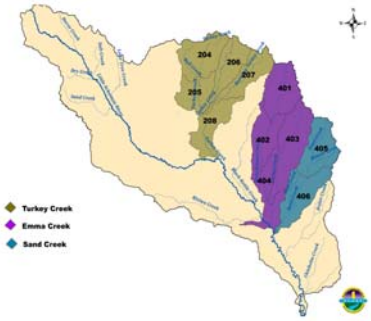
Little Arkansas River WRAPS Lake WRAPS – 9 Element Watershed Plan Summary-Kansas State University - KCARE

Impairments to be addressed:

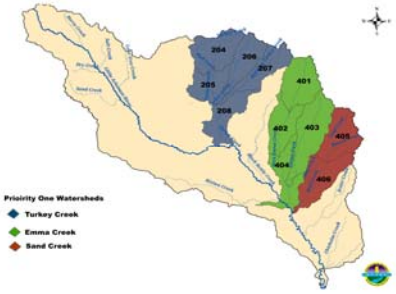
- **Atrazine—Emma Creek, Turkey Creek, Sand Creek, Little Ark River**
- **Biology—Black Kettle, Kisiwa Creek, Emma Creek, Turkey Creek, Sand Creek, Little Ark River**
- **Biology / Sediment—Black Kettle, Kisiwa Creek, Emma Creek, Turkey Creek, Sand Creek, Little Ark River**
- **Dissolved Oxygen—Black Kettle, Kisiwa Creek, Emma Creek, Turkey Creek, Sand Creek**
- **Bacteria—Emma Creek, Turkey Creek, Sand Creek, Little Ark River**
- **Total Suspended Solids—Black Kettle, Kisiwa Creek, Turkey Creek, Little Ark River**
- **Total Phosphorous—Black Kettle, Kisiwa Creek, Emma Creek, Turkey Creek, Sand Creek, Little Ark River**

Prioritized Critical Areas for Targeting BMPs

Tier 1: HUC 12 Targeted Areas for Atrazine *(HUC 12's are labeled by their last three digits)*



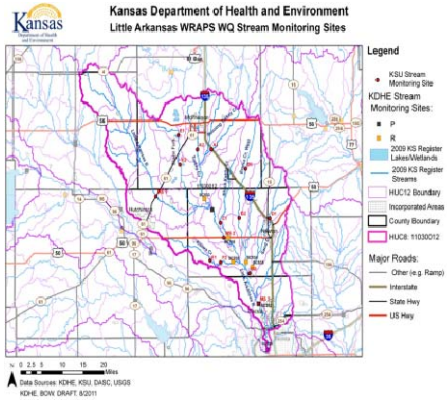
Tier 1: HUC 12 Targeted Areas for Sediment *(HUC 12's are labeled by their last three digits)*



HUC 12 Targeted Livestock Areas for Nutrients and Bacteria
(HUC 12's are labeled by their last three digits)

Targeting Considerations

- Only main stem Little Arkansas River TMDLs exist due sparsely located KDHE sites.
- ArcSWAT and AnnAGNPS was performed on the Black Kettle Creek under a CIG (Conservation Innovation Grant).
- KDHE used KSU monitoring stations and KDHE station results to help identify target by finding loading trends and discerning flow and data on KDHE unmonitored streams, thus filling in gaps.



- KDHE used KSU Tillage Survey data to identify cropping system trends which mirrored water quality data to an extent.
- Target areas will receive attention to both Cropland and Livestock BMP implementation.
- Livestock BMPS includes confined feeding facilities, animal concentrated areas and grazingland.
- Streambanks will be considered on a case-by case basis, KDHE performed an aerial photo analysis.

Little Arkansas River WRAPS Lake WRAPS – 9 Element Watershed Plan Summary-Kansas State University - KCARE

Best Management Practices and Load Reduction Goals

Best Management Practices (BMPs) to address nutrients, sediment, atrazine, and bacteria in the watershed were chosen by the (SLT) based on local acceptance/adoption rate and amount of load reduction gained per dollar spent.

Sediment Reducing Cropland BMPs

- Buffers
- Encouragement of Continuous No-till by producers
- Retain CRP contracts or retain grass as a grazing/haying system
- Convert cropland to grass
- Grassed Waterways w/or w/o Terraces
- Streambank Stabilization case-by-case

Phosphorus Reducing Cropland, Streambank and Livestock BMPs:

- Buffers
- Encouragement of Continuous No-till implementation by producers
- Preparation of Nutrient Management Plans with producers
- Terraces and Grassed Waterways
- Fertilizer/Manure Incorporation
- Retain CRP contracts or retain grass as a grazing/haying system
- Convert cropland to grass
- Vegetative filter strips between small feeding operations and streams
- Relocation of small feeding operations away from streams
- Relocation of pasture feeding sites away from streams
- Promotion of alternative watering sites away from streams

Atrazine Reducing Cropland BMPs:

- Promotion of the Use of Alternative Herbicides
- Vegetative Buffers
- Split Application
- Apply before April 15
- Use post emergence
- Reduce application rates

Load reduction targets for pollutants in HUCs

Sub Watershed	TSS % Reduction	TSS Load Red Tons/year
Turkey Creek	51.92	4895.96
Lower W. Emma Cr	36.31	2336.82
Lower Blazefork	35.9	1898.47
Lower Sand Cr	50.5	5458.29
Lower Kisiwa	52.83	2843.29
Black Kettle	18.03	374.21
LA Valley Center (Less loads from above Hwy 61)	61.95	74616.15

Sub Watershed	TP % Reduction	TP Load Reductions lbs/year
Turkey Creek	73.06	49181.56
Lower W. Emma Cr	56.52	21318.34
Lower Blazefork	66.1	26442.94
Lower Sand Cr	44.76	17346.11
Lower Kisiwa	61.54	16247.35
Black Kettle	41.18	4762.72
LA Valley Center (Less loads from above Hwy 61)	59.35	267837

*Water quality milestone for Bacteria: Load reductions should result in less frequent exceedence of the nominal ECB criterion.

Little Arkansas River Watershed

Watershed Restoration and Protection Strategy

Final Plan September 2011

Funding for the development of this plan was provided through an EPA 319 grant from the Kansas Department of Health and Environment.

Kansas Center for Agricultural Resources and the Environment KCARE

K-STATE Research and Extension Kansas State University

Kansas Department of Health & Environment KDHE

K-State Research and Extension Project Staff

Dan Devlin, State Watershed Extension Specialist
Susan Brown, Kansas Center for Agricultural Resources and the Environment
Ron Graber, Watershed Specialist, Lower Arkansas River Watershed
Dale Ladd, McPherson County Extension Agent
Jonie James, Harvey County Extension Agent
Amanda Schielke, Extension Assistant, Department of Agronomy
Phil Barnes, Water Quality, Bio and Ag Engineering Department
Kyle Mankin, Bio and Ag Engineering Department
Nathan Nelson, Soil Fertility, Agronomy Department
Tim Keane, Landscape Architecture/Regional and Community Planning
Prasad Daggupati, Watershed Modeling Laboratory

Stakeholder Leadership Team:

Watershed Representatives

Joe Bergkamp, Landowner/Producer
Frank Harper, Landowner/Producer
Dwight Lohrenz, landowner/Producer
Mike McGinn, Landowner/Producer
Don Schroeder, Landowner/Producer/State Representative
Mark Toews, Landowner/Producer
Jay Warner, Landowner/Producer
Jerry Sommerfeld, Landowner/Producer
Bill Ridge, Landowner/Producer
Clyde Young, Landowner/Producer
Tim Boese, Manager, Groundwater Management District #2
Ron Krehbiel, Landowner/ Harvey County Commissioner

Project Management Team

Baron Shively, McPherson County, Natural Resource Conservation Service
Gay Spencer, Harvey County, Natural Resource Conservation Service
Brenda Peters, McPherson County Conservation District
Christi Leewright Patry, Harvey County Conservation District
Rick Schlender, Program Assistant, McPherson County
Mark Schwartz, Buffer Coordinator, McPherson County
Dane Baxa, REAP Water Resources Committee
Vaughn Weaver, Basin Advisory Committee/ Water Quality Specialist
Roger Unruh, Crop Consultant, Crop Quest

Kansas Department of Health and Environment Project Officer

Scott Satterthwaite, Watershed Management Section

Additional Technical Assistance Provided by:

Tom Stiles, Kansas Department of Health and Environment
Rich Basore, Kansas Department of Health and Environment
Debra Ary, Superintendent of Production and Pumping, City of Wichita
Mark Van Scoyoc, Kansas Department of Wildlife & Parks, Stream Survey & Monitoring
Don Jones, Division of Conservation, Kansas Department of Agriculture

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Glossary of Terms

Best Management Practices (BMP): Environmental protection practices used to control pollutants, such as sediment or nutrients, from common agricultural or urban land use activities.
Biological Oxygen Demand (BOD): Measure of the amount of oxygen removed from aquatic environments by aerobic microorganisms for their metabolic requirements.
Biota: Plant and animal life of a particular region.
Chlorophyll a: Common pigment found in algae and other aquatic plants that is used in photosynthesis
Dissolved Oxygen (DO): Amount of oxygen dissolved in water.
E. coli bacteria: Bacteria normally found in gastrointestinal tracts of animals. Some strains cause diarrheal diseases.
Eutrophication (E): Excess of mineral and organic nutrients that promote a proliferation of plant life in lakes and ponds.
Fecal coliform bacteria (FCB): Bacteria that originate in the intestines of all warm-blooded animals.
Municipal Water System: Water system that serves at least 25 people or has more than 15 service connections.
NPDES Permit: Required by Federal law for all point source discharges into waters.
Nitrates: Final product of ammonia's biochemical oxidation. Primary source of nitrogen for plants. Contained in manure and fertilizers.
Nitrogen (N or TN): Element that is essential for plants and animals. TN or total nitrogen is a chemical measurement of all nitrogen forms in a water sample.
Nutrients: Nitrogen and phosphorus in water source.
Phosphorus (P or TP): Element in water that, in excess, can lead to increased biological activity.
Riparian Zone: Margin of vegetation within approximately 100 feet of waterway.
Sedimentation: Deposition of slit, clay or sand in slow moving waters.
Secchi Disk: Circular plate 10-12" in diameter with alternating black and white quarters used to measure water clarity by measuring the depth at which it can be seen.
Stakeholder Leadership Team (SLT): Organization of watershed residents, landowners, farmers, ranchers, agency personnel and all persons with an interest in water quality.
Total Suspended Solids (TSS): Measure of the suspended organic and inorganic solids in water. Used as an indicator of sediment or silt.

Watershed Restoration and Protection Strategy for the Little Arkansas River (11030012) Watershed

1.0 Preface

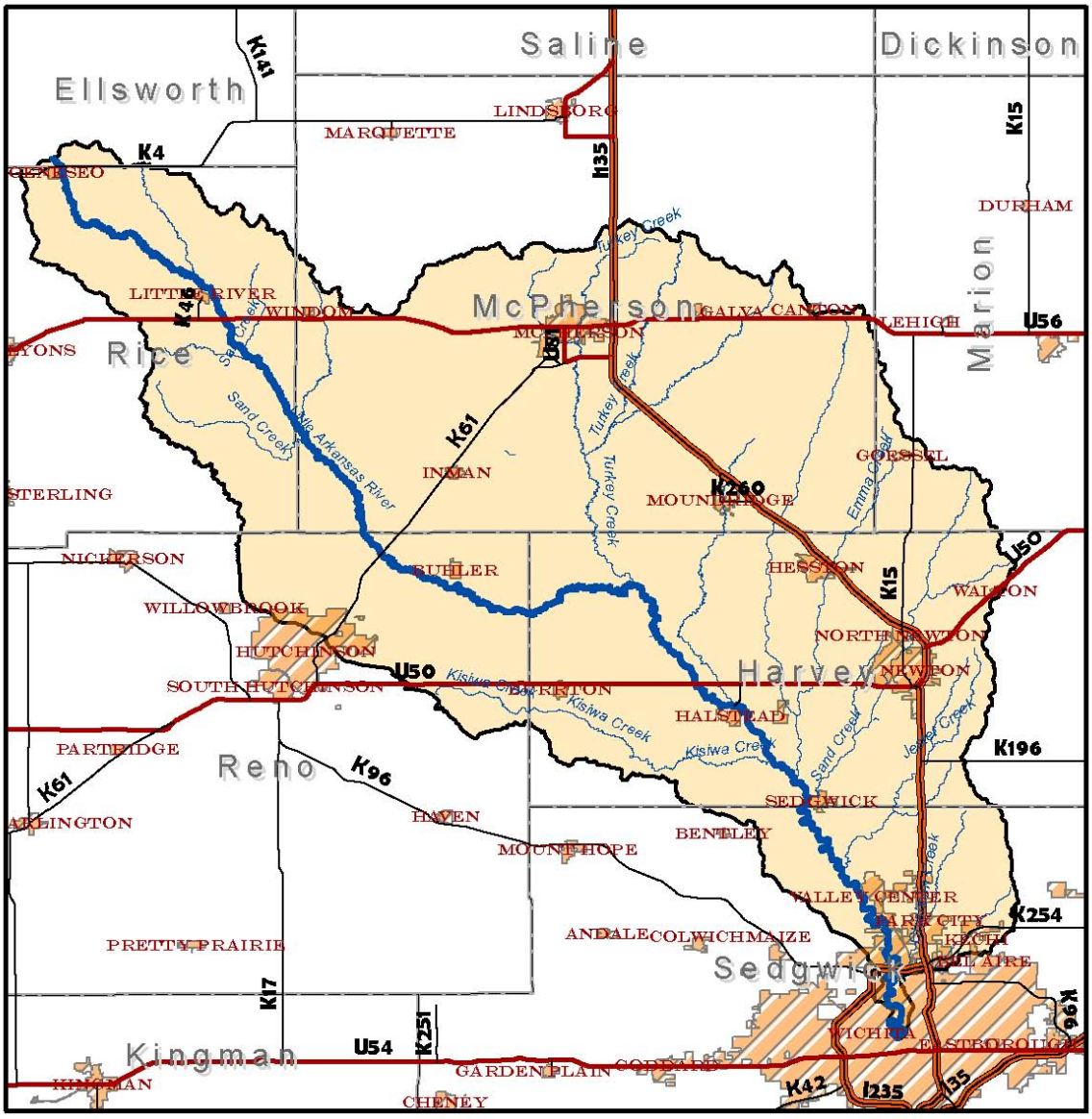
The purpose of this Watershed Restoration and Protection Strategy (WRAPS) report for the Little Arkansas River watershed is to outline a plan of restoration and protection goals and actions for the surface waters and ground waters of the watershed. Watershed goals are characterized as “restoration” or “protection”. Watershed restoration is for waters that do not meet water quality standards, and for areas of the watershed that need improvement in habitat, land management, or other attributes. The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

The WRAPS development process involves local communities and governmental agencies working together toward the common goal of a healthy environment. Local participants or stakeholders provide valuable grass roots leadership, responsibility and management of resources in the process. They have the most “at stake” in ensuring the water quality existing on their land is protected. Agencies bring science-based information, communication, and technical and financial assistance to the table. Together, several steps can be taken towards watershed restoration and protection. These steps involve building awareness and education, engaging local leadership, monitoring and evaluation of watershed conditions, in addition to assessment, planning, and implementation of the WRAPS process at the local level. Final goals for the watershed at the end of the WRAPS process are to provide a sustainable water source for drinking and domestic use while preserving food, fiber, and timber production. Other crucial objectives are to maintain recreational opportunities and biodiversity while protecting the environment from flooding, and negative effects of urbanization and industrial production. The ultimate goal is watershed restoration and protection that will be “locally led and driven” in conjunction with government agencies in order to better the environment for everyone.

This report is intended to serve as an overall strategy to guide watershed restoration and protection efforts by individuals, local, state, and federal agencies and organizations. At the end of the WRAPS process, the Stakeholder Leadership Team (SLT) will have the capability, capacity and confidence to make decisions that will restore and protect the water quality and watershed conditions of the Little Arkansas River watershed.

Figure 1. Map of Watershed[i]

Little Arkansas River Watershed



2.0 Development of the Stakeholder Leadership Team

In 2001, a group of concerned citizens established a proactive, voluntary grass roots Stakeholder Leadership Team (SLT). This volunteer task force consisted of landowners, producers, residents, agency representatives and other stakeholders in the Project Area that were interested in exploring water quality issues and nonpoint source pollution. The SLT was dedicated to developing a WRAPS plan for the preservation and protection of the Project Area and the consensus of the SLT was that atrazine load reduction would be the main watershed objective. The written plan was put together through a series of activities in late 2003 and 2004, the WRAPS plan was submitted to KDHE in October of 2004.

The main pollutants of concern for the SLT are:

- Atrazine
- Sediment
- Nutrients and
- Fecal Coliform Bacteria.

3.0 Watershed Goals

The Stakeholder Leadership Team (SLT) has identified specific goals needed to achieve watershed improvement. Implementation of best management practices (BMPs), as well as financial incentives and cost share programs will, over time, lead to decreases in impairments in surface and ground water resources. Responsibility for restoration and protection of the watershed rests primarily in the hands of local stakeholders. For this reason, federal and state agencies provide technical and financial assistance for education activities and implementation of best management practices.

The SLT has been meeting since 2001 and they have set the following **watershed restoration and protection goals**:

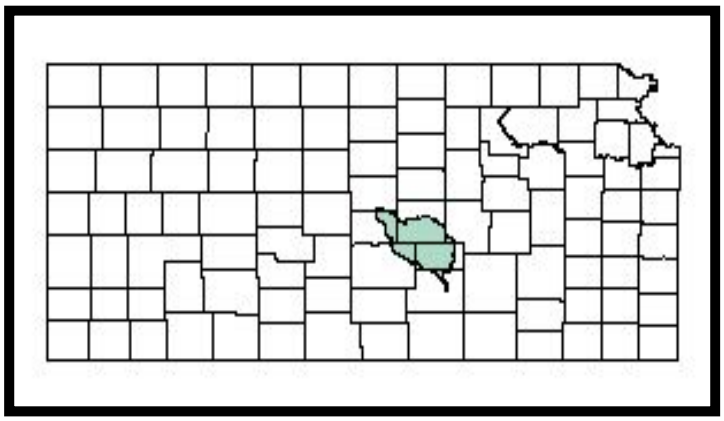
- Protect ground and surface water quality and quantity.
- Protect public drinking water and livestock watering supplies.
- Protect recreational waters and lakes in the watershed.
- Promote wildlife habitat and rural aesthetics while providing for the farming economy and increased population growth.
- Continue sustainability of land conservation.
- Increase public awareness and education about watershed/water quality issues.
- Evaluate and maintain water quality to meet or exceed KDHE standards.
    a. Reduce Atrazine found in surface waters
    b. Reduce Sediment from entering stream and lake waters
    c. Reduce Nutrients in stream and lake waters
    d. Reduce Fecal Coliform Bacteria in surface waters

In this report, the term BMP (Best Management Practice) will be used frequently. A BMP is defined as an environmental protection practice used to control pollutants, such as sediment, or nutrients, from common agricultural or urban land use activities. BMPs are implemented to achieve a specific goal and are placed in an optimal location to achieve that goal. Common agricultural BMPs are buffer strips, terraces, grassed waterways, utilizing no-till or minimum tillage, conservation crop rotation and nutrient management plans. Definitions of each of these BMPs are found in the appendix of this report.

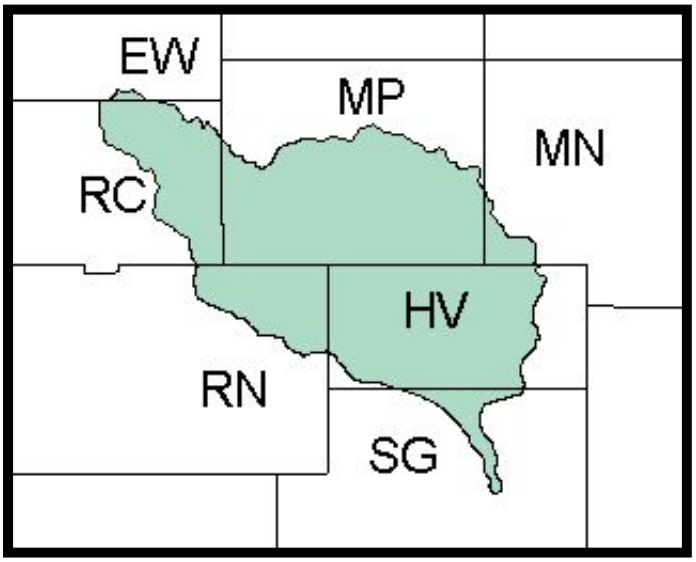
4.0 Watershed Review

NOTE: For this WRAPS Plan, the Little Arkansas River Watershed will be referred to as the "Project Area".

There are twelve river basins located in Kansas. The scope of this Watershed Restoration and Protection Strategy (WRAPS) is the Little Arkansas River Watershed. The Little Arkansas River watershed is located in south central Kansas within Reno, Harvey, Sedgwick, McPherson, Rice, Marion and Ellsworth counties. The headwaters of the Little Arkansas River originate near the town of Geneseo, and the river travels southeast approximately 80 miles draining numerous tributaries before emptying into the Arkansas River at Wichita.



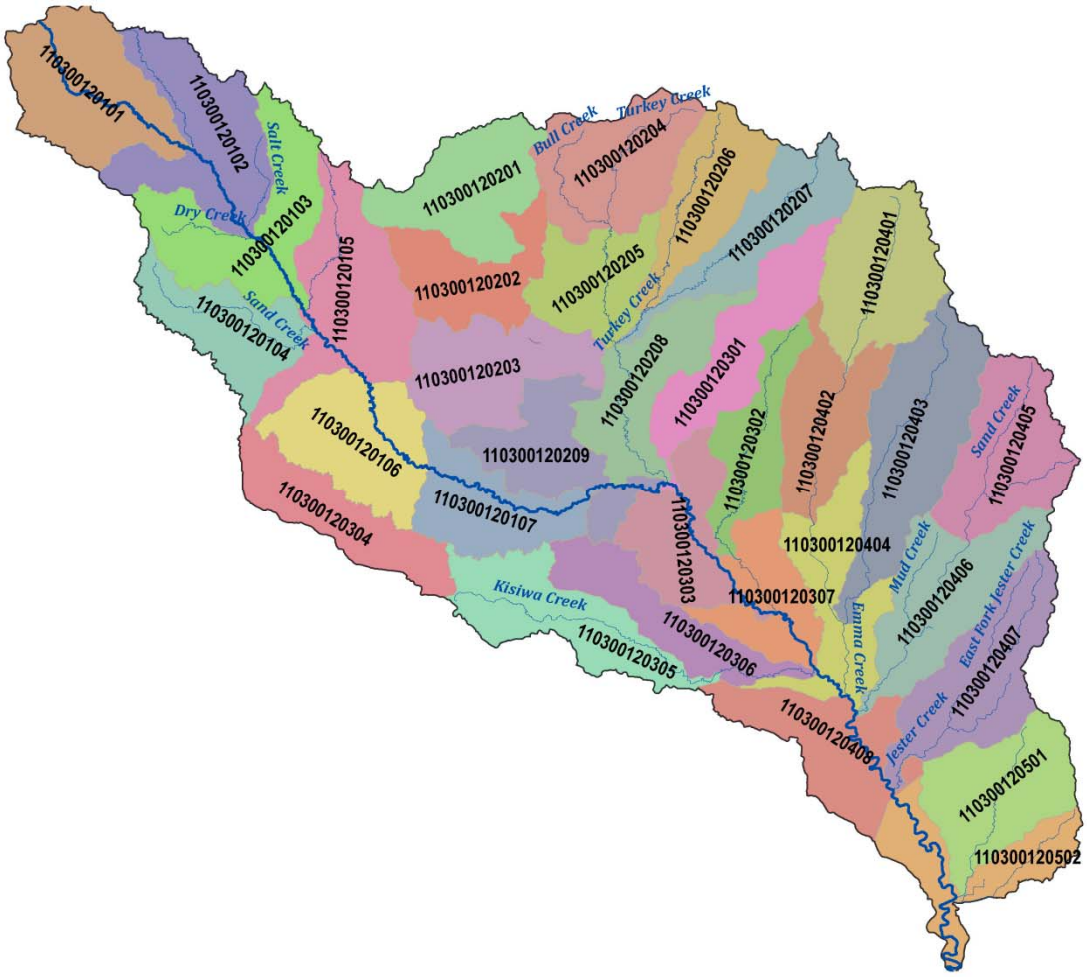
Counties:
EW=Ellsworth County
RC=Rice County
RN=Reno County
MP=McPherson County
HV=Harvey County
SG=Sedgwick County
MN=Marion County



A watershed is an area of land that catches precipitation and funnels it to a particular creek, stream, river and so on, until the water drains into an ocean. A watershed has distinct elevation boundaries that do not follow political "lines" such as county, state and international borders. Watersheds come in all shapes and sizes, with some only covering an area of a few acres while others are thousands of square miles across.

HUC is an acronym for **H**ydrologic **U**nit **C**odes. HUCs are an identification system for watersheds. Each watershed has a HUC number in addition to a common name. As watersheds become smaller, the HUC number will become larger. The Little Arkansas River Watershed is classified as a HUC 8, meaning it has an 8 digit identifying code, **11030012**. HUC 8s can further be split into smaller watersheds that are given HUC 10 numbers and HUC 10 watersheds can be further divided even smaller HUC 12s. The Project Area contains 33 HUC 12 delineations.

Figure 2. HUC 12 Delineations in the Little Arkansas River Watershed

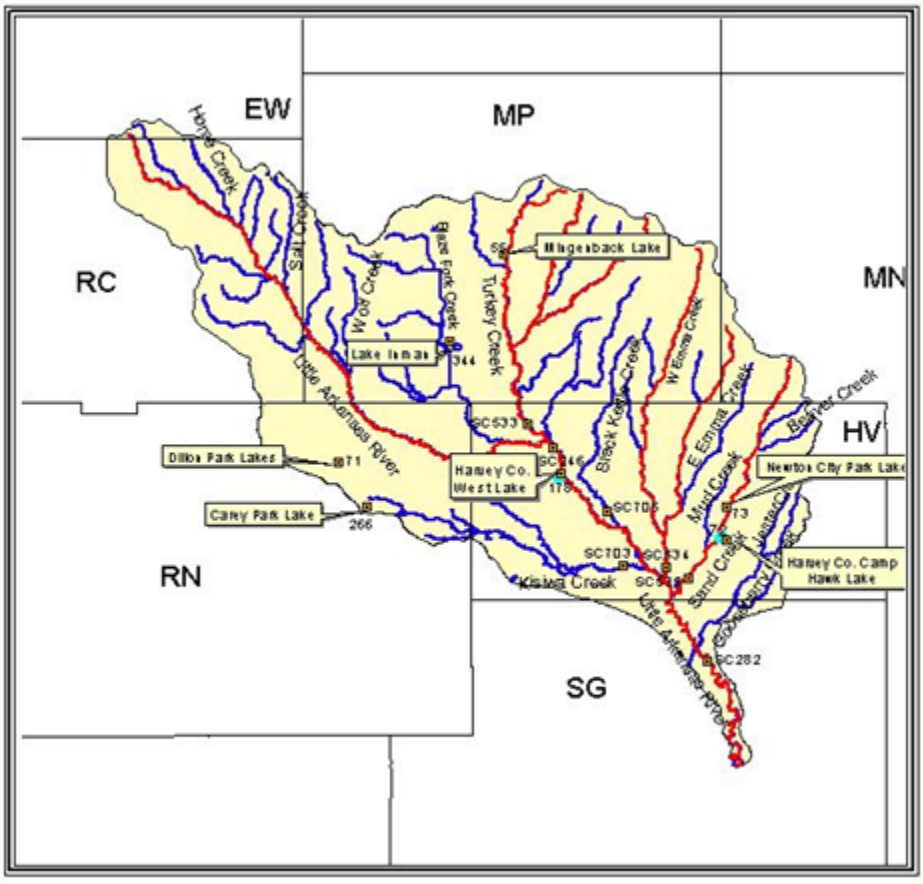


The Little Arkansas River Watershed is designated as a Category I watershed indicating it is in need of restoration as defined by the *Kansas Unified Watershed Assessment 1999* submitted by the Kansas Department of Health and Environment (KDHE) and the United States Department of Agriculture (USDA)[2] in 1999. A Category I watershed does not meet state water quality standards or fails to achieve aquatic system goals related to habitat and ecosystem health. Category I watersheds are also assigned a priority for restoration. The Little Arkansas River Watershed is ranked 14th in priority out of 92 watersheds in the state.

4.1 Description

The Project Area is comprised of 913,430[3] acres that is primarily contained in McPherson and Harvey counties with small coverage in Ellsworth, Rice, Reno, Marion and Sedgwick counties in central Kansas.

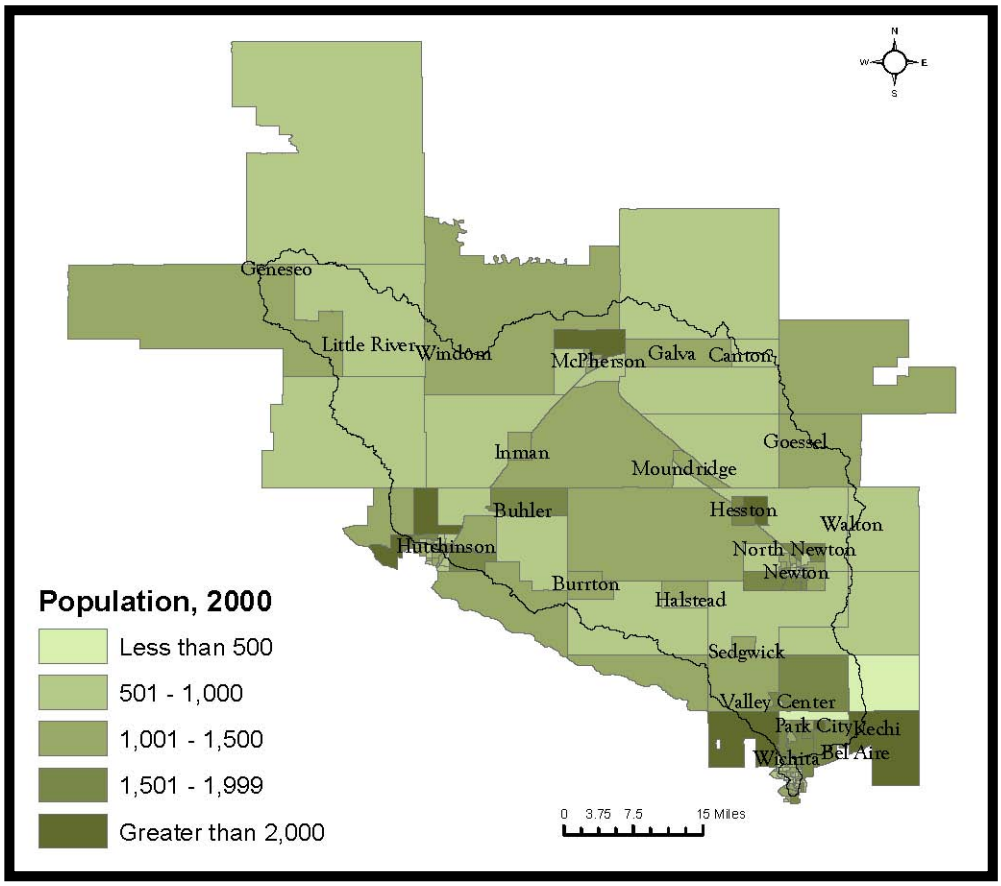
Figure 3. Overview of Project Area



The major city in the watershed is Wichita, located at the base of the watershed with a population of 372,186. Although there are several smaller communities in the watershed there are a few additional larger municipalities that should be noted: McPherson, population of 13,323, Hutchinson population of 40,795 and Newton with a

population of 18,437. These numbers are provided by the US Census Bureau's 2009 estimate. Approximately 637,419 people live in the seven counties that cover the watershed; however this number includes a few larger cities within the counties that are not contained within the Project Area. According to the US Census Bureau, the average population density (in the seven counties covering the Project Area) is above the Kansas state average. Population increased in the Project Area counties of the watershed by an average of 5.7 percent from 2000 to 2009 (US Census Bureau).

Figure 4. Population Distribution Map[4]



4.2 Public Water Supply and NPDES

The table below lists the public water supplies in the Little Arkansas River Watershed. *(Table provided by KDHE 2010)* There are no surface water sources in the Little Arkansas River Basin WRAPS Service Area.

Table 1. PWS in the Project Area

Public Water Supplier	Population Served
BEL AIRE, CITY OF	6,797
BUHLER, CITY OF	1,332
BURRTON, CITY OF	896
CAMP HAWK	25
CANTON, CITY OF	1,593
CHISHOLM CREEK UTILITY AUTHORITY	1
COUNTRYVIEW MOBILE HOME PARK	44
ELYRIA CHRISTIAN SCHOOL	250
GALVA, CITY OF	804
GARDEN VIEW CHRISTIAN SCHOOL	25
GOESSEL, CITY OF	512
HALSTEAD, CITY OF	1,890
HARVEY CO RWD 1	3,000
HARVEY CO WEST PARK EAST WELL 2	26
HARVEY CO WEST PARK WEST WELL 1	26
HESSTON, CITY OF	3,741
HUTCHINSON, CITY OF	40,795
INMAN, CITY OF	1,180
LITTLE RIVER, CITY OF	521
MCPHERSON, CITY OF	13,396
MEDORA LEARNING CENTER	45
MOUNDRIDGE, CITY OF	1,628
NEWTON, CITY OF	18,437
NORTH NEWTON, CITY OF	1,612
NORTH STAR RV PARK AND MOBILE HOME COMM	25
PARK CITY, CITY OF	8,029
PRAIRIE DUNES COUNTRY CLUB	25
PUBLIC WHOLESALE WSD 17	1
RENO CO RWD 1	123
RENO CO WATER DISTRICT 8	260
SEDGWICK, CITY OF	1,694
SPRING LAKE RESORT	150
VALLEY CENTER, CITY OF	6,638
WEDGEWOOD PUBLIC GOLF COURSE	45
WICHITA, CITY OF	372,186
Total population served by PWS in Little Ark WRAPS	**487,752**

Wastewater treatment facilities are permitted and regulated through KDHE. They are considered point sources of pollutants. National Pollutant Discharge Elimination System (NPDES) permits specify the maximum amount of pollutants allowed to be discharged to surface waters. Having theses point sources located on streams or rivers may impact water quality in the waterways. For example, municipal waste water can contain suspended solids, biological pollutants that reduce oxygen in the water column, inorganic compounds or bacteria. Waste water will be treated to remove solids and organic materials, disinfected to kill bacteria and viruses, and discharged to surface water. Treatment of municipal waste water is similar across the country.[5] Any pollutant discharge from point sources that is allowed by the state is considered to be Wasteload Allocation. The watershed has forty-three permitted NPDES facilities.

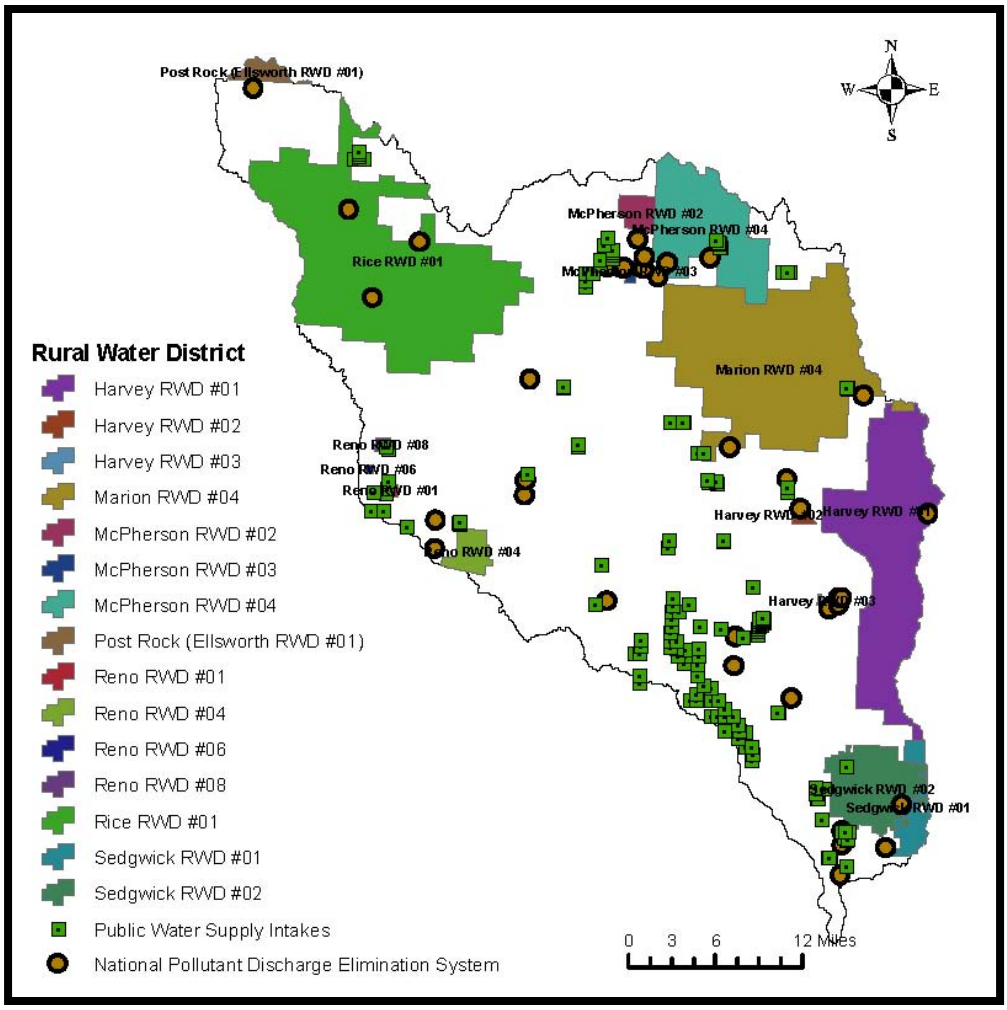
Table 2. NPDES Facilities[6]

Municipality Location	NPDES ID(s)	Waterway	Treatment Description
Buhler	685	Little Arkansas River	Oxidation Ditch
Buhler	937	Little Arkansas River	Waste Stabilization Pond; Overflowing
Burrton	686	Kisiwa Creek	Waste Stabilization Pond; Overflowing
Galva	687	Turkey Creek	Waste Stabilization Pond; Overflowing
Geneseo	688	Little Arkansas River	Trickle Filter Single Stage
Goessel	689	Emma Creek	Waste Stabilization Pond; Overflowing
Halstead	690	Halstead	Oxidation Ditch
Halstead	999	Kisiwa Creek	Not Yet Classified
Hesston	410	Emma Creek	Not Yet Classified
Hesston	691	Emma Creek	Oxidation Ditch
Hutchinson	321	Little Arkansas River	Waste Stabilization Pond; Overflowing
Hutchinson	417	Little Arkansas River	Not Yet Classified
Inman	692	Little Arkansas River	Waste Stabilization Pond; Overflowing
Kechi	693	Chisholm Creek	Waste Stabilization Pond; Overflowing
Little River	694	Little Arkansas River	Waste Stabilization Pond; Overflowing
McPherson	44, 45, 46,47, 48, 49, 238	Turkey Creek	Activated Sludge Contact Stabilization
McPherson	412	Bull Creek	Not Yet Classified

McPherson	413, 414, 993, 1038	Turkey Creek	Not Yet Classified
McPherson	416	Little Arkansas River	Not Yet Classified
Moundridge	293, 696	Black Kettle Creek	Waste Stabilization Pond; Overflowing
Newton	153, 154, 155, 251, 274	Sand Creek	Trickle Filter Multi-Stage
Newton	415	Sand Creek	Not Yet Classified
Park City	701	Little Arkansas River	Sequening Batch Reactor
Sedgwick	697	Sand Creek	Oxidation Ditch
Unknown	411	Little Arkansas River	Not Yet Classified
Valley Center	698	Chisholm Creek	Oxidation Ditch
Walton	699	Sand Creek	Waste Stabilization Pond; Overflowing
Wichita	349	Little Arkansas River	Not Yet Classified
Windom	700	Lone Tree Creek	Waste Stabilization Pond; Overflowing

The municipal and industrial wastewater treatment facilities in the Project Area are located in Figure 5. Thousands of onsite wastewater systems (non-NPDES permit) exist in the basin. The functional condition of these systems is generally unknown. All counties in the watershed have sanitary codes.

Figure 5. Rural Water Districts in the Project Area

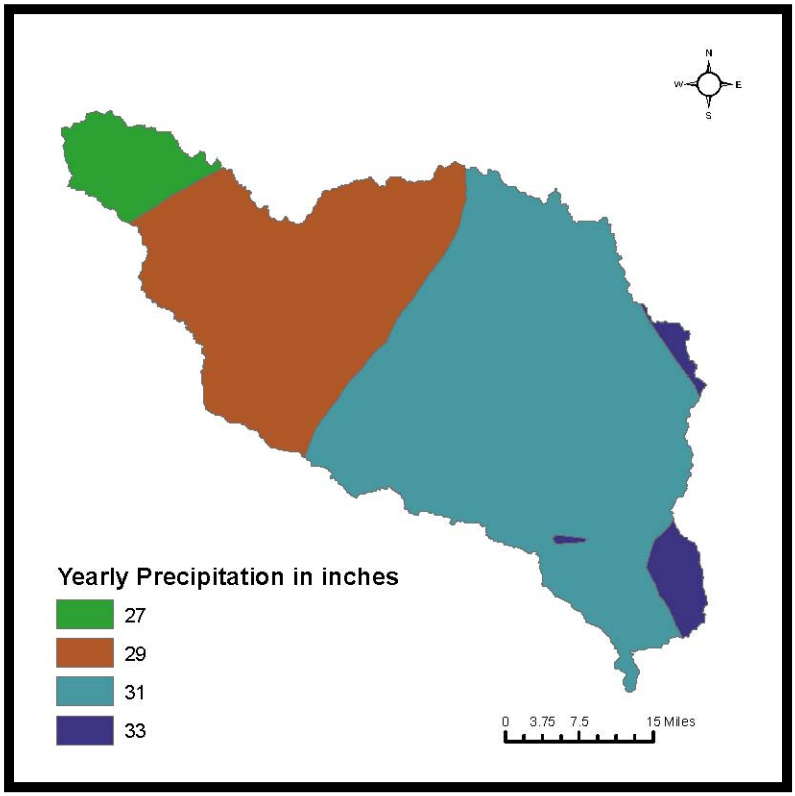


4.3 Water Resources and Uses

Predominant rivers and streams in this watershed are the Little Arkansas River and Emma, Sand, and Turkey Creeks. The Little Arkansas Watershed covers 1,407 square miles and includes 478 stream miles and 88 acres of lakes. Designated resources include aquatic life (fish habitat), recreation (fishing and swimming), domestic water supply and ground water recharge as well as irrigation, livestock and industrial water sources. In addition to the rivers and streams, the watershed contains five major lakes (Newton City Park Lake, Mingenback Lake, Harvey County West Lake, Harvey County Camp Hawk Lake, and Lake Inman), and one wetland area (McPherson Wetlands). The lakes support aquatic life and provide access to fishing, boating and swimming. Lake Inman (the largest natural lake in Kansas) is part of the McPherson Wetlands network, which consists of 3,000 acres, and is an important site for viewing waterfowl and migratory birds. The Little Arkansas Watershed covers 1,407 square miles and includes 478 stream miles and 88 acres of lakes.

Annual rainfall averages range from 27 to 33 inches. Precipitation in the watershed averages 30 inches per year.

Figure 6. Precipitation Map

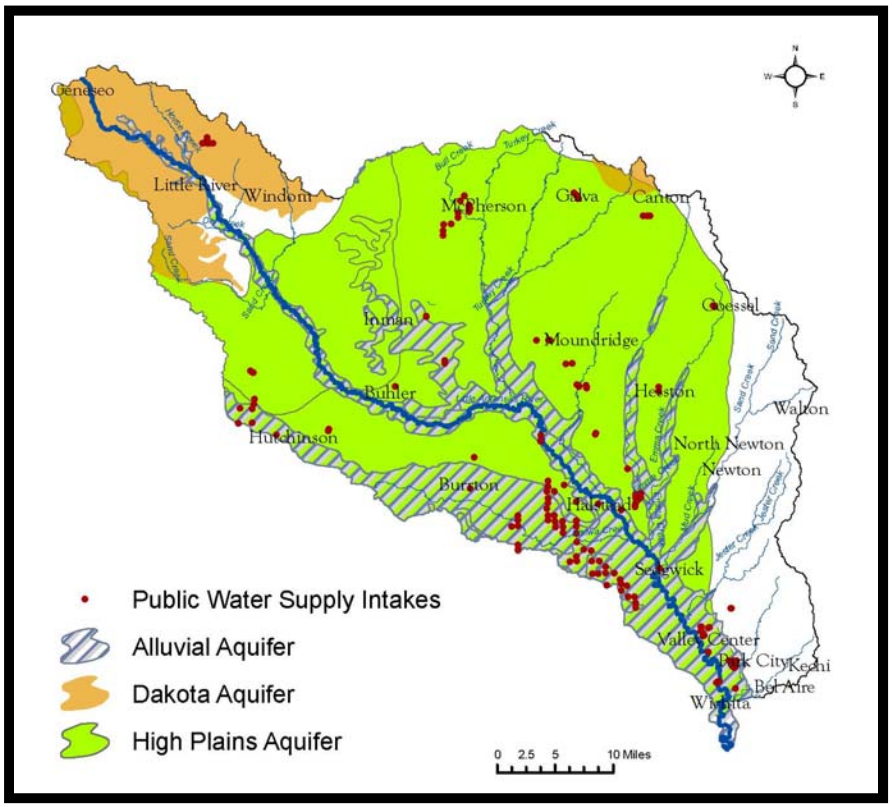


The Project Area lies above portions of the Little Arkansas River Alluvial Aquifer, the Dakota Aquifer, High Plains Aquifer and the Equus beds.

- Alluvial Aquifer - The alluvial aquifer is a part of and connected to a river system and consists of sediments deposited by rivers in the stream valleys. The Alluvial Aquifers follow the path of the Little Arkansas River and its tributaries and are interconnected to the surface water in the river.
- Dakota Aquifer - The Dakota aquifer extends from southwestern Kansas to the Arctic Circle. In recent years, the Dakota aquifer has been used for irrigation purposes in southwest and in north-central Kansas (Cloud, Republic and Washington counties) and continues to present time. The Dakota aquifer also provides water for municipal, industrial, and stock water supplies. A one-mile distance between wells is the current stipulation for drilling in the Dakota.
- High Plains Aquifer – The High Plains Aquifer is a primary source of groundwater in western Kansas. Drawdown or depletion of the aquifer has greatly surpassed the rate of natural recharge. Responses of future aquifer withdrawals are predicted to cause continued aquifer declines, a reduction in the number of functional wells, and an increase of saline water intrusion into the aquifer.
- Equus beds - In 1995, the *Equus* Beds Groundwater Recharge Demonstration Project began evaluation of artificial recharge techniques and their effects on

water quality in the aquifer. The demonstration project was a cooperative effort among the city of Wichita, Bureau of Reclamation (U.S. Department of the Interior), and the U.S. Geological Survey (USGS). Water from the Little Arkansas River was diverted for artificial recharge when flow in the river exceeded base flow in accordance with the Kansas Department of Agriculture, Division of Water Resources, permit conditions (Burns and McDonnell, 1998). Water was artificially recharged to the *Equus* Beds aquifer, which is part of the High Plains aquifer and consists of alluvial (river-deposited) sediments of sand and gravel interbedded with clay and silt.[7] Atrazine is of particular concern during ground water recharge because all waters that are reintroduced to the aquifers must be free of pollutants. The water from the Little Arkansas River requires filtration through charcoal to remove atrazine prior to being reintroduced into the aquifer. This process is a financial burden for the city of Wichita.

Figure 7. Aquifers



There are approximately 7,406 registered groundwater wells in the project area that draw water from these aquifers. Water from these wells is used for domestic use, monitoring, irrigation, livestock watering, lawn and gardening, and public water supply.

Surface waters in this watershed are generally used for aquatic life support (fish), human health purposes, domestic water supply, recreation (fishing, boating, swimming), groundwater recharge, industrial water supply, irrigation and livestock watering. These

are commonly referred to as “designated uses” as stated in the Kansas Surface Water Register, issued by KDHE.

Table 3. Designated Water Uses (Kansas Surface Water Register, 2009)

Designated Uses Table								
Stream Name	**AL**	**CR**	**DS**	**FP**	**GR**	**IW**	**IR**	**LW**
Little Arkansas	E	B	X	X	X	X	X	X
Lone Tree Creek	E	b	O	X	X	O	X	X
Mud Creek	E	b	O	X	O	O	O	X
Running Turkey Creek	E	b	X	O	X	X	X	X
Salt Creek	E	b	O	O	O	O	O	O
Sand Creek	E	B	X	X	X	X	X	X
Sand Creek	E	C	O	O	X	O	X	X
Turkey Creek	E	C	O	O	X	O	X	X
Turkey Creek	E	b	O	O	O	O	X	X
Lake Name								
Dillon Park Lakes, Reno County	E	B	X	X	X	X	X	X
Camp Hawk Lake, Harvey County	E	A	O	X		O	O	O
West Park Lake, Harvey County	E	A		X	X			
Inman Lake, McPherson County	E	B	X	X	X	X	X	X
McPherson Wetlands, McPherson County	E	a	X	X	O	X	X	X
Mingenback Lake, McPherson County	E	B	X	X	O	X	X	X
Newton City Park Lake, Harvey County	E	B	X	X	O	X	X	X

AL = Aquatic Life Support
CR = Contact Recreation Use
DS = Domestic Water Supply
FP = Food Procurement
GR = Groundwater Recharge
IW = Industrial Water Supply
IR = Irrigation Water Supply
LW = Livestock Water Supply

E = Expected Aquatic Life Use Water
X = Referenced stream segment is assigned the indicated designated use
C = Primary contact recreation stream segment is not open to and accessible by the public under Kansas law
O = Referenced stream segment does not support the indicated designated use
A = Primary contact recreation stream segment is a designated public swimming area
B = Primary contact recreation stream segment is by law or written permission of the landowner open to and accessible by the public
a = Secondary contact recreation stream segment is by law or written permission of the landowner open to and accessible by the public
b = Secondary contact recreation stream segment is not open to and accessible by the public under Kansas law

4.4 Land Cover/Uses

Land use activities have a significant impact on the types and quantity of nonpoint source pollutants in the watershed. Urban sprawl or the conversion of agricultural land to suburban homes and small acreages farms can have an impact on water quality. In addition, agricultural activities and lack of maintenance of agricultural structures can have cumulative effects on land transformation.

The major land use in the watershed is **cropland,** covering **68%** of the watershed. The majority of these crops are corn, soybeans, and sorghum. Sources of sediment originating from cropland can originate from overland flow across conventional tilled crop fields and ephemeral gullies that are plowed through each year. Cropland bacteria can originate from application of manure prior to a rainfall event or on frozen ground.

Grazing land or **grassland** comprises **21%** of the watershed. Grassland can be a major contributor of sediment and E. coli bacteria pollution. Gullies in rangeland are a major source of erosion and sedimentation. E. coli can originate from grasslands through overgrazing and allowing livestock access to streams and creeks. **CRP** land makes up nearly **2%** of the land use in this watershed.

The remaining land uses in the watershed are **urban areas**, occupying **5%** of the watershed, and nearly **3%** of the total land mass is **woodlands** with the other 1% coming from water and other uses.

Figure 8. Landcover *(National Land Cover Database, 2001)*

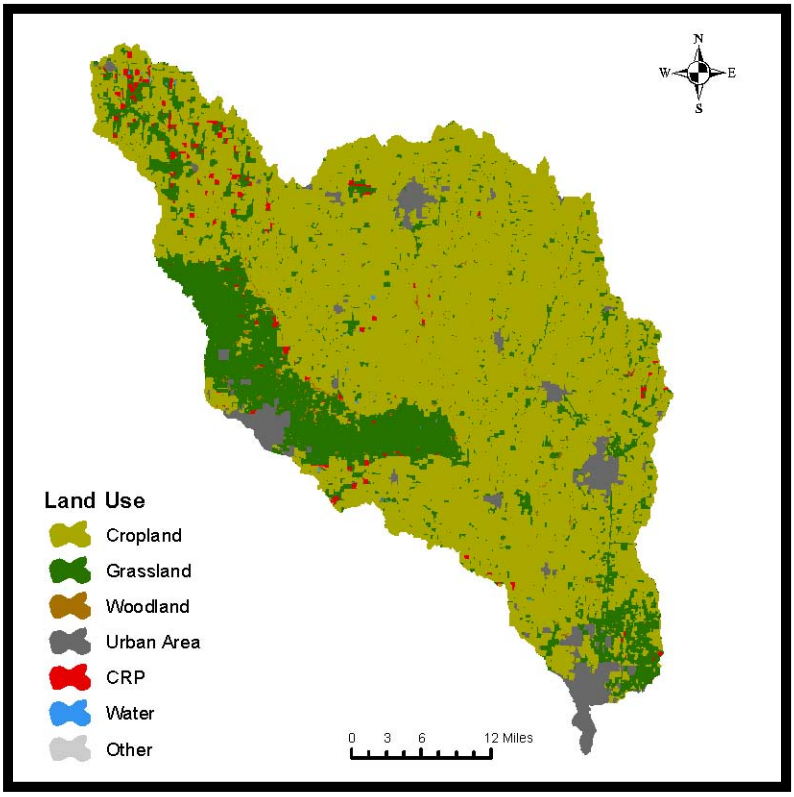


Table 4. Land Use Distribution *(National Land Cover Database, 2001)*

Land Use	Acres	Percentage of Watershed
Cropland	624,499	68.37
Grassland	195,336	21.38
Woodland	26,297	2.88
Urban (including industrial)	47,823	5.24
CRP	15,201	1.66
Water	4,206	0.46
Other	68	0.01
Total	**913,430**	**100.00**

Table 5. Land Cover/Land Use Definitions

Land Cover/Land Use	Definition
Water	All areas of open water, generally with less than 25% cover of vegetation or soil.
Urban/Developed	Includes developed open spaces with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses such as large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes. Also included are lands of low, medium, and high intensity with a mixture of constructed materials and vegetation, such as single-family housing units, multifamily housing units, and areas of retail, commercial, and industrial uses.
Forest/Woodland	Areas dominated by trees generally taller than 5 meters, and greater than 20% of total vegetation cover. Includes deciduous forest, evergreen forest, and mixed forest.
Grassland/Herbaceous	Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
Cropland	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
Source: www.mrlc.gov/nlcd_definitions.php & www.mrlc.gov/changeproduct_definitions.php	

According to the National Agricultural Statistics Service (2007 Census), there are a total of 6,693 farms in the Project Area. The average size of a farm is 216 acres. Crops grown are primarily wheat, grain sorghum, corn and soybeans.

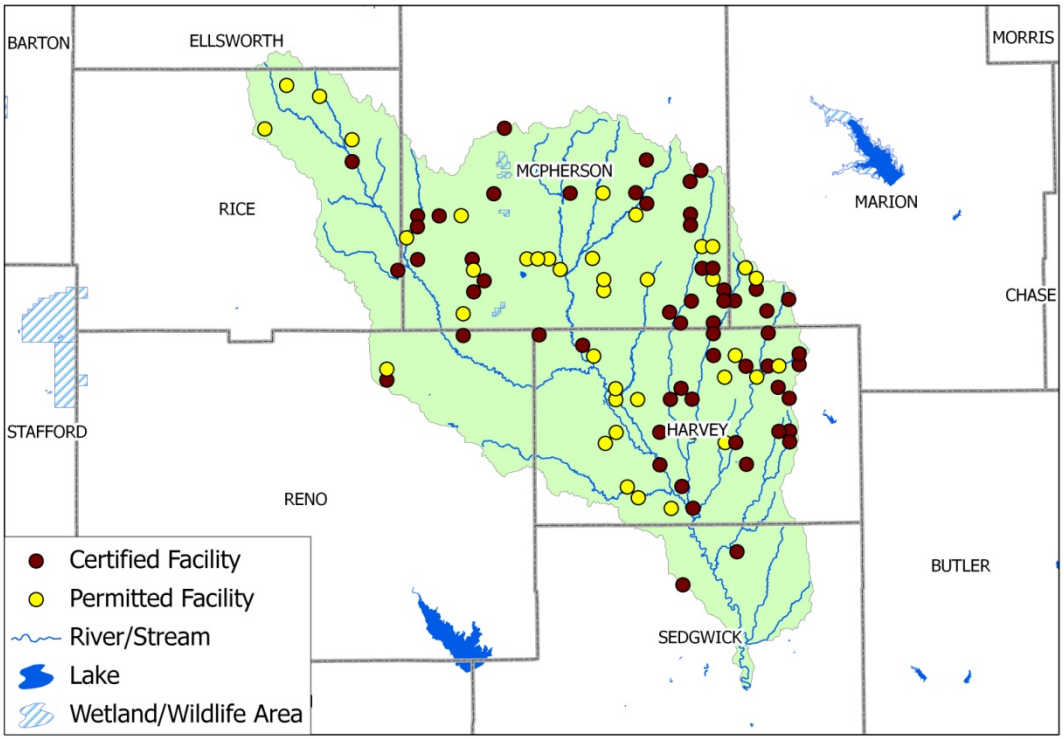
Confined Livestock

Any livestock facility with an animal unit capacity of 300 or more or a facility with a daily discharge regardless of size must register with the Kansas Department of Health and Environment (KDHE). Any facility, no matter what animal capacity, is required to register if KDHE's investigates them due to a complaint and the facility is found to pose a significant pollution potential. Facilities which register with KDHE will be site inspected for significant pollution potential, **if deemed not a significant pollution potential by KDHE, they can be certified if they follow BMPs as recommended by the technical service provider and approved by KDHE. These include but are not limited to: regular cleaning of stalls, managing manure storage areas, etc.** Facilities with 300 animal units up to 999 (known as Confined Feeding Facilities (CFFs) identified to have a significant pollution potential must obtain a State of Kansas Livestock Waste Management Permit. Facilities 1,000 or more must obtain an NPDES Livestock Waste Management Permit (Federal) known as Confined Animal Feeding Operations (CAFOs). Operations with a daily discharge, such as a dairy operation that generates an outflow from the milking barn on a daily basis, are required to have a permit. (see www.kdheks.gov/feedlots) for more information.

Unconfined Concentrated Animal Areas

Unconfined areas of animal concentration – e.g. watering areas, loafing areas or feeding areas can also pose a pollution potential if not managed properly. These are potential sources of nutrients, sediment, bacteria and aquatic impacts from manure and leftover feed. Best Management Practices for these areas can include proper manure application from a cleaning of these areas. This would be especially important when addressing cropland target areas. Other practices such as alternative water supplies, rotational grazing are for grazing type of activities, alternative watering or loafing areas, mineral and feed location rotation etc. will not likely address any type of "regulated" livestock pollution control need.

Figure 9. Animal Feeding Facilities in the Project Area[8]



The purpose of this publication is to illustrate general watershed conditions in the state of Kansas. This map product is provided without representation or implied or expressed warranty of accuracy and is intended for watershed planning purposes only. The originating agency is not responsible for publication or use of this product for any other purpose. This product may be corrected or updated as necessary without prior notification.

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Permit Type

1. *Permitted Facility* – A CAFO that requires on site animal waste management system based upon its pollution potential. A state permit is issued for facilities between 300 and 999 animal units (A.U.); in addition, a federal permit is issued to facilities in excess of 1000 A.U. based upon federal (EPA) animal count procedures.
2. *Certified Facility* – A facility that does not pose a significant pollution potential as determined by KDHE investigation. Certified facilities can be up to 999 animal units and cannot have pollution control structures in place.

Kansas Animal Unit Multipliers

An Animal Unit (AU) is a unit of measurement intended to make comparable the waste generated by different species. As determined by Kansas's law (KSA 65-171d):

- The number of beef cattle weighing more than 700 pounds multiplied by 1.0
- The number of cattle weighing less than 700 pounds multiplied by 0.5
- The number of mature dairy cattle multiplied by 1.4
- The number of swine weighing more than 55 pounds multiplied by 0.4
- The number of swine weighing 55 pounds or less multiplied by 0.1
- The number of sheep or lambs multiplied by 0.1
- The number of horses multiplied by 2.0
- The number of turkeys multiplied by 0.018
- The number of laying hens or broilers, if the facility has continuous overflow watering, multiplied by 0.01
- The number of laying hens or broilers, if the facility has a liquid manure system, multiplied by 0.033
- The number of ducks multiplied by 0.2

4.5 Special Aquatic Life Use Waters

Special aquatic life use waters are defined as “surface waters that contain combinations of habitat types and indigenous biota not found commonly in the state, or surface waters that contain representative populations of threatened or endangered species.” The Little Arkansas River Watershed has NO special aquatic life use waters.

5.0 Overview of Water Quality

5.1 303d Listings in Watershed

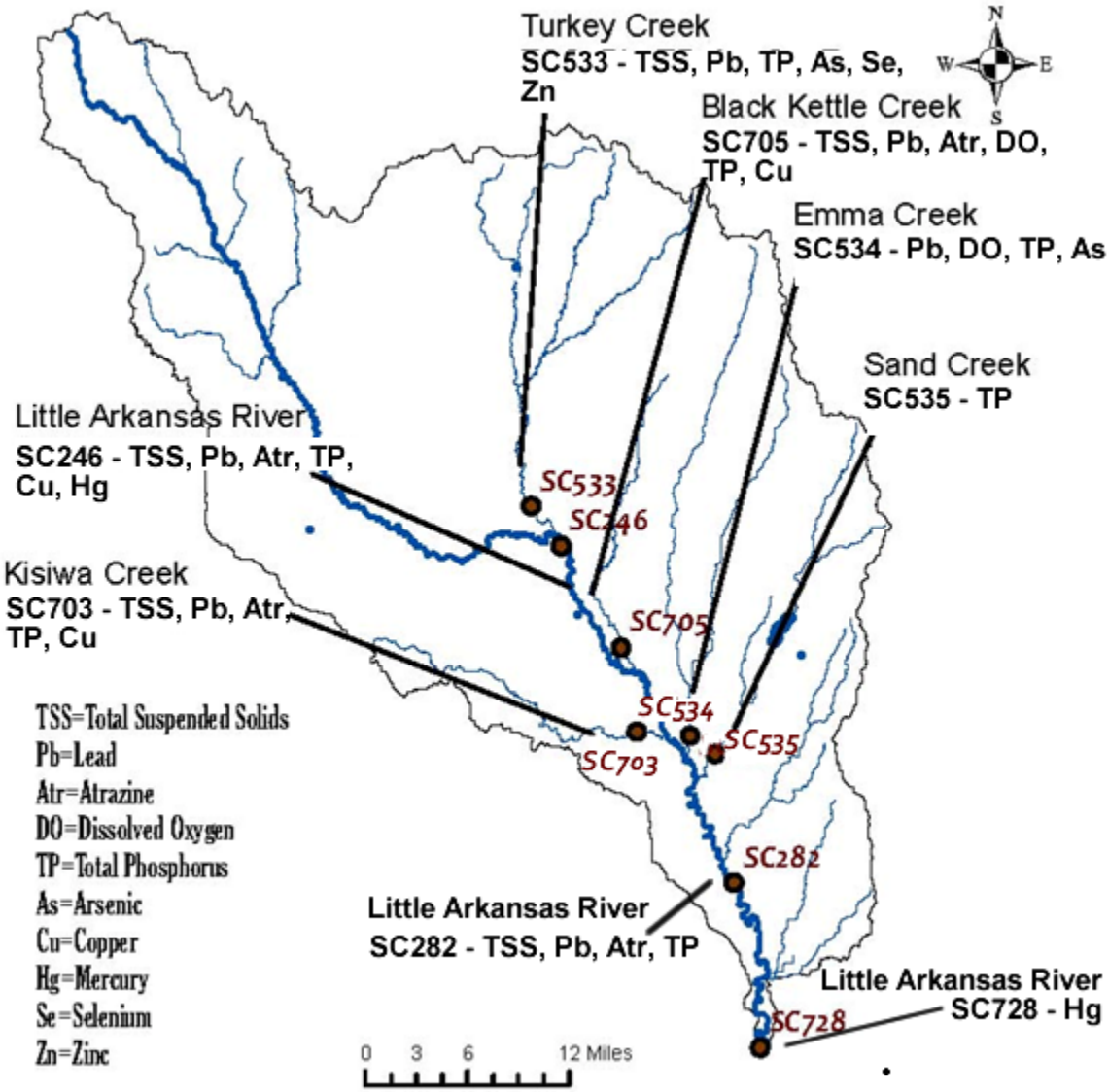
Water quality in the project area is monitored at eight sites on the rivers and six sites on the lakes (see Table 5). As part of the federal *Clean Water Action Plan* completed by KDHE and Natural Resource Conservation Service (NRCS), the Little Arkansas River Watershed was classified as a "Category I – Watershed in Need of Restoration" for water quality and natural resource degradation. It is ranked 14th out of ninety-two watersheds in Kansas in need of restoration. A "303d list" of impaired waters is developed biennially and submitted by KDHE to EPA. To be included on the 303d list, samples taken during the KDHE monitoring program must show that water quality standards are not being met. This in turn means that designated uses are not met. After being included on the 303d list, a water body will then be assigned a TMDL for that impairment. The goal of the WRAPS process is to address high priority TMDLs. According to the *Unified Watershed Assessment*, approximately 67% of the total miles of water in this watershed do not meet their designated uses. Total suspended solids (TSS), lead (Pb), atrazine (Atr), dissolved oxygen (DO), total phosphorus (TP), arsenic (As), copper (Cu), mercury (Hg), Selenium (Se), and zinc (Zn) are impairments of the streams and lakes in the Project Area.

Table 6. Little Arkansas River Watershed Monitoring Sites

Stream Chemistry No.	Monitoring Site
SC533	Turkey Creek near Alta Mills - rotational
SC246	Little Ark River at Alta Mills - permanent
SC705	Black Kettle Creek near Halstead - rotational
SC703	Kisiwa Creek near Halstead - rotational
SC534	Emma Creek near Sedgwick - rotational
SC535	Sand Creek near Sedgwick - rotational
SC282	Little Ark River at Valley Center - permanent
SC728	Little Ark River at Wichita - permanent
Information Provided by KDHE in 2009	

Lake Monitoring No.	Monitoring Site
LM064701	Mingenback Lake
LM050301	Inman Lake
LM063101	Dillon Parks Lake
LM049001	Harvey Co West Park Lake
LM064201	Newton City Park Lake
LM064201	Harvey Co Camp Hawk Lake
Information Provided by the Kansas Nonpoint Source Pollution Management Plan 2000 Update, KDHE	

Figure 10. 303d Listings in the Project Area



5.2 TMDLs in the Watershed

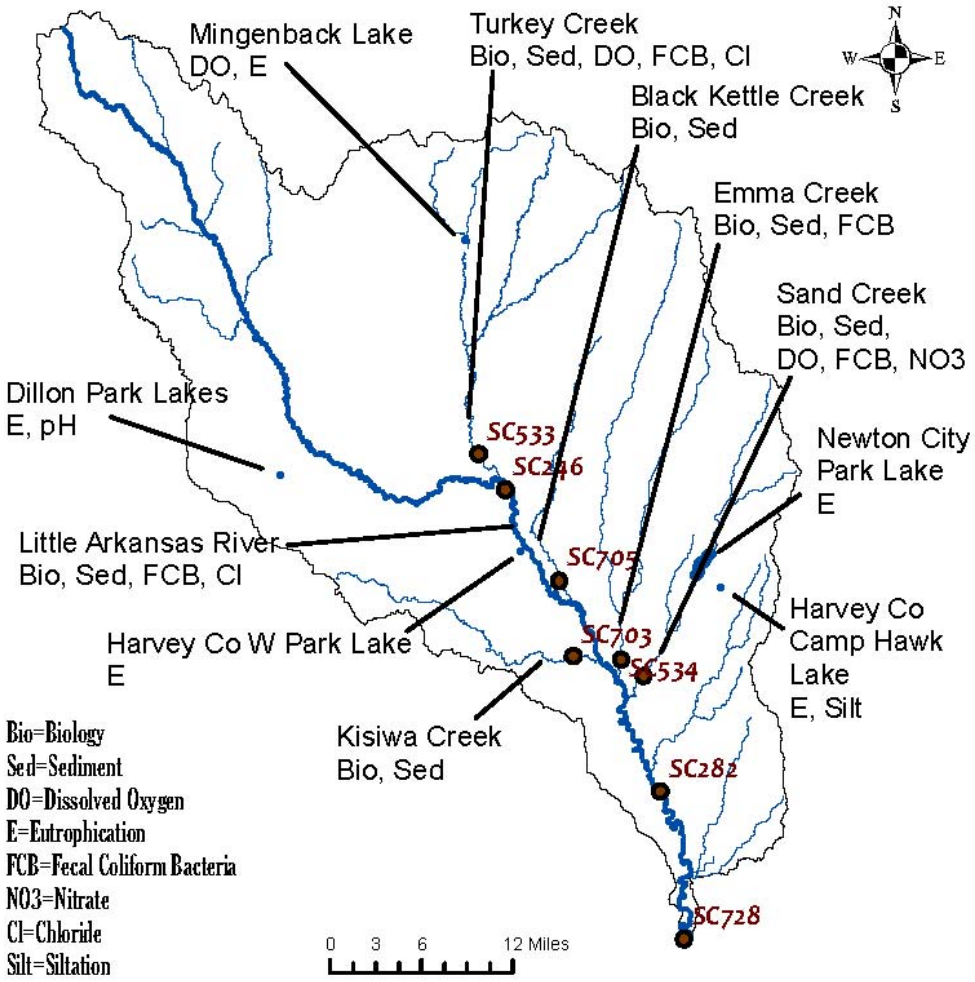
A TMDL designation sets the maximum amount of pollutant that a specific body of water can receive without violating the surface water-quality standards, resulting in failure to support their designated uses. TMDLs established by Kansas may be done on a watershed basis and may use a pollutant-by-pollutant approach or a biomonitoring approach or both as appropriate. TMDL establishment means a draft TMDL has been completed, there has been public notice and comment on the TMDL, there has been consideration of the public comment, any necessary revisions to the TMDL have been made, and the TMDL has been submitted to EPA for approval. The desired outcome of the TMDL process is indicated, using the current situation as the baseline. Deviations from the water quality standards will be documented. The TMDL will state its objective in meeting the appropriate water quality standard by quantifying the degree of pollution reduction expected over time. Interim objectives will also be defined for midpoints in the implementation process. In summary, TMDLs provide a tool to target and reduce point and nonpoint pollution sources.

KDHE reviews TMDLs assigned in each of the twelve basins of Kansas every five years on a rotational schedule. The table below includes the review schedule for the Little Arkansas River Basin.

Table 7. TMDLs Review Schedule for the Project Area[9]

Year Ending in September	Implementation Period	Possible TMDLs to Revise	TMDLs to Evaluate
2011	2012-2021	2000, 2001	2000, 2001, 2006
2016	2017-2026	2000, 2001, 2007	2000, 2001, 2006, 2007

Figure 11. TMDLs in the Project Area



The map above is for general illustration and the following tables accurately describe the relationship between the sampling stations and the TMDL impairment.

Water Quality Impairments and TMDL(s) in the Little Arkansas River Watershed are listed in the table below. **Those high-lighted in yellow are the impairments and areas in which the SLT has chosen to target in this WRAPS Plan. Those TMDL's high-lighted in green are not directly targeted by this WRAPS Plan but the TMDL will subsequently be met by addressing the areas in yellow.**

Table 8. Water Quality Impairments in the Project Area[10]

TMDL Pollutant	Water Segment	Endgoal of TMDL	Priority	Sampling Station
Category 4b – Watershed planning is addressing atrazine problem				
Atrazine (Atr)	Emma Creek	3 µg/l	Low	SC534
	Sand Creek			SC535
	Turkey Creek			SC533
Category 4a – TMDL has been developed for water				
Biology (Bio)	Black Kettle Creek	Average MBI (Macroinvertebrate Biotic Index)of 4.5 or less	High	SC705
	Emma Creek			SC534
	Kisiwa Creek			SC703
	Little Ark River			SC246, SC282, SC728
	Sand Creek			SC535
	Turkey Creek			SC533
Biology/Sediment (Bio/Sed)	Black Kettle Creek	Average % composition of EPT (Ephemeroptera, Plecoptera and Trichoptera)) taxa of 40% or more	High	SC705
	Emma Creek			SC534
	Kisiwa Creek			SC703
	Little Ark River			SC246, SC282, SC728
	Sand Creek			SC535
	Turkey Creek			SC533
Dissolved Oxygen (DO)	Turkey Creek	BPD <4mg/l and dissolved oxygen >5 mg/l	High	SC533
	Sand Creek	Dissolved oxygen >5mg/l	Medium	SC535
	Mingenback Lake	Chlorophyll a ≤12.8 µg/l and dissolved oxygen >5mg/l	Medium	LM064701
Eutrophication (E)	Newton City Park Lake	Chlorophyll a ≤20µg/l	High	LM064201
	Dillon Park Lakes	Chlorophyll a ≤20µg/l, pH ≥6.5 and ≤8.5	Medium	LM063101
	Mingenback Lake	Chlorophyll a ≤12.8 µg/l and dissolved oxygen >5mg/l	Medium	LM064701
	Harvey Co. Camp Hawk Lake	Chlorophyll a ≤9.5µg/l	Low	LM063401
	Harvey Co. West Park Lake	Chlorophyll a ≤12µg/l	Low	LM049001

Fecal Coliform Bacteria (FCB)*	Emma Creek	Achieve Water Quality Standards fully supporting Primary Contact Recreation and Secondary Contact Recreation	High	SC534
	Little Arkansas River			SC246, SC282, SC728
	Sand Creek			SC535
	Turkey Creek			SC533
Nitrate (NO3)	Sand Creek	Nitrate concentration ≤10mg/l	High	SC535
pH	Dillon Park Lakes		Medium	LM063101
Chloride (Cl)	Little Arkansas River	Chloride concentration <250mg/l	Medium	SC246
	Turkey Creek			SC533
Siltation (Silt)	Harvey Co. Camp Hawk Lake	Secchi disk depth >30cm	Low	LM063401

TMDL Pollutant	Water Segment	Priority	Sampling Station
Category 5 – TMDL is needed (303d List)			
Total Suspended Solids (TSS)	Little Arkansas River	High	SC246
	Black Kettle Creek	Low	SC705
	Kisiwa Creek		SC703
	Little Arkansas River		SC282, SC728
	Turkey Creek		SC533
Lead (Pb)	Emma Creek	Medium	SC534
	Kisiwa Creek		SC703
	Little Arkansas River		SC246, SC728
	Turkey Creek		SC533
	Little Arkansas River	Low	SC282
	Black Kettle Creek		SC705
Atrazine (Atr)	Black Kettle Creek	Low	SC705
	Kisiwa Creek		SC703
	Little Arkansas River		SC246, SC282, SC728
Dissolved Oxygen (DO)	Black Kettle Creek	Low	SC705
	Emma Creek		SC534
Total Phosphorus (TP)	Black Kettle Creek	Low	SC705
	Emma Creek		SC534
	Kisiwa Creek		SC703
	Little Arkansas River		SC246, SC282, SC728
	Sand Creek		SC535
	Turkey Creek		SC533
Arsenic	Emma Creek	Low	SC534

(As)	Turkey Creek		SC533
Copper (Cu)	Black Kettle Creek	Low	SC705
	Kisiwa Creek		SC703
	Little Arkansas River		SC246
Mercury (Hg)	Little Arkansas River	Low	SC728
Selenium (Se)	Turkey Creek	Low	SC533
Zinc (Zn)	Turkey Creek	Low	SC533

5.3 Water Quality Impairments Assigned to the Project Area

5.3.1 Atrazine

The SLT team is addressing **Atrazine** on Emma, Sand and Turkey Creeks which are currently listed as low priority on the 2010 TMDL list but have been granted "Category 4b" status.

Section 303(d) of the Clean Water Act and the US Environmental Protection Agency's supporting regulations require states to develop lists of waterbodies impaired by a pollutant and needing a TMDL. USEPA's regulations also recognize that other pollution control requirements may obviate the need for a TMDL. These alternatives to TMDLs are commonly referred to as "Category 4b" waters. For the 2008 reporting cycle, the Kansas Department of Health and Environment assigned 11 nonpoint source atrazine impaired stream segments in the Little Arkansas River subbasin to Category 4b. In August 2010, KDHE and EPA approved the Category 4b designation. KDHE will be reviewing data to evaluate success in maintaining water quality standard compliant atrazine levels in the stream data to keep them on the Category 4b list (personal contact w KDHE, 2011).

Atrazine is also listed on the 303d list for the Little Arkansas River, Black Kettle Creek and Kisiwa Creek. The segments not listed on the 303(d) list within the watershed all have samples that have exceeded the water quality criteria for Drinking Water Supply and Chronic Aquatic Life, with the exception of Station 705 on Black Kettle Creek. However, the sampling stations associated with the segments that are not listed are primarily rotational sampling stations, and therefore lack the sufficient number of samples over the water quality criteria to actually list these segments under Category 5 on the prior 303(d) lists. Since agricultural land uses throughout the watershed are subject to atrazine application practices, this Category 4B alternative will be applicable to the entire watershed of the Little Arkansas River and will benefit the downstream reach of the Arkansas River from Wichita to Derby.

Atrazine is a relatively inexpensive and effective herbicide that is widely used in corn and sorghum production. The watershed average for atrazine exceeds the statewide average. Atrazine is of importance to the City of Wichita due to the expense and

inconvenience of filtering river water in order to remove all atrazine prior to recharge of the river water into the aquifer. The City of Wichita cost shares on Atrazine BMP placement within the watershed.

5.3.2 Sediment and Nutrients

Total Suspended Solids (TSS) is on the 303d list as a high priority for the Little Arkansas River and low priorities for Black Kettle, Kisiwa and Turkey Creeks. TSS is made up of particles such as soil, algae, and finely divided plant material suspended in water. These pollutants may attach to sediment particles on the land and be carried into water bodies with storm water. In the water, the pollutants may be released from the sediment or travel farther downstream. These particles can come from cropland, stream banks, construction sites, as well as municipal and industrial wastewater. High TSS can block light from reaching submerged vegetation, slowing down photosynthesis. High TSS can also cause an increase in surface water temperature as the suspended particles absorb heat from sunlight, also harming aquatic life. Suspended sediment can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development. When suspended solids settle to the bottom of a water body, they can smother the eggs of fish and aquatic insects, as well as suffocate newly hatched insect larvae. Settled sediments can fill in spaces between rocks which could have been used by aquatic organisms for homes. High TSS can also cause problems for industrial use as solids may clog or scour pipes and machinery.

Siltation and/or Sedimentation is listed as a low priority TMDL in this watershed at Harvey County Camp Hawk Lake. Sediment is listed as a high priority TMDL for Black Kettle, Emma, Kisiwa, Sand, and Turkey Creeks as well as the Little Arkansas River. The SLT considers sedimentation to be an area of concern throughout the Little Arkansas River Watershed and will target all these high priority areas.

Silt and sediment accumulation in the lakes are caused by soil erosion into the waterways. Silt decreases water clarity and reduces water storage capacity. Phosphorus attached to soil particles can be introduced into the lake by sediment accumulation, thus accelerating the eutrophication problem. Sedimentation can be caused by overland erosion from cropland, degraded pastureland, streambank sloughing, or improperly contained construction projects.

Eutrophication (E) is a natural process that occurs when a water body receives excess nutrients. These excess nutrients, primarily **nitrogen** and **phosphorus**, create optimum conditions that are favorable for algal blooms and plant growth. Some species of blue-green algae produce chemicals that are harmful to both animals and humans. These algal blooms have been linked to health problems ranging from skin irritation to liver damage to death, depending on type and duration of exposure. The livelihood of many fish, shellfish, and livestock has also been endangered through contact with this toxin. Proliferation of algae and subsequent decomposition can also deplete available dissolved oxygen in the water profile.

Excess nutrient loading from the watershed creates accelerated rates of eutrophication followed by decreasing amounts of **dissolved oxygen** (DO) in the water. This results in unfavorable habitat for aquatic life. These excess nutrients can originate from failing septic systems and manure and fertilizer runoff in rural and urban areas. DO is ranked a medium to high priority TMDL for Turkey and Sand Creeks as well as Mingenback Lake. The SLT will not target for DO impairments specifically but will address Phosphorus and sediment and will subsequently meet the TMDLs for Turkey and Sand Creeks and the 303d listed Emma and Black Kettle Creeks.

Total Phosphorus (TP) is 303D/Category 5 listed currently for Black Kettle, Emma, Sand, Kisiwa and Turkey Creeks as well as the Little Arkansas River. TP will be targeted on cropland and livestock areas in these sub watersheds.

5.3.3 Fecal Coliform Bacteria

The Project Area has a high priority TMDL for **Fecal Coliform Bacteria** (FCB) on Emma, Sand and Turkey Creeks as well as the Little Arkansas River. The SLT will target these areas to meet TMDL needs. FCB are present in human and animal waste and is present in the digestive tract of all warm blooded animals including humans and animals (domestic and wild). Its presence in water indicates that the water has been in contact with human or animal waste. FCB is not itself harmful to humans, but its presence indicates that disease causing organisms, or pathogens, may also be present. A few of these are Giardia, Hepatitis, and Cryptosporidium. Presence of FCB in waterways can originate from failing septic systems, runoff from livestock production areas, close proximity of animals to water sources, and manure application to land if it is applied before a rainfall event or on frozen ground. TMDLs for fecal coliform bacteria have an upper limit of 200cfu/100ml of water for primary contact recreation, such as swimming, and an upper limit of 2,000cfu/ml of water for secondary, non-contact recreation, such as boating and fishing. The Little Arkansas River and many of its tributaries are impacted by FCB.

The approved TMDLs associated within the watershed were written for Fecal Coliform Bacteria. EPA required the adoption of the E. Coli standard in 2003 since E. Coli correlates better between illness and concentrations than FCB. Kansas House Bill 2219 established the E. Coli criteria which is based on a geometric mean for 5-samples collected in a 30-day period with numeric standards based on the designated recreational use of the stream.

The bacteria endpoints tied to water quality standards will be maintaining geometric means of bacteria samples collected within 30-day periods during April-October below 262 cfus/100ml on these streams. Reductions in frequency and magnitude of high bacteria will serve as the necessary allocations to reduce “loading” and achieve the water quality standard.

Throughout the remainder of this WRAPS Plan, the term “Bacteria” will be used and will indicate both FCB and E. Coli Bacteria as required by the 2003 Water Quality Standard for E. Coli Bacteria, House Bill 2219.

5.3.4 Other pollutants in the Project Area

The Project Area has a high priority TMDL for **biology** impairment for support of aquatic life with an end goal Macroinvertebrate Biotic Index (MBI) of 4.5 or less. Organic material from agricultural and urban nonpoint sources may contribute to the biological impairment downstream. These sources tend to become dominant under higher flow conditions. Additional biological measures are necessary to assure indications of good aquatic community health.

The SLT is not directly addressing the Biology TMDL but in addressing the Biology/Sediment TMDLs for Black Kettle, Emma, Kisiwa, Sand and Turkey Creeks as well as the Little Arkansas River, the Biology TMDLs for these water bodies will be met.

Nitrate (NO3) has been listed as a high priority TMDL for Sand Creek. Water naturally contains less than 1 milligram of nitrate-nitrogen per liter and is not a major source of exposure. Higher levels indicate that the water has been contaminated. Common sources of nitrate contamination include fertilizers, animal wastes, septic tanks, municipal sewage treatment systems, and decaying plant debris. High nitrate concentrations can cause health problems. For example, infants who are fed water or formula made with water that is high in nitrate can develop a condition that doctors call methemoglobinemia, also called "blue baby syndrome" because the skin appears blue-gray or lavender in color. This color change is caused by a lack of oxygen in the blood.

Dillon Park Lakes are on the 2010 TMDL list for having a medium priority **pH,** with an average pH of 9.28. The pH of water determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals.

The Little Arkansas River and Turkey Creek are listed as medium priority TMDL for **Chloride**. Chloride is a chemical of concern because of its large and variable concentrations in the Little Arkansas River that can exceed drinking-water standards. Chloride concentrations need to be less than 250 mg/l. Chloride increases the electrical conductivity of water and thus increases its ability to corrode. The corrosion of piping systems could increase levels of metals in drinking-water.

It is reported that TMDLs are needed in the Project Area for Lead, Total Phosphorus, Arsenic, Copper, Mercury, Selenium and Zinc as these pollutants are currently on the 303d list. These pollutants may become of higher priority to the SLT but at this time, the Little Arkansas River Watershed’s SLT wishes to begin addressing the priority issues of Atrazine, Fecal Coliform Bacteria, and Sediment and Nutrient pollutants that are listed as TMDLs in the Project Area.

5.4 TMDL Load Allocations[11]

TMDL loading is based on several factors. A total load is derived from the TMDL. Part of this total load is wasteload allocation. This portion comes from point sources in the watershed: NPDES facilities, CAFOs or other regulated sites. Some TMDLs will have a natural or background load allocation, which might be atmospheric deposition or natural mineral content in the waters. After removing all the point source and natural contributions, the amount of load left is the TMDL Load Allocation that originates from nonpoint sources (pollutants originating from diffuse areas, such as agricultural or urban areas that have no specific point of discharge) and is the amount that this WRAPS project is directed to address. All Best Management Practices (BMPs) derived by the SLT will be directed at this Load Allocation by nonpoint sources.

5.4.1 Atrazine

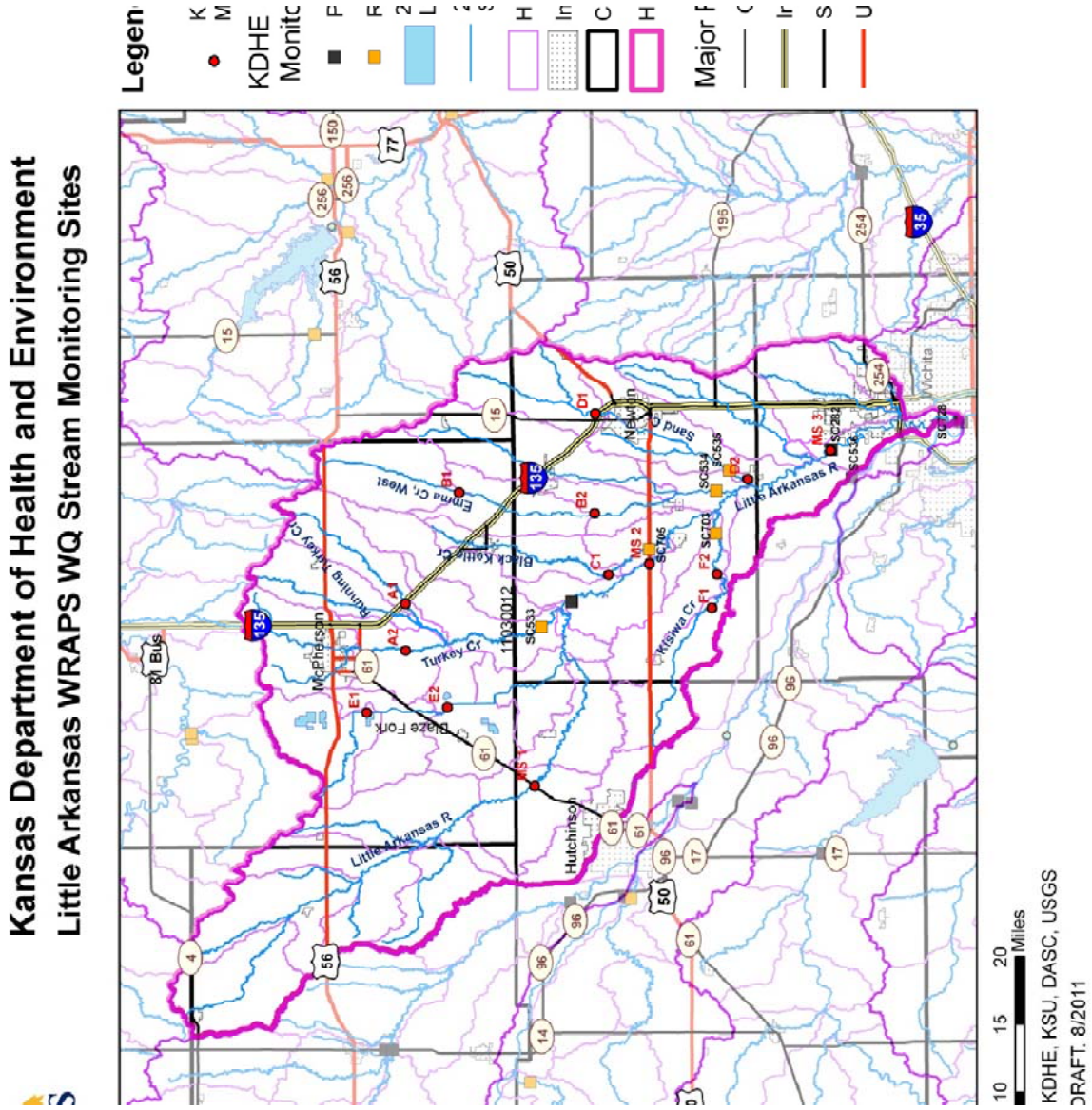
Atrazine comes from field runoff. Streamflows within the Little Arkansas River increase when moving downstream. The high flows associated with these streams are of particular interest when interpreting atrazine impairments because atrazine impairments and exceedances within the stream are primarily caused by runoff from heavy rainfall after the herbicide application. High flows transport atrazine from the upland fields downstream to the on-stream monitoring stations. Atrazine concentrations are significantly higher during the runoff period months of April, May, June, and July due to the prevalent use of atrazine during this time period and because of the susceptibility to heavier rainfall events that contribute runoff. The TMDL has a load reduction target of 50% for atrazine and 3ug/L. Averages will not exceed an average of 3 ppb at sampling stations within the watershed during the runoff period using the *4B Alternative*[12] and the WRAPS Plan.

5.4.2 Sediment

Sedimentation comes predominantly from nonpoint sources. Based on the soil characteristics of the watershed, overland runoff can easily carry sediment to stream segments. Total Suspended Solids (TSS) which are particles such as soil, algae, and finely divided plant material suspended in water. Sources of TSS are soil erosion from cropland, stream banks, or construction sites, and municipal and industrial waste.

The pollutant load reduction responsibility will be to decrease the average condition of sediment over the range of flows encountered on the Little Arkansas River. KDHE cross referenced their monitoring data with K-State's water monitoring data [*Little Arkansas Water Quality Monitoring Quality Assurance Project Plan (QAPP),* Appendix 15.2]; see Figure 12 for monitoring site information. KDHE then added K-State tillage survey results and land usage in the watershed to the monitoring date results and was then able to determine target areas for sediment reductions. KDHE also made an adjustment to the flow on Turkey Creek to better calibrate the mass balance scenario and removed the loads coming in on the Little Arkansas River above Highway 61 based on K-State's data.

Figure 12. KDHE and K-State Water Quality Monitoring Stations



In their analysis, KDHE determined that the Load Allocation will be a reduction of sediment loadings such that average TSS concentrations are below 100ppm in stream a majority of the time. Therefore, the nonpoint source TSS load reduction needed is 204 tons/day to meet the TMDL at the average flow condition based on an in stream average concentration of 100 ppm of TSS. BMPs implemented on targeted areas in the watershed will accomplish the TMDL goal over several years.

Table 9. Estimated TSS Loads, *Provided by KDHE, July 2011.*

Sub Watershed	Average Flow	TSS Load	TSS Target Load	TSS	TSS Load Red

		lbs/day	lbs/day	% Reduction	Tons/year
Turkey Creek	62.37	51667.2	24840	51.92	4895.96
Lower W. Emma Cr	41.6	35268.48	22464	36.31	2336.82
Lower Blazefork	34.4	28978.56	18576	35.9	1898.47
Lower Sand Cr	54.3	59230.44	29322	50.5	5458.29
Lower Kisiwa	25.76	29490.048	13910.4	52.83	2843.29
Black Kettle	17.26	11370.888	9320.4	18.03	374.21
LA Valley Center (Less loads from above Hwy 61)	658	659955.6	251100	61.95	74616.15

5.4.3 Nutrients

Nutrient concentrations in the Little Arkansas River are derived primarily of nitrogen and phosphorus from in-field runoff. The Nitrate TMDL for Sand Creek is a point source TMDL; therefore Nitrates will not be targeted in this WRAPS Plan as WRAPS funds can not be used to address point source pollutants. The City of Newton is a contributor to the point source Nitrate pollution along Sand Creek. This WRAPS plan would like to approach the City of Newton and collaborate to achieve a reduction in N pollution using outside funding. The possibility for collaboration with the City of Newton will be discussed in more detail in Section 13.

KDHE cross referenced their monitoring data with K-State's water monitoring data [*Little Arkansas Water Quality Monitoring Quality Assurance Project Plan (QAPP),* Appendix 15.2], see Figure 12 above for monitoring site information. KDHE then added K-State tillage survey results and land usage in the watershed to the monitoring data results and was then able to determine target areas for phosphorus reductions. KDHE also made an adjustment to the flow on Turkey Creek to better calibrate the mass balance scenario and removed the loads coming in on the Little Arkansas River above Highway 61 based on K-State's data.

Table 10. Estimated Total Phosphorus Loads*, Provided by KDHE in July 2011.*

Sub Watershed	Average Flow	TP Load lbs/day	TP Target Load lbs/day	TP % Reduction	TP Load Reductions lbs/year
Turkey Creek	62.37	184.42	49.68	73.06	49181.56
Lower W. Emma Cr	41.6	103.33	44.93	56.52	21318.34
Lower Blazefork	34.4	109.6	37.15	66.1	26442.94
Lower Sand Cr	54.3	106.17	58.64	44.76	17346.11

Lower Kisiwa	25.76	72.33	27.82	61.54	16247.35
Black Kettle	17.26	31.69	18.64	41.18	4762.72
LA Valley Center (Less loads from above Hwy 61)	658	1236	502.2	59.35	267837

BMPs implemented on targeted areas in the watershed will accomplish this TMDL goal over several years.

5.4.4 Bacteria[13]

Bacteria Load Reductions should result in less frequent exceedance of the nominal E. Coli Bacteria (ECB) criterion (262 Colony Forming Units (CFUs)/100ml) for the sampling stations above Wichita in the Little Arkansas River watershed; and in lowered magnitude of those exceedances.

Data trends presented in Table 11 below, prepared by KDHE Watershed Planning, 2011, indicate Lower Sand Creek needs the most attention in terms of addressing bacteria impairment in the sub-watersheds below. This site is below Newton which has urban contributions such as a concentrated geese population on the creek, pet waste and other sources associated with urban living.

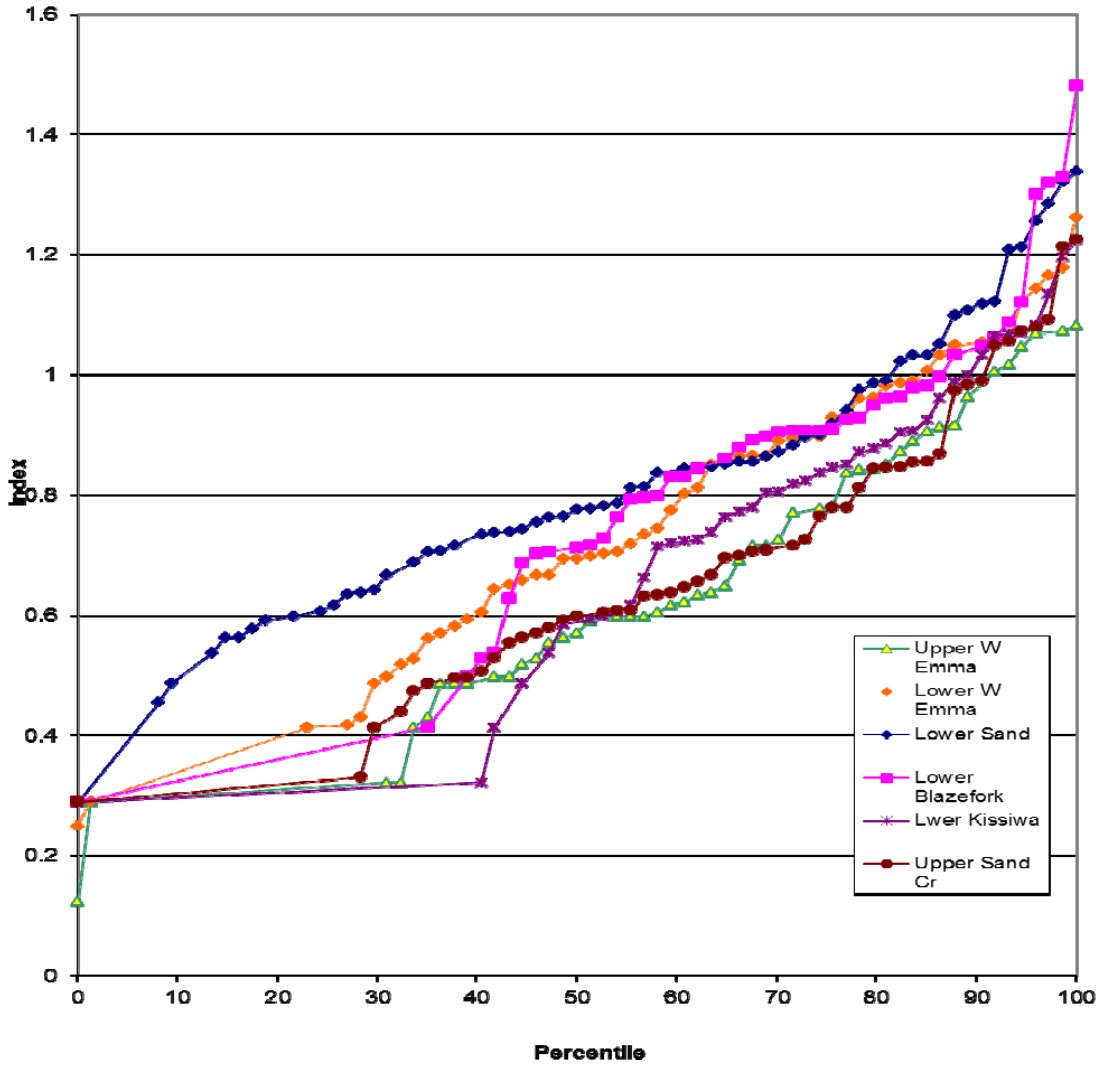
***Table 11. Data Trends for Bacteria**, Provided by KDHE in 2011.*

Data Trends for Bacteria, KDHE 2011						
Location	**Geomean**	**Index 90%**	**Geomean Rank**	**90% Index Rank**	**Index 50%**	**50% Index Rank**
Lower Sand Cr	77	1.12	1	1	0.78	1
Lower West Emma Cr	45	1.05	2	2	0.7	3
Lower Blazefork Cr	41	1.05	3	3	0.71	2
Lower Kissiwa Cr	27	1.03	5	4	0.45	7
Upper West Emma Cr	26	1	6	5	0.57	5
Upper Sand Cr	28	0.99	4	6	0.59	4
Upper Blazefork Cr	23	0.96	7	7	0.49	6
Upper Kissiwa Cr	18	0.92	8	8	0.45	7
Black Kettle	14.5	0.92	9	9	0.32	8
Running Turkey	14.4	0.84	10	10	0.42	9
Dry Turkey	13.4	0.82	11	11	0.36	10

In order to assess the impact of BMPs addressing bacteria impairments the relative frequency and magnitude of bacteria concentrations seen in the receiving streams,

monitored by KDHE on a routine or rotational basis, must be measured to determine if water quality improvements are being achieved. The bacteria index is utilized by KDHE to assess the relative frequency and magnitude of the bacteria concentrations at KDHE monitoring sites.

Figure 13. Bacteria Index for Sub-watersheds, *Provided by KDHE in 2011.*



The calculated bacteria index for the Little Arkansas River sampling stations SC246, SC282, and SC728 are the natural logarithm of each sample value taken during the April-October Primary Recreation season, divided by the natural logarithm of the bacteria criteria for Primary Recreation Class B [ln(262)]. The bacteria indices for the tributaries of Sand and Emma Creek are also based on the Primary Recreation Class B criterion, whereas Turkey Creek is based on the Primary Recreation Class C criterion (427 CFUs/100ml).

Index = ln(ECB Count) / ln(262)

The indicator will be the Upper Decile of those index values; with the target being that the index is below 1.0 at the upper decile (90^{th} percentile).

Ultimately, compliance with water quality standards will require sampling 5 times within 30 days during several periods during the primary recreation season, and calculating the geometric mean of those samplings. Meeting that test, will be justification for delisting the stream impairment.

Sampling station SC282 on the Little Arkansas River at Valley Center, station SC534 on Emma Creek, and station SC535 on Sand Creek were sampled in accordance with the Water Quality Standard in 2009. The geometric mean for the five samples collected over a 30-day period was 1528 CFUs/100ml for SC282, 1190 CFUs/100ml for SC534 and 2093 CFUs/100ml for SC535. The intensive sampling geometric mean results for these stations are well above the Water Quality Standard. BMPs implemented on targeted areas in the watershed will decrease bacteria counts in the Little Arkansas River.

6.0 Critical Targeted Areas

In the Little Arkansas Watershed, “Critical Areas” have been identified as areas that need to be protected or restored, such as areas that have TMDLs, emerging pollutant threats on the 303d list or contain a public water supply. Critical areas are defined by EPA as geographic areas that are critical to implement management practices in order to achieve load reductions.[14] Four areas have been identified as Critical Areas in this WRAPS:

1. Sub watersheds that have been identified by Water Monitoring Data
2. Sub watersheds with high priority TMDLs or are 303d listed
3. Sub watersheds that have a Category 4B designation
4. Sub watersheds that the City of Wichita has special interest in protecting due to their proximity to the recharge project.

Based on the information available, the Sub watersheds that are considered “Critical Areas” are as follows:

- Black Kettle for Sediment/Biology and Total Phosphorus (TP)
- Emma Creek for Atrazine, Sediment/Biology, TP and Bacteria
- Sand Creek for Atrazine, Sediment/Biology, TP and Bacteria
- Turkey Creek for Atrazine, Sediment/Biology, TP and Bacteria
- Kisiwa Creek for Sediment/Biology and TP
- The Little Arkansas River for Atrazine Sediment/Biology, TP and Bacteria

This WRAPS Plan will target specific land within these critical areas and in doing so will meet TMDL needs in all areas mentioned above. While targeting within these critical areas and meeting the previously mentioned TMDLs, this Plan will subsequently serve to meet the TMDLs and 303d listed areas mentioned below:

- Black Kettle for Biology, Total Suspended Solids (TSS) and Dissolved Oxygen (DO)
- Emma Creek for Biology and DO
- Sand Creek for Biology and DO
- Turkey Creek for Biology, TSS and DO
- Kisiwa Creek for Biology and TSS
- Little Arkansas River – Biology and TSS

In every watershed, there are specific locations that contribute a greater pollutant load due to soil type, proximity to a stream and land use practices. By focusing Best Management Practices (BMPs) in these areas; pollutants can be reduced at a more efficient rate. These areas are called targeted areas. “Targeted Areas” are those specific areas within the Critical Areas that require BMP placement in order to meet load reductions.

Therefore, the SLT has targeted areas within the sub watersheds listed above to focus BMP placement for atrazine, sediment, nutrients and Bacteria. Areas and impairments targeted for these sub watersheds:

- Cropland will be targeted for Atrazine, Sediment and Phosphorus.
- Livestock areas will be targeted for Phosphorus and Bacteria.
- Streambanks and Riparian areas for Sediment and Nutrients.

Methodology for Identifying and Prioritizing Watersheds for BMP Implementation Targeting for Sediment and Nutrient (primarily Phosphorus) TMDLs.

Utilization of the TMDL as the method for identifying and prioritizing critical watersheds for BMP implementation targeting was discussed between the project management team and KDHE. It was determined the TMDL was dated (to be revisited in fall of 2011) and KDHE monitoring sites may not be conducive to the goals of the 9 element plan.

Utilizing Existing KSU data: The decision was then made to utilize all of the information gathered in the process. The Black Kettle Creek watershed had been modeled for sediment and had been a focus for atrazine BMPs under a USDA Conservation Innovation Grant. Recent water quality and flow data (2006-2010 for atrazine and 2008 to 2010 for TSS, TP, TN and bacteria) more reflective of the goals of targeting BMP implementation was collected by KSU. Water quality trends did show some areas to focus on as described previously, however, since the modeling was limited to Black Kettle Creek watershed, land use, cropping systems and BMP adoption tendencies were also evaluated. For example, KDHE prepared a landuse map to quantify acres of cropland per sub-watershed where water quality data was available. An estimate of cropping systems for each sub-watershed was also prepared resulting in a numerical illustration of where the greatest opportunity for effective BMPs would be located in the HUC8.

The next step was to analyze data collected by KSU through the Section 319 funded Tillage Survey (Project # NPS 2005-0013). The survey was completed by local extension agents or other local resources for selected counties. The Little Arkansas WRAPS Coordinator foresaw the need to collect this data in the service area (mainly McPherson and Harvey Counties) for the WRAPS 9 element planning process. Additionally, there is discussion about making another round of surveys in the area as there is some evidence no-till practices are only being implemented for double cropping or other purposes not necessarily for long term resource protection and sustainability. This is dependent upon the grant status and circumstances. This information was determined to be more useful to assure BMP implementation schedule prepared by KSU was consistent with BMP needs.

Another factor was the City of Wichita contributing to cost share to enhance incentives for adoption of atrazine BMPs. Their interest is minimizing watershed pollutant contributions thus reducing their treatment costs for the aquifer recharge project.

The Watershed Planning Section evaluated the median (50^{th} % meaning 50% of the samples collected exceeded the surface water quality standard, upper quartile (75^{th} % meaning 75% exceeded the surface water quality standard) and upper decile (90^{th} % meaning 90% exceeded the surface water quality standard) from the samples collected

by KSU. An index and the upper decile statistical method for E. Coli Bacteria, (see water quality summary) to prioritize the HUC 12 critical watersheds for livestock, was utilized. For TSS, the upper decile statistical method was used. The average for TP concentrations was used as it seemed better suited for prioritization. Total nitrogen concentration averages from only KDHE monitoring data was used.

Ultimately, KSU and KDHE concurred that the water quality data collected by KSU and the data at the KDHE Turkey Creek station and KSU would identify and prioritize critical watershed for BMP implementation targeting.

6.1 Targeting Cropland

Runoff from crop fields is undoubtedly a large source of the atrazine, sediment and P pollution entering the Little Arkansas River. In-field erosion, carrying these pollutants to tributaries, is also a contributor to the project area's nonpoint source pollution.

6.1.1 Targeting Cropland for Atrazine

Atrazine priority areas were defined by the Little Arkansas River Watershed stakeholder leadership team, KDHE and Kansas State University. The initial watersheds were selected by size, similar farming, rainfall patterns and proximity to each other. In 2005, these five sub-watersheds (Dry Turkey, Running Turkey, Upper West Emma, Lower West Emma and Black Kettle Creek) were assessed to determine daily atrazine contaminant loadings. Three of the sub-watersheds used atrazine BMPs while the remaining two sub-watersheds maintained existing farm practices. The three watersheds using atrazine BMPs in the "Paired Watershed Study" were:

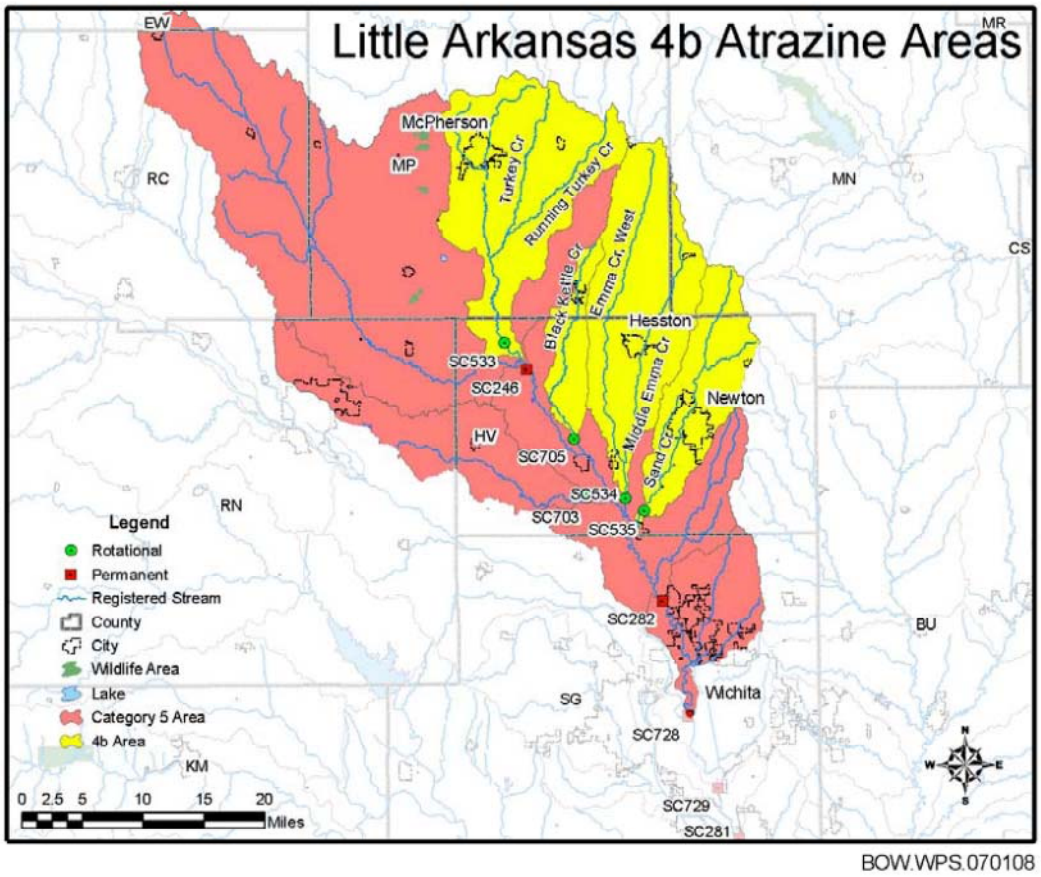
- Dry Turkey Creek, HUC 11030012020070 - 23,536 acres
- Upper West Emma Creek, HUC 11030012040010 - 30,615 acres
- Black Kettle Creek, HUC 11030012030030 - 19,983 acres

These sites were monitored in 2006 and 2007 and results showed that by implementing atrazine BMPs, the concentration of atrazine was decreased by greater than 40% in 2006 when compared to the atrazine concentration from those sub-watersheds without BMPs.

Dry Turkey Creek, Upper West Emma Creek and Sand Creek will be the targeted areas for the Little Arkansas River Watershed WRAPS. Black Kettle, while Category 5/303d listed, will NOT be the main focus of the SLT; however, BMP implementation may take place in this sub watershed since it was part of the paired watershed study back in 2005 and is close in proximity to the Wichita Recharge Project. Landowners may continue to have interest in implementing atrazine BMPs since they were proven to work.

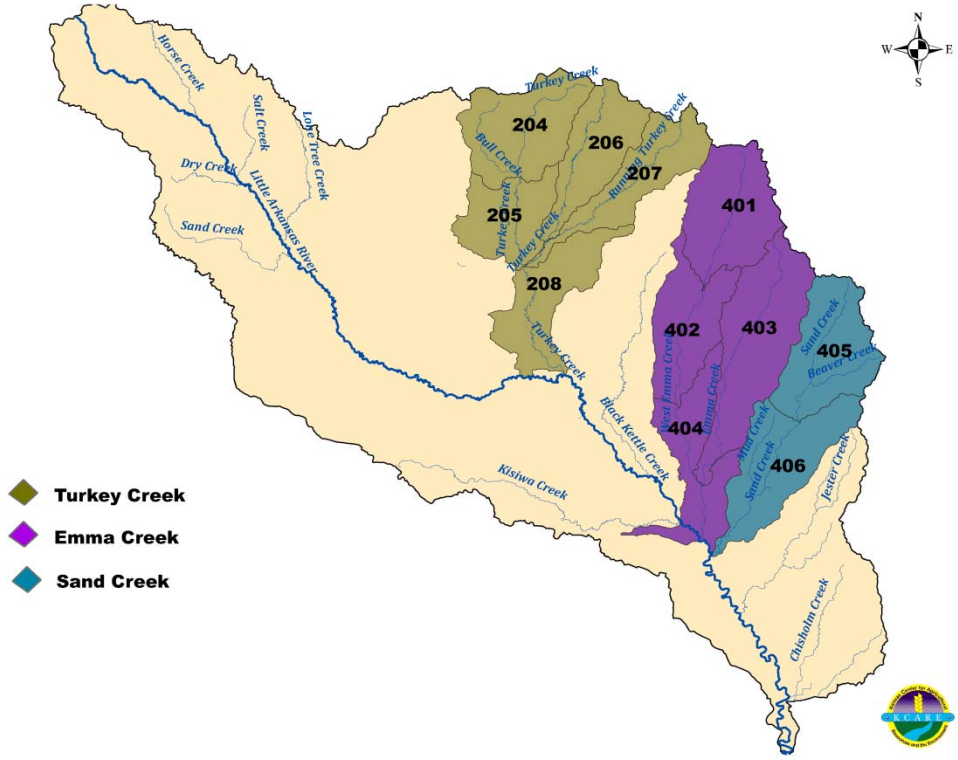
Specific crop fields will be identified based on proximity to streams, vulnerability of slope and soil type. The figure below shows Category 4b and Category 5 Atrazine Areas in the Little Arkansas River Watershed.

Figure 14. Category 4b and 5 Atrazine Areas in the Project Area[15]



As mentioned, only Category 4b designated areas will be largely targeted to include Emma, Sand and Turkey Creeks.

Figure 15. HUC 12 Targeted Areas for Atrazine *(HUC 12's are labeled by their last three digits)*



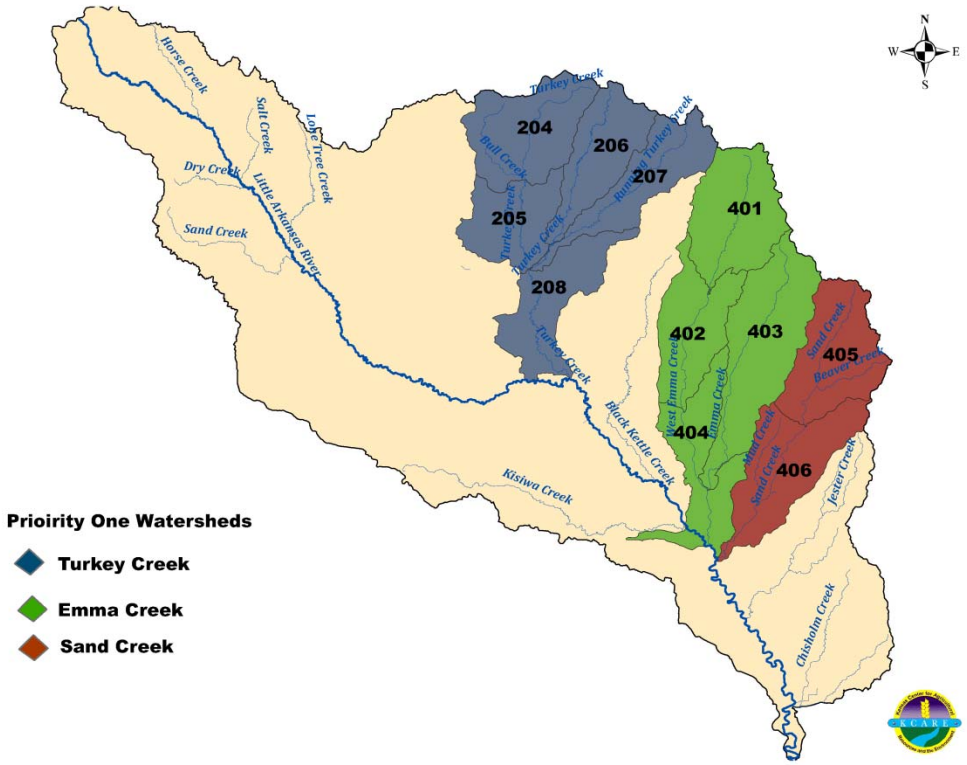
6.1.2 Targeting Cropland for Sediment

Using the KDHE and K-State water monitoring data, tillage survey, and land use comparison table *(Appendix Tables, Section 14)* put together in July 2011 by KDHE, it was determined by the SLT, K-State and KDHE to target the following areas for sediment runoff on cropland. There are two tiers to this plan. The SLT will first focus their efforts on Tier 1 sub watersheds and if they are unable to achieve optimal BMP implementation in that Tier one year in tier 1 targeted areas, the SLT will turn their focus to Tier 2 sub watersheds.

Tier 1 – This WRAPS Plan will first target the following areas for sediment BMP implementations:

- **Emma Creek**
- **Running Turkey Creek**
- **Lower Sand Creek**

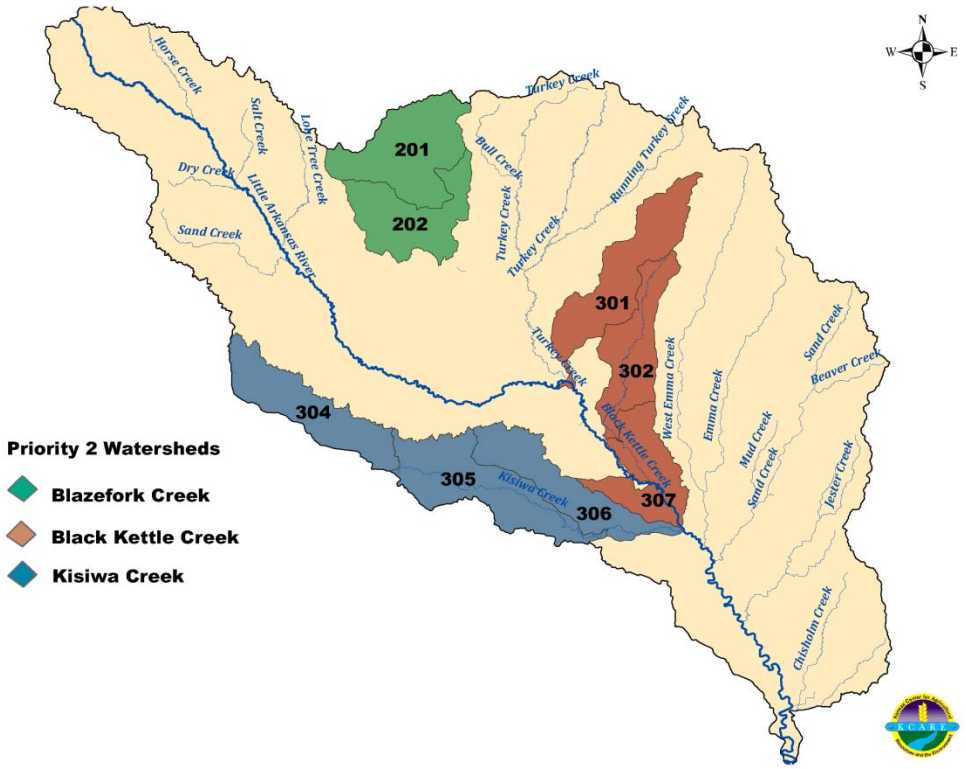
Figure 16. Tier : 1 HUC 12 Targeted Areas for Sediment *(HUC 12's are labeled by their last three digits)*



Tier 2 – The WRAPS Plan will focus on these targeted areas if unable to achieve implementation and required load reductions in Tier 1 targeted areas:

- **Kisiwa Creek**
- **Black Kettle Creek***
- **Lower Blazefork**

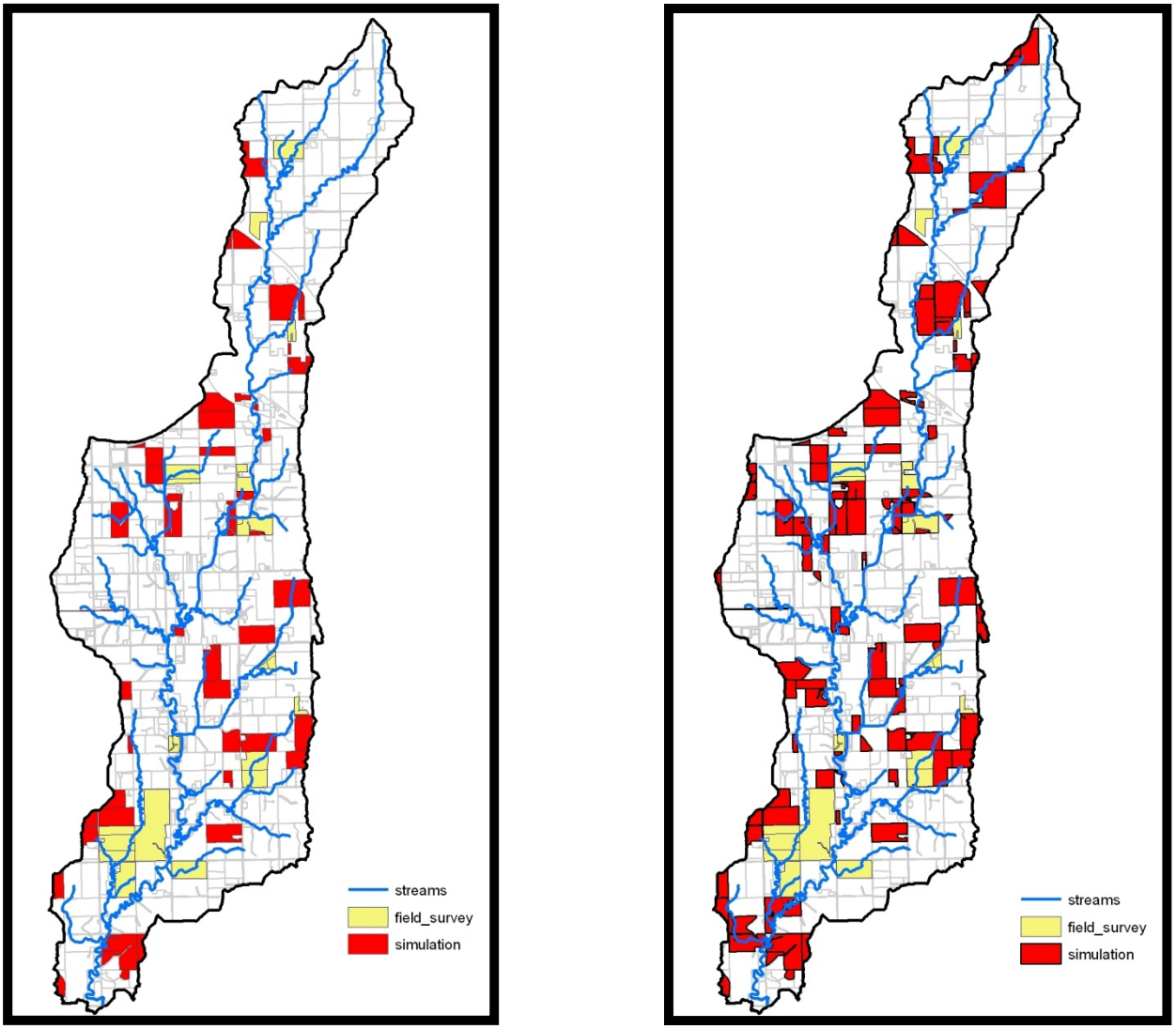
Figure 17. Tier : 2 HUC 12 Targeted Areas for Sediment *(HUC 12's are labeled by their last three digits)*



* Black Kettle Creek sub-watershed, HUC 11030012030030, even though it is showing the least need for load reductions is in close proximity to recharge intake sites, which is of interest to the City of Wichita. Therefore, crop fields along Black Kettle Creek will be targeted for sediment runoff but due to KDHE's comparison of monitoring results, not at a Tier 1 level. A Conservation Innovation Grant was received in 2009 to focus on sediment reduction. The first year of the project was spent on mapping and using ArcSWAT to determine high priority areas in the sub-watershed. 677 fields were identified with an estimated 13,000 tons of erosion annually from crop fields. The top 10 and 20 percent of crop fields having high potential for sediment delivery were assessed and then ground-truthed, see figure 18. Targeted fields will be those determined by the ArcSWAT model.

Figure 18. Black Kettle Creek, Sediment Loss *(Conservation Innovation Grant, 2009)*

Left figure = 10% of fields with most sediment loss
Right figure = 20% of fields with most sediment loss



In targeting Tier 1 and Tier 2 areas for sediment BMP implementation, the Sediment/Biology TMDL will be met. Subsequently, this plan will also meet the high priority Biology TMDL for Emma, Sand, Turkey, Black Kettle and Kisiwa Creeks and the Little Arkansas River. An additional bonus, although this plan is NOT working directly to address Category 5/303d listed areas for the TSS pollutant, targeting sediment along Turkey, Black Kettle and Kisiwa Creeks will result in those areas and the Little Arkansas River as a whole to meet TSS reductions required by KDHE.

6.1.3 Targeting Cropland for Nutrients

Cropland will be targeted for P runoff along those same sub watersheds listed for sediment; Tier 1: Emma Creek, Running Turkey Creek and Lower Sand Creek and Tier 2: Kisiwa Creek, Black Kettle and Lower Blazefork.

Nutrient runoff and sediment runoff often occur together due to nutrients leaching to the sediment when exiting the crop field. Therefore, targeting similar sites for both pollutants will have quicker, and more economical results. BMPs used to target sediment will be effective in reducing P runoff as well. The SLT believes targeting sediment on cropland will also achieve any P load reduction goals set by KDHE and the 303d list.

Although this plan is NOT working directly to reduce dissolved oxygen (DO) in Turkey, Sand, Emma and Black Kettle Creeks, P is the main contributor to DO issues in those areas. Therefore, this WRAPS Plan will meet the TMDL for DO in both Turkey and Sand Creeks as well as improve DO for the 303d listed Emma and Black Kettle Creeks by targeting sediment and phosphorus in those sub watersheds.

6.2 Targeting Livestock Areas

Livestock, like any animal, contributes nutrients and bacteria to nearby water sources by directly depositing the source of said pollutants or by runoff events and proximity to water sources. It is difficult to target wild animal contributions but livestock nutrient and bacteria contributions can be targeted with BMPs that will undoubtedly improve water quality for the animals and will protect tributaries that will ultimately deliver the polluted waters to drinking water sources. BMPs used to target livestock nutrients will serve to improve bacteria loading and vice versa.

6.2.1 Targeting Livestock for Nutrients

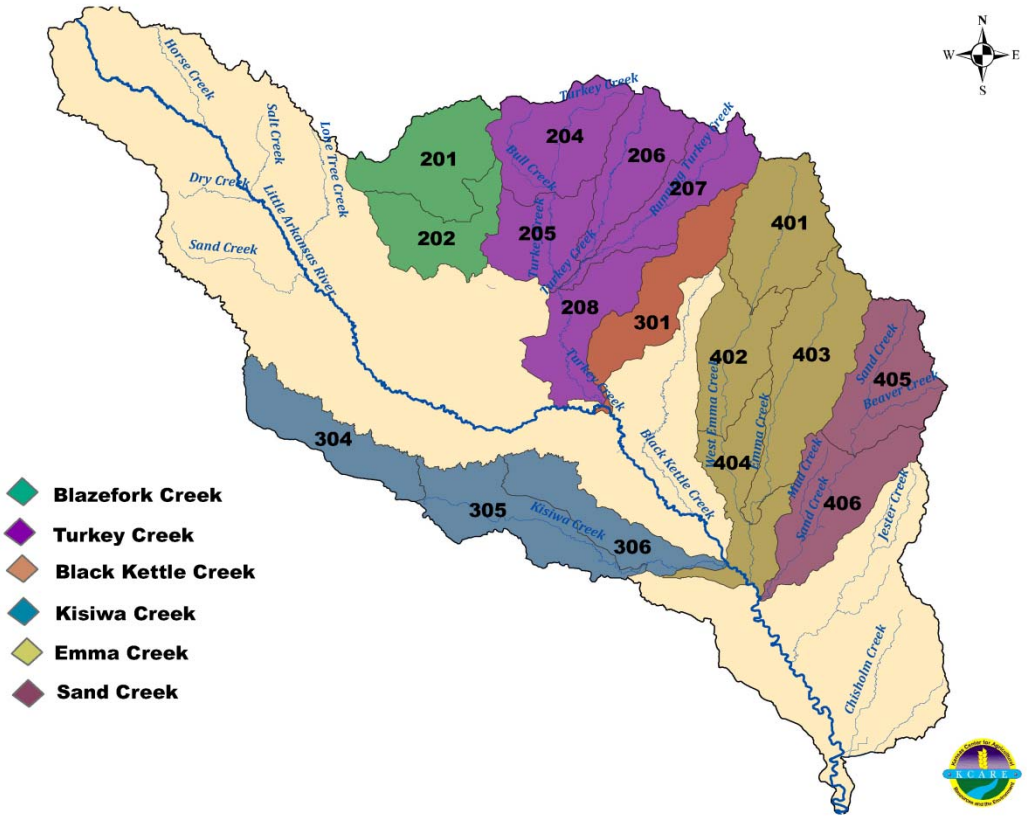
Livestock can be targeted for the nutrient, Phosphorus, which is a low priority on the 303d list and may soon be listed as a TMDL for Black Kettle, Emma, Sand, Kisiwa and Turkey Creeks as well as the Little Arkansas River.

The SLT plans to conduct windshield surveys in the Fall 2011 and Winter 2012 and will use additional assessment activities to determine what livestock locations in those areas should be. Any water monitoring that should take place for bacteria will also show spikes in nutrient levels which will assist in pinpointing what livestock areas should be addressed in those sub watershed that are being targeted. Livestock areas that have received referrals by the Kansas Department of Health and Environment will also be targeted for BMP implementation. **Figure 19 below shows that Sand, Emma, Turkey, Blazefork, Kisiwa and Black Kettle Creeks will all be targeted with Livestock BMPs for nutrients.** Further prioritization to identify sub watersheds for implementation will occur after the Livestock Assessment is complete (Summer 2012).

6.2.2 Targeting Livestock Areas for Bacteria

Given that the Little Arkansas River along with Emma, Sand and Turkey Creeks have been listed with a high priority TMDL for BACTERIA, this area's livestock facilities will be targeted for bacteria and nutrient loss. To accurately target these livestock facilities or operations for BMP implementation, the SLT has determined that they will need an assessment of what farms to target. The SLT plans to conduct a "windshield survey" in the Fall/Winter of 2011/2012 so that proper assessment of feeding and watering sites can be monitored. Water monitoring sites along stream segments may also be set up so that any spikes in bacteria and/or nutrients can be acknowledged and addressed. Livestock areas that have received referrals by the Kansas Department of Health and Environment will also be targeted for BMP implementation.

Figure 19. HUC 12 Targeted Livestock Areas for Nutrients and Bacteria *(HUC 12's are labeled by their last three digits)*



6.3 Targeting Streambank Riparian Buffer Sites for Sediment and Nutrients

As part of the BMP needs inventory for the Little Arkansas plan, KDHE and the Project Management Team (PMT) discussed the possible need for streambank restoration and gully stabilization projects, as well as riparian buffers. The BMP implementation schedule that has been developed to meet the TMDLs addressed by the plan includes

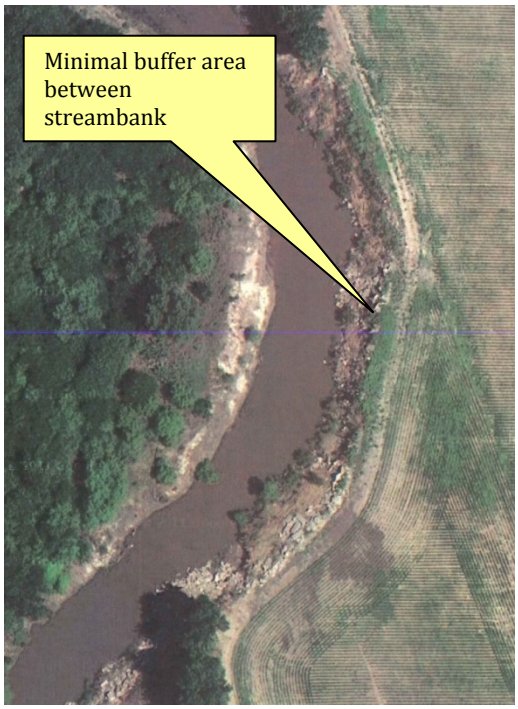
buffers as a conservation practice. While streambank restoration and gully stabilization projects have not been specifically included in the implementation schedule, KDHE and the PMT determined that, if implemented in critical areas, these projects could benefit the watershed by providing load reductions that would contribute to the achievement of the goals set forth in this plan. For this reason, KDHE has completed a preliminary assessment to identify areas along the Little Arkansas River, Lower Sand Creek, Lower Emma Creek and Lower Kisiwa Creek that might be potential sites for streambank restoration and gully stabilization projects, as well as sites in need of riparian buffers.

Due to the size of the watershed, the assessment was targeted to specific areas of the watershed based on three main factors: (1) land use, (2) soil types, and (3) the available water quality monitoring data. Based on this information, as well as discussions with the PMT, the assessment focused on the following areas:

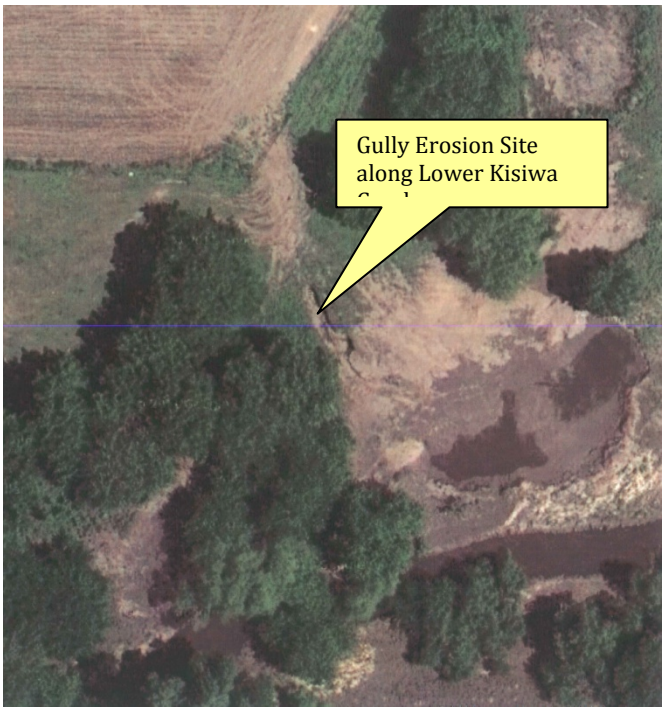
- Lower Little Arkansas River from north of the Wichita city limits upstream to monitoring station SC246 near Alta Mills
- Lower Sand Creek from the Little Arkansas River upstream to the City of Newton
- Lower Emma Creek and a portion of West Emma Creek from the Little Arkansas River upstream to NW 48th Street
- Lower Kisiwa Creek from the Little Arkansas River upstream to S. Spring Lake Road

The preliminary assessment was performed by utilizing ArcMap® software to compare aerial photos from 2002, 2006, 2008 and 2010 to determine areas of streambank changes that might indicate sources of streambank instability. Areas of minimal to no riparian buffers were also noted, as well as potential streambank gully erosion areas. It is important to note that the areas identified have not been ground-truthed, and need to be further investigated and evaluated for project feasibility and effectiveness. Also, the method used for this assessment does not identify all areas in need of restoration. There may be other areas within the watershed in need of restoration not identified as part of this preliminary assessment.

The following aerial photos taken from Google Maps© show some of the areas identified by the assessment in need of riparian buffer restoration or gully stabilization. The locations of these photos have been indicated on the maps included herein.



Google Maps© 2011



Google Maps© 2011

The aerial photos above show examples of potential buffer sites and gully erosion sites that were identified by the streambank assessment.

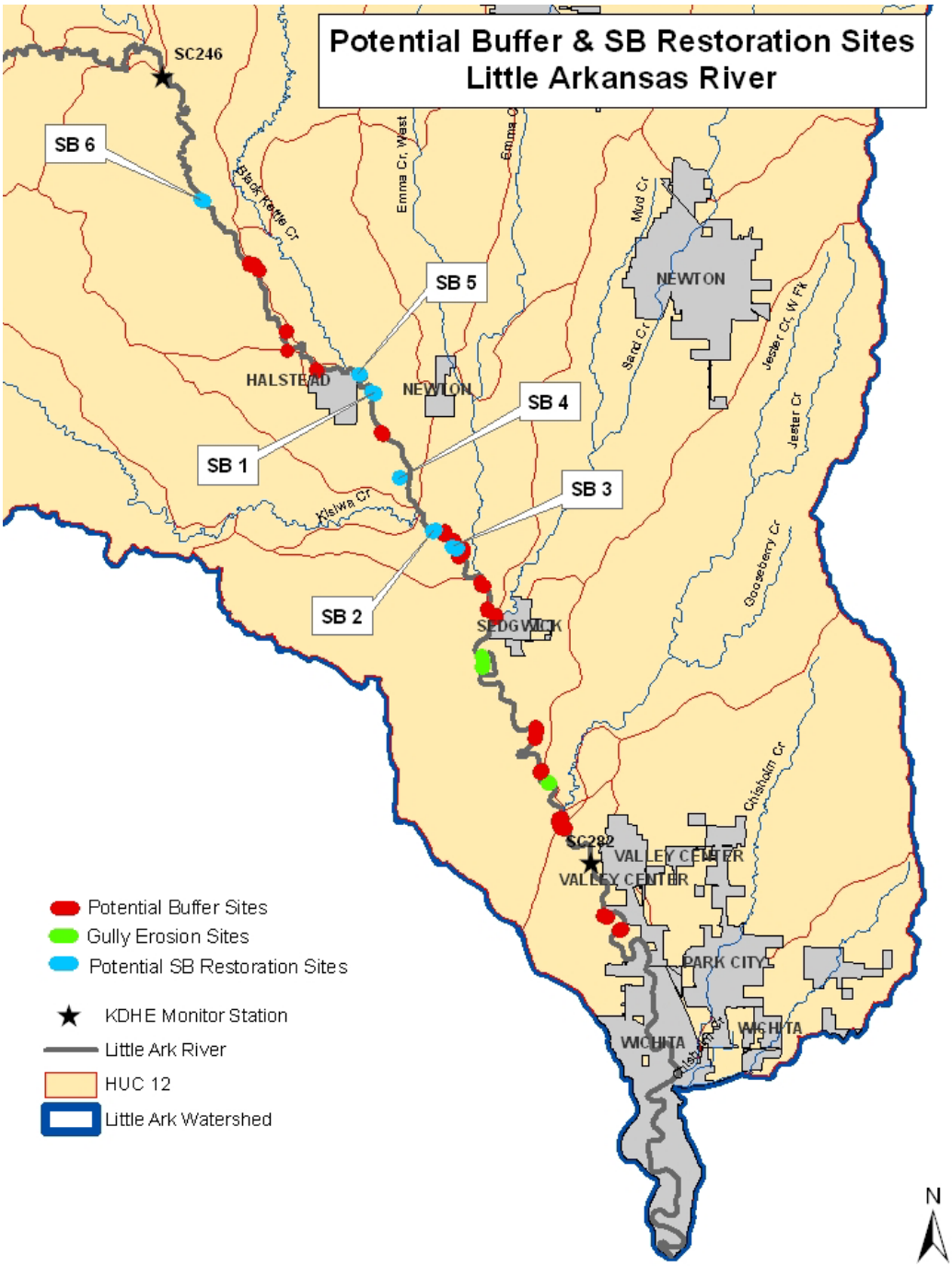
2008 Aerial Photo

Google Maps© 2011

The above images show the changes in the streambank area from 2008 to 2011. This site, labeled SB 1, is located along the Little Arkansas River southeast of Halstead on

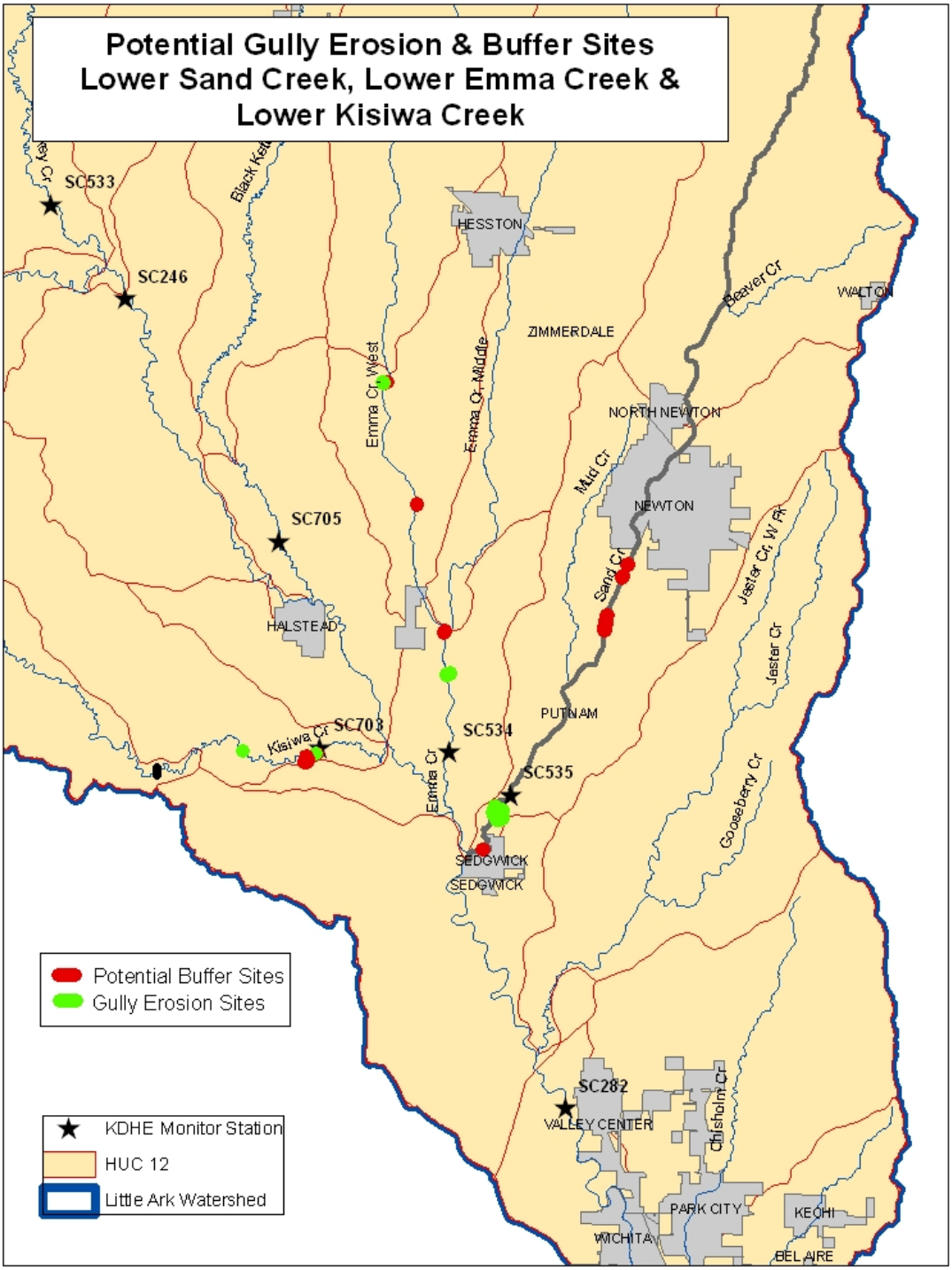
the north side of 36th Street. This site has been identified in the field by the Little Arkansas WRAPS SLT as an area for potential streambank restoration.
As a result of the aerial assessment, several sites were identified as potential sites for various conservation practices. The map below shows the sites that were identified along the Lower Little Arkansas River.

Figure 20. Potential Buffer and Streambank Sites, *Provided by KDHE 2011*



The map below shows the gully erosion sites and potential buffer restoration sites and that were identified along Lower Sand Creek, Lower Emma Creek and Lower Kisiwa Creek .

Figure 21. Potential Gully Erosion and Buffer Sites, *Provided by KDHE 2011*



6.4 Load Reduction Methodology

6.4.1 Cropland

Best management practice (BMP) load reduction efficiencies are derived from K-State Research and Extension Publication MF-2572.[16] Load reduction estimates are the product of baseline loading and the applicable BMP load reduction efficiencies. BMPs specific to atrazine and the Little Arkansas River Watershed are located in MF-2768.[17]

6.4.2 Livestock

Baseline nutrient loadings per animal unit are calculated using the Livestock Waste Facilities Handbook.[18] Livestock management practice load reduction efficiencies are derived from numerous sources including K-State Research and Extension Publication MF-2737 and MF-2454.[19] Load reduction estimates are the product of baseline loading and the applicable BMP load reduction efficiencies.

The SLT of the Little Arkansas River Watershed has determined that the focus of the WRAPS process will be on five key concerns of the watershed listed in order of importance:

1. Atrazine from Cropland
2. Sediment from Cropland
3. Nutrients from Cropland and Livestock
4. Fecal Coliform Bacteria from Livestock
5. Sediment and Nutrients from Streambank and Riparian Areas

All goals and best management practices (BMPs) will be aimed at restoring water quality or protecting the watershed from further degradation. The following sections in this report will address these concerns. BMP descriptions are available in the Appendix, Section 15.3.

7.0 Impairments Addressed by the SLT

7.1 Atrazine

Atrazine is one of the most widely used herbicides in Kansas. It is used to selectively control broadleaf weeds with little to no effect to corn and sorghum crops. Atrazine is popular because if can be applied either pre- or postemergence. When atrazine is applied to the soil surface or to the plant surface, it can be taken up through the root system or through the foliage. 302,022 acres of cropland in the project area use atrazine. Atrazine has been listed on the 2010 TMDL list for three of the project area's tributaries and has also been added to the 303d list for two creeks and the Little Arkansas River. Water samples in the watershed taken from 1996-2003 show atrazine levels ranging from 4.6 to 10.0 µg/l, exceeding the drinking water limit of 3 µg/l set by EPA. The SLT wishes to reduce the amount of atrazine entering water supplies, reaching the drinking water goal of 3 µg/l with no seasonal spikes. The SLT will incorporate Agricultural Best Management Practices (BMPs) to achieve this goal.

BMPs such as splitting the application of the herbicide, incorporating the herbicide into the soil rather than just putting it on the plants and surface soil, creating a buffer zone around the field, as well as other BMPs would reduce the amount of the herbicide leaving the field and entering waterways. Atrazine BMPs have the ability to reduce losses in runoff to 1 to 3 percent of the total atrazine applied. BMPs have been selected by the SLT (and will be discussed later in this section) based on acceptability by the landowners, cost effectiveness and pollutant load reduction effectiveness.

Possible Sources of the Impairment

Studies show that atrazine is weakly adsorbed and therefore leaves the field mostly with runoff water and not with eroding soil particles. Researchers in the project area found

that approximately 90 percent of atrazine loss occurs in the water portion of runoff and only 10 percent by erosion. When atrazine runoff occurs, it begins in the top ½ inch of soil.[20] The movement of atrazine from crop fields is determined by the chemical properties of atrazine; soil type and site characteristics such as slope; and tillage practices. Increased or intense rainfall events and timing relative to atrazine application can result in larger amounts of in-stream herbicide. If a proper buffer is not installed, atrazine, along with sediment and nutrients, can wash from the field downstream. Increased or intense rainfall events and timing relative to atrazine application can result in larger amounts of in-stream herbicide.

7.1.1 Atrazine Pollutant Loads and Load Reductions

Average atrazine runoff reduction with implementation of BMPs in 2007 in the "Paired Watershed Study" was greater than 0.045 lbs of atrazine active ingredient reduction per acre.

The tables below show atrazine reduction rates, assuming BMP implementation, for the next 20 years in the targeted areas outlined in this plan: Emma, Turkey and Sand Creeks. To meet Category 4b desired load reductions of 50%, this plan must result in the following annual reductions of atrazine:

- Emma Creek – 257.32 lbs/year
- Turkey Creek – 191.62 lbs/year
- Sand Creek – 142.35 lbs/year

7.1.2 Atrazine Goal and BMPs

The SLT has laid out specific BMPs that they have determined will be acceptable to watershed residents as listed below. **These BMPs will be implemented in cropland targeted areas to address SLT goals and objectives.**

Atrazine Load Reduction with Cropland BMP Implementation

K-State Economists had to make a few assumptions for atrazine to develop a BMP implementation schedule together. Assumptions were deduced using *"Reducing Atrazine Runoff in the Little Arkansas River Watershed, 2006-2010 Summary of Progress"* publication.

- Average atrazine application rate 1.5 pounds/acre.
- Average atrazine runoff, 5%, or 0.075 pounds/acre.

Unlike BMPs for reducing soil erosion and nutrient runoff, atrazine BMP efficiencies are additive, therefore acres treated may be less than the adoption rates displayed. (i.e. Split application, reduce application, and vegetative buffer may be applied on the same acreage, but in the adoption tables they appear to be separate acreages.)

In the atrazine scenario the cost for implementing and/or repairing buffers, waterways, and terraces was assumed to be $0 since alternative cost-share is available for these practices and is not reimbursed under the *I.A.M.S. Atrazine Management* program.

The following sub watersheds will be targeted with Atrazine BMPs to meet Category 4b standards: Emma Creek, Turkey Creek and Sand Creek. Black Kettle Creek will not be "targeted". However, if there is interest or need for Atrazine BMP implementation and load reductions are being met or exceeded in those areas mentioned above that are Category 4b designated, the SLT may choose to implement BMPs in the Black Kettle sub watershed.

Table 12. Atrazine BMPs, Costs and Effectiveness

Little Ark WRAPS Atrazine BMPs, Costs, and Reduction Efficiencies						
BMP	**Adoption Rate**	**Cost ($/acre)**	**Acres Adopted**	**Reduction Effectiveness**	**Reduction (lbs)**	**% of TMDL**
Use Alternative Herbicide	10%	$6.00	3,709	100%	278	47%
Vegetative Buffers	5%	$0.00	1,236	40%	37	6%
Split Application	5%	$1.50	618	25%	12	2%
Incorporate Atrazine	5%	$4.20	3,090	70%	162	27%
Use Post Emergence	5%	$3.00	3,090	50%	116	20%
Terraces and Waterways	10%	$0.00	618	30%	14	2%
Reduce Application	5%	$1.80	618	30%	14	2%
				Total	**633**	**107%**
Length of Plan (years)	20					
		Required TMDL Reduction (4B)	*591*	*pounds*		

Table 13. Atrazine BMP Adoption

Total Annual Atrazine BMP Adoption Rate								
Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	3,709	618	247	247	618	618	3,709	9,766
2	3,709	618	247	247	618	618	3,709	9,766
3	3,709	618	247	247	618	618	3,709	9,766
4	3,709	618	247	247	618	618	3,709	9,766
5	3,709	618	247	247	618	618	3,709	9,766
6	3,709	618	247	247	618	618	3,709	9,766
7	3,709	618	247	247	618	618	3,709	9,766
8	3,709	618	247	247	618	618	3,709	9,766
9	3,709	618	247	247	618	618	3,709	9,766
10	3,709	618	247	247	618	618	3,709	9,766
11	3,709	618	247	247	618	618	3,709	9,766
12	3,709	618	247	247	618	618	3,709	9,766
13	3,709	618	247	247	618	618	3,709	9,766
14	3,709	618	247	247	618	618	3,709	9,766
15	3,709	618	247	247	618	618	3,709	9,766
16	3,709	618	247	247	618	618	3,709	9,766
17	3,709	618	247	247	618	618	3,709	9,766
18	3,709	618	247	247	618	618	3,709	9,766
19	3,709	618	247	247	618	618	3,709	9,766
20	3,709	618	247	247	618	618	3,709	9,766

Table 14. Atrazine BMP Annual Load Reductions

Total Annual Atrazine BMP Load Reduction								
Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	278.14	18.54	4.64	12.98	23.18	13.91	83.44	434.83
2	278.14	37.09	4.64	12.98	23.18	27.81	83.44	467.28
3	278.14	55.63	4.64	12.98	23.18	41.72	83.44	499.73
4	278.14	74.17	4.64	12.98	23.18	55.63	83.44	532.18
5	278.14	92.71	4.64	12.98	23.18	69.54	83.44	564.63
6	278.14	111.26	4.64	12.98	23.18	83.44	83.44	597.08
7	278.14	129.8	4.64	12.98	23.18	97.35	83.44	629.53
8	278.14	148.34	4.64	12.98	23.18	111.26	83.44	661.98
9	278.14	166.89	4.64	12.98	23.18	125.17	83.44	694.43
10	278.14	185.43	4.64	12.98	23.18	139.07	83.44	726.88
11	278.14	203.97	4.64	12.98	23.18	152.98	83.44	759.34
12	278.14	222.52	4.64	12.98	23.18	166.89	83.44	791.79
13	278.14	241.06	4.64	12.98	23.18	180.79	83.44	824.24
14	278.14	259.6	4.64	12.98	23.18	194.7	83.44	856.69
15	278.14	278.14	4.64	12.98	23.18	208.61	83.44	889.14
16	278.14	296.69	4.64	12.98	23.18	222.52	83.44	921.59
17	278.14	315.23	4.64	12.98	23.18	236.42	83.44	954.04
18	278.14	333.77	4.64	12.98	23.18	250.33	83.44	986.49
19	278.14	352.32	4.64	12.98	23.18	264.24	83.44	1,018.94
20	278.14	370.86	4.64	12.98	23.18	278.14	83.44	1,051.39

Table 15. Atrazine Reductions by Sub Watersheds

Emma Creek Atrazine Reduction		
Year	**Total Annual Reduction**	**% of TMDL**
1	177	69%
2	190	74%
3	204	79%
4	217	84%
5	230	89%
6	243	95%
7	256	100%
8	270	105%
9	283	110%
10	296	115%
11	309	120%
12	323	125%
13	336	130%
14	349	136%
15	362	141%
16	375	146%
17	389	151%
18	402	156%
19	415	161%
20	428	166%
Required Load Reduction (lbs)		*257.325*

Turkey Creek Meeting the Atrazine TMDL		
Year	**Total Annual Reduction**	**% of TMDL**
1	183.91	96%
2	197.63	103%
3	211.36	110%
4	225.08	117%
5	238.81	125%
6	252.53	132%
7	266.26	139%
8	279.98	146%
9	293.71	153%
10	307.43	160%
11	321.16	168%
12	334.88	175%
13	348.61	182%
14	362.33	189%
15	376.06	196%
16	389.78	203%
17	403.5	211%
18	417.23	218%
19	430.95	225%
20	444.68	232%
Required Load Reduction (lbs)		*191.625*

Sand Creek Meeting the Atrazine TMDL		
Year	**Total Annual Reduction**	**% of TMDL**
1	73.79	52%
2	79.29	56%
3	84.8	60%
4	90.31	63%
5	95.81	67%
6	101.32	71%
7	106.82	75%
8	112.33	79%
9	117.84	83%
10	123.34	87%
11	128.85	91%
12	134.36	94%
13	139.86	98%
14	145.37	102%
15	150.88	106%
16	156.38	110%
17	161.89	114%
18	167.4	118%
19	172.9	121%
20	178.41	125%
Required Load Reduction (lbs)		*142.35*

Table 16. Atrazine BMP Implementation – Cropland Acreage Inventory*

Atrazine BMP Implementation - Cropland Inventory										
	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption	Acres Required for BMP Adoption	Available Acres in Sub-Watersheds
Turkey Creek										
110300120204	333	56	22	22	56	56	333	877		
110300120205	268	45	18	18	45	45	268	705		
110300120206	297	49	20	20	49	49	297	781	**4,130**	**17,478**
110300120207	327	55	22	22	55	55	327	861		
110300120208	344	57	23	23	57	57	344	906		
Total	**1,569**	**262**	**105**	**105**	**262**	**262**	**1,569**	**4,130**		
Emma Creek										
110300120401	390	65	26	26	65	65	390	1,026		
110300120402	310	52	21	21	52	52	310	815	**3,978**	**20,799**
110300120403	493	82	33	33	82	82	493	1,297		
110300120404	319	53	21	21	53	53	319	840		
Total	**1,512**	**252**	**101**	**101**	**252**	**252**	**1,512**	**3,978**		
Sand Creek										
110300120405	327	55	22	22	55	55	327	862	**1,657**	**24,206**
110300120406	302	50	20	20	50	50	302	795		
Total	**629**	**105**	**42**	**42**	**105**	**105**	**629**	**1,657**		
Acres Needed/Available for Atrazine BMP Implementation in Little Ark Watershed									***9,765***	***62,484***

**Numbers in the table above are rounded to the nearest acre.*

The table above indicates that there are 62,484 acres of available cropland in the atrazine targeted sub-watersheds. To achieve plan goals and meet Category 4b standards, this plan requires 9,765 acres. Therefore, it can be assumed that there are ample acres to implement this WRAPS plan as written.

7.2 Sediment

Sediment is a common nonpoint source pollutant. Sediment has been listed as a TMDL for five of the project area's creeks (Emma, Sand, Black Kettle, Turkey and Kisiwa) and the Little Arkansas River. Sediment carries other nutrients off the field, primarily nitrogen and phosphorus; increased nutrients can produce eutrophication. Nitrogen reductions of 9 to 66 percent and phosphorus reductions of 20 to 90 percent, are required to improve conditions in project area lakes. 702,377 acres of cropland in the project area could use additional BMPs to aid in the overall reduction of sediment pollution. Agricultural best management practices (BMPs) such as continuous no-till, conservation tillage, grass buffer strips around cropland, terraces, grassed waterways and reducing activities within the riparian areas will reduce erosion and improve water quality. BMPs have been selected by the SLT (and will be discussed later in this section) based on acceptability by the landowners, cost effectiveness and pollutant load reduction effectiveness.

Possible Sources of the Impairment

The primary source of this impairment in the Little Arkansas River Watershed is cropland runoff. Activities performed on the land affects sediment that is transported downstream to the lakes. Physical components of the terrain are important in sediment movement. The slope of the land, propensity to generate runoff and soil type are important. Although not a predominant factor in the project area, sediment can also come from streambank erosion and sloughing of the sides of the river and stream bank. A lack of riparian cover can cause washing on the banks of streams or rivers and enhance erosion. Animal movement, such as livestock that regularly cross the stream, can cause pathways that will erode. Another source of sediment is silt that is present in the stream from past activities and is gradually moving downstream with each high intensity rainfall event.

Rainfall amounts and subsequent runoff can affect sediment runoff from agricultural areas and urban areas into streams. High rainfall events can cause in-field runoff, cropland erosion, rangeland gully erosion and sloughing of streambanks, which add sediment to tributary streams and ultimately the Little Arkansas River. High intensity rainfall events usually occur in late spring and early summer.

The SLT has chosen to focus on runoff since it is the major contributor to the project areas nonpoint source pollution in the stream. T factor and erosion evaluation are also reviewed for sustaining productivity of land use.

7.2.1 Runoff

Soil type has an influence on runoff potential and erosion throughout the watershed. Soils are classified into four hydrologic soil groups (HSG). The soils within each of these groups have the same runoff potential after a rainfall event if the same conditions exist, such as plant cover or storm intensity. Soils are categorized into four groups: A,

B, C and D. The watershed area is predominantly soil group C (39 percent) and group D (36 percent). Group C soils have a slower infiltration rate while group D has a high potential for runoff. This highlights the importance of slowing water flow from rainfall events to allow the soil adequate time to absorb the water before it flushes into creeks and streams causing erosion and the degradation of water quality.

Figure 22. Hydrologic Soil Groups of the Watershed[21]

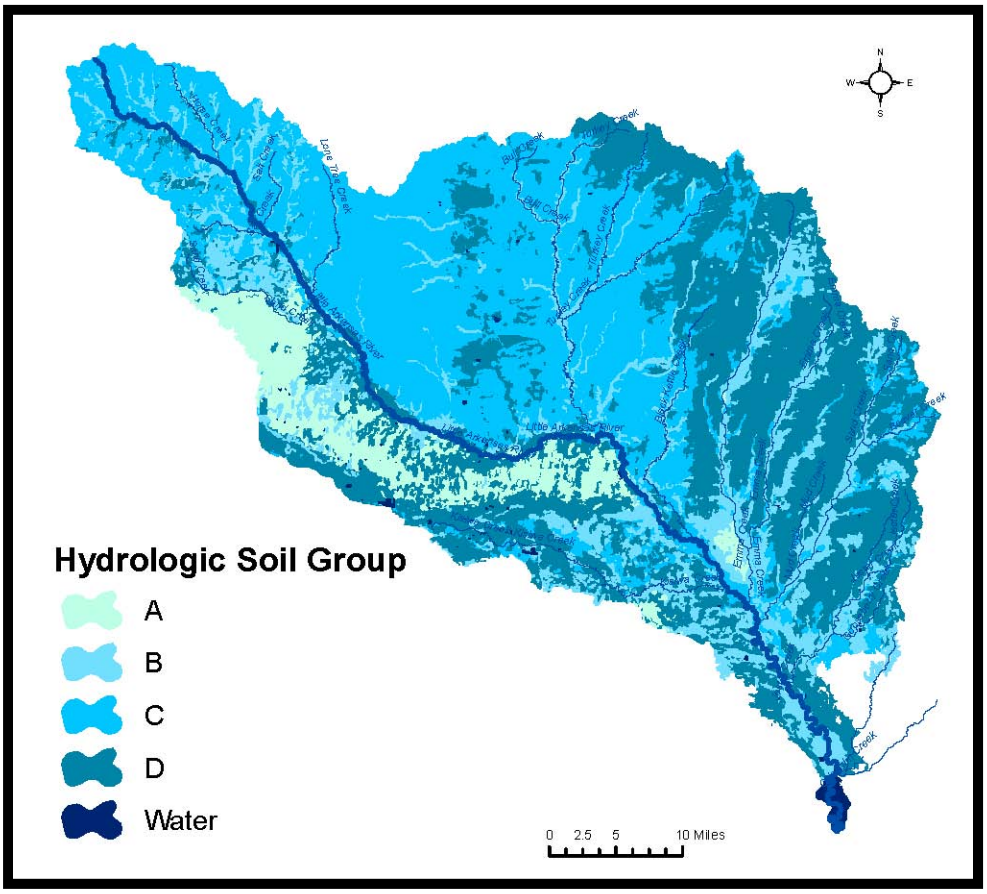


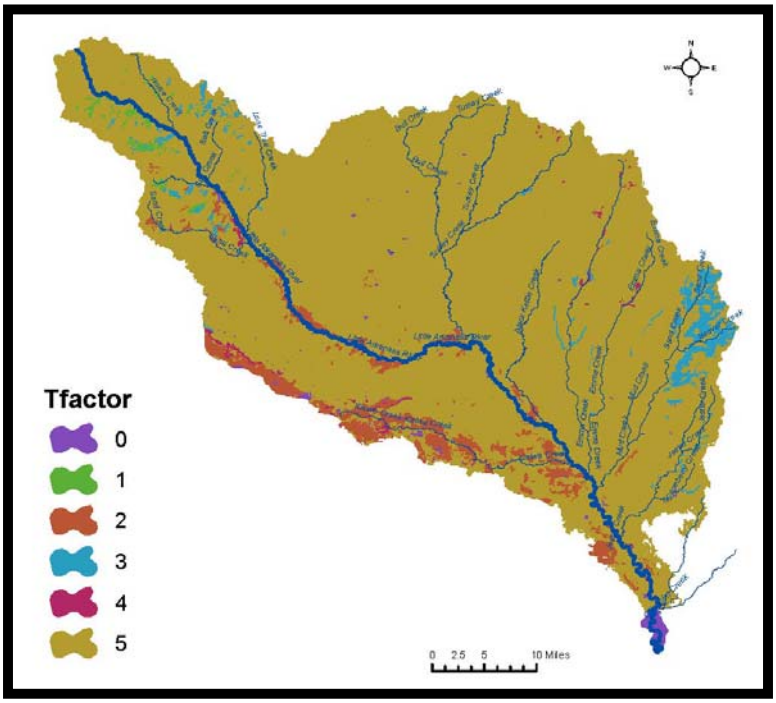
Table 17. Hydrologic Soil Groups of the Watershed and the Targeted Area.
Calculated from SSURGO Soil Data Mart.

Hydrologic Soil Group	Definition	Acres of Watershed in HSG	Percentage of Watershed in HSG
A	Soils with low runoff potential. Soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep well drained to excessively well-drained sands or gravels.	62,344	7.14
B	Soils having moderate infiltration rates even when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to sell drained soils with moderately fine to moderately coarse textures.	148,482	16.99
C	Soils having slow infiltration rates even when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures.	343,452	39.31
D	Soils with high runoff potential. Soils having very slow infiltration rates even when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material.	314,447	35.99
Other	Water, dams, pits, sewage lagoons	4,975	0.57
Total		1,742,426	100.00

7.2.2 Erosion

NRCS has established a “T factor” in evaluating soil erosion. T is the soil loss tolerance factor. It is defined as the maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained. It is assigned to soils without respect to land use or cover and ranges from 1 ton per acre for shallow soils to 5 tons per acre for deep soils that are not as affected by loss of productivity by erosion. T factors represent the goal for maximum annual soil loss in sustaining productivity of the land use.[22]

Figure 23. T Factor with the Cropland Targeted Area Highlighted[23]. *Data derived from SSURGO NRCS Soil Data Mart.*



7.2.3 Riparian Quality

An adequately functioning and healthy riparian area will stop the sediment flow from cropland. Cropland lying adjacent to the stream without buffer protection can cause erosion along the streambank. In the targeted area, the predominant land use in the watershed is cropland at 68 percent and grassland at 21 percent. However, the riparian areas in the project area are comprised of 55 percent cropland and cropland/tree mix and 26 percent of pasture and pasture/tree mix.

Riparian areas are also vulnerable to runoff and erosion from livestock induced activities. Buffers and filter strips along with forested riparian areas can be used to impede erosion and streambank sloughing. Livestock restriction along the stream will prevent livestock from entering the stream and degrading the banks.

Figure 24. Riparian Inventory of the Streambank Targeted Area.[24]
Data from USDA/NRCS, 1991.

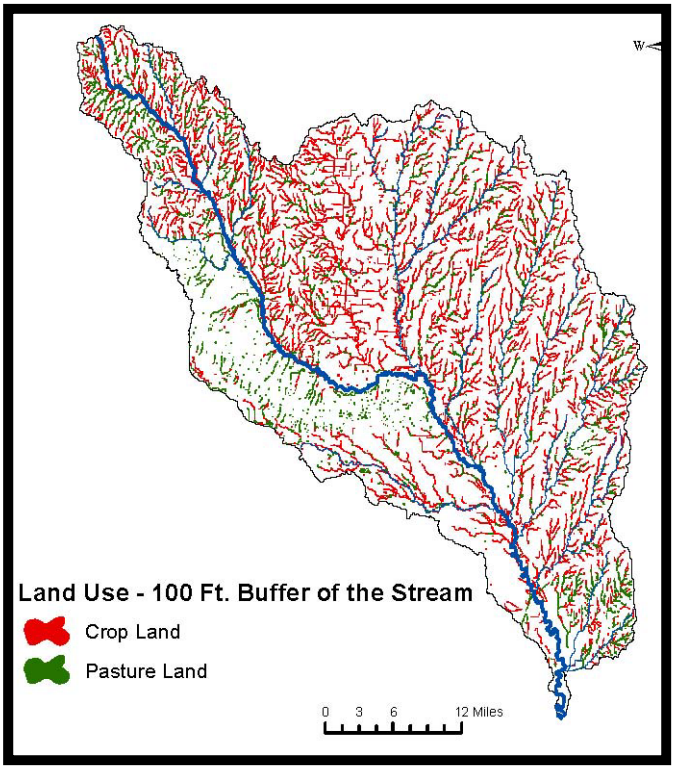


Table 18. Riparian Land Use

Land Use	Acres	Percent
Barren Land	58	0.08
Crop Land	35,123	47.61
Crop/Tree Mix	5,264	7.14
Forest Land	9,274	12.57
Pasture	10,764	14.59
Pasture/Tree Mix	8,354	11.32
Shrub/Scrub Land	136	0.18
Urban Land	1,625	2.20
Urban/Tree Mix	840	1.14
Water	2,332	3.16
Total	**73,770**	**100.00**

KEY:
Crop Land - Areas adjacent to a stream where no trees area present and in which 51% of the 100 foot buffer is planted or was planted during the previous growing season for the production of adapted crops for harvest, including row crops, small-grain crops, legume, hay crops, nursery crops, and other specialty crops. Includes **Crop/Tree Mix** - Cropland land use areas that contain a tree canopy cover of less than 50% of the 100 foot buffer zone.
Pasture- Areas adjacent to a stream in which 51% or more of the 100 foot buffer contains pastureland, native pasture, or range land. Includes **Pasture/Tree Mix** - Grassland land use areas that contain a tree canopy cover of less than 50% of the 100 foot buffer zone.

7.2.4 Sediment Pollutant Loads and Load Reductions

The current estimated Total Suspended Solids (TSS) load in the Little Arkansas River Watershed is 120,442 tons per year according to the TMDL section of KDHE (*July 2011*). Therefore, 74,616 **tons of sediment per year needs to be reduced.** This is the amount of sediment reduction that will have to be met by implemented BMPs in the watershed on a 40 year implementation schedule.

As mentioned in Section 6, the SLT will target Tier 1 areas first in this plan but if sufficient load reductions can not be made annually in those areas, they will continue in to Tier 2 areas with BMP implementation. Based on numbers provided by KDHE in July 2011, the following load reductions need to be made in the sub watersheds listed:

Tier 1 – This WRAPS Plan will first target the following areas for sediment BMP implementations: *(watershed – TSS Load Reduction needed)*

- **Emma Creek – 2,336.82 tons/year**
- **Running Turkey Creek – 4,895.96 tons/year**
- **Lower Sand Creek – 5,458.29 tons/year**

Tier 2 – The WRAPS Plan will focus on these targeted areas if unable to achieve implementation and required load reductions in Tier 1 targeted areas: *(watershed – TSS Load Reduction needed)*

- **Kisiwa Creek – 2,843.29 tons/year**
- **Black Kettle Creek – 374.21 tons/year**
- **Lower Blazefork – 1,898.47 tons/year**

In focusing in the sub watersheds mentioned above for forty years, the Little Arkansas River at Valley Center will show a load reduction as well. The Little Arkansas River at Valley Center needs to show a 74,616 tons/year reduction to be removed from the TMDL list and this plan should over-exceed that amount. Therefore, sediment/biology TMDLs will be met for Emma, Turkey, Sand, Kisiwa, Black Kettle, and Blazefork Creeks as well as the Little Arkansas River. In meeting these TMDLs for sediment, these areas (Little Arkansas River, Black Kettle, Kisiwa and Turkey Creeks) should be removed from the 303d list for TSS.

7.2.5 Sediment Goal and BMPs

The SLT has laid out specific BMPs that they have determined will be acceptable to watershed residents as listed below. **These BMPs will be implemented in cropland targeted areas to address SLT goals and objectives for forty years.**

Table 19. Sediment BMPs, Costs and Effectiveness

Little Ark WRAPS Cropland BMPs, Costs, and Reduction Efficiencies							
Best Management Practice	**Cost per Treated Acre**	**Available Cost Share**	**Erosion Reduction Efficiency**	**Phosphorous Reduction Efficiency**	**Nitrogen Reduction Efficiency**	**Cost per Unit**	
No-Till	$78	39%	75%	40%	25%	$78	acre
Conservation Tillage	$39	0%	38%	20%	13%	$39	acre
Grassed Waterways	$160	50%	40%	40%	40%	$1,600	acre
Vegetative Buffers	$67	90%	50%	50%	25%	$1,000	acre
Nutrient Mgmt Plans	$57	50%	25%	25%	25%	$39	acre
Terraces	$102	50%	30%	30%	30%	$1.25	foot
Incorporate Manure	$6.33	0%	0%	20%	50%	$6.33	acre
Conservation Crop Rotations	$39	0%	25%	25%	25%	$39	acre
Water Retention	$125	0%	50%	50%	50%	$5,000	acre

Table 20. Sediment BMP Adoption

Annual Adoption (treated acres), Cropland BMPs										
Year	**No-Till**	**Cons. Tillage**	**Water-ways**	**Buffers**	**Nutrient Mgmt Plans**	**Terraces**	**Incorp-orate Manure**	**Cons. Crop Rotations**	**Water Retention**	**Total Adoption**
1	548	1,095	822	548	274	822	274	274	110	4,765
2	548	1,095	822	548	274	822	274	274	110	4,765
3	548	1,095	822	548	274	822	274	274	110	4,765
4	548	1,095	822	548	274	822	274	274	110	4,765
5	548	1,095	822	548	274	822	274	274	110	4,765
6	548	1,095	822	548	274	822	274	274	110	4,765
7	548	1,095	822	548	274	822	274	274	110	4,765
8	548	1,095	822	548	274	822	274	274	110	4,765
9	548	1,095	822	548	274	822	274	274	110	4,765
10	548	1,095	822	548	274	822	274	274	110	4,765
11	548	1,095	822	548	274	822	274	274	110	4,765
12	548	1,095	822	548	274	822	274	274	110	4,765
13	548	1,095	822	548	274	822	274	274	110	4,765
14	548	1,095	822	548	274	822	274	274	110	4,765
15	548	1,095	822	548	274	822	274	274	110	4,765
16	548	1,095	822	548	274	822	274	274	110	4,765
17	548	1,095	822	548	274	822	274	274	110	4,765
18	548	1,095	822	548	274	822	274	274	110	4,765
19	548	1,095	822	548	274	822	274	274	110	4,765
20	548	1,095	822	548	274	822	274	274	110	4,765
21	548	1,095	822	548	274	822	274	274	110	4,765
22	548	1,095	822	548	274	822	274	274	110	4,765
23	548	1,095	822	548	274	822	274	274	110	4,765
24	548	1,095	822	548	274	822	274	274	110	4,765
25	548	1,095	822	548	274	822	274	274	110	4,765
26	548	1,095	822	548	274	822	274	274	110	4,765
27	548	1,095	822	548	274	822	274	274	110	4,765
28	548	1,095	822	548	274	822	274	274	110	4,765
29	548	1,095	822	548	274	822	274	274	110	4,765
30	548	1,095	822	548	274	822	274	274	110	4,765
31	548	1,095	822	548	274	822	274	274	110	4,765
32	548	1,095	822	548	274	822	274	274	110	4,765
33	548	1,095	822	548	274	822	274	274	110	4,765
34	548	1,095	822	548	274	822	274	274	110	4,765
35	548	1,095	822	548	274	822	274	274	110	4,765
36	548	1,095	822	548	274	822	274	274	110	4,765
37	548	1,095	822	548	274	822	274	274	110	4,765

38	548	1,095	822	548	274	822	274	274	110	4,765
39	548	1,095	822	548	274	822	274	274	110	4,765
40	548	1,095	822	548	274	822	274	274	110	4,765

Table 21. Sediment BMP Annual Load Reductions

Total Annual Soil Erosion Reduction, Cropland BMPs (tons)										
Year	**No-Till**	**Cons. Tillage**	**Water-ways**	**Buffers**	**Nutrient Mgmt Plans**	**Terraces**	**Incorp-orate Manure**	**Cons. Crop Rotations**	**Water Retention**	**Total Load Reduction**
1	1,610	1,610	1,288	1,073	268	966	0	268	215	7,299
2	3,220	3,220	2,576	2,147	537	1,932	0	537	429	14,599
3	4,830	4,830	3,864	3,220	805	2,898	0	805	644	21,898
4	6,441	6,441	5,153	4,294	1,073	3,864	0	1,073	859	29,198
5	8,051	8,051	6,441	5,367	1,342	4,830	0	1,342	1,073	36,497
6	9,661	9,661	7,729	6,441	1,610	5,797	0	1,610	1,288	43,796
7	11,271	11,271	9,017	7,514	1,879	6,763	0	1,879	1,503	51,096
8	12,881	12,881	10,305	8,588	2,147	7,729	0	2,147	1,718	58,395
9	14,491	14,491	11,593	9,661	2,415	8,695	0	2,415	1,932	65,694
10	16,102	16,102	12,881	10,734	2,684	9,661	0	2,684	2,147	72,994
11	17,712	17,712	14,169	11,808	2,952	10,627	0	2,952	2,362	80,293
12	19,322	19,322	15,458	12,881	3,220	11,593	0	3,220	2,576	87,593
13	20,932	20,932	16,746	13,955	3,489	12,559	0	3,489	2,791	94,892
14	22,542	22,542	18,034	15,028	3,757	13,525	0	3,757	3,006	102,191
15	24,152	24,152	19,322	16,102	4,025	14,491	0	4,025	3,220	109,491
16	25,763	25,763	20,610	17,175	4,294	15,458	0	4,294	3,435	116,790
17	27,373	27,373	21,898	18,248	4,562	16,424	0	4,562	3,650	124,090
18	28,983	28,983	23,186	19,322	4,830	17,390	0	4,830	3,864	131,389
19	30,593	30,593	24,474	20,395	5,099	18,356	0	5,099	4,079	138,688
20	32,203	32,203	25,763	21,469	5,367	19,322	0	5,367	4,294	145,988
21	33,813	33,813	27,051	22,542	5,636	20,288	0	5,636	4,508	153,287
22	35,424	35,424	28,339	23,616	5,904	21,254	0	5,904	4,723	160,587
23	37,034	37,034	29,627	24,689	6,172	22,220	0	6,172	4,938	167,886
24	38,644	38,644	30,915	25,763	6,441	23,186	0	6,441	5,153	175,185
25	40,254	40,254	32,203	26,836	6,709	24,152	0	6,709	5,367	182,485
26	41,864	41,864	33,491	27,909	6,977	25,118	0	6,977	5,582	189,784
27	43,474	43,474	34,779	28,983	7,246	26,085	0	7,246	5,797	197,083
28	45,084	45,084	36,068	30,056	7,514	27,051	0	7,514	6,011	204,383
29	46,695	46,695	37,356	31,130	7,782	28,017	0	7,782	6,226	211,682
30	48,305	48,305	38,644	32,203	8,051	28,983	0	8,051	6,441	218,982
31	49,915	49,915	39,932	33,277	8,319	29,949	0	8,319	6,655	226,281
32	51,525	51,525	41,220	34,350	8,588	30,915	0	8,588	6,870	233,580

33	53,135	53,135	42,508	35,424	8,856	31,881	0	8,856	7,085	240,880
34	54,745	54,745	43,796	36,497	9,124	32,847	0	9,124	7,299	248,179
35	56,356	56,356	45,084	37,570	9,393	33,813	0	9,393	7,514	255,479
36	57,966	57,966	46,373	38,644	9,661	34,779	0	9,661	7,729	262,778
37	59,576	59,576	47,661	39,717	9,929	35,746	0	9,929	7,943	270,077
38	61,186	61,186	48,949	40,791	10,198	36,712	0	10,198	8,158	277,377
39	62,796	62,796	50,237	41,864	10,466	37,678	0	10,466	8,373	284,676
40	64,406	64,406	51,525	42,938	10,734	38,644	0	10,734	8,588	291,976

The Tables below represent total reductions for Sediment using Cropland BMP Implementation for each targeted sub watershed and the Little Arkansas River. The row high-lighted in yellow demonstrates the year in which that particular sub watershed is projected to meet its TMDL. The last line of each table shows what reduction was required to meet the TSS TMDL in that sub watershed. After 40 years of BMP implementation, this plan will far exceed the load reductions required to meet the Tier 1 and Tier 2 sub watershed's individual TSS TMDLs. In exceeding load reduction goals in each sub watershed, TSS load reduction goals for the Little Arkansas River will also be met.

Table 22. Sediment Reductions by Sub Watersheds

Tier 1 – Emma Creek

Meeting the TSS TMDL for Emma Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	2,314	99%
2	4,059	174%
3	5,804	248%
4	7,549	323%
5	9,294	398%
6	11,039	472%
7	12,784	547%
8	14,530	622%
9	16,275	696%
10	18,020	771%
11	19,765	846%
12	21,510	920%
13	23,255	995%
14	25,000	1070%
15	26,745	1144%
16	28,490	1219%
17	30,235	1294%
18	31,980	1368%

19	33,725	1443%
20	35,470	1518%
21	37,215	1592%
22	38,961	1667%
23	40,706	1742%
24	42,451	1816%
25	44,196	1891%
26	45,941	1966%
27	47,686	2040%
28	49,431	2115%
29	51,176	2190%
30	52,921	2264%
31	54,666	2339%
32	56,411	2414%
33	58,156	2489%
34	59,901	2563%
35	61,646	2638%
36	63,391	2713%
37	65,137	2787%
38	66,882	2862%
39	68,627	2937%
40	47,043	2013%
Load Reduction to meet TSS TMDL:		**2,337**

Tier 1 – Turkey Creek

Meeting the TSS TMDL for Turkey Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	2,577	53%
2	5,154	105%
3	7,731	158%
4	10,308	211%
5	12,885	263%
6	15,462	316%
7	18,039	368%
8	20,616	421%
9	23,193	474%
10	25,770	526%
11	28,347	579%
12	30,924	632%

13	33,501	684%
14	36,078	737%
15	38,655	790%
16	41,232	842%
17	43,809	895%
18	46,386	947%
19	48,963	1000%
20	51,540	1053%
21	54,117	1105%
22	56,694	1158%
23	59,271	1211%
24	61,848	1263%
25	64,425	1316%
26	67,002	1369%
27	69,579	1421%
28	72,156	1474%
29	74,733	1526%
30	77,310	1579%
31	79,887	1632%
32	82,464	1684%
33	85,041	1737%
34	87,618	1790%
35	90,195	1842%
36	92,772	1895%
37	95,349	1947%
38	97,926	2000%
39	100,503	2053%
40	103,080	2105%
Load Reduction to meet TSS TMDL:		**4,896**

Tier 1 – Sand Creek

Meeting the TSS TMDL for Sand Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	727	13%
2	1,454	27%
3	2,181	40%
4	2,908	53%
5	3,635	67%
6	4,361	80%

7	5,088	93%
8	5,815	107%
9	6,542	120%
10	7,269	133%
11	7,996	147%
12	8,723	160%
13	9,450	173%
14	10,177	186%
15	10,904	200%
16	11,631	213%
17	12,358	226%
18	13,084	240%
19	13,811	253%
20	14,538	266%
21	15,265	280%
22	15,992	293%
23	16,719	306%
24	17,446	320%
25	18,173	333%
26	18,900	346%
27	19,627	360%
28	20,354	373%
29	21,080	386%
30	21,807	400%
31	22,534	413%
32	23,261	426%
33	23,988	440%
34	24,715	453%
35	25,442	466%
36	26,169	479%
37	26,896	493%
38	27,623	506%
39	28,350	519%
40	29,076	533%
Load Reduction to meet TSS TMDL:		**5,458**

Tier 2- Kisiwa Creek

Meeting the TSS TMDL for Kisiwa Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**

1	742	26%
2	1,484	52%
3	2,226	78%
4	2,968	104%
5	3,710	130%
6	4,452	157%
7	5,194	183%
8	5,936	209%
9	6,678	235%
10	7,420	261%
11	8,162	287%
12	8,904	313%
13	9,646	339%
14	10,388	365%
15	11,130	391%
16	11,872	418%
17	12,614	444%
18	13,356	470%
19	14,098	496%
20	14,840	522%
21	15,582	548%
22	16,324	574%
23	17,066	600%
24	17,808	626%
25	18,550	652%
26	19,292	679%
27	20,034	705%
28	20,776	731%
29	21,518	757%
30	22,260	783%
31	23,002	809%
32	23,744	835%
33	24,486	861%
34	25,228	887%
35	25,970	913%
36	26,712	940%
37	27,454	966%
38	28,196	992%
39	28,938	1018%
40	29,680	1044%

Load Reduction to meet TSS TMDL:	2,843

Tier 2 – Black Kettle Creek

Meeting the TSS TMDL for Black Kettle Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	653	175%
2	1,307	349%
3	1,960	524%
4	2,614	699%
5	3,267	874%
6	3,920	1048%
7	4,574	1223%
8	5,227	1398%
9	5,881	1572%
10	6,534	1747%
11	7,187	1922%
12	7,841	2096%
13	8,494	2271%
14	9,148	2446%
15	9,801	2621%
16	10,454	2795%
17	11,108	2970%
18	11,761	3145%
19	12,415	3319%
20	13,068	3494%
21	13,721	3669%
22	14,375	3844%
23	15,028	4018%
24	15,682	4193%
25	16,335	4368%
26	16,988	4542%
27	17,642	4717%
28	18,295	4892%
29	18,949	5066%
30	19,602	5241%
31	20,255	5416%
32	20,909	5591%
33	21,562	5765%
34	22,216	5940%
35	22,869	6115%

36	23,522	6289%
37	24,176	6464%
38	24,829	6639%
39	25,483	6814%
40	26,136	6988%
Load Reduction to meet TSS TMDL:		**374**

Tier 2- Blazefork Creek

Meeting the TSS TMDL for Blazefork Creek		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	855	45%
2	1,710	90%
3	2,565	135%
4	3,420	180%
5	4,275	225%
6	5,130	270%
7	5,985	315%
8	6,840	360%
9	7,695	405%
10	8,550	450%
11	9,405	496%
12	10,260	541%
13	11,115	586%
14	11,970	631%
15	12,825	676%
16	13,680	721%
17	14,535	766%
18	15,390	811%
19	16,245	856%
20	17,100	901%
21	17,955	946%
22	18,810	991%
23	19,665	1036%
24	20,520	1081%
25	21,375	1126%
26	22,230	1171%
27	23,085	1216%
28	23,940	1261%

29	24,795	1306%
30	25,650	1351%
31	26,505	1396%
32	27,360	1442%
33	28,215	1487%
34	29,070	1532%
35	29,925	1577%
36	30,780	1622%
37	31,635	1667%
38	32,490	1712%
39	33,345	1757%
40	34,200	1802%
Load Reduction to meet TSS TMDL:		**1,898**

In addressing the sub-watersheds mentioned above, the Little Arkansas River TMDL for Sediment will also be met.

Achieving the Little Ark TSS TMDL		
Creek	**Total Erosion Reduction**	**% of Little Ark TMDL**
Blazefork	34,200	46%
Turkey Creek	103,080	138%
Bl. Kettle Creek	26,136	35%
Kisiwa Creek	29,680	40%
Emma Creek	47,043	63%
Sand Creek	29,076	39%
Total	269,216	361%

Meeting the TSS TMDL for the Little Arkansas River:

Meeting the TSS TMDL for the Little Ark River		
Year	**Cropland Reduction (tons)**	**% of TMDL**
1	7,299	10%
2	14,599	20%
3	21,898	29%
4	29,198	39%
5	36,497	49%
6	43,796	59%
7	51,096	68%
8	58,395	78%
9	65,694	88%

10	72,994	98%
11	80,293	108%
12	87,593	117%
13	94,892	127%
14	102,191	137%
15	109,491	147%
16	116,790	157%
17	124,090	166%
18	131,389	176%
19	138,688	186%
20	145,988	196%
21	153,287	205%
22	160,587	215%
23	167,886	225%
24	175,185	235%
25	182,485	245%
26	189,784	254%
27	197,083	264%
28	204,383	274%
29	211,682	284%
30	218,982	293%
31	226,281	303%
32	233,580	313%
33	240,880	323%
34	248,179	333%
35	255,479	342%
36	262,778	352%
37	270,077	362%
38	277,377	372%
39	284,676	382%
40	291,976	391%
Load Reduction to meet TSS TMDL:		**74,616**

To achieve plan goals and meet TMDL requirements, this plan requires 4,768 acres. Table 26 in Section 7.3 indicates that there are 112,279 acres of available cropland in the Sediment targeted Tier 1 and Tier 2 sub-watersheds.

The BMPs delineated by the SLT for sediment reductions will also serve to reduce the amount of phosphorus, nitrates and other nutrients entering the river. Increases in these nutrients can lead to dissolved oxygen and eutrophication, causing problems for

aquatic plants and animals. Nitrates, dissolved oxygen, eutrophication and biology are all listed on the project area's TMDL list, while total phosphorus is listed on the 303(d) list of impairments for this watershed. By implementing sediment BMPs, reductions in nutrient load levels are inevitable.

7.3 Nutrients

Nutrients are a common nonpoint source pollutant. Although not listed as a TMDL, Total Phosphorus (TP) is 303d listed for five of the project area's creeks (Back Kettle, Emma, Sand, Turkey, Kisiwa) and the Little Arkansas River. The SLT wishes to address nutrients in the watershed with an emphasis on phosphorus carried to water bodies by crop field runoff and livestock areas. Nutrients contribute heavily to the eutrophication that is taking place in five of the project area lakes. Phosphorus reductions of 20 to 90 percent and Nitrogen reductions of 9 to 66 percent are required to improve conditions in project area lakes.

Nitrates are TMDL listed as a high priority for Sand Creek but it has been determined that this is a result of point source pollution and will not be addressed by this WRAPS Plan. However, while addressing sediment and P runoff, nitrates will be also be impacted by BMP implementation, resulting in improvements in Biology and DO TMDLs and 303d listed areas.

Reducing crop field runoff and erosion is necessary for a reduction in sediment loss and nutrient loading. 702,377 acres of cropland in the project area could use additional BMPs to aid in the overall reduction of nutrient pollution. Agricultural best management practices (BMPs) such as continuous no-till, conservation tillage, grass buffer strips around cropland, terraces, grassed waterways and reducing activities within the riparian areas will reduce erosion and improve water quality.

Possible Sources of the Impairment

Nutrients, primarily phosphorus, are present in manure. Soluble phosphorus can easily be transported in runoff from fields where livestock gather. Other nutrient issues can arise from fertilizers. Nitrogen and phosphorus can originate from fertilizer runoff caused by either excess application or a rainfall event immediately after application. Not all phosphorus and nitrogen contributions can be attributed to agricultural practices. Excess fertilization of lawns, golf courses and urban areas can easily transport nitrogen and phosphorus downstream.

7.3.1 Nutrient Pollutant Loads and Load Reductions

The current estimated nutrient loading, including total phosphorus (P) entering the Little Arkansas River Watershed are above acceptable numbers. Currently, 451,140 pounds of P are entering the watershed annually according to the TMDL section of KDHE (*July 2011*). Therefore, **P loading needs to be reduced by 267,837 pounds per year**.

As mentioned in Section 6, the SLT will target Tier 1 areas first in this plan but if sufficient load reductions can not be made annually in those areas, they will continue in to Tier 2 areas with BMP implementation. Based on numbers provided by KDHE in July 2011, the following load reductions for TP need to be made in the sub watersheds listed below:

Tier 1 – This WRAPS Plan will first target the following areas for TP BMP implementations: *(watershed – TP Load Reduction needed)*

- **Emma Creek – 21,318.34 lbs/year**
- **Running Turkey Creek – 49,181.56 lbs/year**
- **Lower Sand Creek – 17,346.11 lbs/year**

Tier 2 – The WRAPS Plan will focus on these targeted areas if unable to achieve implementation and required load reductions in Tier 1 targeted areas: *(watershed – TP Load Reduction needed)*

- **Kisiwa Creek – 16,247.35 lbs/year**
- **Black Kettle Creek – 4,762.72 lbs/year**
- **Lower Blazefork – 26,442.94 lbs/year**

In focusing in the sub watersheds mentioned above, the Little Arkansas River at Valley Center will show a load reduction as well. The Little Arkansas River at Valley Center needs to show a 267,837 lbs/year reduction to be removed from the TMDL list and this plan should over-exceed that amount. Therefore, TP TMDLs will be met for Emma, Turkey, Sand, Kisiwa, and Black Kettle Creeks as well as the Little Arkansas River. In meeting these TMDLs for TP and Sediment/Biology (Section 7.2), those areas will also meet Biology TMDLs. DO TMDLs for Turkey, Sand, Emma and Black Kettle Creeks will also be met since TP issues will be resolved.

7.3.2 Nutrient Goal and BMPs

The SLT has laid out specific BMPs that they have determined will be acceptable to watershed residents as listed below. **These BMPs will be implemented in cropland targeted areas to address SLT goals and objectives.** The BMPs delineated by the SLT for nutrient reductions will also serve to reduce sediment and bacteria.

7.3.2.A. Cropland BMPs to be Implemented for Nutrients:

Cropland BMP tables for sediment are listed under Section 7.2.5, beginning with Table 19. These tables include BMPs used for Nutrient reductions based on sediment runoff from cropfields:

1. BMPs, Costs, and Reduction Efficiencies for P and N, Table 19
2. Annual Adoption of Cropland BMPs, Table 20
3. Total Annual Soil Erosion Reductions from Cropland BMPs, Table 21

Table 23. Phosphorus BMP Annual Load Reductions - next page

Total Annual Phosphorous Reduction, Cropland BMPs (pounds)										
Year	No-Till	Cons. Tillage	Water-ways	Buffers	Nutrient Mgmt Plans	Terraces	Incorp-orate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	657	657	986	822	205	739	164	205	164	4,600
2	1,314	1,314	1,972	1,643	411	1,479	329	411	329	9,201
3	1,972	1,972	2,957	2,465	616	2,218	493	616	493	13,801
4	2,629	2,629	3,943	3,286	822	2,957	657	822	657	18,402
5	3,286	3,286	4,929	4,108	1,027	3,697	822	1,027	822	23,002
6	3,943	3,943	5,915	4,929	1,232	4,436	986	1,232	986	27,603
7	4,600	4,600	6,901	5,751	1,438	5,176	1,150	1,438	1,150	32,203
8	5,258	5,258	7,886	6,572	1,643	5,915	1,314	1,643	1,314	36,804
9	5,915	5,915	8,872	7,394	1,848	6,654	1,479	1,848	1,479	41,404
10	6,572	6,572	9,858	8,215	2,054	7,394	1,643	2,054	1,643	46,005
11	7,229	7,229	10,844	9,037	2,259	8,133	1,807	2,259	1,807	50,605
12	7,886	7,886	11,830	9,858	2,465	8,872	1,972	2,465	1,972	55,205
13	8,544	8,544	12,816	10,680	2,670	9,612	2,136	2,670	2,136	59,806
14	9,201	9,201	13,801	11,501	2,875	10,351	2,300	2,875	2,300	64,406
15	9,858	9,858	14,787	12,323	3,081	11,090	2,465	3,081	2,465	69,007
16	10,515	10,515	15,773	13,144	3,286	11,830	2,629	3,286	2,629	73,607
17	11,173	11,173	16,759	13,966	3,491	12,569	2,793	3,491	2,793	78,208
18	11,830	11,830	17,745	14,787	3,697	13,308	2,957	3,697	2,957	82,808
19	12,487	12,487	18,730	15,609	3,902	14,048	3,122	3,902	3,122	87,409
20	13,144	13,144	19,716	16,430	4,108	14,787	3,286	4,108	3,286	92,009
21	13,801	13,801	20,702	17,252	4,313	15,527	3,450	4,313	3,450	96,610
22	14,459	14,459	21,688	18,073	4,518	16,266	3,615	4,518	3,615	101,210
23	15,116	15,116	22,674	18,895	4,724	17,005	3,779	4,724	3,779	105,810
24	15,773	15,773	23,659	19,716	4,929	17,745	3,943	4,929	3,943	110,411
25	16,430	16,430	24,645	20,538	5,134	18,484	4,108	5,134	4,108	115,011
26	17,087	17,087	25,631	21,359	5,340	19,223	4,272	5,340	4,272	119,612
27	17,745	17,745	26,617	22,181	5,545	19,963	4,436	5,545	4,436	124,212
28	18,402	18,402	27,603	23,002	5,751	20,702	4,600	5,751	4,600	128,813
29	19,059	19,059	28,589	23,824	5,956	21,441	4,765	5,956	4,765	133,413
30	19,716	19,716	29,574	24,645	6,161	22,181	4,929	6,161	4,929	138,014
31	20,373	20,373	30,560	25,467	6,367	22,920	5,093	6,367	5,093	142,614
32	21,031	21,031	31,546	26,288	6,572	23,659	5,258	6,572	5,258	147,215
33	21,688	21,688	32,532	27,110	6,777	24,399	5,422	6,777	5,422	151,815
34	22,345	22,345	33,518	27,931	6,983	25,138	5,586	6,983	5,586	156,415
35	23,002	23,002	34,503	28,753	7,188	25,878	5,751	7,188	5,751	161,016
36	23,659	23,659	35,489	29,574	7,394	26,617	5,915	7,394	5,915	165,616
37	24,317	24,317	36,475	30,396	7,599	27,356	6,079	7,599	6,079	170,217
38	24,974	24,974	37,461	31,217	7,804	28,096	6,243	7,804	6,243	174,817
39	25,631	25,631	38,447	32,039	8,010	28,835	6,408	8,010	6,408	179,418
40	26,288	26,288	39,432	32,860	8,215	29,574	6,572	8,215	6,572	184,018

Although N is not a targeted impairment, as previously mentioned, cropland BMPs addressing sediment and P will subsequently remove N as well, the table below exemplifies N load reductions based on BMPs that will already be implemented for sediment and TP targeted areas. These reductions in N and P will aid in the DO TMDLs being met for Turkey and Sand Creeks. As well as the Biology TMDLs for Black Kettle, Emma, Sand, Turkey, Kisiwa Creeks as well as the Little Arkansas River.

Table 24. Nitrogen BMP Annual Load Reductions

Total Annual Nitrogen Reduction, Cropland BMPs (pounds)										
Year	No-Till	Cons. Tillage	Water-ways	Buffers	Nutrient Mgmt Plans	Terraces	Incorp-orate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	1,506	1,506	3,615	1,506	753	2,711	1,506	753	602	14,459
2	3,012	3,012	7,229	3,012	1,506	5,422	3,012	1,506	1,205	28,917
3	4,518	4,518	10,844	4,518	2,259	8,133	4,518	2,259	1,807	43,376
4	6,024	6,024	14,459	6,024	3,012	10,844	6,024	3,012	2,410	57,834
5	7,531	7,531	18,073	7,531	3,765	13,555	7,531	3,765	3,012	72,293
6	9,037	9,037	21,688	9,037	4,518	16,266	9,037	4,518	3,615	86,751
7	10,543	10,543	25,303	10,543	5,271	18,977	10,543	5,271	4,217	101,210
8	12,049	12,049	28,917	12,049	6,024	21,688	12,049	6,024	4,820	115,669
9	13,555	13,555	32,532	13,555	6,777	24,399	13,555	6,777	5,422	130,127
10	15,061	15,061	36,146	15,061	7,531	27,110	15,061	7,531	6,024	144,586
11	16,567	16,567	39,761	16,567	8,284	29,821	16,567	8,284	6,627	159,044
12	18,073	18,073	43,376	18,073	9,037	32,532	18,073	9,037	7,229	173,503
13	19,579	19,579	46,990	19,579	9,790	35,243	19,579	9,790	7,832	187,961
14	21,085	21,085	50,605	21,085	10,543	37,954	21,085	10,543	8,434	202,420
15	22,592	22,592	54,220	22,592	11,296	40,665	22,592	11,296	9,037	216,879
16	24,098	24,098	57,834	24,098	12,049	43,376	24,098	12,049	9,639	231,337
17	25,604	25,604	61,449	25,604	12,802	46,087	25,604	12,802	10,241	245,796
18	27,110	27,110	65,064	27,110	13,555	48,798	27,110	13,555	10,844	260,254
19	28,616	28,616	68,678	28,616	14,308	51,509	28,616	14,308	11,446	274,713
20	30,122	30,122	72,293	30,122	15,061	54,220	30,122	15,061	12,049	289,171
21	31,628	31,628	75,908	31,628	15,814	56,931	31,628	15,814	12,651	303,630
22	33,134	33,134	79,522	33,134	16,567	59,642	33,134	16,567	13,254	318,089
23	34,640	34,640	83,137	34,640	17,320	62,353	34,640	17,320	13,856	332,547
24	36,146	36,146	86,751	36,146	18,073	65,064	36,146	18,073	14,459	347,006
25	37,653	37,653	90,366	37,653	18,826	67,775	37,653	18,826	15,061	361,464
26	39,159	39,159	93,981	39,159	19,579	70,486	39,159	19,579	15,663	375,923
27	40,665	40,665	97,595	40,665	20,332	73,197	40,665	20,332	16,266	390,381
28	42,171	42,171	101,210	42,171	21,085	75,908	42,171	21,085	16,868	404,840
29	43,677	43,677	104,825	43,677	21,838	78,618	43,677	21,838	17,471	419,299
30	45,183	45,183	108,439	45,183	22,592	81,329	45,183	22,592	18,073	433,757

31	46,689	46,689	112,054	46,689	23,345	84,040	46,689	23,345	18,676	448,216
32	48,195	48,195	115,669	48,195	24,098	86,751	48,195	24,098	19,278	462,674
33	49,701	49,701	119,283	49,701	24,851	89,462	49,701	24,851	19,881	477,133
34	51,207	51,207	122,898	51,207	25,604	92,173	51,207	25,604	20,483	491,591
35	52,714	52,714	126,513	52,714	26,357	94,884	52,714	26,357	21,085	506,050
36	54,220	54,220	130,127	54,220	27,110	97,595	54,220	27,110	21,688	520,509
37	55,726	55,726	133,742	55,726	27,863	100,306	55,726	27,863	22,290	534,967
38	57,232	57,232	137,356	57,232	28,616	103,017	57,232	28,616	22,893	549,426
39	58,738	58,738	140,971	58,738	29,369	105,728	58,738	29,369	23,495	563,884
40	60,244	60,244	144,586	60,244	30,122	108,439	60,244	30,122	24,098	578,343

The table below shows cropland reductions in TP over a 40 year span using only cropland BMPs. The row high-lighted in yellow demonstrates the year in which Black Kettle is projected to meet its TP TMDL. Black Kettle is the only sub watershed that will be targeted with only cropland BMP implementation. Rest of the sub watersheds that will be targeted for nutrients (Emma, Turkey, Sand, Kisiwa and Blazefork) will have cropland and livestock BMPs implemented to meet TMDL standards. Their tables will be listed in Section 7.3.2.B. and will include both cropland and livestock TP load reduction numbers.

Table 25. Black Kettle Creek Load Reductions

Meeting the TP TMDL for Black Kettle Creek			
Year	**Cropland Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	718	718	15%
2	1,437	1,437	30%
3	2,155	2,155	45%
4	2,874	2,874	60%
5	3,592	3,592	75%
6	4,310	4,310	90%
7	5,029	5,029	106%
8	5,747	5,747	121%
9	6,466	6,466	136%
10	7,184	7,184	151%
11	7,902	7,902	166%
12	8,621	8,621	181%
13	9,339	9,339	196%
14	10,058	10,058	211%
15	10,776	10,776	226%
16	11,494	11,494	241%
17	12,213	12,213	256%
18	12,931	12,931	271%
19	13,650	13,650	287%

20	14,368	14,368	302%
21	15,086	15,086	317%
22	15,805	15,805	332%
23	16,523	16,523	347%
24	17,242	17,242	362%
25	17,960	17,960	377%
26	18,679	18,679	392%
27	19,397	19,397	407%
28	20,115	20,115	422%
29	20,834	20,834	437%
30	21,552	21,552	452%
31	22,271	22,271	468%
32	22,989	22,989	483%
33	23,707	23,707	498%
34	24,426	24,426	513%
35	25,144	25,144	528%
36	25,863	25,863	543%
37	26,581	26,581	558%
38	27,299	27,299	573%
39	28,018	28,018	588%
40	28,736	28,736	603%
Load Reduction to meet TP TMDL:			**4,763**

Table 26. Sediment and Nutrient BMP Implementation – Cropland Acreage Inventory*

Sediment and Nutrient BMP Implementation - Cropland Inventory												
	No-Till	**Conservation Tillage**	**Waterways**	**Buffers**	**Nutrient Mgt. Plans**	**Terraces**	**Incorporate Manure**	**Cons. Crop Rotations**	**Water Retention**	**Total Adoption Acres**	**Acres Required for BMP Adoption**	**Available Acres in Sub-Watersheds**
Turkey Creek												
110300120204	33	67	50	33	17	50	17	17	7	290		
110300120205	27	54	40	27	13	40	13	13	5	233		
110300120206	30	59	44	30	15	44	15	15	6	258	**1,365**	**17,478**
110300120207	33	65	49	33	16	49	16	16	7	285		
110300120208	34	69	52	34	17	52	17	17	7	299		
Total	**157**	**314**	**235**	**157**	**78**	**235**	**78**	**78**	***32***	**1,365**		
Emma Creek											**1,139**	**20,799**
110300120401	34	68	51	34	17	51	17	17	7	294		

110300120402	27	54	40	27	13	40	13	13	5	233		
110300120403	43	85	64	43	21	64	21	21	9	371		
110300120404	28	55	41	28	14	41	14	14	6	241		
Total	**132**	**262**	**196**	**132**	**65**	**196**	**65**	**65**	***27***	**1,139**		
Sand Creek												
110300120405	28	57	43	28	14	43	14	14	6	247	**475**	**24,206**
110300120406	26	52	39	26	13	39	13	13	5	228		
Total	**54**	**109**	**82**	**54**	**27**	**82**	**27**	**27**	***11***	**475**		
Blazefork Creek												
110300120201	35	69	52	35	17	52	17	17	7	302	**559**	**19,126**
110300120202	29	59	44	29	15	44	15	15	6	257		
Total	**64**	**128**	**96**	**64**	**32**	**96**	**32**	**32**	***13***	**559**		
Black Kettle Creek												
110300120301	36	73	55	36	18	55	18	18	7	318		
110300120302	25	50	37	25	12	37	12	12	5	216	**745**	**17,152**
110300120307	24	48	36	24	12	36	12	12	5	211		
Total	**85**	**171**	**128**	**85**	**42**	**128**	**42**	**42**	***17***	**745**		
Kisiwa Creek												
110300120304	6	13	9	6	3	9	3	3	1	55		
110300120305	29	58	43	29	14	43	14	14	6	252	**485**	**13,517**
110300120306	20	41	31	20	10	31	10	10	4	178		
Total	**55**	**112**	**83**	**55**	**27**	**83**	**27**	**27**	***11***	**485**		
Acres Needed/Available for Cropland BMP Implementation in Little Ark Watershed											**4,768**	**112,279**

**Numbers in the table above are rounded to the nearest acre.*

The table above indicates that there are 112,279 acres of available cropland in the Sediment and Nutrient targeted Tier 1 and Tier 2 sub-watersheds. To achieve plan goals and meet TMDL requirements, this plan requires 4,768 acres. Therefore, it can be assumed that there are ample acres to implement this WRAPS plan as written.

7.3.2.B Livestock BMPs to be Implemented for Nutrients:

Livestock BMPs have been selected by the SLT based on acceptability by the landowners, cost effectiveness and pollutant load reduction effectiveness. Tables below reflect TP load reductions with livestock BMP implementation over a 40 year span.

Table 27. Livestock BMP Adoption

Annual Livestock BMP Adoption				
Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**
1	1	1	1	0
2	1	1	0	1
3	1	1	1	0
4	1	1	0	1
5	1	1	1	0
6	1	1	0	1
7	1	1	1	0
8	1	1	0	1
9	1	1	1	0
10	1	1	0	1
11	1	1	1	0
12	1	1	0	1
13	1	1	1	0
14	1	1	0	1
15	1	1	1	0
16	1	1	0	1
17	1	1	1	0
18	1	1	0	1
19	1	1	1	0
20	1	1	0	1
21	1	1	1	0
22	1	1	0	1
23	1	1	1	0
24	1	1	0	1
25	1	1	1	0
26	1	1	0	1
27	1	1	1	0
28	1	1	0	1
29	1	1	1	0
30	1	1	0	1
31	1	1	1	0
32	1	1	0	1
33	1	1	1	0
34	1	1	0	1
35	1	1	1	0
36	1	1	0	1

37	1	1	1	0
38	1	1	0	1
39	1	1	1	0
40	1	1	0	1
Total	*40*	*40*	*20*	*20*

Table 28. Livestock BMP Adoption by Sub Watershed

Livestock BMP Adoption by Sub Watershed					
Subwatershed	**Vegetative Filter Strip**	**Relocate Feeding Site**	**Relocate Pasture Feeding Site**	**Off-Stream Watering System**	**Total Adoption**
Sand Creek	5	5	2	2	14
Emma Creek	8	8	4	4	24
Blazefork	6	6	3	3	18
Kisiwa	8	8	4	4	24
Turkey Creek	13	13	7	7	40
Total	40	40	20	20	120

Table 29. Phosphorus Reductions using Livestock BMPs

Annual Phosphorous Load Reductions (lbs) using Livestock BMPs					
Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**	**Annual Load Reduction**
1	1,276	1,595	63	0	**2,933**
2	2,552	3,189	63	63	**5,867**
3	3,827	4,784	126	63	**8,800**
4	5,103	6,379	126	126	**11,734**
5	6,379	7,973	189	126	**14,667**
6	7,655	9,568	189	189	**17,601**
7	8,930	11,163	252	189	**20,534**
8	10,206	12,758	252	252	**23,468**
9	11,482	14,352	315	252	**26,401**
10	12,758	15,947	315	315	**29,335**
11	14,033	17,542	378	315	**32,268**
12	15,309	19,136	378	378	**35,202**
13	16,585	20,731	441	378	**38,135**
14	17,861	22,326	441	441	**41,069**
15	19,136	23,920	504	441	**44,002**
16	20,412	25,515	504	504	**46,936**
17	21,688	27,110	568	504	**49,869**

18	22,964	28,704	568	568	**52,803**
19	24,239	30,299	631	568	**55,736**
20	25,515	31,894	631	631	**58,670**
21	26,791	33,488	694	631	**61,603**
22	28,067	35,083	694	694	**64,537**
23	29,342	36,678	757	694	**67,470**
24	30,618	38,273	757	757	**70,404**
25	31,894	39,867	820	757	**73,337**
26	33,170	41,462	820	820	**76,271**
27	34,445	43,057	883	820	**79,204**
28	35,721	44,651	883	883	**82,138**
29	36,997	46,246	946	883	**85,071**
30	38,273	47,841	946	946	**88,005**
31	39,548	49,435	1,009	946	**90,938**
32	40,824	51,030	1,009	1,009	**93,872**
33	42,100	52,625	1,072	1,009	**96,805**
34	43,376	54,219	1,072	1,072	**99,739**
35	44,651	55,814	1,135	1,072	**102,672**
36	45,927	57,409	1,135	1,135	**105,606**
37	47,203	59,003	1,198	1,135	**108,539**
38	48,479	60,598	1,198	1,198	**111,473**
39	49,754	62,193	1,261	1,198	**114,406**
40	51,030	63,788	1,261	1,261	**117,340**

Table 30. Phosphorus Reductions by Sub Watershed Using Livestock BMPS

Livestock BMP Phosphorous Load Reduction by Sub Watershed (pounds)					
Subwatershed	**Vegetative Filter Strip**	**Relocate Feeding Site**	**Relocate Pasture Feeding Site**	**Off-Stream Watering System**	**Total Load Reduction**
Sand Creek	6,379	7,973	126	126	14,604
Emma Creek	10,206	12,758	252	252	23,468
Blazefork	7,655	9,568	189	189	17,601
Kisiwa	10,206	12,758	252	252	23,468
Turkey Creek	16,585	20,731	441	441	38,199
Total	51,030	63,788	1,261	1,261	117,340

Table 31. Nitrogen Load Reductions Using Livestock BMPS

Annual Nitrogen Load Reductions (lbs) using Livestock BMPs					
Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**	**Annual Load Reduction**
1	2,403	3,004	119	0	**5,525**
2	4,806	6,007	119	119	**11,050**
3	7,209	9,011	238	119	**16,576**
4	9,612	12,014	238	238	**22,101**
5	12,014	15,018	356	238	**27,626**
6	14,417	18,022	356	356	**33,151**
7	16,820	21,025	475	356	**38,677**
8	19,223	24,029	475	475	**44,202**
9	21,626	27,032	594	475	**49,727**
10	24,029	30,036	594	594	**55,252**
11	26,432	33,040	713	594	**60,778**
12	28,835	36,043	713	713	**66,303**
13	31,237	39,047	831	713	**71,828**
14	33,640	42,050	831	831	**77,353**
15	36,043	45,054	950	831	**82,879**
16	38,446	48,058	950	950	**88,404**
17	40,849	51,061	1,069	950	**93,929**
18	43,252	54,065	1,069	1,069	**99,454**
19	45,655	57,068	1,188	1,069	**104,980**
20	48,058	60,072	1,188	1,188	**110,505**
21	50,460	63,075	1,307	1,188	**116,030**
22	52,863	66,079	1,307	1,307	**121,555**
23	55,266	69,083	1,425	1,307	**127,081**
24	57,669	72,086	1,425	1,425	**132,606**
25	60,072	75,090	1,544	1,425	**138,131**
26	62,475	78,093	1,544	1,544	**143,656**
27	64,878	81,097	1,663	1,544	**149,182**
28	67,281	84,101	1,663	1,663	**154,707**
29	69,683	87,104	1,782	1,663	**160,232**
30	72,086	90,108	1,782	1,782	**165,757**
31	74,489	93,111	1,900	1,782	**171,283**
32	76,892	96,115	1,900	1,900	**176,808**
33	79,295	99,119	2,019	1,900	**182,333**
34	81,698	102,122	2,019	2,019	**187,858**
35	84,101	105,126	2,138	2,019	**193,384**
36	86,504	108,129	2,138	2,138	**198,909**

37	88,906	111,133	2,257	2,138	**204,434**
38	91,309	114,137	2,257	2,257	**209,959**
39	93,712	117,140	2,375	2,257	**215,485**
40	96,115	120,144	2,375	2,375	**221,010**

Table 32. Nitrogen Load Reductions by Sub Watershed using Livestock BMPs

Livestock BMP Nitrogen Load Reduction by Sub Watershed (pounds)					
Subwatershed	**Vegetative Filter Strip**	**Relocate Feeding Site**	**Relocate Pasture Feeding Site**	**Off-Stream Watering System**	**Total Load Reduction**
Sand Creek	12,014	15,018	238	238	27,507
Emma Creek	19,223	24,029	475	475	44,202
Blazefork	14,417	18,022	356	356	33,151
Kisiwa	19,223	24,029	475	475	44,202
Turkey Creek	31,237	39,047	831	831	71,947
Total	96,115	120,144	2,375	2,375	221,010

The Tables below represent total reductions for TP using both Cropland and Livestock BMP Implementation for each targeted sub watershed and the Little Arkansas River. The row high-lighted in yellow demonstrates the year in which that particular sub watershed is projected to meet its TMDL. The last line of each table shows what reduction was required to meet the TP TMDL in that sub watershed. By year 40 in each table, this plan will far exceed the load reductions needed to meet the TMDL.

Table 33. Total Phosphorus Load Reductions Using Cropland and Livestock BMPs by Sub Watershed

Tier 1 – Emma Creek

Meeting the TP TMDL for Emma Creek				
Year	**Cropland Reduction (lbs)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	1,100	587	1,687	8%
2	2,200	1,173	3,373	16%
3	3,299	1,760	5,060	24%
4	4,399	2,347	6,746	32%
5	5,499	2,934	8,433	40%
6	6,599	3,520	10,119	47%
7	7,699	4,107	11,806	55%
8	8,799	4,694	13,492	63%
9	9,898	5,280	15,179	71%
10	10,998	5,867	16,865	79%
11	12,098	6,454	18,552	87%

12	13,198	7,040	20,238	95%
13	14,298	7,627	21,925	103%
14	15,398	8,214	23,611	111%
15	16,497	8,801	25,298	119%
16	17,597	9,387	26,985	127%
17	18,697	9,974	28,671	134%
18	19,797	10,561	30,358	142%
19	20,897	11,147	32,044	150%
20	21,997	11,734	33,731	158%
21	23,096	12,321	35,417	166%
22	24,196	12,907	37,104	174%
23	25,296	13,494	38,790	182%
24	26,396	14,081	40,477	190%
25	27,496	14,668	42,163	198%
26	28,596	15,254	43,850	206%
27	29,695	15,841	45,536	214%
28	30,795	16,428	47,223	222%
29	31,895	17,014	48,909	229%
30	32,995	17,601	50,596	237%
31	34,095	18,188	52,283	245%
32	35,195	18,774	53,969	253%
33	36,294	19,361	55,656	261%
34	37,394	19,948	57,342	269%
35	38,494	20,535	59,029	277%
36	39,594	21,121	60,715	285%
37	40,694	21,708	62,402	293%
38	41,794	22,295	64,088	301%
39	42,893	22,881	65,775	309%
40	43,993	23,468	67,461	316%
Load Reduction to meet TP TMDL:				**21,318**

Tier 1 – Turkey Creek

Meeting the TP TMDL for Turkey Creek				
Year	**Cropland Reduction (lbs)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	1,318	955	2,273	5%
2	2,635	1,910	4,545	9%
3	3,953	2,865	6,818	14%
4	5,270	3,820	9,090	18%
5	6,588	4,775	11,363	23%
6	7,905	5,730	13,635	28%

7	9,223	6,685	15,908	32%
8	10,541	7,640	18,180	37%
9	11,858	8,595	20,453	42%
10	13,176	9,550	22,725	46%
11	14,493	10,505	24,998	51%
12	15,811	11,460	27,270	55%
13	17,128	12,415	29,543	60%
14	18,446	13,370	31,816	65%
15	19,763	14,325	34,088	69%
16	21,081	15,280	36,361	74%
17	22,399	16,235	38,633	79%
18	23,716	17,190	40,906	83%
19	25,034	18,145	43,178	88%
20	26,351	19,100	45,451	92%
21	27,669	20,054	47,723	97%
22	28,986	21,009	49,996	102%
23	30,304	21,964	52,268	106%
24	31,622	22,919	54,541	111%
25	32,939	23,874	56,814	116%
26	34,257	24,829	59,086	120%
27	35,574	25,784	61,359	125%
28	36,892	26,739	63,631	129%
29	38,209	27,694	65,904	134%
30	39,527	28,649	68,176	139%
31	40,845	29,604	70,449	143%
32	42,162	30,559	72,721	148%
33	43,480	31,514	74,994	152%
34	44,797	32,469	77,266	157%
35	46,115	33,424	79,539	162%
36	47,432	34,379	81,811	166%
37	48,750	35,334	84,084	171%
38	50,067	36,289	86,357	176%
39	51,385	37,244	88,629	180%
40	52,703	38,199	90,902	185%
Load Reduction to meet TP TMDL:				**49,182**

Tier 1 – Sand Creek

Meeting the TP TMDL for Sand Creek				
Year	**Cropland Reduction (lbs)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	458	365	823	5%

2	916	730	1,646	9%
3	1,374	1,095	2,470	14%
4	1,833	1,460	3,293	19%
5	2,291	1,826	4,116	24%
6	2,749	2,191	4,939	28%
7	3,207	2,556	5,763	33%
8	3,665	2,921	6,586	38%
9	4,123	3,286	7,409	43%
10	4,581	3,651	8,232	47%
11	5,040	4,016	9,056	52%
12	5,498	4,381	9,879	57%
13	5,956	4,746	10,702	62%
14	6,414	5,111	11,525	66%
15	6,872	5,477	12,349	71%
16	7,330	5,842	13,172	76%
17	7,788	6,207	13,995	81%
18	8,246	6,572	14,818	85%
19	8,705	6,937	15,642	90%
20	9,163	7,302	16,465	95%
21	9,621	7,667	17,288	100%
22	10,079	8,032	18,111	104%
23	10,537	8,397	18,934	109%
24	10,995	8,762	19,758	114%
25	11,453	9,128	20,581	119%
26	11,912	9,493	21,404	123%
27	12,370	9,858	22,227	128%
28	12,828	10,223	23,051	133%
29	13,286	10,588	23,874	138%
30	13,744	10,953	24,697	142%
31	14,202	11,318	25,520	147%
32	14,660	11,683	26,344	152%
33	15,119	12,048	27,167	157%
34	15,577	12,413	27,990	161%
35	16,035	12,779	28,813	166%
36	16,493	13,144	29,637	171%
37	16,951	13,509	30,460	176%
38	17,409	13,874	31,283	180%
39	17,867	14,239	32,106	185%
40	18,326	14,604	32,930	190%
Load Reduction to meet TP TMDL:				**17,346**

Tier 2 – Kisiwa Creek

Meeting the TP TMDL for Kisiwa Creek				
Year	**Cropland Reduction (lbs)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	468	587	1,054	6%
2	935	1,173	2,109	13%
3	1,403	1,760	3,163	19%
4	1,871	2,347	4,217	26%
5	2,338	2,934	5,272	32%
6	2,806	3,520	6,326	39%
7	3,274	4,107	7,380	45%
8	3,741	4,694	8,435	52%
9	4,209	5,280	9,489	58%
10	4,676	5,867	10,543	65%
11	5,144	6,454	11,598	71%
12	5,612	7,040	12,652	78%
13	6,079	7,627	13,707	84%
14	6,547	8,214	14,761	91%
15	7,015	8,801	15,815	97%
16	7,482	9,387	16,870	104%
17	7,950	9,974	17,924	110%
18	8,418	10,561	18,978	117%
19	8,885	11,147	20,033	123%
20	9,353	11,734	21,087	130%
21	9,821	12,321	22,141	136%
22	10,288	12,907	23,196	143%
23	10,756	13,494	24,250	149%
24	11,224	14,081	25,304	156%
25	11,691	14,668	26,359	162%
26	12,159	15,254	27,413	169%
27	12,627	15,841	28,467	175%
28	13,094	16,428	29,522	182%
29	13,562	17,014	30,576	188%
30	14,029	17,601	31,630	195%
31	14,497	18,188	32,685	201%
32	14,965	18,774	33,739	208%
33	15,432	19,361	34,794	214%
34	15,900	19,948	35,848	221%
35	16,368	20,535	36,902	227%
36	16,835	21,121	37,957	234%
37	17,303	21,708	39,011	240%

38	17,771	22,295	40,065	247%
39	18,238	22,881	41,120	253%
40	18,706	23,468	42,174	260%
Load Reduction to meet TP TMDL:				**16,247**

Tier 2 – Blazefork Creek

Meeting the TP TMDL for Blazefork				
Year	**Cropland Reduction (tons)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	539	440	979	4%
2	1,078	880	1,958	7%
3	1,617	1,320	2,937	11%
4	2,155	1,760	3,916	15%
5	2,694	2,200	4,894	19%
6	3,233	2,640	5,873	22%
7	3,772	3,080	6,852	26%
8	4,311	3,520	7,831	30%
9	4,850	3,960	8,810	33%
10	5,389	4,400	9,789	37%
11	5,928	4,840	10,768	41%
12	6,466	5,280	11,747	44%
13	7,005	5,720	12,726	48%
14	7,544	6,160	13,704	52%
15	8,083	6,600	14,683	56%
16	8,622	7,040	15,662	59%
17	9,161	7,480	16,641	63%
18	9,700	7,920	17,620	67%
19	10,238	8,360	18,599	70%
20	10,777	8,801	19,578	74%
21	11,316	9,241	20,557	78%
22	11,855	9,681	21,536	81%
23	12,394	10,121	22,514	85%
24	12,933	10,561	23,493	89%
25	13,472	11,001	24,472	93%
26	14,010	11,441	25,451	96%
27	14,549	11,881	26,430	100%
28	15,088	12,321	27,409	104%
29	15,627	12,761	28,388	107%
30	16,166	13,201	29,367	111%
31	16,705	13,641	30,346	115%
32	17,244	14,081	31,324	118%

33	17,783	14,521	32,303	122%
34	18,321	14,961	33,282	126%
35	18,860	15,401	34,261	130%
36	19,399	15,841	35,240	133%
37	19,938	16,281	36,219	137%
38	20,477	16,721	37,198	141%
39	21,016	17,161	38,177	144%
40	21,555	17,601	39,156	148%
Load Reduction to meet TP TMDL:				**26,443**

In addressing the sub-watersheds mentioned above, the Little Arkansas River TMDL for Total Phosphorus will also be met.

Achieving the Little Ark TP TMDL		
Creek	**Total Phosphorous Reduction**	**% of Little Ark TMDL**
Blazefork	39,156	15%
Turkey Creek	90,902	34%
Black Kettle Creek	28,736	11%
Kisiwa Creek	42,174	16%
Emma Creek	67,461	25%
Sand Creek	32,930	12%
Total	301,358	113%

Meeting the TP TMDL for the Little Arkansas River:

Meeting the TP TMDL for Little Ark				
Year	**Cropland Reduction (lbs)**	**Livestock Reduction (lbs)**	**Total Reduction (lbs)**	**% of TMDL**
1	4,600	2,934	7,534	3%
2	9,201	5,867	15,068	6%
3	13,801	8,801	22,602	8%
4	18,402	11,734	30,136	11%
5	23,002	14,668	37,670	14%
6	27,603	17,601	45,204	17%
7	32,203	20,535	52,738	20%
8	36,804	23,468	60,272	23%
9	41,404	26,402	67,806	25%
10	46,005	29,335	75,340	28%
11	50,605	32,269	82,874	31%
12	55,205	35,202	90,407	34%
13	59,806	38,136	97,941	37%
14	64,406	41,069	105,475	39%
15	69,007	44,003	113,009	42%

16	73,607	46,936	120,543	45%
17	78,208	49,870	128,077	48%
18	82,808	52,803	135,611	51%
19	87,409	55,737	143,145	53%
20	92,009	58,670	150,679	56%
21	96,610	61,604	158,213	59%
22	101,210	64,537	165,747	62%
23	105,810	67,471	173,281	65%
24	110,411	70,404	180,815	68%
25	115,011	73,338	188,349	70%
26	119,612	76,271	195,883	73%
27	124,212	79,205	203,417	76%
28	128,813	82,138	210,951	79%
29	133,413	85,072	218,485	82%
30	138,014	88,005	226,019	84%
31	142,614	90,939	233,553	87%
32	147,215	93,872	241,087	90%
33	151,815	96,806	248,621	93%
34	156,415	99,739	256,154	96%
35	161,016	102,673	263,688	98%
36	165,616	105,606	271,222	101%
37	170,217	108,540	278,756	104%
38	174,817	111,473	286,290	107%
39	179,418	114,407	293,824	110%
40	184,018	117,340	301,358	113%
Load Reduction to meet TP TMDL:				**267,837**

7.4 Bacteria

Emma, Sand and Turkey Creeks as well as the Little Arkansas River are listed for having fecal coliform bacteria (FCB) TMDLs of high priority. FCB are a broad spectrum of bacteria species which includes E. coli Bacteria. FCB's presence in water indicates that the water has been in contact with human or animal waste. FCB is not itself harmful to humans, but its presence indicates that disease causing organisms, or pathogens, may also be present. As mentioned in Section 5.3.3, FCB and E. Coli will be jointly referred to as "Bacteria" throughout this plan.

Possible Sources of the Impairment

Presence of bacteria in waterways can originate from runoff from livestock production areas, close proximity of any mammals to water sources, and manure application to agricultural fields. Bacteria is present in livestock manure and can be transported into waterways if livestock have access to streams. Bacteria can originate in both rural and urban areas. It can be caused by both point and nonpoint sources. It must be noted that not bacteria can be attributed to livestock. Wildlife has a contribution to bacteria loads as well. In addition, failing septic systems can be a source of bacteria from humans.

7.4.1 Manure Runoff from Fields and Livestock Operations

In Kansas, animal feeding operations (AFOs) with greater than 300 animal units must register with KDHE. Confined animal feeding operations (CAFOs), those with more than 999 animal units, must be permitted with EPA. An animal unit or AU is an equal standard for all animals based on size and manure production. For example: 1 AU=one animal weighing 1,000 pounds. The watershed contains several CAFOs. (This data is derived from KDHE, 2003. It may be dated and subject to change). CAFOs are not allowed to release manure from the operation. However, they are allowed to spread manure on cropland fields for distribution. If this application is followed by a rainfall event or the manure is applied on frozen ground, it can run off into the stream. Smaller operations are not regulated by the state. Many of these operations are located along streams because of historic preferences by early settlers. Movement of feeding sites away from the streams and providing alternate watering sites is logistically important to prevention of bacteria entering the stream. Grazing density is an important factor in manure runoff due to the common practice of cattle loafing in ponds and streams during the hot summer months and frequently defecating directly into the water source.

7.4.2 Land Use and Manure Transport

Livestock production areas are a source of bacteria. Livestock that are housed in close proximity to a stream or allowed to loaf in the water source can shed bacteria into the water sources. Wild animals are also contributors in streams and lakes. However, the wild animal population is not as easily controlled as limiting livestock from water sources. Alternative water supplies allow the livestock to have access to fresh water

while limiting the time they spend in surrounding areas. This not only reduces bacteria, but provides a clean drinking water source. Manure runoff from grasslands close to waterways can add to bacteria in the waterways. The SLT has chosen to target high livestock areas for manure BMPs near those creeks TMDL listed for bacteria (Emma, Sand, Turkey and the Little Arkansas River).

7.4.3 Rainfall and Runoff

Rainfall amounts and subsequent runoff along with flooding outside the stream channel can affect bacteria concentrations in the Little Arkansas River and its tributaries. Manure runoff from livestock that are allowed access to stream or manure applied before a rainfall or on frozen ground is washed into the stream.

7.4.4 Pollutant Load and Load Reductions

The current estimated pollutant load for bacteria is difficult to model. Environmental factors affect the viability of the bacteria since it is a living organism. The fate of the bacteria is affected by variations in its initial loading, ambient temperature, amount of sunlight or UV rays, and a decrease in survivability over time are all factors that affect the viability of bacteria.

The SLT will first target livestock areas in those areas listed as having a TMDL for Bacteria: the Little Arkansas River along Emma, Sand and Turkey Creeks. By meeting TMDLs for Emma, Sand and Turkey Creeks, the bacteria TMDL for the Little Arkansas River will subsequently be met.

As mentioned in Section 6, the SLT would like to conduct “windshield surveys” to assess and target sites for BMP implementation. These surveys would be conducted in the Winter of 2011-2012 and then the SLT may consider water monitoring different sites along the stream to check for increases in bacteria for additional assistance in targeting. Areas targeted for Bacteria will be re-visited once the assessment is completed. Presently, the plan is to implement Nutrient BMPs on targeted areas for TP and that will also include some Bacteria impaired areas. Once the assessment is completed, an implementation table with reduction goals will be developed. Timeframe for this table and BMP targeted areas is thought to be Summer-Fall 2012.

7.4.5 Bacteria Goal and BMPs

The SLT has laid out specific BMPs that they have determined will be acceptable to watershed residents as listed below. **These BMPs will address SLT goals and objectives and will be implemented in livestock areas. Nutrient BMPs as listed in the previous section will serve to reduce bacteria loading in the watershed.**

Table 34. Bacteria Goals and BMPs

Goal: Reduce Bacteria entering the Little Arkansas River.				
TMDL Water Quality Goals: To achieve ECB water quality standards and maintain geometric means of bacteria samples collected within 30-day periods from April – October below 262 cfus/100 ml on the stream.				
Protection Measures	***BMPs and Other Actions***	***Bacteria Load Reduction***	***Timeframe***	***Acres/Projects to be Implemented***
Prohibit Bacteria from entering streams by addressing livestock areas.	Establish vegetative buffer strips along streams	TBD	2010-2050	171,091 acres of grassland and livestock areas could use additional BMPs. Acres implemented and time frame may need adjusted to meet the necessary load reductions.
	Relocate small feedlots away from streams	TBD	2010-2050	
	Relocate pasture feeding sites away from streams	TBD	2010-2050	
	Promote alternative watering sites away from streams	TBD	2010-2050	
Reduce runoff from manure used as fertilizer	Manure application - incorporate with tillage	20% reduction in P, 50% reduction in N, % Bacteria - unknown	2010-2050	
Develop Nutrient Management Plans	Soil tests will be issued to determine nutrient needs. Nutrients, including manure applications, will then be applied at agronomic rates based on test results.	0-25% P, 0-25% N	2010-2050	on-going

7.5 Streambank and Riparian Buffer Restoration Sites

Several gully erosion sites and riparian buffer restoration sites were identified through aerial analysis. The following table indicates the number of gully stabilization areas (in linear feet) that were identified in each area, as well as the estimated load reductions that would be achieved with gully stabilization.

Table 35. Gully Stabilization Projects for Sediment, P and N Load Reductions

Water Body	Gully Stabilization Areas Identified (L.F.)	Estimated Potential Load Reductions*		
		Sediment (ton/yr)	Phosphorus (lb/yr)	Nitrogen (lb/yr)
Lower Little Ark River	1,810	121	121	242
Lower Sand Creek	4,200	281	281	562
Lower Emma Creek	835	56	56	112
Lower Kisiwa	175	12	12	23

*Assumed gullies with average Top Width = 12 ft., Bottom Width = 2 ft., Depth = 1.5 ft., Soil Weight = 85 lb/ft^3, Soil P Concentration (lb/lb soil) = 0.0005, and Soil N Concentration (lb/lb soil) = 0.001

As previously stated, the BMP implementation schedule includes buffers as one of the practices to be implemented in order to achieve the load reduction goals of the plan. As a result of this assessment, the following areas needing buffer restoration/establishment have been identified as shown on the previous maps.

Table 36. Riparian Buffer Projects in the Little Arkansas River Watershed

Water Body	Riparian Buffers Identified (Acres)
Little Arkansas River	23.7
Lower Sand Creek	4.2
Lower Emma Creek	1.4
Lower Kisiwa	1.8
Total Acreage	**31.1**

The potential load reductions associated with the above riparian buffer areas are 19 tons/yr of sediment, 31 lbs/yr of phosphorus, and 42 lbs/yr of nitrogen. It should be noted that this preliminary assessment of the hot spots for riparian areas is not extensive, and could be expanded in the future to identify more potential riparian restoration areas.

Approximately 6 sites for potential streambank restoration/stabilization projects have been identified along the Lower Little Arkansas River. The locations of these sites are shown on the map provided in this section, and they have been identified as SB 1 through SB 6. The following table indicates the estimated length of each potential streambank project (in linear feet) and the estimated load reductions that would be achieved with each project implementation.

Table 37. Streambank Restoration Projects for Sediment, P and N Load Reductions

Streambank Site	Length of Streambank Restoration Site (L.F.)	Estimated Potential Load Reductions*		
		Sediment (ton/yr)	Phosphorus (lb/yr)	Nitrogen (lb/yr)
SB 1	750	143	143	287
SB 2	625	120	120	239
SB 3	880	168	168	337
SB 4	160	31	31	61
SB 5	330	63	63	126
SB 6	540	103	103	207
Totals	**3,285**	**628**	**628**	**1257**

*Assumed averages for Streambank Stabilization Projects as follows: Height = 15 ft.; Lateral Recession Rate (ft/yr) = 0.4, Soil Weight = 85 lb/ft^3, Soil P Concentration (lb/lb soil) = 0.0005, and Soil N Concentration (lb/lb soil) = 0.001

The estimated load reductions for the potential streambank restoration areas are based on the site lengths estimated from the aerial photos, as well as the assumptions noted. In particular, a lateral recession rate of 0.4 ft/yr was used for the load reduction calculations; however, this rate, as well as the other soil data assumptions utilized in the calculations will vary depending on the individual site investigation. Depending on site-specific conditions, some of these projects, if implemented, may achieve greater or less load reductions than those noted.

Summary of Sites by HUC 12

The following table summarizes the potential streambank projects, gully stabilization project and riparian buffer acres by HUC 12 as identified through this preliminary assessment.

Table 38. Streambank and Riparian Area Project Sites by HUC 12

HUC 12	Streambank Projects (L.F.)	Gully Stabilization (L.F.)	Riparian Buffers (Acres)	Streambank Sites Included
110300120303	540	-	2.63	SB 6
110300120306	-	175	1.79	
110300120307	1,240	-	3.19	SB 1, SB 4,

				SB 5
110300120404	1,505	835	8.44	SB 2, SB 3
110300120406	-	4,200	4.75	
110300120408	-	1,810	8.74	
110300120502	-	-	1.45	
Totals	**3,285**	**7,020**	**31**	

8.0 Information and Education in Support of BMPs

The SLT has determined which information and education activities will be needed in the watershed. These activities are important in providing the residents of the watershed with a higher awareness of watershed issues. This will lead to an increase in adoption rates of BMPs. Listed below are the activities and events along with their costs and possible sponsoring agencies.

Table 39. Information and Education Activities and Events

BMP	Target Audience	Information / Education Activity / Event	Time Frame	Estimated Costs	Sponsor/ Responsible Agency
Atrazine BMP Implementation					
Split Applications of Herbicide	Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	$1,000 per year for all Atrazine BMPs combined	
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter / Spring	$200 ($100 per event)	
Incorporate Herbicide into Top 2" of Soil	Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	Combined with Split Application of Herbicide BMP	
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter/ Spring	Combined with Split Application of Herbicide BMP	
Vegetative Buffer Zones	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County

		Seasonal Information Meetings	Ongoing	Combined with Split Application of Herbicide BMP	Offices, Conservation Districts
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter/ Spring	Combined with Split Application of Herbicide BMP	
Use Post-emergence Herbicide	Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	Combined with Split Application of Herbicide BMP	
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter/ Spring	Combined with Split Application of Herbicide BMP	
Use Alternative Herbicides	Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	Combined with Split Application of Herbicide BMP	
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter/ Spring	Combined with Split Application of Herbicide BMP	
Terraces and Grass Waterways	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	$1,000 per year for all cropland pollutants in plan	
Reduce Application Rate	Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County

		Seasonal Information Meetings	Ongoing	Combined with Split Application of Herbicide BMP	Offices, Conservation Districts
		Crop Schools to cover weed control and atrazine use - multi-county	Annual - Winter/ Spring	Combined with Split Application of Herbicide BMP	
Conservation Crop Rotation	Farmers and Rental Operators	Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for terraces	
Cropland BMP Implementation for Sediment					
No-till	Farmers and Rental Operators	Field Day and/or Tour	Annual - Summer	$2,500 per year	K-State Extension Watershed Specialists, K-State Extension County Offices, Conservation Districts, NRCS
		No-till Meetings	Winter	$500 per year	
		Harvey County Discussion Group	Monthly during the Winter	$500 for the Winter	Conservation Districts and Kansas State Research and Extension
Conservation Crop Rotation	Farmers and Rental Operators	Seasonal Information Meeting	Ongoing	Combined with informational meeting mentioned above for terraces	K-State Extension Watershed Specialists, K-State Extension County Offices, Conservation Districts, NRCS
Conservation Tillage	Farmers and Rental Operators	Residue Alliance (bus tour) - McPherson and Rice Counties	Annual - Summer	$1,000 per year	K-State Extension Watershed Specialists, K-State Extension County Offices, Conservation Districts, NRCS

Vegetative Buffers along Streams	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Water Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for buffers	
Terraces and Waterways	Landowners and Farmers	One-on-One Technical Assistance	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for terraces	
Water Retention Structure	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for terraces	
Cropland BMP Implementation for Nutrients					
No-till	Farmers and Rental Operators	Field Day and/or Tour	Annual - Summer	Combined with that listed under Sediment	K-State Extension Watershed Specialists, K-State Extension County Offices, State Conservation Districts, NRCS
		No-till Meetings	Winter		

		Harvey County Discussion Group	Monthly during the Winter	Combined with that listed under Sediment	Conservation Districts and Kansas State Research and Extension
Conservation Crop Rotation	Farmers and Rental Operators	Seasonal Information Meeting	Ongoing	Combined with informational meeting mentioned above for terraces	K-State Extension Watershed Specialists, K-State Extension County Offices, Conservation Districts, NRCS
Conservation Tillage	Farmers and Rental Operators	Residue Alliance (bus tour)	Annual - Summer	Combined with that listed above under Sediment	K-State Extension County Offices and NRCS
Vegetative Buffers along Streams	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP Coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for buffers	
Terraces and Waterways	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for terraces	
Incorporate Manure with Tillage	Farmers and Rental Operators	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP Coordinators, K-State Extension County Offices, Conservation

		Informational Meeting	Fall/Winter	$500 per event to cover all Livestock BMPs	Districts
Water Retention Structure	Landowners and Farmers	One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for terraces	
Nutrient Management Plans	Landowners and Farmers	Information Meetings	Ongoing	Cost included with Technical Assistance for Watershed Specialist	Kansas State Research and Extension
		One on One Meetings with Producers	Annual - Ongoing	Cost included with Technical Assistance for Watershed Specialist	
Livestock BMP Implementation for Nutrients and Bacteria					
Vegetative Buffer Strips along streams	Landowners and Ranchers	Field Day and/or Tour	Annual - Fall	$500 per year	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		One-on-One Technical Assistance*	Ongoing	Cost included with Technical Assistance for Watershed Specialist	
		Seasonal Information Meetings	Ongoing	Combined with informational meeting mentioned above for buffers	
Relocate Small Feedlots away from Streams	Landowners and Ranchers	Field Day and/or Tour	Annual - Fall	Combined with that of Vegetative Filter Strips listed above	

		Informational Meeting	Fall/Winter	Combined with Meeting on Manure Incorporation for Nutrients	
Relocate Pasture Feeding Sites away from Streams	Landowners and Ranchers	Field Day and/or Tour	Annual - Fall	Combined with that of Vegetative Filter Strips listed above	
		Informational Meeting	Fall/Winter	Combined with Meeting on Manure Incorporation for Nutrients	
Promote Alternative Watering Sites away from Streams	Landowners and Ranchers	Field Day and/or Tour	Annual - Fall	Combined with that of Vegetative Filter Strips listed above	
		Informational Meeting	Fall/Winter	Combined with Meeting on Manure Incorporation for Nutrients	
Manure Application-Incorporate with Tillage	Landowners and Farmer	Field Day and/or Tour	Annual - Fall	Combined with that of Vegetative Filter Strips listed above	K-State Extension Watershed Specialists, BMP coordinators, K-State Extension County Offices, Conservation Districts
		Informational Meeting	Fall/Winter	Combined with Meeting on Manure Incorporation for Nutrients	
Nutrient Management Plans	Landowners and Farmers	Information Meetings	Ongoing	Cost included with Technical Assistance for Watershed Specialist	Kansas State Research and Extension

		One on One Meetings with Producers	Annual - Ongoing	Cost included with Technical Assistance for Watershed Specialist	
General / Watershed Wide Information and Education					
Educational Activities Targeting Youth	3rd-4th Grade Students	Ag in the Classroom ~ 400 kids per year	Annual - Winter/ Spring	$5,000 per year	Conservation Districts, County Extension Offices, K-State Research and Extension
	Educators, K-12 Students	Day on the Farm	Annual – Spring	$500 per event	Conservation Districts, County Extension Offices, K-State Research and Extension
		Environmental education	Ongoing	$500 per year	Kansas FFA Organization, Conservation Districts
	10-12 Grade Students	Range Youth Camp - 4 kids per year	Annual - Summer	$880 ($220 per student)	Farm Bureau, Conservation District
	5th-7th Grade Students and Educators	Water Festival (Harvey County)	Annual - Spring	$1,250 per event	Conservation Districts and Kansas State Research and Extension
	5th Grade Students and Educators	EARTH Day	Annual - Spring	$1,200	Farm Buearu, Consevation District, K-State Research and Extension, Master Gardners, NRCS, Harvey County Parks and Recreation, and 4-H

	4th Grade Students and Educators	Water Festival (McPherson County)	Annual - Fall	$15,200 per event	Conservation Districts, Kansas State Research and Extension and Cargill
Educational Activities Targeting Adults	Watershed Residents	Budget Hearings with County Commissioners	Annual - Spring	No charge	Conservation Districts
		Bankers Awards (No-Till, Soil and Water Conservation, Water Quality, Pasture Management and Wildlife Habitat) - Publicity and Tour	Annual - Winter	No charge	Kansas State Research and Extension and Conservation Districts
		Conservation District Annual Meetings (Harvey and McPherson)	Annual - Winter	$2,000 per event	Conservation Districts
Total annual cost for Information and Education if all events are implemented				**$34,230**	

* *One-on-One Technical Assistance includes on-farm assessments and consultations to encourage BMP implementation, proper operation and maintenance techniques for BMP longevity.*

9.0 Costs of implementing BMPs and Possible Funding Sources

The SLT has reviewed all the recommended BMPs listed in Section 7 of this report for each individual impairment. It has been determined by the SLT that specific BMPs will be the target of implementation funding for both cropland and livestock. Most of the BMPs that are targeted will be advantageous to more than one impairment, thus being more efficient.

Summarized Derivation of Cropland BMP Cost Estimates

Atrazine BMPs: Estimated costs were determined by Josh Roe of Kansas State University. Roe figured costs estimates by taking into account the payment that the producer/landowner would be eligible to receive through the Little Arkansas WRAPS atrazine program, therefore dollar amounts listed are not the full dollar amount of the practice.

Split Applications of Herbicide: Using split applications of herbicide, e.g., 1⁄2 to 2/3 prior to May 1 and 1⁄2 to 2.3 at planting would cost about $1.50 per acre. *$6.02 per acre without Atrazine Program Assistance (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Incorporate Herbicide into Top 2" of Soil: $4.20 per acre. *$7.15 per acre without Atrazine Program Assistance (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Use Post-emergence Herbicide: $3.00 per acre for conventional and no-till fields. *$6.02 per acre without Atrazine Program Assistance (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Use Alternative Herbicides: $6.00 per acre for conventional and no-till fields. *$10.12 per acre without Atrazine Program Assistance (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Reduce Application Rate: Use reduced soil-applied herbicide application rates followed by a post-emergence application would cost roughly $1.80 per acre. *$6.02 per acre without Atrazine Program Assistance (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Summarized Derivation of Cropland BMP Cost Estimates – Continued

Other Cropland BMPs not associated with Atrazine specifically:

No-Till: After being presented with information from K-State Research and Extension (Craig Smith and Josh Roe) on the costs and benefits of no-till, the SLT decided that a fair price to entice a producer to adopt no-till would be to pay them $10 per acre for 10 years, or a net present value of $78.00 per acre upfront assuming the NRCS discount rate of 4.75%.

Conservation Tillage: $3.91 per acre based contour farming numbers. *$6.80 per acre without Atrazine Program Assistance* (Water Quality Best Management Practices, Effectiveness and Cost for Reducing Contaminant Losses from Cropland, MF-2572)*

Vegetative Buffer: The cost of $1,000 per acre was arrived at using average cost of installation figures from the conservation districts within the watershed and cost estimates from the KSU Vegetative Buffer Tool developed by Craig Smith. It has been determined that for every acre of a vegetative buffer installed, 15 acres have been treated, this cuts the cost down to $67.00 per acre affected.

Conservation Crop Rotations: $39.00 per acre. Estimate provided by Josh Roe in July 2011.

Terraces: In consulting with numerous conservation districts it was determined by Josh Roe that the average cost of building a terrace at this point in time is $102 per acre.

Grassed Waterway: $2,200 per acre installed was arrived at using average cost of installation figures from the conservation districts within the watershed and updated costs of brome grass seeding from Josh Roe.

Nutrient Management Plan: After being presented with information from K-State Research and Extension (Craig Smith and Josh Roe) on the costs and benefits of nutrient management plans, the SLT decided that a fair price to entice a producer to adopt nutrient management plans would be to pay them $7.30 per acre for 10 years, or a net present value of $57 per acre upfront assuming the NRCS discount rate of 4.75%.

Incorporate Manure with Tillage: It has been determined that it costs about $6.33 per acre to incorporate manure with tillage. This estimate was provided by Josh Roe of Kansas State University in July 2011.

Water Retention Structure: Approximately $5,000 per structure, treats 40 acres, $125 per treated acre. This estimate was provided by Josh Roe of Kansas State University in September 2011.

Summarized Derivation of Livestock BMP Cost Estimates

Vegetative Filter Strip: The cost of $714 an acre was calculated by Josh Roe and Mike Christian figuring the average filter strip in the watershed will require four hours of bulldozer work at $125 an hour plus the cost of seeding one acre in permanent vegetation estimated by Josh Roe.

Relocate Small Feedlots: The cost of moving a one acre feedlot of $6,621 was calculated by Josh Roe figuring the cost of fencing, a new watering system, concrete, and labor.

Relocated Pasture Feeding Site: The cost of moving a pasture feeding site of $2,203 was calculated by Josh Roe figuring the cost of building ¼ mile of fence, a permeable surface, and labor.

Alternative Watering Sites: The average cost of installing an alternative watering system of $3,795 was estimated by Herschel George, Marais des Cygnes Watershed Specialist who has installed numerous systems and has detailed average cost estimates.

Prices below reflect current prices (2011) for implementation and also include technical assistance costs.

Atrazine: Josh Roe, K-State, figured costs estimates by taking into account the payment that the producer/landowner would be eligible to receive through the Little Arkansas WRAPS atrazine program, therefore dollar amounts listed are not the full dollar amount of the practice. The cost for implementing and/or repairing buffers, waterways, and terraces was assumed to be $0 since alternative cost-share is available for these practices and is not reimbursed under the *I.A.M.S. Atrazine Management* program.

Table 40. Estimated Costs for Cropland Implemented BMPs for Atrazine

Total Annual Atrazine BMP Cost								
Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
2	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
3	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
4	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
5	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
6	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
7	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
8	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
9	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
10	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
11	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
12	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
13	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
14	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
15	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
16	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
17	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
18	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
19	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191
20	$22,252	$0	$371	$1,038	$1,854	$0	$6,675	$32,191

Table 41. Estimated Costs for Cropland Implemented BMPs for Sediment and Nutrients *– following two pages*

Total Annual Cost* Before Cost-Share, Cropland BMPs										
Year	No-Till	Cons. Tillage	Water-ways	Buffers	Nutrient Mgmt Plans	Terraces	Incorp-orate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$42,549	$42,549	$131,442	$36,512	$15,529	$83,794	$1,733	$10,680	$8,215	$373,002
2	$43,825	$43,825	$135,385	$37,607	$15,995	$86,308	$1,785	$11,000	$8,462	$384,192
3	$45,140	$45,140	$139,446	$38,735	$16,475	$88,897	$1,839	$11,330	$8,715	$395,718
4	$46,494	$46,494	$143,630	$39,897	$16,969	$91,564	$1,894	$11,670	$8,977	$407,589
5	$47,889	$47,889	$147,939	$41,094	$17,478	$94,311	$1,951	$12,020	$9,246	$419,817
6	$49,326	$49,326	$152,377	$42,327	$18,003	$97,140	$2,009	$12,381	$9,524	$432,412
7	$50,805	$50,805	$156,948	$43,597	$18,543	$100,054	$2,070	$12,752	$9,809	$445,384
8	$52,330	$52,330	$161,657	$44,905	$19,099	$103,056	$2,132	$13,135	$10,104	$458,745
9	$53,899	$53,899	$166,506	$46,252	$19,672	$106,148	$2,196	$13,529	$10,407	$472,508
10	$55,516	$55,516	$171,501	$47,639	$20,262	$109,332	$2,262	$13,934	$10,719	$486,683
11	$57,182	$57,182	$176,646	$49,068	$20,870	$112,612	$2,330	$14,353	$11,040	$501,283
12	$58,897	$58,897	$181,946	$50,541	$21,496	$115,990	$2,399	$14,783	$11,372	$516,322
13	$60,664	$60,664	$187,404	$52,057	$22,141	$119,470	$2,471	$15,227	$11,713	$531,812
14	$62,484	$62,484	$193,026	$53,618	$22,805	$123,054	$2,546	$15,683	$12,064	$547,766
15	$64,359	$64,359	$198,817	$55,227	$23,489	$126,746	$2,622	$16,154	$12,426	$564,199
16	$66,290	$66,290	$204,782	$56,884	$24,194	$130,548	$2,701	$16,639	$12,799	$581,125
17	$68,278	$68,278	$210,925	$58,590	$24,920	$134,465	$2,782	$17,138	$13,183	$598,559
18	$70,327	$70,327	$217,253	$60,348	$25,668	$138,499	$2,865	$17,652	$13,578	$616,515
19	$72,436	$72,436	$223,770	$62,158	$26,438	$142,654	$2,951	$18,181	$13,986	$635,011
20	$74,609	$74,609	$230,484	$64,023	$27,231	$146,933	$3,040	$18,727	$14,405	$654,061
21	$76,848	$76,848	$237,398	$65,944	$28,048	$151,341	$3,131	$19,289	$14,837	$673,683
22	$79,153	$79,153	$244,520	$67,922	$28,889	$155,882	$3,225	$19,867	$15,283	$693,894
23	$81,528	$81,528	$251,856	$69,960	$29,756	$160,558	$3,321	$20,463	$15,741	$714,710
24	$83,974	$83,974	$259,411	$72,059	$30,648	$165,375	$3,421	$21,077	$16,213	$736,152
25	$86,493	$86,493	$267,194	$74,220	$31,568	$170,336	$3,524	$21,709	$16,700	$758,236
26	$89,088	$89,088	$275,209	$76,447	$32,515	$175,446	$3,629	$22,361	$17,201	$780,983
27	$91,760	$91,760	$283,466	$78,740	$33,490	$180,709	$3,738	$23,032	$17,717	$804,413
28	$94,513	$94,513	$291,970	$81,103	$34,495	$186,131	$3,850	$23,723	$18,248	$828,545
29	$97,348	$97,348	$300,729	$83,536	$35,530	$191,715	$3,966	$24,434	$18,796	$853,402
30	$100,269	$100,269	$309,751	$86,042	$36,596	$197,466	$4,085	$25,167	$19,359	$879,004
31	$103,277	$103,277	$319,043	$88,623	$37,694	$203,390	$4,207	$25,922	$19,940	$905,374
32	$106,375	$106,375	$328,614	$91,282	$38,824	$209,492	$4,334	$26,700	$20,538	$932,535
33	$109,567	$109,567	$338,473	$94,020	$39,989	$215,776	$4,464	$27,501	$21,155	$960,511
34	$112,854	$112,854	$348,627	$96,841	$41,189	$222,250	$4,598	$28,326	$21,789	$989,326
35	$116,239	$116,239	$359,086	$99,746	$42,425	$228,917	$4,735	$29,176	$22,443	$1,019,006
36	$119,726	$119,726	$369,859	$102,738	$43,697	$235,785	$4,878	$30,051	$23,116	$1,049,576
37	$123,318	$123,318	$380,954	$105,821	$45,008	$242,858	$5,024	$30,953	$23,810	$1,081,064
38	$127,018	$127,018	$392,383	$108,995	$46,358	$250,144	$5,175	$31,881	$24,524	$1,113,495
39	$130,828	$130,828	$404,154	$112,265	$47,749	$257,648	$5,330	$32,838	$25,260	$1,146,900
40	$134,753	$134,753	$416,279	$115,633	$49,182	$265,378	$5,490	$33,823	$26,017	$1,181,307
*3% Inflation										

Total Annual Cost* After Cost-Share, Cropland BMPs										
Year	No-Till	Cons. Tillage	Water-ways	Buffers	Nutrient Mgmt Plans	Terraces	Incorp-orate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$25,955	$42,549	$65,721	$3,651	$7,765	$41,897	$1,733	$10,680	$4,108	$204,058
2	$26,733	$43,825	$67,692	$3,761	$7,998	$43,154	$1,785	$11,000	$4,231	$210,179
3	$27,535	$45,140	$69,723	$3,874	$8,238	$44,449	$1,839	$11,330	$4,358	$216,485
4	$28,361	$46,494	$71,815	$3,990	$8,485	$45,782	$1,894	$11,670	$4,488	$222,979
5	$29,212	$47,889	$73,969	$4,109	$8,739	$47,155	$1,951	$12,020	$4,623	$229,669
6	$30,089	$49,326	$76,188	$4,233	$9,001	$48,570	$2,009	$12,381	$4,762	$236,559
7	$30,991	$50,805	$78,474	$4,360	$9,271	$50,027	$2,070	$12,752	$4,905	$243,655
8	$31,921	$52,330	$80,828	$4,490	$9,550	$51,528	$2,132	$13,135	$5,052	$250,965
9	$32,879	$53,899	$83,253	$4,625	$9,836	$53,074	$2,196	$13,529	$5,203	$258,494
10	$33,865	$55,516	$85,751	$4,764	$10,131	$54,666	$2,262	$13,934	$5,359	$266,249
11	$34,881	$57,182	$88,323	$4,907	$10,435	$56,306	$2,330	$14,353	$5,520	$274,236
12	$35,927	$58,897	$90,973	$5,054	$10,748	$57,995	$2,399	$14,783	$5,686	$282,463
13	$37,005	$60,664	$93,702	$5,206	$11,071	$59,735	$2,471	$15,227	$5,856	$290,937
14	$38,115	$62,484	$96,513	$5,362	$11,403	$61,527	$2,546	$15,683	$6,032	$299,665
15	$39,259	$64,359	$99,409	$5,523	$11,745	$63,373	$2,622	$16,154	$6,213	$308,655
16	$40,437	$66,290	$102,391	$5,688	$12,097	$65,274	$2,701	$16,639	$6,399	$317,915
17	$41,650	$68,278	$105,463	$5,859	$12,460	$67,232	$2,782	$17,138	$6,591	$327,453
18	$42,899	$70,327	$108,626	$6,035	$12,834	$69,249	$2,865	$17,652	$6,789	$337,276
19	$44,186	$72,436	$111,885	$6,216	$13,219	$71,327	$2,951	$18,181	$6,993	$347,394
20	$45,512	$74,609	$115,242	$6,402	$13,615	$73,467	$3,040	$18,727	$7,203	$357,816
21	$46,877	$76,848	$118,699	$6,594	$14,024	$75,671	$3,131	$19,289	$7,419	$368,551
22	$48,283	$79,153	$122,260	$6,792	$14,445	$77,941	$3,225	$19,867	$7,641	$379,607
23	$49,732	$81,528	$125,928	$6,996	$14,878	$80,279	$3,321	$20,463	$7,870	$390,995
24	$51,224	$83,974	$129,706	$7,206	$15,324	$82,687	$3,421	$21,077	$8,107	$402,725
25	$52,761	$86,493	$133,597	$7,422	$15,784	$85,168	$3,524	$21,709	$8,350	$414,807
26	$54,343	$89,088	$137,605	$7,645	$16,257	$87,723	$3,629	$22,361	$8,600	$427,251
27	$55,974	$91,760	$141,733	$7,874	$16,745	$90,355	$3,738	$23,032	$8,858	$440,069
28	$57,653	$94,513	$145,985	$8,110	$17,248	$93,065	$3,850	$23,723	$9,124	$453,271
29	$59,383	$97,348	$150,364	$8,354	$17,765	$95,857	$3,966	$24,434	$9,398	$466,869
30	$61,164	$100,269	$154,875	$8,604	$18,298	$98,733	$4,085	$25,167	$9,680	$480,875
31	$62,999	$103,277	$159,522	$8,862	$18,847	$101,695	$4,207	$25,922	$9,970	$495,301
32	$64,889	$106,375	$164,307	$9,128	$19,412	$104,746	$4,334	$26,700	$10,269	$510,160
33	$66,836	$109,567	$169,236	$9,402	$19,995	$107,888	$4,464	$27,501	$10,577	$525,465
34	$68,841	$112,854	$174,314	$9,684	$20,594	$111,125	$4,598	$28,326	$10,895	$541,229
35	$70,906	$116,239	$179,543	$9,975	$21,212	$114,459	$4,735	$29,176	$11,221	$557,466
36	$73,033	$119,726	$184,929	$10,274	$21,849	$117,892	$4,878	$30,051	$11,558	$574,190
37	$75,224	$123,318	$190,477	$10,582	$22,504	$121,429	$5,024	$30,953	$11,905	$591,416
38	$77,481	$127,018	$196,191	$10,900	$23,179	$125,072	$5,175	$31,881	$12,262	$609,158
39	$79,805	$130,828	$202,077	$11,227	$23,875	$128,824	$5,330	$32,838	$12,630	$627,433
40	$82,199	$134,753	$208,140	$11,563	$24,591	$132,689	$5,490	$33,823	$13,009	$646,256
*3% Inflation										

Table 42. Estimated Costs for Implementing Livestock BMPs

Annual Cost* Before Cost-Share of Implementing Livestock BMPs					
Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**	**Annual Cost**
1	$714	$6,621	$2,203	$0	$9,538
2	$735	$6,820	$0	$3,909	$11,464
3	$757	$7,024	$2,337	$0	$10,119
4	$780	$7,235	$0	$4,147	$12,162
5	$804	$7,452	$2,479	$0	$10,735
6	$828	$7,676	$0	$4,399	$12,903
7	$853	$7,906	$2,630	$0	$11,389
8	$878	$8,143	$0	$4,667	$13,688
9	$904	$8,387	$2,791	$0	$12,082
10	$932	$8,639	$0	$4,952	$14,522
11	$960	$8,898	$2,961	$0	$12,818
12	$988	$9,165	$0	$5,253	$15,407
13	$1,018	$9,440	$3,141	$0	$13,599
14	$1,049	$9,723	$0	$5,573	$16,345
15	$1,080	$10,015	$3,332	$0	$14,427
16	$1,112	$10,315	$0	$5,912	$17,340
17	$1,146	$10,625	$3,535	$0	$15,306
18	$1,180	$10,944	$0	$6,273	$18,396
19	$1,216	$11,272	$3,750	$0	$16,238
20	$1,252	$11,610	$0	$6,655	$19,517
21	$1,290	$11,958	$3,979	$0	$17,227
22	$1,328	$12,317	$0	$7,060	$20,705
23	$1,368	$12,687	$4,221	$0	$18,276
24	$1,409	$13,067	$0	$7,490	$21,966
25	$1,451	$13,459	$4,478	$0	$19,389
26	$1,495	$13,863	$0	$7,946	$23,304
27	$1,540	$14,279	$4,751	$0	$20,570
28	$1,586	$14,707	$0	$8,430	$24,723
29	$1,634	$15,148	$5,040	$0	$21,822
30	$1,683	$15,603	$0	$8,943	$26,229
31	$1,733	$16,071	$5,347	$0	$23,151
32	$1,785	$16,553	$0	$9,488	$27,826
33	$1,839	$17,050	$5,673	$0	$24,561
34	$1,894	$17,561	$0	$10,066	$29,520
35	$1,951	$18,088	$6,018	$0	$26,057

36	$2,009	$18,631	$0	$10,679	$31,318
37	$2,069	$19,190	$6,385	$0	$27,644
38	$2,131	$19,765	$0	$11,329	$33,226
39	$2,195	$20,358	$6,774	$0	$29,327
40	$2,261	$20,969	$0	$12,019	$35,249
**3% Annual Cost Inflation*					

Annual Cost* After Cost-Share of Implementing Livestock BMPs					
Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**	**Annual Cost**
1	$357	$3,311	$1,102	$0	**$4,769**
2	$368	$3,410	$0	$1,954	**$5,732**
3	$379	$3,512	$1,169	$0	**$5,059**
4	$390	$3,617	$0	$2,073	**$6,081**
5	$402	$3,726	$1,240	$0	**$5,368**
6	$414	$3,838	$0	$2,200	**$6,451**
7	$426	$3,953	$1,315	$0	**$5,694**
8	$439	$4,071	$0	$2,334	**$6,844**
9	$452	$4,194	$1,395	$0	**$6,041**
10	$466	$4,319	$0	$2,476	**$7,261**
11	$480	$4,449	$1,480	$0	**$6,409**
12	$494	$4,583	$0	$2,627	**$7,703**
13	$509	$4,720	$1,570	$0	**$6,799**
14	$524	$4,862	$0	$2,787	**$8,172**
15	$540	$5,007	$1,666	$0	**$7,214**
16	$556	$5,158	$0	$2,956	**$8,670**
17	$573	$5,312	$1,768	$0	**$7,653**
18	$590	$5,472	$0	$3,136	**$9,198**
19	$608	$5,636	$1,875	$0	**$8,119**
20	$626	$5,805	$0	$3,327	**$9,758**
21	$645	$5,979	$1,989	$0	**$8,613**
22	$664	$6,159	$0	$3,530	**$10,353**
23	$684	$6,343	$2,111	$0	**$9,138**
24	$705	$6,534	$0	$3,745	**$10,983**
25	$726	$6,730	$2,239	$0	**$9,694**
26	$747	$6,931	$0	$3,973	**$11,652**
27	$770	$7,139	$2,375	$0	**$10,285**
28	$793	$7,354	$0	$4,215	**$12,361**
29	$817	$7,574	$2,520	$0	**$10,911**

30	$841	$7,801	$0	$4,472	**$13,114**
31	$867	$8,035	$2,674	$0	**$11,576**
32	$893	$8,277	$0	$4,744	**$13,913**
33	$919	$8,525	$2,836	$0	**$12,281**
34	$947	$8,781	$0	$5,033	**$14,760**
35	$975	$9,044	$3,009	$0	**$13,028**
36	$1,005	$9,315	$0	$5,339	**$15,659**
37	$1,035	$9,595	$3,192	$0	**$13,822**
38	$1,066	$9,883	$0	$5,664	**$16,613**
39	$1,098	$10,179	$3,387	$0	**$14,664**
40	$1,131	$10,484	$0	$6,009	**$17,625**
**3% Annual Cost Inflation*					

Livestock BMP Cost Before Cost-Share by Sub Watershed					
Subwatershed	**Vegetative Filter Strip**	**Relocate Feeding Site**	**Relocate Pasture Feeding Site**	**Off-Stream Watering System**	**Total Cost**
Sand Creek	$3,570	$33,105	$4,406	$7,590	$48,671
Emma Creek	$5,712	$52,968	$8,812	$15,180	$82,672
Blazefork	$4,284	$39,726	$6,609	$11,385	$62,004
Kisiwa	$5,712	$52,968	$8,812	$15,180	$82,672
Turkey Creek	$9,282	$86,073	$15,421	$26,565	$137,341
Total	$28,560	$264,840	$44,060	$75,900	$413,360

Livestock BMP Cost After Cost-Share by Sub Watershed					
Subwatershed	**Vegetative Filter Strip**	**Relocate Feeding Site**	**Relocate Pasture Feeding Site**	**Off-Stream Watering System**	**Total Cost**
Sand Creek	$1,785	$16,553	$2,203	$3,795	$24,336
Emma Creek	$2,856	$26,484	$4,406	$7,590	$41,336
Blazefork	$2,142	$19,863	$3,305	$5,693	$31,002
Kisiwa	$2,856	$26,484	$4,406	$7,590	$41,336
Turkey Creek	$4,641	$43,037	$7,711	$13,283	$68,671
Total	$14,280	$132,420	$22,030	$37,950	$206,680

Implementing Riparing and Streambank Restoration Costs:

Approximately 6 sites for potential streambank restoration/stabilization projects have been identified along the Lower Little Arkansas River. The stabilization costs were

estimated utilizing an average of $71.50 per linear foot, based on an assessment conducted by The Watershed Institute, Inc. (TWI).

Table 43. Riparian and Streambank Restoration Costs

Streambank Site	Length of Streambank Restoration Site (L.F.)	Estimated Costs**
SB 1	750	$53,625.00
SB 2	625	$44,687.50
SB 3	880	$62,920.00
SB 4	160	$11,440.00
SB 5	330	$23,595.00
SB 6	540	$38,610.00
Totals	**3,285**	**$234,877.50**

**Stabilization costs based on average of $71.50 per linear foot

It should be noted that the estimated costs shown in the table above for the sites identified for streambank restoration projects may vary depending on the size of the project. The length of the projects may also vary, depending on the site investigation and feasible design of the potential project. Depending on the ground-truthed streambank conditions and adjacent land use, some of the sites identified for streambank restoration may require only vegetative establishment and/or buffers. Some projects may not require structural elements to be incorporated into the project, thus varying the overall cost of the project.

Table 44. Technical Assistance Needed to Implement BMPs

BMP		Technical Assistance	Projected Annual Cost
Atrazine	Split applications of herbicide	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	Extension Agronomist / BMP Coordinator $36,000
	Incorporate herbicide into top 2" of soil	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Use post emergence herbicide	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Use alternative herbicides	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Reduce application rates	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	

Cropland	No-till	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	WRAPS Coordinator $66,016
	Conservation Tillage	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Conservation Crop Rotation	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Vegetative Buffers	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Terraces	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Waterways	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	
	Nutrient Management Plans	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	

Livestock	Incorporate manure with tillage	WRAPS Coordinator, BMP Coordinator, DOC Buffer Technician	DOC Buffer Coordinator $18,000
	Vegetative Buffers	WRAPS Coordinator, DOC Buffer Technician	
	Relocate small feedlots	WRAPS Coordinator	
	Relocate pasture feeding sites	WRAPS Coordinator	
	Promote alternative water sites	WRAPS Coordinator	
	Nutrient Management Plans	WRAPS Coordinator	
Total			**$120,016**

Table 45. Total Annual Costs for Implementing Entire WRAPS Plan.

Total Annual Costs of Implementing Cropland and Livestock BMPs, in addition to Information and Education and Technical Assistance					
Year	BMPs Implemented		I&E and Technical Assistance		Total
	Cropland	Livestock	I&E	Technical Assistance	
1	$204,058	$4,769	$34,230	$120,016	$363,073
2	$210,179	$5,732	$35,257	$123,616	$374,784
3	$216,485	$5,059	$36,315	$127,325	$385,184
4	$222,979	$6,081	$37,404	$131,145	$397,609
5	$229,669	$5,368	$38,527	$135,079	$408,643
6	$236,559	$6,451	$39,682	$139,131	$421,823
7	$243,655	$5,694	$40,873	$143,305	$433,527
8	$250,965	$6,844	$42,099	$147,604	$447,512
9	$258,494	$6,041	$43,362	$152,033	$459,930
10	$266,249	$7,261	$44,663	$156,594	$474,767
11	$274,236	$6,409	$46,003	$161,291	$487,939
12	$282,463	$7,703	$47,383	$166,130	$503,679
13	$290,937	$6,799	$48,804	$171,114	$517,654
14	$299,665	$8,172	$50,268	$176,247	$534,352
15	$308,655	$7,214	$51,776	$181,535	$549,180
16	$317,915	$8,670	$53,330	$186,981	$566,896
17	$327,453	$7,653	$54,930	$192,590	$582,626
18	$337,276	$9,198	$56,578	$198,368	$601,420
19	$347,394	$8,119	$58,275	$204,319	$618,107
20	$357,816	$9,758	$60,023	$210,449	$638,046
21	$368,551	$8,613	$61,824	$216,762	$655,750
22	$379,607	$10,353	$63,678	$223,265	$676,903
23	$390,995	$9,138	$65,589	$229,963	$695,685
24	$402,725	$10,983	$67,557	$236,862	$718,127
25	$414,807	$9,694	$69,583	$243,968	$738,052
26	$427,251	$11,652	$71,671	$251,287	$761,861
27	$440,069	$10,285	$73,821	$258,825	$783,000
28	$453,271	$12,361	$76,035	$266,590	$808,257
29	$466,869	$10,911	$78,317	$274,588	$830,685
30	$480,875	$13,114	$80,666	$282,825	$857,480
31	$495,301	$11,576	$83,086	$291,310	$881,273
32	$510,160	$13,913	$85,579	$300,049	$909,701
33	$525,465	$12,281	$88,146	$309,051	$934,943

34	$541,229	$14,760	$90,790	$318,322	$965,101
35	$557,466	$13,028	$93,514	$327,872	$991,880
36	$574,190	$15,659	$96,319	$337,708	$1,023,876
37	$591,416	$13,822	$99,209	$347,839	$1,052,286
38	$609,158	$16,613	$102,185	$358,275	$1,086,231
39	$627,433	$14,664	$105,251	$369,023	$1,116,371
40	$646,256	$17,625	$108,408	$380,094	$1,152,383
**3% Annual Cost Inflation*					

Potential funding sources for these BMPs are (but not limited to) the following organizations:

Table 46. Potential BMP Funding Sources

Potential Funding Sources	Potential Funding Programs
Natural Resources Conservation Service	Environmental Quality Incentives Program (EQIP)
	Wetland Reserve Program (WRP)
	Conservation Reserve Program (CRP)
	Wildlife Habitat Incentive Program (WHIP)
	Forestland Enhancement Program (FLEP)
	State Acres for Wildlife Enhancement (SAFE)
	Grassland Reserve Program (GRP)
	Farmable Wetlands Program (FWP)
EPA/KDHE	319 Funding Grants
	State Water Plan Funds
	KDHE WRAPS Funding
	Clean Water Neighbor Grants
Kansas Department of Wildlife and Parks	
Kansas Alliance for Wetlands and Streams	
State Conservation Commission	Nonpoint Source Pollution Cost Share Program
Conservation Districts	

Kansas Forest Service	
U.S. Fish and Wildlife	
City of Wichita	
Rural Water Center	

Table 47. Potential Service Providers for BMP Implementation

BMP		Services Needed to Implement BMP		Service Provider *
		Technical Assistance	***Information and Education***	
Atrazine	Split applications of herbicide	Design, cost share and maintenance	Seasonal BMP information meetings, and crop schools	KSRE NRCS DOC CD
	Incorporate herbicide into top 2" of soil	Design, cost share and maintenance	Seasonal BMP information meetings, and crop schools	
	Use post emergence herbicide	Design, cost share and maintenance	Seasonal BMP information meetings, and crop schools	
	Use alternative herbicides	Design, cost share and maintenance	Seasonal BMP information meetings, and crop schools	
	Reduce application rates	Design, cost share and maintenance	Seasonal BMP information meetings, and crop schools	
Cropland	No-till	Design, cost share and maintenance	Field Day and/or Tours, No-toll meetings, discussion groups	KSRE NRCS DOC KRC CD KDWP
	Conservation Tillage	Design, cost share and maintenance	Residue Alliance	
	Conservation Crop Rotation	Design, cost share and maintenance	BMP Information Meetings	
	Vegetative Buffers	Design, cost share and maintenance	BMP Information Meetings	
	Terraces	Design, cost share and maintenance	BMP Information Meetings	
	Waterways	Design, cost share and maintenance	BMP Information Meetings	
	Nutrient Management Plans	Writing	One on One Meetings with Producers	

Livestock	Incorporate manure with tillage	Design, cost share and maintenance	BMP Information Meetings	KSRE NRCS DOC KRC CD KDWP
	Vegetative Buffers	Design, cost share and maintenance	BMP Information Meetings	
	Relocate small feedlots	Design, cost share and maintenance	BMP Information Meetings	
	Relocate pasture feeding sites	Design, cost share and maintenance	BMP Information Meetings	
	Promote alternative water sites	Design, cost share and maintenance	BMP Information Meetings	
	Nutrient Management Plans	Writing	One on One Meetings with Producers	
See Appendix for Service Provider Directory				

10.0 Timeframe

The plan will be reviewed every five years starting in 2016. The timeframe of this document for BMP implementation to meet the Category 4b Atrazine impairments will be twenty years; sediment and phosphorus TMDLs will be met in forty years and bacteria is to be determined. They will examine BMP placement and implementation in 2016 and every subsequent five years after.

Table 48. Review Schedule for Pollutants and BMPs

Review Year	Atrazine	Sediment	Phosphorus	BMP Placement
2016	X	X	X	X
2021	X	X	X	X
2026	X	X	X	X
2031	X	X	X	X
2036		X	X	X
2041		X	X	X
2046		X	X	X
2051		X	X	X

Targeting and BMP implementation might shift over time in order to achieve TMDLs.

- The timeframe for meeting the **atrazine** Category 4b impairment is 20 years. After the atrazine Category 4b designation provisions are met, the BMPs directed at atrazine will be considered "protection measures" instead of "restoration measures". At this point, the SLT may decide to redirect their funding to additional sediment, phosphorus and bacteria BMPs.
- The timeframe for meeting the **sediment TMDL** will be forty years if all BMPs are implemented in the watershed. After the sediment TMDL is met, the BMPs directed at sediment will be considered "protection measures" instead of "restoration measures". At this point, the SLT may decide to redirect their funding to impairments and areas in need at that time.
- The timeframe for meeting the **phosphorus TMDL** will also be forty years if all BMPs are implemented in the watershed. After the sediment TMDL is met, the BMPs directed at sediment will be considered "protection measures" instead of "restoration measures". At this point, the SLT may decide to redirect their funding to impairments and areas in need at that time.
- The timeframe for meeting the **Bacteria TMD**L is to be determined by additional monitoring and guidance from KDHE on desired bacteria parameters.

11.0 Measurable Milestones

11.1 Adoption Rates

Milestones will be determined by number of acres treated, projects installed, contacts made to residents of the watershed or load reductions at the end of five, ten and twenty years for Atrazine BMPs on cropland. The SLT will examine the number of acres treated or the load reduction to determine if adequate progress has been made from the current BMP implementations.

Table 49. Short, Medium and Long Term Goals for Atrazine BMPs

Total Short, Medium, and Long Term Atrazine BMP Adoption									
	Year	**Use Alt. Herbicide**	**Veg. Buffers**	**Split App.**	**Incorp. Atrazine**	**Use Post Emergence**	**Terraces and Waterways**	**Reduce App.**	**Total Load Reduction**
Short-Term	1	3,709	618	247	247	618	618	3,709	9,766
	2	3,709	618	247	247	618	618	3,709	9,766
	3	3,709	618	247	247	618	618	3,709	9,766
	4	3,709	618	247	247	618	618	3,709	9,766
	5	3,709	618	247	247	618	618	3,709	9,766
	Total	***18,543***	***3,090***	***1,236***	***1,236***	***3,090***	***3,090***	***18,543***	***48,830***
Medium-Term	6	3,709	618	247	247	618	618	3,709	9,766
	7	3,709	618	247	247	618	618	3,709	9,766
	8	3,709	618	247	247	618	618	3,709	9,766
	9	3,709	618	247	247	618	618	3,709	9,766
	10	3,709	618	247	247	618	618	3,709	9,766
	Total	***37,086***	***6,181***	***2,472***	***2,472***	***6,181***	***6,181***	***37,086***	***97,660***
Long-Term	11	3,709	618	247	247	618	618	3,709	9,766
	12	3,709	618	247	247	618	618	3,709	9,766
	13	3,709	618	247	247	618	618	3,709	9,766
	14	3,709	618	247	247	618	618	3,709	9,766
	15	3,709	618	247	247	618	618	3,709	9,766
	16	3,709	618	247	247	618	618	3,709	9,766
	17	3,709	618	247	247	618	618	3,709	9,766
	18	3,709	618	247	247	618	618	3,709	9,766
	19	3,709	618	247	247	618	618	3,709	9,766
	20	3,709	618	247	247	618	618	3,709	9,766
	Total	***74,172***	***12,362***	***4,945***	***4,945***	***12,362***	***12,362***	***74,172***	***195,319***

Milestones will be determined by number of acres treated, projects installed, contacts made to residents of the watershed or load reductions at the end of five, ten and forty years for sediment and nutrient Cropland BMPs. The SLT will examine the number of acres treated or the load reduction to determine if adequate progress has been made from the current BMP implementations.

Table 50. Short, Medium and Long Term Goals for Cropland BMPs

Cropland BMP Adoption Milestones										
	Year	**No-Till**	**Cons. Tillage**	**Water-ways**	**Buffers**	**Nutrient Mgmt Plans**	**Terraces**	**Incorp-orate Manure**	**Cons. Crop Rotations**	**Water Retention**
Short-Term	1	548	1,095	822	548	274	822	274	274	110
	2	548	1,095	822	548	274	822	274	274	110
	3	548	1,095	822	548	274	822	274	274	110
	4	548	1,095	822	548	274	822	274	274	110
	5	548	1,095	822	548	274	822	274	274	110
	Total	***2,738***	***5,477***	***4,108***	***2,738***	***1,369***	***4,108***	***1,369***	***1,369***	***548***
Medium-Term	6	548	1,095	822	548	274	822	274	274	110
	7	548	1,095	822	548	274	822	274	274	110
	8	548	1,095	822	548	274	822	274	274	110
	9	548	1,095	822	548	274	822	274	274	110
	10	548	1,095	822	548	274	822	274	274	110
	Total	***5,477***	***10,953***	***8,215***	***5,477***	***2,738***	***8,215***	***2,738***	***2,738***	***1,095***
Long-Term	11	548	1,095	822	548	274	822	274	274	110
	12	548	1,095	822	548	274	822	274	274	110
	13	548	1,095	822	548	274	822	274	274	110
	14	548	1,095	822	548	274	822	274	274	110
	15	548	1,095	822	548	274	822	274	274	110
	16	548	1,095	822	548	274	822	274	274	110
	17	548	1,095	822	548	274	822	274	274	110
	18	548	1,095	822	548	274	822	274	274	110
	19	548	1,095	822	548	274	822	274	274	110
	20	548	1,095	822	548	274	822	274	274	110
	21	548	1,095	822	548	274	822	274	274	110
	22	548	1,095	822	548	274	822	274	274	110
	23	548	1,095	822	548	274	822	274	274	110
	24	548	1,095	822	548	274	822	274	274	110
	25	548	1,095	822	548	274	822	274	274	110
	26	548	1,095	822	548	274	822	274	274	110
	27	548	1,095	822	548	274	822	274	274	110
	28	548	1,095	822	548	274	822	274	274	110
	29	548	1,095	822	548	274	822	274	274	110

	30	548	1,095	822	548	274	822	274	274	110
	31	548	1,095	822	548	274	822	274	274	110
	32	548	1,095	822	548	274	822	274	274	110
	33	548	1,095	822	548	274	822	274	274	110
	34	548	1,095	822	548	274	822	274	274	110
	35	548	1,095	822	548	274	822	274	274	110
	36	548	1,095	822	548	274	822	274	274	110
	37	548	1,095	822	548	274	822	274	274	110
	38	548	1,095	822	548	274	822	274	274	110
	39	548	1,095	822	548	274	822	274	274	110
	40	548	1,095	822	548	274	822	274	274	110
	Total	***21,907***	***43,814***	***32,860***	***21,907***	***10,953***	***32,860***	***10,953***	***10,953***	***4,381***

Table 51. Short, Medium and Long Term Goals for Livestock BMPs

Livestock BMP Adoption Milestones					
	Year	**Vegetative Filter Strip**	**Relocate Feeding Pens**	**Relocate Pasture Feeding Site**	**Off Stream Watering System**
Short-Term	1	1	1	1	0
	2	1	1	0	1
	3	1	1	1	0
	4	1	1	0	1
	5	1	1	1	0
	Total	**5**	**5**	**3**	**2**
Medium-Term	6	1	1	0	1
	7	1	1	1	0
	8	1	1	0	1
	9	1	1	1	0
	10	1	1	0	1
	Total	**10**	**10**	**5**	**5**
Long-Term	11	1	1	1	0
	12	1	1	0	1
	13	1	1	1	0
	14	1	1	0	1
	15	1	1	1	0
	16	1	1	0	1
	17	1	1	1	0
	18	1	1	0	1
	19	1	1	1	0
	20	1	1	0	1
	21	1	1	1	0

	22	1	1	0	1
	23	1	1	1	0
	24	1	1	0	1
	25	1	1	1	0
	26	1	1	0	1
	27	1	1	1	0
	28	1	1	0	1
	29	1	1	1	0
	30	1	1	0	1
	31	1	1	1	0
	32	1	1	0	1
	33	1	1	1	0
	34	1	1	0	1
	35	1	1	1	0
	36	1	1	0	1
	37	1	1	1	0
	38	1	1	0	1
	39	1	1	1	0
	40	1	1	0	1
	Total	**40**	**40**	**20**	**20**

Table 52. Sub Watershed Total Reduction Milestones for Sediment BMP Implementation

Tier 1

Emma Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	47,043	2013%
TSS TMDL	**2,337**	**Pounds**

Turkey Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	103,080	2105%
TSS TMDL	**4,896**	**Pounds**

Sand Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	29,076	533%
TSS TMDL	**5,458**	**Pounds**

Tier 2

Kisiwa Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	29,680	1044%
TSS TMDL	**2,843**	**Pounds**

Black Kettle Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	26,136	6988%
TSS TMDL	**374**	**Pounds**

Blazefork Creek TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	34,200	1802%
TSS TMDL	**1,898**	**Pounds**

Table 53. Sub Watershed Total Reduction Milestones for Nutrient BMP Implementation

Tier 1

Emma Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	43,993	206%
Livestock	23,468	110%
Total	**67,461**	**316%**
P TMDL	**21,318**	**Pounds**

Turkey Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	52,703	107%
Livestock	38,199	78%
Total	**90,902**	**185%**
P TMDL	**49,182**	**Pounds**

Sand Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	18,326	106%
Livestock	14,604	84%
Total	**32,930**	**190%**
P TMDL	**17,346**	**Pounds**

Tier 2

Kisiwa Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	18,706	115%
Livestock	23,468	144%
Total	**42,174**	**260%**
P TMDL	**16,247**	**Pounds**

Black Kettle Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	28,736	603%
Livestock	n/a	n/a
Total	**28,736**	**603%**
P TMDL	**4,763**	**Pounds**

Blazefork Creek P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	21,555	82%
Livestock	17,601	67%
Total	**39,156**	**148%**
P TMDL	**26,443**	**Pounds**

Table 54. Little Arkansas River Total Reduction Milestones for Sediment BMP Implementation

Little Ark River TSS TMDL		
Best Management Practice Category	**Total Load Reduction (tons)**	**% of TSS TMDL**
Cropland	291,976	391%
TSS TMDL	**74,616**	**Pounds**

Table 55. Little Arkansas River Total Reduction Milestones for Nutrient BMP Implementation

Little Ark River P TMDL		
Best Management Practice Category	**Total Load Reduction (pounds)**	**% of Phosphorous TMDL**
Cropland	184,018	69%
Livestock	117,340	44%
Total	**301,358**	**113%**
P TMDL	**267,837**	**Pounds**

11.2 Water Quality

The goal of the Little Arkansas WRAPS plan is to restore water quality for the uses supportive of aquatic life, domestic water supply, recreation, and other designated uses for the Little Arkansas River Watershed. The plan specifically addresses several TMDLs and 303(d) listings for the Little Arkansas River, Turkey Creek, Emma Creek, Black Kettle Creek, Kisiwa Creek and Sand Creek. The following is a list of the impairments being directly addressed by the plan:

Little Arkansas River (At Alta Mills and At Valley Center)

- Atrazine Category Category 5 Listing
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- High Priority Bacteria (FCB) TMDL

- Total Suspended Solids (TSS) 303(d) listing (High Priority At Alta Mills/Low Priority At Valley Center)
- Low Priority Total Phosphorus 303(d) listing

Turkey Creek

- Atrazine Category 4B Alternative Listing
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- High Priority Bacteria (FCB) TMDL
- High Priority Dissolved Oxygen (DO) TMDL
- Low Priority Total Suspended Solids (TSS) 303(d) listing
- Low Priority Total Phosphorus 303(d) listing

Emma Creek

- Atrazine Category 4B Alternative Listing
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- High Priority Bacteria (FCB) TMDL
- Low Priority Dissolved Oxygen (DO) 303(d) listing
- Low Priority Total Phosphorus 303(d) listing

Black Kettle Creek

- Atrazine Category 4B Alternative Listing (in waiting)
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- Low Priority Dissolved Oxygen (DO) 303(d) listing
- Low Priority Total Suspended Solids (TSS) 303(d) listing
- Low Priority Total Phosphorus 303(d) listing

Kisiwa Creek

- Atrazine Category 4B Alternative Listing (in waiting)
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- Low Priority Total Suspended Solids (TSS) 303(d) listing
- Low Priority Total Phosphorus 303(d) listing

Sand Creek

- Atrazine Category 4B Alternative Listing
- High Priority Sediment/Biology TMDL
- High Priority Biology TMDL
- Low Priority Total Phosphorus 303(d) listing
- Medium Priority Dissolved Oxygen (DO) TMDL
- High Priority Bacteria (FCB) TMDL

In order to reach the load reduction goals associated with the Little Arkansas River Watershed impairments, an implementation schedule for BMP implementation spanning 40 years has been developed.

The selected practices included in the plan will be implemented throughout the targeted areas within the Little Arkansas watershed. Water quality milestones have been developed for the Little Arkansas, Turkey Creek, Emma Creek, Black Kettle Creek, Kisiwa Creek and Sand Creek, along with additional indicators of water quality. The purpose of the milestones and indicators is to measure water quality improvements associated with the implementation schedule contained in this plan.

Monitoring Sites in the Little Arkansas River Watershed

Water quality milestones contained in this section are tied to the sampling stations that KDHE continues to monitor for water quality in each of the water bodies that will be positively affected by the BMP implementation schedule included in this plan. KDHE has several monitoring stations located with the Little Arkansas River watershed. The stations listed below will be utilized to measure water quality improvements throughout the implementation of the plan.

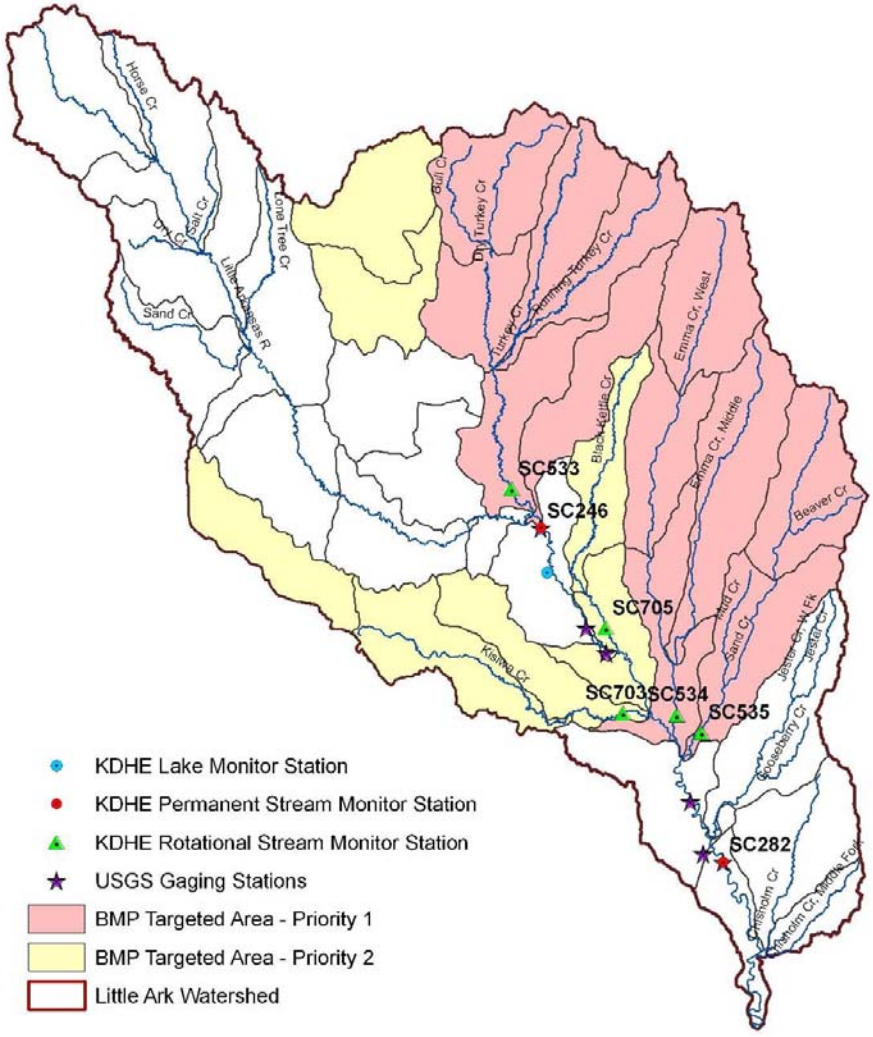
Station ID	Water Body	Type of Station
SC533	Turkey Creek Near Alta Mills	Rotational
SC705	Black Kettle Creek Near Halstead	Rotational
SC703	Kisiwa Creek Near Halstead	Rotational
SC534	Emma Creek Near Sedgwick	Rotational
SC535	Sand Creek Near Sedgwick	Rotational
SC246	Little Ark River at Alta Mills	Permanent
SC282	Little Ark River at Valley Center	Permanent

The map shows both the permanent and rotational KDHE monitoring stations located within the Little Arkansas River Watershed. The permanent monitoring sites are continuously sampled, while the rotational sites are typically sampled every four years. The sites are sampled for nutrients, *E. Coli* bacteria, chemicals, turbidity, alkalinity, dissolved oxygen, pH, ammonia and metals. The pollutant indicators tested for at each site may vary depending on the season at collection time and other factors.

In addition to the KDHE monitoring stations, the Little Arkansas River Watershed has several USGS gaging stations located within the watershed that provide real-time flow information. With two of these stations located in the Little Arkansas River, one located at Hwy 50 near Halstead, and one located near Sedgwick (as shown on the map on the following page), the USGS is currently collecting continuous real-time water quality data for several parameters, including total phosphorus, pH, dissolved oxygen, TSS, and others. This information is available for viewing online at the USGS website.

The map below shows the locations of the monitoring sites located within the Little Arkansas watershed, as well as the targeted areas for implementation that have been identified and discussed in previous sections of this plan.

Figure 25. Monitoring Sites in the Little Arkansas River Watershed



Water Quality Milestones for Little Arkansas River Watershed

As previously stated, this plan estimates that it will take 40 years to implement the planned BMPs necessary to meet the load reduction goals for the impairments being addressed in the Little Arkansas River watershed. Several water quality milestones and indicators have been developed, as included herein. The table below includes short term, mid-term, and long term water quality goals for various parameters monitored in the watershed.

Table 56. Water Quality Milestones for the WRAPS Plan

Water Quality Milestones for Little Arkansas River Watershed										
	Current Condition 1990 - 2010 Average TP	**Short Term Goal**	**Mid Term Goal**	**Long Term Goal**		**Current Condition 1990 - 2010**	**Short Term Goal**	**Mid Term Goal**	**Long Term Goal**	
		Improved Condition (2011 - 2015) Average TP	**Improved Condition (2011 - 2031) Average TP**	**Improved Condition Average TP**	**Total Reduction Needed**	**Average TSS**	**Improved Condition (2011 - 2015) Average TSS**	**Improved Condition (2011 - 2031) Average TSS**	**Improved Condition Average TSS**	**Total Reduction Needed**
Sampling Sites	**Total Phosphorus (average of data collected during indicated period), ppb**					**Total Suspended Solids (TSS) (average of data collected during indicated period), ppm**				
Turkey Creek Near Alta Mills SC533	850	790	590	200	**77%**	99	Maintain Avg TSS ≤ 100	Maintain Avg TSS ≤ 100	Maintain Avg TSS ≤ 100	**0%**
Black Kettle Cr. Near Halstead SC705	780	720	550	200	**74%**	222	210	170	100	**55%**

	Current Condition 1990 - 2010 Average TP	Short Term Goal	Mid Term Goal	Long Term Goal		Current Condition 1990 - 2010	Short Term Goal	Mid Term Goal	Long Term Goal	
		Improved Condition (2011 - 2015) Average TP	Improved Condition (2011 - 2031) Average TP	Improved Condition Average TP	Total Reduction Needed	Average TSS	Improved Condition (2011 - 2015) Average TSS	Improved Condition (2011 - 2031) Average TSS	Improved Condition Average TSS	Total Reduction Needed
Sampling Sites	**Total Phosphorus (average of data collected during indicated period), ppb**					**Total Suspended Solids (TSS) (average of data collected during indicated period), ppm**				
Kisiwa Creek *Near Halstead SC703*	*750*	*695*	*570*	*200*	***73%***	*89*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	***0%***
Emma Creek *Near Sedgwick SC534*	*770*	*710*	*540*	*200*	***74%***	*63*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	***0%***
Sand Creek *Near Sedgwick SC535*	*1950*	*1780*	*1250*	*200*	***90%***	*49*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	*Maintain Avg TSS ≤ 100*	***0%***
Little Ark River At Alta Mills *SC246*	*620*	*580*	*450*	*200*	***68%***	*155*	*150*	*130*	*100*	***35%***
Little Ark River At Valley Center *SC282*	*670*	*620*	*480*	*200*	***70%***	*117*	*115*	*110*	*100*	***15%***

	Current Condition	Short Term Goal	Mid Term Goal	Long Term Goal		Current Condition	Short Term Goal	Mid Term Goal	Long Term Goal
	2000 - 2010 Average TN	Improved Condition (2011 - 2015) Average TN	Improved Condition (2011 - 2031) Average TN	Improved Condition Average TN	Total Reduction Needed	1990 – 2009 *DO < 5 mg/L	Improved Condition (2011 - 2015) *DO < 5 mg/L	Improved Condition (2011 - 2031) *DO < 5 mg/L	Improved Condition
Sampling Sites	**Total Nitrogen (TN) (average of data collected during indicated period), ppm**					***Percent of Samples DO < 5 mg/L (data collected during indicated period)**			
Turkey Creek Near Alta Mills SC533	2.08	1.88	1.26	1	**52%**	43%	35%	15%	No Samples - DO < 5 mg/L
Black Kettle Cr. Near Halstead SC705	4.22	3.44	1.1	1	**76%**	17%	15%	7%	No Samples - DO < 5 mg/L
Kisiwa Creek Near Halstead SC703	2.97	2.64	1.63	1	**66%**	25%	20%	10%	No Samples - DO < 5 mg/L
Emma Creek Near Sedgwick SC534	2.02	1.93	1.65	1	**50%**	7%	6%	4%	No Samples - DO < 5 mg/L

	Current Condition 2000 - 2010 Average TN	Short Term Goal Improved Condition (2011 - 2015) Average TN	Mid Term Goal Improved Condition (2011 - 2031) Average TN	Long Term Goal Improved Condition Average TN	Long Term Goal Total Reduction Needed	Current Condition 1990 – 2009 *DO < 5 mg/L	Short Term Goal Improved Condition (2011 - 2015) *DO < 5 mg/L	Mid Term Goal Improved Condition (2011 - 2031) *DO < 5 mg/L	Long Term Goal Improved Condition
Sampling Sites	**Total Nitrogen (TN) (average of data collected during indicated period), ppm**					***Percent of Samples DO < 5 mg/L (data collected during indicated period)**			
Sand Creek Near Sedgwick SC535	7.53	6.36	2.85	1	**86%**	20%	18%	12%	No Samples - DO < 5 mg/L
Little Ark River At Alta Mills SC246	2.15	1.89	1.11	1	**54%**	4%	3%	0%	No Samples - DO < 5 mg/L
Little Ark River At Valley Center SC282	2.39	2.25	1.34	1	**58%**	0%	0%	0%	No Samples - DO < 5 mg/L

In addition to the water quality milestones listed in the tables above, concurrent biological sampling in the Little Arkansas River should show adequate macroinvertebrate index scores over the same time period. The Macroinvertebrate Biotic Index (MBI) is a biological monitoring metric that can be used to assess compliance with water quality standards.

The MBI values can be used to determine the extent to which the monitored water body can support aquatic life, as follows:

MBI ≤ 4.5	→	fully supporting
4.5 < MBI < 5.4	→	partially supporting
MBI ≥ 5.4	→	non-supporting

An average of MBI of 4.5 or less is desired for a healthy water body, with no sampled values above 5.

Water Quality Milestones for Bacteria

The water quality goal associated with the bacteria impairments in the Little Arkansas River watershed can be tied to the *E. Coli* Bacteria (ECB) Index values. ECB index values for individual samples are computed as the ratio of the sample count to the contact recreation criterion. The calculated index is the natural logarithm of each sample value taken during the primary recreation season (April through October), divided by the natural logarithm of the bacteria criteria. Plotting the ECB ratio against the percentile rank for each individual sample within the data set for each sampling location illustrates the frequency and magnitude of the bacteria impairment for the sampling location. Higher bacteria frequencies are evident when the ECB ratio is over 1 for a large percentage of samples.

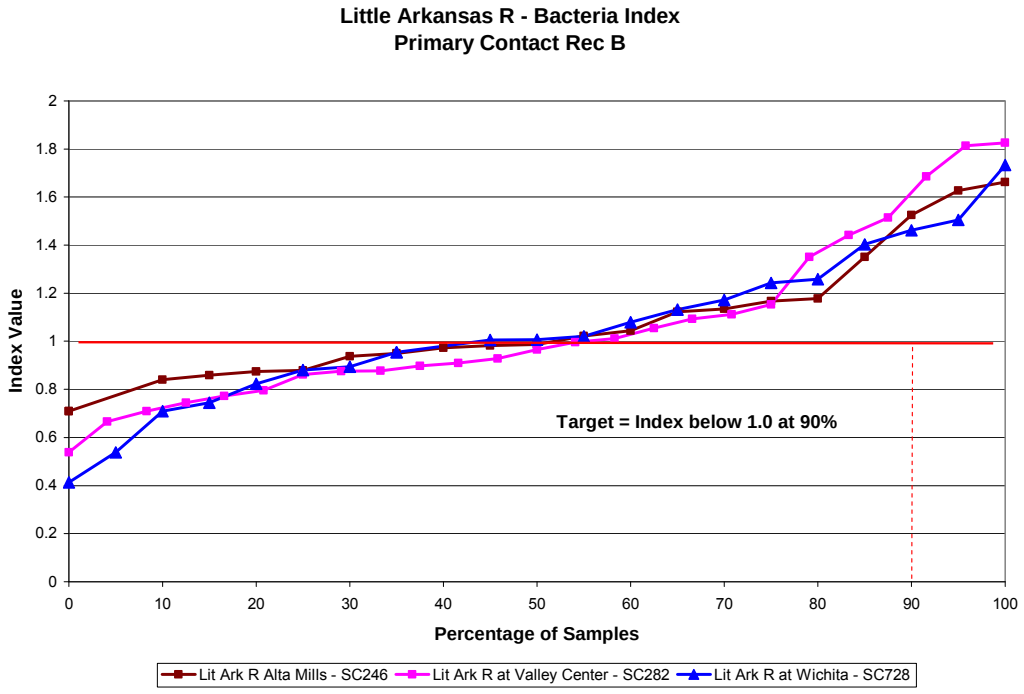
The water quality milestones associated with bacteria are based on the contact recreation designation of the impaired water body, as well as the proximity and designation of the downstream water body. Contact recreation is designated as either primary or secondary. Primary contact recreation designation is assigned to water bodies that have a high likelihood of ingestion based on public access, while secondary contact recreation designation is assigned to waters that are not as likely to be ingested due to restricted public access.

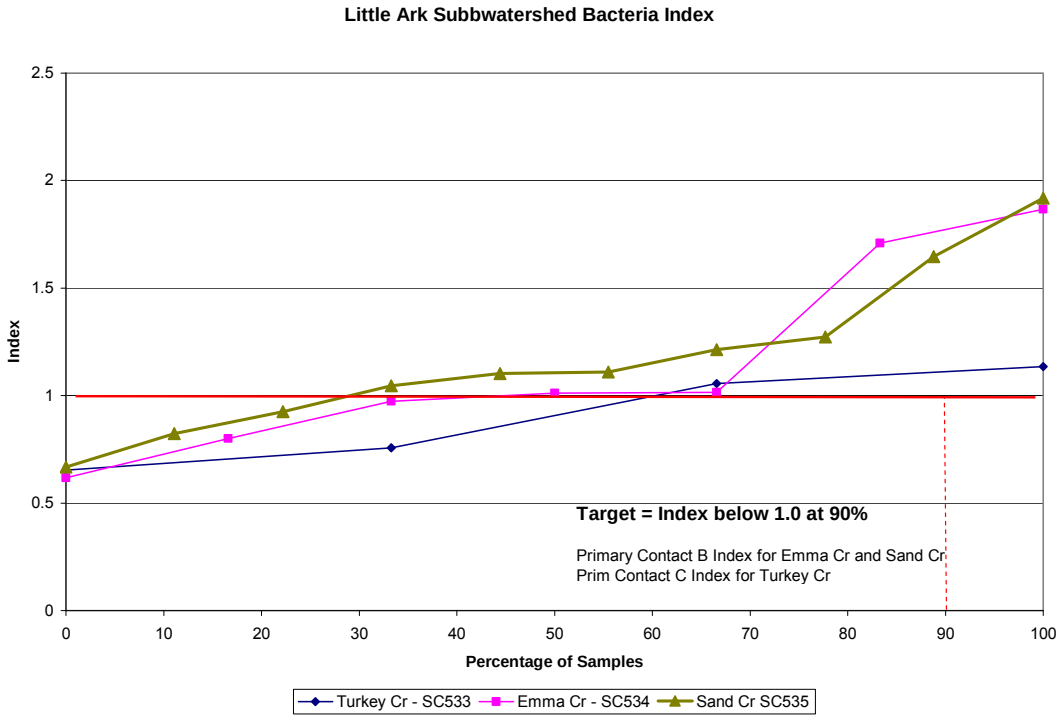
Bacteria load reductions should result in less frequent exceedance of the nominal ECB criterion. For the Little Arkansas River sampling stations SC246 and SC282, the bacteria index is based on the criteria of 262 Colony Forming Units (CFUs)/100ml, Primary Recreation Class B. For are the natural logarithm of each sample value taken during the April-October Primary Recreation season, divided by the natural logarithm of the bacteria criteria for Primary Recreation Class B [ln(262)]. The bacteria indices for the tributaries of Sand and Emma Creek are also based on the Primary Recreation Class B criterion, whereas Turkey Creek is based on the Primary Recreation Class C criterion (427 CFUs/100ml).

Index = ln(ECB Count) / ln(262)

The indicator will be the Upper Decile of those index values, with the target being that the index is below 1.0 at the upper decile (90th percentile).

Sampling station SC282 on the Little Arkansas River at Valley Center, station SC534 on Emma Creek, and station SC535 on Sand Creek were sampled in accordance with the Water Quality Standard in 2009. The geometric mean for the five samples collected over a 30-day period was 1528 CFUs/100ml for SC282, 1190 CFUs/100ml for SC534 and 2093 CFUs/100ml for SC535. The intensive sampling geometric mean results for these stations are well above the Water Quality Standard.





Ultimately, compliance with water quality standards will require sampling 5 times within 30 days during several periods during the primary recreation season, and calculating the geometric mean of those samplings. Meeting that test will be justification for delisting the stream impairment.

Water Quality Milestones for Atrazine

As listed earlier in this section, this plan is addressing the Little Arkansas Watershed 4b Alternative for atrazine. The water quality criterion for domestic water supply (the main stem of the Little Arkansas River) is 3 ppb. The table below is taken from the 4b document and includes the Little Arkansas River monthly comparisons of atrazine detections. Data from three sampling stations is included in the table, which includes KDHE stations SC246 and SC282, as well as two USGS monitoring stations, one located near Hwy. 50, and the other located near Sedgwick.

Station	Location	Month	# of Samples	# of Samples > 3 ppb	% of samples over 3 ppb	Monthly Atz Avg. in ppb
SC246	Alta Mill	April	4	0	0%	0.70
		May	6	1	17%	3.22
		June	4	2	50%	2.87
		July	4	2	50%	2.16
		Aug-Mar	32	2	6%	0.85
USGS 07143672	Hwy 50 Nr Halstead	April	11	5	45%	2.98
		May	34	25	74%	8.99
		June	22	15	68%	8.76
		July	21	14	67%	3.58

		Aug-Mar	29	1	3%	0.75
USGS	Sedgwick	April	44	26	59%	4.72
07144100		May	95	75	79%	9.28
		June	53	42	79%	9.52
		July	66	37	56%	4.07
		Aug-Mar	72	5	7%	0.94
SC282	Valley Center	April	5	1	20%	2.22
		May	6	3	50%	5.51
		June	3	1	33%	3.03
		July	4	3	75%	3.51
		Aug-Mar	32	1	3%	0.83

Due to the lack of data available from the KDHE rotational sampling stations, load reduction estimates were assigned to the respective tributaries and their corresponding sampling stations based on the actual excessive load averages assigned to the corresponding USGS stations along the Little Arkansas River downstream of the tributary.

The first table on the following page illustrates the average and maximum atrazine concentrations at the respective rotational stations during the runoff season and the associated loadings. The second table shows the load contribution and reduction ranges for the average and maximum atrazine concentrations for the respective tributary sampling stations during the runoff period along with the 4B desired average load reduction.

May-July estimated Average and Maximum Atrazine Loadings.

KDHE Station	Stream	Estimated Mean Daily Flow	Runoff Period May-July Atz Avg. Conc.	Runoff Period May-July Atz Max Conc.	Estimated Avg Load Contribution #s/day	Estimated Max Load Contribution #s/day
SC533	Turkey Cr	62.4	3.11	7	1.05	2.36
SC705	Black Kettle Cr	17.4	2.3	2.8	0.22	0.26
SC703	Kisiwa Cr	31.7	4.72	13	0.81	2.23
SC534	Emma Cr	43.1	6.05	9.2	1.41	2.15
SC535	Sand Cr	29	4.95	7.6	0.78	1.19

May-July Load contributions and 4B Desired Loading Reductions.

KDHE Station	Stream	Estimated Runoff Load Contribution #s/day	% Load Reduction Range during Runoff Period	**4B % Desired Avg. Load Reduction during Runoff Period**
SC533	Turkey Cr	1.05-2.36	4-57%	**50%**
SC705	Black Kettle Cr	0.22-0.26	0%	**0%**
SC703	Kisiwa Cr	0.81-2.23	37-77%	**50%**

SC534	Emma Cr	1.41-2.15	50-68%	**50%**
SC535	Sand Cr	0.78-1.19	40-61%	**50%**

The 4B Alternative desired load reduction for all tributary streams within the watershed is 50% on average during May-July, with the exception of Black Kettle Creek. Since Black Kettle Creek does not contribute significant loads and has not had any water quality violations there will be no load reduction applied to this stream. The 50% atrazine load reduction assigned to the tributaries is based on the comparison of the estimated average and maximum load contributions for each stream and consistent with the reduction goals for the Little Arkansas River. While there have been no samples collected during the month of April for any of the tributary sampling stations, April is a month of concern for the lower portion of the watershed, therefore there should be no excursions in April on Kisiwa Creek, Emma Creek, and Sand Creek.

The water quality targets for the 4B alternative are to meet the Water Quality Standard, achieve lower annual averages and fewer excursions over 3 ppb, and averages will not exceed 3 ppb at the sampling stations within the watershed during the runoff period. Since atrazine application is often performed based on the extended weather forecasts, it is inevitable that overland runoff events will occur on occasion despite careful application planning. When excursions do occur, the goal is to limit these to brief periods in May and June.

Additional Water Quality Indicators

In addition to the monitoring data, other water quality indicators can be utilized by KDHE and the SLT. Such indicators may include anecdotal information from the SLT and other citizen groups within the watershed (skin rash outbreaks, fish kills, nuisance odors), which can be used to assess short-term deviations from water quality standards. These additional indicators can act as trigger-points that might initiate further revisions or modifications to the WRAPS plan by KDHE and the SLT.

- No fish kills on Little Arkansas River or tributaries resulting from poor water quality
- No fish consumption advisories resulting from non-point source pollutants
- City of Wichita does not have to increase treatment and associated treatment costs of raw water from Little Arkansas River for ASR project due to degrading water quality trends

Evaluation of Monitoring Data

Monitoring data in the Little Arkansas River watershed will be used to determine water quality progress, track water quality milestones, and to determine the effectiveness of the implementation of conservation practices outlined in the plan. The schedule of review for the monitoring data will be tied to the water quality milestones that have been developed, as well as the frequency of the sampling data. It should be noted that the current TMDLs for the Little Arkansas Watershed are scheduled to be reviewed by

KDHE in 2011. Monitoring data will be utilized at that time to determine necessary modifications to the TMDL.

The implementation schedule and water quality milestones for the Little Arkansas River watershed extend through a 40-year period from 2011 to 2051. Throughout that period, KDHE will continue to analyze and evaluate the monitoring data collected. After the first ten years of monitoring and implementation of conservation practices, KDHE will evaluate the available water quality data to determine whether the water quality milestones have been achieved. If milestones are not achieved, KDHE will assist the Little Arkansas River WRAPS group to analyze and understand the context for non-achievement, as well as the need to review and/or revise the water quality milestones included in the plan. KDHE, the PMT and the SLT can address any necessary modifications or revisions to the plan based on the data analysis. In 2051, at the end of the plan, a determination can be made as to whether the water quality standards have been attained.

In addition to the planned review of the monitoring data and water quality milestones, KDHE, the PMT and the SLT may revisit the plan in shorter increments. This would allow the group to evaluate newer available information, incorporate any revisions to applicable TMDLs, or address any potential water quality indicators that might trigger an immediate review.

12.0 Monitoring Water Quality Progress

The SLT and WRAPS Coordinator will meet to develop a monitoring plan of action. Monitoring site data that will be generated will be of great benefit to the SLT. Many of the existing monitoring sites will benefit multiple targeted areas and the site in Valley Center will benefit all targeted areas. Due to K-State monitoring personnel changing, someone new will need to be brought in to collect water samples. Out sourcing the actual analysis of the samples is preferable but funding may not make that option feasible. Monitoring sites and equipment may change as well with personnel changes, these are items that will need to be addressed and updated in the plan at a later date as additional information becomes available.

Once monitoring resumes, analysis of the data generated will be used to determine effectiveness of implemented BMPs. If the SLT decides at some point in the future that more data is required, they can discuss this with KDHE. All KDHE monitoring data will be shared with the SLT and can then be passed on to the watershed residents by way of the information and education efforts discussed previously.

Year 1 Monitoring Draft Plan:
At the time in which this WRAPS plan was written, a sample plan for monitoring and analyses for the first year of the plan was formulated using the estimated cost of $10,000 as agreed upon in the SFY12 PIP for Year 1.

The monitoring draft plan below and $10,000 expense is ONLY for Year 1 monitoring activities. Changes in budget and/or monitoring needs will require additional evaluation and may result in monitoring strategy and plan changes.

Monitoring for Atrazine: In the targeted areas of Running Turkey Creek, Lower Emma and Lower Sand Creeks; 6 to 9 atrazine samples from April through June will be collected at the established sample sites. Best professional judgment on when the atrazine application will occur within those 3 months would be used to determine sampling periods. Based on past data analysis, the best information collected would not be sampling on the basis of rainfall amounts, but rather on storm intensity. A quick, intense ½ inch rainfall could yield enough flow to track atrazine control/loss from the field. Three samples would be collected during application times using best professional judgment of non-runoff events. This may indicate application error such as spraying over the edge of the field with no riparian buffer or drift to the surface water rather than runoff associated.

Monitoring for Sediment, Nutrients and Bacteria: The KDHE, the Little Arkansas stakeholder leadership and project management teams are interested in maintaining some of the Atrazine sampling sites for long term data collection for other parameters. Therefore, it would appear the atrazine samples mentioned above could be analyzed for sediment, phosphorus, nitrogen and bacteria as well.

Additional monitoring for sediment, nutrients and bacteria would take place for Tier 2 BMP implementation areas as well. Therefore, sampling sites for Blazefork, Black Kettle and Kisiwa Creeks will be determined at a later date. Samples collected for sediment, nutrients and bacteria would be taken in the Fall prior to November 1 and again in the Spring and Summer using best professional judgment. Judgment will be made considering fertilizer application periods and rainfall events (to include storm intensity and runoff). If there is an unusual runoff event in the Winter months, water samples may also be collected during that timeframe as well.

Monitoring data will be used to direct the SLT in their evaluation of water quality progress. KDHE will be requested to meet with the SLT to review the monitoring data accumulated by their sites on a yearly basis. However, the overall strategy and alterations of the WRAPS plan will be discussed with KDHE immediately after each update of the 303d list and subsequent TMDL designation, which will take place in 2011 and 2016. At this time, the plan can be altered or modified in order to meet the water quality goals as assigned by the SLT in the beginning of the WRAPS process.

13.0 Future Planned Activities – Assessment and Outreach

13.1 Assessment for Livestock Targeted Areas

As mentioned in Section 5, current targeted areas for livestock include Sand, Emma, Turkey, Kisiwa and Blakefork Creeks and the Little Arkansas River for nutrients and bacteria. The plan states in Section 5 and again in Section 6 that livestock assessments in the Winter of 2011-2012 will be used to determine specific areas in those sub watersheds in which the SLT will focus BMP implementation. The following steps will be followed to complete the assessment:

1. The SLT will receive a list of current permitted and certified livestock facilities from KDHE.
2. The SLT will meet and go over the list provided by KDHE and will determine other livestock areas that have been noticed to need BMP implementation. For example, if a SLT member notices that a landowner has a feeding site right on a creek, that livestock area may then be assessed and possibly targeted for BMP implementation.
3. Windshield assessments will be made. The WRAPS and BMP Coordinators will locate livestock areas in need of BMP implementation by driving in targeted areas.
4. The SLT may consider water monitoring different sites along the stream to check for increases in bacteria for additional assistance in targeting.

Once the assessment is completed, an implementation table with reduction goals will be developed. Timeframe for this table and BMP targeted areas is thought to be Summer-Fall 2012.

13.2 Outreach for the City of Newton

Although this Nine Element Watershed Plan focuses on rural and agricultural land, the City of Newton should be included in the assessment and overall watershed restoration and protection strategy as it is considered a “municipality located outside of urbanized areas designated as regulated municipal separate storm sewer system referred to as an MS 4” (see www.kdheks.gov/stormwater) for list. This means they are required to have a National Pollutant Discharge Elimination System (NPDES) permit due to their generation of pollutants that impair the use of local water resources. These may even travel downstream and contribute to impairment of uses in regional waters. In Kansas, the stormwater program is administered by KDHE- Bureau of Water- Industrial Programs Section. The permit identifies potential pollutant discharges and their impacts and ways the City will address or abate them. Technical assistance and enforcement for construction activities, illicit discharges from cleaning activities at non-residential facilities, and eliminating dumping into storm drains among other pollution sources are described in their permit. Measures to control/abate and monitoring strategies are included in their permit in both the training, public education and implementation of BMPs . The City has established and maintains a web page

presenting requirements/ordinances and their BMP manual. It also provides some educational and training documents.

Even though EPA Section 319 funds cannot help the City address their permit compliance and maintenance needs, the project management team, SLT and KDHE concur they should be given the opportunity to be a partner. They are a rapidly growing city with development increasing on the south end. There is potential to help them identify funds to assist them with minimizing pollutant discharges above and beyond their permit requirements that could be eligible for Section 319 or other funds. Pet waste and other sources of bacteria, organic load and nutrients are addressed in the NPDES permit, however, the geese population is not addressed and has dramatically increased around and in Sand Creek which flows through town. A monitoring site was established by KSU downstream of the city (see water quality summary). Data indicating loading from organic sources and sediment are an impairment. The WRAPS coordinator will contact the City Public Works Director to let her know about the plan, monitoring data and possible beneficial partnerships with other partners in the Little Arkansas River WRAPS service area. He will also receive technical assistance from KDHE for discussing urban pollution problems and how to address them to improve water quality.

14.0 Review of the Watershed Plan in 2016

In the year 2016, the plan will be reviewed and revised according to results acquired from monitoring data. At this time, the SLT will review the following criteria in addition to any other concerns that may occur at that time:

1. The SLT will ask KDHE for a report on the milestone achievements in **atrazine** load reductions.
2. The SLT will ask KDHE for a report on the milestone achievements in **sediment** load reductions.
3. The SLT will ask KDHE for a report on the milestone achievements in nutrients, specifically **phosphorus** load reductions.
4. The SLT will request a report from KDHE concerning the revisions of the TMDLs from 2011.
5. The SLT will report on progress towards achieving the adoption rates listed in Section 11.1 of this report.
6. The SLT will report on progress towards achieving the benchmarks listed in Section 11.2 of this report.
7. The SLT will report on progress towards achieving the BMP implementations in Section 11.3 of this report.
8. The SLT will discuss the impairments on the 303d list and the possibility of addressing these impairments prior to listing as TMDLs.
9. The SLT will discuss the effect of implementing BMPs aimed at specific TMDLs on the impairments listed on the 303d list.
10. The SLT will discuss necessary adjustments and revisions needed in the targets listed in this plan.

15.0 Appendix

15.1 Service Providers

Table 57. State and Federal Organizations and Agencies

Organizations	Program	Purpose	Phone	Website address
Kansas Dept. of Agriculture	Watershed structures permitting.	Available for watershed districts and multipurpose small lakes development.	785-296-2933	www.accesskansas.org/kda
Kansas Dept. of Health and Environment	**Nonpoint Source Pollution Program** Municipal and livestock waste Livestock waste Municipal waste State Revolving Loan Fund	Provide funds for projects that will reduce nonpoint source pollution. Compliance monitoring. Makes low interest loans for projects to improve and protect water quality.	785-296-5500	www.kdhe.state.ks.us
Kansas Water Office	Public Information and Education	Provide information and education to the public on Kansas Water Resources	785-296-3185	www.kwo.org
Environmental Protection Agency	Clean Water State Revolving Fund Program Watershed Protection	Provides low cost loans to communities for water pollution control activities. To conduct holistic strategies for restoring and protecting aquatic resources based on hydrology rather than political boundaries.	913-551-7003 913-551-7003	www.epa.gov

Division of Conservation, Kansas Dept. of Agriculture	Water Resources Cost Share Nonpoint Source Pollution Control Fund Riparian and Wetland Protection Program Stream Rehabilitation Program Kansas Water Quality Buffer Initiative Watershed district and multipurpose lakes	Provide cost share assistance to landowners for establishment of water conservation practices. Provides financial assistance for nonpoint pollution control projects which help restore water quality. Funds to assist with wetland and riparian development and enhancement. Assist with streams that have been adversely altered by channel modifications. Compliments Conservation Reserve Program by offering additional financial incentives for grass filters and riparian forest buffers. Programs are available for watershed district and multipurpose small lakes.	785-296-3600	www.accesskansas.org/kDOC
Kansas Alliance for Wetlands and Streams	Streambank Stabilization Wetland Restoration Cost share programs	The Kansas Alliance for Wetlands and Streams (KAWS) organized in 1996 to promote the protection, enhancement, restoration and establishment wetlands and streams in Kansas.	620-241-3636	www.kaws.org

Kansas State Research and Extension	Water Quality Programs, Waste Management Programs Kansas Center for Agricultural Resources and Environment (KCARE)	Provide programs, expertise and educational materials that relate to minimizing the impact of rural and urban activities on water quality.	785-532-7108	www.kcare.ksu.edu
	Kansas Environmental Leadership Program (KELP)	Educational program to develop leadership for improved water quality.	785-532-5813	www.oznet.ksu.edu/kelp
	Kansas Local Government Water Quality Planning and Management	Provide guidance to local governments on water protection programs.	785-532-2643	www.oznet.ksu.edu/olg
	Rangeland and Natural Area Services (RNAS)	Reduce non-point source pollution emanating from Kansas grasslands.	785-532-0416	
	Kansas Pride: Healthy Ecosystems/Healthy Communities	Help citizens appraise their local natural resources and develop short and long term plans and activities to protect, sustain and restore their resources for the future.	785-532-3039	www.kansasprideprogram.ksu.edu/healthyecosystems/
	Citizen Science	Education combined with volunteer soil and water testing for enhanced natural resource stewardship.	785-532-1443	www.oznet.ksu.edu/kswater/

Kansas Forest Service	Conservation Tree Planting Program Riparian and Wetland Protection Program	Provides low cost trees and shrubs for conservation plantings. Work closely with other agencies to promote and assist with establishment of riparian forestland and manage existing stands.	785-532-3312 785-532-3310	www.kansasforests.org
Kansas Department of Wildlife and Parks	Land and Water Conservation Funds Conservation Easements for Riparian and Wetland Areas Wildlife Habitat Improvement Program North American Waterfowl Conservation Act MARSH program	Provides funds to preserve develop and assure access to outdoor recreation. To provide easements to secure and enhance quality areas in the state. To provide limited assistance for development of wildlife habitat. To provide up to 50 percent cost share for the purchase and/or development of wetlands and wildlife habitat. May provide up to 100 percent of funding for small wetland projects.	620-672-5911 785-296-2780 620-672-5911 620-342-0658 620-672-5911	www.kdwp.state.ks.us/about/grants.html

US Army Corps of Engineers	Planning Assistance to States Environmental Restoration	Assistance in development of plans for development, utilization and conservation of water and related land resources of drainage Funding assistance for aquatic ecosystem restoration.	816-983-3157 816-983-3157	www.usace.army.mil
Kansas Rural Center	The Heartland Network Clean Water Farms-River Friendly Farms Sustainable Food Systems Project Cost share programs	The Center is committed to economically viable, environmentally sound and socially sustainable rural culture.	913-873-3431	http://www.kansasruralcenter.org
Kansas Corporation Commission	Online Site Specific Remediation Planner	Remediation of brine scar sites	620-432-2300	http://www.kcc.state.ks.us/conservation/scar/index.htm
US Fish and Wildlife Service	Fish and Wildlife Enhancement Program Private Lands Program	Supports field operations which include technical assistance on wetland design. Contracts to restore, enhance, or create wetlands.	785-539-3474 785-539-3474	www.fws.gov

USDA- Natural Resources Conservation Service and Farm Service Agency	Conservation Compliance	Primarily for the technical assistance to develop conservation plans on cropland.	785-823-4565	www.ks.nrcs.usda.gov
	Conservation Operations	To provide technical assistance on private land for development and application of Resource Management Plans.	785-823-4565	
	Watershed Planning and Operations	Primarily focused on high priority areas where agricultural improvements will meet water quality objectives.	785-823-4565	
	Wetland Reserve Program	Cost share and easements to restore wetlands.	785-823-4565	
	Wildlife Habitat Incentives Program	Cost share to establish wildlife habitat which includes wetlands and riparian areas.		
	Grassland Reserve Program, EQIP, and Conservation Reserve Program	Improve and protect rangeland resources with cost-sharing practices, rental agreements, and easement purchases.		

Table 58. Regional Organizations and Agencies and Contact Information

Organization	Contact Person	Email Address	Contact Information
Kansas State Research and Extension	Ron Graber Watershed Specialist – Lower Arkansas River Watershed	rgraber@ksu.edu	7001 W. 21st Street N Wichita, KS 67205 316-660-0100 ext.155
Kansas Department of Health and Environment	Scott Satterthwaite Environmental Scientist	ssatterthwaite@kdheks.gov	1000 SW Jackson St Suite 420 Topeka, KS 66612 785-296-5573
Natural Resources Conservation Service	Gay Spencer Harvey County District Conservationist	gay.spencer@ks.usda.gov	1405 South Spencer Road Newton, KS 67114 316-283-0370
	Baron Shively McPherson County District Conservationist	baron.shively@ks.usda.gov	200 S. Centennial Dr. McPherson, KS 67460 785-241-1836
Conservation District	Christy Leewright-Patry Harvey County Conservation District Manager	Christi.leewright@ks.nacdnet.net	1405 South Spencer Road Newton, KS 67114 316.283.0370
	Brenda Peters McPherson County Conservation District Manager	brenda.peters@ks.nacdnet.net	200 S. Centennial Dr. McPherson, KS 67460 785-241-1836
Central Prairie Resource Conservation & Development	Dan Curtis Coordinator	dan.curtis@ks.usda.gov	1817 16th St. Great Bend, KS 67530 620-792-6224

15.2 Little Arkansas Water Quality Monitoring Quality Assurance Project Plan (QAPP)

Little Arkansas River WRAPS

SAMPLING AND ANALYSIS PLAN

2006-2011 KS-WRAPS Little Arkansas WRAPS Assessment

Prepared By:
Philip L. Barnes PhD – Kansas State University
Ron Graber– KSU Watershed Specialist
Submitted March 2011

_____	_____
KSU Water Quality Specialist	Date
_____	_____
KSU Watershed Specialist	Date
_____	_____
KSU KCARE Director	Date

Distribution List:
Philip Barnes, KSU Water Quality Specialist
Ron Graber, Little Arkansas River WRAPS Coordinator
Scott Satterthwaite, Pollution Control Specialist

K-STATE Research and Extension
Kansas State University

Quality Assurance Project Plan for:

Water Quality Assessment for Little Arkansas River Watershed

Project Number(s): 2007-0042 and 2009-0011

Approvals:

_____ _____

Quality Assurance Officer, Watershed Management Section **Date**

_____ _____

KDHE WMS Project Officer **Date**

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Water Quality Assessment for the Little Arkansas River Watershed
McPherson and Harvey Counties, Kansas

Project Number(s): 2007-0042 and 2009-0011

PROJECT DESCRPTION

Introduction

The purpose of this Watershed Restoration and Protection Strategy (WRAPS) quality assurance project plan for the Little Arkansas Watershed is to outline a plan of collecting, storing, and analysis of the surface waters of the watershed.

The WRAPS assessment and monitoring process involves local communities and governmental agencies working together toward the common goal of collecting water samples that represent the current state of water's quality. Local participants or stakeholders provide valuable grass roots leadership, responsibility and management of resources in the process. They have the most "at stake" in ensuring the water quality existing their land is protected. Agencies bring science-based information, communication, and technical and financial assistance to the table. Together, several steps must be taken to assure that quality samples are taken, properly transported to the lab and analyzed by a standard set of procedures. These steps involve building awareness and education, engaging local leadership, monitoring and evaluation of watershed conditions, in addition to assessment, planning, and implementation of the WRAPS process at the local level. Final goals for the watershed at the end of the WRAPS process are to provide a sustainable water source for drinking and domestic use while preserving food, fiber, and timber production. Other crucial objectives are to maintain recreational opportunities and biodiversity while protecting the environment from flooding, and negative effects of urbanization and agricultural production. The ultimate goal is watershed water quality assessment will be "locally led and driven" in conjunction with government agencies in order to better assess the environment for everyone.

This plan is intended to serve as an overall strategy to guide watershed monitoring efforts by individuals, local, state, and federal agencies and organizations. At the end of the WRAPS process, the Stakeholder Leadership Team (SLT) will have confidence in the water quality data collected and used in their capability, capacity and confidence to make decisions that will restore and protect the water quality and watershed conditions in the Little Arkansas River Watershed.

Project Responsibilities

Organizations & Individuals Participating in Project

The lead agency in the Little Arkansas Watershed is the Little Arkansas River SLT,

advisor Ron Graber. The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) program helps communities plan and carry out projects that increase natural resources conservation, support economic development, and enhance the local environment and standard of living. Other stakeholder groups include the Little Arkansas River WRAPS (Watershed Restoration and Protection Strategy), McPherson and Harvey County Conservation Districts, Division of Conservation (formerly State Conservation Commission) and the City of Wichita. Many local farmers, ranchers, and land owner participate as stakeholders.

Staff Responsibilities and Contacts

Project information will be shared with the general public through newspaper, public meetings and events. The WRAPS coordinator will plan regular presentations to the SLT and communities in the watersheds. Primary events will be the regular meetings of the SLT and meetings with the City of Wichita. The water quality specialist will be responsible for presenting water quality information to these groups. Results of the plan will be shared with the general public through local newspapers, public meetings and events aimed at residents and businesses within the Little Arkansas Watershed. Primary events will be the regular meetings of the SLT. The plan will generate posters, fact sheets, field day reports, annual project reports and journal articles. Community leaders will be informed through newspapers, and public meetings. Primary events will be the regular meetings of the SLT.

K-State Staff Responsibilities
Sampling Coordination: Philip Barnes (785)532-2921, lbarnes@ksu.edu
Laboratory Analysis: Philip Barnes (785)532-2921, lbarnes@ksu.edu
Data Evaluation and Reporting: Philip Barnes (785)532-2921, lbarnes@ksu.edu

Overall Project Coordination – Little Arkansas River WRAPS, Ron Graber (316) 660-0100, rgraber@ksu.edu

Background Information

Contamination by atrazine, sediments and nutrients is the leading cause of impairments in streams and lakes in Kansas according to the Unified Watershed Assessment prepared by the Kansas Department of Health and Environment (KDHE) in 1998. The Little Arkansas Watershed (HUC 8 11030012) has been identified as one of the severely impaired water supplies in the state, and has been given the high priority for remediation of water flowing in the streams. A portion water supply for the city of Wichita, south-central Kansas, currently comes from the *Equus* Beds aquifer and Cheney Reservoir. Because these sources are not expected to meet projected city water needs into the 21st century, artificial recharge of the *Equus* Beds aquifer is being investigated as one alternative to meet future water-supply demands. An additional potential benefit of artificial recharge includes preventing degradation of the water quality of the aquifer by saltwater plumes from the Arkansas River to the southwest and the Burrton oil field to the northwest.

In 1995, the *Equus* Beds Groundwater Recharge Demonstration Project began evaluation of artificial recharge techniques and their effects on water quality in the aquifer. The demonstration project was a cooperative effort among the city of Wichita, Bureau of Reclamation (U.S. Department of the Interior), and the U.S. Geological Survey (USGS).

Water from the Little Arkansas River was diverted for artificial recharge when flow in the river exceeded base flow in accordance with the Kansas Department of Agriculture, Division of Water Resources, permit conditions. Water was artificially recharged to the *Equus* Beds aquifer, which is part of the High Plains aquifer and consists of alluvial (river-deposited) sediments of sand and gravel interbedded with clay and silt.

At the Halstead diversion well site, water was diverted from the Little Arkansas River by pumping a diversion well completed immediately adjacent to the river that induces the surface water into the well. This diverted source water then was pumped to the Halstead recharge site and recharged to the aquifer by basin, trench or injection well. Artificial recharge of the *Equus* Beds aquifer began at the Halstead site in May 1997.

Recharge water for the Sedgwick recharge site was diverted directly from the Little Arkansas River. It was treated to reduce turbidity (the cloudy appearance of water caused by suspended matter) and to remove organic compounds, including the herbicide atrazine, using powder activated carbon (PAC). Artificial recharge of the *Equus* Beds aquifer at the Sedgwick site began in April 1998.

Monitoring of the water quantity and quality has continued in the Little Arkansas River and at monitoring wells throughout the study area since the completion of the demonstration phase of the *Equus* Recharge Project (May 2002). An areal assessment for water quantity and water quality in the *Equus* Beds aquifer also began in November 2001. The areal assessment monitoring wells are completed in both the shallow and deep zones of the *Equus* Beds aquifer and covers approximately 300 square miles north of the Arkansas River and west of the Little Arkansas River.

Much of the water supply for the City of Wichita comes from the *Equus* Beds aquifer. The available water supply for the city of Wichita must be increased to meet its future water needs through 2050. In order to meet this need, the *Equus* Beds Aquifer Storage and Recovery (ASR) Project Phase I began in 2006 “to inject groundwater into the *Equus* Beds Aquifer for the purpose of storage and later recovery of the groundwater and to form a hydraulic barrier to a known brine plume” (USGS, SIR 2007).

This project will attempt to monitor the nonpoint source atrazine, sediment and nutrient impairments in HUC 11030012. First, we have divided the watershed into a paired watershed study, where sub-watersheds of similar size are treated or not treated with atrazine BMPs in an attempt to lower the atrazine concentrations and resulting atrazine loading to the Little Arkansas River. Second, we are monitoring these paired as well as three main stream locations in the Little Arkansas River for atrazine, sediment and nutrient loadings. Third, we will educate land owner, farmers and ranchers of these watersheds about their own potential contributions to nonpoint source contamination.

Forth, we will demonstrate the role that best management practices (BMPs) and other land use options and how they can play in preventing sediment and nutrient contamination.

HUC 11030012 runs south from McPherson County into Harvey County into the Arkansas River near Wichita, Kansas. These watersheds have a history of continuous wheat, row crops and alfalfa grown for small dairy industry. That industry has been on a steady decline over the last ten years. The current agriculture has seen a transition to row crop agriculture and cattle grazing. A few dairies still exist and their operations are permitted. Municipal wastewater treatment systems in a number of small communities contribute some nutrients to the streams despite their NPDES permits.

Another challenge that must be overcome in changing the behavior of residents of these watersheds is the fact that the streams are ephemeral in nature and flow during the rainy portion of the year but can be dry or low flowing during the rest of the year. This leads to flashy high flow that contributes a majority of the sediment and nutrient contribution and periods of low or no flow leading to low dissolved oxygen. If the high flow events occur during field tillage and if atrazine or nutrients have been applied the large flow events can cause large losses of atrazine, sediments and nutrients.

Sources of water quality problems or threats within the project area include:

[x] Cropland run off	[x] Pasture land run off
[x] Rangeland run off	[x] Livestock production area run off
[x] Nutrient application run off	[x] Degraded riparian area
[x] Solid waste disposal area	[x] NPDES permits

K-State Surface Water Quality Monitoring Strategy

To facilitate implementation of its water quality management program, K-State has identified the following monitoring objectives for surface water quality monitoring. The monitoring objectives that will be addressed are:

Purpose: Determine surface water quality conditions in Little Arkansas River (LAR) and its contributing watersheds.

- Characterize the spatial and temporal distribution of water quality conditions at various locations in the LAR and its contributing watersheds.
- Determine if water quality conditions attributed to the urban and agricultural influences in the LAR watersheds are improving, degrading, or staying the same over time.

Purpose: Determine if these sub-watershed surface water conditions impact the quality of the LAR.

- Determine which tributaries and/or HUC 12 sub-watersheds produce the largest water quality concerns and their contribution to the contaminant loading in the LAR
- Assess water quality conditions of sub-watersheds where best management practices will be implemented and measure the improvement in the impaired condition.

Water quality samples will be collected at six paired locations including three main stream LAR locations (Figure 1 and 2). Samples in the winter months of March, October, November, and December will be taken once during the month. During the rest of the sampling year, samples will be taken weekly or on a runoff event. Flow depths and samples were collected near each paired site using an automated sampler or water level recorders. This data will be used to calculate flowrate and flow volumes at sampling collection. Main stream data at USGS gages at Valley Center and Highway 50 while a water level recorder will be used at Highway 61. Samples at these sites will be taken with a depth integrated grad sample. These sites are located in Figure 1 and 2 are described in Table 1.

The water samples will be analyzed for total suspended solids, total nitrogen and phosphorus, atrazine, and Escherichia coli bacteria. When these pollutant concentrations are multiplied by the flow volume, the load of a particular pollutant can be determined. These loads will be assessed over time to examine if the source of the contaminant is derived from an erosion source or potentially by application of fertilizer. Once these loads are assessed then the study can investigate the watershed for potential sources of that contamination.

Stream Flow (Ward and Elliot, 1995)

Flow in a stream is a function of many factors including precipitation, surface runoff, interflow; the cross sectional geometry and bed slope of the channel, the bed and side slope roughness; meandering, obstructions, and changes in shape; hydraulic control structures and impoundments; and sediment transport and channel stability. Generally, flow in streams and impoundments are classified as open-channel flow because the surface of the flow is open to the atmosphere. Stream flow can be classified several ways. For example, it can be turbulent in steep rocky areas or following severe storm events. Typically, stream flow is tranquil and is considered to be a steady uniform flow. The calculated stream flows for this study assume this condition where the stream depth does not change during the flow measurement and the same depth at every section along the stream.

The stream flow is:

$$q = va \tag{1}$$

where: q = stream flow (ft^3/sec),
v = average stream velocity (ft/sec), and
a = cross-sectional area of flow (ft^2).

For uniform flow in a stream, the average stream velocity, v, can be estimated by Manning's equation.

$$v = \frac{1.5}{n} R^{2/3} S^{1/2} \tag{2}$$

where: v = average stream velocity (ft/sec),
n = Manning's roughness coefficient of the stream channel,
R = hydraulic radius (a/p, p = wetted perimeter), and
S = channel bed slope (ft/ft).

Flow measurement and sample collection for this study was made at road crossings at bridges or culverts using an ISCO stage recorder. The cross sectional area and hydraulic parameters needed to estimate stream flow through these structures were measured.

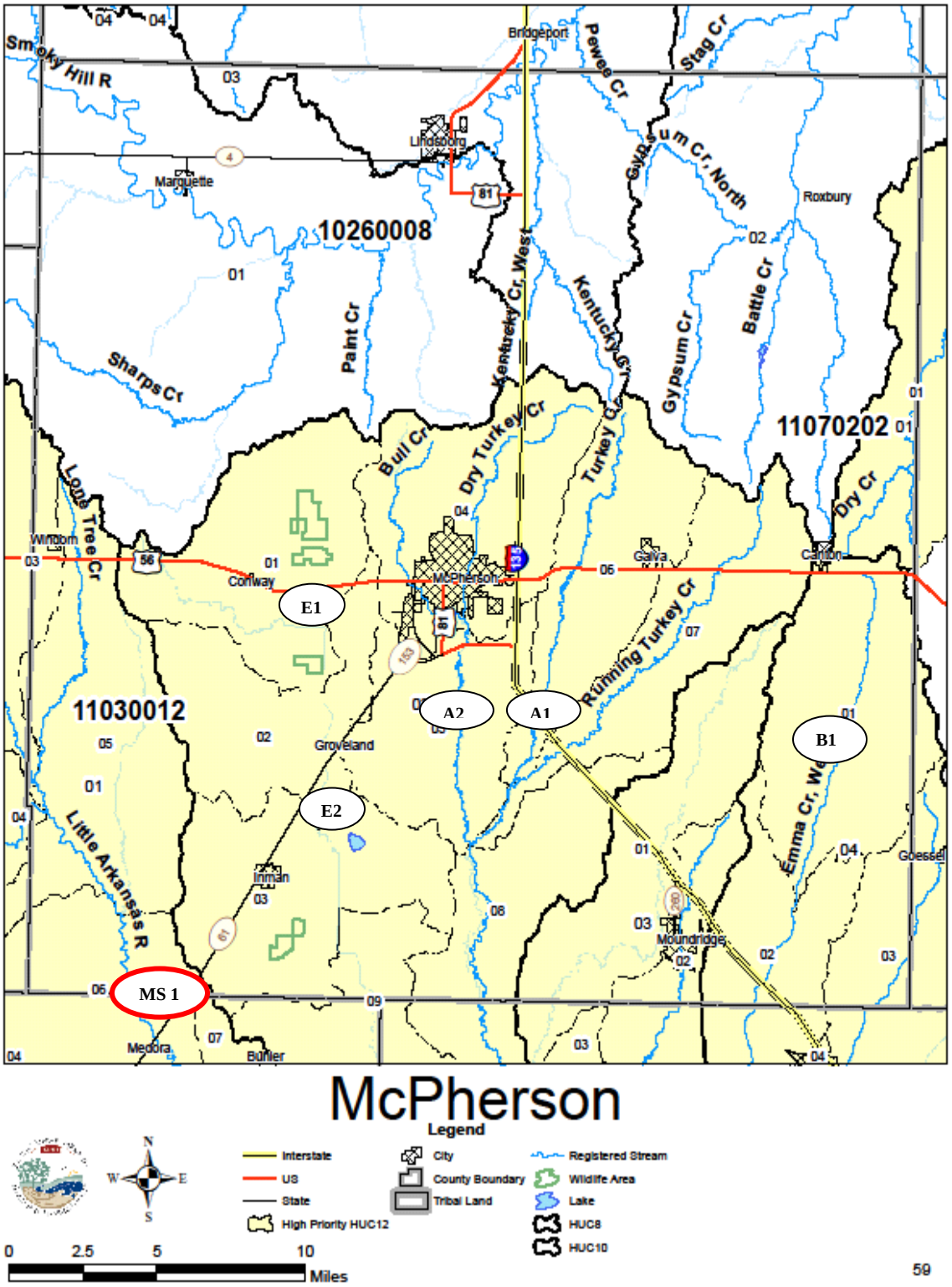

Figure 1. McPherson County monitoring locations.

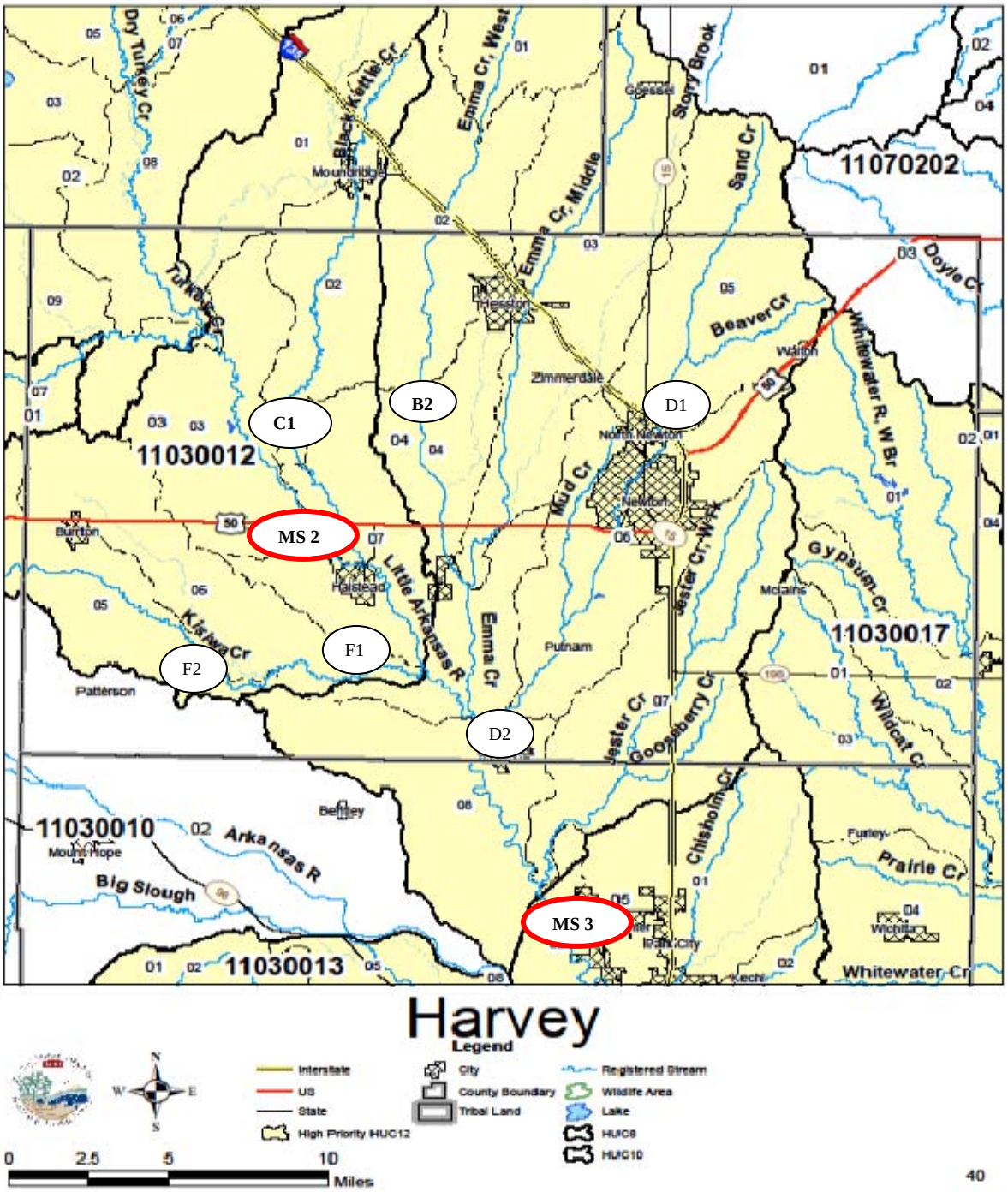

Figure 1. Harvey County monitoring locations.

Table 1. Monitoring site location description and coordinates for Little Arkansas River.

Site Number	Site Location	Site Coordinates
A1	Running Turkey Creek (No Treatment)	Lat 38.29070 Lon 97.59307
A2	Dry Turkey Creek (Atrazine Treatments)	Lat 38.28960 Lon 97.61012
B1	Upper West Emma Creek (Atrazine Treatments)	Lat 38.23195 Lon 97.44167
B2	Lower West Emma Creek (No Treatment)	Lat 38.08677 Lon 97.47170
C1	Black Kettle Creek (Atrazine and Sediment Treatments)	Lat 38.07228 Lon 97.55508
D1	Upper Sand Creek	Lat 38.08509 Lon 97.33597
D2	Lower Sand Creek	Lat 38.92206 Lon 97.42726
E1	Upper Blazefork Creek	Lat 38.33321 Lon 97.74122
E2	Lower Blazefork Creek	Lat 38.24653 Lon 97.73448
F1	Upper Kisiwa Creek	Lat 38.95687 Lon 97.5557
F2	Lower Kisiwa Creek	Lat 38.95561 Lon 97.55565
MS 1	Little Arkansas River HW 61	Lat 38.15302 Lon 97.84207
MS 2	Little Arkansas River HW 50	Lat 38.02858 Lon 97.54053
MS 3	Little Arkansas River Valley Center	Lat 38.83915 Lon 97.40758

DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are qualitative and quantitative statements that clarify study objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. In this context, the following DQOs have been identified for this monitoring project.

Project Monitoring Objectives

The data collected through this monitoring project are meant to address, in whole or part, monitoring objectives identified by K-State in their “K-State Surface Water Quality Monitoring Strategy” (see Page 8).

Types of Data Needed

To meet the project's monitoring objectives, ambient and storm flow water quality monitoring will be conducted at 14 monitoring locations in Little Arkansas River watershed. The monitoring to be undertaken will include flow weighted composites at a mid-channel location during storm flow and integrated grab samples at the mid-channel location.

Parameters to be monitored are those necessary to assess water quality conditions and trends, beneficial use attainment, and pollutant loadings. Measurement of water quality parameters and explanatory variables are both needed. Water samples will be collected and refrigerated until they can be analyzed for total suspended solids, total phosphorus, total nitrogen, Escherichia coli bacteria and atrazine.

Quality of Data Needed
The quality of the data collected needs to be at a level that meets the WRAPS assessment and reporting requirements. Data will be used to aid in the selection of targeted areas for BMP implementation in the watershed.

PROJECT/TASK DESCRIPTION

Sample Collection and Analysis
Sample collection will be the responsibility of K-State. Samples collected by K-State will be analyzed for nutrients by K-State Agronomy Soil Testing laboratories, and for TSS, Escherichia coli bacteria, and water chemistry parameters by the Biological and Agricultural Engineering water quality laboratory.

Data Quality Review
K-State and the WRAPS will be responsible for reviewing the data quality of all field measurements and the analytical results provided by laboratories. Data quality review is to address both data verification and validation and be conducted in accordance with the water quality standard operating procedure (SOP).

Data Management
K-State laboratories and WRAPS will independently manage the collected data for their use. K-State and the WRAPS will initially store the quality-reviewed data in their in-house database.

Data Assessment and Reporting
Both K-State, KDHE, and the WRAPS are free to assess, use, and report on the collected data to meet their individual needs.

DOCUMENTS AND RECORDS
K-State and the WRAPS will be responsible for distributing a copy of the final SOP, and any subsequent revisions, to persons identified on the distribution list.

K-State will provide the WRAPS with an electronic copy of the collected nutrient data after it has been data quality reviewed. The electronic copy of the final data will be in

Microsoft WORD format or other agreed format. WRAPS will maintain original field sheets and laboratory analytical reports for at least 3 years.

DATA COLLECTION APPROACH

DATA COLLECTION DESIGN

Data collection under this project will occur at 7 monitoring locations in the Little Arkansas River Watersehd. Current site locations and station names are shown in Figure 1 and Table 1. When a particular sub-watershed site is deemed an excessive contributor to pollutants of concern, multiple sites will be located within that sub-watershed to further source target. Attempts will be made to sample from each site according to protocol laid out in the QAPP but should weather, access, safety, and availability of water be an issue, a sample will not be collected at that time. Wet weather sampling will correlate with data collected by the Weather Data Library at K-State.

MEASUREMENT AND SAMPLING METHODS

Field Observations and Measurements

A field sheet will be used to record field observations, sampling time, and measurements. Field observations may be made at all sites. Manta multi-parameter probe measurements will be taken at all sites during ambient sampling shown in Figure 1.

Water Quality Sample Collection

All samples will be collected by either dipping a PVC constructed water bomb just below the surface of the water. The appropriate sample containers will be filled from the respective sampling device, as the water is churned, and then appropriately preserved. Event samples will stored in 340 ml Isco bottles and transported to the K-State water quality lab where a flow weighted composite will be made for analysis.

Preparation and Decontamination of Equipment

All sampling bottles are to be cleaned prior to each sampling trip. All parts inside and out will be scrubbed with a synthetic bristled non-metallic brush and a mild solution of phosphate free laboratory type soap. All parts will be rinsed with E-pure water to remove all residues followed by a methanol rinse. Bottles will be oven dried at 100 ^{o}C for 24 hours, assembled and stored in a manner to prevent any contamination. Field cleaning of the sampling devices will consist of triple rinsing them with stream water prior to sample collection.

Selection and P*reparation of Sample Containers*

Disposable plastic sample containers, that are pre-sterilized and sealed, are used for total N, total P, and Escherichia coli bacteria analysis.

Sample Container Types, Preservation, and Holding Times

Table 2 lists the container types that will be used, sample preservation requirements, and maximum holding times for each of the parameters to be analyzed. Sample preservation will be done in as soon as possible after sample collection.

Table 2. Required sample container types, filtration, preservation and holding times.

Container Label Designation	**Parameters to be Analyzed**	**Container Type**	**Preservation**	**Holding Time**
General Chemistry	Total Suspended Solids	Plastic, 1 Liter	Room temperature	28 days
Bacteria	Escherichia coli bacteria	Plastic, 120 mL	Chill sample to 10°C if held longer than 1 hour before processing	24 hrs
Nutrients	Total Nitrogen Total Phosphorus	Plastic, 120 mL	Sulfuric Acid to pH < 2, Chill sample to 4°C	28 days
Pesticide	Atrazine	Amber Glass, 120 mL	Chill sample to 4°C	7 days

SAMPLE HANDLING, CUSTODY, AND TRANSPORT

Example Sample Tag

Each sample container requires a written or an affixed sample tag providing information on sample type, location, date, and time. Sample tags should be filled out (except for time) prior to going to the field to collect the samples.

General Water Sample Tag:

SAMPLE ID:	
Date:	Time:
Collector:	

Sample Handling, Transport, and Delivery to the Laboratory

Upon completion of sample collection, preservation, and tagging, those samples requiring chilling to 4°C should be stored in an iced cooler. Once back at the vehicle, combine recently collected samples with those from other sites adding ice when necessary. Samples are to be at all times stored in an upright position. For this project, collected samples will usually be transported to the appropriate laboratories by the personnel who collected the samples.

An Analytical Request Form (ARF) will be completed and submitted with all samples delivered to the K-state laboratory. The ARF, in addition to specifying the analysis required, serves as a chain-of-custody between the personnel collecting the sample and the laboratory receiving the samples.

K-State laboratory personnel should be alerted with an appropriate time in advance of when samples are going to be collected and delivered so necessary arrangements for sample receipt can be made.

Samples delivered to the K-State Laboratory will be taken to the laboratory, removed from coolers, and grouped by sample location. This will provide an accurate accounting of samples collected and allow for ease of log-in by laboratory personnel. Laboratory personnel will compare the physical samples to information on the ARF, sign and date the ARF, and provide a copy. The original ARF will be retained by laboratory. Once samples are logged-in they are to be stored in a refrigerator maintained at 4^{o}C until analysis is completed. Samples are retained for at least the period of their holding time after analysis is completed.

ANALYTICAL METHODS

Table 3 lists the methods that will be used by the K-State Laboratory to analyze the samples for the required detection and reporting limits.

Table 3. Methods, Detection Limits, and Reporting Limits for Analyses Conducted by the K-State Laboratory.

Analyte	Method	Detection Limit	Lower Reporting Limit
Total Suspended solids	EPA - 160.2	0.1 mg/l	0.2 mg/l
Total Nitrogen	EPA - 351.2	0.01 mg/l	0.02 mg/l
Total Phosphorus	EPA - 300.0 / 365.4	0.01 mg/l	0.02 mg/l
Escherichia coli bacteria	EPA - APHA9223B	<1.0 MPN/100 mL	1.0 MPN/100mL
Atrazine	EPA-Abraxis 500001	0.05 µg/l	0.30 µg/l

Links to Methods on the Internet:

- Total Suspended Solids, EPA-160.2: http://www.caslab.com/EPA-Methods/PDF/EPA-Method-160-2.pdf
- Total Nitrogen, EPA 351.2: http://www.caslab.com/EPA-Methods/PDF/EPA-Method-3512.pdf
- Phosphorus- EPA- 300.0: http://www.caslab.com/EPA-Methods/PDF/EPA-Method-300.pdf
- EPA- 365.4: http://www.caslab.com/EPA-Methods/PDF/EPA-Method-3654.pdf
- Escherichia coli bacteria: http://www.caslab.com/Coliform_Total.php5
- Atrazine, EPA-Abraxis 500001: http://www.caslab.com/Test-Method-500001/

A maximum laboratory turn-around time of 30 days is required. A turn-around time of 30 days or less is needed to implement the identified quality control measures for field activities (i.e., assessment of field quality control samples – field duplicates and blanks,

and data completeness checks). Turn-around times greater than 30 days will not allow for the timely identification of generated data that do not meet the defined data quality control measures. Untimely analysis also impedes the projects ability to target specific HUC-12 sub-watersheds.

QUALITY CONTROL

Quality Control of Field Activities

Adherence to Standard Operating Procedures (SOPs)

Where applicable, field measurements and samples will be collected in accordance with SOPs developed by the K-State Water Quality Unit. Any data collection that is not addressed by existing SOPs will follow the procedures described in the Sampling Methods Section (2.2) of this SOP. All field measurement devices will be appropriately calibrated, maintained, or verified for each sampling trip.

Quality Control Samples

Field quality control samples that will be utilized by this project include: field blanks and co-located samples (i.e., duplicate samples). A field blank will be created and submitted to the laboratory on a regular basis. A duplicate sample will be collected each sampling time at one of the monitoring locations.

Data Quality Indicators and Measurement Quality Objectives

Measurement quality objectives (MQO) are established for the following data quality indicators (DQI): Precision, Bias, Completeness, Representativeness, and Comparability.

Precision

The measurement of precision will be accomplished by the collection of duplicate samples. The premise behind the use of duplicate samples is that two samples collected simultaneously from the same location should yield similar results. Any dissimilarity in results suggests that- errors could be occurring in the field collection or laboratory analyses procedures used. The amount of variation between duplicate samples that ran be accepted is a function of the project objectives and the inherent variation around each parameter. Precision will be measured during this study in terms of percent relative standard deviation (%RSD) which is calculated using the following formula:

$$\%\text{RSD} = \frac{100}{\sqrt{2}} \bullet 2\left(\frac{|\chi_1 - \chi_2|}{\chi_1 + \chi_2}\right), \text{ where}$$

χ_1 and χ_2 = reported concentrations for each duplicate sample.

Data will be considered acceptable if the %RSD is less than or equal to 10% for each parameter. Duplicate samples will be collected in conjunction with the fixed-frequency samples and for approximately ten percent of the samples collected during the study.

Bias (Accuracy)

Measures of accuracy will be primarily accomplished through internal laboratory chemical spikes and analysis of split samples by another laboratory. Spiked samples will be produced and analyzed by the laboratories conducting the sample analyses. Spikes will be performed on a per-batch basis. Table 1 lists the acceptable recovery (accuracy) levels for these atrazine spikes. Other checks for accuracy will be accomplished through close adherence to instrument calibration procedures and laboratory quality control procedures and during the data review process.

To test the accuracy of the analysis of the KSU BAE Laboratory a percentage of the samples will be split and provided to the Agronomy Soil Testing Lab for analysis. Both labs will use the same procedures. Split samples will be done for approximately 10% of the fixed frequency samples collected by the KSU Personnel. This will amount to 2 samples each week from April through September or 50 samples. Similar to the duplicate samples the differences between the splits will be calculated as % Relative Standard Deviation using the above formula and differences equal to or less than 10% will be considered acceptable.

Table 4. Acceptable % Recovery (Accuracy) and the % of Spikes Needing to be Within the Acceptable Recovery Range (Completeness) for the Contaminant Laboratory Analysis During the Watershed Study.

Parameter	Acceptable Recovery	% Spikes Within Acceptable Range
Contaminant (Lab)	90-110%	$\geq$ 90%

Completeness

Completeness is a measure of the amount of acceptable data collected, compared to the amount of data expected (designed) to be collected. To help ensure that all of the designed water samples and study data are collected, a sampling schedule will be prepared and distributed to sample collectors and an inventory kept of the data collected. Potential errors associated with missed information will be reduced by requiring sample collectors to completely fill out appropriate field sheets and laboratory analysis request forms. The name of the sample collector and the collection/preparation of duplicate samples, split samples, and field blanks will be noted on the Quality Assurance Field Sheet. It is the responsibility of the sample collector to make sure these forms are completely and accurately filled out. Notes regarding the environmental conditions present at the time of sampling or in the recent past which could influence data interpretation are to be recorded on the Field Data/Analytical

Request Form. In addition to keeping an inventory of samples collected to help assure complete sets are collected, a completeness check will be conducted during the data quality review process, calculating the percent of the expected data that was actually collected and was of an acceptable quality.

Overall, completeness for the project will be calculated as a percent value using the formula below:

$$Completeness = \frac{Number\ of\ \ acceptable\ data}{Number\ of\ \exp ected\ data} \times 100$$

The completeness criteria for the project will be set at 90 percent. If the actual data collected falls below the completeness criteria, the confidence level of the study data and conclusions may be significantly reduced.

The following equation was used to determine the approximate number of samples (*n*) that must be collected in order to attain the desired level of uncertainty and margin of error for this project. This equation is valid if the data can be assumed to be approximately normally distributed with the variance only approximately known. Under these circumstances, the Student's ι-distribution is used with *n*-1 degrees of freedom. Since the *t*-value to be selected from the Student's *t*-table is dependent upon the number of degrees of freedom, which is unknown, an iterative process must be used in estimating *n.* First, the degrees of freedom are initially assumed to be infinity (∞) and the *t*-value corresponding to ∞ on the Student's *t*-table and the selected uncertainty level (i.e., 0.20) is entered into the equation. After the first iteration, an estimated *n* is derived. This number minus one (*n* - 1) is then used as the degrees of freedom for the second iteration. The corresponding *t*-value for *n* - 1 degrees of freedom in the Student's *t*-table is used to obtain a new *t*-value. The equation is then recalculated in this manner until the value for *n* stabilizes to produce the final estimate for the number of samples that need to be collected.

Calculation of the number of samples (*n*) needed when the desired level of uncertainty (∞) and margin of error (*B*) are specified:

$$\mathrm{n} = \left(\frac{\mathrm{t - value}\left(\sigma\right)}{\mathrm{B}} \right)^2 ; \text{ where :}$$

n = number of samples
t – value = number from Student's *t*-table corresponding to the specified ∝ level and the appropriate degrees of freedom (*n* - 1) (note: first iteration uses ∞)
σ = approximate standard deviation of sample data
B = specified margin of error around the population estimator

For this project, it was determined that it was important to report estimators for contaminants with a confidence level of 80 percent (uncertainty level of 0.20) and a

margin of error or confidence interval of ± 20% around the estimator (e.g., sample mean). Based on previous studies of the variability of contaminant data, this level of uncertainty and margin of error can be achieved with a stratified fixed-frequency and runoff sample design which includes the collection of weekly grab samples, and runoff samples during all runoff events, from April through September, and the collection of monthly grab samples from October through March. If all of the designed samples are collected, this means that there should be only a 20 percent chance that the absolute difference between the sample means and the true population mean for the contaminant will be greater than or equal to ± 20%. If so, statements about contaminant concentrations and loadings in the Watershed can be reported with a relatively high degree of confidence.

Representativeness

Representativeness will be determined in this project through the use of field blanks and by ensuring that the sample design is sound (e.g., sample sites and sample frequency are appropriately selected, parameter holding times are met, collection times art acceptable, and environmental factors are considered). Field blanks should yield values at the method detection limit (MDL) for each parameter tested (commonly listed on the Laboratory Report Form as the MDL value with a "U" remark code). Additionally, all SOPs pertaining to field collection techniques and laboratory analytical techniques should be followed.

One field blank will be prepared during each week of sampling. When values above the MDL are observed in a blank sample, contamination or non-representativeness is suggested and efforts to identify and correct the source of error should be made by consulting appropriate laboratory and field personnel. Data considered non-representative should be flagged with a remark code (e.g., "J" denotes an estimated value; "Q" denotes a sample that did not meet the recommended holding time).

A sound data collection approach is important in addressing potential errors associated with the variability of samples from a target population. Sources of error can be reduced by examining the results of other studies and identifying patterns of variability or the presence of spatial (locational fluctuations) or temporal variation (diurnal or seasonal fluctuations). Also, the reduction of representativeness errors can often be achieved through a stratified sample design which increases sample frequency in response to spatial and temporal variability. If there is no previous Information about established patterns of environmental variability for the target populations, then a sample design composed of simple random sampling or fixed frequency sampling (e.g., biweekly) is usually appropriate. Measures of the representativeness of the data can be expressed by the confidence levels or, conversely, by the levels of uncertainty, and the margins of error (e.g., confidence interval) around the parameter estimators. Calculation of the number of samples needed to achieve various levels of uncertainty and margins of error is described above under completeness.

To help assure that representative samples will be collected in conjunction. With the sample design, the sample collector should carefully review the project plan prior to sampling. Primary issues of concern include sample site locations, sample frequency, sample times, collection procedures, and handling procedures. Any factor which may affect the representativeness of a parameter at the time of collection should be noted on the field sheets. Holding times for the sample parameters must be met to the extent possible throughout the study.

Comparability

The comparability of the data can be affected by several factors including changes in sample locations, parameters, collection or analytical techniques, and MDLs. Quality control procedures are incorporated throughout this study plan to help assure that comparable data are obtained. These quality control procedures include: written descriptions of all sample locations; assigning sampling responsibilities to the same personnel, establishing a set parameter list, describing data collection, analysis, and assessment procedures, and, when available, referencing written SOPs for additional information, and establishing MDLs for each parameter after consulting with laboratory personnel. Adherence to these procedures will be closely evaluated during the data quality review process. Corrections will be made when required. Samples will be collected from the same location at each site throughout the course of the study. If sampling of some runoff events is missed, the weekly fixed frequency samples and runoff event samples collected should provide an adequate estimation of the concentrations and loadings at each sample site.

Quality Control of Laboratory Analysis

Laboratory Turn-Around Time

A maximum laboratory turn-around time of 30 days is required. A turn-around time of 30 days or less is needed to implement the identified quality control measures for field activities (i.e., assessment of field quality control samples – field duplicates and blanks, and data completeness checks). Turn-around times greater than 30 days will not allow for the timely identification of generated data that do not meet the defined data quality control measures.

Adherence to Analytical Methods and Standard Operating Procedures

All samples will be analyzed in accordance with the analytical methods identified in the SOP. Laboratory equipment will be maintained and calibrated in accordance with the K-State Laboratory's SOPs for equipment calibration and maintenance. Lab use equipment at Fort Hays State University will also adhere to K-State Laboratory's SOPs as listed above.

Quality Control Samples and Data Quality Indicators

Laboratory quality control samples and data quality indicators will be utilized in accordance with the K-State's Laboratory Quality Assurance. Routine internal quality control checks are placed in the measurement system to assess the quality of the data

generated. These checks typically include: with each preparative batch, a Method Blank, a Matrix Spike and Matrix Spike Duplicate, a Laboratory Duplicate, and a Laboratory Control Sample. Inclusion of the Matrix Spike, Matrix Spike Duplicate and Laboratory Duplicate are contingent on sufficient sample material being provided. In addition to the checks within the preparative batch there are analysis batch checks that are also completed (retained on file by the laboratory, but typically not reported in a standard data package) including Calibration Blanks and Continuing Calibration Verifications. Additional samples are analyzed periodically (results retained on file) and may include reagent blanks, second source check standards and other performance checks. External quality control checks are provided in the form of Performance and System Audits and Surveillance.

Sample results that are not within the range of typical expectation values for each parameter will be identified at the time of either field or laboratory analysis measurement. These identified measurements will be verified by a review of the instrumental data and supporting quality control samples and may require additional measurements. Analytical results that are verified to be outside the expectation range will also be checked by confirming that aliquots samples used for laboratory analysis are properly labeled.

Project Synopsis Sheet

The Synopsis Sheet provides the project number, a listing of the monitoring stations associated with the project, targeted frequency of sample collection, field measurements to be taken, parameters to be analyzed, and the minimum analytical and reporting limits required. The Project Synopsis Sheet will be used by the Water Quality Unit and K-State Laboratory to identify data expectations.

FIELD INSTRUMENT/EQUIPMENT CALIBRATION AND MAINTENANCE

Water quality measurements will be collected in the field with sites listed. Calibration and maintenance will be conducted in accordance with SOP for this equipment.

INSPECTION/ACCEPTANCE OF FIELD SUPPLIES AND CONSUMABLES

All consumable bottles will be purchased new and be certified pre-cleaned, sterilized, and sealed.

An E-pure water filtration system is accessible at K-State. The system is routinely professionally maintained.

DATA MANAGEMENT, ASSESSMENT, AND REPORTING

DATA MANAGEMENT

Data collected or analyzed by K-State will be compiled in Microsoft EXCEL spreadsheets by the respective analyst. Project data to be compiled includes: field sheets, data logger files, and laboratory analytical results files. The spreadsheets will be compiled on an ongoing basis. Data verification and validation will be completed on the compiled spreadsheets. Once the compiled data has been verified and validated, it will be entered into the K-State database and be accessible quarterly online at

www.MyKansasWatershed.com. A copy will also be emailed to the WRAPS. WRAPS will upload data from the database to EPA's national STORET database on a quarterly basis and also provide KDHE with the same information.

DATA ASSESSMENT AND REPORTING

K-State Data Assessment and Usage

The primary use of the collected data by the WRAPS will be for targeting of pollutant loading across the Little Arkansas River Watershed. The collected data will also serve as a database for developing required project-specific reports. Data assessment to support the preparation of annual and project-specific reports will include: 1) description of existing water quality conditions, 2) water quality standards attainment assessment (i.e., beneficial use support), 3) water quality trend assessment, 4) identification of water quality concerns, 5) assessment of the Little Arkansas River on water quality, and 6) assessment of implemented measures to enhance water quality. Statistical methods that will be utilized as part of the data assessment include: calculating descriptive and comparative statistics, hypothesis testing, and trend analysis. K-State will utilize the WRAPS's methods for assessing beneficial use support. KDHE will consider using the data to further its state monitoring network database.

WRAPS Data Assessment and Usage

Data generated from this project will be used by the WRAPS to meet its 319 reporting requirements.

DATA QUALITY REVIEW

Data quality review is the process for assuring that data verification and validation will be implemented in an objective and consistent manner. Data verification and validation is the conformation by examination and objective evidence that specific requirements of the SOP and intended use of the data have been fulfilled. Data verification is the process of evaluating the completeness, correctness, and conformance of a specific data set against the method, procedural, or contractual requirements. Data validation is an analytic and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., verification) to determine the analytical quality of a specific data set.

RECONCILIATION WITH QAPP/SOP REQUIREMENTS

Data quality review will be based on meeting the project's data quality objectives. If data verification and validation indicate that any data quality objectives can't be achieved, that information will be provided to the K-State and WRAPS Project Coordinators.

15.3 BMP Definitions

Atrazine BMPs

Split Applications of Herbicide

- Apply atrazine and tankmixes as split applications. For example, apply one-half to two-thirds of the atrazine before April 15 and one-third to one-half before or immediately following planting. Using split applications reduces the amount of atrazine available for runoff at any one time. In addition, the early application is made at a less vulnerable time for atrazine runoff. This BMP has the potential to reduce atrazine runoff by 25 percent compared to applying all the atrazine at planting time.

Incorporate Herbicide

- Apply preplant atrazine alone or as part of a tankmix and incorporate it into the top 2 inches of soil with a field cultivator, tandem disc, or other appropriate tillage implement. Avoid deep incorporation, which will reduce weed control. Incorporation will reduce the amount of atrazine in the mixing zone of the soil, where it is most vulnerable to runoff. Incorporation will reduce atrazine runoff by 60 to 75 percent compared to a surface application without incorporation. Incorporation will improve weed control if rainfall does not occur within 7 days of herbicide application.

Use Post-emergence Herbicide

- Postemergence herbicide applications that contain low rates of atrazine in mixtures with other herbicides are widely used by Kansas farmers. Postemergence applications typically contain atrazine at rates of ½ pound applied ingredient per acre, approximately 60 to 70 percent lower than typical soil-applied atrazine application rates. In addition, the growing crop foliage helps reduce atrazine runoff potential by intercepting some of the atrazine and reducing the storm impact at the soil surface. Postemergence applications result in 50 to 67 percent less atrazine runoff compared to typical preemergence soil-applied atrazine applications. The herbicide mixture used for postemergence applications can be based on specific weed species and populations present.

Reduce Application Rate

- There is a direct relationship between atrazine application rate and runoff amount. The lower the rate of atrazine applied, the less the potential runoff. Using lower atrazine rates and/or formulations with lower atrazine rates can still provide excellent control of pigweed and other small-seeded broadleaf weeds. Reducing atrazine rates by one-third potentially reduces atrazine runoff by 33 percent.

Cropland BMPs

No-Till

- A management system in which chemicals may be used for weed control and seedbed preparation.

- The soil surface is never disturbed except for planting or drilling operations in a 100% no-till system.
- 75% erosion reduction efficiency, 40% phosphorous reduction efficiency.

Conservation Tillage
- Involves the planting, growing and harvesting of crops with minimal disturbance to the soil surface through the use of minimum tillage, ridge tillage, or no-till.

Vegetative Buffer
- Area of field maintained in permanent vegetation to help reduce nutrient and sediment loss from agricultural fields, improve runoff water quality, and provide habitat for wildlife.
- On average for Kansas fields, 1 acre buffer treats 15 acres of cropland.
- 50% erosion reduction efficiency, 50% phosphorous reduction efficiency

Terraces
- Earth embankment and/or channel constructed across the slope to intercept runoff water and trap soil.
- One of the oldest/most common BMPs
- 30% Erosion Reduction Efficiency, 30% phosphorous reduction efficiency

Grassed Waterway
- Grassed strip used as an outlet to prevent silt and gully formation.
- Can also be used as outlets for water from terraces.
- On average for Kansas fields, 1 acre waterway will treat 10 acres of cropland.
- 40% erosion reduction efficiency, 40% phosphorous reduction efficiency.

Conservation Crop Rotation
- Growing various crops on the same piece of land in a planned rotation.
- High residue crops (corn) with low residue crops (wheat, soybeans).
- Low residue crops in succession may encourage erosion.
- 25% Erosion Reduction Efficiency, 25% phosphorous reduction efficiency

Nutrient Management Plan
- Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.
- Intensive soil testing
- 25% erosion and 25% P reduction efficiency.

Incorporate Manure with Tillage
Incorporating manure with tillage reduces surface residue cover.

Water Retention Structure
-May include sediment basin that is a water impoundment made by constructing an earthen dam.
-May include grade stabilization structures that control runoff and prevent gully erosion.

-Traps sediment and nutrients from leaving edge of field.
-Provides source of water.
-50% soil erosion, nitrogen, and phosphorous reduction efficiency.

Livestock BMPs

Vegetative Filter Strip
- A vegetated area that receives runoff during rainfall from an animal feeding operation.
- Often require a land area equal to or greater than the drainage area (needs to be as large as the feedlot).
- 10 year lifespan, requires periodic mowing or haying, average P reduction: 50%.

Relocate Small Feedlots
- Feedlot- Move feedlot or pens away from a stream, waterway, or body of water to increase filtration and waste removal of manure.

Relocate Pasture Feeding Site
- Pasture- Move feeding site that is in a pasture away from a stream, waterway, or body of water to increase the filtration and waste removal (eg. move bale feeders away from stream).
- Average P reduction: 30-80%

Alternative (Off-Stream) Watering Sites
- Watering system so that livestock do not enter stream or body of water.
- Studies show cattle will drink from tank over a stream or pond 80% of the time.
- 10-25 year lifespan, average P reduction: 30-98% with greater efficiencies for limited stream access.

Pond
- Water impoundment made by constructing an earthen dam.
- Traps sediment and nutrients from leaving edge of pasture.
- Provides source of water.
- 50% P Reduction.

Rotational Grazing
-Rotating livestock within a pasture to spread manure more uniformly and allow grass to regenerate.
-May involve significant cross fencing and additional watering sites.
-50-75% P Reduction.

Stream Fencing
- Fencing out streams and ponds to prevent livestock from entering.
- 95% P Reduction.
- 25 year life expectancy.

15.4 Appendix Tables

15.4.1 KDHE Tables Used to Determine Targeted Areas

Sediment Table derived by KDHE, July 2011.

• The table uses K-State monitoring data, KDHE monitoring data, K-State Tillage Survey results with Land use for predictions.

• Table is prior to any adjustments made to flow on Turkey Creek and Little Ark above HWY 61.

	Q	TSS Conc	Load	Mass Load	% of Valley Center Load
Dry Turkey	17	38	3488.4	3488.4	0.45
Black Kettle	17.3	42.3	3951.67	3951.67	0.51
Running Turkey	17.4	48	4510.08	4510.08	0.58
Upper Kissiwa Cr	16.71	52	4692.17	4692.17	0.61
Upper West Emma Cr	24.8	50.9	6816.53	6816.53	0.88
Upper Sand Cr	27.1	48.6	7112.12	7112.12	0.92
Lower Kissiwa Cr	25.8	90	12538.8	7846.63	1.01
Lower West Emma Cr	41.6	72.4	16263.94	9447.41	1.22
Lower Blazefork Cr	34.4	116	21548.16	10129.32	1.31
Upper Blazefork Cr	19.4	109	11418.84	11418.84	1.47
Lower Sand Cr	54.3	78.3	22959.13	15847	2.05

Total Phosphorus Table derived by KDHE, July 2011

• The table uses K-State monitoring data, KDHE monitoring data, K-State Tillage Survey results with Land use for predictions.

• Table is prior to any adjustments made to flow on Turkey Creek and Little Ark above HWY 61. This table includes point source discharge in Turkey and Sand Creek.

	TP	TPLoad	Mass load	% of Valley Center Load
Dry Turkey	0.21	19.28	19.28	1.26
Upper Kissiwa Cr	0.28	25.27	25.27	1.65
Running Turkey	0.27	25.37	25.37	1.66
Black Kettle	0.34	31.76	31.76	2.08
Upper West Emma Cr	0.31	41.52	41.52	2.72
Upper Sand Cr	0.29	42.44	42.44	2.78
Upper Blazefork Cr	0.42	44	44	2.88
Lower Kissiwa Cr	0.52	72.45	47.18	3.09
Lower West Emma Cr	0.46	103.33	61.82	4.05
Lower Blazefork Cr	0.59	109.6	65.6	4.29
Lower Sand Cr	0.58	170.07	127.63	8.35

15.4.2 Atrazine BMP Tables

Sub Watershed #204 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	333	56	22	22	56	56	333	877
2	333	56	22	22	56	56	333	877
3	333	56	22	22	56	56	333	877
4	333	56	22	22	56	56	333	877
5	333	56	22	22	56	56	333	877
6	333	56	22	22	56	56	333	877
7	333	56	22	22	56	56	333	877
8	333	56	22	22	56	56	333	877
9	333	56	22	22	56	56	333	877
10	333	56	22	22	56	56	333	877
11	333	56	22	22	56	56	333	877
12	333	56	22	22	56	56	333	877
13	333	56	22	22	56	56	333	877
14	333	56	22	22	56	56	333	877
15	333	56	22	22	56	56	333	877
16	333	56	22	22	56	56	333	877
17	333	56	22	22	56	56	333	877
18	333	56	22	22	56	56	333	877
19	333	56	22	22	56	56	333	877
20	333	56	22	22	56	56	333	877

Sub Watershed #205 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	268	45	18	18	45	45	268	705
2	268	45	18	18	45	45	268	705
3	268	45	18	18	45	45	268	705
4	268	45	18	18	45	45	268	705
5	268	45	18	18	45	45	268	705
6	268	45	18	18	45	45	268	705
7	268	45	18	18	45	45	268	705
8	268	45	18	18	45	45	268	705
9	268	45	18	18	45	45	268	705

10	268	45	18	18	45	45	268	705
11	268	45	18	18	45	45	268	705
12	268	45	18	18	45	45	268	705
13	268	45	18	18	45	45	268	705
14	268	45	18	18	45	45	268	705
15	268	45	18	18	45	45	268	705
16	268	45	18	18	45	45	268	705
17	268	45	18	18	45	45	268	705
18	268	45	18	18	45	45	268	705
19	268	45	18	18	45	45	268	705
20	268	45	18	18	45	45	268	705

Sub Watershed #206 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	297	49	20	20	49	49	297	781
2	297	49	20	20	49	49	297	781
3	297	49	20	20	49	49	297	781
4	297	49	20	20	49	49	297	781
5	297	49	20	20	49	49	297	781
6	297	49	20	20	49	49	297	781
7	297	49	20	20	49	49	297	781
8	297	49	20	20	49	49	297	781
9	297	49	20	20	49	49	297	781
10	297	49	20	20	49	49	297	781
11	297	49	20	20	49	49	297	781
12	297	49	20	20	49	49	297	781
13	297	49	20	20	49	49	297	781
14	297	49	20	20	49	49	297	781
15	297	49	20	20	49	49	297	781
16	297	49	20	20	49	49	297	781
17	297	49	20	20	49	49	297	781
18	297	49	20	20	49	49	297	781
19	297	49	20	20	49	49	297	781
20	297	49	20	20	49	49	297	781

Sub Watershed #207 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicid	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption

	e							
1	327	55	22	22	55	55	327	861
2	327	55	22	22	55	55	327	861
3	327	55	22	22	55	55	327	861
4	327	55	22	22	55	55	327	861
5	327	55	22	22	55	55	327	861
6	327	55	22	22	55	55	327	861
7	327	55	22	22	55	55	327	861
8	327	55	22	22	55	55	327	861
9	327	55	22	22	55	55	327	861
10	327	55	22	22	55	55	327	861
11	327	55	22	22	55	55	327	861
12	327	55	22	22	55	55	327	861
13	327	55	22	22	55	55	327	861
14	327	55	22	22	55	55	327	861
15	327	55	22	22	55	55	327	861
16	327	55	22	22	55	55	327	861
17	327	55	22	22	55	55	327	861
18	327	55	22	22	55	55	327	861
19	327	55	22	22	55	55	327	861
20	327	55	22	22	55	55	327	861

Sub Watershed #208 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	344	57	23	23	57	57	344	906
2	344	57	23	23	57	57	344	906
3	344	57	23	23	57	57	344	906
4	344	57	23	23	57	57	344	906
5	344	57	23	23	57	57	344	906
6	344	57	23	23	57	57	344	906
7	344	57	23	23	57	57	344	906
8	344	57	23	23	57	57	344	906
9	344	57	23	23	57	57	344	906
10	344	57	23	23	57	57	344	906
11	344	57	23	23	57	57	344	906
12	344	57	23	23	57	57	344	906
13	344	57	23	23	57	57	344	906
14	344	57	23	23	57	57	344	906

15	344	57	23	23	57	57	344	906
16	344	57	23	23	57	57	344	906
17	344	57	23	23	57	57	344	906
18	344	57	23	23	57	57	344	906
19	344	57	23	23	57	57	344	906
20	344	57	23	23	57	57	344	906

Sub Watershed #401 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	390	65	26	26	65	65	390	1,026
2	390	65	26	26	65	65	390	1,026
3	390	65	26	26	65	65	390	1,026
4	390	65	26	26	65	65	390	1,026
5	390	65	26	26	65	65	390	1,026
6	390	65	26	26	65	65	390	1,026
7	390	65	26	26	65	65	390	1,026
8	390	65	26	26	65	65	390	1,026
9	390	65	26	26	65	65	390	1,026
10	390	65	26	26	65	65	390	1,026
11	390	65	26	26	65	65	390	1,026
12	390	65	26	26	65	65	390	1,026
13	390	65	26	26	65	65	390	1,026
14	390	65	26	26	65	65	390	1,026
15	390	65	26	26	65	65	390	1,026
16	390	65	26	26	65	65	390	1,026
17	390	65	26	26	65	65	390	1,026
18	390	65	26	26	65	65	390	1,026
19	390	65	26	26	65	65	390	1,026
20	390	65	26	26	65	65	390	1,026

Sub Watershed #402 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	310	52	21	21	52	52	310	815
2	310	52	21	21	52	52	310	815
3	310	52	21	21	52	52	310	815
4	310	52	21	21	52	52	310	815

5	310	52	21	21	52	52	310	815
6	310	52	21	21	52	52	310	815
7	310	52	21	21	52	52	310	815
8	310	52	21	21	52	52	310	815
9	310	52	21	21	52	52	310	815
10	310	52	21	21	52	52	310	815
11	310	52	21	21	52	52	310	815
12	310	52	21	21	52	52	310	815
13	310	52	21	21	52	52	310	815
14	310	52	21	21	52	52	310	815
15	310	52	21	21	52	52	310	815
16	310	52	21	21	52	52	310	815
17	310	52	21	21	52	52	310	815
18	310	52	21	21	52	52	310	815
19	310	52	21	21	52	52	310	815
20	310	52	21	21	52	52	310	815

Sub Watershed #403 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	493	82	33	33	82	82	493	1,297
2	493	82	33	33	82	82	493	1,297
3	493	82	33	33	82	82	493	1,297
4	493	82	33	33	82	82	493	1,297
5	493	82	33	33	82	82	493	1,297
6	493	82	33	33	82	82	493	1,297
7	493	82	33	33	82	82	493	1,297
8	493	82	33	33	82	82	493	1,297
9	493	82	33	33	82	82	493	1,297
10	493	82	33	33	82	82	493	1,297
11	493	82	33	33	82	82	493	1,297
12	493	82	33	33	82	82	493	1,297
13	493	82	33	33	82	82	493	1,297
14	493	82	33	33	82	82	493	1,297
15	493	82	33	33	82	82	493	1,297
16	493	82	33	33	82	82	493	1,297
17	493	82	33	33	82	82	493	1,297
18	493	82	33	33	82	82	493	1,297
19	493	82	33	33	82	82	493	1,297
20	493	82	33	33	82	82	493	1,297

Sub Watershed #405 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	327	55	22	22	55	55	327	862
2	327	55	22	22	55	55	327	862
3	327	55	22	22	55	55	327	862
4	327	55	22	22	55	55	327	862
5	327	55	22	22	55	55	327	862
6	327	55	22	22	55	55	327	862
7	327	55	22	22	55	55	327	862
8	327	55	22	22	55	55	327	862
9	327	55	22	22	55	55	327	862
10	327	55	22	22	55	55	327	862
11	327	55	22	22	55	55	327	862
12	327	55	22	22	55	55	327	862
13	327	55	22	22	55	55	327	862
14	327	55	22	22	55	55	327	862
15	327	55	22	22	55	55	327	862
16	327	55	22	22	55	55	327	862
17	327	55	22	22	55	55	327	862
18	327	55	22	22	55	55	327	862
19	327	55	22	22	55	55	327	862
20	327	55	22	22	55	55	327	862

Sub Watershed #406 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	302	50	20	20	50	50	302	795
2	302	50	20	20	50	50	302	795
3	302	50	20	20	50	50	302	795
4	302	50	20	20	50	50	302	795
5	302	50	20	20	50	50	302	795
6	302	50	20	20	50	50	302	795
7	302	50	20	20	50	50	302	795
8	302	50	20	20	50	50	302	795
9	302	50	20	20	50	50	302	795
10	302	50	20	20	50	50	302	795
11	302	50	20	20	50	50	302	795

12	302	50	20	20	50	50	302	795
13	302	50	20	20	50	50	302	795
14	302	50	20	20	50	50	302	795
15	302	50	20	20	50	50	302	795
16	302	50	20	20	50	50	302	795
17	302	50	20	20	50	50	302	795
18	302	50	20	20	50	50	302	795
19	302	50	20	20	50	50	302	795
20	302	50	20	20	50	50	302	795

Sub Watershed #404 Annual Atrazine BMP Adoption Rate

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Adoption
1	319	53	21	21	53	53	319	840
2	319	53	21	21	53	53	319	840
3	319	53	21	21	53	53	319	840
4	319	53	21	21	53	53	319	840
5	319	53	21	21	53	53	319	840
6	319	53	21	21	53	53	319	840
7	319	53	21	21	53	53	319	840
8	319	53	21	21	53	53	319	840
9	319	53	21	21	53	53	319	840
10	319	53	21	21	53	53	319	840
11	319	53	21	21	53	53	319	840
12	319	53	21	21	53	53	319	840
13	319	53	21	21	53	53	319	840
14	319	53	21	21	53	53	319	840
15	319	53	21	21	53	53	319	840
16	319	53	21	21	53	53	319	840
17	319	53	21	21	53	53	319	840
18	319	53	21	21	53	53	319	840
19	319	53	21	21	53	53	319	840
20	319	53	21	21	53	53	319	840

Sub Watershed #204 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	24.98	1.67	0.42	1.17	2.08	1.25	7.50	39.06
2	24.98	3.33	0.42	1.17	2.08	2.50	7.50	41.97
3	24.98	5.00	0.42	1.17	2.08	3.75	7.50	44.89
4	24.98	6.66	0.42	1.17	2.08	5.00	7.50	47.80
5	24.98	8.33	0.42	1.17	2.08	6.25	7.50	50.72
6	24.98	9.99	0.42	1.17	2.08	7.50	7.50	53.63
7	24.98	11.66	0.42	1.17	2.08	8.74	7.50	56.55
8	24.98	13.32	0.42	1.17	2.08	9.99	7.50	59.46
9	24.98	14.99	0.42	1.17	2.08	11.24	7.50	62.38
10	24.98	16.66	0.42	1.17	2.08	12.49	7.50	65.29
11	24.98	18.32	0.42	1.17	2.08	13.74	7.50	68.21
12	24.98	19.99	0.42	1.17	2.08	14.99	7.50	71.12
13	24.98	21.65	0.42	1.17	2.08	16.24	7.50	74.04
14	24.98	23.32	0.42	1.17	2.08	17.49	7.50	76.95
15	24.98	24.98	0.42	1.17	2.08	18.74	7.50	79.87
16	24.98	26.65	0.42	1.17	2.08	19.99	7.50	82.78
17	24.98	28.32	0.42	1.17	2.08	21.24	7.50	85.70
18	24.98	29.98	0.42	1.17	2.08	22.49	7.50	88.61
19	24.98	31.65	0.42	1.17	2.08	23.73	7.50	91.52
20	24.98	33.31	0.42	1.17	2.08	24.98	7.50	94.44

Sub Watershed #205 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	20.09	1.34	0.33	0.94	1.67	1.00	6.03	31.40
2	20.09	2.68	0.33	0.94	1.67	2.01	6.03	33.75
3	20.09	4.02	0.33	0.94	1.67	3.01	6.03	36.09
4	20.09	5.36	0.33	0.94	1.67	4.02	6.03	38.43
5	20.09	6.70	0.33	0.94	1.67	5.02	6.03	40.78
6	20.09	8.04	0.33	0.94	1.67	6.03	6.03	43.12
7	20.09	9.37	0.33	0.94	1.67	7.03	6.03	45.46
8	20.09	10.71	0.33	0.94	1.67	8.04	6.03	47.81
9	20.09	12.05	0.33	0.94	1.67	9.04	6.03	50.15
10	20.09	13.39	0.33	0.94	1.67	10.04	6.03	52.50
11	20.09	14.73	0.33	0.94	1.67	11.05	6.03	54.84

12	20.09	16.07	0.33	0.94	1.67	12.05	6.03	57.18
13	20.09	17.41	0.33	0.94	1.67	13.06	6.03	59.53
14	20.09	18.75	0.33	0.94	1.67	14.06	6.03	61.87
15	20.09	20.09	0.33	0.94	1.67	15.07	6.03	64.21
16	20.09	21.43	0.33	0.94	1.67	16.07	6.03	66.56
17	20.09	22.77	0.33	0.94	1.67	17.07	6.03	68.90
18	20.09	24.11	0.33	0.94	1.67	18.08	6.03	71.24
19	20.09	25.44	0.33	0.94	1.67	19.08	6.03	73.59
20	20.09	26.78	0.33	0.94	1.67	20.09	6.03	75.93

Sub Watershed #206 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	22.24	1.48	0.37	1.04	1.85	1.11	6.67	34.77
2	22.24	2.97	0.37	1.04	1.85	2.22	6.67	37.37
3	22.24	4.45	0.37	1.04	1.85	3.34	6.67	39.96
4	22.24	5.93	0.37	1.04	1.85	4.45	6.67	42.56
5	22.24	7.41	0.37	1.04	1.85	5.56	6.67	45.15
6	22.24	8.90	0.37	1.04	1.85	6.67	6.67	47.75
7	22.24	10.38	0.37	1.04	1.85	7.79	6.67	50.34
8	22.24	11.86	0.37	1.04	1.85	8.90	6.67	52.94
9	22.24	13.35	0.37	1.04	1.85	10.01	6.67	55.53
10	22.24	14.83	0.37	1.04	1.85	11.12	6.67	58.13
11	22.24	16.31	0.37	1.04	1.85	12.23	6.67	60.72
12	22.24	17.79	0.37	1.04	1.85	13.35	6.67	63.32
13	22.24	19.28	0.37	1.04	1.85	14.46	6.67	65.91
14	22.24	20.76	0.37	1.04	1.85	15.57	6.67	68.51
15	22.24	22.24	0.37	1.04	1.85	16.68	6.67	71.10
16	22.24	23.73	0.37	1.04	1.85	17.79	6.67	73.70
17	22.24	25.21	0.37	1.04	1.85	18.91	6.67	76.29
18	22.24	26.69	0.37	1.04	1.85	20.02	6.67	78.89
19	22.24	28.17	0.37	1.04	1.85	21.13	6.67	81.48
20	22.24	29.66	0.37	1.04	1.85	22.24	6.67	84.08

Sub Watershed #207 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	24.53	1.64	0.41	1.14	2.04	1.23	7.36	38.34

2	24.53	3.27	0.41	1.14	2.04	2.45	7.36	41.20
3	24.53	4.91	0.41	1.14	2.04	3.68	7.36	44.07
4	24.53	6.54	0.41	1.14	2.04	4.91	7.36	46.93
5	24.53	8.18	0.41	1.14	2.04	6.13	7.36	49.79
6	24.53	9.81	0.41	1.14	2.04	7.36	7.36	52.65
7	24.53	11.45	0.41	1.14	2.04	8.58	7.36	55.51
8	24.53	13.08	0.41	1.14	2.04	9.81	7.36	58.37
9	24.53	14.72	0.41	1.14	2.04	11.04	7.36	61.23
10	24.53	16.35	0.41	1.14	2.04	12.26	7.36	64.10
11	24.53	17.99	0.41	1.14	2.04	13.49	7.36	66.96
12	24.53	19.62	0.41	1.14	2.04	14.72	7.36	69.82
13	24.53	21.26	0.41	1.14	2.04	15.94	7.36	72.68
14	24.53	22.89	0.41	1.14	2.04	17.17	7.36	75.54
15	24.53	24.53	0.41	1.14	2.04	18.40	7.36	78.40
16	24.53	26.16	0.41	1.14	2.04	19.62	7.36	81.27
17	24.53	27.80	0.41	1.14	2.04	20.85	7.36	84.13
18	24.53	29.43	0.41	1.14	2.04	22.07	7.36	86.99
19	24.53	31.07	0.41	1.14	2.04	23.30	7.36	89.85
20	24.53	32.70	0.41	1.14	2.04	24.53	7.36	92.71

Sub Watershed #208 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	25.80	1.72	0.43	1.20	2.15	1.29	7.74	40.33
2	25.80	3.44	0.43	1.20	2.15	2.58	7.74	43.34
3	25.80	5.16	0.43	1.20	2.15	3.87	7.74	46.35
4	25.80	6.88	0.43	1.20	2.15	5.16	7.74	49.36
5	25.80	8.60	0.43	1.20	2.15	6.45	7.74	52.37
6	25.80	10.32	0.43	1.20	2.15	7.74	7.74	55.38
7	25.80	12.04	0.43	1.20	2.15	9.03	7.74	58.39
8	25.80	13.76	0.43	1.20	2.15	10.32	7.74	61.40
9	25.80	15.48	0.43	1.20	2.15	11.61	7.74	64.41
10	25.80	17.20	0.43	1.20	2.15	12.90	7.74	67.42
11	25.80	18.92	0.43	1.20	2.15	14.19	7.74	70.43
12	25.80	20.64	0.43	1.20	2.15	15.48	7.74	73.44
13	25.80	22.36	0.43	1.20	2.15	16.77	7.74	76.45
14	25.80	24.08	0.43	1.20	2.15	18.06	7.74	79.46
15	25.80	25.80	0.43	1.20	2.15	19.35	7.74	82.47
16	25.80	27.52	0.43	1.20	2.15	20.64	7.74	85.48
17	25.80	29.24	0.43	1.20	2.15	21.93	7.74	88.49
18	25.80	30.96	0.43	1.20	2.15	23.22	7.74	91.50

19	25.80	32.68	0.43	1.20	2.15	24.51	7.74	94.51
20	25.80	34.40	0.43	1.20	2.15	25.80	7.74	97.52

Sub Watershed #401 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	29.21	1.95	0.49	1.36	2.43	1.46	8.76	45.67
2	29.21	3.90	0.49	1.36	2.43	2.92	8.76	49.08
3	29.21	5.84	0.49	1.36	2.43	4.38	8.76	52.49
4	29.21	7.79	0.49	1.36	2.43	5.84	8.76	55.90
5	29.21	9.74	0.49	1.36	2.43	7.30	8.76	59.30
6	29.21	11.69	0.49	1.36	2.43	8.76	8.76	62.71
7	29.21	13.63	0.49	1.36	2.43	10.22	8.76	66.12
8	29.21	15.58	0.49	1.36	2.43	11.69	8.76	69.53
9	29.21	17.53	0.49	1.36	2.43	13.15	8.76	72.94
10	29.21	19.48	0.49	1.36	2.43	14.61	8.76	76.35
11	29.21	21.42	0.49	1.36	2.43	16.07	8.76	79.75
12	29.21	23.37	0.49	1.36	2.43	17.53	8.76	83.16
13	29.21	25.32	0.49	1.36	2.43	18.99	8.76	86.57
14	29.21	27.27	0.49	1.36	2.43	20.45	8.76	89.98
15	29.21	29.21	0.49	1.36	2.43	21.91	8.76	93.39
16	29.21	31.16	0.49	1.36	2.43	23.37	8.76	96.80
17	29.21	33.11	0.49	1.36	2.43	24.83	8.76	100.20
18	29.21	35.06	0.49	1.36	2.43	26.29	8.76	103.61
19	29.21	37.00	0.49	1.36	2.43	27.75	8.76	107.02
20	29.21	38.95	0.49	1.36	2.43	29.21	8.76	110.43

Sub Watershed #402 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	23.22	1.55	0.39	1.08	1.94	1.16	6.97	36.30
2	23.22	3.10	0.39	1.08	1.94	2.32	6.97	39.01
3	23.22	4.64	0.39	1.08	1.94	3.48	6.97	41.72
4	23.22	6.19	0.39	1.08	1.94	4.64	6.97	44.43
5	23.22	7.74	0.39	1.08	1.94	5.81	6.97	47.14
6	23.22	9.29	0.39	1.08	1.94	6.97	6.97	49.85
7	23.22	10.84	0.39	1.08	1.94	8.13	6.97	52.56
8	23.22	12.39	0.39	1.08	1.94	9.29	6.97	55.27

9	23.22	13.93	0.39	1.08	1.94	10.45	6.97	57.98
10	23.22	15.48	0.39	1.08	1.94	11.61	6.97	60.69
11	23.22	17.03	0.39	1.08	1.94	12.77	6.97	63.40
12	23.22	18.58	0.39	1.08	1.94	13.93	6.97	66.11
13	23.22	20.13	0.39	1.08	1.94	15.09	6.97	68.82
14	23.22	21.67	0.39	1.08	1.94	16.26	6.97	71.53
15	23.22	23.22	0.39	1.08	1.94	17.42	6.97	74.24
16	23.22	24.77	0.39	1.08	1.94	18.58	6.97	76.94
17	23.22	26.32	0.39	1.08	1.94	19.74	6.97	79.65
18	23.22	27.87	0.39	1.08	1.94	20.90	6.97	82.36
19	23.22	29.42	0.39	1.08	1.94	22.06	6.97	85.07
20	23.22	30.96	0.39	1.08	1.94	23.22	6.97	87.78

Sub Watershed #403 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	36.95	2.46	0.62	1.72	3.08	1.85	11.08	57.76
2	36.95	4.93	0.62	1.72	3.08	3.69	11.08	62.07
3	36.95	7.39	0.62	1.72	3.08	5.54	11.08	66.38
4	36.95	9.85	0.62	1.72	3.08	7.39	11.08	70.69
5	36.95	12.32	0.62	1.72	3.08	9.24	11.08	75.00
6	36.95	14.78	0.62	1.72	3.08	11.08	11.08	79.31
7	36.95	17.24	0.62	1.72	3.08	12.93	11.08	83.62
8	36.95	19.70	0.62	1.72	3.08	14.78	11.08	87.93
9	36.95	22.17	0.62	1.72	3.08	16.63	11.08	92.24
10	36.95	24.63	0.62	1.72	3.08	18.47	11.08	96.55
11	36.95	27.09	0.62	1.72	3.08	20.32	11.08	100.86
12	36.95	29.56	0.62	1.72	3.08	22.17	11.08	105.17
13	36.95	32.02	0.62	1.72	3.08	24.01	11.08	109.48
14	36.95	34.48	0.62	1.72	3.08	25.86	11.08	113.79
15	36.95	36.95	0.62	1.72	3.08	27.71	11.08	118.10
16	36.95	39.41	0.62	1.72	3.08	29.56	11.08	122.41
17	36.95	41.87	0.62	1.72	3.08	31.40	11.08	126.72
18	36.95	44.33	0.62	1.72	3.08	33.25	11.08	131.03
19	36.95	46.80	0.62	1.72	3.08	35.10	11.08	135.34
20	36.95	49.26	0.62	1.72	3.08	36.95	11.08	139.65

Sub Watershed #405 Annual Atrazine BMP Load Reduction

Year	Use Alternative	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterwa	Reduce Application	Total Load Reducti

	Herbicide					ys		on
1	24.55	1.64	0.41	1.15	2.05	1.23	7.37	38.39
2	24.55	3.27	0.41	1.15	2.05	2.46	7.37	41.25
3	24.55	4.91	0.41	1.15	2.05	3.68	7.37	44.12
4	24.55	6.55	0.41	1.15	2.05	4.91	7.37	46.98
5	24.55	8.18	0.41	1.15	2.05	6.14	7.37	49.85
6	24.55	9.82	0.41	1.15	2.05	7.37	7.37	52.71
7	24.55	11.46	0.41	1.15	2.05	8.59	7.37	55.57
8	24.55	13.10	0.41	1.15	2.05	9.82	7.37	58.44
9	24.55	14.73	0.41	1.15	2.05	11.05	7.37	61.30
10	24.55	16.37	0.41	1.15	2.05	12.28	7.37	64.17
11	24.55	18.01	0.41	1.15	2.05	13.50	7.37	67.03
12	24.55	19.64	0.41	1.15	2.05	14.73	7.37	69.90
13	24.55	21.28	0.41	1.15	2.05	15.96	7.37	72.76
14	24.55	22.92	0.41	1.15	2.05	17.19	7.37	75.63
15	24.55	24.55	0.41	1.15	2.05	18.42	7.37	78.49
16	24.55	26.19	0.41	1.15	2.05	19.64	7.37	81.36
17	24.55	27.83	0.41	1.15	2.05	20.87	7.37	84.22
18	24.55	29.47	0.41	1.15	2.05	22.10	7.37	87.09
19	24.55	31.10	0.41	1.15	2.05	23.33	7.37	89.95
20	24.55	32.74	0.41	1.15	2.05	24.55	7.37	92.81

Sub Watershed #406 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	22.64	1.51	0.38	1.06	1.89	1.13	6.79	35.40
2	22.64	3.02	0.38	1.06	1.89	2.26	6.79	38.04
3	22.64	4.53	0.38	1.06	1.89	3.40	6.79	40.68
4	22.64	6.04	0.38	1.06	1.89	4.53	6.79	43.33
5	22.64	7.55	0.38	1.06	1.89	5.66	6.79	45.97
6	22.64	9.06	0.38	1.06	1.89	6.79	6.79	48.61
7	22.64	10.57	0.38	1.06	1.89	7.93	6.79	51.25
8	22.64	12.08	0.38	1.06	1.89	9.06	6.79	53.89
9	22.64	13.59	0.38	1.06	1.89	10.19	6.79	56.53
10	22.64	15.10	0.38	1.06	1.89	11.32	6.79	59.18
11	22.64	16.61	0.38	1.06	1.89	12.45	6.79	61.82
12	22.64	18.11	0.38	1.06	1.89	13.59	6.79	64.46
13	22.64	19.62	0.38	1.06	1.89	14.72	6.79	67.10
14	22.64	21.13	0.38	1.06	1.89	15.85	6.79	69.74

15	22.64	22.64	0.38	1.06	1.89	16.98	6.79	72.38
16	22.64	24.15	0.38	1.06	1.89	18.11	6.79	75.03
17	22.64	25.66	0.38	1.06	1.89	19.25	6.79	77.67
18	22.64	27.17	0.38	1.06	1.89	20.38	6.79	80.31
19	22.64	28.68	0.38	1.06	1.89	21.51	6.79	82.95
20	22.64	30.19	0.38	1.06	1.89	22.64	6.79	85.59

Sub Watershed #404 Annual Atrazine BMP Load Reduction

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Load Reduction
1	23.93	1.60	0.40	1.12	1.99	1.20	7.18	37.40
2	23.93	3.19	0.40	1.12	1.99	2.39	7.18	40.19
3	23.93	4.79	0.40	1.12	1.99	3.59	7.18	42.99
4	23.93	6.38	0.40	1.12	1.99	4.79	7.18	45.78
5	23.93	7.98	0.40	1.12	1.99	5.98	7.18	48.57
6	23.93	9.57	0.40	1.12	1.99	7.18	7.18	51.36
7	23.93	11.17	0.40	1.12	1.99	8.37	7.18	54.15
8	23.93	12.76	0.40	1.12	1.99	9.57	7.18	56.94
9	23.93	14.36	0.40	1.12	1.99	10.77	7.18	59.73
10	23.93	15.95	0.40	1.12	1.99	11.96	7.18	62.52
11	23.93	17.55	0.40	1.12	1.99	13.16	7.18	65.32
12	23.93	19.14	0.40	1.12	1.99	14.36	7.18	68.11
13	23.93	20.74	0.40	1.12	1.99	15.55	7.18	70.90
14	23.93	22.33	0.40	1.12	1.99	16.75	7.18	73.69
15	23.93	23.93	0.40	1.12	1.99	17.94	7.18	76.48
16	23.93	25.52	0.40	1.12	1.99	19.14	7.18	79.27
17	23.93	27.12	0.40	1.12	1.99	20.34	7.18	82.06
18	23.93	28.71	0.40	1.12	1.99	21.53	7.18	84.86
19	23.93	30.31	0.40	1.12	1.99	22.73	7.18	87.65
20	23.93	31.90	0.40	1.12	1.99	23.93	7.18	90.44

Sub Watershed # 204 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,999	$0	$33	$93	$167	$0	$600	$2,891
2	$1,999	$0	$33	$93	$167	$0	$600	$2,891
3	$1,999	$0	$33	$93	$167	$0	$600	$2,891
4	$1,999	$0	$33	$93	$167	$0	$600	$2,891
5	$1,999	$0	$33	$93	$167	$0	$600	$2,891
6	$1,999	$0	$33	$93	$167	$0	$600	$2,891
7	$1,999	$0	$33	$93	$167	$0	$600	$2,891
8	$1,999	$0	$33	$93	$167	$0	$600	$2,891
9	$1,999	$0	$33	$93	$167	$0	$600	$2,891
10	$1,999	$0	$33	$93	$167	$0	$600	$2,891
11	$1,999	$0	$33	$93	$167	$0	$600	$2,891
12	$1,999	$0	$33	$93	$167	$0	$600	$2,891
13	$1,999	$0	$33	$93	$167	$0	$600	$2,891
14	$1,999	$0	$33	$93	$167	$0	$600	$2,891
15	$1,999	$0	$33	$93	$167	$0	$600	$2,891
16	$1,999	$0	$33	$93	$167	$0	$600	$2,891
17	$1,999	$0	$33	$93	$167	$0	$600	$2,891
18	$1,999	$0	$33	$93	$167	$0	$600	$2,891
19	$1,999	$0	$33	$93	$167	$0	$600	$2,891

20	$1,999	$0	$33	$93	$167	$0	$600	$2,891

Sub Watershed # 205 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,607	$0	$27	$75	$134	$0	$482	$2,325
2	$1,607	$0	$27	$75	$134	$0	$482	$2,325
3	$1,607	$0	$27	$75	$134	$0	$482	$2,325
4	$1,607	$0	$27	$75	$134	$0	$482	$2,325
5	$1,607	$0	$27	$75	$134	$0	$482	$2,325
6	$1,607	$0	$27	$75	$134	$0	$482	$2,325
7	$1,607	$0	$27	$75	$134	$0	$482	$2,325
8	$1,607	$0	$27	$75	$134	$0	$482	$2,325
9	$1,607	$0	$27	$75	$134	$0	$482	$2,325
10	$1,607	$0	$27	$75	$134	$0	$482	$2,325
11	$1,607	$0	$27	$75	$134	$0	$482	$2,325
12	$1,607	$0	$27	$75	$134	$0	$482	$2,325
13	$1,607	$0	$27	$75	$134	$0	$482	$2,325
14	$1,607	$0	$27	$75	$134	$0	$482	$2,325
15	$1,607	$0	$27	$75	$134	$0	$482	$2,325
16	$1,607	$0	$27	$75	$134	$0	$482	$2,325
17	$1,607	$0	$27	$75	$134	$0	$482	$2,325
18	$1,607	$0	$27	$75	$134	$0	$482	$2,325

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19	$1,607	$0	$27	$75	$134	$0	$482	$2,325
20	$1,607	$0	$27	$75	$134	$0	$482	$2,325

Sub Watershed # 206 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,779	$0	$30	$83	$148	$0	$534	$2,574
2	$1,779	$0	$30	$83	$148	$0	$534	$2,574
3	$1,779	$0	$30	$83	$148	$0	$534	$2,574
4	$1,779	$0	$30	$83	$148	$0	$534	$2,574
5	$1,779	$0	$30	$83	$148	$0	$534	$2,574
6	$1,779	$0	$30	$83	$148	$0	$534	$2,574
7	$1,779	$0	$30	$83	$148	$0	$534	$2,574
8	$1,779	$0	$30	$83	$148	$0	$534	$2,574
9	$1,779	$0	$30	$83	$148	$0	$534	$2,574
10	$1,779	$0	$30	$83	$148	$0	$534	$2,574
11	$1,779	$0	$30	$83	$148	$0	$534	$2,574
12	$1,779	$0	$30	$83	$148	$0	$534	$2,574
13	$1,779	$0	$30	$83	$148	$0	$534	$2,574
14	$1,779	$0	$30	$83	$148	$0	$534	$2,574
15	$1,779	$0	$30	$83	$148	$0	$534	$2,574
16	$1,779	$0	$30	$83	$148	$0	$534	$2,574

17	$1,779	$0	$30	$83	$148	$0	$534	$2,574
18	$1,779	$0	$30	$83	$148	$0	$534	$2,574
19	$1,779	$0	$30	$83	$148	$0	$534	$2,574
20	$1,779	$0	$30	$83	$148	$0	$534	$2,574

Sub Watershed # 207 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,962	$0	$33	$92	$164	$0	$589	$2,839
2	$1,962	$0	$33	$92	$164	$0	$589	$2,839
3	$1,962	$0	$33	$92	$164	$0	$589	$2,839
4	$1,962	$0	$33	$92	$164	$0	$589	$2,839
5	$1,962	$0	$33	$92	$164	$0	$589	$2,839
6	$1,962	$0	$33	$92	$164	$0	$589	$2,839
7	$1,962	$0	$33	$92	$164	$0	$589	$2,839
8	$1,962	$0	$33	$92	$164	$0	$589	$2,839
9	$1,962	$0	$33	$92	$164	$0	$589	$2,839
10	$1,962	$0	$33	$92	$164	$0	$589	$2,839
11	$1,962	$0	$33	$92	$164	$0	$589	$2,839
12	$1,962	$0	$33	$92	$164	$0	$589	$2,839
13	$1,962	$0	$33	$92	$164	$0	$589	$2,839
14	$1,962	$0	$33	$92	$164	$0	$589	$2,839
15	$1,962	$0	$33	$92	$164	$0	$589	$2,839

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16	$1,962	$0	$33	$92	$164	$0	$589	$2,839
17	$1,962	$0	$33	$92	$164	$0	$589	$2,839
18	$1,962	$0	$33	$92	$164	$0	$589	$2,839
19	$1,962	$0	$33	$92	$164	$0	$589	$2,839
20	$1,962	$0	$33	$92	$164	$0	$589	$2,839

Sub Watershed # 208 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$2,064	$0	$34	$96	$172	$0	$619	$2,986
2	$2,064	$0	$34	$96	$172	$0	$619	$2,986
3	$2,064	$0	$34	$96	$172	$0	$619	$2,986
4	$2,064	$0	$34	$96	$172	$0	$619	$2,986
5	$2,064	$0	$34	$96	$172	$0	$619	$2,986
6	$2,064	$0	$34	$96	$172	$0	$619	$2,986
7	$2,064	$0	$34	$96	$172	$0	$619	$2,986
8	$2,064	$0	$34	$96	$172	$0	$619	$2,986
9	$2,064	$0	$34	$96	$172	$0	$619	$2,986
10	$2,064	$0	$34	$96	$172	$0	$619	$2,986
11	$2,064	$0	$34	$96	$172	$0	$619	$2,986
12	$2,064	$0	$34	$96	$172	$0	$619	$2,986
13	$2,064	$0	$34	$96	$172	$0	$619	$2,986

14	$2,064	$0	$34	$96	$172	$0	$619	$2,986
15	$2,064	$0	$34	$96	$172	$0	$619	$2,986
16	$2,064	$0	$34	$96	$172	$0	$619	$2,986
17	$2,064	$0	$34	$96	$172	$0	$619	$2,986
18	$2,064	$0	$34	$96	$172	$0	$619	$2,986
19	$2,064	$0	$34	$96	$172	$0	$619	$2,986
20	$2,064	$0	$34	$96	$172	$0	$619	$2,986

Sub Watershed # 401 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$2,337	$0	$39	$109	$195	$0	$701	$3,381
2	$2,337	$0	$39	$109	$195	$0	$701	$3,381
3	$2,337	$0	$39	$109	$195	$0	$701	$3,381
4	$2,337	$0	$39	$109	$195	$0	$701	$3,381
5	$2,337	$0	$39	$109	$195	$0	$701	$3,381
6	$2,337	$0	$39	$109	$195	$0	$701	$3,381
7	$2,337	$0	$39	$109	$195	$0	$701	$3,381
8	$2,337	$0	$39	$109	$195	$0	$701	$3,381
9	$2,337	$0	$39	$109	$195	$0	$701	$3,381
10	$2,337	$0	$39	$109	$195	$0	$701	$3,381
11	$2,337	$0	$39	$109	$195	$0	$701	$3,381
12	$2,337	$0	$39	$109	$195	$0	$701	$3,38

13	$2,337	$0	$39	$109	$195	$0	$701	$3,381
14	$2,337	$0	$39	$109	$195	$0	$701	$3,381
15	$2,337	$0	$39	$109	$195	$0	$701	$3,381
16	$2,337	$0	$39	$109	$195	$0	$701	$3,381
17	$2,337	$0	$39	$109	$195	$0	$701	$3,381
18	$2,337	$0	$39	$109	$195	$0	$701	$3,381
19	$2,337	$0	$39	$109	$195	$0	$701	$3,381
20	$2,337	$0	$39	$109	$195	$0	$701	$3,381

Sub Watershed # 402 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,858	$0	$31	$87	$155	$0	$557	$2,688
2	$1,858	$0	$31	$87	$155	$0	$557	$2,688
3	$1,858	$0	$31	$87	$155	$0	$557	$2,688
4	$1,858	$0	$31	$87	$155	$0	$557	$2,688
5	$1,858	$0	$31	$87	$155	$0	$557	$2,688
6	$1,858	$0	$31	$87	$155	$0	$557	$2,688
7	$1,858	$0	$31	$87	$155	$0	$557	$2,688
8	$1,858	$0	$31	$87	$155	$0	$557	$2,688
9	$1,858	$0	$31	$87	$155	$0	$557	$2,688
10	$1,858	$0	$31	$87	$155	$0	$557	$2,688

11	$1,858	$0	$31	$87	$155	$0	$557	$2,688
12	$1,858	$0	$31	$87	$155	$0	$557	$2,688
13	$1,858	$0	$31	$87	$155	$0	$557	$2,688
14	$1,858	$0	$31	$87	$155	$0	$557	$2,688
15	$1,858	$0	$31	$87	$155	$0	$557	$2,688
16	$1,858	$0	$31	$87	$155	$0	$557	$2,688
17	$1,858	$0	$31	$87	$155	$0	$557	$2,688
18	$1,858	$0	$31	$87	$155	$0	$557	$2,688
19	$1,858	$0	$31	$87	$155	$0	$557	$2,688
20	$1,858	$0	$31	$87	$155	$0	$557	$2,688

Sub Watershed # 403 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$2,956	$0	$49	$138	$246	$0	$887	$4,276
2	$2,956	$0	$49	$138	$246	$0	$887	$4,276
3	$2,956	$0	$49	$138	$246	$0	$887	$4,276
4	$2,956	$0	$49	$138	$246	$0	$887	$4,276
5	$2,956	$0	$49	$138	$246	$0	$887	$4,276
6	$2,956	$0	$49	$138	$246	$0	$887	$4,276
7	$2,956	$0	$49	$138	$246	$0	$887	$4,276
8	$2,956	$0	$49	$138	$246	$0	$887	$4,276
9	$2,956	$0	$49	$138	$246	$0	$887	$4,27

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10	$2,956	$0	$49	$138	$246	$0	$887	$4,276
11	$2,956	$0	$49	$138	$246	$0	$887	$4,276
12	$2,956	$0	$49	$138	$246	$0	$887	$4,276
13	$2,956	$0	$49	$138	$246	$0	$887	$4,276
14	$2,956	$0	$49	$138	$246	$0	$887	$4,276
15	$2,956	$0	$49	$138	$246	$0	$887	$4,276
16	$2,956	$0	$49	$138	$246	$0	$887	$4,276
17	$2,956	$0	$49	$138	$246	$0	$887	$4,276
18	$2,956	$0	$49	$138	$246	$0	$887	$4,276
19	$2,956	$0	$49	$138	$246	$0	$887	$4,276
20	$2,956	$0	$49	$138	$246	$0	$887	$4,276

Sub Watershed # 405 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,964	$0	$33	$92	$164	$0	$589	$2,842
2	$1,964	$0	$33	$92	$164	$0	$589	$2,842
3	$1,964	$0	$33	$92	$164	$0	$589	$2,842
4	$1,964	$0	$33	$92	$164	$0	$589	$2,842
5	$1,964	$0	$33	$92	$164	$0	$589	$2,842
6	$1,964	$0	$33	$92	$164	$0	$589	$2,842
7	$1,964	$0	$33	$92	$164	$0	$589	$2,842

8	$1,964	$0	$33	$92	$164	$0	$589	$2,842
9	$1,964	$0	$33	$92	$164	$0	$589	$2,842
10	$1,964	$0	$33	$92	$164	$0	$589	$2,842
11	$1,964	$0	$33	$92	$164	$0	$589	$2,842
12	$1,964	$0	$33	$92	$164	$0	$589	$2,842
13	$1,964	$0	$33	$92	$164	$0	$589	$2,842
14	$1,964	$0	$33	$92	$164	$0	$589	$2,842
15	$1,964	$0	$33	$92	$164	$0	$589	$2,842
16	$1,964	$0	$33	$92	$164	$0	$589	$2,842
17	$1,964	$0	$33	$92	$164	$0	$589	$2,842
18	$1,964	$0	$33	$92	$164	$0	$589	$2,842
19	$1,964	$0	$33	$92	$164	$0	$589	$2,842
20	$1,964	$0	$33	$92	$164	$0	$589	$2,842

Sub Watershed # 406 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,811	$0	$30	$85	$151	$0	$543	$2,621
2	$1,811	$0	$30	$85	$151	$0	$543	$2,621
3	$1,811	$0	$30	$85	$151	$0	$543	$2,621
4	$1,811	$0	$30	$85	$151	$0	$543	$2,621
5	$1,811	$0	$30	$85	$151	$0	$543	$2,621
6	$1,811	$0	$30	$85	$151	$0	$543	$2,62

7	$1,811	$0	$30	$85	$151	$0	$543	$2,621
8	$1,811	$0	$30	$85	$151	$0	$543	$2,621
9	$1,811	$0	$30	$85	$151	$0	$543	$2,621
10	$1,811	$0	$30	$85	$151	$0	$543	$2,621
11	$1,811	$0	$30	$85	$151	$0	$543	$2,621
12	$1,811	$0	$30	$85	$151	$0	$543	$2,621
13	$1,811	$0	$30	$85	$151	$0	$543	$2,621
14	$1,811	$0	$30	$85	$151	$0	$543	$2,621
15	$1,811	$0	$30	$85	$151	$0	$543	$2,621
16	$1,811	$0	$30	$85	$151	$0	$543	$2,621
17	$1,811	$0	$30	$85	$151	$0	$543	$2,621
18	$1,811	$0	$30	$85	$151	$0	$543	$2,621
19	$1,811	$0	$30	$85	$151	$0	$543	$2,621
20	$1,811	$0	$30	$85	$151	$0	$543	$2,621

Sub Watershed # 404 Annual Atrazine BMP Cost

Year	Use Alternative Herbicide	Vegetative Buffers	Split Application	Incorporate Atrazine	Use Post Emergence	Terraces and Waterways	Reduce Application	Total Cost
1	$1,914	$0	$32	$89	$160	$0	$574	$2,769
2	$1,914	$0	$32	$89	$160	$0	$574	$2,769
3	$1,914	$0	$32	$89	$160	$0	$574	$2,769
4	$1,914	$0	$32	$89	$160	$0	$574	$2,769

5	$1,914	$0	$32	$89	$160	$0	$574	$2,769
6	$1,914	$0	$32	$89	$160	$0	$574	$2,769
7	$1,914	$0	$32	$89	$160	$0	$574	$2,769
8	$1,914	$0	$32	$89	$160	$0	$574	$2,769
9	$1,914	$0	$32	$89	$160	$0	$574	$2,769
10	$1,914	$0	$32	$89	$160	$0	$574	$2,769
11	$1,914	$0	$32	$89	$160	$0	$574	$2,769
12	$1,914	$0	$32	$89	$160	$0	$574	$2,769
13	$1,914	$0	$32	$89	$160	$0	$574	$2,769
14	$1,914	$0	$32	$89	$160	$0	$574	$2,769
15	$1,914	$0	$32	$89	$160	$0	$574	$2,769
16	$1,914	$0	$32	$89	$160	$0	$574	$2,769
17	$1,914	$0	$32	$89	$160	$0	$574	$2,769
18	$1,914	$0	$32	$89	$160	$0	$574	$2,769
19	$1,914	$0	$32	$89	$160	$0	$574	$2,769
20	$1,914	$0	$32	$89	$160	$0	$574	$2,769

15.4.3 Cropland BMP Tables

Sub Watershed #201 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	35	69	52	35	17	52	17	17	7	302
2	35	69	52	35	17	52	17	17	7	302
3	35	69	52	35	17	52	17	17	7	302
4	35	69	52	35	17	52	17	17	7	302
5	35	69	52	35	17	52	17	17	7	302
6	35	69	52	35	17	52	17	17	7	302
7	35	69	52	35	17	52	17	17	7	302
8	35	69	52	35	17	52	17	17	7	302
9	35	69	52	35	17	52	17	17	7	302
10	35	69	52	35	17	52	17	17	7	302
11	35	69	52	35	17	52	17	17	7	302
12	35	69	52	35	17	52	17	17	7	302
13	35	69	52	35	17	52	17	17	7	302
14	35	69	52	35	17	52	17	17	7	302
15	35	69	52	35	17	52	17	17	7	302
16	35	69	52	35	17	52	17	17	7	302
17	35	69	52	35	17	52	17	17	7	302
18	35	69	52	35	17	52	17	17	7	302
19	35	69	52	35	17	52	17	17	7	302
20	35	69	52	35	17	52	17	17	7	302
21	35	69	52	35	17	52	17	17	7	302
22	35	69	52	35	17	52	17	17	7	302
23	35	69	52	35	17	52	17	17	7	302
24	35	69	52	35	17	52	17	17	7	302
25	35	69	52	35	17	52	17	17	7	302
26	35	69	52	35	17	52	17	17	7	302
27	35	69	52	35	17	52	17	17	7	302
28	35	69	52	35	17	52	17	17	7	302
29	35	69	52	35	17	52	17	17	7	302
30	35	69	52	35	17	52	17	17	7	302
31	35	69	52	35	17	52	17	17	7	302
32	35	69	52	35	17	52	17	17	7	302
33	35	69	52	35	17	52	17	17	7	302
34	35	69	52	35	17	52	17	17	7	302
35	35	69	52	35	17	52	17	17	7	302
36	35	69	52	35	17	52	17	17	7	302

37	35	69	52	35	17	52	17	17	7	302
38	35	69	52	35	17	52	17	17	7	302
39	35	69	52	35	17	52	17	17	7	302
40	35	69	52	35	17	52	17	17	7	302

Sub Watershed #202 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	29	59	44	29	15	44	15	15	6	257
2	29	59	44	29	15	44	15	15	6	257
3	29	59	44	29	15	44	15	15	6	257
4	29	59	44	29	15	44	15	15	6	257
5	29	59	44	29	15	44	15	15	6	257
6	29	59	44	29	15	44	15	15	6	257
7	29	59	44	29	15	44	15	15	6	257
8	29	59	44	29	15	44	15	15	6	257
9	29	59	44	29	15	44	15	15	6	257
10	29	59	44	29	15	44	15	15	6	257
11	29	59	44	29	15	44	15	15	6	257
12	29	59	44	29	15	44	15	15	6	257
13	29	59	44	29	15	44	15	15	6	257
14	29	59	44	29	15	44	15	15	6	257
15	29	59	44	29	15	44	15	15	6	257
16	29	59	44	29	15	44	15	15	6	257
17	29	59	44	29	15	44	15	15	6	257
18	29	59	44	29	15	44	15	15	6	257
19	29	59	44	29	15	44	15	15	6	257
20	29	59	44	29	15	44	15	15	6	257
21	29	59	44	29	15	44	15	15	6	257
22	29	59	44	29	15	44	15	15	6	257
23	29	59	44	29	15	44	15	15	6	257
24	29	59	44	29	15	44	15	15	6	257
25	29	59	44	29	15	44	15	15	6	257
26	29	59	44	29	15	44	15	15	6	257
27	29	59	44	29	15	44	15	15	6	257
28	29	59	44	29	15	44	15	15	6	257
29	29	59	44	29	15	44	15	15	6	257
30	29	59	44	29	15	44	15	15	6	257
31	29	59	44	29	15	44	15	15	6	257
32	29	59	44	29	15	44	15	15	6	257
33	29	59	44	29	15	44	15	15	6	257

34	29	59	44	29	15	44	15	15	6	257
35	29	59	44	29	15	44	15	15	6	257
36	29	59	44	29	15	44	15	15	6	257
37	29	59	44	29	15	44	15	15	6	257
38	29	59	44	29	15	44	15	15	6	257
39	29	59	44	29	15	44	15	15	6	257
40	29	59	44	29	15	44	15	15	6	257

Sub Watershed #204 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	33	67	50	33	17	50	17	17	7	290
2	33	67	50	33	17	50	17	17	7	290
3	33	67	50	33	17	50	17	17	7	290
4	33	67	50	33	17	50	17	17	7	290
5	33	67	50	33	17	50	17	17	7	290
6	33	67	50	33	17	50	17	17	7	290
7	33	67	50	33	17	50	17	17	7	290
8	33	67	50	33	17	50	17	17	7	290
9	33	67	50	33	17	50	17	17	7	290
10	33	67	50	33	17	50	17	17	7	290
11	33	67	50	33	17	50	17	17	7	290
12	33	67	50	33	17	50	17	17	7	290
13	33	67	50	33	17	50	17	17	7	290
14	33	67	50	33	17	50	17	17	7	290
15	33	67	50	33	17	50	17	17	7	290
16	33	67	50	33	17	50	17	17	7	290
17	33	67	50	33	17	50	17	17	7	290
18	33	67	50	33	17	50	17	17	7	290
19	33	67	50	33	17	50	17	17	7	290
20	33	67	50	33	17	50	17	17	7	290
21	33	67	50	33	17	50	17	17	7	290
22	33	67	50	33	17	50	17	17	7	290
23	33	67	50	33	17	50	17	17	7	290
24	33	67	50	33	17	50	17	17	7	290
25	33	67	50	33	17	50	17	17	7	290
26	33	67	50	33	17	50	17	17	7	290
27	33	67	50	33	17	50	17	17	7	290
28	33	67	50	33	17	50	17	17	7	290
29	33	67	50	33	17	50	17	17	7	290
30	33	67	50	33	17	50	17	17	7	290

31	33	67	50	33	17	50	17	17	7	290
32	33	67	50	33	17	50	17	17	7	290
33	33	67	50	33	17	50	17	17	7	290
34	33	67	50	33	17	50	17	17	7	290
35	33	67	50	33	17	50	17	17	7	290
36	33	67	50	33	17	50	17	17	7	290
37	33	67	50	33	17	50	17	17	7	290
38	33	67	50	33	17	50	17	17	7	290
39	33	67	50	33	17	50	17	17	7	290
40	33	67	50	33	17	50	17	17	7	290

Sub Watershed #205 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	27	54	40	27	13	40	13	13	5	233
2	27	54	40	27	13	40	13	13	5	233
3	27	54	40	27	13	40	13	13	5	233
4	27	54	40	27	13	40	13	13	5	233
5	27	54	40	27	13	40	13	13	5	233
6	27	54	40	27	13	40	13	13	5	233
7	27	54	40	27	13	40	13	13	5	233
8	27	54	40	27	13	40	13	13	5	233
9	27	54	40	27	13	40	13	13	5	233
10	27	54	40	27	13	40	13	13	5	233
11	27	54	40	27	13	40	13	13	5	233
12	27	54	40	27	13	40	13	13	5	233
13	27	54	40	27	13	40	13	13	5	233
14	27	54	40	27	13	40	13	13	5	233
15	27	54	40	27	13	40	13	13	5	233
16	27	54	40	27	13	40	13	13	5	233
17	27	54	40	27	13	40	13	13	5	233
18	27	54	40	27	13	40	13	13	5	233
19	27	54	40	27	13	40	13	13	5	233
20	27	54	40	27	13	40	13	13	5	233
21	27	54	40	27	13	40	13	13	5	233
22	27	54	40	27	13	40	13	13	5	233
23	27	54	40	27	13	40	13	13	5	233
24	27	54	40	27	13	40	13	13	5	233
25	27	54	40	27	13	40	13	13	5	233
26	27	54	40	27	13	40	13	13	5	233
27	27	54	40	27	13	40	13	13	5	233

28	27	54	40	27	13	40	13	13	5	233
29	27	54	40	27	13	40	13	13	5	233
30	27	54	40	27	13	40	13	13	5	233
31	27	54	40	27	13	40	13	13	5	233
32	27	54	40	27	13	40	13	13	5	233
33	27	54	40	27	13	40	13	13	5	233
34	27	54	40	27	13	40	13	13	5	233
35	27	54	40	27	13	40	13	13	5	233
36	27	54	40	27	13	40	13	13	5	233
37	27	54	40	27	13	40	13	13	5	233
38	27	54	40	27	13	40	13	13	5	233
39	27	54	40	27	13	40	13	13	5	233
40	27	54	40	27	13	40	13	13	5	233

Sub Watershed #206 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	30	59	44	30	15	44	15	15	6	258
2	30	59	44	30	15	44	15	15	6	258
3	30	59	44	30	15	44	15	15	6	258
4	30	59	44	30	15	44	15	15	6	258
5	30	59	44	30	15	44	15	15	6	258
6	30	59	44	30	15	44	15	15	6	258
7	30	59	44	30	15	44	15	15	6	258
8	30	59	44	30	15	44	15	15	6	258
9	30	59	44	30	15	44	15	15	6	258
10	30	59	44	30	15	44	15	15	6	258
11	30	59	44	30	15	44	15	15	6	258
12	30	59	44	30	15	44	15	15	6	258
13	30	59	44	30	15	44	15	15	6	258
14	30	59	44	30	15	44	15	15	6	258
15	30	59	44	30	15	44	15	15	6	258
16	30	59	44	30	15	44	15	15	6	258
17	30	59	44	30	15	44	15	15	6	258
18	30	59	44	30	15	44	15	15	6	258
19	30	59	44	30	15	44	15	15	6	258
20	30	59	44	30	15	44	15	15	6	258
21	30	59	44	30	15	44	15	15	6	258
22	30	59	44	30	15	44	15	15	6	258
23	30	59	44	30	15	44	15	15	6	258
24	30	59	44	30	15	44	15	15	6	258

25	30	59	44	30	15	44	15	15	6	258
26	30	59	44	30	15	44	15	15	6	258
27	30	59	44	30	15	44	15	15	6	258
28	30	59	44	30	15	44	15	15	6	258
29	30	59	44	30	15	44	15	15	6	258
30	30	59	44	30	15	44	15	15	6	258
31	30	59	44	30	15	44	15	15	6	258
32	30	59	44	30	15	44	15	15	6	258
33	30	59	44	30	15	44	15	15	6	258
34	30	59	44	30	15	44	15	15	6	258
35	30	59	44	30	15	44	15	15	6	258
36	30	59	44	30	15	44	15	15	6	258
37	30	59	44	30	15	44	15	15	6	258
38	30	59	44	30	15	44	15	15	6	258
39	30	59	44	30	15	44	15	15	6	258
40	30	59	44	30	15	44	15	15	6	258

Sub Watershed #207 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	33	65	49	33	16	49	16	16	7	285
2	33	65	49	33	16	49	16	16	7	285
3	33	65	49	33	16	49	16	16	7	285
4	33	65	49	33	16	49	16	16	7	285
5	33	65	49	33	16	49	16	16	7	285
6	33	65	49	33	16	49	16	16	7	285
7	33	65	49	33	16	49	16	16	7	285
8	33	65	49	33	16	49	16	16	7	285
9	33	65	49	33	16	49	16	16	7	285
10	33	65	49	33	16	49	16	16	7	285
11	33	65	49	33	16	49	16	16	7	285
12	33	65	49	33	16	49	16	16	7	285
13	33	65	49	33	16	49	16	16	7	285
14	33	65	49	33	16	49	16	16	7	285
15	33	65	49	33	16	49	16	16	7	285
16	33	65	49	33	16	49	16	16	7	285
17	33	65	49	33	16	49	16	16	7	285
18	33	65	49	33	16	49	16	16	7	285
19	33	65	49	33	16	49	16	16	7	285
20	33	65	49	33	16	49	16	16	7	285
21	33	65	49	33	16	49	16	16	7	285

22	33	65	49	33	16	49	16	16	7	285
23	33	65	49	33	16	49	16	16	7	285
24	33	65	49	33	16	49	16	16	7	285
25	33	65	49	33	16	49	16	16	7	285
26	33	65	49	33	16	49	16	16	7	285
27	33	65	49	33	16	49	16	16	7	285
28	33	65	49	33	16	49	16	16	7	285
29	33	65	49	33	16	49	16	16	7	285
30	33	65	49	33	16	49	16	16	7	285
31	33	65	49	33	16	49	16	16	7	285
32	33	65	49	33	16	49	16	16	7	285
33	33	65	49	33	16	49	16	16	7	285
34	33	65	49	33	16	49	16	16	7	285
35	33	65	49	33	16	49	16	16	7	285
36	33	65	49	33	16	49	16	16	7	285
37	33	65	49	33	16	49	16	16	7	285
38	33	65	49	33	16	49	16	16	7	285
39	33	65	49	33	16	49	16	16	7	285
40	33	65	49	33	16	49	16	16	7	285

Sub Watershed #208 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	34	69	52	34	17	52	17	17	7	299
2	34	69	52	34	17	52	17	17	7	299
3	34	69	52	34	17	52	17	17	7	299
4	34	69	52	34	17	52	17	17	7	299
5	34	69	52	34	17	52	17	17	7	299
6	34	69	52	34	17	52	17	17	7	299
7	34	69	52	34	17	52	17	17	7	299
8	34	69	52	34	17	52	17	17	7	299
9	34	69	52	34	17	52	17	17	7	299
10	34	69	52	34	17	52	17	17	7	299
11	34	69	52	34	17	52	17	17	7	299
12	34	69	52	34	17	52	17	17	7	299
13	34	69	52	34	17	52	17	17	7	299
14	34	69	52	34	17	52	17	17	7	299
15	34	69	52	34	17	52	17	17	7	299
16	34	69	52	34	17	52	17	17	7	299
17	34	69	52	34	17	52	17	17	7	299
18	34	69	52	34	17	52	17	17	7	299

19	34	69	52	34	17	52	17	17	7	299
20	34	69	52	34	17	52	17	17	7	299
21	34	69	52	34	17	52	17	17	7	299
22	34	69	52	34	17	52	17	17	7	299
23	34	69	52	34	17	52	17	17	7	299
24	34	69	52	34	17	52	17	17	7	299
25	34	69	52	34	17	52	17	17	7	299
26	34	69	52	34	17	52	17	17	7	299
27	34	69	52	34	17	52	17	17	7	299
28	34	69	52	34	17	52	17	17	7	299
29	34	69	52	34	17	52	17	17	7	299
30	34	69	52	34	17	52	17	17	7	299
31	34	69	52	34	17	52	17	17	7	299
32	34	69	52	34	17	52	17	17	7	299
33	34	69	52	34	17	52	17	17	7	299
34	34	69	52	34	17	52	17	17	7	299
35	34	69	52	34	17	52	17	17	7	299
36	34	69	52	34	17	52	17	17	7	299
37	34	69	52	34	17	52	17	17	7	299
38	34	69	52	34	17	52	17	17	7	299
39	34	69	52	34	17	52	17	17	7	299
40	34	69	52	34	17	52	17	17	7	299

Sub Watershed #301 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	36	73	55	36	18	55	18	18	7	318
2	36	73	55	36	18	55	18	18	7	318
3	36	73	55	36	18	55	18	18	7	318
4	36	73	55	36	18	55	18	18	7	318
5	36	73	55	36	18	55	18	18	7	318
6	36	73	55	36	18	55	18	18	7	318
7	36	73	55	36	18	55	18	18	7	318
8	36	73	55	36	18	55	18	18	7	318
9	36	73	55	36	18	55	18	18	7	318
10	36	73	55	36	18	55	18	18	7	318
11	36	73	55	36	18	55	18	18	7	318
12	36	73	55	36	18	55	18	18	7	318
13	36	73	55	36	18	55	18	18	7	318
14	36	73	55	36	18	55	18	18	7	318
15	36	73	55	36	18	55	18	18	7	318

16	36	73	55	36	18	55	18	18	7	318
17	36	73	55	36	18	55	18	18	7	318
18	36	73	55	36	18	55	18	18	7	318
19	36	73	55	36	18	55	18	18	7	318
20	36	73	55	36	18	55	18	18	7	318
21	36	73	55	36	18	55	18	18	7	318
22	36	73	55	36	18	55	18	18	7	318
23	36	73	55	36	18	55	18	18	7	318
24	36	73	55	36	18	55	18	18	7	318
25	36	73	55	36	18	55	18	18	7	318
26	36	73	55	36	18	55	18	18	7	318
27	36	73	55	36	18	55	18	18	7	318
28	36	73	55	36	18	55	18	18	7	318
29	36	73	55	36	18	55	18	18	7	318
30	36	73	55	36	18	55	18	18	7	318
31	36	73	55	36	18	55	18	18	7	318
32	36	73	55	36	18	55	18	18	7	318
33	36	73	55	36	18	55	18	18	7	318
34	36	73	55	36	18	55	18	18	7	318
35	36	73	55	36	18	55	18	18	7	318
36	36	73	55	36	18	55	18	18	7	318
37	36	73	55	36	18	55	18	18	7	318
38	36	73	55	36	18	55	18	18	7	318
39	36	73	55	36	18	55	18	18	7	318
40	36	73	55	36	18	55	18	18	7	318

Sub Watershed #302 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	25	50	37	25	12	37	12	12	5	216
2	25	50	37	25	12	37	12	12	5	216
3	25	50	37	25	12	37	12	12	5	216
4	25	50	37	25	12	37	12	12	5	216
5	25	50	37	25	12	37	12	12	5	216
6	25	50	37	25	12	37	12	12	5	216
7	25	50	37	25	12	37	12	12	5	216
8	25	50	37	25	12	37	12	12	5	216
9	25	50	37	25	12	37	12	12	5	216
10	25	50	37	25	12	37	12	12	5	216
11	25	50	37	25	12	37	12	12	5	216
12	25	50	37	25	12	37	12	12	5	216

13	25	50	37	25	12	37	12	12	5	216
14	25	50	37	25	12	37	12	12	5	216
15	25	50	37	25	12	37	12	12	5	216
16	25	50	37	25	12	37	12	12	5	216
17	25	50	37	25	12	37	12	12	5	216
18	25	50	37	25	12	37	12	12	5	216
19	25	50	37	25	12	37	12	12	5	216
20	25	50	37	25	12	37	12	12	5	216
21	25	50	37	25	12	37	12	12	5	216
22	25	50	37	25	12	37	12	12	5	216
23	25	50	37	25	12	37	12	12	5	216
24	25	50	37	25	12	37	12	12	5	216
25	25	50	37	25	12	37	12	12	5	216
26	25	50	37	25	12	37	12	12	5	216
27	25	50	37	25	12	37	12	12	5	216
28	25	50	37	25	12	37	12	12	5	216
29	25	50	37	25	12	37	12	12	5	216
30	25	50	37	25	12	37	12	12	5	216
31	25	50	37	25	12	37	12	12	5	216
32	25	50	37	25	12	37	12	12	5	216
33	25	50	37	25	12	37	12	12	5	216
34	25	50	37	25	12	37	12	12	5	216
35	25	50	37	25	12	37	12	12	5	216
36	25	50	37	25	12	37	12	12	5	216
37	25	50	37	25	12	37	12	12	5	216
38	25	50	37	25	12	37	12	12	5	216
39	25	50	37	25	12	37	12	12	5	216
40	25	50	37	25	12	37	12	12	5	216

Sub Watershed #304 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	6	13	9	6	3	9	3	3	1	55
2	6	13	9	6	3	9	3	3	1	55
3	6	13	9	6	3	9	3	3	1	55
4	6	13	9	6	3	9	3	3	1	55
5	6	13	9	6	3	9	3	3	1	55
6	6	13	9	6	3	9	3	3	1	55
7	6	13	9	6	3	9	3	3	1	55
8	6	13	9	6	3	9	3	3	1	55
9	6	13	9	6	3	9	3	3	1	55

10	6	13	9	6	3	9	3	3	1	55
11	6	13	9	6	3	9	3	3	1	55
12	6	13	9	6	3	9	3	3	1	55
13	6	13	9	6	3	9	3	3	1	55
14	6	13	9	6	3	9	3	3	1	55
15	6	13	9	6	3	9	3	3	1	55
16	6	13	9	6	3	9	3	3	1	55
17	6	13	9	6	3	9	3	3	1	55
18	6	13	9	6	3	9	3	3	1	55
19	6	13	9	6	3	9	3	3	1	55
20	6	13	9	6	3	9	3	3	1	55
21	6	13	9	6	3	9	3	3	1	55
22	6	13	9	6	3	9	3	3	1	55
23	6	13	9	6	3	9	3	3	1	55
24	6	13	9	6	3	9	3	3	1	55
25	6	13	9	6	3	9	3	3	1	55
26	6	13	9	6	3	9	3	3	1	55
27	6	13	9	6	3	9	3	3	1	55
28	6	13	9	6	3	9	3	3	1	55
29	6	13	9	6	3	9	3	3	1	55
30	6	13	9	6	3	9	3	3	1	55
31	6	13	9	6	3	9	3	3	1	55
32	6	13	9	6	3	9	3	3	1	55
33	6	13	9	6	3	9	3	3	1	55
34	6	13	9	6	3	9	3	3	1	55
35	6	13	9	6	3	9	3	3	1	55
36	6	13	9	6	3	9	3	3	1	55
37	6	13	9	6	3	9	3	3	1	55
38	6	13	9	6	3	9	3	3	1	55
39	6	13	9	6	3	9	3	3	1	55
40	6	13	9	6	3	9	3	3	1	55

Sub Watershed #305 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	29	58	43	29	14	43	14	14	6	252
2	29	58	43	29	14	43	14	14	6	252
3	29	58	43	29	14	43	14	14	6	252
4	29	58	43	29	14	43	14	14	6	252
5	29	58	43	29	14	43	14	14	6	252
6	29	58	43	29	14	43	14	14	6	252

7	29	58	43	29	14	43	14	14	6	252
8	29	58	43	29	14	43	14	14	6	252
9	29	58	43	29	14	43	14	14	6	252
10	29	58	43	29	14	43	14	14	6	252
11	29	58	43	29	14	43	14	14	6	252
12	29	58	43	29	14	43	14	14	6	252
13	29	58	43	29	14	43	14	14	6	252
14	29	58	43	29	14	43	14	14	6	252
15	29	58	43	29	14	43	14	14	6	252
16	29	58	43	29	14	43	14	14	6	252
17	29	58	43	29	14	43	14	14	6	252
18	29	58	43	29	14	43	14	14	6	252
19	29	58	43	29	14	43	14	14	6	252
20	29	58	43	29	14	43	14	14	6	252
21	29	58	43	29	14	43	14	14	6	252
22	29	58	43	29	14	43	14	14	6	252
23	29	58	43	29	14	43	14	14	6	252
24	29	58	43	29	14	43	14	14	6	252
25	29	58	43	29	14	43	14	14	6	252
26	29	58	43	29	14	43	14	14	6	252
27	29	58	43	29	14	43	14	14	6	252
28	29	58	43	29	14	43	14	14	6	252
29	29	58	43	29	14	43	14	14	6	252
30	29	58	43	29	14	43	14	14	6	252
31	29	58	43	29	14	43	14	14	6	252
32	29	58	43	29	14	43	14	14	6	252
33	29	58	43	29	14	43	14	14	6	252
34	29	58	43	29	14	43	14	14	6	252
35	29	58	43	29	14	43	14	14	6	252
36	29	58	43	29	14	43	14	14	6	252
37	29	58	43	29	14	43	14	14	6	252
38	29	58	43	29	14	43	14	14	6	252
39	29	58	43	29	14	43	14	14	6	252
40	29	58	43	29	14	43	14	14	6	252

Sub Watershed #306 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	20	41	31	20	10	31	10	10	4	178
2	20	41	31	20	10	31	10	10	4	178
3	20	41	31	20	10	31	10	10	4	178

4	20	41	31	20	10	31	10	10	4	178
5	20	41	31	20	10	31	10	10	4	178
6	20	41	31	20	10	31	10	10	4	178
7	20	41	31	20	10	31	10	10	4	178
8	20	41	31	20	10	31	10	10	4	178
9	20	41	31	20	10	31	10	10	4	178
10	20	41	31	20	10	31	10	10	4	178
11	20	41	31	20	10	31	10	10	4	178
12	20	41	31	20	10	31	10	10	4	178
13	20	41	31	20	10	31	10	10	4	178
14	20	41	31	20	10	31	10	10	4	178
15	20	41	31	20	10	31	10	10	4	178
16	20	41	31	20	10	31	10	10	4	178
17	20	41	31	20	10	31	10	10	4	178
18	20	41	31	20	10	31	10	10	4	178
19	20	41	31	20	10	31	10	10	4	178
20	20	41	31	20	10	31	10	10	4	178
21	20	41	31	20	10	31	10	10	4	178
22	20	41	31	20	10	31	10	10	4	178
23	20	41	31	20	10	31	10	10	4	178
24	20	41	31	20	10	31	10	10	4	178
25	20	41	31	20	10	31	10	10	4	178
26	20	41	31	20	10	31	10	10	4	178
27	20	41	31	20	10	31	10	10	4	178
28	20	41	31	20	10	31	10	10	4	178
29	20	41	31	20	10	31	10	10	4	178
30	20	41	31	20	10	31	10	10	4	178
31	20	41	31	20	10	31	10	10	4	178
32	20	41	31	20	10	31	10	10	4	178
33	20	41	31	20	10	31	10	10	4	178
34	20	41	31	20	10	31	10	10	4	178
35	20	41	31	20	10	31	10	10	4	178
36	20	41	31	20	10	31	10	10	4	178
37	20	41	31	20	10	31	10	10	4	178
38	20	41	31	20	10	31	10	10	4	178
39	20	41	31	20	10	31	10	10	4	178
40	20	41	31	20	10	31	10	10	4	178

Sub Watershed #307 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption

1	24	48	36	24	12	36	12	12	5	211
2	24	48	36	24	12	36	12	12	5	211
3	24	48	36	24	12	36	12	12	5	211
4	24	48	36	24	12	36	12	12	5	211
5	24	48	36	24	12	36	12	12	5	211
6	24	48	36	24	12	36	12	12	5	211
7	24	48	36	24	12	36	12	12	5	211
8	24	48	36	24	12	36	12	12	5	211
9	24	48	36	24	12	36	12	12	5	211
10	24	48	36	24	12	36	12	12	5	211
11	24	48	36	24	12	36	12	12	5	211
12	24	48	36	24	12	36	12	12	5	211
13	24	48	36	24	12	36	12	12	5	211
14	24	48	36	24	12	36	12	12	5	211
15	24	48	36	24	12	36	12	12	5	211
16	24	48	36	24	12	36	12	12	5	211
17	24	48	36	24	12	36	12	12	5	211
18	24	48	36	24	12	36	12	12	5	211
19	24	48	36	24	12	36	12	12	5	211
20	24	48	36	24	12	36	12	12	5	211
21	24	48	36	24	12	36	12	12	5	211
22	24	48	36	24	12	36	12	12	5	211
23	24	48	36	24	12	36	12	12	5	211
24	24	48	36	24	12	36	12	12	5	211
25	24	48	36	24	12	36	12	12	5	211
26	24	48	36	24	12	36	12	12	5	211
27	24	48	36	24	12	36	12	12	5	211
28	24	48	36	24	12	36	12	12	5	211
29	24	48	36	24	12	36	12	12	5	211
30	24	48	36	24	12	36	12	12	5	211
31	24	48	36	24	12	36	12	12	5	211
32	24	48	36	24	12	36	12	12	5	211
33	24	48	36	24	12	36	12	12	5	211
34	24	48	36	24	12	36	12	12	5	211
35	24	48	36	24	12	36	12	12	5	211
36	24	48	36	24	12	36	12	12	5	211
37	24	48	36	24	12	36	12	12	5	211
38	24	48	36	24	12	36	12	12	5	211
39	24	48	36	24	12	36	12	12	5	211
40	24	48	36	24	12	36	12	12	5	211

Sub Watershed #401 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	34	68	51	34	17	51	17	17	7	294
2	34	68	51	34	17	51	17	17	7	294
3	34	68	51	34	17	51	17	17	7	294
4	34	68	51	34	17	51	17	17	7	294
5	34	68	51	34	17	51	17	17	7	294
6	34	68	51	34	17	51	17	17	7	294
7	34	68	51	34	17	51	17	17	7	294
8	34	68	51	34	17	51	17	17	7	294
9	34	68	51	34	17	51	17	17	7	294
10	34	68	51	34	17	51	17	17	7	294
11	34	68	51	34	17	51	17	17	7	294
12	34	68	51	34	17	51	17	17	7	294
13	34	68	51	34	17	51	17	17	7	294
14	34	68	51	34	17	51	17	17	7	294
15	34	68	51	34	17	51	17	17	7	294
16	34	68	51	34	17	51	17	17	7	294
17	34	68	51	34	17	51	17	17	7	294
18	34	68	51	34	17	51	17	17	7	294
19	34	68	51	34	17	51	17	17	7	294
20	34	68	51	34	17	51	17	17	7	294
21	34	68	51	34	17	51	17	17	7	294
22	34	68	51	34	17	51	17	17	7	294
23	34	68	51	34	17	51	17	17	7	294
24	34	68	51	34	17	51	17	17	7	294
25	34	68	51	34	17	51	17	17	7	294
26	34	68	51	34	17	51	17	17	7	294
27	34	68	51	34	17	51	17	17	7	294
28	34	68	51	34	17	51	17	17	7	294
29	34	68	51	34	17	51	17	17	7	294
30	34	68	51	34	17	51	17	17	7	294
31	34	68	51	34	17	51	17	17	7	294
32	34	68	51	34	17	51	17	17	7	294
33	34	68	51	34	17	51	17	17	7	294
34	34	68	51	34	17	51	17	17	7	294
35	34	68	51	34	17	51	17	17	7	294
36	34	68	51	34	17	51	17	17	7	294
37	34	68	51	34	17	51	17	17	7	294
38	34	68	51	34	17	51	17	17	7	294
39	34	68	51	34	17	51	17	17	7	294

40	34	68	51	34	17	51	17	17	7	294

Sub Watershed #402 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	27	54	40	27	13	40	13	13	5	233
2	27	54	40	27	13	40	13	13	5	233
3	27	54	40	27	13	40	13	13	5	233
4	27	54	40	27	13	40	13	13	5	233
5	27	54	40	27	13	40	13	13	5	233
6	27	54	40	27	13	40	13	13	5	233
7	27	54	40	27	13	40	13	13	5	233
8	27	54	40	27	13	40	13	13	5	233
9	27	54	40	27	13	40	13	13	5	233
10	27	54	40	27	13	40	13	13	5	233
11	27	54	40	27	13	40	13	13	5	233
12	27	54	40	27	13	40	13	13	5	233
13	27	54	40	27	13	40	13	13	5	233
14	27	54	40	27	13	40	13	13	5	233
15	27	54	40	27	13	40	13	13	5	233
16	27	54	40	27	13	40	13	13	5	233
17	27	54	40	27	13	40	13	13	5	233
18	27	54	40	27	13	40	13	13	5	233
19	27	54	40	27	13	40	13	13	5	233
20	27	54	40	27	13	40	13	13	5	233
21	27	54	40	27	13	40	13	13	5	233
22	27	54	40	27	13	40	13	13	5	233
23	27	54	40	27	13	40	13	13	5	233
24	27	54	40	27	13	40	13	13	5	233
25	27	54	40	27	13	40	13	13	5	233
26	27	54	40	27	13	40	13	13	5	233
27	27	54	40	27	13	40	13	13	5	233
28	27	54	40	27	13	40	13	13	5	233
29	27	54	40	27	13	40	13	13	5	233
30	27	54	40	27	13	40	13	13	5	233
31	27	54	40	27	13	40	13	13	5	233
32	27	54	40	27	13	40	13	13	5	233
33	27	54	40	27	13	40	13	13	5	233
34	27	54	40	27	13	40	13	13	5	233
35	27	54	40	27	13	40	13	13	5	233
36	27	54	40	27	13	40	13	13	5	233

37	27	54	40	27	13	40	13	13	5	233
38	27	54	40	27	13	40	13	13	5	233
39	27	54	40	27	13	40	13	13	5	233
40	27	54	40	27	13	40	13	13	5	233

Sub Watershed #403 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	43	85	64	43	21	64	21	21	9	371
2	43	85	64	43	21	64	21	21	9	371
3	43	85	64	43	21	64	21	21	9	371
4	43	85	64	43	21	64	21	21	9	371
5	43	85	64	43	21	64	21	21	9	371
6	43	85	64	43	21	64	21	21	9	371
7	43	85	64	43	21	64	21	21	9	371
8	43	85	64	43	21	64	21	21	9	371
9	43	85	64	43	21	64	21	21	9	371
10	43	85	64	43	21	64	21	21	9	371
11	43	85	64	43	21	64	21	21	9	371
12	43	85	64	43	21	64	21	21	9	371
13	43	85	64	43	21	64	21	21	9	371
14	43	85	64	43	21	64	21	21	9	371
15	43	85	64	43	21	64	21	21	9	371
16	43	85	64	43	21	64	21	21	9	371
17	43	85	64	43	21	64	21	21	9	371
18	43	85	64	43	21	64	21	21	9	371
19	43	85	64	43	21	64	21	21	9	371
20	43	85	64	43	21	64	21	21	9	371
21	43	85	64	43	21	64	21	21	9	371
22	43	85	64	43	21	64	21	21	9	371
23	43	85	64	43	21	64	21	21	9	371
24	43	85	64	43	21	64	21	21	9	371
25	43	85	64	43	21	64	21	21	9	371
26	43	85	64	43	21	64	21	21	9	371
27	43	85	64	43	21	64	21	21	9	371
28	43	85	64	43	21	64	21	21	9	371
29	43	85	64	43	21	64	21	21	9	371
30	43	85	64	43	21	64	21	21	9	371
31	43	85	64	43	21	64	21	21	9	371
32	43	85	64	43	21	64	21	21	9	371
33	43	85	64	43	21	64	21	21	9	371

34	43	85	64	43	21	64	21	21	9	371
35	43	85	64	43	21	64	21	21	9	371
36	43	85	64	43	21	64	21	21	9	371
37	43	85	64	43	21	64	21	21	9	371
38	43	85	64	43	21	64	21	21	9	371
39	43	85	64	43	21	64	21	21	9	371
40	43	85	64	43	21	64	21	21	9	371

Sub Watershed #404 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	28	55	41	28	14	41	14	14	6	241
2	28	55	41	28	14	41	14	14	6	241
3	28	55	41	28	14	41	14	14	6	241
4	28	55	41	28	14	41	14	14	6	241
5	28	55	41	28	14	41	14	14	6	241
6	28	55	41	28	14	41	14	14	6	241
7	28	55	41	28	14	41	14	14	6	241
8	28	55	41	28	14	41	14	14	6	241
9	28	55	41	28	14	41	14	14	6	241
10	28	55	41	28	14	41	14	14	6	241
11	28	55	41	28	14	41	14	14	6	241
12	28	55	41	28	14	41	14	14	6	241
13	28	55	41	28	14	41	14	14	6	241
14	28	55	41	28	14	41	14	14	6	241
15	28	55	41	28	14	41	14	14	6	241
16	28	55	41	28	14	41	14	14	6	241
17	28	55	41	28	14	41	14	14	6	241
18	28	55	41	28	14	41	14	14	6	241
19	28	55	41	28	14	41	14	14	6	241
20	28	55	41	28	14	41	14	14	6	241
21	28	55	41	28	14	41	14	14	6	241
22	28	55	41	28	14	41	14	14	6	241
23	28	55	41	28	14	41	14	14	6	241
24	28	55	41	28	14	41	14	14	6	241
25	28	55	41	28	14	41	14	14	6	241
26	28	55	41	28	14	41	14	14	6	241
27	28	55	41	28	14	41	14	14	6	241
28	28	55	41	28	14	41	14	14	6	241
29	28	55	41	28	14	41	14	14	6	241
30	28	55	41	28	14	41	14	14	6	241

31	28	55	41	28	14	41	14	14	6	241
32	28	55	41	28	14	41	14	14	6	241
33	28	55	41	28	14	41	14	14	6	241
34	28	55	41	28	14	41	14	14	6	241
35	28	55	41	28	14	41	14	14	6	241
36	28	55	41	28	14	41	14	14	6	241
37	28	55	41	28	14	41	14	14	6	241
38	28	55	41	28	14	41	14	14	6	241
39	28	55	41	28	14	41	14	14	6	241
40	28	55	41	28	14	41	14	14	6	241

Sub Watershed #405 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	28	57	43	28	14	43	14	14	6	247
2	28	57	43	28	14	43	14	14	6	247
3	28	57	43	28	14	43	14	14	6	247
4	28	57	43	28	14	43	14	14	6	247
5	28	57	43	28	14	43	14	14	6	247
6	28	57	43	28	14	43	14	14	6	247
7	28	57	43	28	14	43	14	14	6	247
8	28	57	43	28	14	43	14	14	6	247
9	28	57	43	28	14	43	14	14	6	247
10	28	57	43	28	14	43	14	14	6	247
11	28	57	43	28	14	43	14	14	6	247
12	28	57	43	28	14	43	14	14	6	247
13	28	57	43	28	14	43	14	14	6	247
14	28	57	43	28	14	43	14	14	6	247
15	28	57	43	28	14	43	14	14	6	247
16	28	57	43	28	14	43	14	14	6	247
17	28	57	43	28	14	43	14	14	6	247
18	28	57	43	28	14	43	14	14	6	247
19	28	57	43	28	14	43	14	14	6	247
20	28	57	43	28	14	43	14	14	6	247
21	28	57	43	28	14	43	14	14	6	247
22	28	57	43	28	14	43	14	14	6	247
23	28	57	43	28	14	43	14	14	6	247
24	28	57	43	28	14	43	14	14	6	247
25	28	57	43	28	14	43	14	14	6	247
26	28	57	43	28	14	43	14	14	6	247
27	28	57	43	28	14	43	14	14	6	247

28	28	57	43	28	14	43	14	14	6	247
29	28	57	43	28	14	43	14	14	6	247
30	28	57	43	28	14	43	14	14	6	247
31	28	57	43	28	14	43	14	14	6	247
32	28	57	43	28	14	43	14	14	6	247
33	28	57	43	28	14	43	14	14	6	247
34	28	57	43	28	14	43	14	14	6	247
35	28	57	43	28	14	43	14	14	6	247
36	28	57	43	28	14	43	14	14	6	247
37	28	57	43	28	14	43	14	14	6	247
38	28	57	43	28	14	43	14	14	6	247
39	28	57	43	28	14	43	14	14	6	247
40	28	57	43	28	14	43	14	14	6	247

Sub Watershed #406 Annual Adoption (treated acres), Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Adoption
1	26	52	39	26	13	39	13	13	5	228
2	26	52	39	26	13	39	13	13	5	228
3	26	52	39	26	13	39	13	13	5	228
4	26	52	39	26	13	39	13	13	5	228
5	26	52	39	26	13	39	13	13	5	228
6	26	52	39	26	13	39	13	13	5	228
7	26	52	39	26	13	39	13	13	5	228
8	26	52	39	26	13	39	13	13	5	228
9	26	52	39	26	13	39	13	13	5	228
10	26	52	39	26	13	39	13	13	5	228
11	26	52	39	26	13	39	13	13	5	228
12	26	52	39	26	13	39	13	13	5	228
13	26	52	39	26	13	39	13	13	5	228
14	26	52	39	26	13	39	13	13	5	228
15	26	52	39	26	13	39	13	13	5	228
16	26	52	39	26	13	39	13	13	5	228
17	26	52	39	26	13	39	13	13	5	228
18	26	52	39	26	13	39	13	13	5	228
19	26	52	39	26	13	39	13	13	5	228
20	26	52	39	26	13	39	13	13	5	228
21	26	52	39	26	13	39	13	13	5	228
22	26	52	39	26	13	39	13	13	5	228
23	26	52	39	26	13	39	13	13	5	228
24	26	52	39	26	13	39	13	13	5	228

25	26	52	39	26	13	39	13	13	5	228
26	26	52	39	26	13	39	13	13	5	228
27	26	52	39	26	13	39	13	13	5	228
28	26	52	39	26	13	39	13	13	5	228
29	26	52	39	26	13	39	13	13	5	228
30	26	52	39	26	13	39	13	13	5	228
31	26	52	39	26	13	39	13	13	5	228
32	26	52	39	26	13	39	13	13	5	228
33	26	52	39	26	13	39	13	13	5	228
34	26	52	39	26	13	39	13	13	5	228
35	26	52	39	26	13	39	13	13	5	228
36	26	52	39	26	13	39	13	13	5	228
37	26	52	39	26	13	39	13	13	5	228
38	26	52	39	26	13	39	13	13	5	228
39	26	52	39	26	13	39	13	13	5	228
40	26	52	39	26	13	39	13	13	5	228

Sub Watershed #201 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	102	102	82	68	17	61	0	17	14	462
2	204	204	163	136	34	122	0	34	27	924
3	306	306	245	204	51	183	0	51	41	1,386
4	408	408	326	272	68	245	0	68	54	1,848
5	510	510	408	340	85	306	0	85	68	2,310
6	612	612	489	408	102	367	0	102	82	2,772
7	713	713	571	476	119	428	0	119	95	3,234
8	815	815	652	544	136	489	0	136	109	3,696
9	917	917	734	612	153	550	0	153	122	4,158
10	1,019	1,019	815	679	170	612	0	170	136	4,621
11	1,121	1,121	897	747	187	673	0	187	149	5,083
12	1,223	1,223	978	815	204	734	0	204	163	5,545
13	1,325	1,325	1,060	883	221	795	0	221	177	6,007
14	1,427	1,427	1,142	951	238	856	0	238	190	6,469
15	1,529	1,529	1,223	1,019	255	917	0	255	204	6,931
16	1,631	1,631	1,305	1,087	272	978	0	272	217	7,393
17	1,73	1,733	1,386	1,155	289	1,040	0	289	231	7,855

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18	1,835	1,835	1,468	1,223	306	1,101	0	306	245	8,317
19	1,937	1,937	1,549	1,291	323	1,162	0	323	258	8,779
20	2,038	2,038	1,631	1,359	340	1,223	0	340	272	9,241
21	2,140	2,140	1,712	1,427	357	1,284	0	357	285	9,703
22	2,242	2,242	1,794	1,495	374	1,345	0	374	299	10,165
23	2,344	2,344	1,875	1,563	391	1,407	0	391	313	10,627
24	2,446	2,446	1,957	1,631	408	1,468	0	408	326	11,089
25	2,548	2,548	2,038	1,699	425	1,529	0	425	340	11,551
26	2,650	2,650	2,120	1,767	442	1,590	0	442	353	12,013
27	2,752	2,752	2,202	1,835	459	1,651	0	459	367	12,475
28	2,854	2,854	2,283	1,903	476	1,712	0	476	381	12,937
29	2,956	2,956	2,365	1,971	493	1,773	0	493	394	13,400
30	3,058	3,058	2,446	2,038	510	1,835	0	510	408	13,862
31	3,160	3,160	2,528	2,106	527	1,896	0	527	421	14,324
32	3,262	3,262	2,609	2,174	544	1,957	0	544	435	14,786
33	3,363	3,363	2,691	2,242	561	2,018	0	561	448	15,248
34	3,465	3,465	2,772	2,310	578	2,079	0	578	462	15,710
35	3,567	3,567	2,854	2,378	595	2,140	0	595	476	16,172
36	3,669	3,669	2,935	2,446	612	2,202	0	612	489	16,634
37	3,771	3,771	3,017	2,514	629	2,263	0	629	503	17,096
38	3,873	3,873	3,098	2,582	646	2,324	0	646	516	17,558
39	3,975	3,975	3,180	2,650	663	2,385	0	663	530	18,020
40	4,077	4,077	3,262	2,718	679	2,446	0	679	544	18,482

Sub Watershed #202 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	87	87	69	58	14	52	0	14	12	393
2	173	173	139	116	29	104	0	29	23	786
3	260	260	208	173	43	156	0	43	35	1,179
4	347	347	277	231	58	208	0	58	46	1,572
5	433	433	347	289	72	260	0	72	58	1,965
6	520	520	416	347	87	312	0	87	69	2,358
7	607	607	485	405	101	364	0	101	81	2,751
8	693	693	555	462	116	416	0	116	92	3,144
9	780	780	624	520	130	468	0	130	104	3,537
10	867	867	693	578	144	520	0	144	116	3,929
11	953	953	763	636	159	572	0	159	127	4,322
12	1,040	1,040	832	693	173	624	0	173	139	4,715
13	1,127	1,127	901	751	188	676	0	188	150	5,108
14	1,214	1,214	971	809	202	728	0	202	162	5,501
15	1,300	1,300	1,040	867	217	780	0	217	173	5,894
16	1,387	1,387	1,109	925	231	832	0	231	185	6,287
17	1,474	1,474	1,179	982	246	884	0	246	196	6,680
18	1,560	1,560	1,248	1,040	260	936	0	260	208	7,073
19	1,647	1,647	1,318	1,098	274	988	0	274	220	7,466
20	1,734	1,734	1,387	1,156	289	1,040	0	289	231	7,859
21	1,820	1,820	1,456	1,214	303	1,092	0	303	243	8,252
22	1,907	1,907	1,526	1,271	318	1,144	0	318	254	8,645
23	1,994	1,994	1,595	1,329	332	1,196	0	332	266	9,038
24	2,080	2,080	1,664	1,387	347	1,248	0	347	277	9,431
25	2,167	2,167	1,734	1,445	361	1,300	0	361	289	9,824
26	2,254	2,254	1,803	1,502	376	1,352	0	376	300	10,217
27	2,340	2,340	1,872	1,560	390	1,404	0	390	312	10,610
28	2,427	2,427	1,942	1,618	405	1,456	0	405	324	11,002
29	2,51	2,514	2,011	1,676	419	1,508	0	419	335	11,395

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30	2,600	2,600	2,080	1,734	433	1,560	0	433	347	11,788
31	2,687	2,687	2,150	1,791	448	1,612	0	448	358	12,181
32	2,774	2,774	2,219	1,849	462	1,664	0	462	370	12,574
33	2,860	2,860	2,288	1,907	477	1,716	0	477	381	12,967
34	2,947	2,947	2,358	1,965	491	1,768	0	491	393	13,360
35	3,034	3,034	2,427	2,023	506	1,820	0	506	405	13,753
36	3,120	3,120	2,496	2,080	520	1,872	0	520	416	14,146
37	3,207	3,207	2,566	2,138	535	1,924	0	535	428	14,539
38	3,294	3,294	2,635	2,196	549	1,976	0	549	439	14,932
39	3,380	3,380	2,704	2,254	563	2,028	0	563	451	15,325
40	3,467	3,467	2,774	2,311	578	2,080	0	578	462	15,718

Sub Watershed #204 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	98	98	78	65	16	59	0	16	13	444
2	196	196	157	131	33	118	0	33	26	888
3	294	294	235	196	49	176	0	49	39	1,332
4	392	392	313	261	65	235	0	65	52	1,776
5	490	490	392	326	82	294	0	82	65	2,220
6	588	588	470	392	98	353	0	98	78	2,664
7	686	686	548	457	114	411	0	114	91	3,108
8	783	783	627	522	131	470	0	131	104	3,552
9	881	881	705	588	147	529	0	147	118	3,996
10	979	979	783	653	163	588	0	163	131	4,440
11	1,077	1,077	862	718	180	646	0	180	144	4,884
12	1,175	1,175	940	783	196	705	0	196	157	5,328
13	1,273	1,273	1,019	849	212	764	0	212	170	5,772
14	1,371	1,371	1,097	914	229	823	0	229	183	6,216
15	1,469	1,469	1,175	979	245	881	0	245	196	6,660

16	1,567	1,567	1,254	1,045	261	940	0	261	209	7,104
17	1,665	1,665	1,332	1,110	277	999	0	277	222	7,548
18	1,763	1,763	1,410	1,175	294	1,058	0	294	235	7,992
19	1,861	1,861	1,489	1,241	310	1,116	0	310	248	8,436
20	1,959	1,959	1,567	1,306	326	1,175	0	326	261	8,880
21	2,057	2,057	1,645	1,371	343	1,234	0	343	274	9,324
22	2,155	2,155	1,724	1,436	359	1,293	0	359	287	9,768
23	2,253	2,253	1,802	1,502	375	1,352	0	375	300	10,212
24	2,350	2,350	1,880	1,567	392	1,410	0	392	313	10,656
25	2,448	2,448	1,959	1,632	408	1,469	0	408	326	11,100
26	2,546	2,546	2,037	1,698	424	1,528	0	424	340	11,544
27	2,644	2,644	2,115	1,763	441	1,587	0	441	353	11,988
28	2,742	2,742	2,194	1,828	457	1,645	0	457	366	12,432
29	2,840	2,840	2,272	1,893	473	1,704	0	473	379	12,875
30	2,938	2,938	2,350	1,959	490	1,763	0	490	392	13,319
31	3,036	3,036	2,429	2,024	506	1,822	0	506	405	13,763
32	3,134	3,134	2,507	2,089	522	1,880	0	522	418	14,207
33	3,232	3,232	2,586	2,155	539	1,939	0	539	431	14,651
34	3,330	3,330	2,664	2,220	555	1,998	0	555	444	15,095
35	3,428	3,428	2,742	2,285	571	2,057	0	571	457	15,539
36	3,526	3,526	2,821	2,350	588	2,115	0	588	470	15,983
37	3,624	3,624	2,899	2,416	604	2,174	0	604	483	16,427
38	3,722	3,722	2,977	2,481	620	2,233	0	620	496	16,871
39	3,820	3,820	3,056	2,546	637	2,292	0	637	509	17,315
40	3,917	3,917	3,134	2,612	653	2,350	0	653	522	17,759

Sub Watershed #205 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	79	79	63	52	13	47	0	13	10	357
2	157	157	126	105	26	94	0	26	21	714
3	236	236	189	157	39	142	0	39	31	1,071
4	315	315	252	210	52	189	0	52	42	1,428
5	394	394	315	262	66	236	0	66	52	1,785
6	472	472	378	315	79	283	0	79	63	2,142
7	551	551	441	367	92	331	0	92	73	2,499
8	630	630	504	420	105	378	0	105	84	2,856
9	709	709	567	472	118	425	0	118	94	3,213
10	787	787	630	525	131	472	0	131	105	3,570
11	866	866	693	577	144	520	0	144	115	3,927
12	945	945	756	630	157	567	0	157	126	4,284
13	1,024	1,024	819	682	171	614	0	171	136	4,641
14	1,102	1,102	882	735	184	661	0	184	147	4,998
15	1,181	1,181	945	787	197	709	0	197	157	5,355
16	1,260	1,260	1,008	840	210	756	0	210	168	5,712
17	1,339	1,339	1,071	892	223	803	0	223	178	6,069
18	1,417	1,417	1,134	945	236	850	0	236	189	6,426
19	1,496	1,496	1,197	997	249	898	0	249	199	6,783
20	1,575	1,575	1,260	1,050	262	945	0	262	210	7,140
21	1,654	1,654	1,323	1,102	276	992	0	276	220	7,497
22	1,732	1,732	1,386	1,155	289	1,039	0	289	231	7,853
23	1,811	1,811	1,449	1,207	302	1,087	0	302	241	8,210
24	1,890	1,890	1,512	1,260	315	1,134	0	315	252	8,567
25	1,969	1,969	1,575	1,312	328	1,181	0	328	262	8,924
26	2,047	2,047	1,638	1,365	341	1,228	0	341	273	9,281
27	2,126	2,126	1,701	1,417	354	1,276	0	354	283	9,638
28	2,205	2,205	1,764	1,470	367	1,323	0	367	294	9,995
29	2,284	2,284	1,827	1,522	381	1,370	0	381	304	10,352

30	2,362	2,362	1,890	1,575	394	1,417	0	394	315	10,709
31	2,441	2,441	1,953	1,627	407	1,465	0	407	325	11,066
32	2,520	2,520	2,016	1,680	420	1,512	0	420	336	11,423
33	2,599	2,599	2,079	1,732	433	1,559	0	433	346	11,780
34	2,677	2,677	2,142	1,785	446	1,606	0	446	357	12,137
35	2,756	2,756	2,205	1,837	459	1,654	0	459	367	12,494
36	2,835	2,835	2,268	1,890	472	1,701	0	472	378	12,851
37	2,914	2,914	2,331	1,942	486	1,748	0	486	388	13,208
38	2,992	2,992	2,394	1,995	499	1,795	0	499	399	13,565
39	3,071	3,071	2,457	2,047	512	1,843	0	512	409	13,922
40	3,150	3,150	2,520	2,100	525	1,890	0	525	420	14,279

Sub Watershed #206 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	87	87	70	58	15	52	0	15	12	395
2	174	174	140	116	29	105	0	29	23	791
3	262	262	209	174	44	157	0	44	35	1,186
4	349	349	279	233	58	209	0	58	47	1,581
5	436	436	349	291	73	262	0	73	58	1,976
6	523	523	419	349	87	314	0	87	70	2,372
7	610	610	488	407	102	366	0	102	81	2,767
8	698	698	558	465	116	419	0	116	93	3,162
9	785	785	628	523	131	471	0	131	105	3,557
10	872	872	698	581	145	523	0	145	116	3,953
11	959	959	767	639	160	575	0	160	128	4,348
12	1,046	1,046	837	698	174	628	0	174	140	4,743
13	1,133	1,133	907	756	189	680	0	189	151	5,138
14	1,221	1,221	977	814	203	732	0	203	163	5,534
15	1,308	1,308	1,046	872	218	785	0	218	174	5,929
16	1,395	1,395	1,116	930	233	837	0	233	186	6,324

17	1,482	1,482	1,186	988	247	889	0	247	198	6,719
18	1,569	1,569	1,256	1,046	262	942	0	262	209	7,115
19	1,657	1,657	1,325	1,104	276	994	0	276	221	7,510
20	1,744	1,744	1,395	1,163	291	1,046	0	291	233	7,905
21	1,831	1,831	1,465	1,221	305	1,099	0	305	244	8,300
22	1,918	1,918	1,535	1,279	320	1,151	0	320	256	8,696
23	2,005	2,005	1,604	1,337	334	1,203	0	334	267	9,091
24	2,093	2,093	1,674	1,395	349	1,256	0	349	279	9,486
25	2,180	2,180	1,744	1,453	363	1,308	0	363	291	9,882
26	2,267	2,267	1,814	1,511	378	1,360	0	378	302	10,277
27	2,354	2,354	1,883	1,569	392	1,412	0	392	314	10,672
28	2,441	2,441	1,953	1,628	407	1,465	0	407	326	11,067
29	2,529	2,529	2,023	1,686	421	1,517	0	421	337	11,463
30	2,616	2,616	2,093	1,744	436	1,569	0	436	349	11,858
31	2,703	2,703	2,162	1,802	450	1,622	0	450	360	12,253
32	2,790	2,790	2,232	1,860	465	1,674	0	465	372	12,648
33	2,877	2,877	2,302	1,918	480	1,726	0	480	384	13,044
34	2,964	2,964	2,372	1,976	494	1,779	0	494	395	13,439
35	3,052	3,052	2,441	2,034	509	1,831	0	509	407	13,834
36	3,139	3,139	2,511	2,093	523	1,883	0	523	419	14,229
37	3,226	3,226	2,581	2,151	538	1,936	0	538	430	14,625
38	3,313	3,313	2,651	2,209	552	1,988	0	552	442	15,020
39	3,400	3,400	2,720	2,267	567	2,040	0	567	453	15,415
40	3,488	3,488	2,790	2,325	581	2,093	0	581	465	15,810

Sub Watershed #207 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	96	96	77	64	16	58	0	16	13	436
2	192	192	154	128	32	115	0	32	26	872
3	288	288	231	192	48	173	0	48	38	1,308
4	385	385	308	256	64	231	0	64	51	1,743
5	481	481	385	320	80	288	0	80	64	2,179
6	577	577	461	385	96	346	0	96	77	2,615
7	673	673	538	449	112	404	0	112	90	3,051
8	769	769	615	513	128	461	0	128	103	3,487
9	865	865	692	577	144	519	0	144	115	3,923
10	961	961	769	641	160	577	0	160	128	4,359
11	1,058	1,058	846	705	176	635	0	176	141	4,794
12	1,154	1,154	923	769	192	692	0	192	154	5,230
13	1,250	1,250	1,000	833	208	750	0	208	167	5,666
14	1,346	1,346	1,077	897	224	808	0	224	179	6,102
15	1,442	1,442	1,154	961	240	865	0	240	192	6,538
16	1,538	1,538	1,231	1,026	256	923	0	256	205	6,974
17	1,634	1,634	1,308	1,090	272	981	0	272	218	7,410
18	1,731	1,731	1,384	1,154	288	1,038	0	288	231	7,845
19	1,827	1,827	1,461	1,218	304	1,096	0	304	244	8,281
20	1,923	1,923	1,538	1,282	320	1,154	0	320	256	8,717
21	2,019	2,019	1,615	1,346	337	1,211	0	337	269	9,153
22	2,115	2,115	1,692	1,410	353	1,269	0	353	282	9,589
23	2,211	2,211	1,769	1,474	369	1,327	0	369	295	10,025
24	2,307	2,307	1,846	1,538	385	1,384	0	385	308	10,461
25	2,404	2,404	1,923	1,602	401	1,442	0	401	320	10,896
26	2,500	2,500	2,000	1,667	417	1,500	0	417	333	11,332
27	2,596	2,596	2,077	1,731	433	1,558	0	433	346	11,768
28	2,692	2,692	2,154	1,795	449	1,615	0	449	359	12,204

29	2,788	2,788	2,231	1,859	465	1,673	0	465	372	12,640
30	2,884	2,884	2,307	1,923	481	1,731	0	481	385	13,076
31	2,980	2,980	2,384	1,987	497	1,788	0	497	397	13,512
32	3,077	3,077	2,461	2,051	513	1,846	0	513	410	13,947
33	3,173	3,173	2,538	2,115	529	1,904	0	529	423	14,383
34	3,269	3,269	2,615	2,179	545	1,961	0	545	436	14,819
35	3,365	3,365	2,692	2,243	561	2,019	0	561	449	15,255
36	3,461	3,461	2,769	2,307	577	2,077	0	577	461	15,691
37	3,557	3,557	2,846	2,372	593	2,134	0	593	474	16,127
38	3,653	3,653	2,923	2,436	609	2,192	0	609	487	16,563
39	3,750	3,750	3,000	2,500	625	2,250	0	625	500	16,998
40	3,846	3,846	3,077	2,564	641	2,307	0	641	513	17,434

Sub Watershed #208 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	101	101	81	67	17	61	0	17	13	458
2	202	202	162	135	34	121	0	34	27	917
3	303	303	243	202	51	182	0	51	40	1,375
4	405	405	324	270	67	243	0	67	54	1,834
5	506	506	405	337	84	303	0	84	67	2,292
6	607	607	485	405	101	364	0	101	81	2,751
7	708	708	566	472	118	425	0	118	94	3,209
8	809	809	647	539	135	485	0	135	108	3,668
9	910	910	728	607	152	546	0	152	121	4,126
10	1,011	1,011	809	674	169	607	0	169	135	4,585
11	1,112	1,112	890	742	185	667	0	185	148	5,043
12	1,214	1,214	971	809	202	728	0	202	162	5,502
13	1,315	1,315	1,052	876	219	789	0	219	175	5,960
14	1,416	1,416	1,133	944	236	849	0	236	189	6,418
15	1,51	1,517	1,214	1,011	253	910	0	253	202	6,877

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16	1,618	1,618	1,294	1,079	270	971	0	270	216	7,335
17	1,719	1,719	1,375	1,146	287	1,032	0	287	229	7,794
18	1,820	1,820	1,456	1,214	303	1,092	0	303	243	8,252
19	1,921	1,921	1,537	1,281	320	1,153	0	320	256	8,711
20	2,023	2,023	1,618	1,348	337	1,214	0	337	270	9,169
21	2,124	2,124	1,699	1,416	354	1,274	0	354	283	9,628
22	2,225	2,225	1,780	1,483	371	1,335	0	371	297	10,086
23	2,326	2,326	1,861	1,551	388	1,396	0	388	310	10,545
24	2,427	2,427	1,942	1,618	405	1,456	0	405	324	11,003
25	2,528	2,528	2,023	1,686	421	1,517	0	421	337	11,461
26	2,629	2,629	2,104	1,753	438	1,578	0	438	351	11,920
27	2,731	2,731	2,184	1,820	455	1,638	0	455	364	12,378
28	2,832	2,832	2,265	1,888	472	1,699	0	472	378	12,837
29	2,933	2,933	2,346	1,955	489	1,760	0	489	391	13,295
30	3,034	3,034	2,427	2,023	506	1,820	0	506	405	13,754
31	3,135	3,135	2,508	2,090	523	1,881	0	523	418	14,212
32	3,236	3,236	2,589	2,157	539	1,942	0	539	431	14,671
33	3,337	3,337	2,670	2,225	556	2,002	0	556	445	15,129
34	3,438	3,438	2,751	2,292	573	2,063	0	573	458	15,588
35	3,540	3,540	2,832	2,360	590	2,124	0	590	472	16,046
36	3,641	3,641	2,913	2,427	607	2,184	0	607	485	16,505
37	3,742	3,742	2,993	2,495	624	2,245	0	624	499	16,963
38	3,843	3,843	3,074	2,562	640	2,306	0	640	512	17,421
39	3,944	3,944	3,155	2,629	657	2,366	0	657	526	17,880
40	4,045	4,045	3,236	2,697	674	2,427	0	674	539	18,338

Sub Watershed #301 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	107	107	86	72	18	64	0	18	14	486
2	215	215	172	143	36	129	0	36	29	973
3	322	322	258	215	54	193	0	54	43	1,459
4	429	429	343	286	72	258	0	72	57	1,946
5	537	537	429	358	89	322	0	89	72	2,432
6	644	644	515	429	107	386	0	107	86	2,919
7	751	751	601	501	125	451	0	125	100	3,405
8	858	858	687	572	143	515	0	143	114	3,892
9	966	966	773	644	161	579	0	161	129	4,378
10	1,073	1,073	858	715	179	644	0	179	143	4,865
11	1,180	1,180	944	787	197	708	0	197	157	5,351
12	1,288	1,288	1,030	858	215	773	0	215	172	5,838
13	1,395	1,395	1,116	930	233	837	0	233	186	6,324
14	1,502	1,502	1,202	1,002	250	901	0	250	200	6,811
15	1,610	1,610	1,288	1,073	268	966	0	268	215	7,297
16	1,717	1,717	1,374	1,145	286	1,030	0	286	229	7,784
17	1,824	1,824	1,459	1,216	304	1,095	0	304	243	8,270
18	1,932	1,932	1,545	1,288	322	1,159	0	322	258	8,756
19	2,039	2,039	1,631	1,359	340	1,223	0	340	272	9,243
20	2,146	2,146	1,717	1,431	358	1,288	0	358	286	9,729
21	2,254	2,254	1,803	1,502	376	1,352	0	376	300	10,216
22	2,361	2,361	1,889	1,574	393	1,416	0	393	315	10,702
23	2,468	2,468	1,974	1,645	411	1,481	0	411	329	11,189
24	2,575	2,575	2,060	1,717	429	1,545	0	429	343	11,675
25	2,683	2,683	2,146	1,788	447	1,610	0	447	358	12,162
26	2,790	2,790	2,232	1,860	465	1,674	0	465	372	12,648
27	2,897	2,897	2,318	1,932	483	1,738	0	483	386	13,135

28	3,005	3,005	2,404	2,003	501	1,803	0	501	401	13,621
29	3,112	3,112	2,490	2,075	519	1,867	0	519	415	14,108
30	3,219	3,219	2,575	2,146	537	1,932	0	537	429	14,594
31	3,327	3,327	2,661	2,218	554	1,996	0	554	444	15,081
32	3,434	3,434	2,747	2,289	572	2,060	0	572	458	15,567
33	3,541	3,541	2,833	2,361	590	2,125	0	590	472	16,054
34	3,649	3,649	2,919	2,432	608	2,189	0	608	486	16,540
35	3,756	3,756	3,005	2,504	626	2,254	0	626	501	17,026
36	3,863	3,863	3,091	2,575	644	2,318	0	644	515	17,513
37	3,970	3,970	3,176	2,647	662	2,382	0	662	529	17,999
38	4,078	4,078	3,262	2,719	680	2,447	0	680	544	18,486
39	4,185	4,185	3,348	2,790	698	2,511	0	698	558	18,972
40	4,292	4,292	3,434	2,862	715	2,575	0	715	572	19,459

Sub Watershed #302 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	73	73	58	49	12	44	0	12	10	330
2	146	146	117	97	24	87	0	24	19	661
3	219	219	175	146	36	131	0	36	29	991
4	292	292	233	194	49	175	0	49	39	1,321
5	364	364	292	243	61	219	0	61	49	1,652
6	437	437	350	292	73	262	0	73	58	1,982
7	510	510	408	340	85	306	0	85	68	2,313
8	583	583	466	389	97	350	0	97	78	2,643
9	656	656	525	437	109	394	0	109	87	2,973
10	729	729	583	486	121	437	0	121	97	3,304
11	802	802	641	534	134	481	0	134	107	3,634
12	875	875	700	583	146	525	0	146	117	3,964
13	947	947	758	632	158	568	0	158	126	4,295
14	1,020	1,020	816	680	170	612	0	170	136	4,625
15	1,093	1,093	875	729	182	656	0	182	146	4,956

16	1,166	1,166	933	777	194	700	0	194	155	5,286
17	1,239	1,239	991	826	206	743	0	206	165	5,616
18	1,312	1,312	1,049	875	219	787	0	219	175	5,947
19	1,385	1,385	1,108	923	231	831	0	231	185	6,277
20	1,458	1,458	1,166	972	243	875	0	243	194	6,607
21	1,530	1,530	1,224	1,020	255	918	0	255	204	6,938
22	1,603	1,603	1,283	1,069	267	962	0	267	214	7,268
23	1,676	1,676	1,341	1,117	279	1,006	0	279	223	7,598
24	1,749	1,749	1,399	1,166	292	1,049	0	292	233	7,929
25	1,822	1,822	1,458	1,215	304	1,093	0	304	243	8,259
26	1,895	1,895	1,516	1,263	316	1,137	0	316	253	8,590
27	1,968	1,968	1,574	1,312	328	1,181	0	328	262	8,920
28	2,041	2,041	1,632	1,360	340	1,224	0	340	272	9,250
29	2,113	2,113	1,691	1,409	352	1,268	0	352	282	9,581
30	2,186	2,186	1,749	1,458	364	1,312	0	364	292	9,911
31	2,259	2,259	1,807	1,506	377	1,355	0	377	301	10,241
32	2,332	2,332	1,866	1,555	389	1,399	0	389	311	10,572
33	2,405	2,405	1,924	1,603	401	1,443	0	401	321	10,902
34	2,478	2,478	1,982	1,652	413	1,487	0	413	330	11,233
35	2,551	2,551	2,041	1,700	425	1,530	0	425	340	11,563
36	2,624	2,624	2,099	1,749	437	1,574	0	437	350	11,893
37	2,696	2,696	2,157	1,798	449	1,618	0	449	360	12,224
38	2,769	2,769	2,215	1,846	462	1,662	0	462	369	12,554
39	2,842	2,842	2,274	1,895	474	1,705	0	474	379	12,884
40	2,915	2,915	2,332	1,943	486	1,749	0	486	389	13,215

Sub Watershed #304 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	18	18	15	12	3	11	0	3	2	84
2	37	37	30	25	6	22	0	6	5	167
3	55	55	44	37	9	33	0	9	7	251
4	74	74	59	49	12	44	0	12	10	335
5	92	92	74	62	15	55	0	15	12	419
6	111	111	89	74	18	67	0	18	15	502
7	129	129	103	86	22	78	0	22	17	586
8	148	148	118	99	25	89	0	25	20	670
9	166	166	133	111	28	100	0	28	22	754
10	185	185	148	123	31	111	0	31	25	837
11	203	203	163	135	34	122	0	34	27	921
12	222	222	177	148	37	133	0	37	30	1,005
13	240	240	192	160	40	144	0	40	32	1,089
14	259	259	207	172	43	155	0	43	34	1,172
15	277	277	222	185	46	166	0	46	37	1,256
16	296	296	236	197	49	177	0	49	39	1,340
17	314	314	251	209	52	188	0	52	42	1,424
18	333	333	266	222	55	200	0	55	44	1,507
19	351	351	281	234	58	211	0	58	47	1,591
20	369	369	296	246	62	222	0	62	49	1,675
21	388	388	310	259	65	233	0	65	52	1,759
22	406	406	325	271	68	244	0	68	54	1,842
23	425	425	340	283	71	255	0	71	57	1,926
24	443	443	355	296	74	266	0	74	59	2,010
25	462	462	369	308	77	277	0	77	62	2,094
26	480	480	384	320	80	288	0	80	64	2,177
27	499	499	399	333	83	299	0	83	67	2,261
28	517	517	414	345	86	310	0	86	69	2,345
29	536	536	429	357	89	321	0	89	71	2,429
30	554	554	443	369	92	333	0	92	74	2,512
31	573	573	458	382	95	344	0	95	76	2,596
32	591	591	473	394	99	355	0	99	79	2,680
33	610	610	488	406	102	366	0	102	81	2,764
34	628	628	502	419	105	377	0	105	84	2,847
35	647	647	517	431	108	388	0	108	86	2,931
36	665	665	532	443	111	399	0	111	89	3,015
37	684	684	547	456	114	410	0	114	91	3,099
38	702	702	562	468	117	421	0	117	94	3,182
39	720	720	576	480	120	432	0	120	96	3,266

40	739	739	591	493	123	443	0	123	99	3,350

Sub Watershed #305 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	85	85	68	57	14	51	0	14	11	385
2	170	170	136	113	28	102	0	28	23	771
3	255	255	204	170	42	153	0	42	34	1,156
4	340	340	272	227	57	204	0	57	45	1,541
5	425	425	340	283	71	255	0	71	57	1,927
6	510	510	408	340	85	306	0	85	68	2,312
7	595	595	476	397	99	357	0	99	79	2,697
8	680	680	544	453	113	408	0	113	91	3,083
9	765	765	612	510	127	459	0	127	102	3,468
10	850	850	680	567	142	510	0	142	113	3,853
11	935	935	748	623	156	561	0	156	125	4,239
12	1,020	1,020	816	680	170	612	0	170	136	4,624
13	1,105	1,105	884	737	184	663	0	184	147	5,009
14	1,190	1,190	952	793	198	714	0	198	159	5,395
15	1,275	1,275	1,020	850	212	765	0	212	170	5,780
16	1,360	1,360	1,088	907	227	816	0	227	181	6,165
17	1,445	1,445	1,156	963	241	867	0	241	193	6,551
18	1,530	1,530	1,224	1,020	255	918	0	255	204	6,936
19	1,615	1,615	1,292	1,077	269	969	0	269	215	7,321
20	1,700	1,700	1,360	1,133	283	1,020	0	283	227	7,707
21	1,785	1,785	1,428	1,190	297	1,071	0	297	238	8,092
22	1,870	1,870	1,496	1,247	312	1,122	0	312	249	8,477
23	1,955	1,955	1,564	1,303	326	1,173	0	326	261	8,862
24	2,040	2,040	1,632	1,360	340	1,224	0	340	272	9,248
25	2,125	2,125	1,700	1,417	354	1,275	0	354	283	9,633
26	2,210	2,210	1,768	1,473	368	1,326	0	368	295	10,018
27	2,29	2,295	1,836	1,530	382	1,377	0	382	306	10,404

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28	2,380	2,380	1,904	1,587	397	1,428	0	397	317	10,789
29	2,465	2,465	1,972	1,643	411	1,479	0	411	329	11,174
30	2,550	2,550	2,040	1,700	425	1,530	0	425	340	11,560
31	2,635	2,635	2,108	1,757	439	1,581	0	439	351	11,945
32	2,720	2,720	2,176	1,813	453	1,632	0	453	363	12,330
33	2,805	2,805	2,244	1,870	467	1,683	0	467	374	12,716
34	2,890	2,890	2,312	1,927	482	1,734	0	482	385	13,101
35	2,975	2,975	2,380	1,983	496	1,785	0	496	397	13,486
36	3,060	3,060	2,448	2,040	510	1,836	0	510	408	13,872
37	3,145	3,145	2,516	2,097	524	1,887	0	524	419	14,257
38	3,230	3,230	2,584	2,153	538	1,938	0	538	431	14,642
39	3,315	3,315	2,652	2,210	552	1,989	0	552	442	15,028
40	3,400	3,400	2,720	2,267	567	2,040	0	567	453	15,413

Sub Watershed #306 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	60	60	48	40	10	36	0	10	8	273
2	120	120	96	80	20	72	0	20	16	546
3	181	181	144	120	30	108	0	30	24	819
4	241	241	193	161	40	144	0	40	32	1,092
5	301	301	241	201	50	181	0	50	40	1,365
6	361	361	289	241	60	217	0	60	48	1,638
7	421	421	337	281	70	253	0	70	56	1,911
8	482	482	385	321	80	289	0	80	64	2,183
9	542	542	433	361	90	325	0	90	72	2,456
10	602	602	482	401	100	361	0	100	80	2,729
11	662	662	530	442	110	397	0	110	88	3,002
12	722	722	578	482	120	433	0	120	96	3,275
13	783	783	626	522	130	470	0	130	104	3,548
14	843	843	674	562	140	506	0	140	112	3,821
15	903	903	722	602	151	542	0	151	120	4,094

16	963	963	771	642	161	578	0	161	128	4,367
17	1,023	1,023	819	682	171	614	0	171	136	4,640
18	1,084	1,084	867	722	181	650	0	181	144	4,913
19	1,144	1,144	915	763	191	686	0	191	153	5,186
20	1,204	1,204	963	803	201	722	0	201	161	5,459
21	1,264	1,264	1,011	843	211	759	0	211	169	5,732
22	1,325	1,325	1,060	883	221	795	0	221	177	6,005
23	1,385	1,385	1,108	923	231	831	0	231	185	6,277
24	1,445	1,445	1,156	963	241	867	0	241	193	6,550
25	1,505	1,505	1,204	1,003	251	903	0	251	201	6,823
26	1,565	1,565	1,252	1,044	261	939	0	261	209	7,096
27	1,626	1,626	1,300	1,084	271	975	0	271	217	7,369
28	1,686	1,686	1,349	1,124	281	1,011	0	281	225	7,642
29	1,746	1,746	1,397	1,164	291	1,048	0	291	233	7,915
30	1,806	1,806	1,445	1,204	301	1,084	0	301	241	8,188
31	1,866	1,866	1,493	1,244	311	1,120	0	311	249	8,461
32	1,927	1,927	1,541	1,284	321	1,156	0	321	257	8,734
33	1,987	1,987	1,589	1,325	331	1,192	0	331	265	9,007
34	2,047	2,047	1,638	1,365	341	1,228	0	341	273	9,280
35	2,107	2,107	1,686	1,405	351	1,264	0	351	281	9,553
36	2,167	2,167	1,734	1,445	361	1,300	0	361	289	9,826
37	2,228	2,228	1,782	1,485	371	1,337	0	371	297	10,098
38	2,288	2,288	1,830	1,525	381	1,373	0	381	305	10,371
39	2,348	2,348	1,878	1,565	391	1,409	0	391	313	10,644
40	2,408	2,408	1,927	1,605	401	1,445	0	401	321	10,917

Sub Watershed #307 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	71	71	57	48	12	43	0	12	10	323
2	143	143	114	95	24	86	0	24	19	646
3	214	214	171	143	36	128	0	36	29	969
4	285	285	228	190	48	171	0	48	38	1,292
5	356	356	285	238	59	214	0	59	48	1,615
6	428	428	342	285	71	257	0	71	57	1,938
7	499	499	399	333	83	299	0	83	67	2,261
8	570	570	456	380	95	342	0	95	76	2,584
9	641	641	513	428	107	385	0	107	86	2,907
10	713	713	570	475	119	428	0	119	95	3,230
11	784	784	627	523	131	470	0	131	105	3,553
12	855	855	684	570	143	513	0	143	114	3,876
13	926	926	741	618	154	556	0	154	124	4,199
14	998	998	798	665	166	599	0	166	133	4,522
15	1,069	1,069	855	713	178	641	0	178	143	4,845
16	1,140	1,140	912	760	190	684	0	190	152	5,168
17	1,211	1,211	969	808	202	727	0	202	162	5,492
18	1,283	1,283	1,026	855	214	770	0	214	171	5,815
19	1,354	1,354	1,083	903	226	812	0	226	181	6,138
20	1,425	1,425	1,140	950	238	855	0	238	190	6,461
21	1,496	1,496	1,197	998	249	898	0	249	200	6,784
22	1,568	1,568	1,254	1,045	261	941	0	261	209	7,107
23	1,639	1,639	1,311	1,093	273	983	0	273	219	7,430
24	1,710	1,710	1,368	1,140	285	1,026	0	285	228	7,753
25	1,781	1,781	1,425	1,188	297	1,069	0	297	238	8,076
26	1,853	1,853	1,482	1,235	309	1,112	0	309	247	8,399
27	1,924	1,924	1,539	1,283	321	1,154	0	321	257	8,722
28	1,995	1,995	1,596	1,330	333	1,197	0	333	266	9,045
29	2,066	2,066	1,653	1,378	344	1,240	0	344	276	9,368
30	2,13	2,138	1,710	1,425	356	1,283	0	356	285	9,691

	8									
31	2,209	2,209	1,767	1,473	368	1,325	0	368	295	10,014
32	2,280	2,280	1,824	1,520	380	1,368	0	380	304	10,337
33	2,351	2,351	1,881	1,568	392	1,411	0	392	314	10,660
34	2,423	2,423	1,938	1,615	404	1,454	0	404	323	10,983
35	2,494	2,494	1,995	1,663	416	1,496	0	416	333	11,306
36	2,565	2,565	2,052	1,710	428	1,539	0	428	342	11,629
37	2,637	2,637	2,109	1,758	439	1,582	0	439	352	11,952
38	2,708	2,708	2,166	1,805	451	1,625	0	451	361	12,275
39	2,779	2,779	2,223	1,853	463	1,667	0	463	371	12,598
40	2,850	2,850	2,280	1,900	475	1,710	0	475	380	12,921

Sub Watershed #401 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	99	99	79	66	17	60	0	17	13	450
2	198	198	159	132	33	119	0	33	26	900
3	298	298	238	198	50	179	0	50	40	1,350
4	397	397	318	265	66	238	0	66	53	1,800
5	496	496	397	331	83	298	0	83	66	2,250
6	595	595	476	397	99	357	0	99	79	2,700
7	695	695	556	463	116	417	0	116	93	3,150
8	794	794	635	529	132	476	0	132	106	3,599
9	893	893	715	595	149	536	0	149	119	4,049
10	992	992	794	662	165	595	0	165	132	4,499
11	1,092	1,092	873	728	182	655	0	182	146	4,949
12	1,191	1,191	953	794	198	715	0	198	159	5,399
13	1,290	1,290	1,032	860	215	774	0	215	172	5,849
14	1,389	1,389	1,112	926	232	834	0	232	185	6,299
15	1,489	1,489	1,191	992	248	893	0	248	198	6,749
16	1,588	1,588	1,270	1,059	265	953	0	265	212	7,199

17	1,687	1,687	1,350	1,125	281	1,012	0	281	225	7,649
18	1,786	1,786	1,429	1,191	298	1,072	0	298	238	8,099
19	1,886	1,886	1,509	1,257	314	1,131	0	314	251	8,549
20	1,985	1,985	1,588	1,323	331	1,191	0	331	265	8,999
21	2,084	2,084	1,667	1,389	347	1,251	0	347	278	9,449
22	2,183	2,183	1,747	1,456	364	1,310	0	364	291	9,899
23	2,283	2,283	1,826	1,522	380	1,370	0	380	304	10,348
24	2,382	2,382	1,906	1,588	397	1,429	0	397	318	10,798
25	2,481	2,481	1,985	1,654	414	1,489	0	414	331	11,248
26	2,580	2,580	2,064	1,720	430	1,548	0	430	344	11,698
27	2,680	2,680	2,144	1,786	447	1,608	0	447	357	12,148
28	2,779	2,779	2,223	1,853	463	1,667	0	463	371	12,598
29	2,878	2,878	2,303	1,919	480	1,727	0	480	384	13,048
30	2,977	2,977	2,382	1,985	496	1,786	0	496	397	13,498
31	3,077	3,077	2,461	2,051	513	1,846	0	513	410	13,948
32	3,176	3,176	2,541	2,117	529	1,906	0	529	423	14,398
33	3,275	3,275	2,620	2,183	546	1,965	0	546	437	14,848
34	3,374	3,374	2,700	2,250	562	2,025	0	562	450	15,298
35	3,474	3,474	2,779	2,316	579	2,084	0	579	463	15,748
36	3,573	3,573	2,858	2,382	595	2,144	0	595	476	16,198
37	3,672	3,672	2,938	2,448	612	2,203	0	612	490	16,647
38	3,771	3,771	3,017	2,514	629	2,263	0	629	503	17,097
39	3,871	3,871	3,097	2,580	645	2,322	0	645	516	17,547
40	3,970	3,970	3,176	2,647	662	2,382	0	662	529	17,997

Sub Watershed #402 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	79	79	63	53	13	47	0	13	11	358
2	158	158	126	105	26	95	0	26	21	715
3	237	237	189	158	39	142	0	39	32	1,073
4	316	316	252	210	53	189	0	53	42	1,431
5	394	394	316	263	66	237	0	66	53	1,788
6	473	473	379	316	79	284	0	79	63	2,146
7	552	552	442	368	92	331	0	92	74	2,504
8	631	631	505	421	105	379	0	105	84	2,861
9	710	710	568	473	118	426	0	118	95	3,219
10	789	789	631	526	131	473	0	131	105	3,577
11	868	868	694	579	145	521	0	145	116	3,934
12	947	947	757	631	158	568	0	158	126	4,292
13	1,026	1,026	820	684	171	615	0	171	137	4,649
14	1,105	1,105	884	736	184	663	0	184	147	5,007
15	1,183	1,183	947	789	197	710	0	197	158	5,365
16	1,262	1,262	1,010	842	210	757	0	210	168	5,722
17	1,341	1,341	1,073	894	224	805	0	224	179	6,080
18	1,420	1,420	1,136	947	237	852	0	237	189	6,438
19	1,499	1,499	1,199	999	250	899	0	250	200	6,795
20	1,578	1,578	1,262	1,052	263	947	0	263	210	7,153
21	1,657	1,657	1,325	1,105	276	994	0	276	221	7,511
22	1,736	1,736	1,389	1,157	289	1,041	0	289	231	7,868
23	1,815	1,815	1,452	1,210	302	1,089	0	302	242	8,226
24	1,893	1,893	1,515	1,262	316	1,136	0	316	252	8,584
25	1,972	1,972	1,578	1,315	329	1,183	0	329	263	8,941
26	2,051	2,051	1,641	1,367	342	1,231	0	342	273	9,299
27	2,130	2,130	1,704	1,420	355	1,278	0	355	284	9,657
28	2,209	2,209	1,767	1,473	368	1,325	0	368	295	10,014
29	2,288	2,288	1,830	1,525	381	1,373	0	381	305	10,372

30	2,367	2,367	1,893	1,578	394	1,420	0	394	316	10,730
31	2,446	2,446	1,957	1,630	408	1,467	0	408	326	11,087
32	2,525	2,525	2,020	1,683	421	1,515	0	421	337	11,445
33	2,603	2,603	2,083	1,736	434	1,562	0	434	347	11,803
34	2,682	2,682	2,146	1,788	447	1,609	0	447	358	12,160
35	2,761	2,761	2,209	1,841	460	1,657	0	460	368	12,518
36	2,840	2,840	2,272	1,893	473	1,704	0	473	379	12,875
37	2,919	2,919	2,335	1,946	487	1,751	0	487	389	13,233
38	2,998	2,998	2,398	1,999	500	1,799	0	500	400	13,591
39	3,077	3,077	2,461	2,051	513	1,846	0	513	410	13,948
40	3,156	3,156	2,525	2,104	526	1,893	0	526	421	14,306

Sub Watershed #403 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	126	126	100	84	21	75	0	21	17	569
2	251	251	201	167	42	151	0	42	33	1,138
3	377	377	301	251	63	226	0	63	50	1,707
4	502	502	402	335	84	301	0	84	67	2,276
5	628	628	502	418	105	377	0	105	84	2,845
6	753	753	602	502	126	452	0	126	100	3,414
7	879	879	703	586	146	527	0	146	117	3,983
8	1,004	1,004	803	669	167	602	0	167	134	4,552
9	1,130	1,130	904	753	188	678	0	188	151	5,121
10	1,255	1,255	1,004	837	209	753	0	209	167	5,690
11	1,381	1,381	1,105	920	230	828	0	230	184	6,259
12	1,506	1,506	1,205	1,004	251	904	0	251	201	6,828
13	1,632	1,632	1,305	1,088	272	979	0	272	218	7,397
14	1,757	1,757	1,406	1,171	293	1,054	0	293	234	7,966
15	1,88	1,883	1,506	1,255	314	1,130	0	314	251	8,535

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16	2,008	2,008	1,607	1,339	335	1,205	0	335	268	9,104
17	2,134	2,134	1,707	1,422	356	1,280	0	356	284	9,673
18	2,259	2,259	1,807	1,506	377	1,356	0	377	301	10,242
19	2,385	2,385	1,908	1,590	397	1,431	0	397	318	10,811
20	2,510	2,510	2,008	1,674	418	1,506	0	418	335	11,380
21	2,636	2,636	2,109	1,757	439	1,581	0	439	351	11,949
22	2,761	2,761	2,209	1,841	460	1,657	0	460	368	12,518
23	2,887	2,887	2,309	1,925	481	1,732	0	481	385	13,087
24	3,012	3,012	2,410	2,008	502	1,807	0	502	402	13,656
25	3,138	3,138	2,510	2,092	523	1,883	0	523	418	14,225
26	3,263	3,263	2,611	2,176	544	1,958	0	544	435	14,794
27	3,389	3,389	2,711	2,259	565	2,033	0	565	452	15,363
28	3,514	3,514	2,812	2,343	586	2,109	0	586	469	15,932
29	3,640	3,640	2,912	2,427	607	2,184	0	607	485	16,501
30	3,765	3,765	3,012	2,510	628	2,259	0	628	502	17,070
31	3,891	3,891	3,113	2,594	648	2,335	0	648	519	17,639
32	4,016	4,016	3,213	2,678	669	2,410	0	669	536	18,208
33	4,142	4,142	3,314	2,761	690	2,485	0	690	552	18,777
34	4,267	4,267	3,414	2,845	711	2,560	0	711	569	19,346
35	4,393	4,393	3,514	2,929	732	2,636	0	732	586	19,915
36	4,519	4,519	3,615	3,012	753	2,711	0	753	602	20,484
37	4,644	4,644	3,715	3,096	774	2,786	0	774	619	21,053
38	4,770	4,770	3,816	3,180	795	2,862	0	795	636	21,622
39	4,895	4,895	3,916	3,263	816	2,937	0	816	653	22,191
40	5,021	5,021	4,016	3,347	837	3,012	0	837	669	22,760

Sub Watershed #404 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	81	81	65	54	14	49	0	14	11	368
2	163	163	130	108	27	98	0	27	22	737
3	244	244	195	163	41	146	0	41	33	1,105
4	325	325	260	217	54	195	0	54	43	1,474
5	406	406	325	271	68	244	0	68	54	1,842
6	488	488	390	325	81	293	0	81	65	2,211
7	569	569	455	379	95	341	0	95	76	2,579
8	650	650	520	434	108	390	0	108	87	2,948
9	732	732	585	488	122	439	0	122	98	3,316
10	813	813	650	542	135	488	0	135	108	3,685
11	894	894	715	596	149	536	0	149	119	4,053
12	975	975	780	650	163	585	0	163	130	4,422
13	1,057	1,057	845	704	176	634	0	176	141	4,790
14	1,138	1,138	910	759	190	683	0	190	152	5,159
15	1,219	1,219	975	813	203	732	0	203	163	5,527
16	1,301	1,301	1,040	867	217	780	0	217	173	5,896
17	1,382	1,382	1,105	921	230	829	0	230	184	6,264
18	1,463	1,463	1,170	975	244	878	0	244	195	6,633
19	1,544	1,544	1,236	1,030	257	927	0	257	206	7,001
20	1,626	1,626	1,301	1,084	271	975	0	271	217	7,370
21	1,707	1,707	1,366	1,138	284	1,024	0	284	228	7,738
22	1,788	1,788	1,431	1,192	298	1,073	0	298	238	8,107
23	1,870	1,870	1,496	1,246	312	1,122	0	312	249	8,475
24	1,951	1,951	1,561	1,301	325	1,170	0	325	260	8,844
25	2,032	2,032	1,626	1,355	339	1,219	0	339	271	9,212
26	2,113	2,113	1,691	1,409	352	1,268	0	352	282	9,581
27	2,195	2,195	1,756	1,463	366	1,317	0	366	293	9,949
28	2,276	2,276	1,821	1,517	379	1,366	0	379	303	10,318

29	2,357	2,357	1,886	1,571	393	1,414	0	393	314	10,686
30	2,439	2,439	1,951	1,626	406	1,463	0	406	325	11,055
31	2,520	2,520	2,016	1,680	420	1,512	0	420	336	11,423
32	2,601	2,601	2,081	1,734	434	1,561	0	434	347	11,792
33	2,682	2,682	2,146	1,788	447	1,609	0	447	358	12,160
34	2,764	2,764	2,211	1,842	461	1,658	0	461	368	12,529
35	2,845	2,845	2,276	1,897	474	1,707	0	474	379	12,897
36	2,926	2,926	2,341	1,951	488	1,756	0	488	390	13,265
37	3,007	3,007	2,406	2,005	501	1,804	0	501	401	13,634
38	3,089	3,089	2,471	2,059	515	1,853	0	515	412	14,002
39	3,170	3,170	2,536	2,113	528	1,902	0	528	423	14,371
40	3,251	3,251	2,601	2,168	542	1,951	0	542	434	14,739

Sub Watershed #405 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	83	83	67	56	14	50	0	14	11	378
2	167	167	133	111	28	100	0	28	22	756
3	250	250	200	167	42	150	0	42	33	1,134
4	334	334	267	222	56	200	0	56	44	1,513
5	417	417	334	278	70	250	0	70	56	1,891
6	501	501	400	334	83	300	0	83	67	2,269
7	584	584	467	389	97	350	0	97	78	2,647
8	667	667	534	445	111	400	0	111	89	3,025
9	751	751	601	501	125	450	0	125	100	3,403
10	834	834	667	556	139	501	0	139	111	3,782
11	918	918	734	612	153	551	0	153	122	4,160
12	1,001	1,001	801	667	167	601	0	167	133	4,538
13	1,084	1,084	868	723	181	651	0	181	145	4,916
14	1,168	1,168	934	779	195	701	0	195	156	5,294
15	1,251	1,251	1,001	834	209	751	0	209	167	5,672

16	1,335	1,335	1,068	890	222	801	0	222	178	6,051
17	1,418	1,418	1,134	945	236	851	0	236	189	6,429
18	1,502	1,502	1,201	1,001	250	901	0	250	200	6,807
19	1,585	1,585	1,268	1,057	264	951	0	264	211	7,185
20	1,668	1,668	1,335	1,112	278	1,001	0	278	222	7,563
21	1,752	1,752	1,401	1,168	292	1,051	0	292	234	7,941
22	1,835	1,835	1,468	1,223	306	1,101	0	306	245	8,320
23	1,919	1,919	1,535	1,279	320	1,151	0	320	256	8,698
24	2,002	2,002	1,602	1,335	334	1,201	0	334	267	9,076
25	2,085	2,085	1,668	1,390	348	1,251	0	348	278	9,454
26	2,169	2,169	1,735	1,446	361	1,301	0	361	289	9,832
27	2,252	2,252	1,802	1,502	375	1,351	0	375	300	10,210
28	2,336	2,336	1,869	1,557	389	1,401	0	389	311	10,589
29	2,419	2,419	1,935	1,613	403	1,451	0	403	323	10,967
30	2,503	2,503	2,002	1,668	417	1,502	0	417	334	11,345
31	2,586	2,586	2,069	1,724	431	1,552	0	431	345	11,723
32	2,669	2,669	2,136	1,780	445	1,602	0	445	356	12,101
33	2,753	2,753	2,202	1,835	459	1,652	0	459	367	12,479
34	2,836	2,836	2,269	1,891	473	1,702	0	473	378	12,858
35	2,920	2,920	2,336	1,946	487	1,752	0	487	389	13,236
36	3,003	3,003	2,402	2,002	501	1,802	0	501	400	13,614
37	3,087	3,087	2,469	2,058	514	1,852	0	514	412	13,992
38	3,170	3,170	2,536	2,113	528	1,902	0	528	423	14,370
39	3,253	3,253	2,603	2,169	542	1,952	0	542	434	14,748
40	3,337	3,337	2,669	2,225	556	2,002	0	556	445	15,127

Sub Watershed #406 Annual Soil Erosion Reduction, Cropland BMPs (tons)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	77	77	62	51	13	46	0	13	10	349
2	154	154	123	103	26	92	0	26	21	697
3	231	231	185	154	38	138	0	38	31	1,046
4	308	308	246	205	51	185	0	51	41	1,395
5	385	385	308	256	64	231	0	64	51	1,744
6	462	462	369	308	77	277	0	77	62	2,092
7	539	539	431	359	90	323	0	90	72	2,441
8	615	615	492	410	103	369	0	103	82	2,790
9	692	692	554	462	115	415	0	115	92	3,139
10	769	769	615	513	128	462	0	128	103	3,487
11	846	846	677	564	141	508	0	141	113	3,836
12	923	923	739	615	154	554	0	154	123	4,185
13	1,000	1,000	800	667	167	600	0	167	133	4,534
14	1,077	1,077	862	718	180	646	0	180	144	4,882
15	1,154	1,154	923	769	192	692	0	192	154	5,231
16	1,231	1,231	985	821	205	739	0	205	164	5,580
17	1,308	1,308	1,046	872	218	785	0	218	174	5,929
18	1,385	1,385	1,108	923	231	831	0	231	185	6,277
19	1,462	1,462	1,169	974	244	877	0	244	195	6,626
20	1,539	1,539	1,231	1,026	256	923	0	256	205	6,975
21	1,616	1,616	1,292	1,077	269	969	0	269	215	7,324
22	1,692	1,692	1,354	1,128	282	1,015	0	282	226	7,672
23	1,769	1,769	1,415	1,180	295	1,062	0	295	236	8,021
24	1,846	1,846	1,477	1,231	308	1,108	0	308	246	8,370
25	1,923	1,923	1,539	1,282	321	1,154	0	321	256	8,719
26	2,000	2,000	1,600	1,333	333	1,200	0	333	267	9,067
27	2,077	2,077	1,662	1,385	346	1,246	0	346	277	9,416
28	2,154	2,154	1,723	1,436	359	1,292	0	359	287	9,765
29	2,231	2,231	1,785	1,487	372	1,339	0	372	297	10,114

30	2,308	2,308	1,846	1,539	385	1,385	0	385	308	10,462
31	2,385	2,385	1,908	1,590	397	1,431	0	397	318	10,811
32	2,462	2,462	1,969	1,641	410	1,477	0	410	328	11,160
33	2,539	2,539	2,031	1,692	423	1,523	0	423	338	11,509
34	2,616	2,616	2,092	1,744	436	1,569	0	436	349	11,857
35	2,693	2,693	2,154	1,795	449	1,616	0	449	359	12,206
36	2,769	2,769	2,216	1,846	462	1,662	0	462	369	12,555
37	2,846	2,846	2,277	1,898	474	1,708	0	474	380	12,904
38	2,923	2,923	2,339	1,949	487	1,754	0	487	390	13,252
39	3,000	3,000	2,400	2,000	500	1,800	0	500	400	13,601
40	3,077	3,077	2,462	2,051	513	1,846	0	513	410	13,950

Sub Watershed #201 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	42	42	62	52	13	47	10	13	10	291
2	83	83	125	104	26	94	21	26	21	582
3	125	125	187	156	39	140	31	39	31	874
4	166	166	250	208	52	187	42	52	42	1,165
5	208	208	312	260	65	234	52	65	52	1,456
6	250	250	374	312	78	281	62	78	62	1,747
7	291	291	437	364	91	328	73	91	73	2,038
8	333	333	499	416	104	374	83	104	83	2,330
9	374	374	562	468	117	421	94	117	94	2,621
10	416	416	624	520	130	468	104	130	104	2,912
11	458	458	686	572	143	515	114	143	114	3,203
12	499	499	749	624	156	562	125	156	125	3,495
13	541	541	811	676	169	608	135	169	135	3,786
14	582	582	874	728	182	655	146	182	146	4,077
15	624	624	936	780	195	702	156	195	156	4,368
16	666	666	998	832	208	749	166	208	166	4,659
17	707	707	1,061	884	221	796	177	221	177	4,951

18	749	749	1,123	936	234	842	187	234	187	5,242
19	790	790	1,186	988	247	889	198	247	198	5,533
20	832	832	1,248	1,040	260	936	208	260	208	5,824
21	874	874	1,310	1,092	273	983	218	273	218	6,115
22	915	915	1,373	1,144	286	1,030	229	286	229	6,407
23	957	957	1,435	1,196	299	1,076	239	299	239	6,698
24	998	998	1,498	1,248	312	1,123	250	312	250	6,989
25	1,040	1,040	1,560	1,300	325	1,170	260	325	260	7,280
26	1,082	1,082	1,622	1,352	338	1,217	270	338	270	7,571
27	1,123	1,123	1,685	1,404	351	1,264	281	351	281	7,863
28	1,165	1,165	1,747	1,456	364	1,310	291	364	291	8,154
29	1,206	1,206	1,810	1,508	377	1,357	302	377	302	8,445
30	1,248	1,248	1,872	1,560	390	1,404	312	390	312	8,736
31	1,290	1,290	1,934	1,612	403	1,451	322	403	322	9,027
32	1,331	1,331	1,997	1,664	416	1,498	333	416	333	9,319
33	1,373	1,373	2,059	1,716	429	1,544	343	429	343	9,610
34	1,414	1,414	2,122	1,768	442	1,591	354	442	354	9,901
35	1,456	1,456	2,184	1,820	455	1,638	364	455	364	10,192
36	1,498	1,498	2,246	1,872	468	1,685	374	468	374	10,484
37	1,539	1,539	2,309	1,924	481	1,732	385	481	385	10,775
38	1,581	1,581	2,371	1,976	494	1,778	395	494	395	11,066
39	1,622	1,622	2,434	2,028	507	1,825	406	507	406	11,357
40	1,664	1,664	2,496	2,080	520	1,872	416	520	416	11,648

Sub Watershed #202 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	35	35	53	44	11	40	9	11	9	248
2	71	71	106	88	22	80	18	22	18	495
3	106	106	159	133	33	119	27	33	27	743
4	142	142	212	177	44	159	35	44	35	991

5	177	177	265	221	55	199	44	55	44	1,238
6	212	212	318	265	66	239	53	66	53	1,486
7	248	248	371	310	77	279	62	77	62	1,734
8	283	283	425	354	88	318	71	88	71	1,981
9	318	318	478	398	100	358	80	100	80	2,229
10	354	354	531	442	111	398	88	111	88	2,477
11	389	389	584	486	122	438	97	122	97	2,724
12	425	425	637	531	133	478	106	133	106	2,972
13	460	460	690	575	144	517	115	144	115	3,220
14	495	495	743	619	155	557	124	155	124	3,467
15	531	531	796	663	166	597	133	166	133	3,715
16	566	566	849	708	177	637	142	177	142	3,962
17	601	601	902	752	188	677	150	188	150	4,210
18	637	637	955	796	199	716	159	199	159	4,458
19	672	672	1,008	840	210	756	168	210	168	4,705
20	708	708	1,061	884	221	796	177	221	177	4,953
21	743	743	1,114	929	232	836	186	232	186	5,201
22	778	778	1,168	973	243	876	195	243	195	5,448
23	814	814	1,221	1,017	254	915	203	254	203	5,696
24	849	849	1,274	1,061	265	955	212	265	212	5,944
25	884	884	1,327	1,106	276	995	221	276	221	6,191
26	920	920	1,380	1,150	287	1,035	230	287	230	6,439
27	955	955	1,433	1,194	299	1,075	239	299	239	6,687
28	991	991	1,486	1,238	310	1,114	248	310	248	6,934
29	1,026	1,026	1,539	1,283	321	1,154	257	321	257	7,182
30	1,061	1,061	1,592	1,327	332	1,194	265	332	265	7,430
31	1,097	1,097	1,645	1,371	343	1,234	274	343	274	7,677
32	1,132	1,132	1,698	1,415	354	1,274	283	354	283	7,925
33	1,168	1,168	1,751	1,459	365	1,313	292	365	292	8,173
34	1,203	1,203	1,804	1,504	376	1,353	301	376	301	8,420
35	1,238	1,238	1,857	1,548	387	1,393	310	387	310	8,668
36	1,274	1,274	1,910	1,592	398	1,433	318	398	318	8,916
37	1,309	1,309	1,964	1,636	409	1,473	327	409	327	9,163
38	1,344	1,344	2,017	1,681	420	1,512	336	420	336	9,411
39	1,380	1,380	2,070	1,725	431	1,552	345	431	345	9,659
40	1,41	1,415	2,123	1,769	442	1,592	354	442	354	9,906

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Sub Watershed #204 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	40	40	60	50	12	45	10	12	10	280
2	80	80	120	100	25	90	20	25	20	560
3	120	120	180	150	37	135	30	37	30	839
4	160	160	240	200	50	180	40	50	40	1,119
5	200	200	300	250	62	225	50	62	50	1,399
6	240	240	360	300	75	270	60	75	60	1,679
7	280	280	420	350	87	315	70	87	70	1,959
8	320	320	480	400	100	360	80	100	80	2,239
9	360	360	540	450	112	405	90	112	90	2,518
10	400	400	600	500	125	450	100	125	100	2,798
11	440	440	660	550	137	495	110	137	110	3,078
12	480	480	720	600	150	540	120	150	120	3,358
13	520	520	780	650	162	585	130	162	130	3,638
14	560	560	839	700	175	630	140	175	140	3,917
15	600	600	899	750	187	675	150	187	150	4,197
16	640	640	959	799	200	720	160	200	160	4,477
17	680	680	1,019	849	212	765	170	212	170	4,757
18	720	720	1,079	899	225	809	180	225	180	5,037
19	760	760	1,139	949	237	854	190	237	190	5,317
20	799	799	1,199	999	250	899	200	250	200	5,596
21	839	839	1,259	1,049	262	944	210	262	210	5,876
22	879	879	1,319	1,099	275	989	220	275	220	6,156
23	919	919	1,379	1,149	287	1,034	230	287	230	6,436
24	959	959	1,439	1,199	300	1,079	240	300	240	6,716
25	999	999	1,499	1,249	312	1,124	250	312	250	6,996
26	1,039	1,039	1,559	1,299	325	1,169	260	325	260	7,275
27	1,079	1,079	1,619	1,349	337	1,214	270	337	270	7,555
28	1,119	1,119	1,679	1,399	350	1,259	280	350	280	7,835
29	1,159	1,159	1,739	1,449	362	1,304	290	362	290	8,115
30	1,199	1,199	1,799	1,499	375	1,349	300	375	300	8,395
31	1,239	1,239	1,859	1,549	387	1,394	310	387	310	8,674
32	1,279	1,279	1,919	1,599	400	1,439	320	400	320	8,954

33	1,319	1,319	1,979	1,649	412	1,484	330	412	330	9,234
34	1,359	1,359	2,039	1,699	425	1,529	340	425	340	9,514
35	1,399	1,399	2,099	1,749	437	1,574	350	437	350	9,794
36	1,439	1,439	2,159	1,799	450	1,619	360	450	360	10,074
37	1,479	1,479	2,219	1,849	462	1,664	370	462	370	10,353
38	1,519	1,519	2,279	1,899	475	1,709	380	475	380	10,633
39	1,559	1,559	2,339	1,949	487	1,754	390	487	390	10,913
40	1,599	1,599	2,398	1,999	500	1,799	400	500	400	11,193

Sub Watershed #205 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	32	32	48	40	10	36	8	10	8	225
2	64	64	96	80	20	72	16	20	16	450
3	96	96	145	121	30	108	24	30	24	675
4	129	129	193	161	40	145	32	40	32	900
5	161	161	241	201	50	181	40	50	40	1,125
6	193	193	289	241	60	217	48	60	48	1,350
7	225	225	337	281	70	253	56	70	56	1,575
8	257	257	386	321	80	289	64	80	64	1,800
9	289	289	434	362	90	325	72	90	72	2,025
10	321	321	482	402	100	362	80	100	80	2,250
11	354	354	530	442	110	398	88	110	88	2,475
12	386	386	579	482	121	434	96	121	96	2,700
13	418	418	627	522	131	470	104	131	104	2,925
14	450	450	675	562	141	506	112	141	112	3,150
15	482	482	723	603	151	542	121	151	121	3,375
16	514	514	771	643	161	579	129	161	129	3,600
17	546	546	820	683	171	615	137	171	137	3,825
18	579	579	868	723	181	651	145	181	145	4,050
19	611	611	916	763	191	687	153	191	153	4,275
20	643	643	964	804	201	723	161	201	161	4,500
21	675	675	1,012	844	211	759	169	211	169	4,725
22	707	707	1,061	884	221	795	177	221	177	4,950
23	739	739	1,109	924	231	832	185	231	185	5,175
24	771	771	1,157	964	241	868	193	241	193	5,400

25	804	804	1,205	1,004	251	904	201	251	201	5,625
26	836	836	1,253	1,045	261	940	209	261	209	5,850
27	868	868	1,302	1,085	271	976	217	271	217	6,075
28	900	900	1,350	1,125	281	1,012	225	281	225	6,300
29	932	932	1,398	1,165	291	1,049	233	291	233	6,525
30	964	964	1,446	1,205	301	1,085	241	301	241	6,750
31	996	996	1,495	1,245	311	1,121	249	311	249	6,975
32	1,029	1,029	1,543	1,286	321	1,157	257	321	257	7,200
33	1,061	1,061	1,591	1,326	331	1,193	265	331	265	7,425
34	1,093	1,093	1,639	1,366	341	1,229	273	341	273	7,650
35	1,125	1,125	1,687	1,406	352	1,266	281	352	281	7,874
36	1,157	1,157	1,736	1,446	362	1,302	289	362	289	8,099
37	1,189	1,189	1,784	1,487	372	1,338	297	372	297	8,324
38	1,221	1,221	1,832	1,527	382	1,374	305	382	305	8,549
39	1,253	1,253	1,880	1,567	392	1,410	313	392	313	8,774
40	1,286	1,286	1,928	1,607	402	1,446	321	402	321	8,999

Sub Watershed #206 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	36	36	53	44	11	40	9	11	9	249
2	71	71	107	89	22	80	18	22	18	498
3	107	107	160	133	33	120	27	33	27	747
4	142	142	214	178	44	160	36	44	36	996
5	178	178	267	222	56	200	44	56	44	1,246
6	214	214	320	267	67	240	53	67	53	1,495
7	249	249	374	311	78	280	62	78	62	1,744
8	285	285	427	356	89	320	71	89	71	1,993
9	320	320	480	400	100	360	80	100	80	2,242
10	356	356	534	445	111	400	89	111	89	2,491
11	391	391	587	489	122	440	98	122	98	2,740
12	427	427	641	534	133	480	107	133	107	2,989
13	463	463	694	578	145	520	116	145	116	3,238
14	498	498	747	623	156	561	125	156	125	3,488
15	534	534	801	667	167	601	133	167	133	3,737
16	569	569	854	712	178	641	142	178	142	3,986

17	605	605	907	756	189	681	151	189	151	4,235
18	641	641	961	801	200	721	160	200	160	4,484
19	676	676	1,014	845	211	761	169	211	169	4,733
20	712	712	1,068	890	222	801	178	222	178	4,982
21	747	747	1,121	934	234	841	187	234	187	5,231
22	783	783	1,174	979	245	881	196	245	196	5,481
23	819	819	1,228	1,023	256	921	205	256	205	5,730
24	854	854	1,281	1,068	267	961	214	267	214	5,979
25	890	890	1,335	1,112	278	1,001	222	278	222	6,228
26	925	925	1,388	1,157	289	1,041	231	289	231	6,477
27	961	961	1,441	1,201	300	1,081	240	300	240	6,726
28	996	996	1,495	1,246	311	1,121	249	311	249	6,975
29	1,032	1,032	1,548	1,290	323	1,161	258	323	258	7,224
30	1,068	1,068	1,601	1,335	334	1,201	267	334	267	7,473
31	1,103	1,103	1,655	1,379	345	1,241	276	345	276	7,723
32	1,139	1,139	1,708	1,424	356	1,281	285	356	285	7,972
33	1,174	1,174	1,762	1,468	367	1,321	294	367	294	8,221
34	1,210	1,210	1,815	1,512	378	1,361	302	378	302	8,470
35	1,246	1,246	1,868	1,557	389	1,401	311	389	311	8,719
36	1,281	1,281	1,922	1,601	400	1,441	320	400	320	8,968
37	1,317	1,317	1,975	1,646	411	1,481	329	411	329	9,217
38	1,352	1,352	2,029	1,690	423	1,521	338	423	338	9,466
39	1,388	1,388	2,082	1,735	434	1,561	347	434	347	9,715
40	1,424	1,424	2,135	1,779	445	1,601	356	445	356	9,965

Sub Watershed #207 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	39	39	59	49	12	44	10	12	10	275
2	78	78	118	98	25	88	20	25	20	549
3	118	118	177	147	37	132	29	37	29	824
4	157	157	235	196	49	177	39	49	39	1,099
5	196	196	294	245	61	221	49	61	49	1,373
6	235	235	353	294	74	265	59	74	59	1,648

7	275	275	412	343	86	309	69	86	69	1,923
8	314	314	471	392	98	353	78	98	78	2,198
9	353	353	530	441	110	397	88	110	88	2,472
10	392	392	589	491	123	441	98	123	98	2,747
11	432	432	648	540	135	486	108	135	108	3,022
12	471	471	706	589	147	530	118	147	118	3,296
13	510	510	765	638	159	574	128	159	128	3,571
14	549	549	824	687	172	618	137	172	137	3,846
15	589	589	883	736	184	662	147	184	147	4,120
16	628	628	942	785	196	706	157	196	157	4,395
17	667	667	1,001	834	208	751	167	208	167	4,670
18	706	706	1,060	883	221	795	177	221	177	4,945
19	746	746	1,118	932	233	839	186	233	186	5,219
20	785	785	1,177	981	245	883	196	245	196	5,494
21	824	824	1,236	1,030	258	927	206	258	206	5,769
22	863	863	1,295	1,079	270	971	216	270	216	6,043
23	903	903	1,354	1,128	282	1,015	226	282	226	6,318
24	942	942	1,413	1,177	294	1,060	235	294	235	6,593
25	981	981	1,472	1,226	307	1,104	245	307	245	6,867
26	1,020	1,020	1,530	1,275	319	1,148	255	319	255	7,142
27	1,060	1,060	1,589	1,324	331	1,192	265	331	265	7,417
28	1,099	1,099	1,648	1,373	343	1,236	275	343	275	7,692
29	1,138	1,138	1,707	1,423	356	1,280	285	356	285	7,966
30	1,177	1,177	1,766	1,472	368	1,324	294	368	294	8,241
31	1,217	1,217	1,825	1,521	380	1,369	304	380	304	8,516
32	1,256	1,256	1,884	1,570	392	1,413	314	392	314	8,790
33	1,295	1,295	1,943	1,619	405	1,457	324	405	324	9,065
34	1,334	1,334	2,001	1,668	417	1,501	334	417	334	9,340
35	1,373	1,373	2,060	1,717	429	1,545	343	429	343	9,614
36	1,413	1,413	2,119	1,766	441	1,589	353	441	353	9,889
37	1,452	1,452	2,178	1,815	454	1,633	363	454	363	10,164
38	1,491	1,491	2,237	1,864	466	1,678	373	466	373	10,439
39	1,530	1,530	2,296	1,913	478	1,722	383	478	383	10,713
40	1,57	1,570	2,355	1,962	491	1,766	392	491	392	10,988

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Sub Watershed #208 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	41	41	62	52	13	46	10	13	10	289
2	83	83	124	103	26	93	21	26	21	578
3	124	124	186	155	39	139	31	39	31	867
4	165	165	248	206	52	186	41	52	41	1,156
5	206	206	310	258	64	232	52	64	52	1,445
6	248	248	372	310	77	279	62	77	62	1,734
7	289	289	433	361	90	325	72	90	72	2,023
8	330	330	495	413	103	372	83	103	83	2,312
9	372	372	557	464	116	418	93	116	93	2,601
10	413	413	619	516	129	464	103	129	103	2,889
11	454	454	681	568	142	511	114	142	114	3,178
12	495	495	743	619	155	557	124	155	124	3,467
13	537	537	805	671	168	604	134	168	134	3,756
14	578	578	867	722	181	650	144	181	144	4,045
15	619	619	929	774	193	697	155	193	155	4,334
16	660	660	991	826	206	743	165	206	165	4,623
17	702	702	1,053	877	219	789	175	219	175	4,912
18	743	743	1,115	929	232	836	186	232	186	5,201
19	784	784	1,176	980	245	882	196	245	196	5,490
20	826	826	1,238	1,032	258	929	206	258	206	5,779
21	867	867	1,300	1,084	271	975	217	271	217	6,068
22	908	908	1,362	1,135	284	1,022	227	284	227	6,357
23	949	949	1,424	1,187	297	1,068	237	297	237	6,646
24	991	991	1,486	1,238	310	1,115	248	310	248	6,935
25	1,032	1,032	1,548	1,290	322	1,161	258	322	258	7,224
26	1,073	1,073	1,610	1,342	335	1,207	268	335	268	7,513
27	1,115	1,115	1,672	1,393	348	1,254	279	348	279	7,802
28	1,156	1,156	1,734	1,445	361	1,300	289	361	289	8,090
29	1,197	1,197	1,796	1,496	374	1,347	299	374	299	8,379
30	1,238	1,238	1,858	1,548	387	1,393	310	387	310	8,668
31	1,280	1,280	1,919	1,600	400	1,440	320	400	320	8,957
32	1,32	1,321	1,981	1,651	413	1,486	330	413	330	9,246

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33	1,362	1,362	2,043	1,703	426	1,532	341	426	341	9,535
34	1,403	1,403	2,105	1,754	439	1,579	351	439	351	9,824
35	1,445	1,445	2,167	1,806	451	1,625	361	451	361	10,113
36	1,486	1,486	2,229	1,858	464	1,672	372	464	372	10,402
37	1,527	1,527	2,291	1,909	477	1,718	382	477	382	10,691
38	1,569	1,569	2,353	1,961	490	1,765	392	490	392	10,980
39	1,610	1,610	2,415	2,012	503	1,811	402	503	402	11,269
40	1,651	1,651	2,477	2,064	516	1,858	413	516	413	11,558

Sub Watershed #301 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	44	44	66	55	14	49	11	14	11	307
2	88	88	131	109	27	99	22	27	22	613
3	131	131	197	164	41	148	33	41	33	920
4	175	175	263	219	55	197	44	55	44	1,226
5	219	219	328	274	68	246	55	68	55	1,533
6	263	263	394	328	82	296	66	82	66	1,840
7	307	307	460	383	96	345	77	96	77	2,146
8	350	350	526	438	109	394	88	109	88	2,453
9	394	394	591	493	123	443	99	123	99	2,759
10	438	438	657	547	137	493	109	137	109	3,066
11	482	482	723	602	151	542	120	151	120	3,373
12	526	526	788	657	164	591	131	164	131	3,679
13	569	569	854	712	178	641	142	178	142	3,986
14	613	613	920	766	192	690	153	192	153	4,292
15	657	657	985	821	205	739	164	205	164	4,599
16	701	701	1,051	876	219	788	175	219	175	4,906
17	745	745	1,117	931	233	838	186	233	186	5,212
18	788	788	1,183	985	246	887	197	246	197	5,519
19	832	832	1,248	1,040	260	936	208	260	208	5,825
20	876	876	1,314	1,095	274	985	219	274	219	6,132
21	920	920	1,380	1,150	287	1,035	230	287	230	6,439
22	964	964	1,445	1,204	301	1,084	241	301	241	6,745
23	1,007	1,007	1,511	1,259	315	1,133	252	315	252	7,052

24	1,051	1,051	1,577	1,314	328	1,183	263	328	263	7,358
25	1,095	1,095	1,642	1,369	342	1,232	274	342	274	7,665
26	1,139	1,139	1,708	1,423	356	1,281	285	356	285	7,972
27	1,183	1,183	1,774	1,478	370	1,330	296	370	296	8,278
28	1,226	1,226	1,840	1,533	383	1,380	307	383	307	8,585
29	1,270	1,270	1,905	1,588	397	1,429	318	397	318	8,891
30	1,314	1,314	1,971	1,642	411	1,478	328	411	328	9,198
31	1,358	1,358	2,037	1,697	424	1,528	339	424	339	9,505
32	1,402	1,402	2,102	1,752	438	1,577	350	438	350	9,811
33	1,445	1,445	2,168	1,807	452	1,626	361	452	361	10,118
34	1,489	1,489	2,234	1,861	465	1,675	372	465	372	10,424
35	1,533	1,533	2,299	1,916	479	1,725	383	479	383	10,731
36	1,577	1,577	2,365	1,971	493	1,774	394	493	394	11,038
37	1,621	1,621	2,431	2,026	506	1,823	405	506	405	11,344
38	1,664	1,664	2,497	2,080	520	1,872	416	520	416	11,651
39	1,708	1,708	2,562	2,135	534	1,922	427	534	427	11,957
40	1,752	1,752	2,628	2,190	547	1,971	438	547	438	12,264

Sub Watershed #302 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	30	30	45	37	9	33	7	9	7	208
2	59	59	89	74	19	67	15	19	15	416
3	89	89	134	112	28	100	22	28	22	625
4	119	119	178	149	37	134	30	37	30	833
5	149	149	223	186	46	167	37	46	37	1,041
6	178	178	268	223	56	201	45	56	45	1,249
7	208	208	312	260	65	234	52	65	52	1,458
8	238	238	357	297	74	268	59	74	59	1,666
9	268	268	402	335	84	301	67	84	67	1,874
10	297	297	446	372	93	335	74	93	74	2,082

11	327	327	491	409	102	368	82	102	82	2,290
12	357	357	535	446	112	402	89	112	89	2,499
13	387	387	580	483	121	435	97	121	97	2,707
14	416	416	625	521	130	468	104	130	104	2,915
15	446	446	669	558	139	502	112	139	112	3,123
16	476	476	714	595	149	535	119	149	119	3,331
17	506	506	758	632	158	569	126	158	126	3,540
18	535	535	803	669	167	602	134	167	134	3,748
19	565	565	848	706	177	636	141	177	141	3,956
20	595	595	892	744	186	669	149	186	149	4,164
21	625	625	937	781	195	703	156	195	156	4,373
22	654	654	982	818	204	736	164	204	164	4,581
23	684	684	1,026	855	214	770	171	214	171	4,789
24	714	714	1,071	892	223	803	178	223	178	4,997
25	744	744	1,115	930	232	837	186	232	186	5,205
26	773	773	1,160	967	242	870	193	242	193	5,414
27	803	803	1,205	1,004	251	904	201	251	201	5,622
28	833	833	1,249	1,041	260	937	208	260	208	5,830
29	863	863	1,294	1,078	270	970	216	270	216	6,038
30	892	892	1,339	1,115	279	1,004	223	279	223	6,246
31	922	922	1,383	1,153	288	1,037	231	288	231	6,455
32	952	952	1,428	1,190	297	1,071	238	297	238	6,663
33	982	982	1,472	1,227	307	1,104	245	307	245	6,871
34	1,011	1,011	1,517	1,264	316	1,138	253	316	253	7,079
35	1,041	1,041	1,562	1,301	325	1,171	260	325	260	7,288
36	1,071	1,071	1,606	1,339	335	1,205	268	335	268	7,496
37	1,101	1,101	1,651	1,376	344	1,238	275	344	275	7,704
38	1,130	1,130	1,695	1,413	353	1,272	283	353	283	7,912
39	1,160	1,160	1,740	1,450	363	1,305	290	363	290	8,120
40	1,190	1,190	1,785	1,487	372	1,339	297	372	297	8,329

Sub Watershed #304 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	8	8	11	9	2	8	2	2	2	53

2	15	15	23	19	5	17	4	5	4	106
3	23	23	34	28	7	25	6	7	6	158
4	30	30	45	38	9	34	8	9	8	211
5	38	38	57	47	12	42	9	12	9	264
6	45	45	68	57	14	51	11	14	11	317
7	53	53	79	66	16	59	13	16	13	369
8	60	60	90	75	19	68	15	19	15	422
9	68	68	102	85	21	76	17	21	17	475
10	75	75	113	94	24	85	19	24	19	528
11	83	83	124	104	26	93	21	26	21	581
12	90	90	136	113	28	102	23	28	23	633
13	98	98	147	123	31	110	25	31	25	686
14	106	106	158	132	33	119	26	33	26	739
15	113	113	170	141	35	127	28	35	28	792
16	121	121	181	151	38	136	30	38	30	845
17	128	128	192	160	40	144	32	40	32	897
18	136	136	204	170	42	153	34	42	34	950
19	143	143	215	179	45	161	36	45	36	1,003
20	151	151	226	189	47	170	38	47	38	1,056
21	158	158	238	198	49	178	40	49	40	1,108
22	166	166	249	207	52	187	41	52	41	1,161
23	173	173	260	217	54	195	43	54	43	1,214
24	181	181	271	226	57	204	45	57	45	1,267
25	189	189	283	236	59	212	47	59	47	1,320
26	196	196	294	245	61	221	49	61	49	1,372
27	204	204	305	254	64	229	51	64	51	1,425
28	211	211	317	264	66	238	53	66	53	1,478
29	219	219	328	273	68	246	55	68	55	1,531
30	226	226	339	283	71	254	57	71	57	1,583
31	234	234	351	292	73	263	58	73	58	1,636
32	241	241	362	302	75	271	60	75	60	1,689
33	249	249	373	311	78	280	62	78	62	1,742
34	256	256	385	320	80	288	64	80	64	1,795
35	264	264	396	330	82	297	66	82	66	1,847
36	271	271	407	339	85	305	68	85	68	1,900
37	279	279	418	349	87	314	70	87	70	1,953
38	287	287	430	358	90	322	72	90	72	2,006
39	294	294	441	368	92	331	74	92	74	2,058
40	302	302	452	377	94	339	75	94	75	2,111

Sub Watershed #305 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	35	35	52	43	11	39	9	11	9	243
2	69	69	104	87	22	78	17	22	17	486
3	104	104	156	130	33	117	26	33	26	729
4	139	139	208	173	43	156	35	43	35	971
5	173	173	260	217	54	195	43	54	43	1,214
6	208	208	312	260	65	234	52	65	52	1,457
7	243	243	364	304	76	273	61	76	61	1,700
8	278	278	416	347	87	312	69	87	69	1,943
9	312	312	468	390	98	351	78	98	78	2,186
10	347	347	520	434	108	390	87	108	87	2,429
11	382	382	572	477	119	429	95	119	95	2,671
12	416	416	624	520	130	468	104	130	104	2,914
13	451	451	677	564	141	507	113	141	113	3,157
14	486	486	729	607	152	546	121	152	121	3,400
15	520	520	781	650	163	585	130	163	130	3,643
16	555	555	833	694	173	624	139	173	139	3,886
17	590	590	885	737	184	664	147	184	147	4,128
18	624	624	937	781	195	703	156	195	156	4,371
19	659	659	989	824	206	742	165	206	165	4,614
20	694	694	1,041	867	217	781	173	217	173	4,857
21	729	729	1,093	911	228	820	182	228	182	5,100
22	763	763	1,145	954	239	859	191	239	191	5,343
23	798	798	1,197	997	249	898	199	249	199	5,586
24	833	833	1,249	1,041	260	937	208	260	208	5,828
25	867	867	1,301	1,084	271	976	217	271	217	6,071
26	902	902	1,353	1,128	282	1,015	226	282	226	6,314
27	937	937	1,405	1,171	293	1,054	234	293	234	6,557
28	971	971	1,457	1,214	304	1,093	243	304	243	6,800
29	1,006	1,006	1,509	1,258	314	1,132	252	314	252	7,043
30	1,041	1,041	1,561	1,301	325	1,171	260	325	260	7,286
31	1,075	1,075	1,613	1,344	336	1,210	269	336	269	7,528
32	1,110	1,110	1,665	1,388	347	1,249	278	347	278	7,771
33	1,145	1,145	1,717	1,431	358	1,288	286	358	286	8,014
34	1,180	1,180	1,769	1,474	369	1,327	295	369	295	8,257
35	1,214	1,214	1,821	1,518	379	1,366	304	379	304	8,500
36	1,249	1,249	1,873	1,561	390	1,405	312	390	312	8,743
37	1,284	1,284	1,925	1,605	401	1,444	321	401	321	8,986
38	1,318	1,318	1,978	1,648	412	1,483	330	412	330	9,228
39	1,353	1,353	2,030	1,691	423	1,522	338	423	338	9,471

40	1,388	1,388	2,082	1,735	434	1,561	347	434	347	9,714

Sub Watershed #306 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	25	25	37	31	8	28	6	8	6	172
2	49	49	74	61	15	55	12	15	12	344
3	74	74	111	92	23	83	18	23	18	516
4	98	98	147	123	31	111	25	31	25	688
5	123	123	184	154	38	138	31	38	31	860
6	147	147	221	184	46	166	37	46	37	1,032
7	172	172	258	215	54	194	43	54	43	1,204
8	197	197	295	246	61	221	49	61	49	1,376
9	221	221	332	276	69	249	55	69	55	1,548
10	246	246	369	307	77	276	61	77	61	1,720
11	270	270	405	338	84	304	68	84	68	1,892
12	295	295	442	369	92	332	74	92	74	2,064
13	319	319	479	399	100	359	80	100	80	2,236
14	344	344	516	430	108	387	86	108	86	2,408
15	369	369	553	461	115	415	92	115	92	2,580
16	393	393	590	491	123	442	98	123	98	2,752
17	418	418	627	522	131	470	104	131	104	2,924
18	442	442	663	553	138	498	111	138	111	3,096
19	467	467	700	584	146	525	117	146	117	3,268
20	491	491	737	614	154	553	123	154	123	3,440
21	516	516	774	645	161	581	129	161	129	3,612
22	541	541	811	676	169	608	135	169	135	3,784
23	565	565	848	706	177	636	141	177	141	3,956
24	590	590	885	737	184	663	147	184	147	4,128
25	614	614	922	768	192	691	154	192	154	4,300
26	639	639	958	799	200	719	160	200	160	4,472
27	663	663	995	829	207	746	166	207	166	4,644
28	688	688	1,032	860	215	774	172	215	172	4,816
29	713	713	1,069	891	223	802	178	223	178	4,988
30	737	737	1,106	922	230	829	184	230	184	5,160
31	762	762	1,143	952	238	857	190	238	190	5,332
32	786	786	1,180	983	246	885	197	246	197	5,505
33	811	811	1,216	1,014	253	912	203	253	203	5,677
34	836	836	1,253	1,044	261	940	209	261	209	5,849
35	860	860	1,290	1,075	269	968	215	269	215	6,021
36	885	885	1,327	1,106	276	995	221	276	221	6,193

37	909	909	1,364	1,137	284	1,023	227	284	227	6,365
38	934	934	1,401	1,167	292	1,051	233	292	233	6,537
39	958	958	1,438	1,198	299	1,078	240	299	240	6,709
40	983	983	1,474	1,229	307	1,106	246	307	246	6,881

Sub Watershed #307 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	29	29	44	36	9	33	7	9	7	204
2	58	58	87	73	18	65	15	18	15	407
3	87	87	131	109	27	98	22	27	22	611
4	116	116	175	145	36	131	29	36	29	814
5	145	145	218	182	45	164	36	45	36	1,018
6	175	175	262	218	55	196	44	55	44	1,222
7	204	204	305	254	64	229	51	64	51	1,425
8	233	233	349	291	73	262	58	73	58	1,629
9	262	262	393	327	82	294	65	82	65	1,832
10	291	291	436	364	91	327	73	91	73	2,036
11	320	320	480	400	100	360	80	100	80	2,239
12	349	349	524	436	109	393	87	109	87	2,443
13	378	378	567	473	118	425	95	118	95	2,647
14	407	407	611	509	127	458	102	127	102	2,850
15	436	436	654	545	136	491	109	136	109	3,054
16	465	465	698	582	145	524	116	145	116	3,257
17	494	494	742	618	155	556	124	155	124	3,461
18	524	524	785	654	164	589	131	164	131	3,665
19	553	553	829	691	173	622	138	173	138	3,868
20	582	582	873	727	182	654	145	182	145	4,072
21	611	611	916	763	191	687	153	191	153	4,275
22	640	640	960	800	200	720	160	200	160	4,479
23	669	669	1,003	836	209	753	167	209	167	4,683
24	698	698	1,047	873	218	785	175	218	175	4,886
25	727	727	1,091	909	227	818	182	227	182	5,090
26	756	756	1,134	945	236	851	189	236	189	5,293
27	785	785	1,178	982	245	883	196	245	196	5,497
28	814	814	1,222	1,018	254	916	204	254	204	5,701
29	843	843	1,265	1,054	264	949	211	264	211	5,904
30	873	873	1,309	1,091	273	982	218	273	218	6,108
31	902	902	1,352	1,127	282	1,014	225	282	225	6,311
32	931	931	1,396	1,163	291	1,047	233	291	233	6,515
33	960	960	1,440	1,200	300	1,080	240	300	240	6,718

34	989	989	1,483	1,236	309	1,112	247	309	247	6,922
35	1,018	1,018	1,527	1,272	318	1,145	254	318	254	7,126
36	1,047	1,047	1,571	1,309	327	1,178	262	327	262	7,329
37	1,076	1,076	1,614	1,345	336	1,211	269	336	269	7,533
38	1,105	1,105	1,658	1,382	345	1,243	276	345	276	7,736
39	1,134	1,134	1,701	1,418	354	1,276	284	354	284	7,940
40	1,163	1,163	1,745	1,454	364	1,309	291	364	291	8,144

Sub Watershed #401 AnnualPhosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	41	41	61	51	13	46	10	13	10	284
2	81	81	122	101	25	91	20	25	20	567
3	122	122	182	152	38	137	30	38	30	851
4	162	162	243	203	51	182	41	51	41	1,134
5	203	203	304	253	63	228	51	63	51	1,418
6	243	243	365	304	76	273	61	76	61	1,701
7	284	284	425	354	89	319	71	89	71	1,985
8	324	324	486	405	101	365	81	101	81	2,269
9	365	365	547	456	114	410	91	114	91	2,552
10	405	405	608	506	127	456	101	127	101	2,836
11	446	446	668	557	139	501	111	139	111	3,119
12	486	486	729	608	152	547	122	152	122	3,403
13	527	527	790	658	165	592	132	165	132	3,686
14	567	567	851	709	177	638	142	177	142	3,970
15	608	608	911	760	190	684	152	190	152	4,254
16	648	648	972	810	203	729	162	203	162	4,537
17	689	689	1,033	861	215	775	172	215	172	4,821
18	729	729	1,094	911	228	820	182	228	182	5,104
19	770	770	1,155	962	241	866	192	241	192	5,388
20	810	810	1,215	1,013	253	911	203	253	203	5,671
21	851	851	1,276	1,063	266	957	213	266	213	5,955
22	891	891	1,337	1,114	279	1,003	223	279	223	6,239
23	932	932	1,398	1,165	291	1,048	233	291	233	6,522
24	972	972	1,458	1,215	304	1,094	243	304	243	6,806
25	1,013	1,013	1,519	1,266	316	1,139	253	316	253	7,089
26	1,053	1,053	1,580	1,317	329	1,185	263	329	263	7,373
27	1,094	1,094	1,641	1,367	342	1,230	273	342	273	7,656
28	1,134	1,134	1,701	1,418	354	1,276	284	354	284	7,940
29	1,175	1,175	1,762	1,468	367	1,322	294	367	294	8,224
30	1,215	1,215	1,823	1,519	380	1,367	304	380	304	8,507

31	1,256	1,256	1,884	1,570	392	1,413	314	392	314	8,791
32	1,296	1,296	1,944	1,620	405	1,458	324	405	324	9,074
33	1,337	1,337	2,005	1,671	418	1,504	334	418	334	9,358
34	1,377	1,377	2,066	1,722	430	1,550	344	430	344	9,641
35	1,418	1,418	2,127	1,772	443	1,595	354	443	354	9,925
36	1,458	1,458	2,188	1,823	456	1,641	365	456	365	10,209
37	1,499	1,499	2,248	1,874	468	1,686	375	468	375	10,492
38	1,539	1,539	2,309	1,924	481	1,732	385	481	385	10,776
39	1,580	1,580	2,370	1,975	494	1,777	395	494	395	11,059
40	1,620	1,620	2,431	2,026	506	1,823	405	506	405	11,343

Sub Watershed #402 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	32	32	48	40	10	36	8	10	8	225
2	64	64	97	81	20	72	16	20	16	451
3	97	97	145	121	30	109	24	30	24	676
4	129	129	193	161	40	145	32	40	32	902
5	161	161	242	201	50	181	40	50	40	1,127
6	193	193	290	242	60	217	48	60	48	1,352
7	225	225	338	282	70	254	56	70	56	1,578
8	258	258	386	322	81	290	64	81	64	1,803
9	290	290	435	362	91	326	72	91	72	2,029
10	322	322	483	403	101	362	81	101	81	2,254
11	354	354	531	443	111	398	89	111	89	2,480
12	386	386	580	483	121	435	97	121	97	2,705
13	419	419	628	523	131	471	105	131	105	2,930
14	451	451	676	564	141	507	113	141	113	3,156
15	483	483	725	604	151	543	121	151	121	3,381
16	515	515	773	644	161	580	129	161	129	3,607
17	547	547	821	684	171	616	137	171	137	3,832
18	580	580	869	725	181	652	145	181	145	4,057
19	612	612	918	765	191	688	153	191	153	4,283
20	644	644	966	805	201	725	161	201	161	4,508
21	676	676	1,014	845	211	761	169	211	169	4,734
22	708	708	1,063	886	221	797	177	221	177	4,959
23	741	741	1,111	926	231	833	185	231	185	5,184
24	773	773	1,159	966	242	869	193	242	193	5,410
25	805	805	1,208	1,006	252	906	201	252	201	5,635
26	837	837	1,256	1,047	262	942	209	262	209	5,861
27	869	869	1,304	1,087	272	978	217	272	217	6,086

28	902	902	1,352	1,127	282	1,014	225	282	225	6,311
29	934	934	1,401	1,167	292	1,051	233	292	233	6,537
30	966	966	1,449	1,208	302	1,087	242	302	242	6,762
31	998	998	1,497	1,248	312	1,123	250	312	250	6,988
32	1,030	1,030	1,546	1,288	322	1,159	258	322	258	7,213
33	1,063	1,063	1,594	1,328	332	1,195	266	332	266	7,439
34	1,095	1,095	1,642	1,369	342	1,232	274	342	274	7,664
35	1,127	1,127	1,691	1,409	352	1,268	282	352	282	7,889
36	1,159	1,159	1,739	1,449	362	1,304	290	362	290	8,115
37	1,191	1,191	1,787	1,489	372	1,340	298	372	298	8,340
38	1,224	1,224	1,835	1,530	382	1,377	306	382	306	8,566
39	1,256	1,256	1,884	1,570	392	1,413	314	392	314	8,791
40	1,288	1,288	1,932	1,610	403	1,449	322	403	322	9,016

Sub Watershed #403 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	51	51	77	64	16	58	13	16	13	359
2	102	102	154	128	32	115	26	32	26	717
3	154	154	231	192	48	173	38	48	38	1,076
4	205	205	307	256	64	231	51	64	51	1,434
5	256	256	384	320	80	288	64	80	64	1,793
6	307	307	461	384	96	346	77	96	77	2,152
7	359	359	538	448	112	403	90	112	90	2,510
8	410	410	615	512	128	461	102	128	102	2,869
9	461	461	692	576	144	519	115	144	115	3,228
10	512	512	768	640	160	576	128	160	128	3,586
11	564	564	845	704	176	634	141	176	141	3,945
12	615	615	922	768	192	692	154	192	154	4,303
13	666	666	999	832	208	749	166	208	166	4,662
14	717	717	1,076	897	224	807	179	224	179	5,021
15	768	768	1,153	961	240	865	192	240	192	5,379
16	820	820	1,230	1,025	256	922	205	256	205	5,738
17	871	871	1,306	1,089	272	980	218	272	218	6,096
18	922	922	1,383	1,153	288	1,037	231	288	231	6,455
19	973	973	1,460	1,217	304	1,095	243	304	243	6,814
20	1,025	1,025	1,537	1,281	320	1,153	256	320	256	7,172
21	1,076	1,076	1,614	1,345	336	1,210	269	336	269	7,531
22	1,127	1,127	1,691	1,409	352	1,268	282	352	282	7,889
23	1,178	1,178	1,767	1,473	368	1,326	295	368	295	8,248
24	1,230	1,230	1,844	1,537	384	1,383	307	384	307	8,607

25	1,281	1,281	1,921	1,601	400	1,441	320	400	320	8,965
26	1,332	1,332	1,998	1,665	416	1,498	333	416	333	9,324
27	1,383	1,383	2,075	1,729	432	1,556	346	432	346	9,683
28	1,434	1,434	2,152	1,793	448	1,614	359	448	359	10,041
29	1,486	1,486	2,229	1,857	464	1,671	371	464	371	10,400
30	1,537	1,537	2,305	1,921	480	1,729	384	480	384	10,758
31	1,588	1,588	2,382	1,985	496	1,787	397	496	397	11,117
32	1,639	1,639	2,459	2,049	512	1,844	410	512	410	11,476
33	1,691	1,691	2,536	2,113	528	1,902	423	528	423	11,834
34	1,742	1,742	2,613	2,177	544	1,960	435	544	435	12,193
35	1,793	1,793	2,690	2,241	560	2,017	448	560	448	12,551
36	1,844	1,844	2,766	2,305	576	2,075	461	576	461	12,910
37	1,896	1,896	2,843	2,369	592	2,132	474	592	474	13,269
38	1,947	1,947	2,920	2,433	608	2,190	487	608	487	13,627
39	1,998	1,998	2,997	2,497	624	2,248	499	624	499	13,986
40	2,049	2,049	3,074	2,562	640	2,305	512	640	512	14,345

Sub Watershed #404 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	33	33	50	41	10	37	8	10	8	232
2	66	66	100	83	21	75	17	21	17	464
3	100	100	149	124	31	112	25	31	25	697
4	133	133	199	166	41	149	33	41	33	929
5	166	166	249	207	52	187	41	52	41	1,161
6	199	199	299	249	62	224	50	62	50	1,393
7	232	232	348	290	73	261	58	73	58	1,626
8	265	265	398	332	83	299	66	83	66	1,858
9	299	299	448	373	93	336	75	93	75	2,090
10	332	332	498	415	104	373	83	104	83	2,322
11	365	365	547	456	114	411	91	114	91	2,555
12	398	398	597	498	124	448	100	124	100	2,787
13	431	431	647	539	135	485	108	135	108	3,019
14	464	464	697	581	145	523	116	145	116	3,251
15	498	498	746	622	156	560	124	156	124	3,484
16	531	531	796	664	166	597	133	166	133	3,716
17	564	564	846	705	176	635	141	176	141	3,948
18	597	597	896	746	187	672	149	187	149	4,180
19	630	630	946	788	197	709	158	197	158	4,413
20	664	664	995	829	207	746	166	207	166	4,645
21	697	697	1,045	871	218	784	174	218	174	4,877

22	730	730	1,095	912	228	821	182	228	182	5,109
23	763	763	1,145	954	238	858	191	238	191	5,341
24	796	796	1,194	995	249	896	199	249	199	5,574
25	829	829	1,244	1,037	259	933	207	259	207	5,806
26	863	863	1,294	1,078	270	970	216	270	216	6,038
27	896	896	1,344	1,120	280	1,008	224	280	224	6,270
28	929	929	1,393	1,161	290	1,045	232	290	232	6,503
29	962	962	1,443	1,203	301	1,082	241	301	241	6,735
30	995	995	1,493	1,244	311	1,120	249	311	249	6,967
31	1,028	1,028	1,543	1,286	321	1,157	257	321	257	7,199
32	1,062	1,062	1,592	1,327	332	1,194	265	332	265	7,432
33	1,095	1,095	1,642	1,369	342	1,232	274	342	274	7,664
34	1,128	1,128	1,692	1,410	353	1,269	282	353	282	7,896
35	1,161	1,161	1,742	1,451	363	1,306	290	363	290	8,128
36	1,194	1,194	1,792	1,493	373	1,344	299	373	299	8,361
37	1,228	1,228	1,841	1,534	384	1,381	307	384	307	8,593
38	1,261	1,261	1,891	1,576	394	1,418	315	394	315	8,825
39	1,294	1,294	1,941	1,617	404	1,456	323	404	323	9,057
40	1,327	1,327	1,991	1,659	415	1,493	332	415	332	9,290

Sub Watershed #405 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	34	34	51	43	11	38	9	11	9	238
2	68	68	102	85	21	77	17	21	17	477
3	102	102	153	128	32	115	26	32	26	715
4	136	136	204	170	43	153	34	43	34	953
5	170	170	255	213	53	192	43	53	43	1,192
6	204	204	306	255	64	230	51	64	51	1,430
7	238	238	358	298	74	268	60	74	60	1,668
8	272	272	409	340	85	306	68	85	68	1,907
9	306	306	460	383	96	345	77	96	77	2,145
10	340	340	511	426	106	383	85	106	85	2,383
11	375	375	562	468	117	421	94	117	94	2,622
12	409	409	613	511	128	460	102	128	102	2,860
13	443	443	664	553	138	498	111	138	111	3,098
14	477	477	715	596	149	536	119	149	119	3,337
15	511	511	766	638	160	575	128	160	128	3,575
16	545	545	817	681	170	613	136	170	136	3,813
17	579	579	868	724	181	651	145	181	145	4,052
18	613	613	919	766	192	689	153	192	153	4,290

19	647	647	970	809	202	728	162	202	162	4,528
20	681	681	1,021	851	213	766	170	213	170	4,767
21	715	715	1,073	894	223	804	179	223	179	5,005
22	749	749	1,124	936	234	843	187	234	187	5,243
23	783	783	1,175	979	245	881	196	245	196	5,482
24	817	817	1,226	1,021	255	919	204	255	204	5,720
25	851	851	1,277	1,064	266	958	213	266	213	5,958
26	885	885	1,328	1,107	277	996	221	277	221	6,197
27	919	919	1,379	1,149	287	1,034	230	287	230	6,435
28	953	953	1,430	1,192	298	1,073	238	298	238	6,674
29	987	987	1,481	1,234	309	1,111	247	309	247	6,912
30	1,021	1,021	1,532	1,277	319	1,149	255	319	255	7,150
31	1,056	1,056	1,583	1,319	330	1,187	264	330	264	7,389
32	1,090	1,090	1,634	1,362	340	1,226	272	340	272	7,627
33	1,124	1,124	1,685	1,405	351	1,264	281	351	281	7,865
34	1,158	1,158	1,736	1,447	362	1,302	289	362	289	8,104
35	1,192	1,192	1,788	1,490	372	1,341	298	372	298	8,342
36	1,226	1,226	1,839	1,532	383	1,379	306	383	306	8,580
37	1,260	1,260	1,890	1,575	394	1,417	315	394	315	8,819
38	1,294	1,294	1,941	1,617	404	1,456	323	404	323	9,057
39	1,328	1,328	1,992	1,660	415	1,494	332	415	332	9,295
40	1,362	1,362	2,043	1,702	426	1,532	340	426	340	9,534

Sub Watershed #406 Annual Phosphorous Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	31	31	47	39	10	35	8	10	8	220
2	63	63	94	78	20	71	16	20	16	440
3	94	94	141	118	29	106	24	29	24	659
4	126	126	188	157	39	141	31	39	31	879
5	157	157	235	196	49	177	39	49	39	1,099
6	188	188	283	235	59	212	47	59	47	1,319
7	220	220	330	275	69	247	55	69	55	1,539
8	251	251	377	314	78	283	63	78	63	1,758
9	283	283	424	353	88	318	71	88	71	1,978
10	314	314	471	392	98	353	78	98	78	2,198
11	345	345	518	432	108	389	86	108	86	2,418
12	377	377	565	471	118	424	94	118	94	2,638
13	408	408	612	510	128	459	102	128	102	2,857
14	440	440	659	549	137	495	110	137	110	3,077
15	471	471	706	589	147	530	118	147	118	3,297

16	502	502	754	628	157	565	126	157	126	3,517
17	534	534	801	667	167	601	133	167	133	3,737
18	565	565	848	706	177	636	141	177	141	3,956
19	597	597	895	746	186	671	149	186	149	4,176
20	628	628	942	785	196	706	157	196	157	4,396
21	659	659	989	824	206	742	165	206	165	4,616
22	691	691	1,036	863	216	777	173	216	173	4,836
23	722	722	1,083	903	226	812	181	226	181	5,055
24	754	754	1,130	942	235	848	188	235	188	5,275
25	785	785	1,177	981	245	883	196	245	196	5,495
26	816	816	1,225	1,020	255	918	204	255	204	5,715
27	848	848	1,272	1,060	265	954	212	265	212	5,935
28	879	879	1,319	1,099	275	989	220	275	220	6,154
29	911	911	1,366	1,138	285	1,024	228	285	228	6,374
30	942	942	1,413	1,177	294	1,060	235	294	235	6,594
31	973	973	1,460	1,217	304	1,095	243	304	243	6,814
32	1,005	1,005	1,507	1,256	314	1,130	251	314	251	7,034
33	1,036	1,036	1,554	1,295	324	1,166	259	324	259	7,253
34	1,068	1,068	1,601	1,334	334	1,201	267	334	267	7,473
35	1,099	1,099	1,648	1,374	343	1,236	275	343	275	7,693
36	1,130	1,130	1,696	1,413	353	1,272	283	353	283	7,913
37	1,162	1,162	1,743	1,452	363	1,307	290	363	290	8,133
38	1,193	1,193	1,790	1,491	373	1,342	298	373	298	8,352
39	1,225	1,225	1,837	1,531	383	1,378	306	383	306	8,572
40	1,256	1,256	1,884	1,570	392	1,413	314	392	314	8,792

Sub Watershed #201 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	95	95	229	95	48	172	95	48	38	915
2	191	191	458	191	95	343	191	95	76	1,830
3	286	286	686	286	143	515	286	143	114	2,746
4	381	381	915	381	191	686	381	191	153	3,661
5	477	477	1,144	477	238	858	477	238	191	4,576
6	572	572	1,373	572	286	1,030	572	286	229	5,491
7	667	667	1,602	667	334	1,201	667	334	267	6,407
8	763	763	1,830	763	381	1,373	763	381	305	7,322
9	858	858	2,059	858	429	1,544	858	429	343	8,237
10	953	953	2,288	953	477	1,716	953	477	381	9,152

11	1,049	1,049	2,517	1,049	524	1,888	1,049	524	419	10,068
12	1,144	1,144	2,746	1,144	572	2,059	1,144	572	458	10,983
13	1,239	1,239	2,974	1,239	620	2,231	1,239	620	496	11,898
14	1,335	1,335	3,203	1,335	667	2,402	1,335	667	534	12,813
15	1,430	1,430	3,432	1,430	715	2,574	1,430	715	572	13,728
16	1,525	1,525	3,661	1,525	763	2,746	1,525	763	610	14,644
17	1,621	1,621	3,890	1,621	810	2,917	1,621	810	648	15,559
18	1,716	1,716	4,119	1,716	858	3,089	1,716	858	686	16,474
19	1,811	1,811	4,347	1,811	906	3,261	1,811	906	725	17,389
20	1,907	1,907	4,576	1,907	953	3,432	1,907	953	763	18,305
21	2,002	2,002	4,805	2,002	1,001	3,604	2,002	1,001	801	19,220
22	2,097	2,097	5,034	2,097	1,049	3,775	2,097	1,049	839	20,135
23	2,193	2,193	5,263	2,193	1,096	3,947	2,193	1,096	877	21,050
24	2,288	2,288	5,491	2,288	1,144	4,119	2,288	1,144	915	21,966
25	2,383	2,383	5,720	2,383	1,192	4,290	2,383	1,192	953	22,881
26	2,479	2,479	5,949	2,479	1,239	4,462	2,479	1,239	991	23,796
27	2,574	2,574	6,178	2,574	1,287	4,633	2,574	1,287	1,030	24,711
28	2,669	2,669	6,407	2,669	1,335	4,805	2,669	1,335	1,068	25,626
29	2,765	2,765	6,635	2,765	1,382	4,977	2,765	1,382	1,106	26,542
30	2,860	2,860	6,864	2,860	1,430	5,148	2,860	1,430	1,144	27,457
31	2,955	2,955	7,093	2,955	1,478	5,320	2,955	1,478	1,182	28,372
32	3,051	3,051	7,322	3,051	1,525	5,491	3,051	1,525	1,220	29,287
33	3,146	3,146	7,551	3,146	1,573	5,663	3,146	1,573	1,258	30,203
34	3,241	3,241	7,779	3,241	1,621	5,835	3,241	1,621	1,297	31,118
35	3,337	3,337	8,008	3,337	1,668	6,006	3,337	1,668	1,335	32,033
36	3,432	3,432	8,237	3,432	1,716	6,178	3,432	1,716	1,373	32,948
37	3,527	3,527	8,466	3,527	1,764	6,349	3,527	1,764	1,411	33,863
38	3,623	3,623	8,695	3,623	1,811	6,521	3,623	1,811	1,449	34,779
39	3,718	3,718	8,923	3,718	1,859	6,693	3,718	1,859	1,487	35,694
40	3,813	3,813	9,152	3,813	1,907	6,864	3,813	1,907	1,525	36,609

Sub Watershed #202 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	81	81	195	81	41	146	81	41	32	778
2	162	162	389	162	81	292	162	81	65	1,557
3	243	243	584	243	122	438	243	122	97	2,335
4	324	324	778	324	162	584	324	162	130	3,113
5	405	405	973	405	203	730	405	203	162	3,892
6	486	486	1,168	486	243	876	486	243	195	4,670
7	568	568	1,362	568	284	1,022	568	284	227	5,448

8	649	649	1,557	649	324	1,168	649	324	259	6,227
9	730	730	1,751	730	365	1,313	730	365	292	7,005
10	811	811	1,946	811	405	1,459	811	405	324	7,783
11	892	892	2,140	892	446	1,605	892	446	357	8,562
12	973	973	2,335	973	486	1,751	973	486	389	9,340
13	1,054	1,054	2,530	1,054	527	1,897	1,054	527	422	10,118
14	1,135	1,135	2,724	1,135	568	2,043	1,135	568	454	10,897
15	1,216	1,216	2,919	1,216	608	2,189	1,216	608	486	11,675
16	1,297	1,297	3,113	1,297	649	2,335	1,297	649	519	12,454
17	1,378	1,378	3,308	1,378	689	2,481	1,378	689	551	13,232
18	1,459	1,459	3,503	1,459	730	2,627	1,459	730	584	14,010
19	1,540	1,540	3,697	1,540	770	2,773	1,540	770	616	14,789
20	1,622	1,622	3,892	1,622	811	2,919	1,622	811	649	15,567
21	1,703	1,703	4,086	1,703	851	3,065	1,703	851	681	16,345
22	1,784	1,784	4,281	1,784	892	3,211	1,784	892	713	17,124
23	1,865	1,865	4,475	1,865	932	3,357	1,865	932	746	17,902
24	1,946	1,946	4,670	1,946	973	3,503	1,946	973	778	18,680
25	2,027	2,027	4,865	2,027	1,013	3,648	2,027	1,013	811	19,459
26	2,108	2,108	5,059	2,108	1,054	3,794	2,108	1,054	843	20,237
27	2,189	2,189	5,254	2,189	1,095	3,940	2,189	1,095	876	21,015
28	2,270	2,270	5,448	2,270	1,135	4,086	2,270	1,135	908	21,794
29	2,351	2,351	5,643	2,351	1,176	4,232	2,351	1,176	941	22,572
30	2,432	2,432	5,838	2,432	1,216	4,378	2,432	1,216	973	23,350
31	2,513	2,513	6,032	2,513	1,257	4,524	2,513	1,257	1,005	24,129
32	2,594	2,594	6,227	2,594	1,297	4,670	2,594	1,297	1,038	24,907
33	2,676	2,676	6,421	2,676	1,338	4,816	2,676	1,338	1,070	25,685
34	2,757	2,757	6,616	2,757	1,378	4,962	2,757	1,378	1,103	26,464
35	2,838	2,838	6,811	2,838	1,419	5,108	2,838	1,419	1,135	27,242
36	2,919	2,919	7,005	2,919	1,459	5,254	2,919	1,459	1,168	28,020
37	3,000	3,000	7,200	3,000	1,500	5,400	3,000	1,500	1,200	28,799
38	3,081	3,081	7,394	3,081	1,540	5,546	3,081	1,540	1,232	29,577
39	3,162	3,162	7,589	3,162	1,581	5,692	3,162	1,581	1,265	30,355
40	3,243	3,243	7,783	3,243	1,622	5,838	3,243	1,622	1,297	31,134

Sub Watershed #204 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	92	92	220	92	46	165	92	46	37	879
2	183	183	440	183	92	330	183	92	73	1,759
3	275	275	660	275	137	495	275	137	110	2,638
4	366	366	879	366	183	660	366	183	147	3,518

5	458	458	1,099	458	229	824	458	229	183	4,397
6	550	550	1,319	550	275	989	550	275	220	5,277
7	641	641	1,539	641	321	1,154	641	321	257	6,156
8	733	733	1,759	733	366	1,319	733	366	293	7,035
9	824	824	1,979	824	412	1,484	824	412	330	7,915
10	916	916	2,199	916	458	1,649	916	458	366	8,794
11	1,008	1,008	2,418	1,008	504	1,814	1,008	504	403	9,674
12	1,099	1,099	2,638	1,099	550	1,979	1,099	550	440	10,553
13	1,191	1,191	2,858	1,191	595	2,144	1,191	595	476	11,433
14	1,283	1,283	3,078	1,283	641	2,309	1,283	641	513	12,312
15	1,374	1,374	3,298	1,374	687	2,473	1,374	687	550	13,192
16	1,466	1,466	3,518	1,466	733	2,638	1,466	733	586	14,071
17	1,557	1,557	3,738	1,557	779	2,803	1,557	779	623	14,950
18	1,649	1,649	3,957	1,649	824	2,968	1,649	824	660	15,830
19	1,741	1,741	4,177	1,741	870	3,133	1,741	870	696	16,709
20	1,832	1,832	4,397	1,832	916	3,298	1,832	916	733	17,589
21	1,924	1,924	4,617	1,924	962	3,463	1,924	962	770	18,468
22	2,015	2,015	4,837	2,015	1,008	3,628	2,015	1,008	806	19,348
23	2,107	2,107	5,057	2,107	1,053	3,793	2,107	1,053	843	20,227
24	2,199	2,199	5,277	2,199	1,099	3,957	2,199	1,099	879	21,106
25	2,290	2,290	5,496	2,290	1,145	4,122	2,290	1,145	916	21,986
26	2,382	2,382	5,716	2,382	1,191	4,287	2,382	1,191	953	22,865
27	2,473	2,473	5,936	2,473	1,237	4,452	2,473	1,237	989	23,745
28	2,565	2,565	6,156	2,565	1,283	4,617	2,565	1,283	1,026	24,624
29	2,657	2,657	6,376	2,657	1,328	4,782	2,657	1,328	1,063	25,504
30	2,748	2,748	6,596	2,748	1,374	4,947	2,748	1,374	1,099	26,383
31	2,840	2,840	6,816	2,840	1,420	5,112	2,840	1,420	1,136	27,263
32	2,931	2,931	7,035	2,931	1,466	5,277	2,931	1,466	1,173	28,142
33	3,023	3,023	7,255	3,023	1,512	5,442	3,023	1,512	1,209	29,021
34	3,115	3,115	7,475	3,115	1,557	5,606	3,115	1,557	1,246	29,901
35	3,206	3,206	7,695	3,206	1,603	5,771	3,206	1,603	1,283	30,780
36	3,298	3,298	7,915	3,298	1,649	5,936	3,298	1,649	1,319	31,660
37	3,389	3,389	8,135	3,389	1,695	6,101	3,389	1,695	1,356	32,539
38	3,481	3,481	8,355	3,481	1,741	6,266	3,481	1,741	1,392	33,419
39	3,573	3,573	8,575	3,573	1,786	6,431	3,573	1,786	1,429	34,298
40	3,664	3,664	8,794	3,664	1,832	6,596	3,664	1,832	1,466	35,177

Sub Watershed #205 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	74	74	177	74	37	133	74	37	29	707

2	147	147	354	147	74	265	147	74	59	1,414
3	221	221	530	221	110	398	221	110	88	2,121
4	295	295	707	295	147	530	295	147	118	2,828
5	368	368	884	368	184	663	368	184	147	3,535
6	442	442	1,061	442	221	795	442	221	177	4,243
7	516	516	1,237	516	258	928	516	258	206	4,950
8	589	589	1,414	589	295	1,061	589	295	236	5,657
9	663	663	1,591	663	331	1,193	663	331	265	6,364
10	737	737	1,768	737	368	1,326	737	368	295	7,071
11	810	810	1,945	810	405	1,458	810	405	324	7,778
12	884	884	2,121	884	442	1,591	884	442	354	8,485
13	958	958	2,298	958	479	1,724	958	479	383	9,192
14	1,031	1,031	2,475	1,031	516	1,856	1,031	516	412	9,899
15	1,105	1,105	2,652	1,105	552	1,989	1,105	552	442	10,606
16	1,178	1,178	2,828	1,178	589	2,121	1,178	589	471	11,314
17	1,252	1,252	3,005	1,252	626	2,254	1,252	626	501	12,021
18	1,326	1,326	3,182	1,326	663	2,386	1,326	663	530	12,728
19	1,399	1,399	3,359	1,399	700	2,519	1,399	700	560	13,435
20	1,473	1,473	3,535	1,473	737	2,652	1,473	737	589	14,142
21	1,547	1,547	3,712	1,547	773	2,784	1,547	773	619	14,849
22	1,620	1,620	3,889	1,620	810	2,917	1,620	810	648	15,556
23	1,694	1,694	4,066	1,694	847	3,049	1,694	847	678	16,263
24	1,768	1,768	4,243	1,768	884	3,182	1,768	884	707	16,970
25	1,841	1,841	4,419	1,841	921	3,315	1,841	921	737	17,677
26	1,915	1,915	4,596	1,915	958	3,447	1,915	958	766	18,385
27	1,989	1,989	4,773	1,989	994	3,580	1,989	994	795	19,092
28	2,062	2,062	4,950	2,062	1,031	3,712	2,062	1,031	825	19,799
29	2,136	2,136	5,126	2,136	1,068	3,845	2,136	1,068	854	20,506
30	2,210	2,210	5,303	2,210	1,105	3,977	2,210	1,105	884	21,213
31	2,283	2,283	5,480	2,283	1,142	4,110	2,283	1,142	913	21,920
32	2,357	2,357	5,657	2,357	1,178	4,243	2,357	1,178	943	22,627
33	2,431	2,431	5,834	2,431	1,215	4,375	2,431	1,215	972	23,334
34	2,504	2,504	6,010	2,504	1,252	4,508	2,504	1,252	1,002	24,041
35	2,578	2,578	6,187	2,578	1,289	4,640	2,578	1,289	1,031	24,748
36	2,652	2,652	6,364	2,652	1,326	4,773	2,652	1,326	1,061	25,456
37	2,725	2,725	6,541	2,725	1,363	4,905	2,725	1,363	1,090	26,163
38	2,799	2,799	6,717	2,799	1,399	5,038	2,799	1,399	1,120	26,870
39	2,873	2,873	6,894	2,873	1,436	5,171	2,873	1,436	1,149	27,577
40	2,946	2,946	7,071	2,946	1,473	5,303	2,946	1,473	1,178	28,284

Sub Watershed #206 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	82	82	196	82	41	147	82	41	33	783
2	163	163	391	163	82	294	163	82	65	1,566
3	245	245	587	245	122	440	245	122	98	2,349
4	326	326	783	326	163	587	326	163	130	3,132
5	408	408	979	408	204	734	408	204	163	3,915
6	489	489	1,174	489	245	881	489	245	196	4,698
7	571	571	1,370	571	285	1,028	571	285	228	5,481
8	652	652	1,566	652	326	1,174	652	326	261	6,263
9	734	734	1,762	734	367	1,321	734	367	294	7,046
10	816	816	1,957	816	408	1,468	816	408	326	7,829
11	897	897	2,153	897	449	1,615	897	449	359	8,612
12	979	979	2,349	979	489	1,762	979	489	391	9,395
13	1,060	1,060	2,545	1,060	530	1,908	1,060	530	424	10,178
14	1,142	1,142	2,740	1,142	571	2,055	1,142	571	457	10,961
15	1,223	1,223	2,936	1,223	612	2,202	1,223	612	489	11,744
16	1,305	1,305	3,132	1,305	652	2,349	1,305	652	522	12,527
17	1,386	1,386	3,327	1,386	693	2,496	1,386	693	555	13,310
18	1,468	1,468	3,523	1,468	734	2,642	1,468	734	587	14,093
19	1,550	1,550	3,719	1,550	775	2,789	1,550	775	620	14,876
20	1,631	1,631	3,915	1,631	816	2,936	1,631	816	652	15,659
21	1,713	1,713	4,110	1,713	856	3,083	1,713	856	685	16,442
22	1,794	1,794	4,306	1,794	897	3,230	1,794	897	718	17,224
23	1,876	1,876	4,502	1,876	938	3,376	1,876	938	750	18,007
24	1,957	1,957	4,698	1,957	979	3,523	1,957	979	783	18,790
25	2,039	2,039	4,893	2,039	1,019	3,670	2,039	1,019	816	19,573
26	2,120	2,120	5,089	2,120	1,060	3,817	2,120	1,060	848	20,356
27	2,202	2,202	5,285	2,202	1,101	3,964	2,202	1,101	881	21,139
28	2,284	2,284	5,481	2,284	1,142	4,110	2,284	1,142	913	21,922
29	2,365	2,365	5,676	2,365	1,183	4,257	2,365	1,183	946	22,705
30	2,447	2,447	5,872	2,447	1,223	4,404	2,447	1,223	979	23,488
31	2,528	2,528	6,068	2,528	1,264	4,551	2,528	1,264	1,011	24,271
32	2,610	2,610	6,263	2,610	1,305	4,698	2,610	1,305	1,044	25,054
33	2,691	2,691	6,459	2,691	1,346	4,844	2,691	1,346	1,077	25,837
34	2,773	2,773	6,655	2,773	1,386	4,991	2,773	1,386	1,109	26,620
35	2,854	2,854	6,851	2,854	1,427	5,138	2,854	1,427	1,142	27,403
36	2,936	2,936	7,046	2,936	1,468	5,285	2,936	1,468	1,174	28,186
37	3,018	3,018	7,242	3,018	1,509	5,432	3,018	1,509	1,207	28,968
38	3,099	3,099	7,438	3,099	1,550	5,578	3,099	1,550	1,240	29,751
39	3,181	3,181	7,634	3,181	1,590	5,725	3,181	1,590	1,272	30,534

40	3,262	3,262	7,829	3,262	1,631	5,872	3,262	1,631	1,305	31,317

Sub Watershed #207 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	90	90	216	90	45	162	90	45	36	863
2	180	180	432	180	90	324	180	90	72	1,727
3	270	270	648	270	135	486	270	135	108	2,590
4	360	360	863	360	180	648	360	180	144	3,453
5	450	450	1,079	450	225	809	450	225	180	4,317
6	540	540	1,295	540	270	971	540	270	216	5,180
7	630	630	1,511	630	315	1,133	630	315	252	6,043
8	719	719	1,727	719	360	1,295	719	360	288	6,907
9	809	809	1,943	809	405	1,457	809	405	324	7,770
10	899	899	2,158	899	450	1,619	899	450	360	8,633
11	989	989	2,374	989	495	1,781	989	495	396	9,497
12	1,079	1,079	2,590	1,079	540	1,943	1,079	540	432	10,360
13	1,169	1,169	2,806	1,169	585	2,104	1,169	585	468	11,223
14	1,259	1,259	3,022	1,259	630	2,266	1,259	630	504	12,087
15	1,349	1,349	3,238	1,349	674	2,428	1,349	674	540	12,950
16	1,439	1,439	3,453	1,439	719	2,590	1,439	719	576	13,813
17	1,529	1,529	3,669	1,529	764	2,752	1,529	764	612	14,677
18	1,619	1,619	3,885	1,619	809	2,914	1,619	809	648	15,540
19	1,709	1,709	4,101	1,709	854	3,076	1,709	854	683	16,403
20	1,799	1,799	4,317	1,799	899	3,238	1,799	899	719	17,267
21	1,889	1,889	4,533	1,889	944	3,399	1,889	944	755	18,130
22	1,978	1,978	4,748	1,978	989	3,561	1,978	989	791	18,993
23	2,068	2,068	4,964	2,068	1,034	3,723	2,068	1,034	827	19,857
24	2,158	2,158	5,180	2,158	1,079	3,885	2,158	1,079	863	20,720
25	2,248	2,248	5,396	2,248	1,124	4,047	2,248	1,124	899	21,583
26	2,338	2,338	5,612	2,338	1,169	4,209	2,338	1,169	935	22,447
27	2,428	2,428	5,828	2,428	1,214	4,371	2,428	1,214	971	23,310
28	2,518	2,518	6,043	2,518	1,259	4,533	2,518	1,259	1,007	24,174
29	2,608	2,608	6,259	2,608	1,304	4,694	2,608	1,304	1,043	25,037
30	2,698	2,698	6,475	2,698	1,349	4,856	2,698	1,349	1,079	25,900
31	2,788	2,788	6,691	2,788	1,394	5,018	2,788	1,394	1,115	26,764
32	2,878	2,878	6,907	2,878	1,439	5,180	2,878	1,439	1,151	27,627
33	2,968	2,968	7,123	2,968	1,484	5,342	2,968	1,484	1,187	28,490
34	3,058	3,058	7,338	3,058	1,529	5,504	3,058	1,529	1,223	29,354
35	3,148	3,148	7,554	3,148	1,574	5,666	3,148	1,574	1,259	30,217
36	3,238	3,238	7,770	3,238	1,619	5,828	3,238	1,619	1,295	31,080

37	3,327	3,327	7,986	3,327	1,664	5,989	3,327	1,664	1,331	31,944
38	3,417	3,417	8,202	3,417	1,709	6,151	3,417	1,709	1,367	32,807
39	3,507	3,507	8,418	3,507	1,754	6,313	3,507	1,754	1,403	33,670
40	3,597	3,597	8,633	3,597	1,799	6,475	3,597	1,799	1,439	34,534

Sub Watershed #208 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	95	95	227	95	47	170	95	47	38	908
2	189	189	454	189	95	341	189	95	76	1,816
3	284	284	681	284	142	511	284	142	114	2,724
4	378	378	908	378	189	681	378	189	151	3,632
5	473	473	1,135	473	236	851	473	236	189	4,541
6	568	568	1,362	568	284	1,022	568	284	227	5,449
7	662	662	1,589	662	331	1,192	662	331	265	6,357
8	757	757	1,816	757	378	1,362	757	378	303	7,265
9	851	851	2,043	851	426	1,532	851	426	341	8,173
10	946	946	2,270	946	473	1,703	946	473	378	9,081
11	1,041	1,041	2,497	1,041	520	1,873	1,041	520	416	9,989
12	1,135	1,135	2,724	1,135	568	2,043	1,135	568	454	10,897
13	1,230	1,230	2,951	1,230	615	2,214	1,230	615	492	11,805
14	1,324	1,324	3,178	1,324	662	2,384	1,324	662	530	12,714
15	1,419	1,419	3,405	1,419	709	2,554	1,419	709	568	13,622
16	1,514	1,514	3,632	1,514	757	2,724	1,514	757	605	14,530
17	1,608	1,608	3,859	1,608	804	2,895	1,608	804	643	15,438
18	1,703	1,703	4,087	1,703	851	3,065	1,703	851	681	16,346
19	1,797	1,797	4,314	1,797	899	3,235	1,797	899	719	17,254
20	1,892	1,892	4,541	1,892	946	3,405	1,892	946	757	18,162
21	1,986	1,986	4,768	1,986	993	3,576	1,986	993	795	19,070
22	2,081	2,081	4,995	2,081	1,041	3,746	2,081	1,041	832	19,978
23	2,176	2,176	5,222	2,176	1,088	3,916	2,176	1,088	870	20,887
24	2,270	2,270	5,449	2,270	1,135	4,087	2,270	1,135	908	21,795
25	2,365	2,365	5,676	2,365	1,182	4,257	2,365	1,182	946	22,703
26	2,459	2,459	5,903	2,459	1,230	4,427	2,459	1,230	984	23,611
27	2,554	2,554	6,130	2,554	1,277	4,597	2,554	1,277	1,022	24,519
28	2,649	2,649	6,357	2,649	1,324	4,768	2,649	1,324	1,059	25,427
29	2,743	2,743	6,584	2,743	1,372	4,938	2,743	1,372	1,097	26,335
30	2,838	2,838	6,811	2,838	1,419	5,108	2,838	1,419	1,135	27,243
31	2,932	2,932	7,038	2,932	1,466	5,278	2,932	1,466	1,173	28,152
32	3,027	3,027	7,265	3,027	1,514	5,449	3,027	1,514	1,211	29,060
33	3,122	3,122	7,492	3,122	1,561	5,619	3,122	1,561	1,249	29,968

34	3,216	3,216	7,719	3,216	1,608	5,789	3,216	1,608	1,286	30,876
35	3,311	3,311	7,946	3,311	1,655	5,959	3,311	1,655	1,324	31,784
36	3,405	3,405	8,173	3,405	1,703	6,130	3,405	1,703	1,362	32,692
37	3,500	3,500	8,400	3,500	1,750	6,300	3,500	1,750	1,400	33,600
38	3,595	3,595	8,627	3,595	1,797	6,470	3,595	1,797	1,438	34,508
39	3,689	3,689	8,854	3,689	1,845	6,641	3,689	1,845	1,476	35,416
40	3,784	3,784	9,081	3,784	1,892	6,811	3,784	1,892	1,514	36,325

Sub Watershed #301 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	100	100	241	100	50	181	100	50	40	964
2	201	201	482	201	100	361	201	100	80	1,927
3	301	301	723	301	151	542	301	151	120	2,891
4	401	401	964	401	201	723	401	201	161	3,854
5	502	502	1,204	502	251	903	502	251	201	4,818
6	602	602	1,445	602	301	1,084	602	301	241	5,782
7	703	703	1,686	703	351	1,265	703	351	281	6,745
8	803	803	1,927	803	401	1,445	803	401	321	7,709
9	903	903	2,168	903	452	1,626	903	452	361	8,672
10	1,004	1,004	2,409	1,004	502	1,807	1,004	502	401	9,636
11	1,104	1,104	2,650	1,104	552	1,987	1,104	552	442	10,600
12	1,204	1,204	2,891	1,204	602	2,168	1,204	602	482	11,563
13	1,305	1,305	3,132	1,305	652	2,349	1,305	652	522	12,527
14	1,405	1,405	3,373	1,405	703	2,529	1,405	703	562	13,490
15	1,506	1,506	3,613	1,506	753	2,710	1,506	753	602	14,454
16	1,606	1,606	3,854	1,606	803	2,891	1,606	803	642	15,418
17	1,706	1,706	4,095	1,706	853	3,071	1,706	853	683	16,381
18	1,807	1,807	4,336	1,807	903	3,252	1,807	903	723	17,345
19	1,907	1,907	4,577	1,907	954	3,433	1,907	954	763	18,308
20	2,007	2,007	4,818	2,007	1,004	3,613	2,007	1,004	803	19,272
21	2,108	2,108	5,059	2,108	1,054	3,794	2,108	1,054	843	20,236
22	2,208	2,208	5,300	2,208	1,104	3,975	2,208	1,104	883	21,199
23	2,309	2,309	5,541	2,309	1,154	4,156	2,309	1,154	923	22,163
24	2,409	2,409	5,782	2,409	1,204	4,336	2,409	1,204	964	23,126
25	2,509	2,509	6,022	2,509	1,255	4,517	2,509	1,255	1,004	24,090
26	2,610	2,610	6,263	2,610	1,305	4,698	2,610	1,305	1,044	25,054
27	2,710	2,710	6,504	2,710	1,355	4,878	2,710	1,355	1,084	26,017
28	2,810	2,810	6,745	2,810	1,405	5,059	2,810	1,405	1,124	26,981
29	2,911	2,911	6,986	2,911	1,455	5,240	2,911	1,455	1,164	27,944
30	3,011	3,011	7,227	3,011	1,506	5,420	3,011	1,506	1,204	28,908

31	3,112	3,112	7,468	3,112	1,556	5,601	3,112	1,556	1,245	29,871
32	3,212	3,212	7,709	3,212	1,606	5,782	3,212	1,606	1,285	30,835
33	3,312	3,312	7,950	3,312	1,656	5,962	3,312	1,656	1,325	31,799
34	3,413	3,413	8,191	3,413	1,706	6,143	3,413	1,706	1,365	32,762
35	3,513	3,513	8,431	3,513	1,757	6,324	3,513	1,757	1,405	33,726
36	3,613	3,613	8,672	3,613	1,807	6,504	3,613	1,807	1,445	34,689
37	3,714	3,714	8,913	3,714	1,857	6,685	3,714	1,857	1,486	35,653
38	3,814	3,814	9,154	3,814	1,907	6,866	3,814	1,907	1,526	36,617
39	3,915	3,915	9,395	3,915	1,957	7,046	3,915	1,957	1,566	37,580
40	4,015	4,015	9,636	4,015	2,007	7,227	4,015	2,007	1,606	38,544

Sub Watershed #302 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	68	68	164	68	34	123	68	34	27	654
2	136	136	327	136	68	245	136	68	55	1,309
3	204	204	491	204	102	368	204	102	82	1,963
4	273	273	654	273	136	491	273	136	109	2,618
5	341	341	818	341	170	613	341	170	136	3,272
6	409	409	982	409	204	736	409	204	164	3,926
7	477	477	1,145	477	239	859	477	239	191	4,581
8	545	545	1,309	545	273	982	545	273	218	5,235
9	613	613	1,472	613	307	1,104	613	307	245	5,890
10	682	682	1,636	682	341	1,227	682	341	273	6,544
11	750	750	1,800	750	375	1,350	750	375	300	7,198
12	818	818	1,963	818	409	1,472	818	409	327	7,853
13	886	886	2,127	886	443	1,595	886	443	354	8,507
14	954	954	2,290	954	477	1,718	954	477	382	9,161
15	1,022	1,022	2,454	1,022	511	1,840	1,022	511	409	9,816
16	1,091	1,091	2,618	1,091	545	1,963	1,091	545	436	10,470
17	1,159	1,159	2,781	1,159	579	2,086	1,159	579	464	11,125
18	1,227	1,227	2,945	1,227	613	2,209	1,227	613	491	11,779
19	1,295	1,295	3,108	1,295	648	2,331	1,295	648	518	12,433
20	1,363	1,363	3,272	1,363	682	2,454	1,363	682	545	13,088
21	1,431	1,431	3,436	1,431	716	2,577	1,431	716	573	13,742
22	1,500	1,500	3,599	1,500	750	2,699	1,500	750	600	14,397
23	1,568	1,568	3,763	1,568	784	2,822	1,568	784	627	15,051
24	1,636	1,636	3,926	1,636	818	2,945	1,636	818	654	15,705
25	1,704	1,704	4,090	1,704	852	3,067	1,704	852	682	16,360
26	1,772	1,772	4,254	1,772	886	3,190	1,772	886	709	17,014
27	1,840	1,840	4,417	1,840	920	3,313	1,840	920	736	17,669

28	1,909	1,909	4,581	1,909	954	3,436	1,909	954	763	18,323
29	1,977	1,977	4,744	1,977	988	3,558	1,977	988	791	18,977
30	2,045	2,045	4,908	2,045	1,022	3,681	2,045	1,022	818	19,632
31	2,113	2,113	5,072	2,113	1,057	3,804	2,113	1,057	845	20,286
32	2,181	2,181	5,235	2,181	1,091	3,926	2,181	1,091	873	20,940
33	2,249	2,249	5,399	2,249	1,125	4,049	2,249	1,125	900	21,595
34	2,318	2,318	5,562	2,318	1,159	4,172	2,318	1,159	927	22,249
35	2,386	2,386	5,726	2,386	1,193	4,294	2,386	1,193	954	22,904
36	2,454	2,454	5,890	2,454	1,227	4,417	2,454	1,227	982	23,558
37	2,522	2,522	6,053	2,522	1,261	4,540	2,522	1,261	1,009	24,212
38	2,590	2,590	6,217	2,590	1,295	4,663	2,590	1,295	1,036	24,867
39	2,658	2,658	6,380	2,658	1,329	4,785	2,658	1,329	1,063	25,521
40	2,727	2,727	6,544	2,727	1,363	4,908	2,727	1,363	1,091	26,176

Sub Watershed #304 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	17	17	41	17	9	31	17	9	7	166
2	35	35	83	35	17	62	35	17	14	332
3	52	52	124	52	26	93	52	26	21	498
4	69	69	166	69	35	124	69	35	28	664
5	86	86	207	86	43	156	86	43	35	829
6	104	104	249	104	52	187	104	52	41	995
7	121	121	290	121	60	218	121	60	48	1,161
8	138	138	332	138	69	249	138	69	55	1,327
9	156	156	373	156	78	280	156	78	62	1,493
10	173	173	415	173	86	311	173	86	69	1,659
11	190	190	456	190	95	342	190	95	76	1,825
12	207	207	498	207	104	373	207	104	83	1,991
13	225	225	539	225	112	404	225	112	90	2,156
14	242	242	581	242	121	435	242	121	97	2,322
15	259	259	622	259	130	467	259	130	104	2,488
16	276	276	664	276	138	498	276	138	111	2,654
17	294	294	705	294	147	529	294	147	118	2,820
18	311	311	746	311	156	560	311	156	124	2,986
19	328	328	788	328	164	591	328	164	131	3,152
20	346	346	829	346	173	622	346	173	138	3,318
21	363	363	871	363	181	653	363	181	145	3,484
22	380	380	912	380	190	684	380	190	152	3,649
23	397	397	954	397	199	715	397	199	159	3,815
24	415	415	995	415	207	746	415	207	166	3,981

25	432	432	1,037	432	216	778	432	216	173	4,147
26	449	449	1,078	449	225	809	449	225	180	4,313
27	467	467	1,120	467	233	840	467	233	187	4,479
28	484	484	1,161	484	242	871	484	242	194	4,645
29	501	501	1,203	501	251	902	501	251	200	4,811
30	518	518	1,244	518	259	933	518	259	207	4,977
31	536	536	1,286	536	268	964	536	268	214	5,142
32	553	553	1,327	553	276	995	553	276	221	5,308
33	570	570	1,369	570	285	1,026	570	285	228	5,474
34	588	588	1,410	588	294	1,058	588	294	235	5,640
35	605	605	1,451	605	302	1,089	605	302	242	5,806
36	622	622	1,493	622	311	1,120	622	311	249	5,972
37	639	639	1,534	639	320	1,151	639	320	256	6,138
38	657	657	1,576	657	328	1,182	657	328	263	6,304
39	674	674	1,617	674	337	1,213	674	337	270	6,469
40	691	691	1,659	691	346	1,244	691	346	276	6,635

Sub Watershed #305 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	80	80	191	80	40	143	80	40	32	763
2	159	159	382	159	80	286	159	80	64	1,527
3	239	239	572	239	119	429	239	119	95	2,290
4	318	318	763	318	159	572	318	159	127	3,053
5	398	398	954	398	199	716	398	199	159	3,816
6	477	477	1,145	477	239	859	477	239	191	4,580
7	557	557	1,336	557	278	1,002	557	278	223	5,343
8	636	636	1,527	636	318	1,145	636	318	254	6,106
9	716	716	1,717	716	358	1,288	716	358	286	6,869
10	795	795	1,908	795	398	1,431	795	398	318	7,633
11	875	875	2,099	875	437	1,574	875	437	350	8,396
12	954	954	2,290	954	477	1,717	954	477	382	9,159
13	1,034	1,034	2,481	1,034	517	1,860	1,034	517	413	9,922
14	1,113	1,113	2,671	1,113	557	2,004	1,113	557	445	10,686
15	1,193	1,193	2,862	1,193	596	2,147	1,193	596	477	11,449
16	1,272	1,272	3,053	1,272	636	2,290	1,272	636	509	12,212
17	1,352	1,352	3,244	1,352	676	2,433	1,352	676	541	12,975
18	1,431	1,431	3,435	1,431	716	2,576	1,431	716	572	13,739
19	1,511	1,511	3,625	1,511	755	2,719	1,511	755	604	14,502
20	1,590	1,590	3,816	1,590	795	2,862	1,590	795	636	15,265
21	1,670	1,670	4,007	1,670	835	3,005	1,670	835	668	16,028

22	1,749	1,749	4,198	1,749	875	3,148	1,749	875	700	16,792
23	1,829	1,829	4,389	1,829	914	3,292	1,829	914	731	17,555
24	1,908	1,908	4,580	1,908	954	3,435	1,908	954	763	18,318
25	1,988	1,988	4,770	1,988	994	3,578	1,988	994	795	19,081
26	2,067	2,067	4,961	2,067	1,034	3,721	2,067	1,034	827	19,845
27	2,147	2,147	5,152	2,147	1,073	3,864	2,147	1,073	859	20,608
28	2,226	2,226	5,343	2,226	1,113	4,007	2,226	1,113	890	21,371
29	2,306	2,306	5,534	2,306	1,153	4,150	2,306	1,153	922	22,134
30	2,385	2,385	5,724	2,385	1,193	4,293	2,385	1,193	954	22,898
31	2,465	2,465	5,915	2,465	1,232	4,436	2,465	1,232	986	23,661
32	2,544	2,544	6,106	2,544	1,272	4,580	2,544	1,272	1,018	24,424
33	2,624	2,624	6,297	2,624	1,312	4,723	2,624	1,312	1,049	25,187
34	2,703	2,703	6,488	2,703	1,352	4,866	2,703	1,352	1,081	25,951
35	2,783	2,783	6,678	2,783	1,391	5,009	2,783	1,391	1,113	26,714
36	2,862	2,862	6,869	2,862	1,431	5,152	2,862	1,431	1,145	27,477
37	2,942	2,942	7,060	2,942	1,471	5,295	2,942	1,471	1,177	28,240
38	3,021	3,021	7,251	3,021	1,511	5,438	3,021	1,511	1,208	29,004
39	3,101	3,101	7,442	3,101	1,550	5,581	3,101	1,550	1,240	29,767
40	3,180	3,180	7,633	3,180	1,590	5,724	3,180	1,590	1,272	30,530

Sub Watershed #306 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	56	56	135	56	28	101	56	28	23	541
2	113	113	270	113	56	203	113	56	45	1,081
3	169	169	405	169	84	304	169	84	68	1,622
4	225	225	541	225	113	405	225	113	90	2,162
5	282	282	676	282	141	507	282	141	113	2,703
6	338	338	811	338	169	608	338	169	135	3,244
7	394	394	946	394	197	710	394	197	158	3,784
8	451	451	1,081	451	225	811	451	225	180	4,325
9	507	507	1,216	507	253	912	507	253	203	4,866
10	563	563	1,352	563	282	1,014	563	282	225	5,406
11	619	619	1,487	619	310	1,115	619	310	248	5,947
12	676	676	1,622	676	338	1,216	676	338	270	6,487
13	732	732	1,757	732	366	1,318	732	366	293	7,028
14	788	788	1,892	788	394	1,419	788	394	315	7,569
15	845	845	2,027	845	422	1,520	845	422	338	8,109
16	901	901	2,162	901	451	1,622	901	451	360	8,650
17	957	957	2,298	957	479	1,723	957	479	383	9,191
18	1,014	1,014	2,433	1,014	507	1,825	1,014	507	405	9,731

19	1,070	1,070	2,568	1,070	535	1,926	1,070	535	428	10,272
20	1,126	1,126	2,703	1,126	563	2,027	1,126	563	451	10,812
21	1,183	1,183	2,838	1,183	591	2,129	1,183	591	473	11,353
22	1,239	1,239	2,973	1,239	619	2,230	1,239	619	496	11,894
23	1,295	1,295	3,109	1,295	648	2,331	1,295	648	518	12,434
24	1,352	1,352	3,244	1,352	676	2,433	1,352	676	541	12,975
25	1,408	1,408	3,379	1,408	704	2,534	1,408	704	563	13,516
26	1,464	1,464	3,514	1,464	732	2,636	1,464	732	586	14,056
27	1,520	1,520	3,649	1,520	760	2,737	1,520	760	608	14,597
28	1,577	1,577	3,784	1,577	788	2,838	1,577	788	631	15,137
29	1,633	1,633	3,920	1,633	817	2,940	1,633	817	653	15,678
30	1,689	1,689	4,055	1,689	845	3,041	1,689	845	676	16,219
31	1,746	1,746	4,190	1,746	873	3,142	1,746	873	698	16,759
32	1,802	1,802	4,325	1,802	901	3,244	1,802	901	721	17,300
33	1,858	1,858	4,460	1,858	929	3,345	1,858	929	743	17,841
34	1,915	1,915	4,595	1,915	957	3,446	1,915	957	766	18,381
35	1,971	1,971	4,730	1,971	986	3,548	1,971	986	788	18,922
36	2,027	2,027	4,866	2,027	1,014	3,649	2,027	1,014	811	19,462
37	2,084	2,084	5,001	2,084	1,042	3,751	2,084	1,042	833	20,003
38	2,140	2,140	5,136	2,140	1,070	3,852	2,140	1,070	856	20,544
39	2,196	2,196	5,271	2,196	1,098	3,953	2,196	1,098	879	21,084
40	2,253	2,253	5,406	2,253	1,126	4,055	2,253	1,126	901	21,625

Sub Watershed #307 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	67	67	160	67	33	120	67	33	27	640
2	133	133	320	133	67	240	133	67	53	1,280
3	200	200	480	200	100	360	200	100	80	1,920
4	267	267	640	267	133	480	267	133	107	2,559
5	333	333	800	333	167	600	333	167	133	3,199
6	400	400	960	400	200	720	400	200	160	3,839
7	467	467	1,120	467	233	840	467	233	187	4,479
8	533	533	1,280	533	267	960	533	267	213	5,119
9	600	600	1,440	600	300	1,080	600	300	240	5,759
10	667	667	1,600	667	333	1,200	667	333	267	6,399
11	733	733	1,760	733	367	1,320	733	367	293	7,038
12	800	800	1,920	800	400	1,440	800	400	320	7,678
13	866	866	2,080	866	433	1,560	866	433	347	8,318
14	933	933	2,239	933	467	1,680	933	467	373	8,958
15	1,000	1,000	2,399	1,000	500	1,800	1,000	500	400	9,598

16	1,066	1,066	2,559	1,066	533	1,920	1,066	533	427	10,238
17	1,133	1,133	2,719	1,133	567	2,040	1,133	567	453	10,878
18	1,200	1,200	2,879	1,200	600	2,160	1,200	600	480	11,517
19	1,266	1,266	3,039	1,266	633	2,279	1,266	633	507	12,157
20	1,333	1,333	3,199	1,333	667	2,399	1,333	667	533	12,797
21	1,400	1,400	3,359	1,400	700	2,519	1,400	700	560	13,437
22	1,466	1,466	3,519	1,466	733	2,639	1,466	733	587	14,077
23	1,533	1,533	3,679	1,533	766	2,759	1,533	766	613	14,717
24	1,600	1,600	3,839	1,600	800	2,879	1,600	800	640	15,357
25	1,666	1,666	3,999	1,666	833	2,999	1,666	833	667	15,996
26	1,733	1,733	4,159	1,733	866	3,119	1,733	866	693	16,636
27	1,800	1,800	4,319	1,800	900	3,239	1,800	900	720	17,276
28	1,866	1,866	4,479	1,866	933	3,359	1,866	933	746	17,916
29	1,933	1,933	4,639	1,933	966	3,479	1,933	966	773	18,556
30	2,000	2,000	4,799	2,000	1,000	3,599	2,000	1,000	800	19,196
31	2,066	2,066	4,959	2,066	1,033	3,719	2,066	1,033	826	19,836
32	2,133	2,133	5,119	2,133	1,066	3,839	2,133	1,066	853	20,475
33	2,200	2,200	5,279	2,200	1,100	3,959	2,200	1,100	880	21,115
34	2,266	2,266	5,439	2,266	1,133	4,079	2,266	1,133	906	21,755
35	2,333	2,333	5,599	2,333	1,166	4,199	2,333	1,166	933	22,395
36	2,399	2,399	5,759	2,399	1,200	4,319	2,399	1,200	960	23,035
37	2,466	2,466	5,919	2,466	1,233	4,439	2,466	1,233	986	23,675
38	2,533	2,533	6,079	2,533	1,266	4,559	2,533	1,266	1,013	24,315
39	2,599	2,599	6,239	2,599	1,300	4,679	2,599	1,300	1,040	24,954
40	2,666	2,666	6,399	2,666	1,333	4,799	2,666	1,333	1,066	25,594

Sub Watershed #401 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	93	93	223	93	46	167	93	46	37	891
2	186	186	446	186	93	334	186	93	74	1,782
3	279	279	668	279	139	501	279	139	111	2,674
4	371	371	891	371	186	668	371	186	149	3,565
5	464	464	1,114	464	232	836	464	232	186	4,456
6	557	557	1,337	557	279	1,003	557	279	223	5,347
7	650	650	1,560	650	325	1,170	650	325	260	6,239
8	743	743	1,782	743	371	1,337	743	371	297	7,130
9	836	836	2,005	836	418	1,504	836	418	334	8,021
10	928	928	2,228	928	464	1,671	928	464	371	8,912
11	1,021	1,021	2,451	1,021	511	1,838	1,021	511	408	9,803
12	1,114	1,114	2,674	1,114	557	2,005	1,114	557	446	10,695

13	1,207	1,207	2,896	1,207	603	2,172	1,207	603	483	11,586
14	1,300	1,300	3,119	1,300	650	2,339	1,300	650	520	12,477
15	1,393	1,393	3,342	1,393	696	2,507	1,393	696	557	13,368
16	1,485	1,485	3,565	1,485	743	2,674	1,485	743	594	14,260
17	1,578	1,578	3,788	1,578	789	2,841	1,578	789	631	15,151
18	1,671	1,671	4,010	1,671	836	3,008	1,671	836	668	16,042
19	1,764	1,764	4,233	1,764	882	3,175	1,764	882	706	16,933
20	1,857	1,857	4,456	1,857	928	3,342	1,857	928	743	17,824
21	1,950	1,950	4,679	1,950	975	3,509	1,950	975	780	18,716
22	2,042	2,042	4,902	2,042	1,021	3,676	2,042	1,021	817	19,607
23	2,135	2,135	5,125	2,135	1,068	3,843	2,135	1,068	854	20,498
24	2,228	2,228	5,347	2,228	1,114	4,010	2,228	1,114	891	21,389
25	2,321	2,321	5,570	2,321	1,160	4,178	2,321	1,160	928	22,281
26	2,414	2,414	5,793	2,414	1,207	4,345	2,414	1,207	965	23,172
27	2,507	2,507	6,016	2,507	1,253	4,512	2,507	1,253	1,003	24,063
28	2,599	2,599	6,239	2,599	1,300	4,679	2,599	1,300	1,040	24,954
29	2,692	2,692	6,461	2,692	1,346	4,846	2,692	1,346	1,077	25,845
30	2,785	2,785	6,684	2,785	1,393	5,013	2,785	1,393	1,114	26,737
31	2,878	2,878	6,907	2,878	1,439	5,180	2,878	1,439	1,151	27,628
32	2,971	2,971	7,130	2,971	1,485	5,347	2,971	1,485	1,188	28,519
33	3,064	3,064	7,353	3,064	1,532	5,514	3,064	1,532	1,225	29,410
34	3,156	3,156	7,575	3,156	1,578	5,682	3,156	1,578	1,263	30,302
35	3,249	3,249	7,798	3,249	1,625	5,849	3,249	1,625	1,300	31,193
36	3,342	3,342	8,021	3,342	1,671	6,016	3,342	1,671	1,337	32,084
37	3,435	3,435	8,244	3,435	1,717	6,183	3,435	1,717	1,374	32,975
38	3,528	3,528	8,467	3,528	1,764	6,350	3,528	1,764	1,411	33,866
39	3,621	3,621	8,689	3,621	1,810	6,517	3,621	1,810	1,448	34,758
40	3,713	3,713	8,912	3,713	1,857	6,684	3,713	1,857	1,485	35,649

Sub Watershed #402 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	74	74	177	74	37	133	74	37	30	708
2	148	148	354	148	74	266	148	74	59	1,417
3	221	221	531	221	111	398	221	111	89	2,125
4	295	295	708	295	148	531	295	148	118	2,834
5	369	369	886	369	184	664	369	184	148	3,542
6	443	443	1,063	443	221	797	443	221	177	4,251
7	517	517	1,240	517	258	930	517	258	207	4,959
8	590	590	1,417	590	295	1,063	590	295	236	5,667
9	664	664	1,594	664	332	1,195	664	332	266	6,376

10	738	738	1,771	738	369	1,328	738	369	295	7,084
11	812	812	1,948	812	406	1,461	812	406	325	7,793
12	886	886	2,125	886	443	1,594	886	443	354	8,501
13	959	959	2,302	959	480	1,727	959	480	384	9,210
14	1,033	1,033	2,480	1,033	517	1,860	1,033	517	413	9,918
15	1,107	1,107	2,657	1,107	553	1,992	1,107	553	443	10,627
16	1,181	1,181	2,834	1,181	590	2,125	1,181	590	472	11,335
17	1,255	1,255	3,011	1,255	627	2,258	1,255	627	502	12,043
18	1,328	1,328	3,188	1,328	664	2,391	1,328	664	531	12,752
19	1,402	1,402	3,365	1,402	701	2,524	1,402	701	561	13,460
20	1,476	1,476	3,542	1,476	738	2,657	1,476	738	590	14,169
21	1,550	1,550	3,719	1,550	775	2,789	1,550	775	620	14,877
22	1,623	1,623	3,896	1,623	812	2,922	1,623	812	649	15,586
23	1,697	1,697	4,073	1,697	849	3,055	1,697	849	679	16,294
24	1,771	1,771	4,251	1,771	886	3,188	1,771	886	708	17,002
25	1,845	1,845	4,428	1,845	922	3,321	1,845	922	738	17,711
26	1,919	1,919	4,605	1,919	959	3,454	1,919	959	767	18,419
27	1,992	1,992	4,782	1,992	996	3,586	1,992	996	797	19,128
28	2,066	2,066	4,959	2,066	1,033	3,719	2,066	1,033	827	19,836
29	2,140	2,140	5,136	2,140	1,070	3,852	2,140	1,070	856	20,545
30	2,214	2,214	5,313	2,214	1,107	3,985	2,214	1,107	886	21,253
31	2,288	2,288	5,490	2,288	1,144	4,118	2,288	1,144	915	21,961
32	2,361	2,361	5,667	2,361	1,181	4,251	2,361	1,181	945	22,670
33	2,435	2,435	5,845	2,435	1,218	4,383	2,435	1,218	974	23,378
34	2,509	2,509	6,022	2,509	1,255	4,516	2,509	1,255	1,004	24,087
35	2,583	2,583	6,199	2,583	1,291	4,649	2,583	1,291	1,033	24,795
36	2,657	2,657	6,376	2,657	1,328	4,782	2,657	1,328	1,063	25,504
37	2,730	2,730	6,553	2,730	1,365	4,915	2,730	1,365	1,092	26,212
38	2,804	2,804	6,730	2,804	1,402	5,048	2,804	1,402	1,122	26,920
39	2,878	2,878	6,907	2,878	1,439	5,180	2,878	1,439	1,151	27,629
40	2,952	2,952	7,084	2,952	1,476	5,313	2,952	1,476	1,181	28,337

Sub Watershed #403 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	117	117	282	117	59	211	117	59	47	1,127
2	235	235	564	235	117	423	235	117	94	2,254
3	352	352	845	352	176	634	352	176	141	3,381
4	470	470	1,127	470	235	845	470	235	188	4,508
5	587	587	1,409	587	294	1,057	587	294	235	5,635
6	704	704	1,691	704	352	1,268	704	352	282	6,762

7	822	822	1,972	822	411	1,479	822	411	329	7,889
8	939	939	2,254	939	470	1,691	939	470	376	9,017
9	1,057	1,057	2,536	1,057	528	1,902	1,057	528	423	10,144
10	1,174	1,174	2,818	1,174	587	2,113	1,174	587	470	11,271
11	1,291	1,291	3,099	1,291	646	2,325	1,291	646	517	12,398
12	1,409	1,409	3,381	1,409	704	2,536	1,409	704	564	13,525
13	1,526	1,526	3,663	1,526	763	2,747	1,526	763	610	14,652
14	1,644	1,644	3,945	1,644	822	2,959	1,644	822	657	15,779
15	1,761	1,761	4,227	1,761	881	3,170	1,761	881	704	16,906
16	1,878	1,878	4,508	1,878	939	3,381	1,878	939	751	18,033
17	1,996	1,996	4,790	1,996	998	3,593	1,996	998	798	19,160
18	2,113	2,113	5,072	2,113	1,057	3,804	2,113	1,057	845	20,287
19	2,231	2,231	5,354	2,231	1,115	4,015	2,231	1,115	892	21,414
20	2,348	2,348	5,635	2,348	1,174	4,227	2,348	1,174	939	22,541
21	2,465	2,465	5,917	2,465	1,233	4,438	2,465	1,233	986	23,668
22	2,583	2,583	6,199	2,583	1,291	4,649	2,583	1,291	1,033	24,796
23	2,700	2,700	6,481	2,700	1,350	4,860	2,700	1,350	1,080	25,923
24	2,818	2,818	6,762	2,818	1,409	5,072	2,818	1,409	1,127	27,050
25	2,935	2,935	7,044	2,935	1,468	5,283	2,935	1,468	1,174	28,177
26	3,052	3,052	7,326	3,052	1,526	5,494	3,052	1,526	1,221	29,304
27	3,170	3,170	7,608	3,170	1,585	5,706	3,170	1,585	1,268	30,431
28	3,287	3,287	7,889	3,287	1,644	5,917	3,287	1,644	1,315	31,558
29	3,405	3,405	8,171	3,405	1,702	6,128	3,405	1,702	1,362	32,685
30	3,522	3,522	8,453	3,522	1,761	6,340	3,522	1,761	1,409	33,812
31	3,639	3,639	8,735	3,639	1,820	6,551	3,639	1,820	1,456	34,939
32	3,757	3,757	9,017	3,757	1,878	6,762	3,757	1,878	1,503	36,066
33	3,874	3,874	9,298	3,874	1,937	6,974	3,874	1,937	1,550	37,193
34	3,992	3,992	9,580	3,992	1,996	7,185	3,992	1,996	1,597	38,320
35	4,109	4,109	9,862	4,109	2,055	7,396	4,109	2,055	1,644	39,447
36	4,227	4,227	10,144	4,227	2,113	7,608	4,227	2,113	1,691	40,574
37	4,344	4,344	10,425	4,344	2,172	7,819	4,344	2,172	1,738	41,702
38	4,461	4,461	10,707	4,461	2,231	8,030	4,461	2,231	1,785	42,829
39	4,579	4,579	10,989	4,579	2,289	8,242	4,579	2,289	1,831	43,956
40	4,696	4,696	11,271	4,696	2,348	8,453	4,696	2,348	1,878	45,083

Sub Watershed #404 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	76	76	182	76	38	137	76	38	30	730
2	152	152	365	152	76	274	152	76	61	1,460
3	228	228	547	228	114	411	228	114	91	2,190

4	304	304	730	304	152	547	304	152	122	2,920
5	380	380	912	380	190	684	380	190	152	3,649
6	456	456	1,095	456	228	821	456	228	182	4,379
7	532	532	1,277	532	266	958	532	266	213	5,109
8	608	608	1,460	608	304	1,095	608	304	243	5,839
9	684	684	1,642	684	342	1,232	684	342	274	6,569
10	760	760	1,825	760	380	1,369	760	380	304	7,299
11	836	836	2,007	836	418	1,505	836	418	335	8,029
12	912	912	2,190	912	456	1,642	912	456	365	8,759
13	988	988	2,372	988	494	1,779	988	494	395	9,489
14	1,064	1,064	2,555	1,064	532	1,916	1,064	532	426	10,219
15	1,140	1,140	2,737	1,140	570	2,053	1,140	570	456	10,948
16	1,216	1,216	2,920	1,216	608	2,190	1,216	608	487	11,678
17	1,293	1,293	3,102	1,293	646	2,327	1,293	646	517	12,408
18	1,369	1,369	3,285	1,369	684	2,463	1,369	684	547	13,138
19	1,445	1,445	3,467	1,445	722	2,600	1,445	722	578	13,868
20	1,521	1,521	3,649	1,521	760	2,737	1,521	760	608	14,598
21	1,597	1,597	3,832	1,597	798	2,874	1,597	798	639	15,328
22	1,673	1,673	4,014	1,673	836	3,011	1,673	836	669	16,058
23	1,749	1,749	4,197	1,749	874	3,148	1,749	874	699	16,788
24	1,825	1,825	4,379	1,825	912	3,285	1,825	912	730	17,517
25	1,901	1,901	4,562	1,901	950	3,421	1,901	950	760	18,247
26	1,977	1,977	4,744	1,977	988	3,558	1,977	988	791	18,977
27	2,053	2,053	4,927	2,053	1,026	3,695	2,053	1,026	821	19,707
28	2,129	2,129	5,109	2,129	1,064	3,832	2,129	1,064	852	20,437
29	2,205	2,205	5,292	2,205	1,102	3,969	2,205	1,102	882	21,167
30	2,281	2,281	5,474	2,281	1,140	4,106	2,281	1,140	912	21,897
31	2,357	2,357	5,657	2,357	1,178	4,243	2,357	1,178	943	22,627
32	2,433	2,433	5,839	2,433	1,216	4,379	2,433	1,216	973	23,357
33	2,509	2,509	6,022	2,509	1,255	4,516	2,509	1,255	1,004	24,087
34	2,585	2,585	6,204	2,585	1,293	4,653	2,585	1,293	1,034	24,816
35	2,661	2,661	6,387	2,661	1,331	4,790	2,661	1,331	1,064	25,546
36	2,737	2,737	6,569	2,737	1,369	4,927	2,737	1,369	1,095	26,276
37	2,813	2,813	6,752	2,813	1,407	5,064	2,813	1,407	1,125	27,006
38	2,889	2,889	6,934	2,889	1,445	5,200	2,889	1,445	1,156	27,736
39	2,965	2,965	7,116	2,965	1,483	5,337	2,965	1,483	1,186	28,466
40	3,041	3,041	7,299	3,041	1,521	5,474	3,041	1,521	1,216	29,196

Sub Watershed #405 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction

1	78	78	187	78	39	140	78	39	31	749
2	156	156	375	156	78	281	156	78	62	1,498
3	234	234	562	234	117	421	234	117	94	2,247
4	312	312	749	312	156	562	312	156	125	2,996
5	390	390	936	390	195	702	390	195	156	3,745
6	468	468	1,124	468	234	843	468	234	187	4,494
7	546	546	1,311	546	273	983	546	273	218	5,243
8	624	624	1,498	624	312	1,124	624	312	250	5,993
9	702	702	1,685	702	351	1,264	702	351	281	6,742
10	780	780	1,873	780	390	1,405	780	390	312	7,491
11	858	858	2,060	858	429	1,545	858	429	343	8,240
12	936	936	2,247	936	468	1,685	936	468	375	8,989
13	1,014	1,014	2,434	1,014	507	1,826	1,014	507	406	9,738
14	1,092	1,092	2,622	1,092	546	1,966	1,092	546	437	10,487
15	1,170	1,170	2,809	1,170	585	2,107	1,170	585	468	11,236
16	1,248	1,248	2,996	1,248	624	2,247	1,248	624	499	11,985
17	1,326	1,326	3,184	1,326	663	2,388	1,326	663	531	12,734
18	1,405	1,405	3,371	1,405	702	2,528	1,405	702	562	13,483
19	1,483	1,483	3,558	1,483	741	2,669	1,483	741	593	14,232
20	1,561	1,561	3,745	1,561	780	2,809	1,561	780	624	14,981
21	1,639	1,639	3,933	1,639	819	2,949	1,639	819	655	15,730
22	1,717	1,717	4,120	1,717	858	3,090	1,717	858	687	16,480
23	1,795	1,795	4,307	1,795	897	3,230	1,795	897	718	17,229
24	1,873	1,873	4,494	1,873	936	3,371	1,873	936	749	17,978
25	1,951	1,951	4,682	1,951	975	3,511	1,951	975	780	18,727
26	2,029	2,029	4,869	2,029	1,014	3,652	2,029	1,014	811	19,476
27	2,107	2,107	5,056	2,107	1,053	3,792	2,107	1,053	843	20,225
28	2,185	2,185	5,243	2,185	1,092	3,933	2,185	1,092	874	20,974
29	2,263	2,263	5,431	2,263	1,131	4,073	2,263	1,131	905	21,723
30	2,341	2,341	5,618	2,341	1,170	4,214	2,341	1,170	936	22,472
31	2,419	2,419	5,805	2,419	1,209	4,354	2,419	1,209	968	23,221
32	2,497	2,497	5,993	2,497	1,248	4,494	2,497	1,248	999	23,970
33	2,575	2,575	6,180	2,575	1,287	4,635	2,575	1,287	1,030	24,719
34	2,653	2,653	6,367	2,653	1,326	4,775	2,653	1,326	1,061	25,468
35	2,731	2,731	6,554	2,731	1,365	4,916	2,731	1,365	1,092	26,217
36	2,809	2,809	6,742	2,809	1,405	5,056	2,809	1,405	1,124	26,966
37	2,887	2,887	6,929	2,887	1,444	5,197	2,887	1,444	1,155	27,716
38	2,965	2,965	7,116	2,965	1,483	5,337	2,965	1,483	1,186	28,465
39	3,043	3,043	7,303	3,043	1,522	5,478	3,043	1,522	1,217	29,214
40	3,121	3,121	7,491	3,121	1,561	5,618	3,121	1,561	1,248	29,963

Sub Watershed #406 Annual Nitrogen Reduction, Cropland BMPs (pounds)

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Load Reduction
1	72	72	173	72	36	130	72	36	29	691
2	144	144	345	144	72	259	144	72	58	1,382
3	216	216	518	216	108	389	216	108	86	2,072
4	288	288	691	288	144	518	288	144	115	2,763
5	360	360	863	360	180	648	360	180	144	3,454
6	432	432	1,036	432	216	777	432	216	173	4,145
7	504	504	1,209	504	252	907	504	252	201	4,836
8	576	576	1,382	576	288	1,036	576	288	230	5,526
9	648	648	1,554	648	324	1,166	648	324	259	6,217
10	720	720	1,727	720	360	1,295	720	360	288	6,908
11	792	792	1,900	792	396	1,425	792	396	317	7,599
12	863	863	2,072	863	432	1,554	863	432	345	8,290
13	935	935	2,245	935	468	1,684	935	468	374	8,980
14	1,007	1,007	2,418	1,007	504	1,813	1,007	504	403	9,671
15	1,079	1,079	2,590	1,079	540	1,943	1,079	540	432	10,362
16	1,151	1,151	2,763	1,151	576	2,072	1,151	576	461	11,053
17	1,223	1,223	2,936	1,223	612	2,202	1,223	612	489	11,743
18	1,295	1,295	3,109	1,295	648	2,331	1,295	648	518	12,434
19	1,367	1,367	3,281	1,367	684	2,461	1,367	684	547	13,125
20	1,439	1,439	3,454	1,439	720	2,590	1,439	720	576	13,816
21	1,511	1,511	3,627	1,511	756	2,720	1,511	756	604	14,507
22	1,583	1,583	3,799	1,583	792	2,850	1,583	792	633	15,197
23	1,655	1,655	3,972	1,655	828	2,979	1,655	828	662	15,888
24	1,727	1,727	4,145	1,727	863	3,109	1,727	863	691	16,579
25	1,799	1,799	4,317	1,799	899	3,238	1,799	899	720	17,270
26	1,871	1,871	4,490	1,871	935	3,368	1,871	935	748	17,961
27	1,943	1,943	4,663	1,943	971	3,497	1,943	971	777	18,651
28	2,015	2,015	4,836	2,015	1,007	3,627	2,015	1,007	806	19,342
29	2,087	2,087	5,008	2,087	1,043	3,756	2,087	1,043	835	20,033
30	2,159	2,159	5,181	2,159	1,079	3,886	2,159	1,079	863	20,724
31	2,231	2,231	5,354	2,231	1,115	4,015	2,231	1,115	892	21,415
32	2,303	2,303	5,526	2,303	1,151	4,145	2,303	1,151	921	22,105
33	2,375	2,375	5,699	2,375	1,187	4,274	2,375	1,187	950	22,796
34	2,447	2,447	5,872	2,447	1,223	4,404	2,447	1,223	979	23,487
35	2,519	2,519	6,044	2,519	1,259	4,533	2,519	1,259	1,007	24,178
36	2,590	2,590	6,217	2,590	1,295	4,663	2,590	1,295	1,036	24,869
37	2,662	2,662	6,390	2,662	1,331	4,792	2,662	1,331	1,065	25,559
38	2,734	2,734	6,563	2,734	1,367	4,922	2,734	1,367	1,094	26,250
39	2,806	2,806	6,735	2,806	1,403	5,051	2,806	1,403	1,123	26,941

40	2,878	2,878	6,908	2,878	1,439	5,181	2,878	1,439	1,151	27,632

Sub Watershed #201 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,693	$2,693	$8,320	$2,311	$983	$5,304	$110	$676	$520	$23,611
2	$2,774	$2,774	$8,570	$2,381	$1,012	$5,463	$113	$696	$536	$24,319
3	$2,857	$2,857	$8,827	$2,452	$1,043	$5,627	$116	$717	$552	$25,049
4	$2,943	$2,943	$9,092	$2,525	$1,074	$5,796	$120	$739	$568	$25,800
5	$3,031	$3,031	$9,365	$2,601	$1,106	$5,970	$123	$761	$585	$26,574
6	$3,122	$3,122	$9,645	$2,679	$1,140	$6,149	$127	$784	$603	$27,372
7	$3,216	$3,216	$9,935	$2,760	$1,174	$6,333	$131	$807	$621	$28,193
8	$3,312	$3,312	$10,233	$2,842	$1,209	$6,523	$135	$831	$640	$29,039
9	$3,412	$3,412	$10,540	$2,928	$1,245	$6,719	$139	$856	$659	$29,910
10	$3,514	$3,514	$10,856	$3,016	$1,283	$6,921	$143	$882	$679	$30,807
11	$3,620	$3,620	$11,182	$3,106	$1,321	$7,128	$147	$909	$699	$31,731
12	$3,728	$3,728	$11,517	$3,199	$1,361	$7,342	$152	$936	$720	$32,683
13	$3,840	$3,840	$11,863	$3,295	$1,402	$7,562	$156	$964	$741	$33,664
14	$3,955	$3,955	$12,219	$3,394	$1,444	$7,789	$161	$993	$764	$34,674
15	$4,074	$4,074	$12,585	$3,496	$1,487	$8,023	$166	$1,023	$787	$35,714
16	$4,196	$4,196	$12,963	$3,601	$1,531	$8,264	$171	$1,053	$810	$36,785
17	$4,322	$4,322	$13,352	$3,709	$1,577	$8,512	$176	$1,085	$834	$37,889
18	$4,452	$4,452	$13,752	$3,820	$1,625	$8,767	$181	$1,117	$860	$39,025
19	$4,585	$4,585	$14,165	$3,935	$1,673	$9,030	$187	$1,151	$885	$40,196
20	$4,723	$4,723	$14,590	$4,053	$1,724	$9,301	$192	$1,185	$912	$41,402
21	$4,864	$4,864	$15,027	$4,174	$1,775	$9,580	$198	$1,221	$939	$42,644

22	$5,010	$5,010	$15,478	$4,299	$1,829	$9,867	$204	$1,258	$967	$43,924
23	$5,161	$5,161	$15,942	$4,428	$1,884	$10,163	$210	$1,295	$996	$45,241
24	$5,316	$5,316	$16,421	$4,561	$1,940	$10,468	$217	$1,334	$1,026	$46,598
25	$5,475	$5,475	$16,913	$4,698	$1,998	$10,782	$223	$1,374	$1,057	$47,996
26	$5,639	$5,639	$17,421	$4,839	$2,058	$11,106	$230	$1,415	$1,089	$49,436
27	$5,808	$5,808	$17,943	$4,984	$2,120	$11,439	$237	$1,458	$1,121	$50,919
28	$5,983	$5,983	$18,482	$5,134	$2,184	$11,782	$244	$1,502	$1,155	$52,447
29	$6,162	$6,162	$19,036	$5,288	$2,249	$12,136	$251	$1,547	$1,190	$54,020
30	$6,347	$6,347	$19,607	$5,446	$2,317	$12,500	$259	$1,593	$1,225	$55,641
31	$6,537	$6,537	$20,195	$5,610	$2,386	$12,875	$266	$1,641	$1,262	$57,310
32	$6,734	$6,734	$20,801	$5,778	$2,458	$13,261	$274	$1,690	$1,300	$59,030
33	$6,936	$6,936	$21,425	$5,951	$2,531	$13,659	$283	$1,741	$1,339	$60,800
34	$7,144	$7,144	$22,068	$6,130	$2,607	$14,068	$291	$1,793	$1,379	$62,624
35	$7,358	$7,358	$22,730	$6,314	$2,685	$14,490	$300	$1,847	$1,421	$64,503
36	$7,579	$7,579	$23,412	$6,503	$2,766	$14,925	$309	$1,902	$1,463	$66,438
37	$7,806	$7,806	$24,114	$6,698	$2,849	$15,373	$318	$1,959	$1,507	$68,431
38	$8,040	$8,040	$24,838	$6,899	$2,934	$15,834	$328	$2,018	$1,552	$70,484
39	$8,281	$8,281	$25,583	$7,106	$3,023	$16,309	$337	$2,079	$1,599	$72,599
40	$8,530	$8,530	$26,351	$7,320	$3,113	$16,798	$347	$2,141	$1,647	$74,777

**3% Inflation*

Sub Watershed #202 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,291	$2,291	$7,076	$1,966	$836	$4,511	$93	$575	$442	$20,080
2	$2,359	$2,359	$7,288	$2,024	$861	$4,646	$96	$592	$456	$20,682
3	$2,430	$2,430	$7,507	$2,085	$887	$4,786	$99	$610	$469	$21,303
4	$2,503	$2,503	$7,732	$2,148	$914	$4,929	$102	$628	$483	$21,942

5	$2,578	$2,578	$7,964	$2,212	$941	$5,077	$105	$647	$498	$22,600
6	$2,655	$2,655	$8,203	$2,279	$969	$5,229	$108	$666	$513	$23,278
7	$2,735	$2,735	$8,449	$2,347	$998	$5,386	$111	$686	$528	$23,976
8	$2,817	$2,817	$8,702	$2,417	$1,028	$5,548	$115	$707	$544	$24,696
9	$2,902	$2,902	$8,963	$2,490	$1,059	$5,714	$118	$728	$560	$25,436
10	$2,989	$2,989	$9,232	$2,565	$1,091	$5,886	$122	$750	$577	$26,199
11	$3,078	$3,078	$9,509	$2,641	$1,123	$6,062	$125	$773	$594	$26,985
12	$3,171	$3,171	$9,795	$2,721	$1,157	$6,244	$129	$796	$612	$27,795
13	$3,266	$3,266	$10,088	$2,802	$1,192	$6,431	$133	$820	$631	$28,629
14	$3,364	$3,364	$10,391	$2,886	$1,228	$6,624	$137	$844	$649	$29,488
15	$3,465	$3,465	$10,703	$2,973	$1,265	$6,823	$141	$870	$669	$30,372
16	$3,569	$3,569	$11,024	$3,062	$1,302	$7,028	$145	$896	$689	$31,284
17	$3,676	$3,676	$11,355	$3,154	$1,342	$7,239	$150	$923	$710	$32,222
18	$3,786	$3,786	$11,695	$3,249	$1,382	$7,456	$154	$950	$731	$33,189
19	$3,899	$3,899	$12,046	$3,346	$1,423	$7,679	$159	$979	$753	$34,184
20	$4,016	$4,016	$12,408	$3,447	$1,466	$7,910	$164	$1,008	$775	$35,210
21	$4,137	$4,137	$12,780	$3,550	$1,510	$8,147	$169	$1,038	$799	$36,266
22	$4,261	$4,261	$13,163	$3,656	$1,555	$8,392	$174	$1,070	$823	$37,354
23	$4,389	$4,389	$13,558	$3,766	$1,602	$8,643	$179	$1,102	$847	$38,475
24	$4,521	$4,521	$13,965	$3,879	$1,650	$8,903	$184	$1,135	$873	$39,629
25	$4,656	$4,656	$14,384	$3,995	$1,699	$9,170	$190	$1,169	$899	$40,818
26	$4,796	$4,796	$14,815	$4,115	$1,750	$9,445	$195	$1,204	$926	$42,043
27	$4,940	$4,940	$15,260	$4,239	$1,803	$9,728	$201	$1,240	$954	$43,304
28	$5,088	$5,088	$15,718	$4,366	$1,857	$10,020	$207	$1,277	$982	$44,603
29	$5,241	$5,241	$16,189	$4,497	$1,913	$10,321	$213	$1,315	$1,012	$45,941
30	$5,398	$5,398	$16,675	$4,632	$1,970	$10,630	$220	$1,355	$1,042	$47,319

31	$5,560	$5,560	$17,175	$4,771	$2,029	$10,949	$226	$1,395	$1,073	$48,739
32	$5,726	$5,726	$17,690	$4,914	$2,090	$11,278	$233	$1,437	$1,106	$50,201
33	$5,898	$5,898	$18,221	$5,061	$2,153	$11,616	$240	$1,480	$1,139	$51,707
34	$6,075	$6,075	$18,768	$5,213	$2,217	$11,964	$247	$1,525	$1,173	$53,258
35	$6,257	$6,257	$19,331	$5,370	$2,284	$12,323	$255	$1,571	$1,208	$54,856
36	$6,445	$6,445	$19,911	$5,531	$2,352	$12,693	$263	$1,618	$1,244	$56,502
37	$6,639	$6,639	$20,508	$5,697	$2,423	$13,074	$270	$1,666	$1,282	$58,197
38	$6,838	$6,838	$21,123	$5,868	$2,496	$13,466	$279	$1,716	$1,320	$59,943
39	$7,043	$7,043	$21,757	$6,044	$2,570	$13,870	$287	$1,768	$1,360	$61,741
40	$7,254	$7,254	$22,409	$6,225	$2,648	$14,286	$296	$1,821	$1,401	$63,593

**3% Inflation*

Sub Watershed #204 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,588	$2,588	$7,995	$2,221	$945	$5,097	$105	$650	$500	$22,688
2	$2,666	$2,666	$8,235	$2,287	$973	$5,250	$109	$669	$515	$23,368
3	$2,746	$2,746	$8,482	$2,356	$1,002	$5,407	$112	$689	$530	$24,069
4	$2,828	$2,828	$8,736	$2,427	$1,032	$5,569	$115	$710	$546	$24,791
5	$2,913	$2,913	$8,998	$2,500	$1,063	$5,736	$119	$731	$562	$25,535
6	$3,000	$3,000	$9,268	$2,575	$1,095	$5,909	$122	$753	$579	$26,301
7	$3,090	$3,090	$9,546	$2,652	$1,128	$6,086	$126	$776	$597	$27,090
8	$3,183	$3,183	$9,833	$2,731	$1,162	$6,268	$130	$799	$615	$27,903
9	$3,278	$3,278	$10,128	$2,813	$1,197	$6,456	$134	$823	$633	$28,740
10	$3,377	$3,377	$10,432	$2,898	$1,232	$6,650	$138	$848	$652	$29,602
11	$3,478	$3,478	$10,744	$2,985	$1,269	$6,850	$142	$873	$672	$30,490
12	$3,582	$3,582	$11,067	$3,074	$1,307	$7,055	$146	$899	$692	$31,405
13	$3,690	$3,690	$11,399	$3,166	$1,347	$7,267	$150	$926	$712	$32,347

14	$3,801	$3,801	$11,741	$3,261	$1,387	$7,485	$155	$954	$734	$33,318
15	$3,915	$3,915	$12,093	$3,359	$1,429	$7,709	$159	$983	$756	$34,317
16	$4,032	$4,032	$12,456	$3,460	$1,472	$7,941	$164	$1,012	$778	$35,347
17	$4,153	$4,153	$12,829	$3,564	$1,516	$8,179	$169	$1,042	$802	$36,407
18	$4,278	$4,278	$13,214	$3,671	$1,561	$8,424	$174	$1,074	$826	$37,499
19	$4,406	$4,406	$13,611	$3,781	$1,608	$8,677	$179	$1,106	$851	$38,624
20	$4,538	$4,538	$14,019	$3,894	$1,656	$8,937	$185	$1,139	$876	$39,783
21	$4,674	$4,674	$14,440	$4,011	$1,706	$9,205	$190	$1,173	$902	$40,976
22	$4,814	$4,814	$14,873	$4,131	$1,757	$9,481	$196	$1,208	$930	$42,206
23	$4,959	$4,959	$15,319	$4,255	$1,810	$9,766	$202	$1,245	$957	$43,472
24	$5,108	$5,108	$15,779	$4,383	$1,864	$10,059	$208	$1,282	$986	$44,776
25	$5,261	$5,261	$16,252	$4,514	$1,920	$10,361	$214	$1,320	$1,016	$46,119
26	$5,419	$5,419	$16,740	$4,650	$1,978	$10,671	$221	$1,360	$1,046	$47,503
27	$5,581	$5,581	$17,242	$4,789	$2,037	$10,992	$227	$1,401	$1,078	$48,928
28	$5,749	$5,749	$17,759	$4,933	$2,098	$11,321	$234	$1,443	$1,110	$50,396
29	$5,921	$5,921	$18,292	$5,081	$2,161	$11,661	$241	$1,486	$1,143	$51,908
30	$6,099	$6,099	$18,840	$5,233	$2,226	$12,011	$248	$1,531	$1,178	$53,465
31	$6,282	$6,282	$19,406	$5,390	$2,293	$12,371	$256	$1,577	$1,213	$55,069
32	$6,470	$6,470	$19,988	$5,552	$2,361	$12,742	$264	$1,624	$1,249	$56,721
33	$6,664	$6,664	$20,587	$5,719	$2,432	$13,125	$271	$1,673	$1,287	$58,423
34	$6,864	$6,864	$21,205	$5,890	$2,505	$13,518	$280	$1,723	$1,325	$60,175
35	$7,070	$7,070	$21,841	$6,067	$2,580	$13,924	$288	$1,775	$1,365	$61,981
36	$7,282	$7,282	$22,496	$6,249	$2,658	$14,342	$297	$1,828	$1,406	$63,840
37	$7,501	$7,501	$23,171	$6,436	$2,738	$14,772	$306	$1,883	$1,448	$65,755
38	$7,726	$7,726	$23,867	$6,630	$2,820	$15,215	$315	$1,939	$1,492	$67,728
39	$7,958	$7,958	$24,583	$6,828	$2,904	$15,671	$324	$1,997	$1,536	$69,760

40	$8,196	$8,196	$25,320	$7,033	$2,991	$16,142	$334	$2,057	$1,583	$71,853

**3% Inflation*

Sub Watershed #205 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,081	$2,081	$6,428	$1,786	$759	$4,098	$85	$522	$402	$18,242
2	$2,143	$2,143	$6,621	$1,839	$782	$4,221	$87	$538	$414	$18,789
3	$2,208	$2,208	$6,820	$1,894	$806	$4,348	$90	$554	$426	$19,353
4	$2,274	$2,274	$7,024	$1,951	$830	$4,478	$93	$571	$439	$19,933
5	$2,342	$2,342	$7,235	$2,010	$855	$4,612	$95	$588	$452	$20,531
6	$2,412	$2,412	$7,452	$2,070	$880	$4,751	$98	$605	$466	$21,147
7	$2,485	$2,485	$7,676	$2,132	$907	$4,893	$101	$624	$480	$21,782
8	$2,559	$2,559	$7,906	$2,196	$934	$5,040	$104	$642	$494	$22,435
9	$2,636	$2,636	$8,143	$2,262	$962	$5,191	$107	$662	$509	$23,108
10	$2,715	$2,715	$8,387	$2,330	$991	$5,347	$111	$681	$524	$23,801
11	$2,796	$2,796	$8,639	$2,400	$1,021	$5,507	$114	$702	$540	$24,515
12	$2,880	$2,880	$8,898	$2,472	$1,051	$5,673	$117	$723	$556	$25,251
13	$2,967	$2,967	$9,165	$2,546	$1,083	$5,843	$121	$745	$573	$26,008
14	$3,056	$3,056	$9,440	$2,622	$1,115	$6,018	$124	$767	$590	$26,789
15	$3,147	$3,147	$9,723	$2,701	$1,149	$6,199	$128	$790	$608	$27,592
16	$3,242	$3,242	$10,015	$2,782	$1,183	$6,384	$132	$814	$626	$28,420
17	$3,339	$3,339	$10,315	$2,865	$1,219	$6,576	$136	$838	$645	$29,273
18	$3,439	$3,439	$10,625	$2,951	$1,255	$6,773	$140	$863	$664	$30,151
19	$3,543	$3,543	$10,944	$3,040	$1,293	$6,976	$144	$889	$684	$31,055
20	$3,649	$3,649	$11,272	$3,131	$1,332	$7,186	$149	$916	$704	$31,987
21	$3,758	$3,758	$11,610	$3,225	$1,372	$7,401	$153	$943	$726	$32,947
22	$3,871	$3,871	$11,958	$3,322	$1,413	$7,623	$158	$972	$747	$33,935

23	$3,987	$3,987	$12,317	$3,421	$1,455	$7,852	$162	$1,001	$770	$34,953
24	$4,107	$4,107	$12,687	$3,524	$1,499	$8,088	$167	$1,031	$793	$36,002
25	$4,230	$4,230	$13,067	$3,630	$1,544	$8,330	$172	$1,062	$817	$37,082
26	$4,357	$4,357	$13,459	$3,739	$1,590	$8,580	$177	$1,094	$841	$38,194
27	$4,488	$4,488	$13,863	$3,851	$1,638	$8,838	$183	$1,126	$866	$39,340
28	$4,622	$4,622	$14,279	$3,966	$1,687	$9,103	$188	$1,160	$892	$40,520
29	$4,761	$4,761	$14,707	$4,085	$1,738	$9,376	$194	$1,195	$919	$41,736
30	$4,904	$4,904	$15,148	$4,208	$1,790	$9,657	$200	$1,231	$947	$42,988
31	$5,051	$5,051	$15,603	$4,334	$1,843	$9,947	$206	$1,268	$975	$44,277
32	$5,202	$5,202	$16,071	$4,464	$1,899	$10,245	$212	$1,306	$1,004	$45,606
33	$5,358	$5,358	$16,553	$4,598	$1,956	$10,553	$218	$1,345	$1,035	$46,974
34	$5,519	$5,519	$17,050	$4,736	$2,014	$10,869	$225	$1,385	$1,066	$48,383
35	$5,685	$5,685	$17,561	$4,878	$2,075	$11,195	$232	$1,427	$1,098	$49,835
36	$5,855	$5,855	$18,088	$5,024	$2,137	$11,531	$239	$1,470	$1,130	$51,330
37	$6,031	$6,031	$18,631	$5,175	$2,201	$11,877	$246	$1,514	$1,164	$52,869
38	$6,212	$6,212	$19,190	$5,330	$2,267	$12,233	$253	$1,559	$1,199	$54,456
39	$6,398	$6,398	$19,765	$5,490	$2,335	$12,600	$261	$1,606	$1,235	$56,089
40	$6,590	$6,590	$20,358	$5,655	$2,405	$12,978	$268	$1,654	$1,272	$57,772

**3% Inflation*

Sub Watershed #206 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,304	$2,304	$7,118	$1,977	$841	$4,537	$94	$578	$445	$20,198
2	$2,373	$2,373	$7,331	$2,036	$866	$4,674	$97	$596	$458	$20,804
3	$2,444	$2,444	$7,551	$2,098	$892	$4,814	$100	$614	$472	$21,428
4	$2,518	$2,518	$7,778	$2,160	$919	$4,958	$103	$632	$486	$22,071
5	$2,593	$2,593	$8,011	$2,225	$946	$5,107	$106	$651	$501	$22,733

6	$2,671	$2,671	$8,251	$2,292	$975	$5,260	$109	$670	$516	$23,415
7	$2,751	$2,751	$8,499	$2,361	$1,004	$5,418	$112	$691	$531	$24,118
8	$2,834	$2,834	$8,754	$2,432	$1,034	$5,580	$115	$711	$547	$24,841
9	$2,919	$2,919	$9,016	$2,505	$1,065	$5,748	$119	$733	$564	$25,586
10	$3,006	$3,006	$9,287	$2,580	$1,097	$5,920	$122	$755	$580	$26,354
11	$3,096	$3,096	$9,565	$2,657	$1,130	$6,098	$126	$777	$598	$27,144
12	$3,189	$3,189	$9,852	$2,737	$1,164	$6,281	$130	$801	$616	$27,959
13	$3,285	$3,285	$10,148	$2,819	$1,199	$6,469	$134	$825	$634	$28,798
14	$3,384	$3,384	$10,452	$2,903	$1,235	$6,663	$138	$849	$653	$29,662
15	$3,485	$3,485	$10,766	$2,991	$1,272	$6,863	$142	$875	$673	$30,551
16	$3,590	$3,590	$11,089	$3,080	$1,310	$7,069	$146	$901	$693	$31,468
17	$3,697	$3,697	$11,422	$3,173	$1,349	$7,281	$151	$928	$714	$32,412
18	$3,808	$3,808	$11,764	$3,268	$1,390	$7,500	$155	$956	$735	$33,384
19	$3,922	$3,922	$12,117	$3,366	$1,432	$7,725	$160	$985	$757	$34,386
20	$4,040	$4,040	$12,481	$3,467	$1,475	$7,956	$165	$1,014	$780	$35,417
21	$4,161	$4,161	$12,855	$3,571	$1,519	$8,195	$170	$1,044	$803	$36,480
22	$4,286	$4,286	$13,241	$3,678	$1,564	$8,441	$175	$1,076	$828	$37,574
23	$4,415	$4,415	$13,638	$3,788	$1,611	$8,694	$180	$1,108	$852	$38,702
24	$4,547	$4,547	$14,047	$3,902	$1,660	$8,955	$185	$1,141	$878	$39,863
25	$4,684	$4,684	$14,469	$4,019	$1,709	$9,224	$191	$1,176	$904	$41,058
26	$4,824	$4,824	$14,903	$4,140	$1,761	$9,500	$197	$1,211	$931	$42,290
27	$4,969	$4,969	$15,350	$4,264	$1,813	$9,785	$202	$1,247	$959	$43,559
28	$5,118	$5,118	$15,810	$4,392	$1,868	$10,079	$208	$1,285	$988	$44,866
29	$5,271	$5,271	$16,284	$4,523	$1,924	$10,381	$215	$1,323	$1,018	$46,212
30	$5,430	$5,430	$16,773	$4,659	$1,982	$10,693	$221	$1,363	$1,048	$47,598
31	$5,592	$5,592	$17,276	$4,799	$2,041	$11,014	$228	$1,404	$1,080	$49,026

32	$5,760	$5,760	$17,794	$4,943	$2,102	$11,344	$235	$1,446	$1,112	$50,497
33	$5,933	$5,933	$18,328	$5,091	$2,165	$11,684	$242	$1,489	$1,146	$52,012
34	$6,111	$6,111	$18,878	$5,244	$2,230	$12,035	$249	$1,534	$1,180	$53,572
35	$6,294	$6,294	$19,444	$5,401	$2,297	$12,396	$256	$1,580	$1,215	$55,179
36	$6,483	$6,483	$20,028	$5,563	$2,366	$12,768	$264	$1,627	$1,252	$56,835
37	$6,678	$6,678	$20,629	$5,730	$2,437	$13,151	$272	$1,676	$1,289	$58,540
38	$6,878	$6,878	$21,248	$5,902	$2,510	$13,545	$280	$1,726	$1,328	$60,296
39	$7,084	$7,084	$21,885	$6,079	$2,586	$13,952	$289	$1,778	$1,368	$62,105
40	$7,297	$7,297	$22,542	$6,262	$2,663	$14,370	$297	$1,831	$1,409	$63,968

**3% Inflation*

Sub Watershed #207 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,541	$2,541	$7,849	$2,180	$927	$5,003	$104	$638	$491	$22,272
2	$2,617	$2,617	$8,084	$2,246	$955	$5,154	$107	$657	$505	$22,941
3	$2,695	$2,695	$8,327	$2,313	$984	$5,308	$110	$677	$520	$23,629
4	$2,776	$2,776	$8,576	$2,382	$1,013	$5,467	$113	$697	$536	$24,338
5	$2,860	$2,860	$8,834	$2,454	$1,044	$5,631	$116	$718	$552	$25,068
6	$2,945	$2,945	$9,099	$2,527	$1,075	$5,800	$120	$739	$569	$25,820
7	$3,034	$3,034	$9,372	$2,603	$1,107	$5,974	$124	$761	$586	$26,594
8	$3,125	$3,125	$9,653	$2,681	$1,140	$6,154	$127	$784	$603	$27,392
9	$3,218	$3,218	$9,942	$2,762	$1,175	$6,338	$131	$808	$621	$28,214
10	$3,315	$3,315	$10,241	$2,845	$1,210	$6,528	$135	$832	$640	$29,060
11	$3,414	$3,414	$10,548	$2,930	$1,246	$6,724	$139	$857	$659	$29,932
12	$3,517	$3,517	$10,864	$3,018	$1,284	$6,926	$143	$883	$679	$30,830
13	$3,622	$3,622	$11,190	$3,108	$1,322	$7,134	$148	$909	$699	$31,755
14	$3,731	$3,731	$11,526	$3,202	$1,362	$7,348	$152	$936	$720	$32,708

15	$3,843	$3,843	$11,872	$3,298	$1,403	$7,568	$157	$965	$742	$33,689
16	$3,958	$3,958	$12,228	$3,397	$1,445	$7,795	$161	$994	$764	$34,700
17	$4,077	$4,077	$12,595	$3,499	$1,488	$8,029	$166	$1,023	$787	$35,741
18	$4,199	$4,199	$12,972	$3,603	$1,533	$8,270	$171	$1,054	$811	$36,813
19	$4,325	$4,325	$13,362	$3,712	$1,579	$8,518	$176	$1,086	$835	$37,917
20	$4,455	$4,455	$13,762	$3,823	$1,626	$8,774	$181	$1,118	$860	$39,055
21	$4,589	$4,589	$14,175	$3,938	$1,675	$9,037	$187	$1,152	$886	$40,226
22	$4,726	$4,726	$14,601	$4,056	$1,725	$9,308	$193	$1,186	$913	$41,433
23	$4,868	$4,868	$15,039	$4,177	$1,777	$9,587	$198	$1,222	$940	$42,676
24	$5,014	$5,014	$15,490	$4,303	$1,830	$9,875	$204	$1,259	$968	$43,957
25	$5,165	$5,165	$15,954	$4,432	$1,885	$10,171	$210	$1,296	$997	$45,275
26	$5,320	$5,320	$16,433	$4,565	$1,942	$10,476	$217	$1,335	$1,027	$46,633
27	$5,479	$5,479	$16,926	$4,702	$2,000	$10,790	$223	$1,375	$1,058	$48,033
28	$5,643	$5,643	$17,434	$4,843	$2,060	$11,114	$230	$1,417	$1,090	$49,473
29	$5,813	$5,813	$17,957	$4,988	$2,122	$11,448	$237	$1,459	$1,122	$50,958
30	$5,987	$5,987	$18,496	$5,138	$2,185	$11,791	$244	$1,503	$1,156	$52,486
31	$6,167	$6,167	$19,050	$5,292	$2,251	$12,145	$251	$1,548	$1,191	$54,061
32	$6,352	$6,352	$19,622	$5,451	$2,318	$12,509	$259	$1,594	$1,226	$55,683
33	$6,542	$6,542	$20,211	$5,614	$2,388	$12,884	$267	$1,642	$1,263	$57,353
34	$6,739	$6,739	$20,817	$5,782	$2,459	$13,271	$275	$1,691	$1,301	$59,074
35	$6,941	$6,941	$21,441	$5,956	$2,533	$13,669	$283	$1,742	$1,340	$60,846
36	$7,149	$7,149	$22,085	$6,135	$2,609	$14,079	$291	$1,794	$1,380	$62,672
37	$7,363	$7,363	$22,747	$6,319	$2,687	$14,501	$300	$1,848	$1,422	$64,552
38	$7,584	$7,584	$23,430	$6,508	$2,768	$14,936	$309	$1,904	$1,464	$66,488
39	$7,812	$7,812	$24,133	$6,703	$2,851	$15,385	$318	$1,961	$1,508	$68,483
40	$8,046	$8,046	$24,857	$6,905	$2,937	$15,846	$328	$2,020	$1,554	$70,537

**3% Inflation*

Sub Watershed #208 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,672	$2,672	$8,256	$2,293	$975	$5,263	$109	$671	$516	$23,427
2	$2,753	$2,753	$8,503	$2,362	$1,005	$5,421	$112	$691	$531	$24,130
3	$2,835	$2,835	$8,758	$2,433	$1,035	$5,583	$116	$712	$547	$24,854
4	$2,920	$2,920	$9,021	$2,506	$1,066	$5,751	$119	$733	$564	$25,600
5	$3,008	$3,008	$9,292	$2,581	$1,098	$5,923	$123	$755	$581	$26,368
6	$3,098	$3,098	$9,570	$2,658	$1,131	$6,101	$126	$778	$598	$27,159
7	$3,191	$3,191	$9,858	$2,738	$1,165	$6,284	$130	$801	$616	$27,974
8	$3,287	$3,287	$10,153	$2,820	$1,200	$6,473	$134	$825	$635	$28,813
9	$3,385	$3,385	$10,458	$2,905	$1,236	$6,667	$138	$850	$654	$29,677
10	$3,487	$3,487	$10,772	$2,992	$1,273	$6,867	$142	$875	$673	$30,568
11	$3,591	$3,591	$11,095	$3,082	$1,311	$7,073	$146	$901	$693	$31,485
12	$3,699	$3,699	$11,428	$3,174	$1,350	$7,285	$151	$928	$714	$32,429
13	$3,810	$3,810	$11,770	$3,270	$1,391	$7,504	$155	$956	$736	$33,402
14	$3,925	$3,925	$12,124	$3,368	$1,432	$7,729	$160	$985	$758	$34,404
15	$4,042	$4,042	$12,487	$3,469	$1,475	$7,961	$165	$1,015	$780	$35,436
16	$4,164	$4,164	$12,862	$3,573	$1,520	$8,199	$170	$1,045	$804	$36,499
17	$4,288	$4,288	$13,248	$3,680	$1,565	$8,445	$175	$1,076	$828	$37,594
18	$4,417	$4,417	$13,645	$3,790	$1,612	$8,699	$180	$1,109	$853	$38,722
19	$4,550	$4,550	$14,055	$3,904	$1,660	$8,960	$185	$1,142	$878	$39,884
20	$4,686	$4,686	$14,476	$4,021	$1,710	$9,229	$191	$1,176	$905	$41,080
21	$4,827	$4,827	$14,910	$4,142	$1,762	$9,505	$197	$1,211	$932	$42,313
22	$4,971	$4,971	$15,358	$4,266	$1,814	$9,791	$203	$1,248	$960	$43,582
23	$5,121	$5,121	$15,819	$4,394	$1,869	$10,084	$209	$1,285	$989	$44,889

24	$5,274	$5,274	$16,293	$4,526	$1,925	$10,387	$215	$1,324	$1,018	$46,236
25	$5,432	$5,432	$16,782	$4,662	$1,983	$10,698	$221	$1,364	$1,049	$47,623
26	$5,595	$5,595	$17,285	$4,801	$2,042	$11,019	$228	$1,404	$1,080	$49,052
27	$5,763	$5,763	$17,804	$4,946	$2,103	$11,350	$235	$1,447	$1,113	$50,524
28	$5,936	$5,936	$18,338	$5,094	$2,167	$11,690	$242	$1,490	$1,146	$52,039
29	$6,114	$6,114	$18,888	$5,247	$2,232	$12,041	$249	$1,535	$1,181	$53,600
30	$6,298	$6,298	$19,455	$5,404	$2,299	$12,402	$257	$1,581	$1,216	$55,208
31	$6,487	$6,487	$20,038	$5,566	$2,367	$12,775	$264	$1,628	$1,252	$56,865
32	$6,681	$6,681	$20,640	$5,733	$2,438	$13,158	$272	$1,677	$1,290	$58,571
33	$6,882	$6,882	$21,259	$5,905	$2,512	$13,552	$280	$1,727	$1,329	$60,328
34	$7,088	$7,088	$21,897	$6,082	$2,587	$13,959	$289	$1,779	$1,369	$62,138
35	$7,301	$7,301	$22,553	$6,265	$2,665	$14,378	$297	$1,832	$1,410	$64,002
36	$7,520	$7,520	$23,230	$6,453	$2,745	$14,809	$306	$1,887	$1,452	$65,922
37	$7,745	$7,745	$23,927	$6,646	$2,827	$15,253	$316	$1,944	$1,495	$67,899
38	$7,978	$7,978	$24,645	$6,846	$2,912	$15,711	$325	$2,002	$1,540	$69,936
39	$8,217	$8,217	$25,384	$7,051	$2,999	$16,182	$335	$2,062	$1,587	$72,034
40	$8,464	$8,464	$26,146	$7,263	$3,089	$16,668	$345	$2,124	$1,634	$74,195

**3% Inflation*

Sub Watershed #20301 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,836	$2,836	$8,760	$2,433	$1,035	$5,584	$116	$712	$547	$24,859
2	$2,921	$2,921	$9,023	$2,506	$1,066	$5,752	$119	$733	$564	$25,605
3	$3,008	$3,008	$9,293	$2,582	$1,098	$5,925	$123	$755	$581	$26,373
4	$3,099	$3,099	$9,572	$2,659	$1,131	$6,102	$126	$778	$598	$27,164
5	$3,192	$3,192	$9,859	$2,739	$1,165	$6,285	$130	$801	$616	$27,979
6	$3,287	$3,287	$10,155	$2,821	$1,200	$6,474	$134	$825	$635	$28,818

7	$3,386	$3,386	$10,460	$2,906	$1,236	$6,668	$138	$850	$654	$29,683
8	$3,488	$3,488	$10,774	$2,993	$1,273	$6,868	$142	$875	$673	$30,573
9	$3,592	$3,592	$11,097	$3,082	$1,311	$7,074	$146	$902	$694	$31,490
10	$3,700	$3,700	$11,430	$3,175	$1,350	$7,286	$151	$929	$714	$32,435
11	$3,811	$3,811	$11,773	$3,270	$1,391	$7,505	$155	$957	$736	$33,408
12	$3,925	$3,925	$12,126	$3,368	$1,433	$7,730	$160	$985	$758	$34,410
13	$4,043	$4,043	$12,490	$3,469	$1,476	$7,962	$165	$1,015	$781	$35,443
14	$4,164	$4,164	$12,864	$3,573	$1,520	$8,201	$170	$1,045	$804	$36,506
15	$4,289	$4,289	$13,250	$3,681	$1,565	$8,447	$175	$1,077	$828	$37,601
16	$4,418	$4,418	$13,648	$3,791	$1,612	$8,700	$180	$1,109	$853	$38,729
17	$4,550	$4,550	$14,057	$3,905	$1,661	$8,961	$185	$1,142	$879	$39,891
18	$4,687	$4,687	$14,479	$4,022	$1,711	$9,230	$191	$1,176	$905	$41,088
19	$4,828	$4,828	$14,913	$4,143	$1,762	$9,507	$197	$1,212	$932	$42,321
20	$4,972	$4,972	$15,361	$4,267	$1,815	$9,792	$203	$1,248	$960	$43,590
21	$5,122	$5,122	$15,821	$4,395	$1,869	$10,086	$209	$1,285	$989	$44,898
22	$5,275	$5,275	$16,296	$4,527	$1,925	$10,389	$215	$1,324	$1,019	$46,245
23	$5,433	$5,433	$16,785	$4,663	$1,983	$10,700	$221	$1,364	$1,049	$47,632
24	$5,596	$5,596	$17,289	$4,802	$2,043	$11,021	$228	$1,405	$1,081	$49,061
25	$5,764	$5,764	$17,807	$4,946	$2,104	$11,352	$235	$1,447	$1,113	$50,533
26	$5,937	$5,937	$18,341	$5,095	$2,167	$11,693	$242	$1,490	$1,146	$52,049
27	$6,115	$6,115	$18,892	$5,248	$2,232	$12,043	$249	$1,535	$1,181	$53,610
28	$6,299	$6,299	$19,458	$5,405	$2,299	$12,405	$257	$1,581	$1,216	$55,219
29	$6,488	$6,488	$20,042	$5,567	$2,368	$12,777	$264	$1,628	$1,253	$56,875
30	$6,682	$6,682	$20,643	$5,734	$2,439	$13,160	$272	$1,677	$1,290	$58,581
31	$6,883	$6,883	$21,263	$5,906	$2,512	$13,555	$280	$1,728	$1,329	$60,339
32	$7,089	$7,089	$21,901	$6,084	$2,587	$13,962	$289	$1,779	$1,369	$62,149

33	$7,302	$7,302	$22,558	$6,266	$2,665	$14,380	$297	$1,833	$1,410	$64,014
34	$7,521	$7,521	$23,234	$6,454	$2,745	$14,812	$306	$1,888	$1,452	$65,934
35	$7,747	$7,747	$23,931	$6,648	$2,827	$15,256	$316	$1,944	$1,496	$67,912
36	$7,979	$7,979	$24,649	$6,847	$2,912	$15,714	$325	$2,003	$1,541	$69,949
37	$8,219	$8,219	$25,389	$7,052	$3,000	$16,185	$335	$2,063	$1,587	$72,048
38	$8,465	$8,465	$26,150	$7,264	$3,090	$16,671	$345	$2,125	$1,634	$74,209
39	$8,719	$8,719	$26,935	$7,482	$3,182	$17,171	$355	$2,188	$1,683	$76,436
40	$8,981	$8,981	$27,743	$7,706	$3,278	$17,686	$366	$2,254	$1,734	$78,729

**3% Inflation*

Sub Watershed #301 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,926	$1,926	$5,949	$1,653	$703	$3,792	$78	$483	$372	$16,882
2	$1,984	$1,984	$6,127	$1,702	$724	$3,906	$81	$498	$383	$17,388
3	$2,043	$2,043	$6,311	$1,753	$746	$4,023	$83	$513	$394	$17,910
4	$2,104	$2,104	$6,501	$1,806	$768	$4,144	$86	$528	$406	$18,447
5	$2,167	$2,167	$6,696	$1,860	$791	$4,268	$88	$544	$418	$19,001
6	$2,232	$2,232	$6,897	$1,916	$815	$4,397	$91	$560	$431	$19,571
7	$2,299	$2,299	$7,103	$1,973	$839	$4,528	$94	$577	$444	$20,158
8	$2,368	$2,368	$7,317	$2,032	$864	$4,664	$96	$594	$457	$20,763
9	$2,439	$2,439	$7,536	$2,093	$890	$4,804	$99	$612	$471	$21,386
10	$2,513	$2,513	$7,762	$2,156	$917	$4,948	$102	$631	$485	$22,027
11	$2,588	$2,588	$7,995	$2,221	$945	$5,097	$105	$650	$500	$22,688
12	$2,666	$2,666	$8,235	$2,287	$973	$5,250	$109	$669	$515	$23,369
13	$2,746	$2,746	$8,482	$2,356	$1,002	$5,407	$112	$689	$530	$24,070
14	$2,828	$2,828	$8,736	$2,427	$1,032	$5,569	$115	$710	$546	$24,792
15	$2,913	$2,913	$8,998	$2,500	$1,063	$5,736	$119	$731	$562	$25,535

16	$3,000	$3,000	$9,268	$2,575	$1,095	$5,909	$122	$753	$579	$26,302
17	$3,090	$3,090	$9,546	$2,652	$1,128	$6,086	$126	$776	$597	$27,091
18	$3,183	$3,183	$9,833	$2,731	$1,162	$6,268	$130	$799	$615	$27,903
19	$3,278	$3,278	$10,128	$2,813	$1,197	$6,456	$134	$823	$633	$28,740
20	$3,377	$3,377	$10,432	$2,898	$1,232	$6,650	$138	$848	$652	$29,603
21	$3,478	$3,478	$10,745	$2,985	$1,269	$6,850	$142	$873	$672	$30,491
22	$3,582	$3,582	$11,067	$3,074	$1,308	$7,055	$146	$899	$692	$31,405
23	$3,690	$3,690	$11,399	$3,166	$1,347	$7,267	$150	$926	$712	$32,348
24	$3,801	$3,801	$11,741	$3,261	$1,387	$7,485	$155	$954	$734	$33,318
25	$3,915	$3,915	$12,093	$3,359	$1,429	$7,709	$159	$983	$756	$34,318
26	$4,032	$4,032	$12,456	$3,460	$1,472	$7,941	$164	$1,012	$778	$35,347
27	$4,153	$4,153	$12,830	$3,564	$1,516	$8,179	$169	$1,042	$802	$36,407
28	$4,278	$4,278	$13,214	$3,671	$1,561	$8,424	$174	$1,074	$826	$37,500
29	$4,406	$4,406	$13,611	$3,781	$1,608	$8,677	$179	$1,106	$851	$38,625
30	$4,538	$4,538	$14,019	$3,894	$1,656	$8,937	$185	$1,139	$876	$39,783
31	$4,674	$4,674	$14,440	$4,011	$1,706	$9,205	$190	$1,173	$902	$40,977
32	$4,815	$4,815	$14,873	$4,131	$1,757	$9,482	$196	$1,208	$930	$42,206
33	$4,959	$4,959	$15,319	$4,255	$1,810	$9,766	$202	$1,245	$957	$43,472
34	$5,108	$5,108	$15,779	$4,383	$1,864	$10,059	$208	$1,282	$986	$44,777
35	$5,261	$5,261	$16,252	$4,514	$1,920	$10,361	$214	$1,320	$1,016	$46,120
36	$5,419	$5,419	$16,740	$4,650	$1,978	$10,672	$221	$1,360	$1,046	$47,503
37	$5,581	$5,581	$17,242	$4,789	$2,037	$10,992	$227	$1,401	$1,078	$48,929
38	$5,749	$5,749	$17,759	$4,933	$2,098	$11,321	$234	$1,443	$1,110	$50,396
39	$5,921	$5,921	$18,292	$5,081	$2,161	$11,661	$241	$1,486	$1,143	$51,908
40	$6,099	$6,099	$18,841	$5,234	$2,226	$12,011	$248	$1,531	$1,178	$53,466

**3% Inflation*

Sub Watershed #304 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$488	$488	$1,508	$419	$178	$961	$20	$123	$94	$4,279
2	$503	$503	$1,553	$431	$184	$990	$20	$126	$97	$4,408
3	$518	$518	$1,600	$444	$189	$1,020	$21	$130	$100	$4,540
4	$533	$533	$1,648	$458	$195	$1,051	$22	$134	$103	$4,676
5	$549	$549	$1,697	$471	$201	$1,082	$22	$138	$106	$4,817
6	$566	$566	$1,748	$486	$207	$1,114	$23	$142	$109	$4,961
7	$583	$583	$1,801	$500	$213	$1,148	$24	$146	$113	$5,110
8	$600	$600	$1,855	$515	$219	$1,182	$24	$151	$116	$5,263
9	$618	$618	$1,910	$531	$226	$1,218	$25	$155	$119	$5,421
10	$637	$637	$1,968	$547	$232	$1,254	$26	$160	$123	$5,584
11	$656	$656	$2,027	$563	$239	$1,292	$27	$165	$127	$5,751
12	$676	$676	$2,087	$580	$247	$1,331	$28	$170	$130	$5,924
13	$696	$696	$2,150	$597	$254	$1,371	$28	$175	$134	$6,102
14	$717	$717	$2,215	$615	$262	$1,412	$29	$180	$138	$6,285
15	$738	$738	$2,281	$634	$269	$1,454	$30	$185	$143	$6,473
16	$761	$761	$2,349	$653	$278	$1,498	$31	$191	$147	$6,667
17	$783	$783	$2,420	$672	$286	$1,543	$32	$197	$151	$6,867
18	$807	$807	$2,493	$692	$294	$1,589	$33	$203	$156	$7,073
19	$831	$831	$2,567	$713	$303	$1,637	$34	$209	$160	$7,286
20	$856	$856	$2,644	$735	$312	$1,686	$35	$215	$165	$7,504
21	$882	$882	$2,724	$757	$322	$1,736	$36	$221	$170	$7,729
22	$908	$908	$2,805	$779	$331	$1,788	$37	$228	$175	$7,961
23	$935	$935	$2,890	$803	$341	$1,842	$38	$235	$181	$8,200
24	$963	$963	$2,976	$827	$352	$1,897	$39	$242	$186	$8,446
25	$992	$992	$3,066	$852	$362	$1,954	$40	$249	$192	$8,699
26	$1,022	$1,022	$3,158	$877	$373	$2,013	$42	$257	$197	$8,960
27	$1,053	$1,053	$3,252	$903	$384	$2,073	$43	$264	$203	$9,229
28	$1,084	$1,084	$3,350	$930	$396	$2,135	$44	$272	$209	$9,506
29	$1,117	$1,117	$3,450	$958	$408	$2,200	$46	$280	$216	$9,791
30	$1,150	$1,150	$3,554	$987	$420	$2,266	$47	$289	$222	$10,085
31	$1,185	$1,185	$3,660	$1,017	$432	$2,334	$48	$297	$229	$10,387
32	$1,220	$1,220	$3,770	$1,047	$445	$2,404	$50	$306	$236	$10,699
33	$1,257	$1,257	$3,883	$1,079	$459	$2,476	$51	$316	$243	$11,020
34	$1,295	$1,295	$4,000	$1,111	$473	$2,550	$53	$325	$250	$11,351
35	$1,334	$1,334	$4,120	$1,144	$487	$2,626	$54	$335	$257	$11,691
36	$1,374	$1,374	$4,243	$1,179	$501	$2,705	$56	$345	$265	$12,042

37	$1,415	$1,415	$4,371	$1,214	$516	$2,786	$58	$355	$273	$12,403
38	$1,457	$1,457	$4,502	$1,251	$532	$2,870	$59	$366	$281	$12,775
39	$1,501	$1,501	$4,637	$1,288	$548	$2,956	$61	$377	$290	$13,158
40	$1,546	$1,546	$4,776	$1,327	$564	$3,045	$63	$388	$299	$13,553

**3% Inflation*

Sub Watershed #305 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,246	$2,246	$6,939	$1,927	$820	$4,423	$92	$564	$434	$19,690
2	$2,313	$2,313	$7,147	$1,985	$844	$4,556	$94	$581	$447	$20,281
3	$2,383	$2,383	$7,361	$2,045	$870	$4,693	$97	$598	$460	$20,889
4	$2,454	$2,454	$7,582	$2,106	$896	$4,834	$100	$616	$474	$21,516
5	$2,528	$2,528	$7,810	$2,169	$923	$4,979	$103	$635	$488	$22,162
6	$2,604	$2,604	$8,044	$2,234	$950	$5,128	$106	$654	$503	$22,826
7	$2,682	$2,682	$8,285	$2,301	$979	$5,282	$109	$673	$518	$23,511
8	$2,762	$2,762	$8,534	$2,370	$1,008	$5,440	$113	$693	$533	$24,217
9	$2,845	$2,845	$8,790	$2,442	$1,038	$5,603	$116	$714	$549	$24,943
10	$2,931	$2,931	$9,053	$2,515	$1,070	$5,772	$119	$736	$566	$25,691
11	$3,019	$3,019	$9,325	$2,590	$1,102	$5,945	$123	$758	$583	$26,462
12	$3,109	$3,109	$9,605	$2,668	$1,135	$6,123	$127	$780	$600	$27,256
13	$3,202	$3,202	$9,893	$2,748	$1,169	$6,307	$130	$804	$618	$28,074
14	$3,298	$3,298	$10,190	$2,830	$1,204	$6,496	$134	$828	$637	$28,916
15	$3,397	$3,397	$10,495	$2,915	$1,240	$6,691	$138	$853	$656	$29,783
16	$3,499	$3,499	$10,810	$3,003	$1,277	$6,891	$143	$878	$676	$30,677
17	$3,604	$3,604	$11,134	$3,093	$1,315	$7,098	$147	$905	$696	$31,597
18	$3,712	$3,712	$11,469	$3,186	$1,355	$7,311	$151	$932	$717	$32,545
19	$3,824	$3,824	$11,813	$3,281	$1,396	$7,531	$156	$960	$738	$33,521

20	$3,939	$3,939	$12,167	$3,380	$1,437	$7,756	$160	$989	$760	$34,527
21	$4,057	$4,057	$12,532	$3,481	$1,481	$7,989	$165	$1,018	$783	$35,563
22	$4,178	$4,178	$12,908	$3,586	$1,525	$8,229	$170	$1,049	$807	$36,630
23	$4,304	$4,304	$13,295	$3,693	$1,571	$8,476	$175	$1,080	$831	$37,729
24	$4,433	$4,433	$13,694	$3,804	$1,618	$8,730	$181	$1,113	$856	$38,861
25	$4,566	$4,566	$14,105	$3,918	$1,666	$8,992	$186	$1,146	$882	$40,026
26	$4,703	$4,703	$14,528	$4,036	$1,716	$9,262	$192	$1,180	$908	$41,227
27	$4,844	$4,844	$14,964	$4,157	$1,768	$9,539	$197	$1,216	$935	$42,464
28	$4,989	$4,989	$15,413	$4,281	$1,821	$9,826	$203	$1,252	$963	$43,738
29	$5,139	$5,139	$15,875	$4,410	$1,876	$10,120	$209	$1,290	$992	$45,050
30	$5,293	$5,293	$16,351	$4,542	$1,932	$10,424	$216	$1,329	$1,022	$46,402
31	$5,452	$5,452	$16,842	$4,678	$1,990	$10,737	$222	$1,368	$1,053	$47,794
32	$5,615	$5,615	$17,347	$4,819	$2,049	$11,059	$229	$1,409	$1,084	$49,227
33	$5,784	$5,784	$17,868	$4,963	$2,111	$11,391	$236	$1,452	$1,117	$50,704
34	$5,957	$5,957	$18,404	$5,112	$2,174	$11,732	$243	$1,495	$1,150	$52,225
35	$6,136	$6,136	$18,956	$5,265	$2,240	$12,084	$250	$1,540	$1,185	$53,792
36	$6,320	$6,320	$19,524	$5,423	$2,307	$12,447	$257	$1,586	$1,220	$55,406
37	$6,510	$6,510	$20,110	$5,586	$2,376	$12,820	$265	$1,634	$1,257	$57,068
38	$6,705	$6,705	$20,713	$5,754	$2,447	$13,205	$273	$1,683	$1,295	$58,780
39	$6,906	$6,906	$21,335	$5,926	$2,521	$13,601	$281	$1,733	$1,333	$60,543
40	$7,113	$7,113	$21,975	$6,104	$2,596	$14,009	$290	$1,785	$1,373	$62,360

**3% Inflation*

Sub Watershed #306 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,591	$1,591	$4,915	$1,365	$581	$3,133	$65	$399	$307	$13,947
2	$1,639	$1,639	$5,062	$1,406	$598	$3,227	$67	$411	$316	$14,365

3	$1,688	$1,688	$5,214	$1,448	$616	$3,324	$69	$424	$326	$14,796
4	$1,738	$1,738	$5,370	$1,492	$634	$3,424	$71	$436	$336	$15,240
5	$1,791	$1,791	$5,532	$1,537	$654	$3,526	$73	$449	$346	$15,697
6	$1,844	$1,844	$5,698	$1,583	$673	$3,632	$75	$463	$356	$16,168
7	$1,900	$1,900	$5,868	$1,630	$693	$3,741	$77	$477	$367	$16,653
8	$1,957	$1,957	$6,045	$1,679	$714	$3,853	$80	$491	$378	$17,153
9	$2,015	$2,015	$6,226	$1,729	$736	$3,969	$82	$506	$389	$17,668
10	$2,076	$2,076	$6,413	$1,781	$758	$4,088	$85	$521	$401	$18,198
11	$2,138	$2,138	$6,605	$1,835	$780	$4,211	$87	$537	$413	$18,744
12	$2,202	$2,202	$6,803	$1,890	$804	$4,337	$90	$553	$425	$19,306
13	$2,268	$2,268	$7,007	$1,946	$828	$4,467	$92	$569	$438	$19,885
14	$2,336	$2,336	$7,217	$2,005	$853	$4,601	$95	$586	$451	$20,482
15	$2,406	$2,406	$7,434	$2,065	$878	$4,739	$98	$604	$465	$21,096
16	$2,479	$2,479	$7,657	$2,127	$905	$4,881	$101	$622	$479	$21,729
17	$2,553	$2,553	$7,887	$2,191	$932	$5,028	$104	$641	$493	$22,381
18	$2,630	$2,630	$8,123	$2,256	$960	$5,179	$107	$660	$508	$23,052
19	$2,708	$2,708	$8,367	$2,324	$989	$5,334	$110	$680	$523	$23,744
20	$2,790	$2,790	$8,618	$2,394	$1,018	$5,494	$114	$700	$539	$24,456
21	$2,873	$2,873	$8,877	$2,466	$1,049	$5,659	$117	$721	$555	$25,190
22	$2,960	$2,960	$9,143	$2,540	$1,080	$5,829	$121	$743	$571	$25,945
23	$3,048	$3,048	$9,417	$2,616	$1,113	$6,003	$124	$765	$589	$26,724
24	$3,140	$3,140	$9,700	$2,694	$1,146	$6,184	$128	$788	$606	$27,526
25	$3,234	$3,234	$9,991	$2,775	$1,180	$6,369	$132	$812	$624	$28,351
26	$3,331	$3,331	$10,290	$2,858	$1,216	$6,560	$136	$836	$643	$29,202
27	$3,431	$3,431	$10,599	$2,944	$1,252	$6,757	$140	$861	$662	$30,078
28	$3,534	$3,534	$10,917	$3,033	$1,290	$6,960	$144	$887	$682	$30,980

29	$3,640	$3,640	$11,245	$3,123	$1,329	$7,168	$148	$914	$703	$31,910
30	$3,749	$3,749	$11,582	$3,217	$1,368	$7,383	$153	$941	$724	$32,867
31	$3,862	$3,862	$11,929	$3,314	$1,409	$7,605	$157	$969	$746	$33,853
32	$3,977	$3,977	$12,287	$3,413	$1,452	$7,833	$162	$998	$768	$34,869
33	$4,097	$4,097	$12,656	$3,516	$1,495	$8,068	$167	$1,028	$791	$35,915
34	$4,220	$4,220	$13,036	$3,621	$1,540	$8,310	$172	$1,059	$815	$36,992
35	$4,346	$4,346	$13,427	$3,730	$1,586	$8,559	$177	$1,091	$839	$38,102
36	$4,477	$4,477	$13,829	$3,842	$1,634	$8,816	$182	$1,124	$864	$39,245
37	$4,611	$4,611	$14,244	$3,957	$1,683	$9,081	$188	$1,157	$890	$40,422
38	$4,749	$4,749	$14,672	$4,075	$1,733	$9,353	$193	$1,192	$917	$41,635
39	$4,892	$4,892	$15,112	$4,198	$1,785	$9,634	$199	$1,228	$944	$42,884
40	$5,039	$5,039	$15,565	$4,324	$1,839	$9,923	$205	$1,265	$973	$44,170

**3% Inflation*

Sub Watershed #307 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,883	$1,883	$5,817	$1,616	$687	$3,708	$77	$473	$364	$16,507
2	$1,939	$1,939	$5,991	$1,664	$708	$3,820	$79	$487	$374	$17,002
3	$1,998	$1,998	$6,171	$1,714	$729	$3,934	$81	$501	$386	$17,512
4	$2,058	$2,058	$6,356	$1,766	$751	$4,052	$84	$516	$397	$18,038
5	$2,119	$2,119	$6,547	$1,819	$773	$4,174	$86	$532	$409	$18,579
6	$2,183	$2,183	$6,743	$1,873	$797	$4,299	$89	$548	$421	$19,136
7	$2,248	$2,248	$6,946	$1,929	$821	$4,428	$92	$564	$434	$19,710
8	$2,316	$2,316	$7,154	$1,987	$845	$4,561	$94	$581	$447	$20,302
9	$2,385	$2,385	$7,369	$2,047	$871	$4,698	$97	$599	$461	$20,911
10	$2,457	$2,457	$7,590	$2,108	$897	$4,838	$100	$617	$474	$21,538
11	$2,531	$2,531	$7,817	$2,172	$924	$4,984	$103	$635	$489	$22,184

12	$2,606	$2,606	$8,052	$2,237	$951	$5,133	$106	$654	$503	$22,850
13	$2,685	$2,685	$8,293	$2,304	$980	$5,287	$109	$674	$518	$23,535
14	$2,765	$2,765	$8,542	$2,373	$1,009	$5,446	$113	$694	$534	$24,241
15	$2,848	$2,848	$8,799	$2,444	$1,040	$5,609	$116	$715	$550	$24,968
16	$2,934	$2,934	$9,063	$2,517	$1,071	$5,777	$120	$736	$566	$25,717
17	$3,022	$3,022	$9,334	$2,593	$1,103	$5,951	$123	$758	$583	$26,489
18	$3,112	$3,112	$9,614	$2,671	$1,136	$6,129	$127	$781	$601	$27,284
19	$3,206	$3,206	$9,903	$2,751	$1,170	$6,313	$131	$805	$619	$28,102
20	$3,302	$3,302	$10,200	$2,833	$1,205	$6,502	$135	$829	$637	$28,945
21	$3,401	$3,401	$10,506	$2,918	$1,241	$6,698	$139	$854	$657	$29,814
22	$3,503	$3,503	$10,821	$3,006	$1,278	$6,898	$143	$879	$676	$30,708
23	$3,608	$3,608	$11,146	$3,096	$1,317	$7,105	$147	$906	$697	$31,629
24	$3,716	$3,716	$11,480	$3,189	$1,356	$7,319	$151	$933	$718	$32,578
25	$3,828	$3,828	$11,825	$3,285	$1,397	$7,538	$156	$961	$739	$33,555
26	$3,943	$3,943	$12,179	$3,383	$1,439	$7,764	$161	$990	$761	$34,562
27	$4,061	$4,061	$12,545	$3,485	$1,482	$7,997	$165	$1,019	$784	$35,599
28	$4,183	$4,183	$12,921	$3,589	$1,527	$8,237	$170	$1,050	$808	$36,667
29	$4,308	$4,308	$13,309	$3,697	$1,572	$8,484	$176	$1,081	$832	$37,767
30	$4,437	$4,437	$13,708	$3,808	$1,620	$8,739	$181	$1,114	$857	$38,900
31	$4,570	$4,570	$14,119	$3,922	$1,668	$9,001	$186	$1,147	$882	$40,067
32	$4,708	$4,708	$14,543	$4,040	$1,718	$9,271	$192	$1,182	$909	$41,269
33	$4,849	$4,849	$14,979	$4,161	$1,770	$9,549	$198	$1,217	$936	$42,507
34	$4,994	$4,994	$15,428	$4,286	$1,823	$9,836	$203	$1,254	$964	$43,782
35	$5,144	$5,144	$15,891	$4,414	$1,877	$10,131	$210	$1,291	$993	$45,096
36	$5,298	$5,298	$16,368	$4,547	$1,934	$10,435	$216	$1,330	$1,023	$46,448
37	$5,457	$5,457	$16,859	$4,683	$1,992	$10,748	$222	$1,370	$1,054	$47,842

38	$5,621	$5,621	$17,365	$4,824	$2,052	$11,070	$229	$1,411	$1,085	$49,277
39	$5,790	$5,790	$17,886	$4,968	$2,113	$11,402	$236	$1,453	$1,118	$50,755
40	$5,963	$5,963	$18,422	$5,117	$2,177	$11,744	$243	$1,497	$1,151	$52,278

**3% Inflation*

Sub Watershed #401 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,623	$2,623	$8,102	$2,251	$957	$5,165	$107	$658	$506	$22,992
2	$2,701	$2,701	$8,345	$2,318	$986	$5,320	$110	$678	$522	$23,681
3	$2,782	$2,782	$8,595	$2,388	$1,016	$5,480	$113	$698	$537	$24,392
4	$2,866	$2,866	$8,853	$2,459	$1,046	$5,644	$117	$719	$553	$25,124
5	$2,952	$2,952	$9,119	$2,533	$1,077	$5,813	$120	$741	$570	$25,877
6	$3,040	$3,040	$9,392	$2,609	$1,110	$5,988	$124	$763	$587	$26,654
7	$3,132	$3,132	$9,674	$2,687	$1,143	$6,167	$128	$786	$605	$27,453
8	$3,226	$3,226	$9,964	$2,768	$1,177	$6,352	$131	$810	$623	$28,277
9	$3,322	$3,322	$10,263	$2,851	$1,213	$6,543	$135	$834	$641	$29,125
10	$3,422	$3,422	$10,571	$2,936	$1,249	$6,739	$139	$859	$661	$29,999
11	$3,525	$3,525	$10,888	$3,025	$1,286	$6,941	$144	$885	$681	$30,899
12	$3,630	$3,630	$11,215	$3,115	$1,325	$7,150	$148	$911	$701	$31,826
13	$3,739	$3,739	$11,552	$3,209	$1,365	$7,364	$152	$939	$722	$32,781
14	$3,852	$3,852	$11,898	$3,305	$1,406	$7,585	$157	$967	$744	$33,764
15	$3,967	$3,967	$12,255	$3,404	$1,448	$7,813	$162	$996	$766	$34,777
16	$4,086	$4,086	$12,623	$3,506	$1,491	$8,047	$166	$1,026	$789	$35,820
17	$4,209	$4,209	$13,001	$3,611	$1,536	$8,288	$171	$1,056	$813	$36,895
18	$4,335	$4,335	$13,391	$3,720	$1,582	$8,537	$177	$1,088	$837	$38,002
19	$4,465	$4,465	$13,793	$3,831	$1,630	$8,793	$182	$1,121	$862	$39,142
20	$4,599	$4,599	$14,207	$3,946	$1,678	$9,057	$187	$1,154	$888	$40,316

21	$4,737	$4,737	$14,633	$4,065	$1,729	$9,329	$193	$1,189	$915	$41,526
22	$4,879	$4,879	$15,072	$4,187	$1,781	$9,608	$199	$1,225	$942	$42,771
23	$5,025	$5,025	$15,524	$4,312	$1,834	$9,897	$205	$1,261	$970	$44,055
24	$5,176	$5,176	$15,990	$4,442	$1,889	$10,194	$211	$1,299	$999	$45,376
25	$5,331	$5,331	$16,470	$4,575	$1,946	$10,499	$217	$1,338	$1,029	$46,737
26	$5,491	$5,491	$16,964	$4,712	$2,004	$10,814	$224	$1,378	$1,060	$48,140
27	$5,656	$5,656	$17,473	$4,854	$2,064	$11,139	$230	$1,420	$1,092	$49,584
28	$5,826	$5,826	$17,997	$4,999	$2,126	$11,473	$237	$1,462	$1,125	$51,071
29	$6,001	$6,001	$18,537	$5,149	$2,190	$11,817	$244	$1,506	$1,159	$52,603
30	$6,181	$6,181	$19,093	$5,304	$2,256	$12,172	$252	$1,551	$1,193	$54,181
31	$6,366	$6,366	$19,666	$5,463	$2,323	$12,537	$259	$1,598	$1,229	$55,807
32	$6,557	$6,557	$20,256	$5,627	$2,393	$12,913	$267	$1,646	$1,266	$57,481
33	$6,754	$6,754	$20,863	$5,795	$2,465	$13,300	$275	$1,695	$1,304	$59,206
34	$6,956	$6,956	$21,489	$5,969	$2,539	$13,699	$283	$1,746	$1,343	$60,982
35	$7,165	$7,165	$22,134	$6,148	$2,615	$14,110	$292	$1,798	$1,383	$62,811
36	$7,380	$7,380	$22,798	$6,333	$2,693	$14,534	$301	$1,852	$1,425	$64,696
37	$7,601	$7,601	$23,482	$6,523	$2,774	$14,970	$310	$1,908	$1,468	$66,636
38	$7,829	$7,829	$24,186	$6,718	$2,858	$15,419	$319	$1,965	$1,512	$68,635
39	$8,064	$8,064	$24,912	$6,920	$2,943	$15,881	$329	$2,024	$1,557	$70,695
40	$8,306	$8,306	$25,659	$7,128	$3,032	$16,358	$338	$2,085	$1,604	$72,815

**3% Inflation*

Sub Watershed #402 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,085	$2,085	$6,440	$1,789	$761	$4,106	$85	$523	$403	$18,276
2	$2,147	$2,147	$6,634	$1,843	$784	$4,229	$87	$539	$415	$18,824
3	$2,212	$2,212	$6,833	$1,898	$807	$4,356	$90	$555	$427	$19,389

4	$2,278	$2,278	$7,037	$1,955	$831	$4,486	$93	$572	$440	$19,971
5	$2,346	$2,346	$7,249	$2,014	$856	$4,621	$96	$589	$453	$20,570
6	$2,417	$2,417	$7,466	$2,074	$882	$4,760	$98	$607	$467	$21,187
7	$2,489	$2,489	$7,690	$2,136	$909	$4,902	$101	$625	$481	$21,823
8	$2,564	$2,564	$7,921	$2,200	$936	$5,049	$104	$644	$495	$22,477
9	$2,641	$2,641	$8,158	$2,266	$964	$5,201	$108	$663	$510	$23,152
10	$2,720	$2,720	$8,403	$2,334	$993	$5,357	$111	$683	$525	$23,846
11	$2,802	$2,802	$8,655	$2,404	$1,023	$5,518	$114	$703	$541	$24,562
12	$2,886	$2,886	$8,915	$2,476	$1,053	$5,683	$118	$724	$557	$25,298
13	$2,972	$2,972	$9,182	$2,551	$1,085	$5,854	$121	$746	$574	$26,057
14	$3,062	$3,062	$9,458	$2,627	$1,117	$6,029	$125	$768	$591	$26,839
15	$3,153	$3,153	$9,742	$2,706	$1,151	$6,210	$128	$791	$609	$27,644
16	$3,248	$3,248	$10,034	$2,787	$1,185	$6,397	$132	$815	$627	$28,474
17	$3,345	$3,345	$10,335	$2,871	$1,221	$6,588	$136	$840	$646	$29,328
18	$3,446	$3,446	$10,645	$2,957	$1,258	$6,786	$140	$865	$665	$30,208
19	$3,549	$3,549	$10,964	$3,046	$1,295	$6,990	$145	$891	$685	$31,114
20	$3,656	$3,656	$11,293	$3,137	$1,334	$7,199	$149	$918	$706	$32,047
21	$3,765	$3,765	$11,632	$3,231	$1,374	$7,415	$153	$945	$727	$33,009
22	$3,878	$3,878	$11,981	$3,328	$1,415	$7,638	$158	$973	$749	$33,999
23	$3,995	$3,995	$12,340	$3,428	$1,458	$7,867	$163	$1,003	$771	$35,019
24	$4,114	$4,114	$12,710	$3,531	$1,502	$8,103	$168	$1,033	$794	$36,070
25	$4,238	$4,238	$13,092	$3,637	$1,547	$8,346	$173	$1,064	$818	$37,152
26	$4,365	$4,365	$13,485	$3,746	$1,593	$8,596	$178	$1,096	$843	$38,266
27	$4,496	$4,496	$13,889	$3,858	$1,641	$8,854	$183	$1,128	$868	$39,414
28	$4,631	$4,631	$14,306	$3,974	$1,690	$9,120	$189	$1,162	$894	$40,597
29	$4,770	$4,770	$14,735	$4,093	$1,741	$9,394	$194	$1,197	$921	$41,815

30	$4,913	$4,913	$15,177	$4,216	$1,793	$9,675	$200	$1,233	$949	$43,069
31	$5,060	$5,060	$15,632	$4,342	$1,847	$9,966	$206	$1,270	$977	$44,361
32	$5,212	$5,212	$16,101	$4,473	$1,902	$10,265	$212	$1,308	$1,006	$45,692
33	$5,368	$5,368	$16,584	$4,607	$1,959	$10,573	$219	$1,347	$1,037	$47,063
34	$5,530	$5,530	$17,082	$4,745	$2,018	$10,890	$225	$1,388	$1,068	$48,474
35	$5,695	$5,695	$17,594	$4,887	$2,079	$11,216	$232	$1,430	$1,100	$49,929
36	$5,866	$5,866	$18,122	$5,034	$2,141	$11,553	$239	$1,472	$1,133	$51,427
37	$6,042	$6,042	$18,666	$5,185	$2,205	$11,899	$246	$1,517	$1,167	$52,969
38	$6,224	$6,224	$19,226	$5,340	$2,271	$12,256	$254	$1,562	$1,202	$54,558
39	$6,410	$6,410	$19,803	$5,501	$2,340	$12,624	$261	$1,609	$1,238	$56,195
40	$6,603	$6,603	$20,397	$5,666	$2,410	$13,003	$269	$1,657	$1,275	$57,881

**3% Inflation*

Sub Watershed #403 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$3,317	$3,317	$10,246	$2,846	$1,211	$6,532	$135	$832	$640	$29,076
2	$3,416	$3,416	$10,553	$2,932	$1,247	$6,728	$139	$857	$660	$29,948
3	$3,519	$3,519	$10,870	$3,019	$1,284	$6,930	$143	$883	$679	$30,847
4	$3,624	$3,624	$11,196	$3,110	$1,323	$7,138	$148	$910	$700	$31,772
5	$3,733	$3,733	$11,532	$3,203	$1,362	$7,352	$152	$937	$721	$32,725
6	$3,845	$3,845	$11,878	$3,299	$1,403	$7,572	$157	$965	$742	$33,707
7	$3,960	$3,960	$12,234	$3,398	$1,445	$7,799	$161	$994	$765	$34,718
8	$4,079	$4,079	$12,601	$3,500	$1,489	$8,033	$166	$1,024	$788	$35,760
9	$4,202	$4,202	$12,979	$3,605	$1,533	$8,274	$171	$1,055	$811	$36,833
10	$4,328	$4,328	$13,369	$3,714	$1,579	$8,523	$176	$1,086	$836	$37,938
11	$4,457	$4,457	$13,770	$3,825	$1,627	$8,778	$182	$1,119	$861	$39,076
12	$4,591	$4,591	$14,183	$3,940	$1,676	$9,042	$187	$1,152	$886	$40,248

13	$4,729	$4,729	$14,608	$4,058	$1,726	$9,313	$193	$1,187	$913	$41,456
14	$4,871	$4,871	$15,047	$4,180	$1,778	$9,592	$198	$1,223	$940	$42,699
15	$5,017	$5,017	$15,498	$4,305	$1,831	$9,880	$204	$1,259	$969	$43,980
16	$5,167	$5,167	$15,963	$4,434	$1,886	$10,176	$211	$1,297	$998	$45,300
17	$5,322	$5,322	$16,442	$4,567	$1,943	$10,482	$217	$1,336	$1,028	$46,659
18	$5,482	$5,482	$16,935	$4,704	$2,001	$10,796	$223	$1,376	$1,058	$48,058
19	$5,647	$5,647	$17,443	$4,845	$2,061	$11,120	$230	$1,417	$1,090	$49,500
20	$5,816	$5,816	$17,967	$4,991	$2,123	$11,454	$237	$1,460	$1,123	$50,985
21	$5,990	$5,990	$18,506	$5,140	$2,186	$11,797	$244	$1,504	$1,157	$52,515
22	$6,170	$6,170	$19,061	$5,295	$2,252	$12,151	$251	$1,549	$1,191	$54,090
23	$6,355	$6,355	$19,633	$5,453	$2,320	$12,516	$259	$1,595	$1,227	$55,713
24	$6,546	$6,546	$20,222	$5,617	$2,389	$12,891	$267	$1,643	$1,264	$57,384
25	$6,742	$6,742	$20,828	$5,786	$2,461	$13,278	$275	$1,692	$1,302	$59,106
26	$6,945	$6,945	$21,453	$5,959	$2,535	$13,676	$283	$1,743	$1,341	$60,879
27	$7,153	$7,153	$22,097	$6,138	$2,611	$14,087	$291	$1,795	$1,381	$62,705
28	$7,367	$7,367	$22,760	$6,322	$2,689	$14,509	$300	$1,849	$1,422	$64,586
29	$7,588	$7,588	$23,442	$6,512	$2,770	$14,944	$309	$1,905	$1,465	$66,524
30	$7,816	$7,816	$24,146	$6,707	$2,853	$15,393	$318	$1,962	$1,509	$68,520
31	$8,051	$8,051	$24,870	$6,908	$2,938	$15,855	$328	$2,021	$1,554	$70,575
32	$8,292	$8,292	$25,616	$7,116	$3,026	$16,330	$338	$2,081	$1,601	$72,693
33	$8,541	$8,541	$26,385	$7,329	$3,117	$16,820	$348	$2,144	$1,649	$74,873
34	$8,797	$8,797	$27,176	$7,549	$3,211	$17,325	$358	$2,208	$1,699	$77,120
35	$9,061	$9,061	$27,991	$7,775	$3,307	$17,844	$369	$2,274	$1,749	$79,433
36	$9,333	$9,333	$28,831	$8,009	$3,406	$18,380	$380	$2,343	$1,802	$81,816
37	$9,613	$9,613	$29,696	$8,249	$3,508	$18,931	$392	$2,413	$1,856	$84,271
38	$9,901	$9,901	$30,587	$8,496	$3,614	$19,499	$403	$2,485	$1,912	$86,799

39	$10,198	$10,198	$31,504	$8,751	$3,722	$20,084	$415	$2,560	$1,969	$89,403
40	$10,504	$10,504	$32,450	$9,014	$3,834	$20,687	$428	$2,637	$2,028	$92,085

**3% Inflation*

Sub Watershed #404 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,148	$2,148	$6,635	$1,843	$784	$4,230	$88	$539	$415	$18,830
2	$2,212	$2,212	$6,834	$1,898	$807	$4,357	$90	$555	$427	$19,395
3	$2,279	$2,279	$7,039	$1,955	$832	$4,488	$93	$572	$440	$19,977
4	$2,347	$2,347	$7,251	$2,014	$857	$4,622	$96	$589	$453	$20,576
5	$2,418	$2,418	$7,468	$2,075	$882	$4,761	$98	$607	$467	$21,193
6	$2,490	$2,490	$7,692	$2,137	$909	$4,904	$101	$625	$481	$21,829
7	$2,565	$2,565	$7,923	$2,201	$936	$5,051	$104	$644	$495	$22,484
8	$2,642	$2,642	$8,161	$2,267	$964	$5,202	$108	$663	$510	$23,158
9	$2,721	$2,721	$8,406	$2,335	$993	$5,359	$111	$683	$525	$23,853
10	$2,803	$2,803	$8,658	$2,405	$1,023	$5,519	$114	$703	$541	$24,569
11	$2,887	$2,887	$8,917	$2,477	$1,054	$5,685	$118	$725	$557	$25,306
12	$2,973	$2,973	$9,185	$2,551	$1,085	$5,855	$121	$746	$574	$26,065
13	$3,062	$3,062	$9,460	$2,628	$1,118	$6,031	$125	$769	$591	$26,847
14	$3,154	$3,154	$9,744	$2,707	$1,151	$6,212	$129	$792	$609	$27,652
15	$3,249	$3,249	$10,037	$2,788	$1,186	$6,398	$132	$815	$627	$28,482
16	$3,346	$3,346	$10,338	$2,872	$1,221	$6,590	$136	$840	$646	$29,336
17	$3,447	$3,447	$10,648	$2,958	$1,258	$6,788	$140	$865	$665	$30,216
18	$3,550	$3,550	$10,967	$3,046	$1,296	$6,992	$145	$891	$685	$31,123
19	$3,657	$3,657	$11,296	$3,138	$1,335	$7,201	$149	$918	$706	$32,056
20	$3,766	$3,766	$11,635	$3,232	$1,375	$7,417	$153	$945	$727	$33,018
21	$3,879	$3,879	$11,984	$3,329	$1,416	$7,640	$158	$974	$749	$34,009

22	$3,996	$3,996	$12,344	$3,429	$1,458	$7,869	$163	$1,003	$771	$35,029
23	$4,116	$4,116	$12,714	$3,532	$1,502	$8,105	$168	$1,033	$795	$36,080
24	$4,239	$4,239	$13,096	$3,638	$1,547	$8,348	$173	$1,064	$818	$37,162
25	$4,366	$4,366	$13,488	$3,747	$1,594	$8,599	$178	$1,096	$843	$38,277
26	$4,497	$4,497	$13,893	$3,859	$1,641	$8,857	$183	$1,129	$868	$39,425
27	$4,632	$4,632	$14,310	$3,975	$1,691	$9,123	$189	$1,163	$894	$40,608
28	$4,771	$4,771	$14,739	$4,094	$1,741	$9,396	$194	$1,198	$921	$41,826
29	$4,914	$4,914	$15,181	$4,217	$1,794	$9,678	$200	$1,233	$949	$43,081
30	$5,062	$5,062	$15,637	$4,344	$1,847	$9,968	$206	$1,270	$977	$44,374
31	$5,214	$5,214	$16,106	$4,474	$1,903	$10,267	$212	$1,309	$1,007	$45,705
32	$5,370	$5,370	$16,589	$4,608	$1,960	$10,576	$219	$1,348	$1,037	$47,076
33	$5,531	$5,531	$17,087	$4,746	$2,019	$10,893	$225	$1,388	$1,068	$48,488
34	$5,697	$5,697	$17,599	$4,889	$2,079	$11,220	$232	$1,430	$1,100	$49,943
35	$5,868	$5,868	$18,127	$5,035	$2,142	$11,556	$239	$1,473	$1,133	$51,441
36	$6,044	$6,044	$18,671	$5,186	$2,206	$11,903	$246	$1,517	$1,167	$52,984
37	$6,225	$6,225	$19,231	$5,342	$2,272	$12,260	$254	$1,563	$1,202	$54,574
38	$6,412	$6,412	$19,808	$5,502	$2,340	$12,628	$261	$1,609	$1,238	$56,211
39	$6,604	$6,604	$20,402	$5,667	$2,410	$13,007	$269	$1,658	$1,275	$57,898
40	$6,803	$6,803	$21,014	$5,837	$2,483	$13,397	$277	$1,707	$1,313	$59,634

**3% Inflation*

Sub Watershed #405 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,204	$2,204	$6,810	$1,892	$805	$4,341	$90	$553	$426	$19,324
2	$2,270	$2,270	$7,014	$1,948	$829	$4,471	$92	$570	$438	$19,904
3	$2,339	$2,339	$7,224	$2,007	$854	$4,606	$95	$587	$452	$20,501
4	$2,409	$2,409	$7,441	$2,067	$879	$4,744	$98	$605	$465	$21,116

5	$2,481	$2,481	$7,664	$2,129	$906	$4,886	$101	$623	$479	$21,750
6	$2,555	$2,555	$7,894	$2,193	$933	$5,033	$104	$641	$493	$22,402
7	$2,632	$2,632	$8,131	$2,259	$961	$5,184	$107	$661	$508	$23,074
8	$2,711	$2,711	$8,375	$2,326	$989	$5,339	$110	$680	$523	$23,767
9	$2,792	$2,792	$8,626	$2,396	$1,019	$5,499	$114	$701	$539	$24,480
10	$2,876	$2,876	$8,885	$2,468	$1,050	$5,664	$117	$722	$555	$25,214
11	$2,962	$2,962	$9,152	$2,542	$1,081	$5,834	$121	$744	$572	$25,970
12	$3,051	$3,051	$9,426	$2,618	$1,114	$6,009	$124	$766	$589	$26,750
13	$3,143	$3,143	$9,709	$2,697	$1,147	$6,190	$128	$789	$607	$27,552
14	$3,237	$3,237	$10,000	$2,778	$1,181	$6,375	$132	$813	$625	$28,379
15	$3,334	$3,334	$10,300	$2,861	$1,217	$6,566	$136	$837	$644	$29,230
16	$3,434	$3,434	$10,609	$2,947	$1,253	$6,763	$140	$862	$663	$30,107
17	$3,537	$3,537	$10,928	$3,035	$1,291	$6,966	$144	$888	$683	$31,010
18	$3,643	$3,643	$11,255	$3,127	$1,330	$7,175	$148	$915	$703	$31,940
19	$3,753	$3,753	$11,593	$3,220	$1,370	$7,391	$153	$942	$725	$32,899
20	$3,865	$3,865	$11,941	$3,317	$1,411	$7,612	$157	$970	$746	$33,886
21	$3,981	$3,981	$12,299	$3,416	$1,453	$7,841	$162	$999	$769	$34,902
22	$4,101	$4,101	$12,668	$3,519	$1,497	$8,076	$167	$1,029	$792	$35,949
23	$4,224	$4,224	$13,048	$3,624	$1,542	$8,318	$172	$1,060	$816	$37,028
24	$4,350	$4,350	$13,440	$3,733	$1,588	$8,568	$177	$1,092	$840	$38,138
25	$4,481	$4,481	$13,843	$3,845	$1,635	$8,825	$183	$1,125	$865	$39,283
26	$4,615	$4,615	$14,258	$3,961	$1,685	$9,089	$188	$1,158	$891	$40,461
27	$4,754	$4,754	$14,686	$4,079	$1,735	$9,362	$194	$1,193	$918	$41,675
28	$4,897	$4,897	$15,126	$4,202	$1,787	$9,643	$199	$1,229	$945	$42,925
29	$5,043	$5,043	$15,580	$4,328	$1,841	$9,932	$205	$1,266	$974	$44,213
30	$5,195	$5,195	$16,048	$4,458	$1,896	$10,230	$212	$1,304	$1,003	$45,539

31	$5,351	$5,351	$16,529	$4,591	$1,953	$10,537	$218	$1,343	$1,033	$46,906
32	$5,511	$5,511	$17,025	$4,729	$2,011	$10,853	$225	$1,383	$1,064	$48,313
33	$5,676	$5,676	$17,536	$4,871	$2,072	$11,179	$231	$1,425	$1,096	$49,762
34	$5,847	$5,847	$18,062	$5,017	$2,134	$11,514	$238	$1,468	$1,129	$51,255
35	$6,022	$6,022	$18,603	$5,168	$2,198	$11,860	$245	$1,512	$1,163	$52,793
36	$6,203	$6,203	$19,162	$5,323	$2,264	$12,216	$253	$1,557	$1,198	$54,376
37	$6,389	$6,389	$19,736	$5,482	$2,332	$12,582	$260	$1,604	$1,234	$56,008
38	$6,581	$6,581	$20,329	$5,647	$2,402	$12,959	$268	$1,652	$1,271	$57,688
39	$6,778	$6,778	$20,938	$5,816	$2,474	$13,348	$276	$1,701	$1,309	$59,418
40	$6,981	$6,981	$21,567	$5,991	$2,548	$13,749	$284	$1,752	$1,348	$61,201

**3% Inflation*

Sub Watershed #406 Annual Cost* Before Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,033	$2,033	$6,280	$1,744	$742	$4,003	$83	$510	$392	$17,821
2	$2,094	$2,094	$6,468	$1,797	$764	$4,124	$85	$526	$404	$18,356
3	$2,157	$2,157	$6,662	$1,851	$787	$4,247	$88	$541	$416	$18,906
4	$2,221	$2,221	$6,862	$1,906	$811	$4,375	$90	$558	$429	$19,474
5	$2,288	$2,288	$7,068	$1,963	$835	$4,506	$93	$574	$442	$20,058
6	$2,357	$2,357	$7,280	$2,022	$860	$4,641	$96	$592	$455	$20,659
7	$2,427	$2,427	$7,499	$2,083	$886	$4,780	$99	$609	$469	$21,279
8	$2,500	$2,500	$7,724	$2,145	$913	$4,924	$102	$628	$483	$21,918
9	$2,575	$2,575	$7,955	$2,210	$940	$5,071	$105	$646	$497	$22,575
10	$2,652	$2,652	$8,194	$2,276	$968	$5,224	$108	$666	$512	$23,252
11	$2,732	$2,732	$8,440	$2,344	$997	$5,380	$111	$686	$527	$23,950
12	$2,814	$2,814	$8,693	$2,415	$1,027	$5,542	$115	$706	$543	$24,669
13	$2,898	$2,898	$8,954	$2,487	$1,058	$5,708	$118	$727	$560	$25,409

14	$2,985	$2,985	$9,222	$2,562	$1,090	$5,879	$122	$749	$576	$26,171
15	$3,075	$3,075	$9,499	$2,639	$1,122	$6,056	$125	$772	$594	$26,956
16	$3,167	$3,167	$9,784	$2,718	$1,156	$6,237	$129	$795	$611	$27,765
17	$3,262	$3,262	$10,077	$2,799	$1,191	$6,424	$133	$819	$630	$28,598
18	$3,360	$3,360	$10,380	$2,883	$1,226	$6,617	$137	$843	$649	$29,456
19	$3,461	$3,461	$10,691	$2,970	$1,263	$6,816	$141	$869	$668	$30,339
20	$3,565	$3,565	$11,012	$3,059	$1,301	$7,020	$145	$895	$688	$31,249
21	$3,672	$3,672	$11,342	$3,151	$1,340	$7,231	$150	$922	$709	$32,187
22	$3,782	$3,782	$11,683	$3,245	$1,380	$7,448	$154	$949	$730	$33,152
23	$3,895	$3,895	$12,033	$3,343	$1,422	$7,671	$159	$978	$752	$34,147
24	$4,012	$4,012	$12,394	$3,443	$1,464	$7,901	$163	$1,007	$775	$35,171
25	$4,132	$4,132	$12,766	$3,546	$1,508	$8,138	$168	$1,037	$798	$36,227
26	$4,256	$4,256	$13,149	$3,652	$1,553	$8,382	$173	$1,068	$822	$37,313
27	$4,384	$4,384	$13,543	$3,762	$1,600	$8,634	$179	$1,100	$846	$38,433
28	$4,516	$4,516	$13,950	$3,875	$1,648	$8,893	$184	$1,133	$872	$39,586
29	$4,651	$4,651	$14,368	$3,991	$1,698	$9,160	$189	$1,167	$898	$40,773
30	$4,791	$4,791	$14,799	$4,111	$1,748	$9,434	$195	$1,202	$925	$41,997
31	$4,934	$4,934	$15,243	$4,234	$1,801	$9,717	$201	$1,238	$953	$43,256
32	$5,082	$5,082	$15,700	$4,361	$1,855	$10,009	$207	$1,276	$981	$44,554
33	$5,235	$5,235	$16,171	$4,492	$1,911	$10,309	$213	$1,314	$1,011	$45,891
34	$5,392	$5,392	$16,656	$4,627	$1,968	$10,619	$220	$1,353	$1,041	$47,267
35	$5,554	$5,554	$17,156	$4,766	$2,027	$10,937	$226	$1,394	$1,072	$48,685
36	$5,720	$5,720	$17,671	$4,909	$2,088	$11,265	$233	$1,436	$1,104	$50,146
37	$5,892	$5,892	$18,201	$5,056	$2,150	$11,603	$240	$1,479	$1,138	$51,650
38	$6,069	$6,069	$18,747	$5,208	$2,215	$11,951	$247	$1,523	$1,172	$53,200
39	$6,251	$6,251	$19,309	$5,364	$2,281	$12,310	$255	$1,569	$1,207	$54,796

40	$6,438	$6,438	$19,889	$5,525	$2,350	$12,679	$262	$1,616	$1,243	$56,440

**3% Inflation*

Sub Watershed #201 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,643	$2,693	$4,160	$231	$492	$2,652	$110	$676	$260	$12,917
2	$1,692	$2,774	$4,285	$238	$506	$2,732	$113	$696	$268	$13,304
3	$1,743	$2,857	$4,413	$245	$521	$2,814	$116	$717	$276	$13,704
4	$1,795	$2,943	$4,546	$253	$537	$2,898	$120	$739	$284	$14,115
5	$1,849	$3,031	$4,682	$260	$553	$2,985	$123	$761	$293	$14,538
6	$1,905	$3,122	$4,823	$268	$570	$3,074	$127	$784	$301	$14,974
7	$1,962	$3,216	$4,967	$276	$587	$3,167	$131	$807	$310	$15,423
8	$2,021	$3,312	$5,116	$284	$604	$3,262	$135	$831	$320	$15,886
9	$2,081	$3,412	$5,270	$293	$623	$3,360	$139	$856	$329	$16,363
10	$2,144	$3,514	$5,428	$302	$641	$3,460	$143	$882	$339	$16,854
11	$2,208	$3,620	$5,591	$311	$661	$3,564	$147	$909	$349	$17,359
12	$2,274	$3,728	$5,759	$320	$680	$3,671	$152	$936	$360	$17,880
13	$2,342	$3,840	$5,931	$330	$701	$3,781	$156	$964	$371	$18,416
14	$2,413	$3,955	$6,109	$339	$722	$3,895	$161	$993	$382	$18,969
15	$2,485	$4,074	$6,293	$350	$743	$4,012	$166	$1,023	$393	$19,538
16	$2,560	$4,196	$6,481	$360	$766	$4,132	$171	$1,053	$405	$20,124
17	$2,636	$4,322	$6,676	$371	$789	$4,256	$176	$1,085	$417	$20,728
18	$2,716	$4,452	$6,876	$382	$812	$4,383	$181	$1,117	$430	$21,350
19	$2,797	$4,585	$7,082	$393	$837	$4,515	$187	$1,151	$443	$21,990
20	$2,881	$4,723	$7,295	$405	$862	$4,650	$192	$1,185	$456	$22,650
21	$2,967	$4,864	$7,514	$417	$888	$4,790	$198	$1,221	$470	$23,329
22	$3,056	$5,010	$7,739	$430	$914	$4,934	$204	$1,258	$484	$24,029
23	$3,148	$5,161	$7,971	$443	$942	$5,082	$210	$1,295	$498	$24,750
24	$3,242	$5,316	$8,210	$456	$970	$5,234	$217	$1,334	$513	$25,493
25	$3,340	$5,475	$8,457	$470	$999	$5,391	$223	$1,374	$529	$26,257
26	$3,440	$5,639	$8,710	$484	$1,029	$5,553	$230	$1,415	$544	$27,045
27	$3,543	$5,808	$8,972	$498	$1,060	$5,719	$237	$1,458	$561	$27,856
28	$3,649	$5,983	$9,241	$513	$1,092	$5,891	$244	$1,502	$578	$28,692
29	$3,759	$6,162	$9,518	$529	$1,125	$6,068	$251	$1,547	$595	$29,553
30	$3,872	$6,347	$9,804	$545	$1,158	$6,250	$259	$1,593	$613	$30,439
31	$3,988	$6,537	$10,098	$561	$1,193	$6,437	$266	$1,641	$631	$31,353
32	$4,107	$6,734	$10,401	$578	$1,229	$6,630	$274	$1,690	$650	$32,293
33	$4,231	$6,936	$10,713	$595	$1,266	$6,829	$283	$1,741	$670	$33,262

34	$4,358	$7,144	$11,034	$613	$1,304	$7,034	$291	$1,793	$690	$34,260
35	$4,488	$7,358	$11,365	$631	$1,343	$7,245	$300	$1,847	$710	$35,288
36	$4,623	$7,579	$11,706	$650	$1,383	$7,463	$309	$1,902	$732	$36,346
37	$4,762	$7,806	$12,057	$670	$1,425	$7,686	$318	$1,959	$754	$37,437
38	$4,905	$8,040	$12,419	$690	$1,467	$7,917	$328	$2,018	$776	$38,560
39	$5,052	$8,281	$12,792	$711	$1,511	$8,155	$337	$2,079	$799	$39,717
40	$5,203	$8,530	$13,175	$732	$1,557	$8,399	$347	$2,141	$823	$40,908

**3% Inflation*

Sub Watershed #202 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,397	$2,291	$3,538	$197	$418	$2,255	$93	$575	$221	$10,985
2	$1,439	$2,359	$3,644	$202	$431	$2,323	$96	$592	$228	$11,315
3	$1,482	$2,430	$3,753	$209	$443	$2,393	$99	$610	$235	$11,654
4	$1,527	$2,503	$3,866	$215	$457	$2,465	$102	$628	$242	$12,004
5	$1,573	$2,578	$3,982	$221	$470	$2,539	$105	$647	$249	$12,364
6	$1,620	$2,655	$4,101	$228	$485	$2,615	$108	$666	$256	$12,735
7	$1,668	$2,735	$4,224	$235	$499	$2,693	$111	$686	$264	$13,117
8	$1,718	$2,817	$4,351	$242	$514	$2,774	$115	$707	$272	$13,510
9	$1,770	$2,902	$4,482	$249	$529	$2,857	$118	$728	$280	$13,915
10	$1,823	$2,989	$4,616	$256	$545	$2,943	$122	$750	$289	$14,333
11	$1,878	$3,078	$4,755	$264	$562	$3,031	$125	$773	$297	$14,763
12	$1,934	$3,171	$4,897	$272	$579	$3,122	$129	$796	$306	$15,206
13	$1,992	$3,266	$5,044	$280	$596	$3,216	$133	$820	$315	$15,662
14	$2,052	$3,364	$5,196	$289	$614	$3,312	$137	$844	$325	$16,132
15	$2,113	$3,465	$5,351	$297	$632	$3,412	$141	$870	$334	$16,616
16	$2,177	$3,569	$5,512	$306	$651	$3,514	$145	$896	$344	$17,114
17	$2,242	$3,676	$5,677	$315	$671	$3,619	$150	$923	$355	$17,628
18	$2,309	$3,786	$5,848	$325	$691	$3,728	$154	$950	$365	$18,157
19	$2,379	$3,899	$6,023	$335	$712	$3,840	$159	$979	$376	$18,701
20	$2,450	$4,016	$6,204	$345	$733	$3,955	$164	$1,008	$388	$19,262
21	$2,524	$4,137	$6,390	$355	$755	$4,074	$169	$1,038	$399	$19,840
22	$2,599	$4,261	$6,582	$366	$778	$4,196	$174	$1,070	$411	$20,435
23	$2,677	$4,389	$6,779	$377	$801	$4,322	$179	$1,102	$424	$21,048
24	$2,758	$4,521	$6,982	$388	$825	$4,451	$184	$1,135	$436	$21,680
25	$2,840	$4,656	$7,192	$400	$850	$4,585	$190	$1,169	$449	$22,330
26	$2,925	$4,796	$7,408	$412	$875	$4,722	$195	$1,204	$463	$23,000
27	$3,013	$4,940	$7,630	$424	$901	$4,864	$201	$1,240	$477	$23,690
28	$3,104	$5,088	$7,859	$437	$928	$5,010	$207	$1,277	$491	$24,401
29	$3,197	$5,241	$8,095	$450	$956	$5,160	$213	$1,315	$506	$25,133
30	$3,293	$5,398	$8,337	$463	$985	$5,315	$220	$1,355	$521	$25,887

31	$3,391	$5,560	$8,587	$477	$1,015	$5,475	$226	$1,395	$537	$26,663
32	$3,493	$5,726	$8,845	$491	$1,045	$5,639	$233	$1,437	$553	$27,463
33	$3,598	$5,898	$9,110	$506	$1,076	$5,808	$240	$1,480	$569	$28,287
34	$3,706	$6,075	$9,384	$521	$1,109	$5,982	$247	$1,525	$586	$29,136
35	$3,817	$6,257	$9,665	$537	$1,142	$6,162	$255	$1,571	$604	$30,010
36	$3,932	$6,445	$9,955	$553	$1,176	$6,346	$263	$1,618	$622	$30,910
37	$4,050	$6,639	$10,254	$570	$1,211	$6,537	$270	$1,666	$641	$31,838
38	$4,171	$6,838	$10,562	$587	$1,248	$6,733	$279	$1,716	$660	$32,793
39	$4,296	$7,043	$10,878	$604	$1,285	$6,935	$287	$1,768	$680	$33,776
40	$4,425	$7,254	$11,205	$622	$1,324	$7,143	$296	$1,821	$700	$34,790

**3% Inflation*

Sub Watershed #204 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,579	$2,588	$3,997	$222	$472	$2,548	$105	$650	$250	$12,412
2	$1,626	$2,666	$4,117	$229	$486	$2,625	$109	$669	$257	$12,784
3	$1,675	$2,746	$4,241	$236	$501	$2,704	$112	$689	$265	$13,168
4	$1,725	$2,828	$4,368	$243	$516	$2,785	$115	$710	$273	$13,563
5	$1,777	$2,913	$4,499	$250	$532	$2,868	$119	$731	$281	$13,970
6	$1,830	$3,000	$4,634	$257	$548	$2,954	$122	$753	$290	$14,389
7	$1,885	$3,090	$4,773	$265	$564	$3,043	$126	$776	$298	$14,820
8	$1,942	$3,183	$4,916	$273	$581	$3,134	$130	$799	$307	$15,265
9	$2,000	$3,278	$5,064	$281	$598	$3,228	$134	$823	$316	$15,723
10	$2,060	$3,377	$5,216	$290	$616	$3,325	$138	$848	$326	$16,194
11	$2,122	$3,478	$5,372	$298	$635	$3,425	$142	$873	$336	$16,680
12	$2,185	$3,582	$5,533	$307	$654	$3,528	$146	$899	$346	$17,181
13	$2,251	$3,690	$5,699	$317	$673	$3,633	$150	$926	$356	$17,696
14	$2,318	$3,801	$5,870	$326	$694	$3,742	$155	$954	$367	$18,227
15	$2,388	$3,915	$6,046	$336	$714	$3,855	$159	$983	$378	$18,774
16	$2,460	$4,032	$6,228	$346	$736	$3,970	$164	$1,012	$389	$19,337
17	$2,533	$4,153	$6,415	$356	$758	$4,089	$169	$1,042	$401	$19,917
18	$2,609	$4,278	$6,607	$367	$781	$4,212	$174	$1,074	$413	$20,515
19	$2,688	$4,406	$6,805	$378	$804	$4,338	$179	$1,106	$425	$21,130
20	$2,768	$4,538	$7,010	$389	$828	$4,469	$185	$1,139	$438	$21,764
21	$2,851	$4,674	$7,220	$401	$853	$4,603	$190	$1,173	$451	$22,417
22	$2,937	$4,814	$7,436	$413	$879	$4,741	$196	$1,208	$465	$23,089
23	$3,025	$4,959	$7,660	$426	$905	$4,883	$202	$1,245	$479	$23,782
24	$3,116	$5,108	$7,889	$438	$932	$5,029	$208	$1,282	$493	$24,496
25	$3,209	$5,261	$8,126	$451	$960	$5,180	$214	$1,320	$508	$25,230
26	$3,305	$5,419	$8,370	$465	$989	$5,336	$221	$1,360	$523	$25,987
27	$3,405	$5,581	$8,621	$479	$1,019	$5,496	$227	$1,401	$539	$26,767

28	$3,507	$5,749	$8,879	$493	$1,049	$5,661	$234	$1,443	$555	$27,570
29	$3,612	$5,921	$9,146	$508	$1,081	$5,830	$241	$1,486	$572	$28,397
30	$3,720	$6,099	$9,420	$523	$1,113	$6,005	$248	$1,531	$589	$29,249
31	$3,832	$6,282	$9,703	$539	$1,146	$6,186	$256	$1,577	$606	$30,127
32	$3,947	$6,470	$9,994	$555	$1,181	$6,371	$264	$1,624	$625	$31,030
33	$4,065	$6,664	$10,294	$572	$1,216	$6,562	$271	$1,673	$643	$31,961
34	$4,187	$6,864	$10,603	$589	$1,253	$6,759	$280	$1,723	$663	$32,920
35	$4,313	$7,070	$10,921	$607	$1,290	$6,962	$288	$1,775	$683	$33,908
36	$4,442	$7,282	$11,248	$625	$1,329	$7,171	$297	$1,828	$703	$34,925
37	$4,575	$7,501	$11,586	$644	$1,369	$7,386	$306	$1,883	$724	$35,973
38	$4,713	$7,726	$11,933	$663	$1,410	$7,607	$315	$1,939	$746	$37,052
39	$4,854	$7,958	$12,291	$683	$1,452	$7,836	$324	$1,997	$768	$38,163
40	$5,000	$8,196	$12,660	$703	$1,496	$8,071	$334	$2,057	$791	$39,308

**3% Inflation*

Sub Watershed #205 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,269	$2,081	$3,214	$179	$380	$2,049	$85	$522	$201	$9,979
2	$1,307	$2,143	$3,311	$184	$391	$2,110	$87	$538	$207	$10,279
3	$1,347	$2,208	$3,410	$189	$403	$2,174	$90	$554	$213	$10,587
4	$1,387	$2,274	$3,512	$195	$415	$2,239	$93	$571	$220	$10,905
5	$1,429	$2,342	$3,617	$201	$427	$2,306	$95	$588	$226	$11,232
6	$1,471	$2,412	$3,726	$207	$440	$2,375	$98	$605	$233	$11,569
7	$1,516	$2,485	$3,838	$213	$453	$2,447	$101	$624	$240	$11,916
8	$1,561	$2,559	$3,953	$220	$467	$2,520	$104	$642	$247	$12,273
9	$1,608	$2,636	$4,072	$226	$481	$2,596	$107	$662	$254	$12,642
10	$1,656	$2,715	$4,194	$233	$495	$2,673	$111	$681	$262	$13,021
11	$1,706	$2,796	$4,319	$240	$510	$2,754	$114	$702	$270	$13,412
12	$1,757	$2,880	$4,449	$247	$526	$2,836	$117	$723	$278	$13,814
13	$1,810	$2,967	$4,583	$255	$541	$2,921	$121	$745	$286	$14,228
14	$1,864	$3,056	$4,720	$262	$558	$3,009	$124	$767	$295	$14,655
15	$1,920	$3,147	$4,862	$270	$574	$3,099	$128	$790	$304	$15,095
16	$1,978	$3,242	$5,007	$278	$592	$3,192	$132	$814	$313	$15,548
17	$2,037	$3,339	$5,158	$287	$609	$3,288	$136	$838	$322	$16,014
18	$2,098	$3,439	$5,312	$295	$628	$3,387	$140	$863	$332	$16,495
19	$2,161	$3,543	$5,472	$304	$646	$3,488	$144	$889	$342	$16,989
20	$2,226	$3,649	$5,636	$313	$666	$3,593	$149	$916	$352	$17,499
21	$2,293	$3,758	$5,805	$322	$686	$3,701	$153	$943	$363	$18,024
22	$2,361	$3,871	$5,979	$332	$706	$3,812	$158	$972	$374	$18,565
23	$2,432	$3,987	$6,159	$342	$728	$3,926	$162	$1,001	$385	$19,122
24	$2,505	$4,107	$6,343	$352	$749	$4,044	$167	$1,031	$396	$19,695

25	$2,580	$4,230	$6,534	$363	$772	$4,165	$172	$1,062	$408	$20,286
26	$2,658	$4,357	$6,730	$374	$795	$4,290	$177	$1,094	$421	$20,895
27	$2,737	$4,488	$6,931	$385	$819	$4,419	$183	$1,126	$433	$21,522
28	$2,820	$4,622	$7,139	$397	$843	$4,551	$188	$1,160	$446	$22,167
29	$2,904	$4,761	$7,354	$409	$869	$4,688	$194	$1,195	$460	$22,832
30	$2,991	$4,904	$7,574	$421	$895	$4,829	$200	$1,231	$473	$23,517
31	$3,081	$5,051	$7,801	$433	$922	$4,973	$206	$1,268	$488	$24,223
32	$3,173	$5,202	$8,035	$446	$949	$5,123	$212	$1,306	$502	$24,949
33	$3,269	$5,358	$8,277	$460	$978	$5,276	$218	$1,345	$517	$25,698
34	$3,367	$5,519	$8,525	$474	$1,007	$5,435	$225	$1,385	$533	$26,469
35	$3,468	$5,685	$8,781	$488	$1,037	$5,598	$232	$1,427	$549	$27,263
36	$3,572	$5,855	$9,044	$502	$1,069	$5,766	$239	$1,470	$565	$28,081
37	$3,679	$6,031	$9,315	$518	$1,101	$5,939	$246	$1,514	$582	$28,923
38	$3,789	$6,212	$9,595	$533	$1,134	$6,117	$253	$1,559	$600	$29,791
39	$3,903	$6,398	$9,883	$549	$1,168	$6,300	$261	$1,606	$618	$30,685
40	$4,020	$6,590	$10,179	$566	$1,203	$6,489	$268	$1,654	$636	$31,605

**3% Inflation*

Sub Watershed #206 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,405	$2,304	$3,559	$198	$420	$2,269	$94	$578	$222	$11,050
2	$1,448	$2,373	$3,666	$204	$433	$2,337	$97	$596	$229	$11,381
3	$1,491	$2,444	$3,776	$210	$446	$2,407	$100	$614	$236	$11,723
4	$1,536	$2,518	$3,889	$216	$459	$2,479	$103	$632	$243	$12,074
5	$1,582	$2,593	$4,005	$223	$473	$2,553	$106	$651	$250	$12,437
6	$1,629	$2,671	$4,126	$229	$487	$2,630	$109	$670	$258	$12,810
7	$1,678	$2,751	$4,249	$236	$502	$2,709	$112	$691	$266	$13,194
8	$1,729	$2,834	$4,377	$243	$517	$2,790	$115	$711	$274	$13,590
9	$1,780	$2,919	$4,508	$250	$533	$2,874	$119	$733	$282	$13,997
10	$1,834	$3,006	$4,643	$258	$549	$2,960	$122	$755	$290	$14,417
11	$1,889	$3,096	$4,783	$266	$565	$3,049	$126	$777	$299	$14,850
12	$1,945	$3,189	$4,926	$274	$582	$3,140	$130	$801	$308	$15,295
13	$2,004	$3,285	$5,074	$282	$599	$3,235	$134	$825	$317	$15,754
14	$2,064	$3,384	$5,226	$290	$617	$3,332	$138	$849	$327	$16,227
15	$2,126	$3,485	$5,383	$299	$636	$3,432	$142	$875	$336	$16,714
16	$2,190	$3,590	$5,544	$308	$655	$3,535	$146	$901	$347	$17,215
17	$2,255	$3,697	$5,711	$317	$675	$3,641	$151	$928	$357	$17,732
18	$2,323	$3,808	$5,882	$327	$695	$3,750	$155	$956	$368	$18,263
19	$2,393	$3,922	$6,059	$337	$716	$3,862	$160	$985	$379	$18,811
20	$2,464	$4,040	$6,240	$347	$737	$3,978	$165	$1,014	$390	$19,376
21	$2,538	$4,161	$6,428	$357	$759	$4,098	$170	$1,044	$402	$19,957

22	$2,615	$4,286	$6,620	$368	$782	$4,220	$175	$1,076	$414	$20,556
23	$2,693	$4,415	$6,819	$379	$806	$4,347	$180	$1,108	$426	$21,172
24	$2,774	$4,547	$7,024	$390	$830	$4,478	$185	$1,141	$439	$21,808
25	$2,857	$4,684	$7,234	$402	$855	$4,612	$191	$1,176	$452	$22,462
26	$2,943	$4,824	$7,451	$414	$880	$4,750	$197	$1,211	$466	$23,136
27	$3,031	$4,969	$7,675	$426	$907	$4,893	$202	$1,247	$480	$23,830
28	$3,122	$5,118	$7,905	$439	$934	$5,039	$208	$1,285	$494	$24,545
29	$3,216	$5,271	$8,142	$452	$962	$5,191	$215	$1,323	$509	$25,281
30	$3,312	$5,430	$8,386	$466	$991	$5,346	$221	$1,363	$524	$26,039
31	$3,411	$5,592	$8,638	$480	$1,021	$5,507	$228	$1,404	$540	$26,821
32	$3,514	$5,760	$8,897	$494	$1,051	$5,672	$235	$1,446	$556	$27,625
33	$3,619	$5,933	$9,164	$509	$1,083	$5,842	$242	$1,489	$573	$28,454
34	$3,728	$6,111	$9,439	$524	$1,115	$6,017	$249	$1,534	$590	$29,308
35	$3,840	$6,294	$9,722	$540	$1,149	$6,198	$256	$1,580	$608	$30,187
36	$3,955	$6,483	$10,014	$556	$1,183	$6,384	$264	$1,627	$626	$31,092
37	$4,073	$6,678	$10,314	$573	$1,219	$6,575	$272	$1,676	$645	$32,025
38	$4,196	$6,878	$10,624	$590	$1,255	$6,773	$280	$1,726	$664	$32,986
39	$4,321	$7,084	$10,942	$608	$1,293	$6,976	$289	$1,778	$684	$33,975
40	$4,451	$7,297	$11,271	$626	$1,332	$7,185	$297	$1,831	$704	$34,995

**3% Inflation*

Sub Watershed #207 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,550	$2,541	$3,924	$218	$464	$2,502	$104	$638	$245	$12,185
2	$1,596	$2,617	$4,042	$225	$478	$2,577	$107	$657	$253	$12,550
3	$1,644	$2,695	$4,163	$231	$492	$2,654	$110	$677	$260	$12,927
4	$1,693	$2,776	$4,288	$238	$507	$2,734	$113	$697	$268	$13,314
5	$1,744	$2,860	$4,417	$245	$522	$2,816	$116	$718	$276	$13,714
6	$1,797	$2,945	$4,549	$253	$537	$2,900	$120	$739	$284	$14,125
7	$1,851	$3,034	$4,686	$260	$554	$2,987	$124	$761	$293	$14,549
8	$1,906	$3,125	$4,826	$268	$570	$3,077	$127	$784	$302	$14,985
9	$1,963	$3,218	$4,971	$276	$587	$3,169	$131	$808	$311	$15,435
10	$2,022	$3,315	$5,120	$284	$605	$3,264	$135	$832	$320	$15,898
11	$2,083	$3,414	$5,274	$293	$623	$3,362	$139	$857	$330	$16,375
12	$2,145	$3,517	$5,432	$302	$642	$3,463	$143	$883	$340	$16,866
13	$2,210	$3,622	$5,595	$311	$661	$3,567	$148	$909	$350	$17,372
14	$2,276	$3,731	$5,763	$320	$681	$3,674	$152	$936	$360	$17,893
15	$2,344	$3,843	$5,936	$330	$701	$3,784	$157	$965	$371	$18,430
16	$2,415	$3,958	$6,114	$340	$722	$3,898	$161	$994	$382	$18,983
17	$2,487	$4,077	$6,297	$350	$744	$4,015	$166	$1,023	$394	$19,553
18	$2,562	$4,199	$6,486	$360	$766	$4,135	$171	$1,054	$405	$20,139

19	$2,638	$4,325	$6,681	$371	$789	$4,259	$176	$1,086	$418	$20,743
20	$2,718	$4,455	$6,881	$382	$813	$4,387	$181	$1,118	$430	$21,366
21	$2,799	$4,589	$7,088	$394	$837	$4,518	$187	$1,152	$443	$22,007
22	$2,883	$4,726	$7,300	$406	$863	$4,654	$193	$1,186	$456	$22,667
23	$2,970	$4,868	$7,519	$418	$888	$4,794	$198	$1,222	$470	$23,347
24	$3,059	$5,014	$7,745	$430	$915	$4,937	$204	$1,259	$484	$24,047
25	$3,150	$5,165	$7,977	$443	$942	$5,085	$210	$1,296	$499	$24,769
26	$3,245	$5,320	$8,217	$456	$971	$5,238	$217	$1,335	$514	$25,512
27	$3,342	$5,479	$8,463	$470	$1,000	$5,395	$223	$1,375	$529	$26,277
28	$3,443	$5,643	$8,717	$484	$1,030	$5,557	$230	$1,417	$545	$27,065
29	$3,546	$5,813	$8,978	$499	$1,061	$5,724	$237	$1,459	$561	$27,877
30	$3,652	$5,987	$9,248	$514	$1,093	$5,895	$244	$1,503	$578	$28,714
31	$3,762	$6,167	$9,525	$529	$1,125	$6,072	$251	$1,548	$595	$29,575
32	$3,875	$6,352	$9,811	$545	$1,159	$6,255	$259	$1,594	$613	$30,462
33	$3,991	$6,542	$10,105	$561	$1,194	$6,442	$267	$1,642	$632	$31,376
34	$4,111	$6,739	$10,408	$578	$1,230	$6,635	$275	$1,691	$651	$32,317
35	$4,234	$6,941	$10,721	$596	$1,267	$6,834	$283	$1,742	$670	$33,287
36	$4,361	$7,149	$11,042	$613	$1,305	$7,040	$291	$1,794	$690	$34,286
37	$4,492	$7,363	$11,374	$632	$1,344	$7,251	$300	$1,848	$711	$35,314
38	$4,626	$7,584	$11,715	$651	$1,384	$7,468	$309	$1,904	$732	$36,374
39	$4,765	$7,812	$12,066	$670	$1,426	$7,692	$318	$1,961	$754	$37,465
40	$4,908	$8,046	$12,428	$690	$1,468	$7,923	$328	$2,020	$777	$38,589

**3% Inflation*

Sub Watershed #208 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,630	$2,672	$4,128	$229	$488	$2,631	$109	$671	$258	$12,816
2	$1,679	$2,753	$4,252	$236	$502	$2,710	$112	$691	$266	$13,201
3	$1,729	$2,835	$4,379	$243	$517	$2,792	$116	$712	$274	$13,597
4	$1,781	$2,920	$4,511	$251	$533	$2,875	$119	$733	$282	$14,005
5	$1,835	$3,008	$4,646	$258	$549	$2,962	$123	$755	$290	$14,425
6	$1,890	$3,098	$4,785	$266	$565	$3,051	$126	$778	$299	$14,858
7	$1,947	$3,191	$4,929	$274	$582	$3,142	$130	$801	$308	$15,304
8	$2,005	$3,287	$5,077	$282	$600	$3,236	$134	$825	$317	$15,763
9	$2,065	$3,385	$5,229	$290	$618	$3,333	$138	$850	$327	$16,235
10	$2,127	$3,487	$5,386	$299	$636	$3,433	$142	$875	$337	$16,723
11	$2,191	$3,591	$5,547	$308	$655	$3,536	$146	$901	$347	$17,224
12	$2,257	$3,699	$5,714	$317	$675	$3,643	$151	$928	$357	$17,741
13	$2,324	$3,810	$5,885	$327	$695	$3,752	$155	$956	$368	$18,273
14	$2,394	$3,925	$6,062	$337	$716	$3,864	$160	$985	$379	$18,821
15	$2,466	$4,042	$6,244	$347	$738	$3,980	$165	$1,015	$390	$19,386

16	$2,540	$4,164	$6,431	$357	$760	$4,100	$170	$1,045	$402	$19,968
17	$2,616	$4,288	$6,624	$368	$783	$4,223	$175	$1,076	$414	$20,567
18	$2,694	$4,417	$6,823	$379	$806	$4,349	$180	$1,109	$426	$21,184
19	$2,775	$4,550	$7,027	$390	$830	$4,480	$185	$1,142	$439	$21,819
20	$2,859	$4,686	$7,238	$402	$855	$4,614	$191	$1,176	$452	$22,474
21	$2,944	$4,827	$7,455	$414	$881	$4,753	$197	$1,211	$466	$23,148
22	$3,033	$4,971	$7,679	$427	$907	$4,895	$203	$1,248	$480	$23,842
23	$3,124	$5,121	$7,909	$439	$934	$5,042	$209	$1,285	$494	$24,558
24	$3,217	$5,274	$8,147	$453	$962	$5,193	$215	$1,324	$509	$25,294
25	$3,314	$5,432	$8,391	$466	$991	$5,349	$221	$1,364	$524	$26,053
26	$3,413	$5,595	$8,643	$480	$1,021	$5,510	$228	$1,404	$540	$26,835
27	$3,516	$5,763	$8,902	$495	$1,052	$5,675	$235	$1,447	$556	$27,640
28	$3,621	$5,936	$9,169	$509	$1,083	$5,845	$242	$1,490	$573	$28,469
29	$3,730	$6,114	$9,444	$525	$1,116	$6,021	$249	$1,535	$590	$29,323
30	$3,842	$6,298	$9,727	$540	$1,149	$6,201	$257	$1,581	$608	$30,203
31	$3,957	$6,487	$10,019	$557	$1,184	$6,387	$264	$1,628	$626	$31,109
32	$4,076	$6,681	$10,320	$573	$1,219	$6,579	$272	$1,677	$645	$32,042
33	$4,198	$6,882	$10,629	$591	$1,256	$6,776	$280	$1,727	$664	$33,003
34	$4,324	$7,088	$10,948	$608	$1,293	$6,980	$289	$1,779	$684	$33,993
35	$4,453	$7,301	$11,277	$626	$1,332	$7,189	$297	$1,832	$705	$35,013
36	$4,587	$7,520	$11,615	$645	$1,372	$7,405	$306	$1,887	$726	$36,064
37	$4,725	$7,745	$11,963	$665	$1,413	$7,627	$316	$1,944	$748	$37,146
38	$4,866	$7,978	$12,322	$685	$1,456	$7,856	$325	$2,002	$770	$38,260
39	$5,012	$8,217	$12,692	$705	$1,500	$8,091	$335	$2,062	$793	$39,408
40	$5,163	$8,464	$13,073	$726	$1,544	$8,334	$345	$2,124	$817	$40,590

**3% Inflation*

Sub Watershed #20301 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,730	$2,836	$4,380	$243	$517	$2,792	$116	$712	$274	$13,599
2	$1,782	$2,921	$4,511	$251	$533	$2,876	$119	$733	$282	$14,007
3	$1,835	$3,008	$4,647	$258	$549	$2,962	$123	$755	$290	$14,428
4	$1,890	$3,099	$4,786	$266	$565	$3,051	$126	$778	$299	$14,861
5	$1,947	$3,192	$4,930	$274	$582	$3,143	$130	$801	$308	$15,306
6	$2,005	$3,287	$5,078	$282	$600	$3,237	$134	$825	$317	$15,766
7	$2,065	$3,386	$5,230	$291	$618	$3,334	$138	$850	$327	$16,238
8	$2,127	$3,488	$5,387	$299	$636	$3,434	$142	$875	$337	$16,726
9	$2,191	$3,592	$5,548	$308	$656	$3,537	$146	$902	$347	$17,227
10	$2,257	$3,700	$5,715	$317	$675	$3,643	$151	$929	$357	$17,744
11	$2,325	$3,811	$5,886	$327	$695	$3,753	$155	$957	$368	$18,277
12	$2,394	$3,925	$6,063	$337	$716	$3,865	$160	$985	$379	$18,825

13	$2,466	$4,043	$6,245	$347	$738	$3,981	$165	$1,015	$390	$19,390
14	$2,540	$4,164	$6,432	$357	$760	$4,100	$170	$1,045	$402	$19,971
15	$2,616	$4,289	$6,625	$368	$783	$4,224	$175	$1,077	$414	$20,570
16	$2,695	$4,418	$6,824	$379	$806	$4,350	$180	$1,109	$426	$21,188
17	$2,776	$4,550	$7,029	$390	$830	$4,481	$185	$1,142	$439	$21,823
18	$2,859	$4,687	$7,239	$402	$855	$4,615	$191	$1,176	$452	$22,478
19	$2,945	$4,828	$7,457	$414	$881	$4,754	$197	$1,212	$466	$23,152
20	$3,033	$4,972	$7,680	$427	$907	$4,896	$203	$1,248	$480	$23,847
21	$3,124	$5,122	$7,911	$439	$935	$5,043	$209	$1,285	$494	$24,562
22	$3,218	$5,275	$8,148	$453	$963	$5,194	$215	$1,324	$509	$25,299
23	$3,314	$5,433	$8,393	$466	$992	$5,350	$221	$1,364	$525	$26,058
24	$3,414	$5,596	$8,644	$480	$1,021	$5,511	$228	$1,405	$540	$26,840
25	$3,516	$5,764	$8,904	$495	$1,052	$5,676	$235	$1,447	$556	$27,645
26	$3,622	$5,937	$9,171	$509	$1,083	$5,846	$242	$1,490	$573	$28,474
27	$3,730	$6,115	$9,446	$525	$1,116	$6,022	$249	$1,535	$590	$29,329
28	$3,842	$6,299	$9,729	$541	$1,149	$6,202	$257	$1,581	$608	$30,208
29	$3,958	$6,488	$10,021	$557	$1,184	$6,388	$264	$1,628	$626	$31,115
30	$4,076	$6,682	$10,322	$573	$1,219	$6,580	$272	$1,677	$645	$32,048
31	$4,199	$6,883	$10,631	$591	$1,256	$6,777	$280	$1,728	$664	$33,010
32	$4,325	$7,089	$10,950	$608	$1,294	$6,981	$289	$1,779	$684	$34,000
33	$4,454	$7,302	$11,279	$627	$1,333	$7,190	$297	$1,833	$705	$35,020
34	$4,588	$7,521	$11,617	$645	$1,373	$7,406	$306	$1,888	$726	$36,070
35	$4,726	$7,747	$11,966	$665	$1,414	$7,628	$316	$1,944	$748	$37,153
36	$4,867	$7,979	$12,325	$685	$1,456	$7,857	$325	$2,003	$770	$38,267
37	$5,013	$8,219	$12,694	$705	$1,500	$8,093	$335	$2,063	$793	$39,415
38	$5,164	$8,465	$13,075	$726	$1,545	$8,335	$345	$2,125	$817	$40,598
39	$5,319	$8,719	$13,467	$748	$1,591	$8,586	$355	$2,188	$842	$41,815
40	$5,478	$8,981	$13,872	$771	$1,639	$8,843	$366	$2,254	$867	$43,070

**3% Inflation*

Sub Watershed #301 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,175	$1,926	$2,975	$165	$351	$1,896	$78	$483	$186	$9,236
2	$1,210	$1,984	$3,064	$170	$362	$1,953	$81	$498	$191	$9,513
3	$1,246	$2,043	$3,156	$175	$373	$2,012	$83	$513	$197	$9,798
4	$1,284	$2,104	$3,250	$181	$384	$2,072	$86	$528	$203	$10,092
5	$1,322	$2,167	$3,348	$186	$396	$2,134	$88	$544	$209	$10,395
6	$1,362	$2,232	$3,448	$192	$407	$2,198	$91	$560	$216	$10,707
7	$1,403	$2,299	$3,552	$197	$420	$2,264	$94	$577	$222	$11,028
8	$1,445	$2,368	$3,658	$203	$432	$2,332	$96	$594	$229	$11,359
9	$1,488	$2,439	$3,768	$209	$445	$2,402	$99	$612	$236	$11,699

10	$1,533	$2,513	$3,881	$216	$459	$2,474	$102	$631	$243	$12,050
11	$1,579	$2,588	$3,997	$222	$472	$2,548	$105	$650	$250	$12,412
12	$1,626	$2,666	$4,117	$229	$486	$2,625	$109	$669	$257	$12,784
13	$1,675	$2,746	$4,241	$236	$501	$2,704	$112	$689	$265	$13,168
14	$1,725	$2,828	$4,368	$243	$516	$2,785	$115	$710	$273	$13,563
15	$1,777	$2,913	$4,499	$250	$532	$2,868	$119	$731	$281	$13,970
16	$1,830	$3,000	$4,634	$257	$548	$2,954	$122	$753	$290	$14,389
17	$1,885	$3,090	$4,773	$265	$564	$3,043	$126	$776	$298	$14,820
18	$1,942	$3,183	$4,916	$273	$581	$3,134	$130	$799	$307	$15,265
19	$2,000	$3,278	$5,064	$281	$598	$3,228	$134	$823	$316	$15,723
20	$2,060	$3,377	$5,216	$290	$616	$3,325	$138	$848	$326	$16,195
21	$2,122	$3,478	$5,372	$298	$635	$3,425	$142	$873	$336	$16,680
22	$2,185	$3,582	$5,533	$307	$654	$3,528	$146	$899	$346	$17,181
23	$2,251	$3,690	$5,699	$317	$673	$3,633	$150	$926	$356	$17,696
24	$2,318	$3,801	$5,870	$326	$694	$3,742	$155	$954	$367	$18,227
25	$2,388	$3,915	$6,047	$336	$714	$3,855	$159	$983	$378	$18,774
26	$2,460	$4,032	$6,228	$346	$736	$3,970	$164	$1,012	$389	$19,337
27	$2,533	$4,153	$6,415	$356	$758	$4,089	$169	$1,042	$401	$19,917
28	$2,609	$4,278	$6,607	$367	$781	$4,212	$174	$1,074	$413	$20,515
29	$2,688	$4,406	$6,805	$378	$804	$4,338	$179	$1,106	$425	$21,130
30	$2,768	$4,538	$7,010	$389	$828	$4,469	$185	$1,139	$438	$21,764
31	$2,851	$4,674	$7,220	$401	$853	$4,603	$190	$1,173	$451	$22,417
32	$2,937	$4,815	$7,436	$413	$879	$4,741	$196	$1,208	$465	$23,090
33	$3,025	$4,959	$7,660	$426	$905	$4,883	$202	$1,245	$479	$23,782
34	$3,116	$5,108	$7,889	$438	$932	$5,029	$208	$1,282	$493	$24,496
35	$3,209	$5,261	$8,126	$451	$960	$5,180	$214	$1,320	$508	$25,231
36	$3,305	$5,419	$8,370	$465	$989	$5,336	$221	$1,360	$523	$25,988
37	$3,405	$5,581	$8,621	$479	$1,019	$5,496	$227	$1,401	$539	$26,767
38	$3,507	$5,749	$8,880	$493	$1,049	$5,661	$234	$1,443	$555	$27,570
39	$3,612	$5,921	$9,146	$508	$1,081	$5,831	$241	$1,486	$572	$28,397
40	$3,720	$6,099	$9,420	$523	$1,113	$6,005	$248	$1,531	$589	$29,249

**3% Inflation*

Sub Watershed #304 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$298	$488	$754	$42	$89	$481	$20	$123	$47	$2,341
2	$307	$503	$777	$43	$92	$495	$20	$126	$49	$2,411
3	$316	$518	$800	$44	$95	$510	$21	$130	$50	$2,484
4	$325	$533	$824	$46	$97	$525	$22	$134	$51	$2,558
5	$335	$549	$849	$47	$100	$541	$22	$138	$53	$2,635
6	$345	$566	$874	$49	$103	$557	$23	$142	$55	$2,714

7	$356	$583	$900	$50	$106	$574	$24	$146	$56	$2,795
8	$366	$600	$927	$52	$110	$591	$24	$151	$58	$2,879
9	$377	$618	$955	$53	$113	$609	$25	$155	$60	$2,966
10	$389	$637	$984	$55	$116	$627	$26	$160	$61	$3,055
11	$400	$656	$1,013	$56	$120	$646	$27	$165	$63	$3,146
12	$412	$676	$1,044	$58	$123	$665	$28	$170	$65	$3,241
13	$425	$696	$1,075	$60	$127	$685	$28	$175	$67	$3,338
14	$437	$717	$1,107	$62	$131	$706	$29	$180	$69	$3,438
15	$450	$738	$1,141	$63	$135	$727	$30	$185	$71	$3,541
16	$464	$761	$1,175	$65	$139	$749	$31	$191	$73	$3,647
17	$478	$783	$1,210	$67	$143	$771	$32	$197	$76	$3,757
18	$492	$807	$1,246	$69	$147	$795	$33	$203	$78	$3,870
19	$507	$831	$1,284	$71	$152	$818	$34	$209	$80	$3,986
20	$522	$856	$1,322	$73	$156	$843	$35	$215	$83	$4,105
21	$538	$882	$1,362	$76	$161	$868	$36	$221	$85	$4,228
22	$554	$908	$1,403	$78	$166	$894	$37	$228	$88	$4,355
23	$571	$935	$1,445	$80	$171	$921	$38	$235	$90	$4,486
24	$588	$963	$1,488	$83	$176	$949	$39	$242	$93	$4,621
25	$605	$992	$1,533	$85	$181	$977	$40	$249	$96	$4,759
26	$623	$1,022	$1,579	$88	$187	$1,006	$42	$257	$99	$4,902
27	$642	$1,053	$1,626	$90	$192	$1,037	$43	$264	$102	$5,049
28	$661	$1,084	$1,675	$93	$198	$1,068	$44	$272	$105	$5,200
29	$681	$1,117	$1,725	$96	$204	$1,100	$46	$280	$108	$5,356
30	$702	$1,150	$1,777	$99	$210	$1,133	$47	$289	$111	$5,517
31	$723	$1,185	$1,830	$102	$216	$1,167	$48	$297	$114	$5,683
32	$744	$1,220	$1,885	$105	$223	$1,202	$50	$306	$118	$5,853
33	$767	$1,257	$1,942	$108	$229	$1,238	$51	$316	$121	$6,029
34	$790	$1,295	$2,000	$111	$236	$1,275	$53	$325	$125	$6,210
35	$814	$1,334	$2,060	$114	$243	$1,313	$54	$335	$129	$6,396
36	$838	$1,374	$2,122	$118	$251	$1,353	$56	$345	$133	$6,588
37	$863	$1,415	$2,185	$121	$258	$1,393	$58	$355	$137	$6,785
38	$889	$1,457	$2,251	$125	$266	$1,435	$59	$366	$141	$6,989
39	$916	$1,501	$2,318	$129	$274	$1,478	$61	$377	$145	$7,199
40	$943	$1,546	$2,388	$133	$282	$1,522	$63	$388	$149	$7,415

**3% Inflation*

Sub Watershed #305 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,370	$2,246	$3,469	$193	$410	$2,212	$92	$564	$217	$10,772
2	$1,411	$2,313	$3,573	$199	$422	$2,278	$94	$581	$223	$11,095
3	$1,454	$2,383	$3,681	$204	$435	$2,346	$97	$598	$230	$11,428

4	$1,497	$2,454	$3,791	$211	$448	$2,417	$100	$616	$237	$11,771
5	$1,542	$2,528	$3,905	$217	$461	$2,489	$103	$635	$244	$12,124
6	$1,588	$2,604	$4,022	$223	$475	$2,564	$106	$654	$251	$12,488
7	$1,636	$2,682	$4,143	$230	$489	$2,641	$109	$673	$259	$12,862
8	$1,685	$2,762	$4,267	$237	$504	$2,720	$113	$693	$267	$13,248
9	$1,736	$2,845	$4,395	$244	$519	$2,802	$116	$714	$275	$13,646
10	$1,788	$2,931	$4,527	$251	$535	$2,886	$119	$736	$283	$14,055
11	$1,841	$3,019	$4,662	$259	$551	$2,972	$123	$758	$291	$14,477
12	$1,897	$3,109	$4,802	$267	$567	$3,061	$127	$780	$300	$14,911
13	$1,953	$3,202	$4,946	$275	$584	$3,153	$130	$804	$309	$15,358
14	$2,012	$3,298	$5,095	$283	$602	$3,248	$134	$828	$318	$15,819
15	$2,072	$3,397	$5,248	$292	$620	$3,345	$138	$853	$328	$16,294
16	$2,135	$3,499	$5,405	$300	$639	$3,446	$143	$878	$338	$16,782
17	$2,199	$3,604	$5,567	$309	$658	$3,549	$147	$905	$348	$17,286
18	$2,265	$3,712	$5,734	$319	$677	$3,656	$151	$932	$358	$17,804
19	$2,333	$3,824	$5,906	$328	$698	$3,765	$156	$960	$369	$18,339
20	$2,403	$3,939	$6,083	$338	$719	$3,878	$160	$989	$380	$18,889
21	$2,475	$4,057	$6,266	$348	$740	$3,995	$165	$1,018	$392	$19,455
22	$2,549	$4,178	$6,454	$359	$763	$4,114	$170	$1,049	$403	$20,039
23	$2,625	$4,304	$6,648	$369	$785	$4,238	$175	$1,080	$415	$20,640
24	$2,704	$4,433	$6,847	$380	$809	$4,365	$181	$1,113	$428	$21,259
25	$2,785	$4,566	$7,052	$392	$833	$4,496	$186	$1,146	$441	$21,897
26	$2,869	$4,703	$7,264	$404	$858	$4,631	$192	$1,180	$454	$22,554
27	$2,955	$4,844	$7,482	$416	$884	$4,770	$197	$1,216	$468	$23,231
28	$3,043	$4,989	$7,706	$428	$910	$4,913	$203	$1,252	$482	$23,928
29	$3,135	$5,139	$7,938	$441	$938	$5,060	$209	$1,290	$496	$24,645
30	$3,229	$5,293	$8,176	$454	$966	$5,212	$216	$1,329	$511	$25,385
31	$3,326	$5,452	$8,421	$468	$995	$5,368	$222	$1,368	$526	$26,146
32	$3,425	$5,615	$8,674	$482	$1,025	$5,529	$229	$1,409	$542	$26,931
33	$3,528	$5,784	$8,934	$496	$1,055	$5,695	$236	$1,452	$558	$27,739
34	$3,634	$5,957	$9,202	$511	$1,087	$5,866	$243	$1,495	$575	$28,571
35	$3,743	$6,136	$9,478	$527	$1,120	$6,042	$250	$1,540	$592	$29,428
36	$3,855	$6,320	$9,762	$542	$1,153	$6,223	$257	$1,586	$610	$30,311
37	$3,971	$6,510	$10,055	$559	$1,188	$6,410	$265	$1,634	$628	$31,220
38	$4,090	$6,705	$10,357	$575	$1,224	$6,602	$273	$1,683	$647	$32,157
39	$4,213	$6,906	$10,667	$593	$1,260	$6,800	$281	$1,733	$667	$33,121
40	$4,339	$7,113	$10,987	$610	$1,298	$7,004	$290	$1,785	$687	$34,115

**3% Inflation*

Sub Watershed #306 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost

1	$970	$1,591	$2,457	$137	$290	$1,567	$65	$399	$154	$7,630
2	$1,000	$1,639	$2,531	$141	$299	$1,614	$67	$411	$158	$7,859
3	$1,030	$1,688	$2,607	$145	$308	$1,662	$69	$424	$163	$8,095
4	$1,060	$1,738	$2,685	$149	$317	$1,712	$71	$436	$168	$8,337
5	$1,092	$1,791	$2,766	$154	$327	$1,763	$73	$449	$173	$8,588
6	$1,125	$1,844	$2,849	$158	$337	$1,816	$75	$463	$178	$8,845
7	$1,159	$1,900	$2,934	$163	$347	$1,871	$77	$477	$183	$9,111
8	$1,194	$1,957	$3,022	$168	$357	$1,927	$80	$491	$189	$9,384
9	$1,229	$2,015	$3,113	$173	$368	$1,984	$82	$506	$195	$9,665
10	$1,266	$2,076	$3,206	$178	$379	$2,044	$85	$521	$200	$9,955
11	$1,304	$2,138	$3,303	$183	$390	$2,105	$87	$537	$206	$10,254
12	$1,343	$2,202	$3,402	$189	$402	$2,169	$90	$553	$213	$10,562
13	$1,384	$2,268	$3,504	$195	$414	$2,234	$92	$569	$219	$10,878
14	$1,425	$2,336	$3,609	$200	$426	$2,301	$95	$586	$226	$11,205
15	$1,468	$2,406	$3,717	$206	$439	$2,370	$98	$604	$232	$11,541
16	$1,512	$2,479	$3,829	$213	$452	$2,441	$101	$622	$239	$11,887
17	$1,557	$2,553	$3,943	$219	$466	$2,514	$104	$641	$246	$12,244
18	$1,604	$2,630	$4,062	$226	$480	$2,589	$107	$660	$254	$12,611
19	$1,652	$2,708	$4,184	$232	$494	$2,667	$110	$680	$261	$12,989
20	$1,702	$2,790	$4,309	$239	$509	$2,747	$114	$700	$269	$13,379
21	$1,753	$2,873	$4,438	$247	$524	$2,829	$117	$721	$277	$13,781
22	$1,805	$2,960	$4,571	$254	$540	$2,914	$121	$743	$286	$14,194
23	$1,860	$3,048	$4,709	$262	$556	$3,002	$124	$765	$294	$14,620
24	$1,915	$3,140	$4,850	$269	$573	$3,092	$128	$788	$303	$15,058
25	$1,973	$3,234	$4,995	$278	$590	$3,185	$132	$812	$312	$15,510
26	$2,032	$3,331	$5,145	$286	$608	$3,280	$136	$836	$322	$15,975
27	$2,093	$3,431	$5,300	$294	$626	$3,378	$140	$861	$331	$16,455
28	$2,156	$3,534	$5,459	$303	$645	$3,480	$144	$887	$341	$16,948
29	$2,220	$3,640	$5,622	$312	$664	$3,584	$148	$914	$351	$17,457
30	$2,287	$3,749	$5,791	$322	$684	$3,692	$153	$941	$362	$17,980
31	$2,356	$3,862	$5,965	$331	$705	$3,802	$157	$969	$373	$18,520
32	$2,426	$3,977	$6,144	$341	$726	$3,917	$162	$998	$384	$19,075
33	$2,499	$4,097	$6,328	$352	$748	$4,034	$167	$1,028	$395	$19,648
34	$2,574	$4,220	$6,518	$362	$770	$4,155	$172	$1,059	$407	$20,237
35	$2,651	$4,346	$6,713	$373	$793	$4,280	$177	$1,091	$420	$20,844
36	$2,731	$4,477	$6,915	$384	$817	$4,408	$182	$1,124	$432	$21,470
37	$2,813	$4,611	$7,122	$396	$841	$4,540	$188	$1,157	$445	$22,114
38	$2,897	$4,749	$7,336	$408	$867	$4,677	$193	$1,192	$458	$22,777
39	$2,984	$4,892	$7,556	$420	$893	$4,817	$199	$1,228	$472	$23,460
40	$3,074	$5,039	$7,783	$432	$919	$4,961	$205	$1,265	$486	$24,164

**3% Inflation*

Sub Watershed #307 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,149	$1,883	$2,908	$162	$344	$1,854	$77	$473	$182	$9,030
2	$1,183	$1,939	$2,996	$166	$354	$1,910	$79	$487	$187	$9,301
3	$1,219	$1,998	$3,086	$171	$365	$1,967	$81	$501	$193	$9,580
4	$1,255	$2,058	$3,178	$177	$375	$2,026	$84	$516	$199	$9,868
5	$1,293	$2,119	$3,273	$182	$387	$2,087	$86	$532	$205	$10,164
6	$1,332	$2,183	$3,372	$187	$398	$2,149	$89	$548	$211	$10,469
7	$1,372	$2,248	$3,473	$193	$410	$2,214	$92	$564	$217	$10,783
8	$1,413	$2,316	$3,577	$199	$423	$2,280	$94	$581	$224	$11,106
9	$1,455	$2,385	$3,684	$205	$435	$2,349	$97	$599	$230	$11,440
10	$1,499	$2,457	$3,795	$211	$448	$2,419	$100	$617	$237	$11,783
11	$1,544	$2,531	$3,909	$217	$462	$2,492	$103	$635	$244	$12,136
12	$1,590	$2,606	$4,026	$224	$476	$2,567	$106	$654	$252	$12,500
13	$1,638	$2,685	$4,147	$230	$490	$2,644	$109	$674	$259	$12,875
14	$1,687	$2,765	$4,271	$237	$505	$2,723	$113	$694	$267	$13,262
15	$1,737	$2,848	$4,399	$244	$520	$2,805	$116	$715	$275	$13,659
16	$1,790	$2,934	$4,531	$252	$535	$2,889	$120	$736	$283	$14,069
17	$1,843	$3,022	$4,667	$259	$551	$2,975	$123	$758	$292	$14,491
18	$1,898	$3,112	$4,807	$267	$568	$3,065	$127	$781	$300	$14,926
19	$1,955	$3,206	$4,951	$275	$585	$3,157	$131	$805	$309	$15,374
20	$2,014	$3,302	$5,100	$283	$603	$3,251	$135	$829	$319	$15,835
21	$2,075	$3,401	$5,253	$292	$621	$3,349	$139	$854	$328	$16,310
22	$2,137	$3,503	$5,411	$301	$639	$3,449	$143	$879	$338	$16,799
23	$2,201	$3,608	$5,573	$310	$658	$3,553	$147	$906	$348	$17,303
24	$2,267	$3,716	$5,740	$319	$678	$3,659	$151	$933	$359	$17,822
25	$2,335	$3,828	$5,912	$328	$699	$3,769	$156	$961	$370	$18,357
26	$2,405	$3,943	$6,090	$338	$719	$3,882	$161	$990	$381	$18,908
27	$2,477	$4,061	$6,272	$348	$741	$3,999	$165	$1,019	$392	$19,475
28	$2,551	$4,183	$6,460	$359	$763	$4,119	$170	$1,050	$404	$20,059
29	$2,628	$4,308	$6,654	$370	$786	$4,242	$176	$1,081	$416	$20,661
30	$2,707	$4,437	$6,854	$381	$810	$4,369	$181	$1,114	$428	$21,281
31	$2,788	$4,570	$7,060	$392	$834	$4,500	$186	$1,147	$441	$21,919
32	$2,872	$4,708	$7,271	$404	$859	$4,635	$192	$1,182	$454	$22,577
33	$2,958	$4,849	$7,489	$416	$885	$4,775	$198	$1,217	$468	$23,254
34	$3,047	$4,994	$7,714	$429	$911	$4,918	$203	$1,254	$482	$23,952
35	$3,138	$5,144	$7,946	$441	$939	$5,065	$210	$1,291	$497	$24,670
36	$3,232	$5,298	$8,184	$455	$967	$5,217	$216	$1,330	$511	$25,410
37	$3,329	$5,457	$8,429	$468	$996	$5,374	$222	$1,370	$527	$26,173
38	$3,429	$5,621	$8,682	$482	$1,026	$5,535	$229	$1,411	$543	$26,958
39	$3,532	$5,790	$8,943	$497	$1,057	$5,701	$236	$1,453	$559	$27,767

40	$3,638	$5,963	$9,211	$512	$1,088	$5,872	$243	$1,497	$576	$28,600

**3% Inflation*

Sub Watershed #401 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,600	$2,623	$4,051	$225	$479	$2,583	$107	$658	$253	$12,578
2	$1,648	$2,701	$4,173	$232	$493	$2,660	$110	$678	$261	$12,955
3	$1,697	$2,782	$4,298	$239	$508	$2,740	$113	$698	$269	$13,344
4	$1,748	$2,866	$4,427	$246	$523	$2,822	$117	$719	$277	$13,744
5	$1,801	$2,952	$4,559	$253	$539	$2,907	$120	$741	$285	$14,157
6	$1,855	$3,040	$4,696	$261	$555	$2,994	$124	$763	$294	$14,581
7	$1,910	$3,132	$4,837	$269	$571	$3,084	$128	$786	$302	$15,019
8	$1,968	$3,226	$4,982	$277	$589	$3,176	$131	$810	$311	$15,469
9	$2,027	$3,322	$5,132	$285	$606	$3,271	$135	$834	$321	$15,933
10	$2,087	$3,422	$5,286	$294	$624	$3,370	$139	$859	$330	$16,411
11	$2,150	$3,525	$5,444	$302	$643	$3,471	$144	$885	$340	$16,904
12	$2,215	$3,630	$5,608	$312	$663	$3,575	$148	$911	$350	$17,411
13	$2,281	$3,739	$5,776	$321	$682	$3,682	$152	$939	$361	$17,933
14	$2,349	$3,852	$5,949	$331	$703	$3,793	$157	$967	$372	$18,471
15	$2,420	$3,967	$6,128	$340	$724	$3,906	$162	$996	$383	$19,025
16	$2,493	$4,086	$6,311	$351	$746	$4,023	$166	$1,026	$394	$19,596
17	$2,567	$4,209	$6,501	$361	$768	$4,144	$171	$1,056	$406	$20,184
18	$2,644	$4,335	$6,696	$372	$791	$4,269	$177	$1,088	$418	$20,790
19	$2,724	$4,465	$6,897	$383	$815	$4,397	$182	$1,121	$431	$21,413
20	$2,805	$4,599	$7,103	$395	$839	$4,528	$187	$1,154	$444	$22,056
21	$2,889	$4,737	$7,317	$406	$864	$4,664	$193	$1,189	$457	$22,717
22	$2,976	$4,879	$7,536	$419	$890	$4,804	$199	$1,225	$471	$23,399
23	$3,065	$5,025	$7,762	$431	$917	$4,948	$205	$1,261	$485	$24,101
24	$3,157	$5,176	$7,995	$444	$945	$5,097	$211	$1,299	$500	$24,824
25	$3,252	$5,331	$8,235	$457	$973	$5,250	$217	$1,338	$515	$25,569
26	$3,350	$5,491	$8,482	$471	$1,002	$5,407	$224	$1,378	$530	$26,336
27	$3,450	$5,656	$8,736	$485	$1,032	$5,569	$230	$1,420	$546	$27,126
28	$3,554	$5,826	$8,998	$500	$1,063	$5,737	$237	$1,462	$562	$27,939
29	$3,660	$6,001	$9,268	$515	$1,095	$5,909	$244	$1,506	$579	$28,778
30	$3,770	$6,181	$9,546	$530	$1,128	$6,086	$252	$1,551	$597	$29,641
31	$3,883	$6,366	$9,833	$546	$1,162	$6,268	$259	$1,598	$615	$30,530
32	$4,000	$6,557	$10,128	$563	$1,197	$6,457	$267	$1,646	$633	$31,446
33	$4,120	$6,754	$10,432	$580	$1,232	$6,650	$275	$1,695	$652	$32,390
34	$4,243	$6,956	$10,745	$597	$1,269	$6,850	$283	$1,746	$672	$33,361
35	$4,371	$7,165	$11,067	$615	$1,308	$7,055	$292	$1,798	$692	$34,362
36	$4,502	$7,380	$11,399	$633	$1,347	$7,267	$301	$1,852	$712	$35,393

37	$4,637	$7,601	$11,741	$652	$1,387	$7,485	$310	$1,908	$734	$36,455
38	$4,776	$7,829	$12,093	$672	$1,429	$7,709	$319	$1,965	$756	$37,548
39	$4,919	$8,064	$12,456	$692	$1,472	$7,941	$329	$2,024	$778	$38,675
40	$5,067	$8,306	$12,830	$713	$1,516	$8,179	$338	$2,085	$802	$39,835

**3% Inflation*

Sub Watershed #402 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,272	$2,085	$3,220	$179	$380	$2,053	$85	$523	$201	$9,998
2	$1,310	$2,147	$3,317	$184	$392	$2,114	$87	$539	$207	$10,298
3	$1,349	$2,212	$3,416	$190	$404	$2,178	$90	$555	$214	$10,607
4	$1,390	$2,278	$3,519	$195	$416	$2,243	$93	$572	$220	$10,925
5	$1,431	$2,346	$3,624	$201	$428	$2,310	$96	$589	$227	$11,253
6	$1,474	$2,417	$3,733	$207	$441	$2,380	$98	$607	$233	$11,591
7	$1,518	$2,489	$3,845	$214	$454	$2,451	$101	$625	$240	$11,938
8	$1,564	$2,564	$3,960	$220	$468	$2,525	$104	$644	$248	$12,297
9	$1,611	$2,641	$4,079	$227	$482	$2,600	$108	$663	$255	$12,666
10	$1,659	$2,720	$4,202	$233	$496	$2,678	$111	$683	$263	$13,046
11	$1,709	$2,802	$4,328	$240	$511	$2,759	$114	$703	$270	$13,437
12	$1,760	$2,886	$4,457	$248	$527	$2,842	$118	$724	$279	$13,840
13	$1,813	$2,972	$4,591	$255	$542	$2,927	$121	$746	$287	$14,255
14	$1,868	$3,062	$4,729	$263	$559	$3,015	$125	$768	$296	$14,683
15	$1,924	$3,153	$4,871	$271	$575	$3,105	$128	$791	$304	$15,123
16	$1,981	$3,248	$5,017	$279	$593	$3,198	$132	$815	$314	$15,577
17	$2,041	$3,345	$5,167	$287	$611	$3,294	$136	$840	$323	$16,044
18	$2,102	$3,446	$5,322	$296	$629	$3,393	$140	$865	$333	$16,526
19	$2,165	$3,549	$5,482	$305	$648	$3,495	$145	$891	$343	$17,021
20	$2,230	$3,656	$5,647	$314	$667	$3,600	$149	$918	$353	$17,532
21	$2,297	$3,765	$5,816	$323	$687	$3,708	$153	$945	$363	$18,058
22	$2,366	$3,878	$5,990	$333	$708	$3,819	$158	$973	$374	$18,600
23	$2,437	$3,995	$6,170	$343	$729	$3,933	$163	$1,003	$386	$19,158
24	$2,510	$4,114	$6,355	$353	$751	$4,051	$168	$1,033	$397	$19,733
25	$2,585	$4,238	$6,546	$364	$773	$4,173	$173	$1,064	$409	$20,324
26	$2,663	$4,365	$6,742	$375	$797	$4,298	$178	$1,096	$421	$20,934
27	$2,743	$4,496	$6,945	$386	$820	$4,427	$183	$1,128	$434	$21,562
28	$2,825	$4,631	$7,153	$397	$845	$4,560	$189	$1,162	$447	$22,209
29	$2,910	$4,770	$7,367	$409	$870	$4,697	$194	$1,197	$460	$22,875
30	$2,997	$4,913	$7,588	$422	$897	$4,838	$200	$1,233	$474	$23,562
31	$3,087	$5,060	$7,816	$434	$923	$4,983	$206	$1,270	$489	$24,269
32	$3,179	$5,212	$8,051	$447	$951	$5,132	$212	$1,308	$503	$24,997
33	$3,275	$5,368	$8,292	$461	$980	$5,286	$219	$1,347	$518	$25,746

34	$3,373	$5,530	$8,541	$474	$1,009	$5,445	$225	$1,388	$534	$26,519
35	$3,474	$5,695	$8,797	$489	$1,039	$5,608	$232	$1,430	$550	$27,314
36	$3,578	$5,866	$9,061	$503	$1,071	$5,776	$239	$1,472	$566	$28,134
37	$3,686	$6,042	$9,333	$518	$1,103	$5,950	$246	$1,517	$583	$28,978
38	$3,796	$6,224	$9,613	$534	$1,136	$6,128	$254	$1,562	$601	$29,847
39	$3,910	$6,410	$9,901	$550	$1,170	$6,312	$261	$1,609	$619	$30,743
40	$4,028	$6,603	$10,198	$567	$1,205	$6,501	$269	$1,657	$637	$31,665

**3% Inflation*

Sub Watershed #403 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$2,023	$3,317	$5,123	$285	$605	$3,266	$135	$832	$320	$15,907
2	$2,084	$3,416	$5,277	$293	$623	$3,364	$139	$857	$330	$16,384
3	$2,146	$3,519	$5,435	$302	$642	$3,465	$143	$883	$340	$16,875
4	$2,211	$3,624	$5,598	$311	$661	$3,569	$148	$910	$350	$17,382
5	$2,277	$3,733	$5,766	$320	$681	$3,676	$152	$937	$360	$17,903
6	$2,345	$3,845	$5,939	$330	$702	$3,786	$157	$965	$371	$18,440
7	$2,416	$3,960	$6,117	$340	$723	$3,900	$161	$994	$382	$18,993
8	$2,488	$4,079	$6,301	$350	$744	$4,017	$166	$1,024	$394	$19,563
9	$2,563	$4,202	$6,490	$361	$767	$4,137	$171	$1,055	$406	$20,150
10	$2,640	$4,328	$6,684	$371	$790	$4,261	$176	$1,086	$418	$20,755
11	$2,719	$4,457	$6,885	$382	$813	$4,389	$182	$1,119	$430	$21,377
12	$2,801	$4,591	$7,091	$394	$838	$4,521	$187	$1,152	$443	$22,018
13	$2,885	$4,729	$7,304	$406	$863	$4,656	$193	$1,187	$457	$22,679
14	$2,971	$4,871	$7,523	$418	$889	$4,796	$198	$1,223	$470	$23,359
15	$3,060	$5,017	$7,749	$431	$916	$4,940	$204	$1,259	$484	$24,060
16	$3,152	$5,167	$7,982	$443	$943	$5,088	$211	$1,297	$499	$24,782
17	$3,247	$5,322	$8,221	$457	$971	$5,241	$217	$1,336	$514	$25,525
18	$3,344	$5,482	$8,468	$470	$1,000	$5,398	$223	$1,376	$529	$26,291
19	$3,444	$5,647	$8,722	$485	$1,030	$5,560	$230	$1,417	$545	$27,080
20	$3,548	$5,816	$8,983	$499	$1,061	$5,727	$237	$1,460	$561	$27,892
21	$3,654	$5,990	$9,253	$514	$1,093	$5,899	$244	$1,504	$578	$28,729
22	$3,764	$6,170	$9,530	$529	$1,126	$6,076	$251	$1,549	$596	$29,591
23	$3,877	$6,355	$9,816	$545	$1,160	$6,258	$259	$1,595	$614	$30,479
24	$3,993	$6,546	$10,111	$562	$1,195	$6,446	$267	$1,643	$632	$31,393
25	$4,113	$6,742	$10,414	$579	$1,230	$6,639	$275	$1,692	$651	$32,335
26	$4,236	$6,945	$10,727	$596	$1,267	$6,838	$283	$1,743	$670	$33,305
27	$4,363	$7,153	$11,048	$614	$1,305	$7,043	$291	$1,795	$691	$34,304
28	$4,494	$7,367	$11,380	$632	$1,344	$7,255	$300	$1,849	$711	$35,333
29	$4,629	$7,588	$11,721	$651	$1,385	$7,472	$309	$1,905	$733	$36,393
30	$4,768	$7,816	$12,073	$671	$1,426	$7,696	$318	$1,962	$755	$37,485

31	$4,911	$8,051	$12,435	$691	$1,469	$7,927	$328	$2,021	$777	$38,610
32	$5,058	$8,292	$12,808	$712	$1,513	$8,165	$338	$2,081	$801	$39,768
33	$5,210	$8,541	$13,192	$733	$1,559	$8,410	$348	$2,144	$825	$40,961
34	$5,366	$8,797	$13,588	$755	$1,605	$8,662	$358	$2,208	$849	$42,190
35	$5,527	$9,061	$13,996	$778	$1,654	$8,922	$369	$2,274	$875	$43,455
36	$5,693	$9,333	$14,416	$801	$1,703	$9,190	$380	$2,343	$901	$44,759
37	$5,864	$9,613	$14,848	$825	$1,754	$9,466	$392	$2,413	$928	$46,102
38	$6,040	$9,901	$15,293	$850	$1,807	$9,750	$403	$2,485	$956	$47,485
39	$6,221	$10,198	$15,752	$875	$1,861	$10,042	$415	$2,560	$985	$48,909
40	$6,408	$10,504	$16,225	$901	$1,917	$10,343	$428	$2,637	$1,014	$50,377

**3% Inflation*

Sub Watershed #404 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,310	$2,148	$3,318	$184	$392	$2,115	$88	$539	$207	$10,301
2	$1,350	$2,212	$3,417	$190	$404	$2,178	$90	$555	$214	$10,610
3	$1,390	$2,279	$3,520	$196	$416	$2,244	$93	$572	$220	$10,929
4	$1,432	$2,347	$3,625	$201	$428	$2,311	$96	$589	$227	$11,256
5	$1,475	$2,418	$3,734	$207	$441	$2,380	$98	$607	$233	$11,594
6	$1,519	$2,490	$3,846	$214	$454	$2,452	$101	$625	$240	$11,942
7	$1,564	$2,565	$3,962	$220	$468	$2,525	$104	$644	$248	$12,300
8	$1,611	$2,642	$4,080	$227	$482	$2,601	$108	$663	$255	$12,669
9	$1,660	$2,721	$4,203	$233	$497	$2,679	$111	$683	$263	$13,049
10	$1,710	$2,803	$4,329	$240	$511	$2,760	$114	$703	$271	$13,441
11	$1,761	$2,887	$4,459	$248	$527	$2,842	$118	$725	$279	$13,844
12	$1,814	$2,973	$4,592	$255	$543	$2,928	$121	$746	$287	$14,259
13	$1,868	$3,062	$4,730	$263	$559	$3,016	$125	$769	$296	$14,687
14	$1,924	$3,154	$4,872	$271	$576	$3,106	$129	$792	$305	$15,128
15	$1,982	$3,249	$5,018	$279	$593	$3,199	$132	$815	$314	$15,581
16	$2,041	$3,346	$5,169	$287	$611	$3,295	$136	$840	$323	$16,049
17	$2,103	$3,447	$5,324	$296	$629	$3,394	$140	$865	$333	$16,530
18	$2,166	$3,550	$5,484	$305	$648	$3,496	$145	$891	$343	$17,026
19	$2,231	$3,657	$5,648	$314	$667	$3,601	$149	$918	$353	$17,537
20	$2,298	$3,766	$5,818	$323	$687	$3,709	$153	$945	$364	$18,063
21	$2,366	$3,879	$5,992	$333	$708	$3,820	$158	$974	$375	$18,605
22	$2,437	$3,996	$6,172	$343	$729	$3,935	$163	$1,003	$386	$19,163
23	$2,511	$4,116	$6,357	$353	$751	$4,053	$168	$1,033	$397	$19,738
24	$2,586	$4,239	$6,548	$364	$774	$4,174	$173	$1,064	$409	$20,330
25	$2,663	$4,366	$6,744	$375	$797	$4,299	$178	$1,096	$422	$20,940
26	$2,743	$4,497	$6,947	$386	$821	$4,428	$183	$1,129	$434	$21,568

27	$2,826	$4,632	$7,155	$397	$845	$4,561	$189	$1,163	$447	$22,215
28	$2,910	$4,771	$7,370	$409	$871	$4,698	$194	$1,198	$461	$22,882
29	$2,998	$4,914	$7,591	$422	$897	$4,839	$200	$1,233	$474	$23,568
30	$3,088	$5,062	$7,818	$434	$924	$4,984	$206	$1,270	$489	$24,275
31	$3,180	$5,214	$8,053	$447	$951	$5,134	$212	$1,309	$503	$25,004
32	$3,276	$5,370	$8,295	$461	$980	$5,288	$219	$1,348	$518	$25,754
33	$3,374	$5,531	$8,543	$475	$1,009	$5,446	$225	$1,388	$534	$26,526
34	$3,475	$5,697	$8,800	$489	$1,040	$5,610	$232	$1,430	$550	$27,322
35	$3,579	$5,868	$9,064	$504	$1,071	$5,778	$239	$1,473	$566	$28,142
36	$3,687	$6,044	$9,336	$519	$1,103	$5,951	$246	$1,517	$583	$28,986
37	$3,797	$6,225	$9,616	$534	$1,136	$6,130	$254	$1,563	$601	$29,856
38	$3,911	$6,412	$9,904	$550	$1,170	$6,314	$261	$1,609	$619	$30,751
39	$4,029	$6,604	$10,201	$567	$1,205	$6,503	$269	$1,658	$638	$31,674
40	$4,150	$6,803	$10,507	$584	$1,241	$6,698	$277	$1,707	$657	$32,624

**3% Inflation*

Sub Watershed #405 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,345	$2,204	$3,405	$189	$402	$2,171	$90	$553	$213	$10,572
2	$1,385	$2,270	$3,507	$195	$414	$2,236	$92	$570	$219	$10,889
3	$1,427	$2,339	$3,612	$201	$427	$2,303	$95	$587	$226	$11,216
4	$1,469	$2,409	$3,721	$207	$440	$2,372	$98	$605	$233	$11,552
5	$1,513	$2,481	$3,832	$213	$453	$2,443	$101	$623	$240	$11,899
6	$1,559	$2,555	$3,947	$219	$466	$2,516	$104	$641	$247	$12,256
7	$1,606	$2,632	$4,066	$226	$480	$2,592	$107	$661	$254	$12,623
8	$1,654	$2,711	$4,188	$233	$495	$2,670	$110	$680	$262	$13,002
9	$1,703	$2,792	$4,313	$240	$510	$2,750	$114	$701	$270	$13,392
10	$1,754	$2,876	$4,443	$247	$525	$2,832	$117	$722	$278	$13,794
11	$1,807	$2,962	$4,576	$254	$541	$2,917	$121	$744	$286	$14,208
12	$1,861	$3,051	$4,713	$262	$557	$3,005	$124	$766	$295	$14,634
13	$1,917	$3,143	$4,855	$270	$574	$3,095	$128	$789	$303	$15,073
14	$1,975	$3,237	$5,000	$278	$591	$3,188	$132	$813	$313	$15,525
15	$2,034	$3,334	$5,150	$286	$608	$3,283	$136	$837	$322	$15,991
16	$2,095	$3,434	$5,305	$295	$627	$3,382	$140	$862	$332	$16,471
17	$2,158	$3,537	$5,464	$304	$646	$3,483	$144	$888	$341	$16,965
18	$2,223	$3,643	$5,628	$313	$665	$3,588	$148	$915	$352	$17,474
19	$2,289	$3,753	$5,797	$322	$685	$3,695	$153	$942	$362	$17,998
20	$2,358	$3,865	$5,970	$332	$705	$3,806	$157	$970	$373	$18,538
21	$2,429	$3,981	$6,150	$342	$727	$3,920	$162	$999	$384	$19,094
22	$2,501	$4,101	$6,334	$352	$748	$4,038	$167	$1,029	$396	$19,667
23	$2,577	$4,224	$6,524	$362	$771	$4,159	$172	$1,060	$408	$20,257

24	$2,654	$4,350	$6,720	$373	$794	$4,284	$177	$1,092	$420	$20,864
25	$2,733	$4,481	$6,921	$385	$818	$4,412	$183	$1,125	$433	$21,490
26	$2,815	$4,615	$7,129	$396	$842	$4,545	$188	$1,158	$446	$22,135
27	$2,900	$4,754	$7,343	$408	$868	$4,681	$194	$1,193	$459	$22,799
28	$2,987	$4,897	$7,563	$420	$894	$4,822	$199	$1,229	$473	$23,483
29	$3,076	$5,043	$7,790	$433	$920	$4,966	$205	$1,266	$487	$24,188
30	$3,169	$5,195	$8,024	$446	$948	$5,115	$212	$1,304	$501	$24,913
31	$3,264	$5,351	$8,264	$459	$976	$5,269	$218	$1,343	$517	$25,661
32	$3,362	$5,511	$8,512	$473	$1,006	$5,427	$225	$1,383	$532	$26,430
33	$3,463	$5,676	$8,768	$487	$1,036	$5,589	$231	$1,425	$548	$27,223
34	$3,566	$5,847	$9,031	$502	$1,067	$5,757	$238	$1,468	$564	$28,040
35	$3,673	$6,022	$9,302	$517	$1,099	$5,930	$245	$1,512	$581	$28,881
36	$3,784	$6,203	$9,581	$532	$1,132	$6,108	$253	$1,557	$599	$29,748
37	$3,897	$6,389	$9,868	$548	$1,166	$6,291	$260	$1,604	$617	$30,640
38	$4,014	$6,581	$10,164	$565	$1,201	$6,480	$268	$1,652	$635	$31,559
39	$4,135	$6,778	$10,469	$582	$1,237	$6,674	$276	$1,701	$654	$32,506
40	$4,259	$6,981	$10,783	$599	$1,274	$6,874	$284	$1,752	$674	$33,481

**3% Inflation*

Sub Watershed #406 Annual Cost* After Cost-Share, Cropland BMPs

Year	No-Till	Cons. Tillage	Waterways	Buffers	Nutrient Mgmt Plans	Terraces	Incorporate Manure	Cons. Crop Rotations	Water Retention	Total Cost
1	$1,240	$2,033	$3,140	$174	$371	$2,002	$83	$510	$196	$9,749
2	$1,277	$2,094	$3,234	$180	$382	$2,062	$85	$526	$202	$10,042
3	$1,316	$2,157	$3,331	$185	$394	$2,124	$88	$541	$208	$10,343
4	$1,355	$2,221	$3,431	$191	$405	$2,187	$90	$558	$214	$10,653
5	$1,396	$2,288	$3,534	$196	$418	$2,253	$93	$574	$221	$10,973
6	$1,438	$2,357	$3,640	$202	$430	$2,321	$96	$592	$228	$11,302
7	$1,481	$2,427	$3,749	$208	$443	$2,390	$99	$609	$234	$11,641
8	$1,525	$2,500	$3,862	$215	$456	$2,462	$102	$628	$241	$11,990
9	$1,571	$2,575	$3,978	$221	$470	$2,536	$105	$646	$249	$12,350
10	$1,618	$2,652	$4,097	$228	$484	$2,612	$108	$666	$256	$12,721
11	$1,667	$2,732	$4,220	$234	$499	$2,690	$111	$686	$264	$13,102
12	$1,717	$2,814	$4,346	$241	$514	$2,771	$115	$706	$272	$13,495
13	$1,768	$2,898	$4,477	$249	$529	$2,854	$118	$727	$280	$13,900
14	$1,821	$2,985	$4,611	$256	$545	$2,940	$122	$749	$288	$14,317
15	$1,876	$3,075	$4,749	$264	$561	$3,028	$125	$772	$297	$14,747
16	$1,932	$3,167	$4,892	$272	$578	$3,119	$129	$795	$306	$15,189
17	$1,990	$3,262	$5,039	$280	$595	$3,212	$133	$819	$315	$15,645
18	$2,050	$3,360	$5,190	$288	$613	$3,309	$137	$843	$324	$16,114
19	$2,111	$3,461	$5,346	$297	$632	$3,408	$141	$869	$334	$16,598
20	$2,174	$3,565	$5,506	$306	$651	$3,510	$145	$895	$344	$17,096

21	$2,240	$3,672	$5,671	$315	$670	$3,615	$150	$922	$354	$17,608
22	$2,307	$3,782	$5,841	$325	$690	$3,724	$154	$949	$365	$18,137
23	$2,376	$3,895	$6,017	$334	$711	$3,836	$159	$978	$376	$18,681
24	$2,447	$4,012	$6,197	$344	$732	$3,951	$163	$1,007	$387	$19,241
25	$2,521	$4,132	$6,383	$355	$754	$4,069	$168	$1,037	$399	$19,818
26	$2,596	$4,256	$6,574	$365	$777	$4,191	$173	$1,068	$411	$20,413
27	$2,674	$4,384	$6,772	$376	$800	$4,317	$179	$1,100	$423	$21,025
28	$2,755	$4,516	$6,975	$387	$824	$4,446	$184	$1,133	$436	$21,656
29	$2,837	$4,651	$7,184	$399	$849	$4,580	$189	$1,167	$449	$22,306
30	$2,922	$4,791	$7,400	$411	$874	$4,717	$195	$1,202	$462	$22,975
31	$3,010	$4,934	$7,622	$423	$900	$4,859	$201	$1,238	$476	$23,664
32	$3,100	$5,082	$7,850	$436	$927	$5,004	$207	$1,276	$491	$24,374
33	$3,193	$5,235	$8,086	$449	$955	$5,155	$213	$1,314	$505	$25,105
34	$3,289	$5,392	$8,328	$463	$984	$5,309	$220	$1,353	$521	$25,859
35	$3,388	$5,554	$8,578	$477	$1,013	$5,469	$226	$1,394	$536	$26,634
36	$3,489	$5,720	$8,835	$491	$1,044	$5,633	$233	$1,436	$552	$27,433
37	$3,594	$5,892	$9,101	$506	$1,075	$5,802	$240	$1,479	$569	$28,256
38	$3,702	$6,069	$9,374	$521	$1,107	$5,976	$247	$1,523	$586	$29,104
39	$3,813	$6,251	$9,655	$536	$1,141	$6,155	$255	$1,569	$603	$29,977
40	$3,927	$6,438	$9,944	$552	$1,175	$6,340	$262	$1,616	$622	$30,876

**3% Inflation*

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