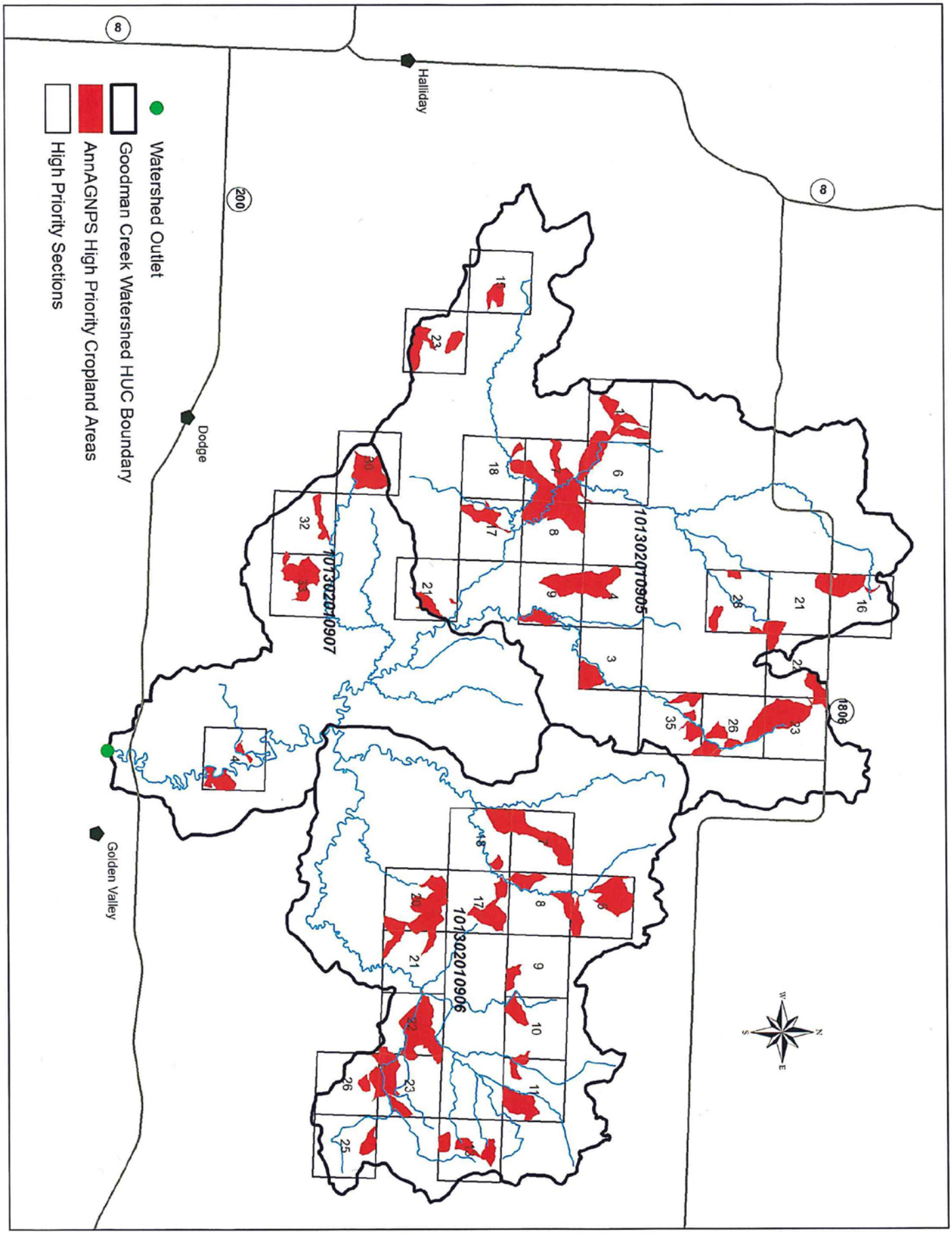
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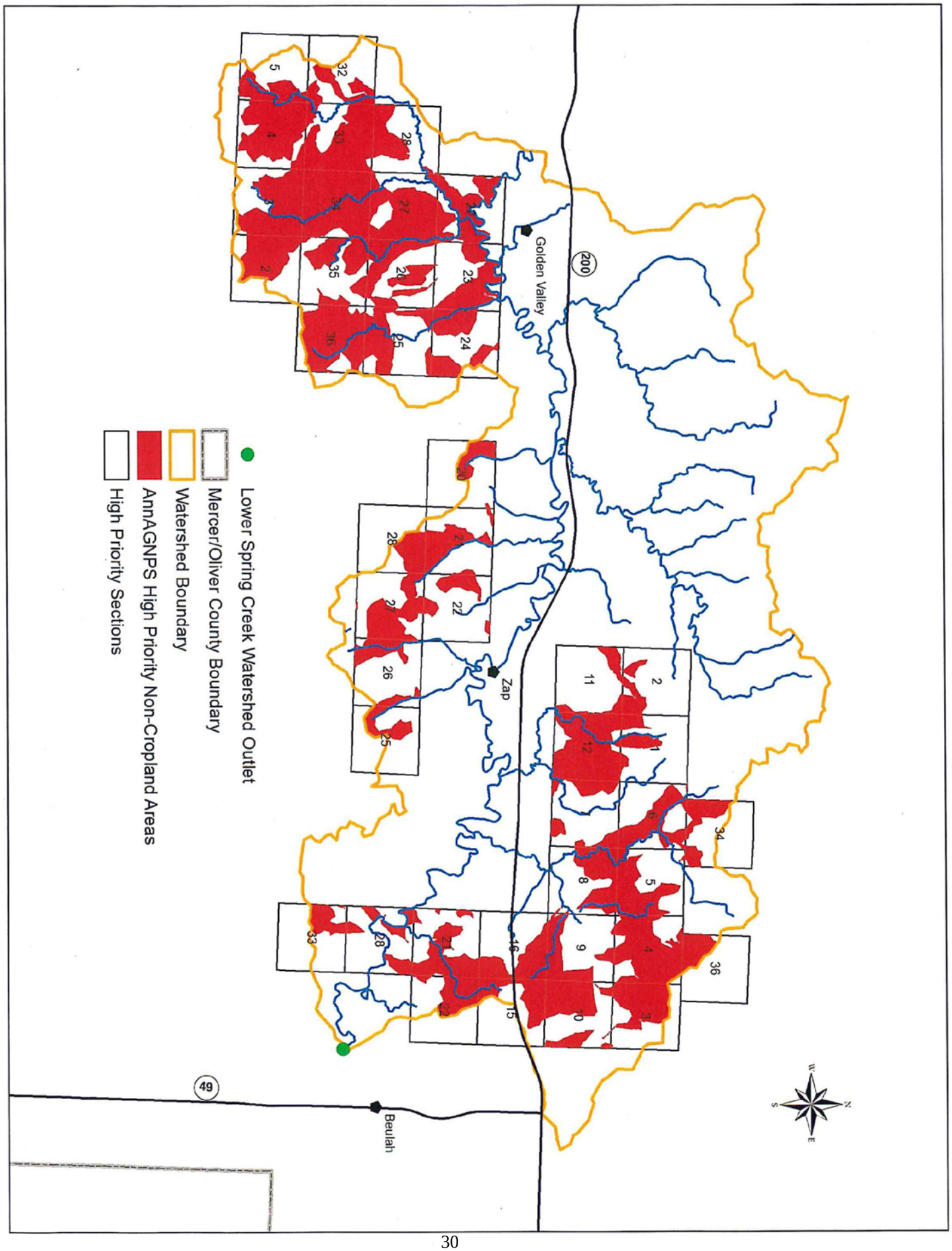
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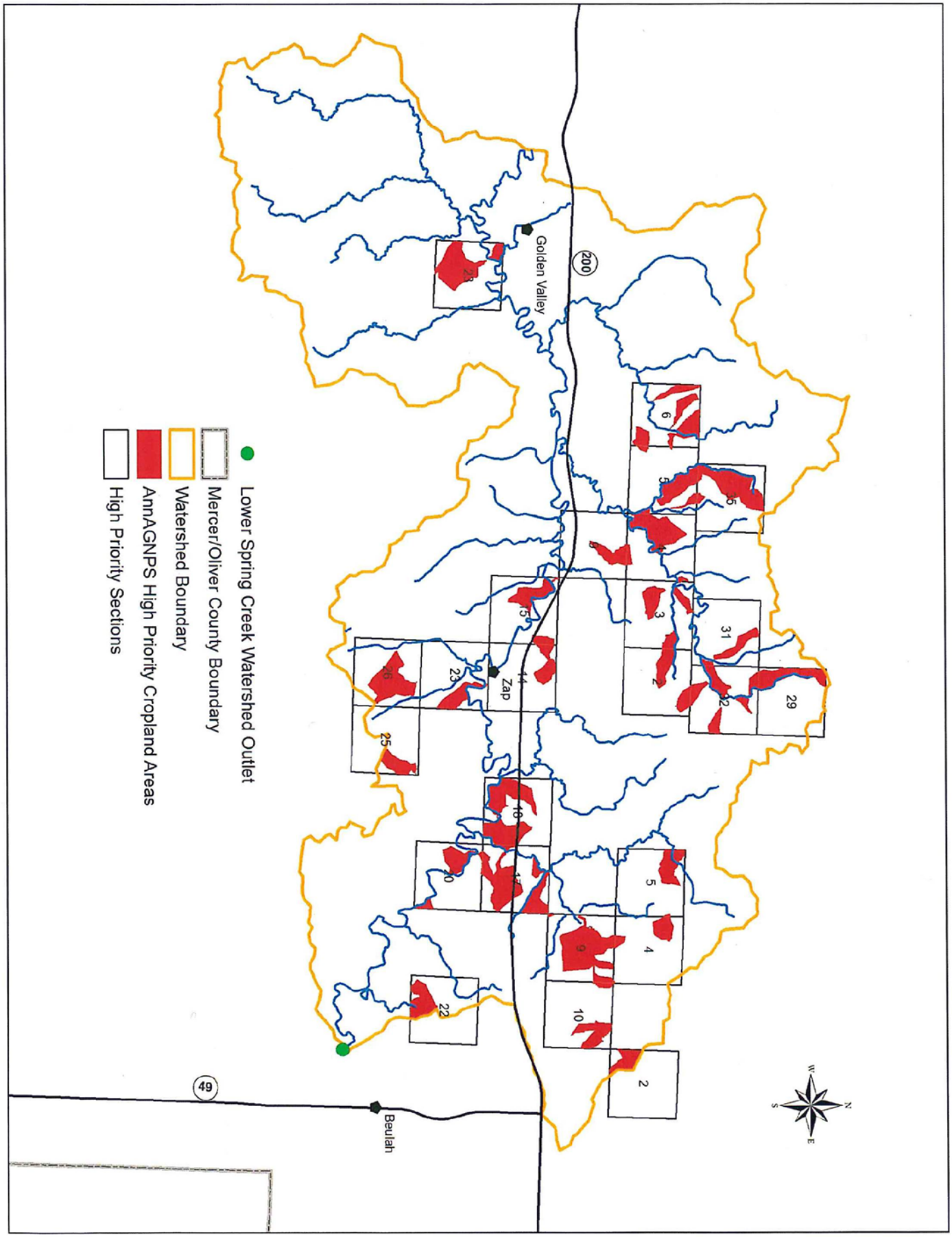
Lower Spring Creek Watershed Outlet
Mercer/Oliver County Boundary
Watershed Boundary
AnnAGNPS High Priority Non-Cropland Areas
High Priority Sections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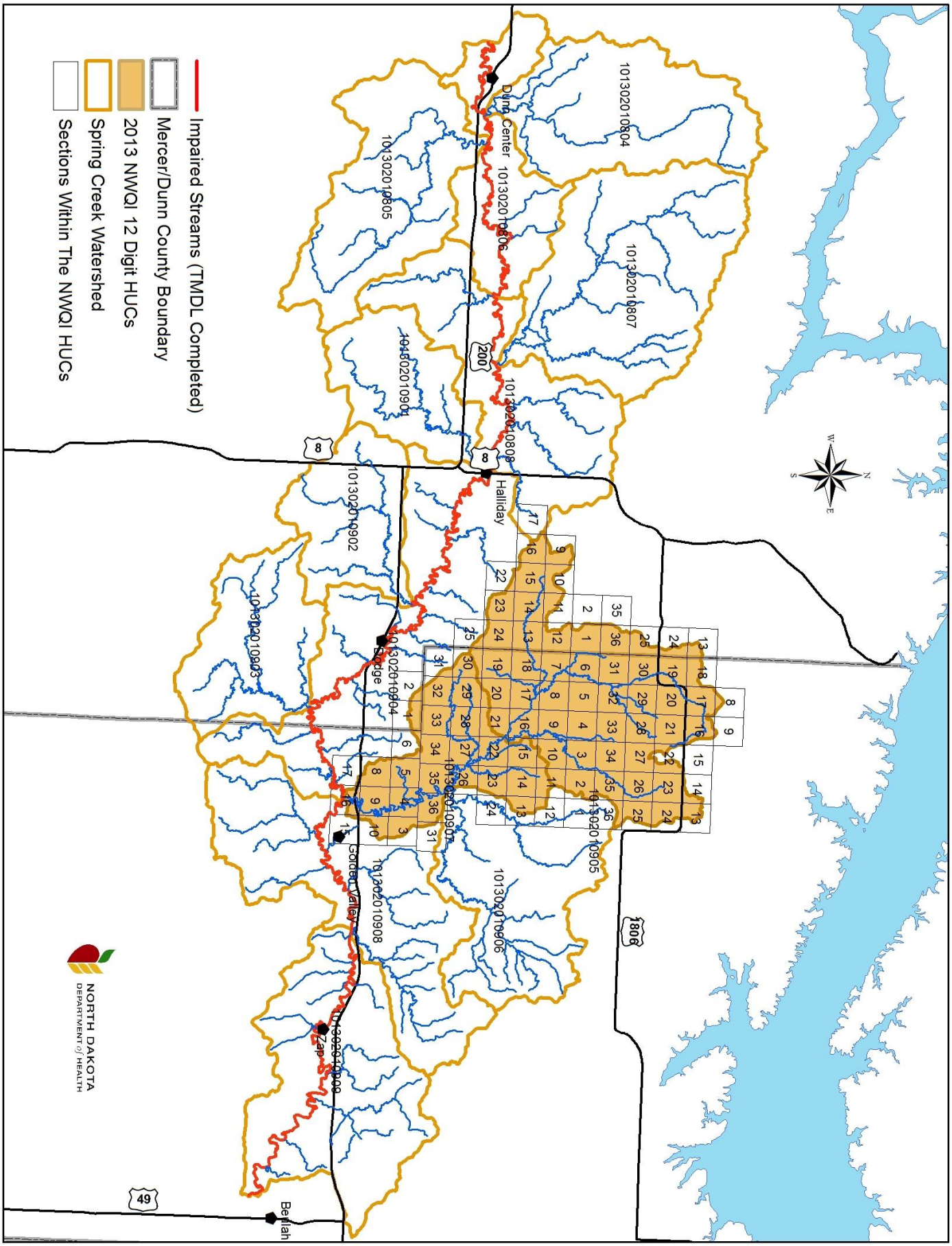
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Mercer/Dunn County Boundary
2013 NWQI 12 Digit HUCs
Spring Creek Watershed
Sections Within The NWQI HUCs
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NORTH DAKOTA
DEPARTMENT of HEALTH

Appendix E

DUNN COUNTY
WATER RESOURCE DISTRICT

INGVALD PAULSON, CHAIRMAN, 9371 19 ST SW, TAYLOR, ND 58656 701-974-3331
TIM WASEM, 8730 1 ST SW, HALLIDAY, ND 58636 701-938-4376
SCOTT LAZORENKO, 511 100TH AVE SW, KILLDEER ND 58640 701-764-6373
REINHARD HAUCK, SECRETARY – TREASURER, 851 97th Ave SW, Dunn Center, ND 58626
701-548-8287

September 23, 2014

MERCER COUNTY SOIL CONSERVATION DISTRICT
1400 HWY 49 N #102
BEULAH ND 58523

Dear Sirs:

The Dunn County Water Resource District has agreed to support the Spring Watershed Project both technically and financially.

Reinhard Hauck
Sec/Treas.

Mercer County Water Resource District

Ph. 701-748-2206
Fax 701-748-6200

P.O. Box 488
Hazen, ND 58545

September 15, 2014

Kasha Hansen
Mercer County SCD
1400 Hwy 49 N
Beulah, ND 58523

Re: Spring Creek Watershed Project

Dear Mrs. Hansen:

I write to confirm for you the actions of the Mercer County Water Resource Board taken on September 11, 2014. On that date, the Board decided to go on record as supporting the continued level of funding for the Spring Creek Watershed Project after November 2015. They agreed to continue their current level of financial support for the next 12 months of the Assessment Project, and through the term of a Project.

Sincerely,

Greg Lange

Gregory L. Lange
Secretary

GLL/kn

USDA

United States Department of Agriculture

Farm Service Agency

Mercer County office
1400 Hwy 49 N #101
Beulah, ND 58523

Phone: (701) 873-5290
FAX: (855) 813-6267

September 18, 2014

Mercer County Soil Conservation District
Spring Creek Watershed Project
% Kasha Hansen
1400 Hwy 49 N #102
Beulah, ND 58523

Dear Ms. Hansen:

Thank you for inviting us to comment on your Spring Creek Watershed Project. The Mercer County Farm Service Agency is interested in supporting natural resource projects like yours that address water quality needs and concerns for Mercer County. We can provide financial assistance to landowners through a variety of practices under the Continuous CRP Program. Our staff will work collaboratively with you to assess watershed needs and assist landowners in this area. Landowners can apply for this assistance at their local county FSA office.

The Mercer County contact for the CRP Program is Toni Moore. Toni can assist you in explaining the different practices available under the Continuous CRP Provisions. Please let us know if we can be of further assistance in advancing your Project.

Sincerely,

Alison Hoffer

Alison Hoffer
County Executive Director

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Dakota Prairies Resource Conservation & Development

919 S. Seventh St., Suite 310
Bismarck ND 58504
Phone: 701-250-4222 or 701-226-8409 (cell)
Web site: www.ndrcd.org
Email: dakotaprairiesrcd@gmail.com

Sept. 23, 2014

Greg Sandness, NSP Coordinator
North Dakota Department of Health/Water Quality
918 E. Divide Ave., 4th Floor
Bismarck, ND 58501

Dear Mr. Sandness,

Dakota Prairies RC&D Council, strongly supports the Mercer County Soil Conservation District's 319 grant application to help fund phase two of its Spring Creek Watershed Program.

This new application for funding to help repair riparian areas is critical to controlling NSP water pollution.

Protection of our natural resources, especially water, is a priority for our RC&D Council area that includes Mercer County. Protecting water resources and improving water quality is addressed in the long-range plan of Dakota Prairies RC&D.

As a 319 Program grant applicant, Dakota Prairies also pledges to collaborate with the Mercer County SCD on our work plan to bring vital training and education to an 18-county area in south central and southwestern North Dakota. The Mercer County SCD is one of the member/partners of Dakota Prairies and we will work together to share information and learnings.

Again, we support the application of Mercer County SCD for an EPA 319 watershed grant to fund the plan of work for the Spring Creek Watershed in Mercer and Dunn counties.

Sincerely,

Susan L Davis

Susan L. Davis
Executive Director

The Programs and Services of Dakota Prairies RC&D are Provided on An Equal Opportunity Basis.

NDSU
Extension Service

NORTH DAKOTA STATE UNIVERSITY

Mercer County
1400 Highway 49 N., #103
Beulah, ND 58523-6066

Tel. 701.873.5195
Fax 701.873.5993
NDSU.Mercer.Extension@ndsu.edu
www.ag.ndsu.edu/MercerCountyExtension
www.ag.ndsu.edu/extension

September 15, 2014

Watershed Conservationist
Mercer County Soil Conservation District
1400 Hwy 49 N #102
Beulah, ND 58523

Dear Sir:

The Mercer County NDSU Extension Service is in full support of the Phase Two Spring Creek Watershed Project. This watershed project has been very well received by the producers in the Spring Creek drainage area.

It is my hope that funding for this watershed project will continue for an additional five years.

Sincerely,

Craig Askim, Extension Agent
Agriculture and Natural Resources

CA/ce

County Commissions, North Dakota State University and U.S. Department of Agriculture Cooperating
NDSU is an equal opportunity institution

Dunn County Soil Conservation District
PO Box 359
Killdeer, ND 58640
(701) 764-5646 ext 3

July 28, 2010

Mercer County Soil Conservation District
1400 Hwy 49 N #2
Beulah, ND 58523-6065

Mercer County Soil Conservation District:

On behalf of the Dunn County Soil Conservation District, I am writing this letter in support of the Spring Creek Watershed Project for a five year project.

The District will support the Spring Creek Watershed Project with technical and financial assistance.

We look forward to seeing this project progress and succeed over the years.

Sincerely,

Alexander Lazorenko

The Dunn County Soil Conservation Board

All programs and services of the Dunn County Soil Conservation District are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Larry Knudsvig	Alex Lazorenko	James Danks	Gordon Kadrmas	Frank Karsky Jr.
Chairman	Vice Chairman	Member	Member	Member
Dunn Center	Killdeer	Mandaree	Dickinson	Dickinson

NORTH DAKOTA FOREST SERVICE

"To care for, protect and improve forest and natural resources to enhance the quality of life for present and future generations."

August 3, 2010

Kasha Hansen, Watershed Coordinator
Mercer County Soil Conservation District
1400 Highway 49 North #102
Beulah, ND 58523-6065

Re: Spring Creek Watershed

Dear Kasha,

We are pleased to provide a letter of support for the Spring Creek Watershed Project. The project will be instrumental in addressing water quality needs and concerns in Mercer County. Staff from the North Dakota Forest Service are available to provide technical assistance through our Forest Stewardship Program to landowners interested in restoring riparian areas and applying conservation measures. Our staff will work collaboratively with you to assess watershed needs and implement forestry best management practices.

Please feel free to contact Trent Bristol, Stewardship Specialist, North Dakota Forest Service, 916 East Interstate Avenue, Bismarck, ND 58503, Telephone 701-328-9916. Trent can assist you in writing forest stewardship management plans for landowners and in applying for cost-share aligned with a variety of conservation forestry initiatives.

Please feel free to contact my office if we can be of further assistance in advancing the Spring Creek Watershed Project.

Sincerely,

Larry A. Kotchman, State Forester

cc: Trent Bristol, Stewardship Forester
Thomas Claeys, Forestry and Fire Management Team Leader

State Forester **Molberg Forestry Center** **307 First Street East** **Bottineau, ND 58318-1100**
Tel: (701) 228-5422 • Fax: (701) 228-5448 • E-mail: forest@nd.gov • www.nd.gov/forest

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
GARRISON PROJECT OFFICE
201 1ST STREET, PO BOX 527
RIVERDALE, NORTH DAKOTA 58565-0527

July 30, 2010

Natural Resources Section

Mrs. Kasha Hansen
Watershed Conservationist
Mercer County Soil Conservation District
1400 Hwy 49 N #102
Beulah, ND 58523

Dear Mrs. Hansen,

We have received your request for a letter of support for the Spring Creek watershed to address natural resource concerns. The U.S. Army Corps of Engineers is interested in supporting projects that will reduce sedimentation flows into our reservoirs, improve water quality and ultimately reduce the potential risk of flooding, which is inherent to our mission. Your collaborative efforts to assess watershed needs and implement best management practices will help restore the natural function of the watershed. We can provide technical assistance on flood related matters should the need arise and look forward to working with your agency to better serve our customers.

Sincerely,

Todd J. Lindquist
Operations Project Manager

Appendix F

Water Quality Monitoring Results for the Spring Creek Watershed Implementation Project

Final: September 2014

Prepared for:
Mercer County SCD
1400 Highway 49th North, #102
Beulah, ND 58523

Prepared by:
Paul Olson
ND Department of Health
Division of Water Quality
Gold Seal Center, 4th Floor
918 East Divide Avenue
Bismarck, ND 58501-1947

Water Quality Monitoring Results for the Spring Creek Watershed Implementation Project

Jack Dalrymple, Governor
Terry Dwelle, M.D., State Health Officer

North Dakota Department of Health
Division of Water Quality
Gold Seal Center, 4th Floor
918 East Divide Avenue
Bismarck, ND 58501-1947
701.328.5210

Table of Contents

List of Figures ii
List of Tables ii

1.0 Background and Overview 1
1.1 Monitoring Goals 2
1.2 Water Quality Monitoring Locations 2

2.0 Water Quality Results by Monitoring Station 2
2.1 Station 385416 3
2.2 Station 385417 5
2.3 Station 380139 7
2.4 Station 380060 9

3.0 Attainment of Beneficial Uses and/or Parameter Targets 11

List of Figures

Figure 1. Location of the Spring Creek Watershed and Water Quality Monitoring Locations 1
Figure 2. Trends in E. coli Bacteria at Station 385416 5
Figure 3. Trends in E. coli Bacteria at Station 385417 7
Figure 4. Trends in E. coli Bacteria at Station 380139 9
Figure 5. Trends in E. coli Bacteria at Station 380060 11

List of Tables

Table 1. Water Quality Monitoring Stations in the Spring Creek Watershed 2
Table 2. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 385416 4
Table 3. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status.for Sampling Site 385417 6
Table 4. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380139 8
Table 5. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380060 10

1.0 Background and Overview

The Spring Creek watershed is located in the eastern half of Dunn County and the western half of Mercer County. The Spring Creek Watershed is 375,351 acres in size and this project will address 293,849 acres of the watershed below Lake Ilo, with 175,837 acres in Dunn County and 118,012 acres in Mercer County. Spring Creek originates in the center of Dunn County and flows through the center portion of Mercer County where it confluences with the Knife River (Figure 1). Spring Creek is identified on the "North Dakota 2012 Section 303(d) List of Impaired Waters" as fully supporting, but threatened recreational uses due to E. coli bacteria. An E. coli bacteria Total Maximum Daily Load (TMDL) has all ready been written and finalized in September 2011. The data collected during this project was used to track attainment and trends toward the goal of the Spring Creek Watershed Implementation Project. The long term goal of the project is the restoration of the recreational use of Spring Creek and its tributaries within the project area.

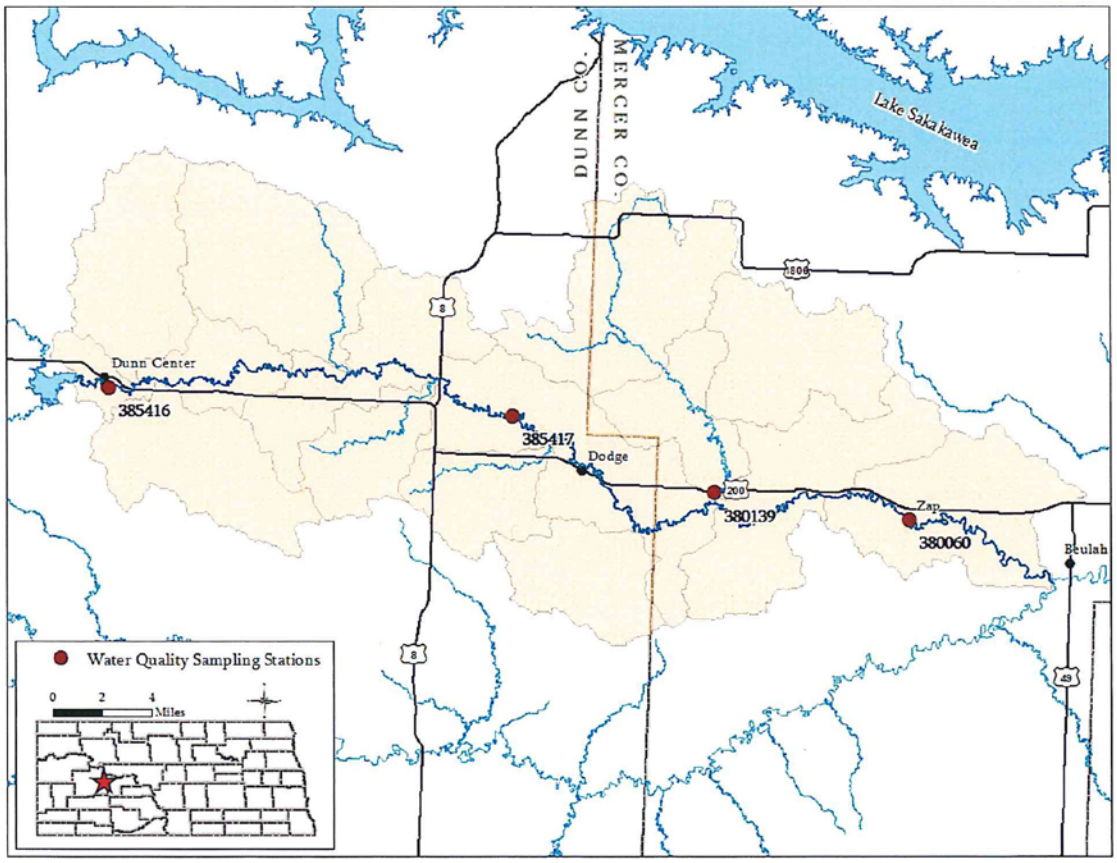

Figure 1. Location of the Spring Creek Watershed and the Water Quality Monitoring Locations

1.1 Monitoring Goals

In response to the completed E. coli bacteria TMDL for Spring Creek, and the documented bacteria impairments, the Mercer County Soil Conservation District (SCD) initiated an implementation project. The primary goal of the monitoring component of the project is to determine the effectiveness of best management practices (BMPs) (e.g., proper riparian area grazing management and ag waste system installation) in reducing in-stream E. coli bacteria concentrations, thereby restoring the recreational uses of Spring Creek.

To define success, the SCD set specific water quality improvement targets for the Spring Creek watershed. The E. coli bacteria State water quality standard of 126 colony forming units (CFUs) per 100 milliliters (mL) is the current water quality standard for bacteria. Thus, the target for this project is 126 CFUs/100 mL. In addition, no more than ten percent of samples collected for E. coli bacteria should exceed 409 CFUs/100 mL. The E. coli bacteria standard applies only during the recreation season from May 1 to September 30.

1.2 Water Quality Monitoring Locations

Four stream sites were selected for data collection (Figure 1, Table 1). Water quality grab samples were collected for E. coli bacteria during the recreational use season (May 1 through September 30). Sampling frequency for the sampling sites was scheduled to occur at a minimum of five times per month.

Table 1. Water Quality Monitoring Stations in the Spring Creek Watershed

Station	Location	Years	Samples
385416	Spring Creek	2008-2009 and 2012-2014	109
385417	Spring Creek	2008-2009 and 2012-2014	115
380139	Goodman Creek	2008-2009 and 2012-2014	116
380060	Spring Creek	2008-2009 and 2012-2014	115

2.0 Water Quality Results by Monitoring Station

The water quality monitoring station results (Sections 2.1 through 2.4) are broken down into two basic parts consisting of: (1) the 12 digit hydrologic unit where the monitoring station is located and (2) trends in E. coli bacteria counts and the relationship to the beneficial use recreation.

Recreation use includes primary contact activities such as swimming and wading and secondary contact activities such as boating, fishing, and wading. Recreation use in rivers and streams is considered fully supporting where there is little or no risk of illness through either primary or secondary contact with the water. The State's recreation use support assessment methodology for rivers and streams is based on the State's numeric water quality standards for E. coli bacteria (Section 1.1).

For each assessment based solely on E. coli data, the following criteria are used:

- Assessment Criteria 1: For each assessment unit, the geometric mean of samples collected during any month for May 1 through September 30 does not exceed a density of 126 CFUs/mL. A minimum of five monthly samples is required to compute the geometric mean. If necessary, samples may be pooled by month across years.

- Assessment Criteria 2: For each assessment unit, less than 10 percent of samples collected during any month from May 1 through September 30 may exceed a density of 409 CFUs per 100 mL. A minimum of five monthly samples is required to compute the percent of samples exceeding the criteria. 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.

The recreational use assessment methodology information provided above can be found in the *North Dakota 2012 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads.*

2.1 Station 385416

Station 385416 is located one-half mile south of Dunn Center, ND and monitors the immediate upstream 12 digit HUC 101302010806 (Figure 1). In total, 109 E. coli bacteria samples were collected and analyzed from 2008-2009 and 2012-2014.

Analysis of E. coli bacteria data collected at site 385416 demonstrated that the months of May, June, August and September were fully supporting the recreational beneficial uses while July was not supporting. Data for this analysis is provided in Table 2 and Figure 2. Though recreational beneficial uses are not supporting, data suggests that E. coli bacteria concentrations have declined since the beginning of the project (Figure 2). The monthly geometric mean has declined from 175 CFU/100 mL during the assessment phase to 142 CFU/100 mL during the implementation phase for the month of July. It should also be noted that the percent exceeding 409 CFU/100 mL has declined from 25% to 0% during the same time periods.

Table 2. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 385416

385416	May		June		July		August		September	
	5/4/2008	10	6/2/2008	10	7/8/2008	380	8/4/2008	90	9/2/2008	260
	5/12/2008	10	6/9/2008	10	7/15/2008	50	8/12/2008	10	9/9/2008	40
	5/19/2008	10	6/16/2008	10	7/22/2008	20	8/18/2008	60	9/15/2008	60
	5/20/2008	30	6/23/2008	30	7/28/2008	360	8/25/2008	10	9/22/2008	10
	5/27/2008	800	6/30/2008	10	7/29/2008	10	8/4/2009	10	9/29/2008	70
	5/6/2009	10	6/1/2009	30	7/15/2009	800	8/12/2009	40	9/8/2009	80
	5/11/2009	30	6/9/2009	30	7/21/2009	70	8/18/2009	10	9/16/2009	10
	5/26/2009	410	6/16/2009	10	7/28/2009	1700	8/25/2009	10	9/22/2009	10
	5/27/2009	40	6/22/2009	30	7/10/2012	140	8/31/2009	10	9/30/2009	10
	5/8/2012	60	6/29/2009	800	7/16/2012	90	8/8/2012	40	9/12/2012	20
	5/23/2012	150	6/4/2012	30	7/23/2012	50	8/14/2012	40	9/17/2012	10
	5/30/2012	130	6/6/2012	5	7/24/2012	320	8/15/2012	80	9/18/2012	30
	5/13/2013	40	6/26/2012	20	7/25/2012	290	8/21/2012	5	9/24/2012	10
	5/14/2013	120	6/27/2012	200	7/31/2012	130	8/27/2012	5	9/26/2012	10
	5/21/2013	40	6/4/2013	140	7/15/2013	160	8/29/2012	5	9/3/2013	50
	5/12/2014	5	6/10/2013	70	7/16/2013	220	8/5/2013	120	9/18/2013	100
	5/20/2014	40	6/12/2013	50	7/17/2013	350	8/14/2013	140	9/23/2013	70
	5/20/2014	5	6/18/2013	90	7/30/2013	100	8/19/2013	40	9/25/2013	90
	5/21/2014	10	6/25/2013	360	7/31/2013	50	8/21/2013	30	9/30/2013	90
	5/28/2014	220	6/3/2014	120	7/1/2014	220	8/26/2013	130		
			6/9/2014	20	7/8/2014	140	8/27/2013	80		
			6/16/2014	150	7/9/2014	90				
			6/18/2014	260	7/15/2014	120				
			6/23/2014	180	7/22/2014	300				
					7/29/2014	100				
Geo Mean 08-09	38		24		175		19		30	
% over	22%		10%		25%		0%		0%	
Status	FST		FS		NS		FS		FS	
Geo Mean 12-14	41		74		144		35		33	
% over	0%		0%		0%		0%		0%	
Status	FS		FS		FST		FS		FS	
Overall Geo Mean	39		47		142		26		33	
% over	10%		4%		8%		0%		0%	
Status	FS		FS		NS		FS		FS	

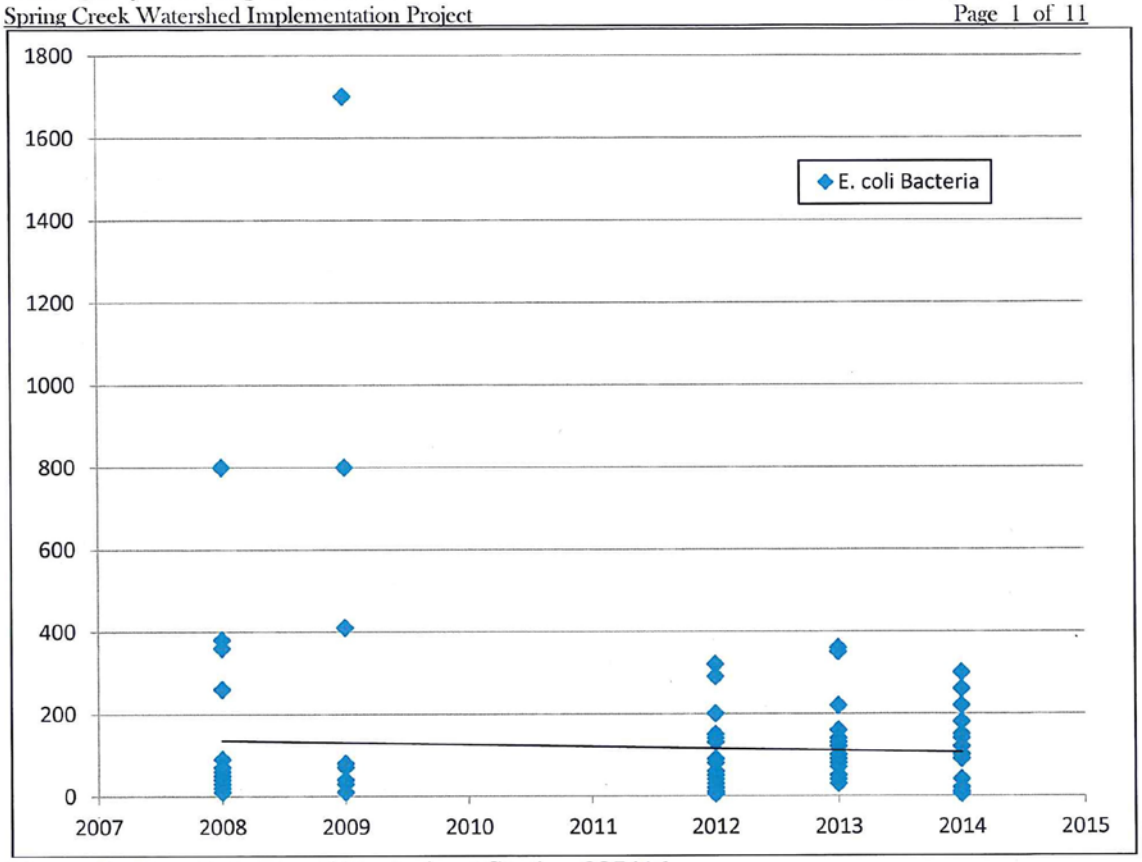

Figure 2. Trends in E. coli Bacteria at Station 385416

2.2 Station 385417

Station 385417 is located three miles west and one and one-half miles north of Dodge, ND and monitors the upstream 12 digit HUCs (Figure 1). In total, 115 E. coli bacteria samples were collected and analyzed from 2008-2009 and 2012-2014.

Analysis of E. coli bacteria data collected at site 385417 shows the site is fully supporting the recreational beneficial uses for all months except May, at which time the site had fully supporting, but threatened recreational uses. Data for this analysis is provided in Table 3 and Figure 3. While all but one month is fully supporting recreational beneficial uses, data implies that E. coli bacteria concentrations appear to be on a rising trend (Figure 3). The monthly geometric mean has increased from 33 CFU/100 mL during the assessment phase to 164 CFU/100 mL during the implementation phase for the month of May. It should be noted, while the overall support status is fully supporting, but threatened during the implementation phase, site 385417 was not supporting which would explain the increasing trends.

Table 3. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 385417

385417	May		June		July		August		September	
	5/4/2008	10	6/2/2008	70	7/8/2008	70	8/4/2008	20	9/2/2008	50
	5/12/2008	70	6/9/2008	40	7/15/2008	100	8/18/2008	50	9/9/2008	40
	5/19/2008	10	6/16/2008	10	7/22/2008	70	8/25/2008	10	9/15/2008	10
	5/20/2008	10	6/23/2008	20	7/28/2008	800	8/4/2009	210	9/22/2008	360
	5/27/2008	10	6/30/2008	50	7/29/2008	140	8/12/2009	80	9/29/2008	10
	5/4/2009	10	6/1/2009	390	7/6/2009	800	8/18/2009	30	9/8/2009	380
	5/6/2009	50	6/9/2009	1100	7/15/2009	60	8/25/2009	10	9/16/2009	10
	5/11/2009	90	6/16/2009	100	7/21/2009	20	8/31/2009	60	9/22/2009	30
	5/26/2009	380	6/22/2009	160	7/28/2009	40	8/8/2012	10	9/30/2009	10
	5/27/2009	140	6/29/2009	50	7/10/2012	30	8/14/2012	120	9/12/2012	40
	5/8/2012	310	6/4/2012	120	7/16/2012	30	8/15/2012	40	9/17/2012	30
	5/16/2012	100	6/6/2012	30	7/23/2012	50	8/21/2012	40	9/18/2012	80
	5/23/2012	600	6/26/2012	10	7/24/2012	50	8/27/2012	40	9/24/2012	10
	5/30/2012	160	6/27/2012	20	7/25/2012	40	8/29/2012	10	9/25/2012	30
	5/13/2013	20	6/4/2013	370	7/31/2012	20	8/5/2013	130	9/26/2012	30
	5/14/2013	90	6/10/2013	340	7/10/2013	270	8/14/2013	270	9/3/2013	20
	5/21/2013	2900	6/12/2013	180	7/15/2013	270	8/19/2013	90	9/18/2013	80
	5/12/2014	60	6/18/2013	120	7/16/2013	170	8/21/2013	90	9/23/2013	760
	5/20/2014	20	6/24/2013	5	7/17/2013	320	8/26/2013	170	9/24/2013	30
	5/21/2014	5	6/25/2013	100	7/30/2013	330	8/27/2013	130	9/25/2013	40
	5/27/2014	1000	6/3/2014	210	7/31/2013	370			9/30/2013	40
	5/28/2014	4200	6/9/2014	170	7/1/2014	200				
			6/16/2014	160	7/8/2014	110				
			6/18/2014	60	7/9/2014	150				
			6/23/2014	160	7/15/2014	40				
					7/22/2014	50				
					7/29/2014	30				
Geo Mean 08-09	33		79		105		33		35	
% over	0%		10%		22%		0%		0%	
Status	FS		FS		FST		FS		FS	
Geo Mean 12-14	164		82		91		64		44	
% over	33%		0%		0%		0%		8%	
Status	NS		FS		FS		FS		FS	
Overall Geo Mean	80		81		96		51		40	
% over	18%		4%		7%		0%		5%	
Status	FST		FS		FS		FS		FS	

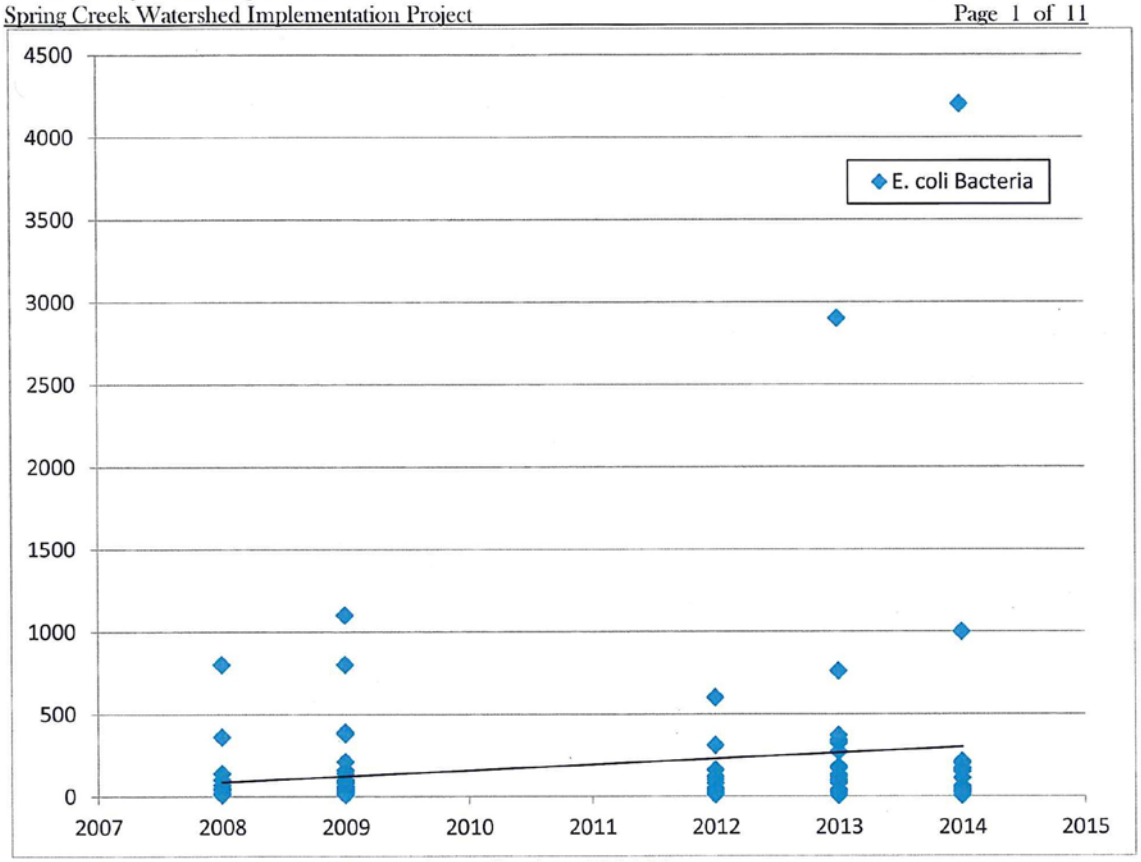

Figure 3. Trends in E. coli Bacteria at Station 385417

2.3 Station 380139

Station 380139 is located two miles west of Golden Valley, ND and monitors the entire Goodman Creek watershed including 12 digit HUCs 101302010905, 101302010906, and 101302010907 (Figure 1). In total, 116 E. coli bacteria samples were collected and analyzed from 2008-2009 and 2012-2014.

Analysis of E. coli bacteria data collected at site 380139 indicates the months of August and September were fully supporting the recreational beneficial uses while May was fully supporting, but threatened. The geometric mean and percent exceeded calculations for beneficial uses in the month of June and July were not supporting recreational uses. Data for this analysis is provided in Table 4 and Figure 4. Recreational beneficial uses are not supporting and data suggests that E. coli bacteria concentrations have been increasing since the beginning of the project (Figure 4). The monthly geometric mean has increased from 169 CFU/100 mL during the assessment phase to 278 CFU/100 mL during the implementation phase and 170 CFU/100 mL during the assessment phase to 325 CFU/100 mL during the implementation phase for the months of June and July, respectively.

Table 4. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380139

380139	May		June		July		August		September	
	5/4/2008	10	6/2/2008	260	7/8/2008	10	8/4/2008	40	9/2/2008	170
	5/12/2008	10	6/9/2008	110	7/15/2008	10	8/12/2008	10	9/9/2008	10
	5/19/2008	30	6/16/2008	100	7/22/2008	200	8/18/2008	10	9/15/2008	10
	5/20/2008	10	6/23/2008	20	7/28/2008	800	8/25/2008	50	9/22/2008	10
	5/27/2008	10	6/30/2008	30	7/29/2008	220	8/4/2009	110	9/29/2008	10
	5/4/2009	10	6/1/2009	50	7/6/2009	140	8/12/2009	240	9/8/2009	250
	5/6/2009	10	6/9/2009	800	7/15/2009	1100	8/18/2009	110	9/16/2009	40
	5/11/2009	10	6/16/2009	230	7/21/2009	800	8/25/2009	10	9/22/2009	50
	5/26/2009	310	6/22/2009	8000	7/28/2009	270	8/31/2009	10	9/30/2009	30
	5/27/2009	250	6/29/2009	150	7/10/2012	90	8/8/2012	30	9/12/2012	80
	5/8/2012	70	6/4/2012	570	7/16/2012	160	8/14/2012	50	9/17/2012	10
	5/16/2012	70	6/6/2012	8000	7/23/2012	60	8/15/2012	160	9/18/2012	20
	5/23/2012	10	6/26/2012	210	7/24/2012	130	8/21/2012	50	9/24/2012	10
	5/30/2012	150	6/26/2012	300	7/25/2012	330	8/27/2012	40	9/25/2012	5
	5/13/2013	20	6/27/2012	130	7/31/2012	30	8/29/2012	140	9/26/2012	5
	5/14/2013	110	6/4/2013	240	7/10/2013	210	8/5/2013	270	9/3/2013	5
	5/21/2013	4200	6/10/2013	180	7/15/2013	2500	8/14/2013	130	9/18/2013	80
	5/12/2014	20	6/12/2013	80	7/16/2013	3200	8/19/2013	90	9/23/2013	230
	5/21/2014	5	6/18/2013	120	7/17/2013	5300	8/21/2013	140	9/24/2013	170
	5/27/2014	1600	6/24/2013	60	7/30/2013	270	8/26/2013	180	9/25/2013	110
	5/28/2014	480	6/25/2013	300	7/31/2013	410	8/27/2013	50	9/30/2013	70
			6/3/2014	160	7/1/2014	210				
			6/9/2014	420	7/8/2014	500				
			6/16/2014	160	7/9/2014	680				
			6/18/2014	330	7/15/2014	450				
			6/23/2014	1300	7/22/2014	220				
					7/29/2014	210				
Geo Mean 08-09	22		169		170		34		31	
% over	0%		20%		33%		0%		0%	
Status	FS		NS		NS		FS		FS	
Geo Mean 12-14	94		278		325		99		30	
% over	27%		25%		39%		0%		0%	
Status	FST		NS		NS		FS		FS	
Overall Geo Mean	47		230		262		59		30	
% over	14%		23%		37%		0%		0%	
Status	FST		NS		NS		FS		FS	

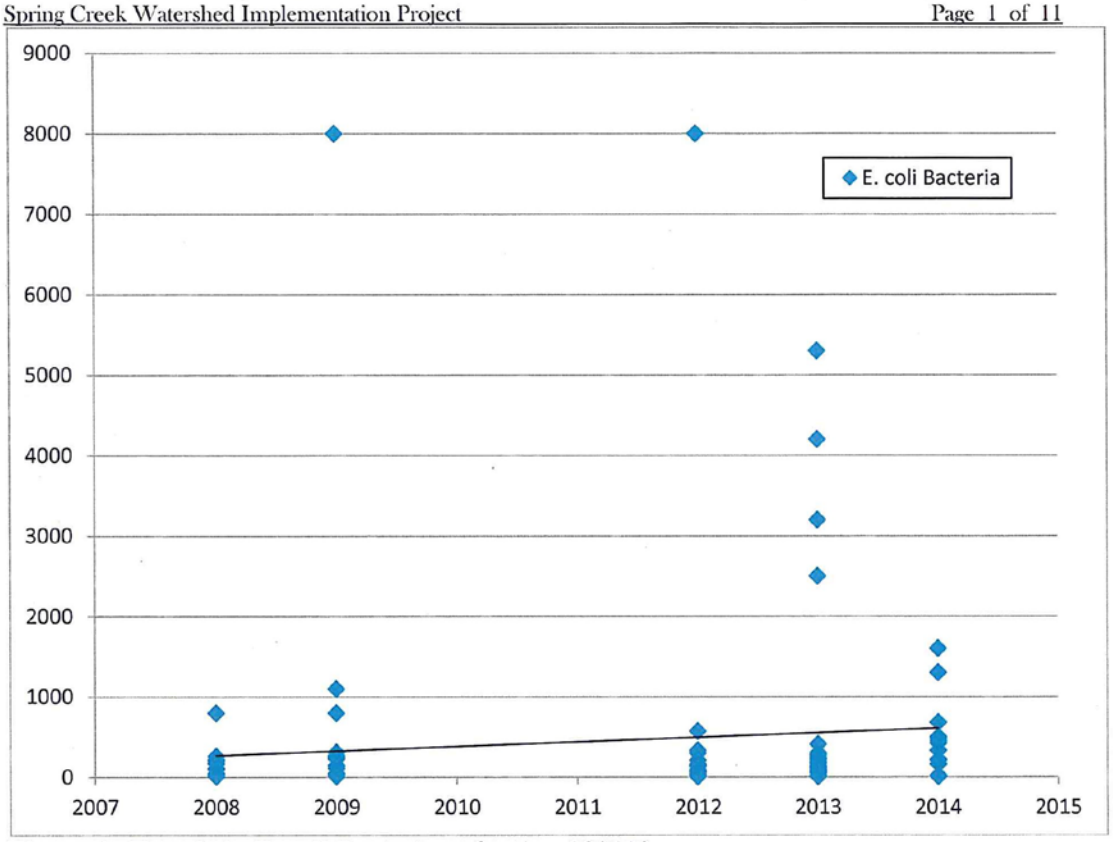

Figure 4. Trends in E. coli Bacteria at Station 380139

2.4 Station 380060

Station 380060 is located at bridge in Zap, ND and monitors the entire Spring Creek watershed (Figure 1). In total, 115 E. coli bacteria samples were collected and analyzed from 2008-2009 and 2012-2014.

Analysis of E. coli bacteria data collected at site 380060 indicates the months of August and September were fully supporting the recreational beneficial uses while May was fully supporting, but threatened. The geometric mean and percent exceeded calculations for beneficial uses in the month of June and July were not supporting recreational uses. Data for this analysis is provided in Table 5 and Figure 5. Recreational beneficial uses are not supporting and data suggests that E. coli bacteria concentrations have been increasing since the beginning of the project (Figure 5). The monthly geometric mean has increased from 78 CFU/100 mL during the assessment phase to 179 CFU/100 mL during the implementation phase for the month of July.

Table 5. E. coli Bacteria 30-day Geometric Mean, Percent Exceedance of 409 CFU and Support Status for Sampling Site 380060

380060	May		June		July		August		September	
	5/4/2008	10	6/2/2008	70	7/8/2008	60	8/4/2008	90	9/2/2008	90
	5/12/2008	20	6/9/2008	90	7/15/2008	80	8/12/2008	100	9/9/2008	30
	5/19/2008	100	6/16/2008	160	7/22/2008	150	8/18/2008	10	9/15/2008	40
	5/20/2008	120	6/23/2008	20	7/28/2008	800	8/25/2008	20	9/22/2008	30
	5/27/2008	160	6/30/2008	10	7/29/2008	240	8/4/2009	130	9/29/2008	380
	5/4/2009	10	6/1/2009	60	7/6/2009	50	8/12/2009	250	9/8/2009	90
	5/6/2009	10	6/9/2009	1100	7/15/2009	20	8/18/2009	60	9/16/2009	120
	5/11/2009	20	6/16/2009	1700	7/21/2009	40	8/25/2009	60	9/22/2009	100
	5/26/2009	1400	6/22/2009	2400	7/28/2009	40	8/31/2009	40	9/30/2009	30
	5/27/2009	100	6/29/2009	60	7/10/2012	140	8/8/2012	130	9/12/2012	130
	5/8/2012	240	6/4/2012	410	7/16/2012	70	8/14/2012	100	9/17/2012	250
	5/16/2012	250	6/6/2012	400	7/23/2012	60	8/15/2012	70	9/18/2012	140
	5/23/2012	240	6/26/2012	90	7/24/2012	190	8/21/2012	150	9/24/2012	20
	5/30/2012	360	6/27/2012	70	7/25/2012	30	8/21/2012	90	9/25/2012	5
	5/13/2013	20	6/4/2013	280	7/31/2012	10	8/29/2012	160	9/26/2012	20
	5/14/2013	110	6/10/2013	230	7/10/2013	3100	8/5/2013	100	9/3/2013	10
	5/21/2013	1300	6/12/2013	90	7/15/2013	350	8/14/2013	90	9/18/2013	150
	5/12/2014	10	6/18/2013	20	7/16/2013	260	8/19/2013	90	9/23/2013	350
	5/20/2014	10	6/24/2013	50	7/17/2013	370	8/26/2013	80	9/24/2013	50
	5/21/2014	5	6/25/2013	120	7/30/2013	80	8/27/2013	30	9/25/2013	230
	5/27/2014	770	6/3/2014	240	7/31/2013	140			9/30/2013	30
	5/28/2014	1100	6/9/2014	800	7/1/2014	400				
			6/16/2014	210	7/8/2014	160				
			6/18/2014	70	7/9/2014	150				
			6/23/2014	160	7/15/2014	170				
					7/22/2014	4300				
					7/29/2014	130				
Geo Mean 08-09	50		142		78		56		70	
% over	10%		30%		10%		0%		0%	
Status	FS		NS		FS		FS		FS	
Geo Mean 12-14	117		147		179		92		59	
% over	25%		13%		11%		0%		0%	
Status	FST		NS		NS		FS		FS	
Overall Geo Mean	80		145		139		75		63	
% over	18%		20%		11%		0%		0%	
Status	FST		NS		NS		FS		FS	

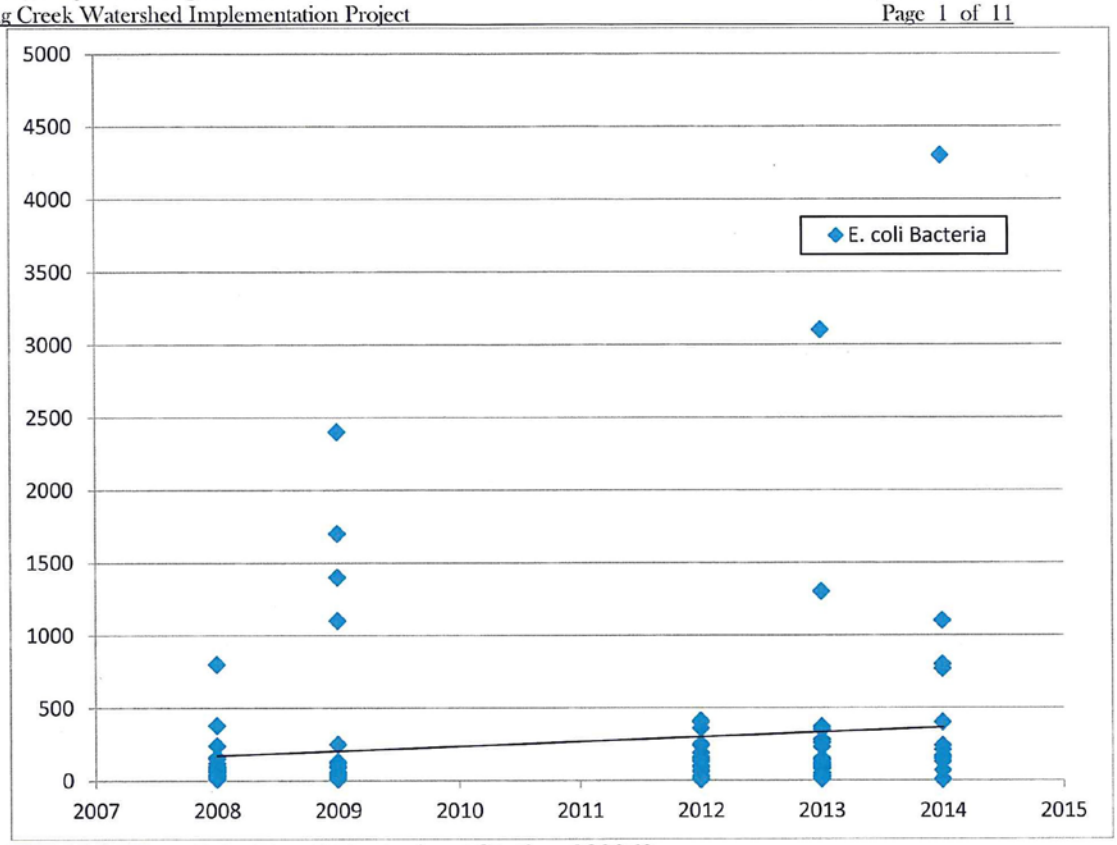

Figure 4. Trends in E. coli Bacteria at Station 380060

3.0. Attainment of Beneficial Uses and/or Parameter Targets

The goal of the Spring Creek Watershed Implementation Project was to achieve fully supporting status for the recreational uses on the portion of Spring Creek from just below Lake Ilo downstream to its confluence with the Knife River. To achieve this goal, E. coli bacteria concentration targets at all sites had to be at or below a 30-day geometric mean of 126 CFU/100 mL with less than ten percent of the samples exceeding 409 CFU/100 mL.

The Spring Creek Watershed Implementation Project did not attain its goal of recreational uses at any of the three sites. Sampling sites 385416, 380139 and 380060 were not supporting recreational uses at least one month during the recreational season. Site 385417 was fully supporting recreational uses for all months except May when the recreational uses at the site were fully supporting, but threatened. Site 385417 was fully supporting for all months but May when 18 percent of the samples exceeded 409 CFU/100 mL.

Despite the shortfalls in attaining fully supporting status data showed varied levels of E. coli bacteria throughout the watershed. All sites experienced periodic elevated levels of E. coli bacteria in excess of state water quality standards. There were large peaks in E. coli bacteria concentrations at all sites, with the exception of 385417, during the months of June and July. Excluding these concentration peaks, there were no significant trends identified that could be attributed to an explanatory variable.

Appendix G

Completed BMPs

Cultural	5	
Tanks	15	
Pipelines	33,761	
Wells	12	
Fence	19,622	
Trees	11,391	
Elec hook	5	
Fab Wind	1	
Solar	1	
forage planting	884	
60% cost share paid		$ 207,349.87

Planned BMPs

Cultural	1	
Tanks	16	
Pipelines	11150	
Wells	0	
Fence	19000	
forage planting	200	
60% cost share planned		$ 49,041.00

Appendix H

Spring Creek Watershed Stream Assessment

Sponsored by:

Mercer County Soil Conservation District

Prepared by:

USDA Natural Resources Conservation Service
Bismarck, North Dakota

In cooperation with:

North Dakota Department of Health

September 2009

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Table of Contents

TABLE OF CONTENTS I

INTRODUCTION 1

EVALUATION PROCESS 2

Stream Visual Assessment Protocol (SVAP) 2
Rapid Geomorphic Assessment – Channel Stability Ranking Scheme 2

SPRING CREEK WATERSHED STUDY RESULTS 3

Preliminary Analysis of Main Stem SVAP Elements 3
Preliminary Analysis of Cover Types and Land Uses 4
Preliminary Analysis of RGA Elements 5

PRIORITY RESOURCE ISSUES 8

CONCLUSIONS 9

APPENDIX A -WATERSHED MAPS A-1

APPENDIX B - SPRING CREEK STREAM SAMPLE SURVEY DESIGN B-1

Contact: B-1
Description of Spring Creek Survey Design B-1
Description of Sample Design Output: B-3
Projection Information B-4
Evaluation Process B-4
Statistical Analysis B-5
For further information, contact B-5
Bibliography: B-5

APPENDIX C - PARTICIPANT LIST C-1

APPENDIX D – STREAM VISUAL ASSESSMENT PROTOCOL D-1

APPENDIX E – RAPID GEOMORPHIC ASSESSMENT – CHANNEL STABILITY RANKING SCHEME E-1

APPENDIX F - SPRING CREEK SITE ASSESSMENT RESULTS F-1

APPENDIX G - SPRING CREEK PHOTOS G-1

Site Photos G-1

Figures

Figure 1 - Spring Creek Land Use (percent) 5

Figure 2 - Six stages of channel evolution from Simon and Hupp (1986) and Simon (1989b) identifying Stages I and VI as "reference" conditions for given Ecoregions. 7

Spring Creek Watershed Stream Assessment

September 2009

Introduction

The Mercer County Soil Conservation District (SCD) initiated a Stream Visual Assessment Protocol (SVAP) and Rapid Geomorphic Assessment (RGA) as part of a comprehensive resource inventory of the condition of the natural resources in the Spring Creek Basin in Dunn and Mercer Counties. The SCD requested the Natural Resources Conservation Service (NRCS) and North Dakota Department of Health (NDDH) staffs to assist with these stream assessments.

The assessments were done in conjunction with the NDDH water quality monitoring program and the local SCD's land use assessment. These inventories and evaluations will be used as a basis for determining the need to pursue additional technical and financial assistance for a land treatment watershed project to improve water quality in the Spring Creek.

The NRCS-Natural Resources Planning Staff (NRPS) and NDDH staff served in a leadership role in providing technical training to complete the stream assessments.

The selection of the stream inventory sites (Appendix B - Spring Creek Stream Sample Survey Design) was done by NDDH. The NDDH utilized the Environmental Protection Agency (EPA) to select random assessment sites (Appendix B - Spring Creek Stream Sample Survey Design). Fifty assessment sites were initially selected on the main stem of Spring Creek.

Keith Weston, Water Quality Specialist, NRCS-NRPS; Mike Ell, Manager, Surface Water Quality Management Program Manager, NDDH; and Jason Frye, Environmental Scientist, NDDH, provided training and "in the field" assistance to SCD and NRCS staff from the Beulah Field Office. Others receiving training and providing assistance with the assessment were staff from the NRCS Bismarck State office (see Appendix C - Participant List).

The assessment data was collected in the field from September 2 through September 4, 2008. Forty-three of the initially selected sites on the main stem were inventoried. Seven over-sample sites were inventoried to replace the seven sights the inventory teams were not able to access or evaluate (Appendix A -Watershed Maps).

Evaluation Process

Stream Visual Assessment Protocol (SVAP)

The riparian health assessment SVAP (see Appendix D – Stream Visual Assessment Protocol) provides a way to assess the current health and overall ecological condition of the riparian zone. This assessment protocol is the first level in a hierarchy of ecological assessments. The assessment is very basic in nature and will be used by the local SCD and land users. This assessment also allows the evaluation of the condition of the aquatic ecosystems associated with the stream. It addresses water quality and physical habitat resource concerns. The assessment was useful in identifying specific causes for the sites current condition.

The evaluation considered three main categories:

(1) Hydrology and streambanks,
(2) soil, and
(3) riparian vegetation.

This assessment can be used for the inventory and analysis steps of developing individual conservation plans, assisting local watershed sponsors in priority setting, and doing pre- and post-assessments to evaluate the implementation of a conservation practice, best management practice (BMP), or conservation management system.

The rating of each category on each of the selected sites enables landowners/land users to define areas where resource management strategies could enhance natural resource conditions. The management of natural resources includes soil, water, air, plants, and animals as well as human considerations pertaining to social and economic values.

See Appendix D for specific instructions on completing the assessment and a copy of the technical note itself.

Rapid Geomorphic Assessment – Channel Stability Ranking Scheme

The Rapid Geomorphic Assessment (RGA) (see Appendix E – Rapid Geomorphic Assessment) provides a method of assessing the geomorphic mechanisms affecting the stream channel at a given point. The RGA calculation considers slope and bed characterization of the stream. The RGA model is more complex than SVAP. The model primarily addresses bank stability.

The RGA procedure consists of four steps to be completed on site:

1. Determine the 'reach'. The 'reach' is described as the length of channel covering 6-20 channel widths, thus is scale dependent, and covers at least two pool-riffle sequences.
2. Take photographs looking upstream, downstream, and across the reach; for quality assurance and quality control purposes. Photographs are used with RGA forms to review the field evaluation
3. Make observations of channel conditions and diagnostic criteria listed on the channel stability ranking scheme.
4. Sample bed material.

Spring Creek Watershed Study Results

Preliminary Analysis of Main Stem SVAP Elements

Fifty main stem sites were inventoried and evaluated in this watershed using the SVAP tool. See Appendix F for table showing SVAP results and Appendix G for individual main stem assessment site photos. Below is a list of the ranking results:

SVAP Rank	Number of Sites
Good	0
Fair (high)	0
Fair (medium)	0
Fair (low)	4
Poor	46

The following observations were made on the ranking elements:

1. Channel condition was found to be in generally good condition.
2. Hydrologic alterations are having significant impacts on stream condition. The stream has been altered in several areas. In these areas, the channel is going through the stream evolution processes.
3. Riparian zone width and health is varied along the creek. Ten of the 50 sites were in good to excellent condition, while four sites were rated low, and the remaining 36 sites were in poor health. The poor ratings were due in part to haying or grazing too close or in the riparian zone.
4. Bank stability was generally poor. An area located between sites M15 and M21 appears to have more stability. Encroachment and livestock impacts were the primary reason for low bank stability scores.
5. Water appearance was variable along the main stem. Sites M39 through M42 showed the most turbidity.
6. Nutrient enrichment was evident on most of the sampling sites. There was excessive alga and macrophyte growth along the stream. Sites M-23 to M-27 had the least nutrient enrichment.
7. Major barriers such as culverts, dams, and bridges were identified on only two sites (M-3 and M-4). Barriers may cause bank instability or serve as a barrier to aquatic life.
8. Instream fish cover was lacking on many of the sites. More interpretation of the assessment data and additional studies would be necessary to draw definitive conclusions. As stated earlier, some possible reasons for lack of cover could be size of stream, sediment load, stream flow, and channel morphology.
9. Pools within the stream system were typically not present on most of the sites. Only seven sites had adequate pools. Pools offer excellent fish and macroinvertebrate habitat.

10. Invertebrate habitat was variable throughout the main stem. Ten sites were considered fair to good with the remaining stream showing poor habitat. Further analysis of this stream and additional studies may be necessary to draw conclusions for the poor habitat.
11. Canopy cover as it relates to woody cover was not evaluated.
12. Manure presence along or in the stream was identified on 35 of 50 sites evaluated. It is a primary water quality concern.
13. Salinity naturally occurs within the watershed, but no significant salinity related water quality concerns were noted, except for sites M-2, M-19, M-21, M-27, and M-37,
14. Riffle embeddedness (burying of gravel and cobbles) was only evaluated on eight sites. Five of these eight sites had buried or partially buried substrate.
15. Macroinvertebrates were not evaluated. North Dakota Department of Health and the Mercer County SCD will complete an Index of Biological Indicators (IBI) study on the stream.

Preliminary Analysis of Cover Types and Land Uses

The land uses identified in the assessment area were identified as:

- Cropland (CRP)
- Hayland
- Pastureland
- Forestland
- Farmstead/Feedlot
- Other (Highways, Golf Course, etc.)

Cropland

Only nine percent of the sites were in annual crops. Wheat was the predominate crop grown in the assessment area.

Cropland was found on one or both sides of the selected assessment area on 7 of the 50 sites.

CRP

Conservation Reserve Program (CRP) was not identified as an active land use, although some of the hay fields may have been in CRP in the past.

Hayland

Hayland sites, including both tame and native hayland, were found on one or both sides of the assessment area on ten of the 50 sites.

Pasture land

Pasture land was the predominate land use in the assessment area. It was identified on one or both sides of the selected assessment area on 41 of the 50 sites. Pasture land was located on both sides of the assessment area on 31 of the 41 identified sites. Three of the other 10 sites had cropland, four sites had farmstead/feedlots, and three sites had hayland.

Forest land

Forest land was not identified on any of the selected assessment areas.

Farmstead/Feedlot

Farmsteads and feedlots were identified on five of the 50 sites. Three of the five sites had pasture land on the opposite bank and the other sites were cropland and hayland.

Other land

One site was classified as other land. This site was designated as wildlife.

The pie chart below provides a visual comparison of Spring Creek SVAP site land uses.

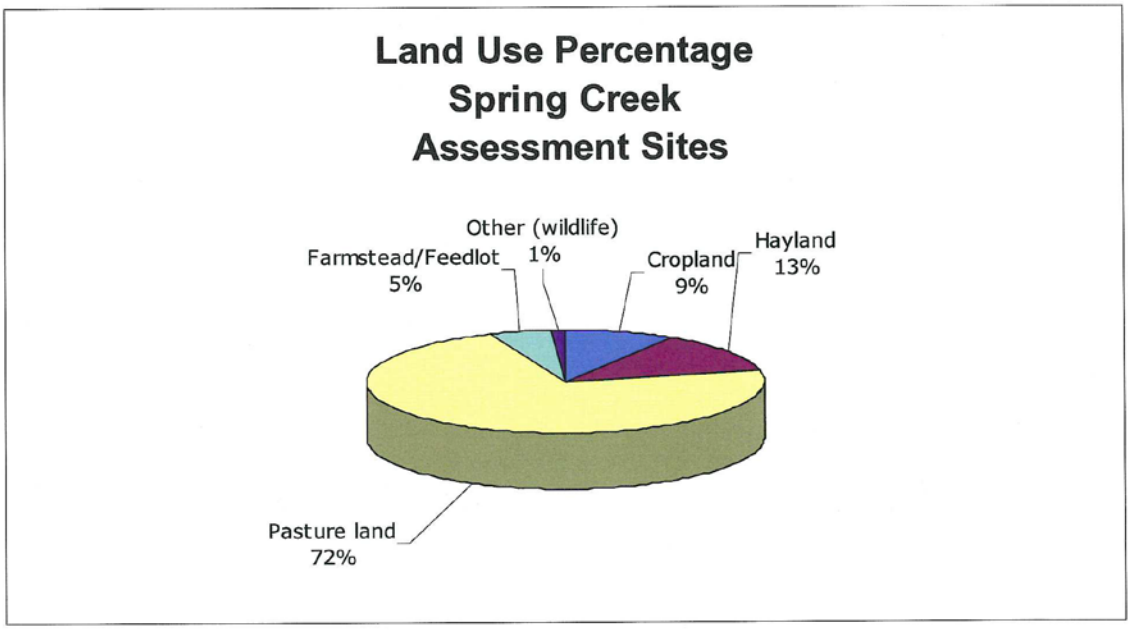

Figure 1 - Spring Creek Land Use (percent)

A complete accounting of ranking scores for each assessment site and individual assessment elements along with other pertinent assessment data are found in Appendix F - Spring Creek Site Assessment Results.

Preliminary Analysis of RGA Elements

The following observations were made on the RGA ranking elements. See Appendix F for table showing RGA results and Appendix G for individual tributary assessment site photos.

The predominant stream pattern in the study area was meandering. Thirty-nine of the 50 sites were meandering streams. The other 11 sites had straight stream segments. There were no braided streams segments observed. Site M16 was not fully evaluated due to the site being armored with riprap.

1. Primary bed material - the Spring Creek main stem bed material was predominantly sand and silt clay. The silty sites were generally located in the upper portions of the watershed.

2. Bed/bank protection – Only one site (M-16) was identified with streambanks protected with rock rip rap, concrete, or other armor.

3. Degree of incision - relative to elevation of normal low water and floodplain terrace at 100%. A ratio between the normal low water flow and the floodplain terrace is calculated to determine how deeply incised "downcut" the stream has become. The assessment results indicate 44% of the main stem assessment sites are deeply incised with another 46% moderately incised. Overall 90% of the sites assessed were either deeply or moderately incised.

4. Degree of constriction – relative decrease in top-bank width from upstream to downstream. This element is to determine if or what obstructions or channel modification are present in the stream. Moderate to severe channel constriction was noted on 8 of the 49 sites.

5. Streambank erosion (each bank) - Each streambank is assessed for erosion and categorized by "none, fluvial, or mass wasting". The following table shows the breakdown of the type of bank erosion occurring at the 49 sites assessed.

Type of Bank Erosions	Number of Sites
Mass wasting – both sides	21
Mass wasting – one side	22
Fluvial erosion – one side	20
Fluvial erosion – two sides	6
No erosion – one side	2

6. Streambank instability (percent of each bank failing) – On those banks where mass wasting is exhibited, a percentage estimate of bank failures along the assessment reach is determined. Bank failures were prevalent with large cracks in the bank which will lead to future failure of the streambank. Thirty-seven of the 49 (76%) streambanks observed were moderately to severely unstable.

7. Established riparian native-vegetative cover (each bank) – This element is the percentage of native vegetation that provides year around bank protection. Eleven of the 98 riparian zones assessed had good to excellent riparian zone health.

8. Occurrence of bank accretion (percent of each bank with fluvial deposition) – This element identifies the percentage of the stream reach being assessed that has deposits of sand, fine, and gravels. The occurrence of accretion is a sign of channel evolution Stage V. Only six sites showed measurable or appreciable accretion.

9. Stage of channel evolution – This element identifies what the current stage of channel evolution is according to Simon, 1999 Channel Evolution Model. All streams go through natural evolution (see Figure 2); however, man induced or natural phenomenon can accelerate the stages of channel evolution. It appears that many of the sites assessed are going into or through Stage IV of Simon, 1999 Channel Evolution Model.

   Stage IV occurs where the channel is degrading and widening. Mass wasting is evident and excessive undercutting is occurring. Riparian vegetation is leaning or has fallen into the stream and a vertical bank may be present. With time and sound resource management Stage V will begin to evolve.

   Stage V occurs when the channel begins to aggrade or build itself up. Deposition of material occurs on the stream bed. Channel widening occurs through bank retreat, no new incision is present. A concave bank profile is present. Sediment

has been re-worked and deposited. There may be evidence of new floodplain terraces and the channel follows a meandering course.

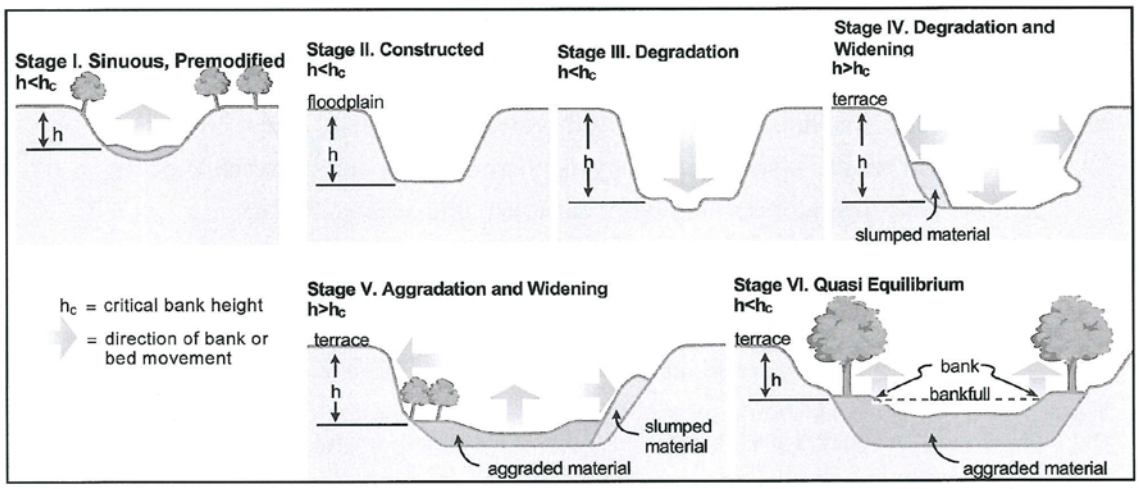

Figure 2 - Six stages of channel evolution from Simon and Hupp (1986) and Simon (1989b) identifying Stages I and VI as "reference" conditions for given Ecoregions.

A complete accounting of ranking scores for each RGA assessment site and individual assessment elements along with other pertinent assessment data are found in Appendix F - Spring Creek Site Assessment Results.

Priority Resource Issues

The watershed sponsors, landowners, and land users will need to decide what they want the "future desired condition" of the Spring Creek Watershed to resemble. There are some obvious natural resource needs which have been identified, but only a locally led conservation effort will ensure long-term sustainability of the natural resource base.

Some issues which should be considered in this locally led process are:

1. Riparian health – farming and haying encroachment and livestock impacts.
2. Excessive grazing (stocking rates, duration, and season of use).
3. Nutrient management.
4. Channelization of streams.
5. Loss of native plant communities and increase of invasive species (bromegrass, quackgrass, leafy spurge, absinth wormwood, and Canadian thistle).

Watershed priority areas should be selected on natural resource need, social acceptance by the watershed's producers and landowners, and sound economical principles.

In Appendix F - Spring Creek Site Assessment Results, the overall ranking scores are color coded to provide the reader with a quick visual reference to what assessment sites could benefit from additional land treatment or conservation technical assistance. Those sites were identified as:

Color Code	Priority
Red	Highest priority
Yellow	Moderate to high priority
Green	Low priority

Conclusions

These riparian assessment tools can be used in developing a long-range watershed plan. This assessment data needs to be evaluated along with the NDDH water quality monitoring data, the local soil conservation district land use assessment, and AnnAGNPS or similar water quality model data to accurately identify priority areas within the Spring Creek Watershed.

The assessments do point out a continued need for riparian management through proper grazing use, pasture management, and adequate native buffers and filter strips. Encroachment by introduced hayland species is also impacting riparian health and management. It was evident that native plant communities provide superior soil and water protection in the riparian zone as opposed to tame or introduced plants.

Grazing systems, which enhance native plant communities through proper utilization and season of use, will significantly improve the watersheds riparian health. Continuation of "on the ground technical assistance" from the watershed conservationist is needed to assist land users in implementing resource management systems on their land.

A strong information and education program will facilitate implementing a land treatment watershed. The success of any voluntary watershed project is dependent on this aspect of the watershed plan.

Financial assistance through EPA-319, USDA conservation programs, and State programs should be requested to install the necessary conservation practices.