Sulphur Creek Watershed

Watershed Implementation Plan

3/18/2015
Kentucky Division of Water

Sulphur Creek Watershed

319 Watershed Implementation Plan

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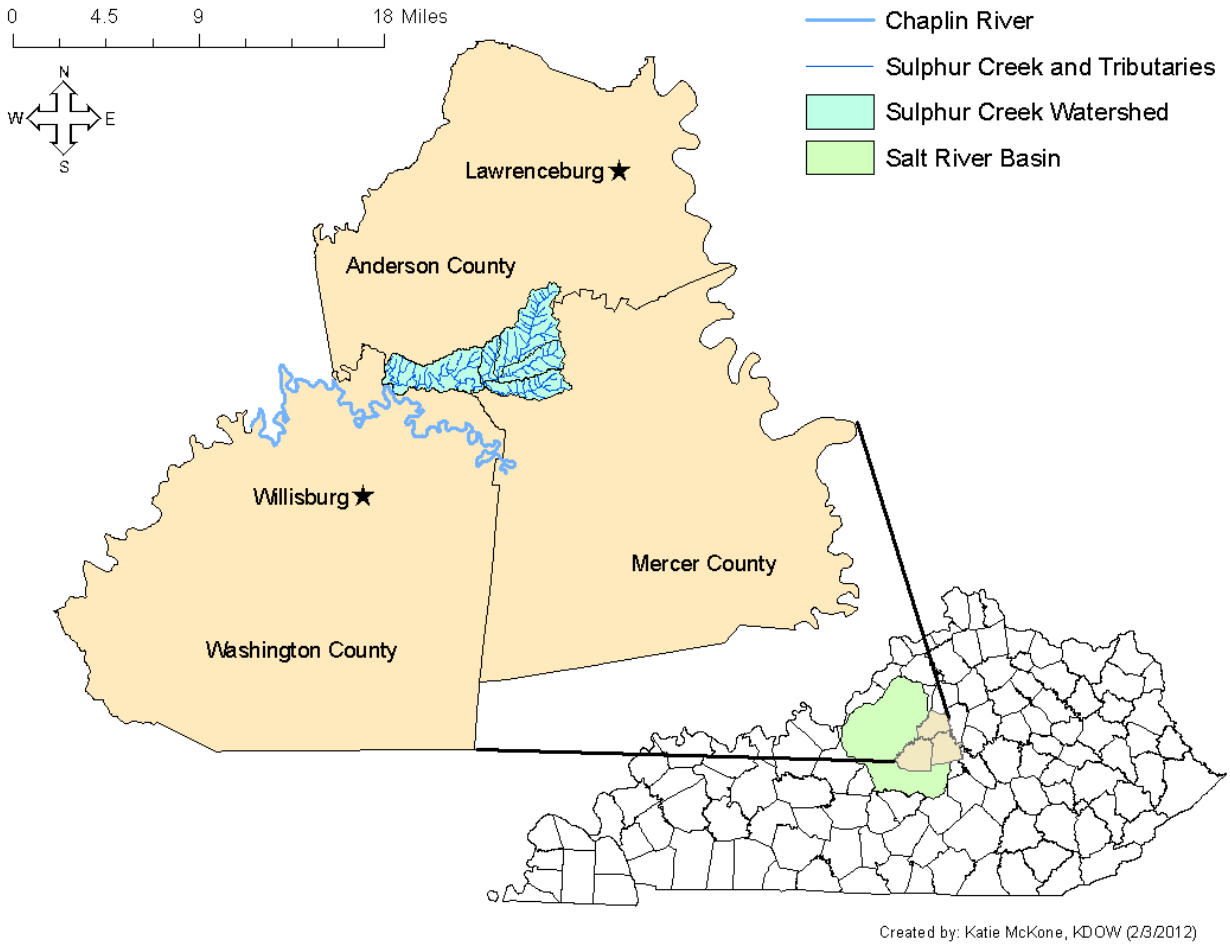
1.0 Watershed Background

Nonpoint source pollution continues to dominate water quality impairments across the Commonwealth. The ability to effectively address nonpoint source pollution relies on clearly understanding all aspects of the watershed from land use and hydrology to the number of citizens and their ability to pay for potential Best Management Practice (BMP) implementation. In addition to gaining this vital background information about the watershed, it is critical for success to define partner roles and establish working relationship with those in the community.

The Sulphur Creek Watershed is located in central Kentucky in parts of Anderson, Mercer and Washington Counties and is approximately 6.2 miles southwest of Lawrenceburg, KY and approximately 5.2 miles east of Willisburg, KY (Figure 1). The Sulphur Creek Watershed drains approximately 23.142 square miles and is a tributary to the Chaplin River which drains directly to the Salt River. The watershed location is identified as Hydrologic Unit Code (HUC) 051401030107 within the Salt River Basin.

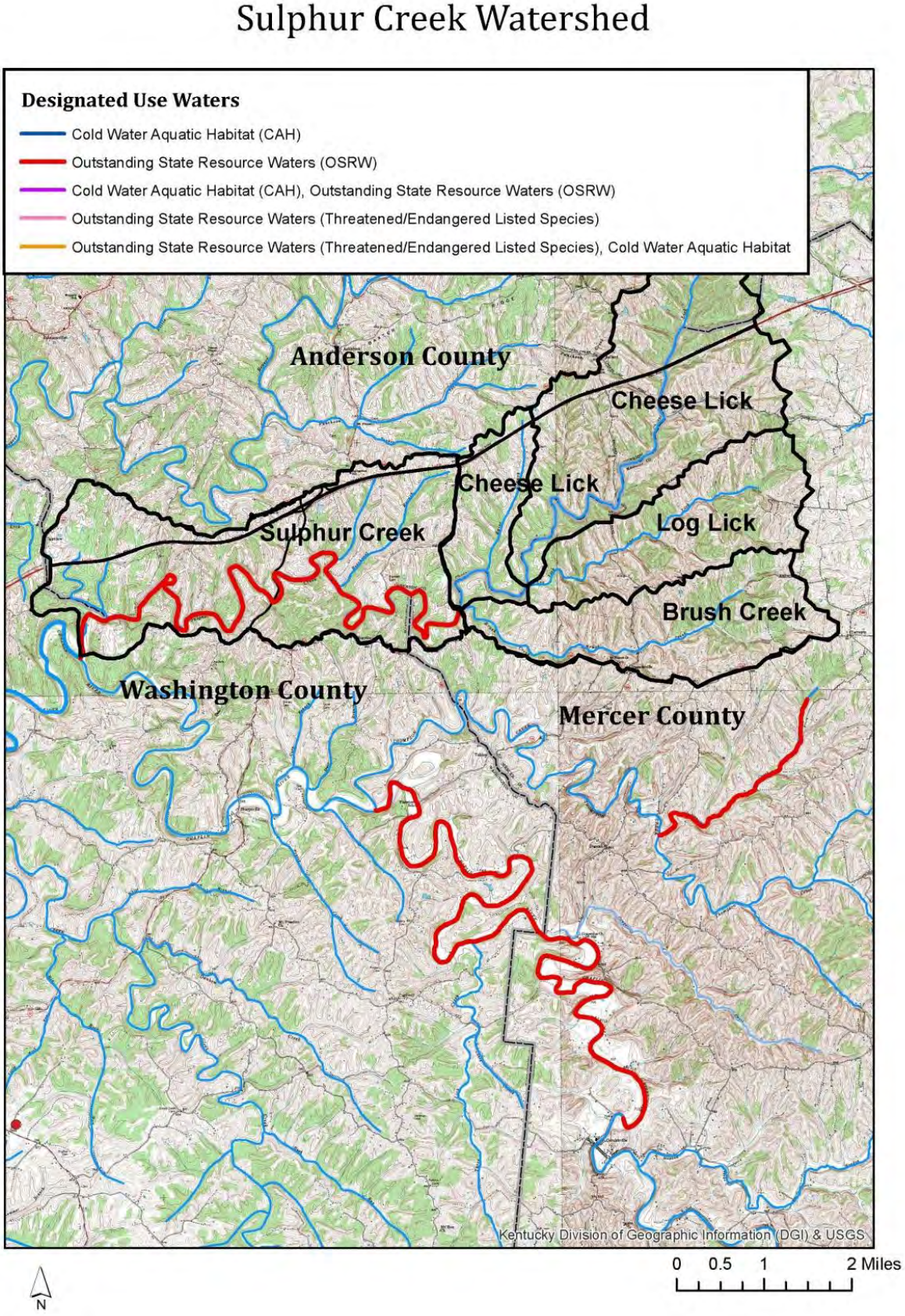
Figure 1-Location of Sulphur Creek Watershed



One segment of Sulphur Creek, within the Sulphur Creek subwatershed, has been designated an Exceptional Water (Reference Reach) and an Outstanding State Resource Water (OSRW). Sulphur Creek drains into the Chaplin River from this subwatershed. Slightly downstream of the Sulphur Creek and Chaplin River confluence there is a segment of Chaplin River designated as an Exceptional Water (Reference Reach) and an Outstanding State Resource Water (OSRW).

Figure 2-Designated and Exceptional Use Waters within the Sulphur Creek Watershed

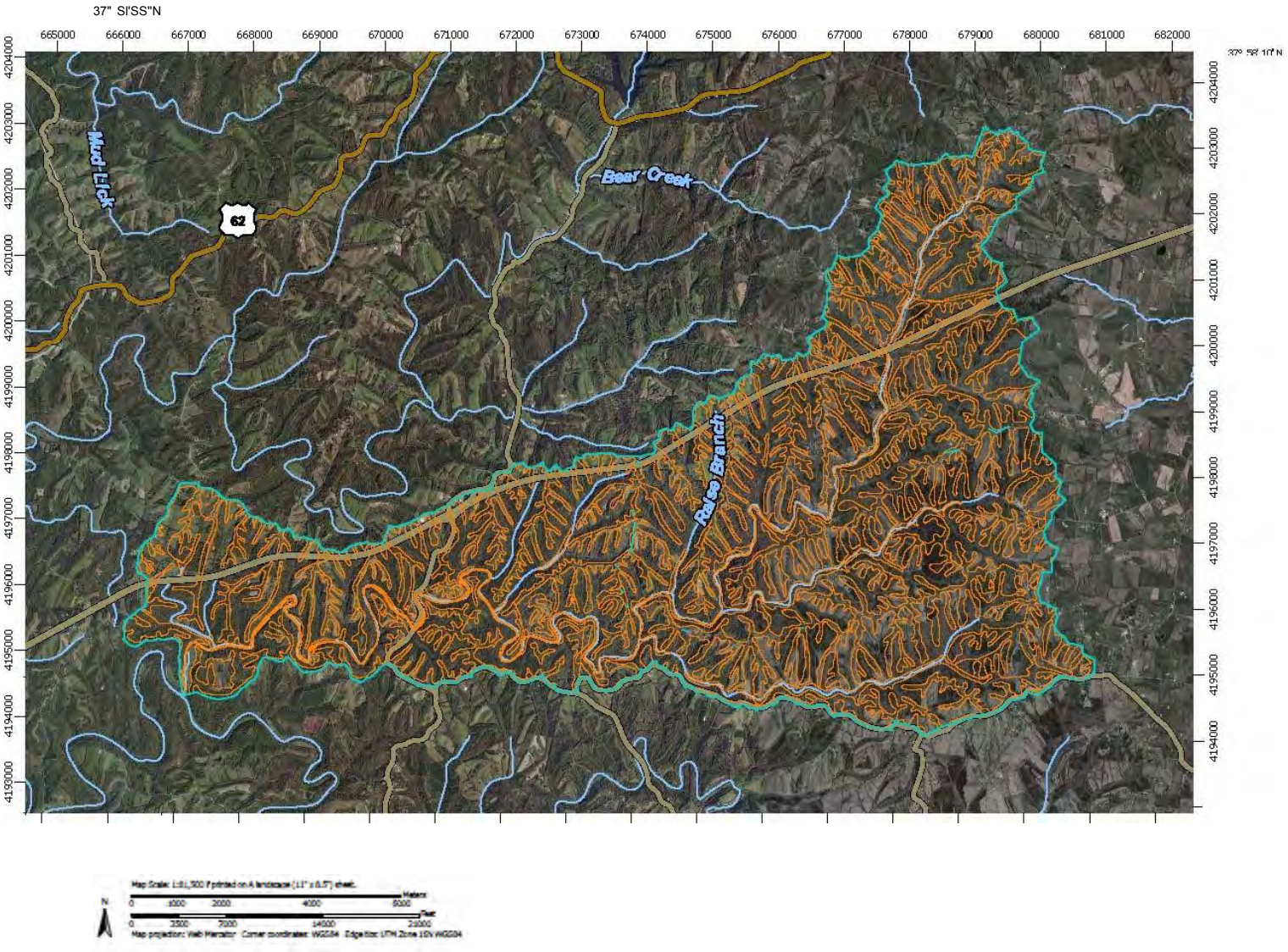
Figure 3-Outstanding State Resource Water within the Sulphur Creek Watershed



1.1 Topography, geology and soils

Sulphur Creek Watershed is located in the Interior Plateau ecoregion where the physiographic region is the outer blue grass. The geologic formation dominate through the watershed is the Clays Ferry Formation. The major soil types in the Sulphur Creek Watershed are Eden flaggy silty clay, Eden silty clay loam, Boonesboro silt loam, Lowell silt loam, Elk silt loam, Faywood silt loam, Newark silt loam, and Nolin silt loam (KY ArcGIS 2011). The soils in the watershed are described in detail in the soils report included in Appendix A.

Figure 4-Sulphur Creek Watershed Soils Map



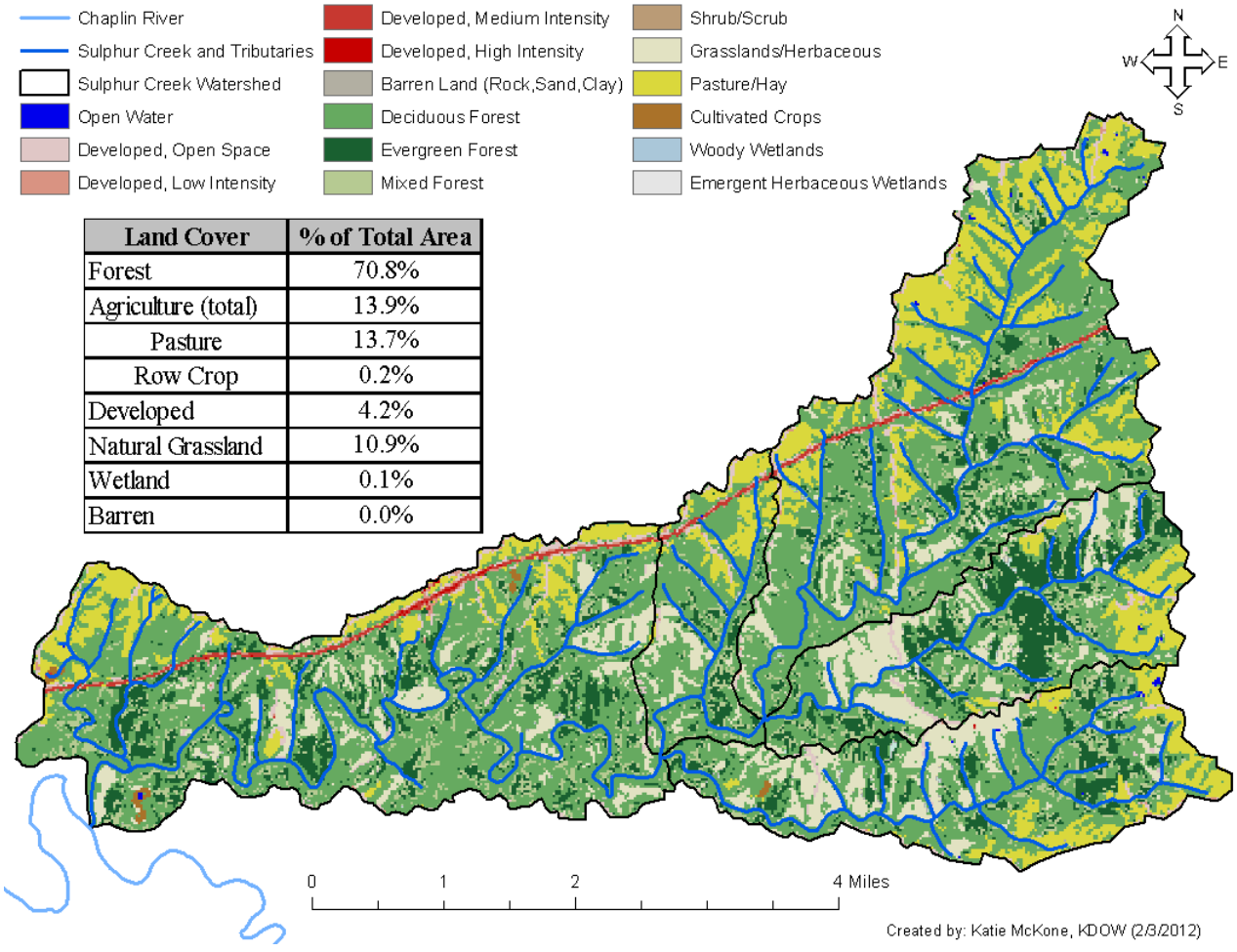
1.2 Hydrology

Sulphur Creek flows mostly west for 10.0 miles and drains an area of 23.19 mi2. Sulphur Creek begins as a 4th order stream at the confluence of Cheese Lick and Brush Creek. Cheese Lick flows in a southwesterly direction for 8.2 miles and drains an area of 11.85 mi2, while Brush Creek flows west for 4.9 miles and drains an area of 3.62 mi2. Both Cheese Lick and Brush Creek begin as 1st order streams, but quickly become 2nd and then 3rd order streams before combining to form Sulphur Creek. Over Sulphur Creek's 10-mile length, it remains a 4th order stream before entering the Chaplin River.

1.3 Land Use

The majority of land cover in the Sulphur Creek Watershed is forest cover (70.8%); however farmland is also a major feature (13.9%). Agriculture is dominated by pasture (13.7%) while row crops account for only 0.2% of the agricultural land. There is some developed land (4.2%) within the watershed. The area of the watershed in acres per county are as follows: Anderson County 7,314, Mercer County 6,216 and Washington County 1,282: totaling 14,812 acres.

Figure 5-Percent Land Cover within the Sulphur Creek Watershed



Land Cover	% of Total Area
Forest	70.8%
Agriculture (total)	13.9%
Pasture	13.7%
Row Crop	0.2%
Developed	4.2%
Natural Grassland	10.9%
Wetland	0.1%
Barren	0.0%

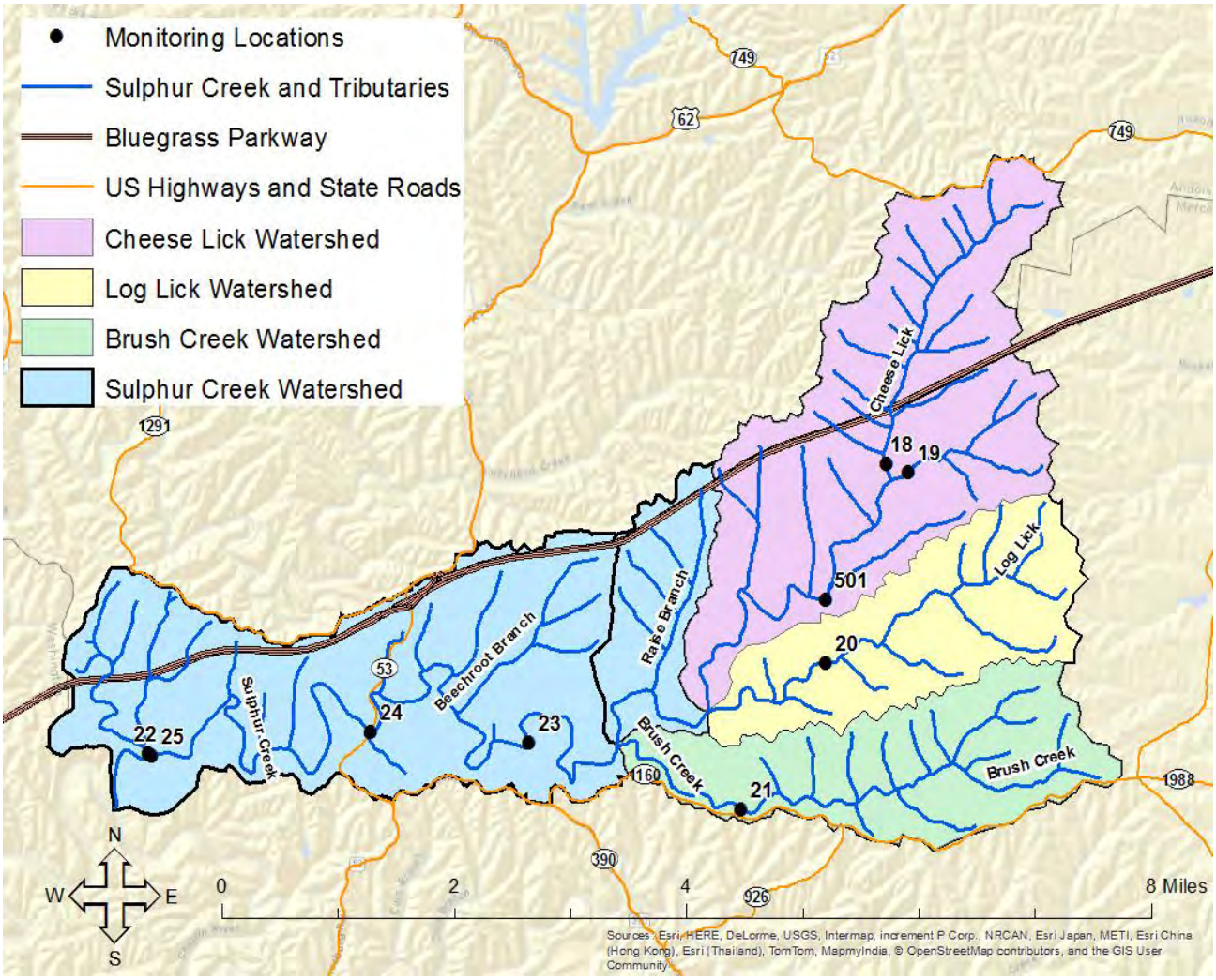
The Sulphur Creek Watershed includes four primary sub-watersheds; Cheese Lick, Log Lick, Brush Creek and Sulphur Creek.

A list of the subwatersheds and their associated HUC numbers and drainage area are shown in Table 1.

Table 1 – Subwatersheds and Drainage Area within the Sulphur Creek Watershed

HUC 14 Number	Name	Square Miles	Acres
05140103-110-280	Cheese Lick	6.975	4464.2
05140103-110-300	Cheese Lick	1.584	1013.97
05140103-110-290	Log Lick	3.312	2119.49
05140103-110-320	Sulphur Creek	7.688	4920.01
05140103-110-310	Brush Creek	3.583	2293.43

Figure 6-Subwatersheds within the Sulphur Creek Watershed



1.4 Agriculture

In Kentucky an Agriculture Water Quality Act was passed by the General Assembly in 1994. The law focuses on the protection of surface water and groundwater resources from agricultural and silvicultural activities. The Act created the Kentucky Agriculture Water Quality Authority (KAWQA), a 15-member peer group comprising of farmers and representatives from various agencies and organizations. The Act requires farms greater than 10 acres in size to adhere to the Best Management Practices (BMPs) specified in the Kentucky Agriculture Water Quality plan. Specific BMPs have been designated for all operations. There are an estimated 8 to 10 Ag Water Quality Plans in place in the Sulphur Creek Watershed.

The USDA National Agricultural Statistics Service (NASS) compiles Census of Agriculture data by County for virtually every facet of U.S. agriculture. Selected agricultural data from the latest Census of Agriculture reports for Anderson, Mercer and Washington Counties are listed are listed in Table 2.

Table 2 -Cattle Population within Anderson, Mercer and Washington Counties

County	All Cattle & Calves	Beef Cows	Milk Cows
Anderson	16,200	6,500	600
Mercer	45,500	14,600	900
Washington	37,000	18,000	1,1000

*USDA NASS Survey Kentucky County Estimates Report 2012

In the Log Lick subwatershed there are 15 landowners with farms greater than 10 acres. The Farm Service Agency shows 2,436.87 acres of "farmland" and 1,288.61 acres of "crop land". In Log Lick the average size farm is 163 acres in size (farmland/landowners). There are 1,148 acres of forestland which is 47% of the Log Lick watershed. These forest land acres would include homesteads, but that number would not be significant (15-30 acres).

In the Brush Creek subwatershed, there are 23 landowners, 1857 acres of farmland, and 1030 acres of cropland. The average farm size is 88 acres. There is 827 acres of forestland which is 45% of the Bruch Creek watershed.

In the Anderson County section of the Upper Cheese Lick subwatershed there are 58 recorded landowners. The land use is approximately 50% pasture, 30% woods and 20% hay and cropland. The livestock are primarily cattle with approximately 1,500 animals. The average farm size is 85 acres; there are no known operational dairies and there are 3 permitted beef operations. In the Mercer County portion of the Upper Cheese Lick subwatershed there are 11 landowners with 1,574 acres of farmland. The average farm size is 143 acres with 550 cows in this section of the subwatershed. There are 663 forested acres. The total from both county portions of this subwatershed are 69 landowners and 2,050 head of cattle.

Table 3 - Number of landowners and cattle per subwatershed within the Sulphur Creek Watershed

Subwatershed	Number of Landowners	Number of Cattle	% Farmland(Pasture + Hay and Cropland)	% Forested
Log Lick	15	605	53	47
Brush Creek	23	655	55	45
Upper Cheese Lick	69	2,050	70	30
Lower Cheese Lick	14	202	71	29
Sulphur Creek	86	982	67	33

*The values derived for the Lower Cheese Lick and the Sulphur Creek watershed were calculated using ratios provided by NRCS based on similar characteristics of these subwatersheds. Ratios are as follows: .0076 pastureland per acre, .1996 cows per acre, .0533 farmland per acre, and .2987 forest land per acre.

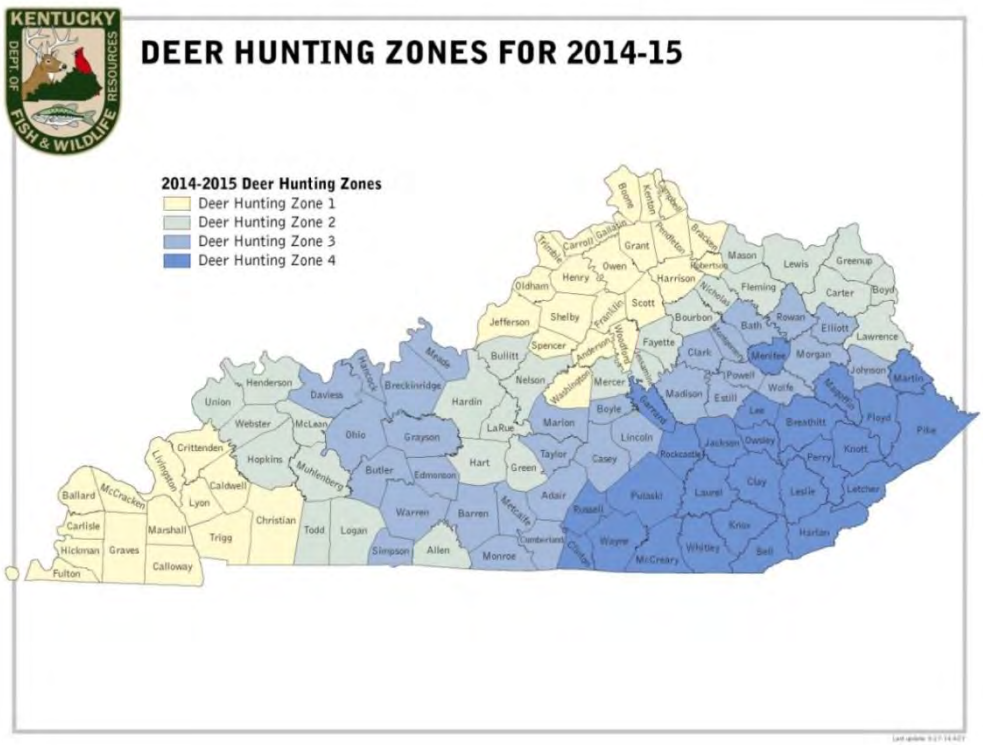
According to the EPA Basins modeling tool, beef cattle produce an average of 5.4 billion fecal coliform CFU/day/animal. Using the ration Is this the term for the calculator? between the water quality benchmarks for fecal coliform and *E. coli* (200:130 respectively). The daily fecal rate per head is calculated to 3.51 billions CFU *E. coli*.

The watershed is subjected to a variety of non-point source pollutants including livestock, loss of riparian habitat, stream bank modifications/destabilization, and habitat modification, and on-site treatment systems (septic and similar decentralized systems).

1.5 Wildlife

There are 36 different mammal species found within the central Kentucky counties comprising Sulphur Creek watershed some of which include: coyote, American beaver, white-tailed deer, muskrat, and Northern raccoon, gray fox. There are 199 species of birds which can be found in the watershed throughout the course of the year. Due to the forested composition of the watershed, some fecal loading to the surface water from wildlife sources is inevitable. Since source tracking was not conducted we do not have data regarding the loading from this source. However, we do know deer densities per square mile in each of the counties within the watershed; Anderson=68 deer per square mile, Mercer=21 deer per square mile and Washington=37 deer per square mile. The Kentucky Department of Fish and Wildlife Resources (KDFWR) considers 25 deer per square mile to be the optimum/preferred density. Anderson and Washington Counties are both in Deer Zone 1 and Mercer County is in Deer Zone 2 because it is at or near KDFWR's target/preferred level of deer population density.

Figure 7-Deer Hunting Zones for 2014-2015



1.6 Septic and Decentralized Systems

The estimated population within the watershed is 519 people (Bluegrass ADD, 2014). The human built structures in the watershed are not serviced with sewer, so On-site Sewage Treatment and Disposal Systems (OSTDSs) are utilized throughout. OSTDS, including septic tank systems, are commonly used in areas where providing a centralized sewage collection and treatment system is not cost-effective or practical. When properly sited, designed, constructed, maintained, and operated, septic systems are an effective means of disposing and treating domestic waste. The effluent from a well-functioning OSTDS is comparable to secondarily treated wastewater from a sewage treatment plant. When not functioning properly, they can be a source of *E. coli* (or fecal coliform) to both groundwater and surface water. It is estimated that every failing septic system can discharge more than 76,650 gallons of untreated wastewater into groundwater and surface waters each year (Lee, B. et al).

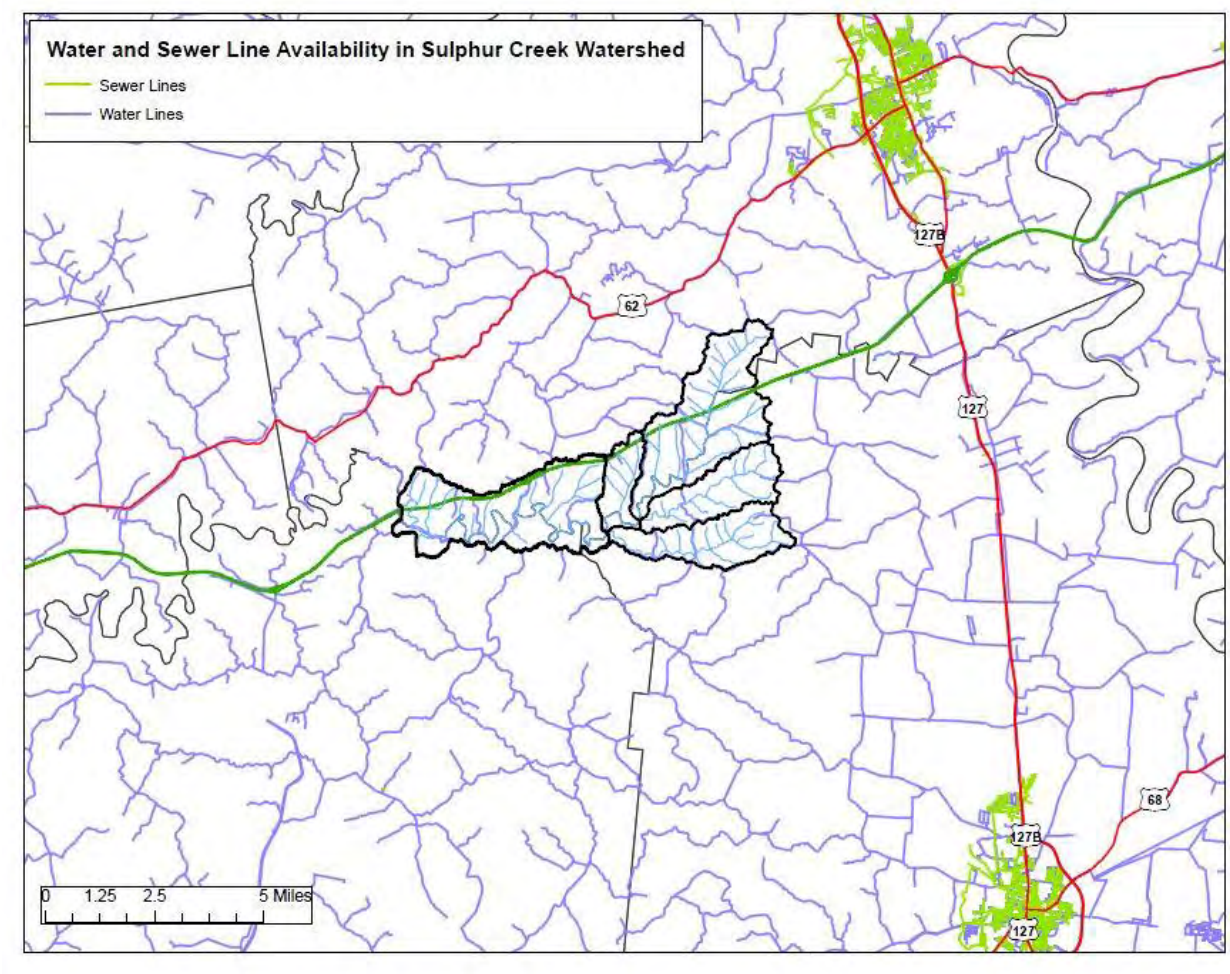
The soils in the watershed are highly erodible and are very limited to septic tank absorption suitability. In Kentucky, at least a 12 inch separation distance between rock or massive clay and the bottom of a septic lateral line trench bottom is required. Because of the depth to rock or clay, most lateral lines must be installed at a shallower depth in order to meet the required separation distance, and then would require additional topsoil. In cases where the 12 inch separation requirement can't be met, topsoil may be brought in and allowed to settle for one year before lines are installed. In these situations holding tanks are installed and required to be pumped during the one year waiting period.

Due to the limited soil suitability for traditional systems, lagoon systems are often utilized in this area. However, in order to install a lagoon system the land owner must have more than 2 acres of property with the required amount of set-back from the property line available. There are no future plans to install sewer in this area.

In addition to the bacteriological impairment due in part to failing and improperly maintained septic systems, the presence of straight pipes in the watershed is a suspected source of the pathogen impairment. A straight pipe is a sewer line from a house or building

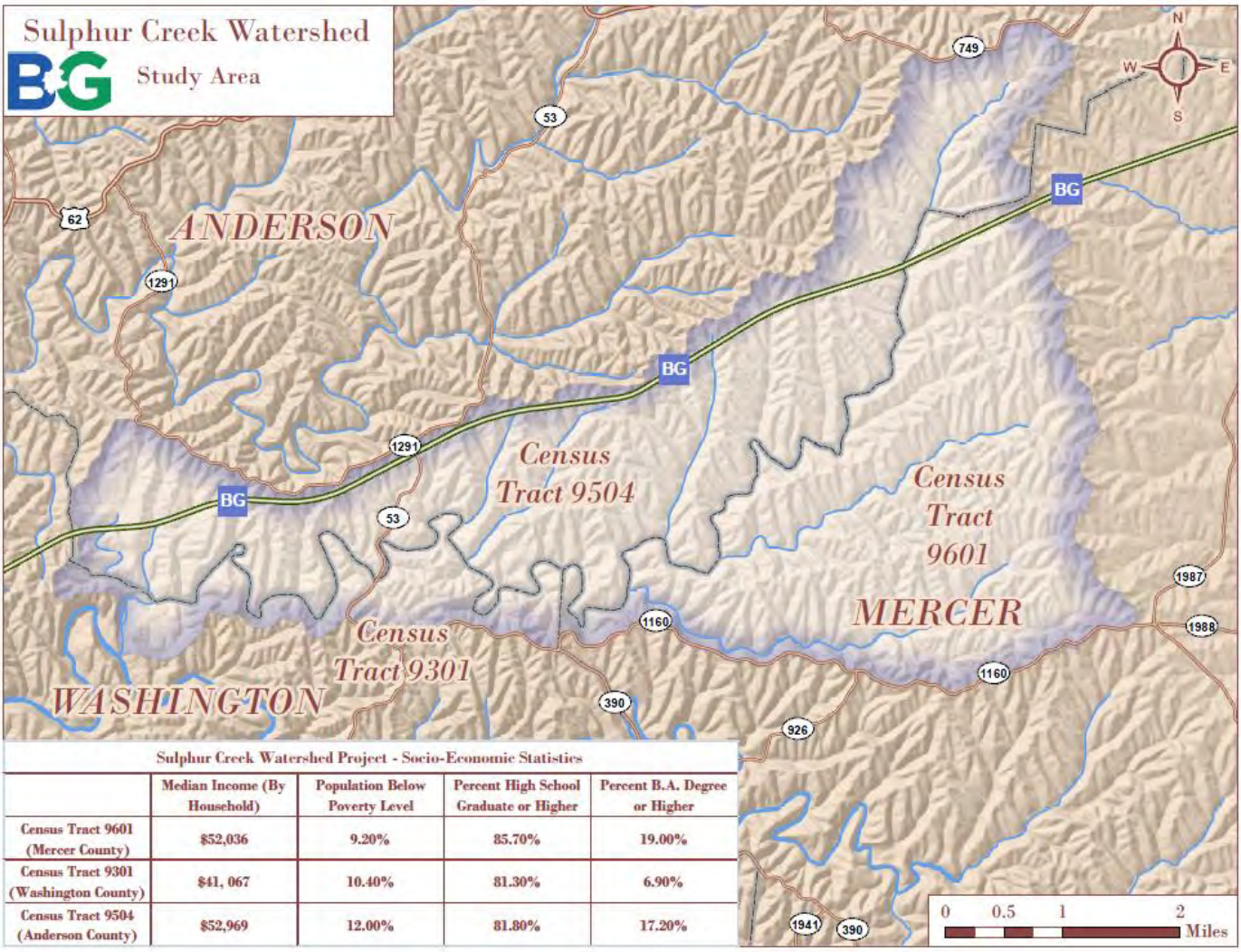
that discharge raw sewage directly into a receiving stream or river.

Figure 8-Water and Sewer Line Availability within the Sulphur Creek Watershed



Until 1992 there was a septic Farmstead Exemption in place, which stated that if a property was on greater than or equal to ten acres they did not have to apply for a septic system permit. Prior to 1986 the permitting and installation of on-site sewage treatment systems was the responsibility of the Division of Plumbing. After 1986 these job functions moved to the local health departments. Due to this transition, all of these older records are not available to the health department staff. Unless there was a new house built in the watershed it is extremely difficult to find any information about the type of system installed, the date and any subsequent maintenance activities.

Figure 9-Socio-economic Statistics Sulphur Creek Watershed



Sulphur Creek Watershed Project - Socio-Economic Statistics

	Median Income (By Household)	Population Below Poverty Level	Percent High School Graduate or Higher	Percent B.A. Degree or Higher
Census Tract 9601 (Mercer County)	$52,036	9.20%	85.70%	19.00%
Census Tract 9301 (Washington County)	$41, 067	10.40%	81.30%	6.90%
Census Tract 9504 (Anderson County)	$52,969	12.00%	81.80%	17.20%

The census tract data for the watershed gives us an idea of the income level of the area. Based on the median income by household, we can infer that the cost of removing a straight pipe or repairing a failing system would be cost prohibitive in many circumstances.

1.7. Point Sources

Points sources are defined as "discernible, confined, and discrete conveyances…from which pollutants are or may be discharges to surface waters" (EPA Website state the web site address, 2014). Point source discharges are permitted through the national pollutant discharge elimination system (NPDES). In Kentucky, these permits are referred to as Kentucky Pollution Discharge Elimination System (KPDES) permits. Sanitary Wastewater Systems (SWSs) are required to obtain KPDES permit coverage. SWSs include Wastewater Treatment Plants, Sewage Treatment Plant, package plants and home units. There are no Sanitary Wastewater systems within the Sulphur Creek Watershed. There are no MS4 sources within the watershed. Operations that are defined as a Combined Animal Feeding Operation (CAFO) are required to obtain KPDES permit coverage; there are no CAFOs within the Sulphur Creek watershed. The only KPDES permitted outfall in the watershed is a general stormwater construction permit issued for work on the Bluegrass Parkway, permit KYR10I484 issued on 7/2/2014.

Facilities with agricultural waste handling systems of that dispose of effluent by spray irrigation but do not discharge to surface waters are required to obtain a Kentucky no Discharge Operating Permit (KNDOP) from the Kentucky Division of Water. There are no KNDOPs within the Sulphur Creek watershed. In addition, there are no Division of Water permitted water withdrawals.

1.8. Precipitation and Climate

Table 4 - Monthly and Yearly Precipitation Totals

County	Jan 2014	Feb 2014	March 2014	April 2014	May 2014	June 2014	July 2014	Aug 2014	Sept 2014	Oct 2014	Nov 2014	Dec 2014	Total
Mercer	1.87	5.23	3.41	5.72	3.86	3.20	4.21	5.69	0.44	5.26	2.59	2.17	43.65

County	Jan 2013	Feb 2013	March 2013	April 2013	May 2013	June 2013	July 2013	Aug 2013	Sept 2013	Oct 2013	Nov 2013	Dec 2013	Total
Mercer	4.49	1.31	5.11	4.86	5.18	7.20	9.69	6.75	1.31	3.79	2.30	5.94	57.91

County	Jan 2012	Feb 2012	March 2012	April 2012	May 2012	June 2012	July 2012	Aug 2013	Sept 2012	Oct 2012	Nov 2012	Dec 2012	Total
Mercer	2.96	3.13	3.34	2.52	4.21	0.91	4.64	0.50	5.83	1.31	1.40	5.44	36.19

Kentucky Mesonet (http://www.kymesonet.org/index.html) data was used to create the precipitation table. This is the only monitoring location within the Sulphur Creek Watershed.

Based upon the Kentucky Mesonet data for the monitoring site in Mercer County, Kentucky the average yearly in 2013 temperature was 54.8 degrees Fahrenheit, 2014 was 54 degrees Fahrenheit.

2.0 Water Quality Standards

Table 5 - 303(d) Listed Streams in the Sulphur Creek Watershed

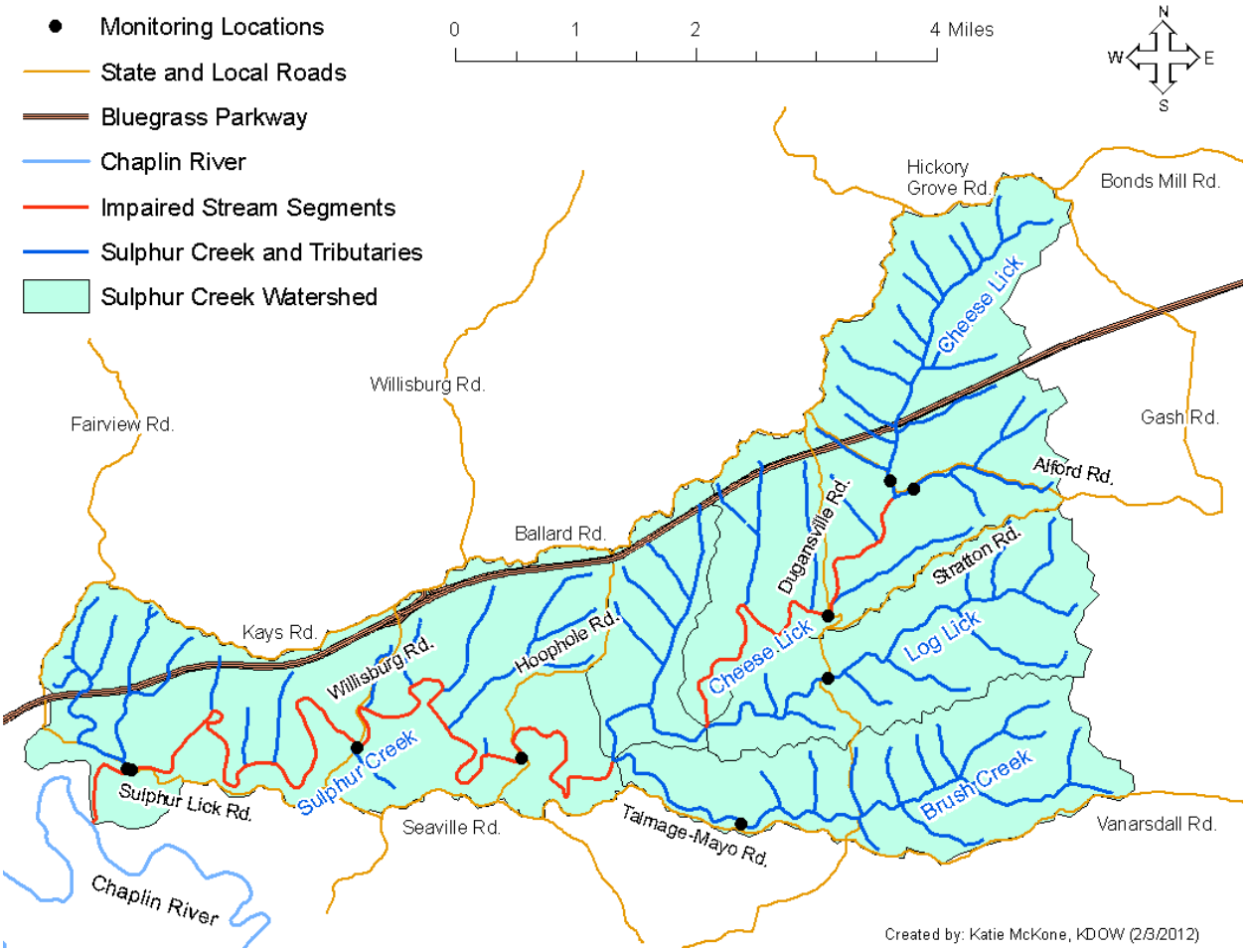
Waterbody & Segment	Total Size	County	Category	Use	Impairment	Suspected Source
Sulphur Creek 0.0 to 10.0	10 miles	Anderson	5-PS	PCR	Escherichia coli	Non-point sources
Cheese Lick 0.7 to 4.4	3.7 Miles	Anderson	5-PS	WAH	Nutrient/ Eutrophication Biological Indicators Sedimentation/Siltation	Grazing in Riparian or Shoreline Zones; Loss of Riparian Habitat; Stream bank Modifications/ Destabilization

The 2010 Clean Water Act (CWA) 303 (d) List of Impaired Waters included river miles 0 to 10 of Sulphur Creek for non- support of the Primary Contact Recreation use due to an impairment of fecal coliform due to non-point sources. In the 2012 303(d) List of Impaired Waters the fecal coliform listing was replaced with *Escherichia coli*. In addition, a segment of Cheese Lick a tributary

to Sulphur Creek does not support the Warm Water Aquatic Habitat (WAH) use due to sediment and nutrient loads originating from grazing in riparian zones, loss of riparian habitat and stream bank modifications/destabilization.

Since these streams do not support some of their designated uses, they are both on the 303 (d) list which requires the development of a Total Maximum Daily Load (TMDL) to calculate how much the pollutant (s) of concern must be reduced in order for the stream to support its designated use once again. In order to gather the necessary data for TMDL development, Kentucky Division of Water biologists conducted monitoring activities in 2012 and 2013 at 9 monitoring locations within the watershed.

Figure 10-Monitoring Locations and Impaired Stream Segments within the Sulphur Creek Watershed



After completing this more comprehensive study of the Sulphur Creek Watershed, the KDOW biologists found all nine (9) monitoring locations did not support the Primary Contact Designated use due to *E. coli*. The highest bacteria levels coincided with runoff events. In general the aquatic habitat conditions according to the KDOW Macroinvertebrate Index of Biotic Integrity (MIBI) in the Sulphur Creek watershed ranges between fair and good.

3.0. Project

This watershed based plan is being developed for the Sulphur Creek Watershed because it currently fails water quality standards for primary contact recreation (PCR). The plan that follows describes the water quality problems in the watershed and how they will be addressed. The plan provides the details needed to meet the criteria of the Environmental Protection Agency's nine key elements of a watershed plan. These nine elements include the following:

A. Identification of causes of impairments and pollutant sources that need to be reduced to achieve load reductions.

B. An assessment of load reductions needed.

C. A description of best management practices that will need to be implemented to achieve load reductions and identification of critical areas where those BMPs will need to implemented.

D. Development of effective education and outreach component to effectively communicate with targeted audiences.

E. A schedule for implementing BMPs.

F. A projection of costs to administer the plan and to implement BMPs.

G. Develop interim milestones to track implementation of management measures.

H. Develop criteria to measure progress towards meeting watershed goals.

I. A monitoring component to evaluate the effectiveness of the implementation efforts.

3.1. Causes and sources of pollutants

Sulphur Creek is listed as impaired for fecal coliform on the 2010 303(d) List of Impaired Waters. Sulphur Creek was monitored by the DOW Ambient and Reference Reach Programs from April 2004 through March 2005 at river mile 0.8 (2004 Salt Licking Basin Management Unit (BMU) Assessments). It was determined that 10.0 river miles of Sulphur Creek do not support the designated use of primary contact recreation (PCR) due to high

levels of fecal coliform originating from an unknown source. Additionally, a tributary of Sulphur Creek, named Cheese Lick, is listed as impaired for sediment and nutrients on the 2010 303(d) List of Impaired Waters (KDOW 2010). Cheese Lick was monitored by the Department of Fish and Wildlife Resources (DFWR) on October 1st, 2003 at river mile 3.1 (2004 Salt Licking BMU Assessments). It was determined that 3.7 river miles of Cheese Lick do not support the designated use of Warm Water Aquatic Habitat (WAH) due to sediment and nutrient loads originating from grazing in riparian or shoreline zones, loss of riparian habitat, and stream bank modifications/destabilization.

Streams listed on the 303(d) require a Total Maximum Daily Load (TMDL) to calculate how much the pollutant(s) of concern must be reduced in order to support a stream's designated use. To support the development of a TMDL, biologists conducted monitoring activities in 2012 and 2013 at 9 monitoring locations with an additional site (DOW12023026) that was monitored occasionally (further discussion of this site is located in the "Site by Site Discussion" section) (Table 1, Figure 1). At each site, the following parameters were collected:

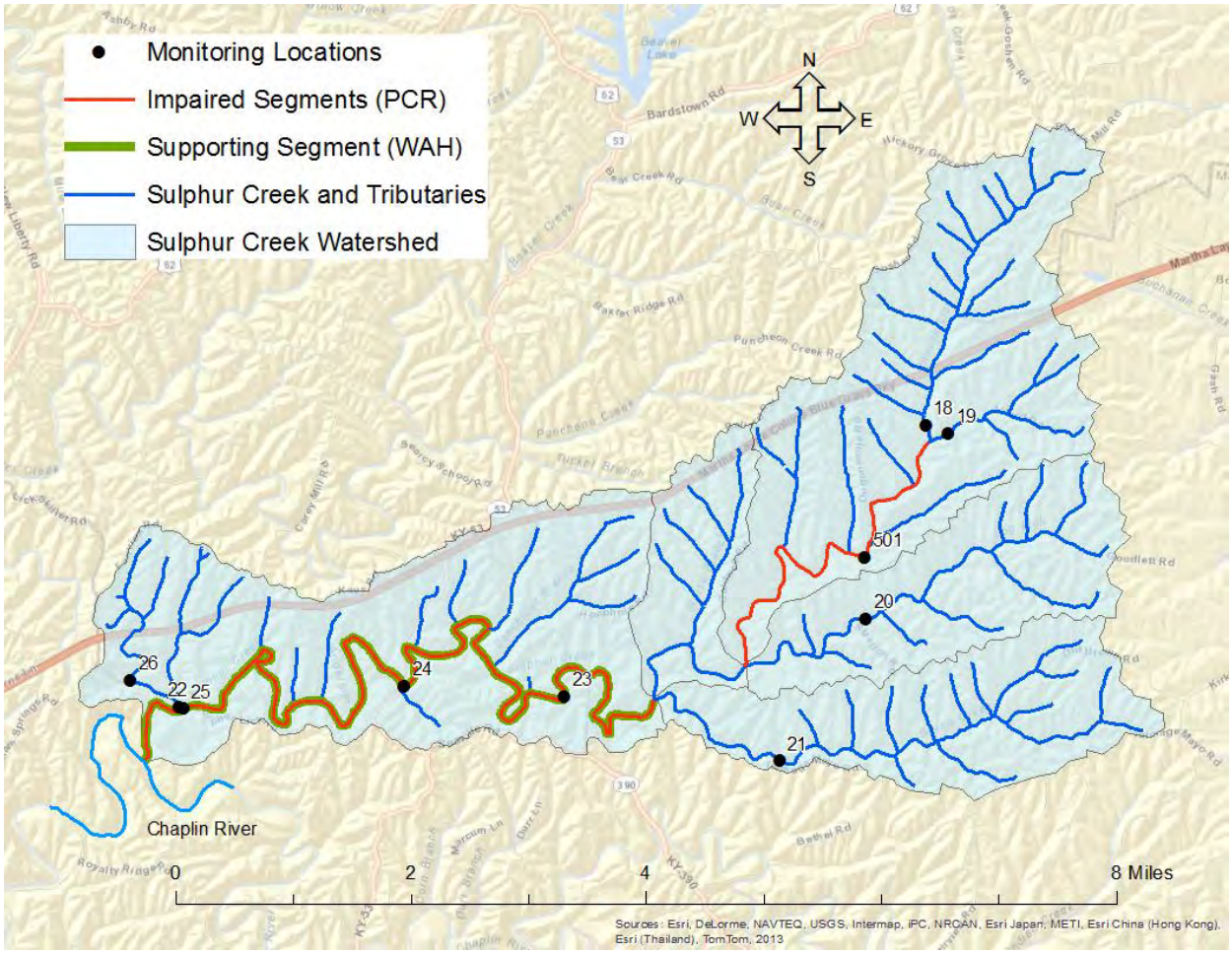
- *In situ* measurements (temperature, DO, pH, specific conductivity)
- Field observations
- Discharge
- Water chemistry (CBOD, inorganic ions, TSS, sulfate, TDS, chlorides, turbidity, TOC, ammonia, nitrate/nitrite, total phosphorus, TKN, ortho-phosphate)
- *E. coli*
- Biological samples (macroinvertebrates and algae)
- Habitat

Table 6 - Sulphur Creek Watershed Monitoring Locations

EDAS #	Stream Name	Location	County	RM at UT	River Mile	CA	Latitude	Longitude
CFD12023501	Cheese Lick	At Ballard-Dugansville Road crossing	Anderson		3.8	5.10	37.9059	-84.98748
DOW12023018	Cheese Lick	at Alford Rd. bridge	Anderson		5.3	2.97	37.9221	-84.97779
DOW12023019	UT Cheese Lick	at Alford Rd. bridge	Mercer	5.2	0.2	1.14	37.9211	-84.97429
DOW12023020	Log Lick	at Stratton Road bridge	Mercer		1.4	2.53	37.8983	-84.98745
DOW12023021	Brush Creek	at Henry Robinson Rd. bridge	Mercer		1.4	3.14	37.8808	-85.00102
DOW12023022	UT Sulphur Creek	at Sulphur Lick Rd. bridge	Anderson	0.7	0.1	1.41	37.888	-85.09438
DOW12023023	Sulphur Creek	Where Hoophold Rd. turns into Drury Rd.	Anderson		8.1	16.22	37.889	-85.03439
DOW12023024	Sulphur Creek	at Lawrenceburg Rd. bridge	Washington		4.9	19.31	37.8904	-85.05929
DOW12023025	Sulphur Creek	at Sulphur Lick Rd. bridge, upstream UT	Anderson		0.8	21.55	37.8879	-85.09374
DOW12023026	UT to UT Sulphur Creek	off Sulphur Lick Rd.	Anderson	0.03	0.1	0.60	37.891419	-85.101984

Worth noting is that 2012 was characterized as a dry year; most sites were pooled or went dry by late May or early June. Conversely, 2013 was wet in the spring and early summer and then dried out into the late summer and early fall, which would classify 2013 as a more "normal" year in regards to precipitation.

Figure 11-Location of Monitoring Sites within the Sulphur Creek Watershed and in Relation to Assessed Stream Segments



3.2. Environmental Services Branch (ESB) Results Reporting

The data table was compiled from electronic spreadsheets of results obtained from ESB's LIMS database. Data that was reported by ESB as not-detected was translated into a numerical value that indicates the result was less than the method detection limit. For example, if an Ammonia result was reported as not-detected by ESB, it was recorded in the data table as <0.025 mg/L. For parameters that do not have a method detection limit but do have a reporting limit (i.e. CBOD-5), not-detected was translated into a numerical value that indicates the result was less than the reporting limit. For example, if a CBOD-5 result was reported as not-detected by ESB, it was recorded in the data table as <2.00 mg/L.

Duplicate samples were taken during the course of the study. Precision estimates from these duplicates will incorporate variability from the sampling process to the laboratory analysis. Full acceptability of duplicate data will require that the relative percent difference (RPD) of a duplicate value is ≤20%. All RPD values that exceeded acceptance levels have been highlighted in yellow, and these data should be used with discretion.

Orthophosphate field rinsate blanks were collected at the end of every sampling day. The results for these can be found in the 'ortho-p rinsate blanks' tab. One result (03/27/12) exceeded the MDL. All ortho-p results for this sampling day have been flagged (highlighted in purple) in the water chemistry results table and should be used with discretion.

3.3. *E. coli* Results Reporting

All *E. coli* analyses were performed by TMDL monitoring staff in the WQB Microbiology Lab. Results were recorded on lab bench sheets, the COC, and were entered into EDAS. If a dilution was used when analyzing the sample, the dilution factor is noted in the comment column. Additionally, all values that exceed the permissible level of 240 CFU 100 ml^{-1} have been highlighted in red.

Duplicate samples were taken during the course of this study. Precision criteria (PC) for duplicate samples was developed using the most recent 15 samples collected during the previous PCR season. Therefore, for duplicate samples collected from the Sulphur Creek watershed during the 2012 and 2013 PCR season, the range of logs had to be ≤ 0.246 and ≤ 0.309, respectively, for PC to be achieved. All duplicate samples met the defined PC during the 2012 and 2013 monitoring season.

Field Blanks and sterile water blanks were analyzed for *E. coli* throughout the monitoring project. All field blanks and sterile water blanks were reported to have <1 CFU 100 ml^{-1}. Temperature blanks were also recorded with each sampling event, and these blanks were always <10.0 ˚C, demonstrating the correct preservation.

Twice during the project, 2 analysts would read the samples to determine if analyst discrepancy resulted in a RPD >20.0%. On one occasion, the discrepancy between analyst 1 and 2 was >20.0%; this sample was flagged for precision criteria exceedances.

A spreadsheet of the duplicate precision criteria, field blank data, sterile water blank data, temperature blank data, and analyst discrepancy can be found in the 'Precision Criteria – E. coli' tab.

3.4. Data Quality Assurance

QA checks have been conducted for 10% of data entered into EDAS and for 10% of all data entered into the final data table.

3.5. Physiochemical Data

The physiochemical data collected in the Sulphur Creek watershed was mostly normal throughout the study project. However, during a few sampling events the DO (mg/L) was below the KY surface water standards, which states that "the instantaneous minimum shall not be less than four and zero-tenths (4.0) mg/L in water with WAH use". On 4 occasions, DO levels <4.0 mg/L were observed (Table 7).

Table 7 -Site, date and DO level when DO was observed to fall below the water quality standard of 4.0 mg/L

Site Number	Stream Name	Collection Date	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%Saturation)
DOW12023019	CHEESE LICK UT	05/22/12	3.76	40.5
DOW12023023	SULPHUR CREEK	07/31/12	3.29	38.5
DOW12023024	SULPHUR CREEK	07/31/12	3.70	43.1
DOW12023025	SULPHUR CREEK	07/31/12	3.25	38.2

Furthermore, specific conductivity levels, which are typically higher in the bluegrass ecoregion, were perhaps slightly elevated from what is considered reference. Most of the time the elevated specific conductivity levels were of no concern, but a few sampling events at a few sites saw levels rise into the 600's and 700's, which should be noted. For reference, the geomean, minimum and maximum specific conductance levels for each site are provided in Table 8.

Table 8 - Geomean, minimum and maximum specific conductance levels at each site within the Sulphur Creek Watershed.

Specific Conductance (µS/cm)				
Site Number	**Stream Name**	**Geomean**	**Minimum**	**Maximum**
CFD12023501	CHEESE LICK	494	292	573
DOW12023018	CHEESE LICK	496	315	591
DOW12023019	CHEESE LICK UT	507	320	598
DOW12023020	LOG LICK	509	287	590
DOW12023021	BRUSH CREEK	489	298	567
DOW12023022	UT SULPHUR CREEK	593	384	742
DOW12023023	SULPHUR CREEK	467	264	581
DOW12023024	SULPHUR CREEK	460	248	589
DOW12023025	SULPHUR CREEK	422	228	587
DOW12023026	UT to UT SULPHUR CREEK*	592	488	646

3.6. *E. coli*

According to KY water quality standards for primary contact recreation water, *E. coli* content shall not exceed 130 colonies/100 mL as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period, or *E. coli* content shall not exceed 240 colonies/100 mL in twenty percent or more of all samples. These values are based on specific levels of risk of acute gastrointestinal illness. The levels of risk used by EPS define this correlating to these values are no more than eight illnesses per 1,000 swimmers for fresh waters. Table 9 outlines the % exceedances, minimum, maximum and geometric means of *E. coli* collected from each site during the course of the study. Percent exceedances and geomeans that do not meet the water quality standard have been highlighted in red.

Table 9 - Percent Exceedances, Minimum, Maximum and Geometric Means of Each Sampling Site within the Sulphur Creek Watershed

E. coli (CFU / 100mL)								
Site Number	**Stream Name**	**% Exceedance**	**Minimum**	**Maximum**	**2012 geomean 1**	**2012 geomean 2**	**2013 geomean 1**	**2013 geomean 2**
CFD12023501	CHEESE LICK	45	45	12033	440	*	167	320
DOW12023018	CHEESE LICK	73	115	14136	907	*	344	521
DOW12023019	CHEESE LICK UT	89	196	12997	*	*	4755	4767
DOW12023020	LOG LICK	55	50	15531	568	*	147	266
DOW12023021	BRUSH CREEK	45	71	9804	609	*	192	376
DOW12023022	UT SULPHUR CREEK	40	73	2909	*	*	168	294
DOW12023023	SULPHUR CREEK	54	37	24192	>274	91	244	444
DOW12023024	SULPHUR CREEK	38	33	19863	261	73	156	330
DOW12023025	SULPHUR CREEK	46	31	17329	406	160	108	192
DOW12023026	UT to UT SULPHUR CREEK*	*Not enough data						

3.7. Water Chemistry

Since a segment of Cheese Lick is listed as impaired for the Aquatic Life Use due to nutrients and sedimentation, the pollutants of concern are nitrate/nitrite, TKN, TOC, total phosphorus, ortho-phosphate, TSS, turbidity and sediment related scores from the habitat sheet, such as embeddedness and sediment deposition.

Nitrate/nitrite levels were always below 0.400 mg/L, but during a few visits, when nitrate and nitrite were analyzed separately, nitrate levels exceeded 0.400 mg/L. Specifically, nitrate was greater than 0.400 mg/L at sites 019, 023, 024 and 025 on 1 occasion.

TKN levels exceeded 0.800 mg/L on 2 occasions at site 023, 1 occasion at 024, and 2 occasions at 025. The 2 highest observations of TKN were at 023 during the summer of 2012.

Total phosphorus levels exceeded 0.100 mg/L four times at 023, three times at 024 and 025, twice at 019 and 501, and once at 018. Conversely, orthophosphate levels were always within a reasonable range.

TOC, which is indicative of eutrophication and organic enrichment, was high throughout the watershed and exceeded 4 mg/L at every site on at least 2 occasions (020). At sites 023 and 024, TOC was greater than 4 mg/L on 6 occasions, and at 025 it exceeded this level on 9 occasions.

Another line of evidence to support the presence of eutrophication and organic enrichment is to see if the DO goes above 10.0 mg/L during the growing season. Within the Sulphur Creek watershed, every site had DO levels > 10.0 mg/L throughout the spring and summer months, especially in the smaller, headwater streams (501, 018, 019, 020, 021, 022). The larger, wadeable streams (023, 024, 025) also had site visits where the DO was greater than 10.0 mg/L, but on fewer occasions.

For reference, Table 10 provides geomeans for all nutrient data collected within the Sulphur Creek watershed during 2012 and 2013, where the non-detects were replaced with the method detection limit (MDL), implying that the number reported is the largest possible geomean.

Table 10 - Geomeans of nutrient data collected within the Sulphur Creek Watershed

		Geomeans						
Site Number	**Stream Name**	**Nitrate (mg/L)**	**Nitrate/Nitrite (mg/L)**	**Nitrite (mg/L)**	**Ortho-P (mg/L)**	**TP (mg/L)**	**TKN (mg/L)**	**TOC (mg/L)**
CFD12023501	CHEESE LICK	0.037	0.033	0.015	0.0149	0.0442	0.330	3.88
DOW12023018	CHEESE LICK	0.045	0.048	0.015	0.0136	0.0417	0.378	3.94
DOW12023019	CHEESE LICK UT	0.109	0.063	0.015	0.0152	0.0535	0.349	3.55
DOW12023020	LOG LICK	0.014	0.016	0.015	0.0126	0.0387	0.283	2.77
DOW12023021	BRUSH CREEK	0.022	0.020	0.015	0.0134	0.0395	0.261	3.02
DOW12023022	UT SULPHUR CREEK	0.025	0.025	0.015	0.0156	0.0385	0.276	3.09
DOW12023023	SULPHUR CREEK	0.051	0.043	0.016	0.0176	0.0617	0.368	3.87
DOW12023024	SULPHUR CREEK	0.047	0.036	0.016	0.0184	0.0600	0.325	3.97
DOW12023025	SULPHUR CREEK	0.043	0.030	0.017	0.0198	0.0662	0.381	4.37
DOW12023026	UT to UT SULPHUR CREEK*	Not enough data	0.027	Not enough data	0.0162	0.0361	0.238	2.86

Turbidity and TSS increased during runoff events, but the water clarity was good during base flow conditions. Sedimentation was not evident at most sites throughout the Sulphur Creek watershed, with embeddedness and sediment deposition scores in the optimal and sub-optimal ranges. The exceptions are at 018, where the sediment deposition scored in the marginal range, 019, where the sediment deposition and embeddedness scored in the marginal range, and 024, where the embeddedness scored in the marginal range and the sediment deposition scored sub-optimal by only 1 point. Table 11 summarizes the sediment related scores from the habitat assessment form for each site.

Table 11- Scores for embeddedness and sediment deposition for each site within the Sulphur Creek Watershed. Scores of 20-16 relate to optimal, 15-11 suboptimal, 10-6 marginal and 5-0 poor.

Site Number	Stream Name	Embeddedness	Sediment Deposition
CFD12023501	CHEESE LICK	12	14
DOW12023018	CHEESE LICK	12	9
DOW12023019	CHEESE LICK UT	10	7
DOW12023020	LOG LICK	13	12
DOW12023021	BRUSH CREEK	17	17
DOW12023022	UT SULPHUR CREEK	18	17
DOW12023023	SULPHUR CREEK	13	13
DOW12023024	SULPHUR CREEK	8	11
DOW12023025	SULPHUR CREEK	15	14
DOW12023026	UT to UT SULPHUR CREEK*	17	14

3.8. Habitat

Habitat throughout the Sulphur Creek watershed was found to be non-support at 6 of the 10 sites. Brush Creek (021) was found to partially support, while 3 sites were found to fully support. Both 023 and 024 scored 111, which is 3 points short of partial support for a wadeable stream in the bluegrass bioregion. Table 12 summarizes the habitat scores from each site.

Table 12 - Habitat Scores and Narrative

StationID	Stream Name	Catchment Area	Collection Date	Total Score	Narrative Score	Comments
CFD12023501	CHEESE LICK	5.10	03/29/12	111	non support	
DOW12023018	CHEESE LICK	2.97	03/21/12	116	non support	
DOW12023019	CHEESE LICK UT	1.14	03/21/12	109	non support	
DOW12023020	LOG LICK	2.53	03/27/12	127	non support	
DOW12023021	BRUSH CREEK	3.14	03/29/12	143	partial support	
DOW12023022	UT SULPHUR CREEK	1.41	03/28/12	168	full support	
DOW12023023	SULPHUR CREEK	16.22	07/31/13	111	non support	Missed partial support by 3 points (cut-off is 114).
DOW12023024	SULPHUR CREEK	19.31	07/31/13	111	non support	Missed partial support by 3 points (cut-off is 114).
DOW12023025	SULPHUR CREEK	21.55	08/01/13	142	full support	
DOW12023026	UT to UT SULPHUR CREEK	0.60	03/27/12	160	full support	

3.9. Macroinvertebrates

Macroinvertebrates ranged from Fair to Excellent throughout the Sulphur Creek watershed. The site with the highest scoring bugs was -501, which was the only site to score an excellent. Two sites, -025 and -026, were classified as Good. The remaining sites were on the edge between Fair and Good or Good and Fair. Table 13 summarizes the MBI scores and includes other metrics, such as % Chiro+Olig and %EPT, in order to aid in final use attainment decisions.

StationID	StreamName	CollDate	Catchment Area	G-TR	G-EPT	HBI2	m%EPT	%Ephem	%-Chiro+Olig	%ClngP	%Nutrient Tolerant	MBI Score	Narrative	Borderline?
CFD12023501	CHEESE LICK	03/29/12	5.10	49	14	4.63	43.42	10.53	8.22	74.34	42.76	66.6	Excellent	
DOW12023018	CHEESE LICK	03/21/12	2.97	32	12	4.93	42.14	0.89	13.65	49.85	43.92	52.6	Fair	Fair/Good
DOW12023019	CHEESE LICK UT	03/21/12	1.14	44	13	4.77	25.35	5.21	27.78	38.19	30.56	50.8	Fair	Fair/Good
DOW12023020	LOG LICK	03/27/12	2.53	31	9	4.85	43.48	6.52	6.52	54.71	46.74	54.4	Good	Good/Fair
DOW12023021	BRUSH CREEK	03/29/12	3.14	33	13	4.77	36.51	6.67	2.86	48.25	58.10	55.4	Good	Good/Fair
DOW12023022	UT SULPHUR CREEK	03/28/12	1.41	30	12	4.98	60.86	3.98	7.95	46.79	32.72	56.0	Good	Good/Fair
DOW12023023	SULPHUR CREEK	07/31/13	16.22	37	8	6.22	6.96	6.33	56.96	82.59	86.39	50.2	Fair	Fair/Good
DOW12023024	SULPHUR CREEK	07/31/13	19.31	40	8	6.24	15.03	14.74	32.08	53.47	74.57	51.3	Fair	Fair/Good
DOW12023025	SULPHUR CREEK	08/01/13	21.55	53	12	5.70	21.00	18.81	14.42	62.70	77.12	65.15	Good	
DOW12023026	UT to UT SULPHUR CREEK	03/27/12	0.60	38	13	4.67	62.39	4.27	6.55	54.13	29.34	61.1	Good	

Table 13 - Macroinvertebrate Score and Narrative with Additional Metrics.

4.0. Problem Identification and Prioritization

PCR

There is a bacteria issue related to non-point source pollution in the Sulphur Creek watershed. All 9 sites assessed for PCR were found to not support this designated use, and the highest bacteria levels coincided with runoff events.

WAH

Throughout the entire watershed, there are enough indicators that point to a water quality problem related to nutrients, organic enrichment and/or sediment, which is affecting the aquatic community in various ways. Although 6 of the 10 sites were found to fully support their aquatic life use and 4 of the 10 sites were found to partially support their aquatic life use, the observed water quality issues make it plausible that during a different year with slightly different conditions, the aquatic community could fair better or worse. In general, the Sulphur Creek watershed seems to be teetering on the line between good and fair, and slight changes in pollutant loading due to annual variability could tip the community one way or the other. Important to note is that the sites which seem to be fairing better also seem to have slightly improved habitat, demonstrating that a slight habitat advantage can go a long way in protecting the aquatic environment. Therefore, general recommendations are that the Sulphur Creek watershed could benefit from pollutant reductions that are contributing to eutrophication, organic enrichment and sedimentation, and that the areas with improved habitat are especially important for recruitment and refuge, and should therefore be protected and maintained. A more detailed, site by site analysis of the watershed follows.

4.1. Site by Site Discussion of Assessment Recommendations

The final use determinations for the sites assessed in the Sulphur Creek Watershed are reflected in the 2014 Integrated Report to Congress. Below is a site by site discussion of the assessment recommendations.

4.1.1 CFD12023501, Cheese Lick at Ballard-Dugansville Road Crossing

PCR: Since 45% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -501 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), and non-point source.

WAH: Despite the habitat scoring a 111, which relates to non-support, the macroinvertebrates scored a 66.6, which relates to an excellent, the highest bug score observed in the watershed. In opposition to the

reduced habitat and slightly elevated levels of TP, TOC and TKN, the aquatic community is meeting the Aquatic Life use. Therefore, -501 was found to fully support its Aquatic Life use.

4.1.2 DOW12023018, Cheese Lick at Alford Road bridge

PCR: Since 73% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -018 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), grazing in riparian or shoreline zones, and non-point source.

WAH: The habitat scored a 116, which relates to non-support, while the macroinvertebrates scored a 52.6, which relates to a fair (but borderline good). Despite scoring a high fair, -018 had the 2nd lowest genus taxa richness (G-TR = 32) and the sample was comprised of <1% mayflies but 14% chironomidae and oligochaetes. This site had some of the highest observations of nitrate, nitrate/nitrite, and TOC. Additionally, sediment deposition did score in the marginal category with a score of 9 and the percent fines were estimated at 40%. The diminished macroinvertebrate community is probably the result of reduced water quality related to nutrient enrichment in conjunction with sedimentation and poor habitat that was characterized by unstable banks with little vegetative protection. Nutrient loading and sedimentation are most likely linked, which can be further supported by the DO levels often exceeding 10.0 mg/L throughout the growing season. Therefore, it is recommended that -018 be listed as partially supporting its Aquatic Life use as a result of habitat modification, eutrophication and sedimentation. The suspected sources are non-point sources, livestock (grazing or feeding operations), grazing in riparian or shoreline zones, loss of riparian habitat, stream bank modifications/destabilization, and habitat modification – other than hydromodification.

4.1.3 DOW12023019, UT Cheese Lick at Alford Road bridge

PCR: Since 89% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -019 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), grazing in riparian or shoreline zones, and non-point source.

WAH: The habitat scored a 109, which relates to non-support, while the macroinvertebrates scored a 50.8, which relates to a fair (but borderline good). Additionally, -019 was comprised of 27.78% chironomidae and oligochaetes. The water chemistry at this site was one of the worst in the watershed in regards to nutrients. Nitrate and nitrate/nitrite levels were the highest, on average, in the watershed, while TP, TKN

and TOC were also elevated more frequently when compared to the other headwater sites (020, 021, and 022). Additionally, DO dropped below 4.0 mg/L on May 22nd, 2012 and also exceeded 10.0 mg/L frequently throughout the growing season. Sediment problems were also evident at this site, with sediment deposition scoring a 7 and embeddedness scoring a 10, both of which relate to marginal. This stream runs through a cow pasture, and cattle were observed grazing in and along the stream. Additionally, this site always had suds and scum built up along the cattle fence, and the water was "gross" or "slimy" most of the time. Therefore, it is recommended that -019 be listed as partially supporting its Aquatic Life use as a result of habitat modification, eutrophication and sedimentation. The suspected sources are non-point sources, livestock (grazing or feeding operations), grazing in riparian or shoreline zones, loss of riparian habitat, stream bank modifications/destabilization, and habitat modification – other than hydromodification.

4.1.4 DOW12023020, Log Lick at Stratton Road bridge

PCR: Since 55% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -020 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), grazing in riparian or shoreline zones, and non-point source.

WAH: The habitat scored a 127, which relates to non-support, while the macroinvertebrates scored a 54.4, which relates to a good (but borderline with fair). Although the score was borderline, the percent chironomidae and oligochaetes was low and the modified percent EPT was high. Sedimentation and water chemistry were better at this site when compared to the rest of the watershed, but some evidence of nutrient enrichment is present in the TOC and DO signatures. Since this site's macroinvertebrate community scored a good, which may be related to the stable banks (score of 18) that are protected with vegetation (score of 16), it is recommended that -020 be assessed as fully supporting its Aquatic Life use, with the precaution that this site is vulnerable to reduced water and habitat quality.

4.1.4 DOW12023021, Brush Creek at Henry Robinson Road bridge

PCR: Since 45% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -021 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), grazing in riparian or shoreline zones, and non-point source.

WAH: The habitat scored a 143, which relates to partial support, while the macroinvertebrates scored a 55.4, which relates to a good (but borderline with fair). Although the score was borderline, the percent chironomidae and oligochaetes was low, the modified percent EPT was relatively high, and EPT richness

was high. Sedimentation and water chemistry were better at this site when compared to the rest of the watershed, but some evidence of nutrient enrichment is present in the TOC, TP and DO signatures. Since this site's macroinvertebrate community scored a good, which may be related to the improved epifaunal substrate (score of 13), and the frequency of riffles (score of 18), which were not embedded (score of 18), it is recommended that -021 be assessed as fully supporting its Aquatic life use, with the precaution that this site is vulnerable to reduced water and habitat quality.

4.1.5 DOW12023022, UT Sulphur Creek at Sulphur Lick Road bridge

PCR: Since 40% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -022 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), and non-point source.

WAH: The habitat scored a 168, which relates to fully supporting, while the macroinvertebrates scored a 56.0, which relates to a good (but borderline fair). There were no sediment issues present, and the water chemistry was good for the most part, but specific conductivity levels were elevated at this site when compared to other sites within the watershed, with a maximum of nearly 750. A few springs were observed at this site when completing biology sampling and this may help explain the increased specific conductivity. Although high levels of specific conductivity may be influencing the macroinvertebrate community slightly, -022 is fully supporting its Aquatic Life use and should be assessed as such.

4.1.6 DOW12023023, Sulphur Creek at ford where Hoophold Road turns into Drury Road

PCR: Since 54% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -023 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), and non-point source.

WAH: The habitat scored a 111, which relates to non-support (missed partial support by 3 points), while the macroinvertebrates scored a 50.2, which relates to a fair (but borderline good). Additionally, -023 tied with -024 for the lowest EPT richness in the watershed (G-EPT = 8), had the highest percent of chironomidae and oligochaetes (56.96%), and had the lowest % modified EPT (6.96). This site had some of the highest observations of TP, TKN and TOC, while dissolved oxygen dropped below 4.0 mg/L on July 31st, 2012 (this is most likely a result of very low flow conditions) and exceeded 10.0 mg/L on 2 occasions during the growing season. Therefore, it is recommended that -023 be assessed as partially supporting its Aquatic Life use as a result of habitat degradation and eutrophication. The suspected sources are non-point

sources, livestock (grazing or feeding operations), loss of riparian habitat, stream bank modifications/destabilization, and habitat modification – other than hydromodification.

4.1.7 DOW12023024, Sulphur Creek at Lawrenceburg Road bridge

PCR: Since 38% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and the geomeans were >130 CFU/100mL, it is recommended that -024 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), and non-point source.

WAH: The habitat scored a 111, which relates to non-support (missed partial support by 3 points), while the macroinvertebrates scored a 51.3, which relates to a fair (but borderline good). Additionally, -024 tied with -023 for the lowest EPT richness in the watershed (G-EPT = 8), had the second highest percent of chironomidae and oligochaetes (32.08%), and had the second lowest % modified EPT (15.03). This site had some of the highest observations of TP and TOC and nitrate/nitrite exceeded 0.400 mg/L on 1 occasion. Dissolved oxygen dropped below 4.0 mg/L on July 31st, 2012 (this is most likely a result of very low flow conditions) and exceeded 10.0 mg/L twice during the growing season. Sediment was found to be contributing to embeddedness at this site, which scored in the marginal range with an 8, and sediment deposition scored an 11, making it sub-optimal by 1 point. Additionally, % fines were estimated at 35%. Therefore, it is recommended that -024 be assessed as partially supporting its Aquatic Life use as a result of habitat degradation, eutrophication and sediment deposition. The suspected sources are non-point sources, livestock (grazing or feeding operations), loss of riparian habitat, stream bank modifications/destabilization, and habitat modification – other than hydromodification.

4.1.8 DOW12023025, Sulphur Creek at Sulphur Lick Road bridge, upstream UT

PCR: Since 46% of the *E. coli* samples collected in 2012 and 2013 were >240 CFU/100 mL and 2 of the 3 geomeans were >130 CFU/100mL, it is recommended that -025 be listed as impaired for PCR. The suspected sources are on-site treatment systems (septic and similar decentralized systems), livestock (grazing or feeding operations), and non-point source.

WAH: The habitat scored a 142, which relates to full support, while the macroinvertebrates scored a 65.2, which relates to a good. Although evidence of nutrient enrichment was present at this site in the TP, TKN and TOC signatures, the lack of sediment issues and improved habitat seem to be allowing this site to support its aquatic life use, and should be assessed as such, with the precaution that this site is vulnerable to reduced water and habitat quality.

4.1.9 DOW12023026, UT to UT Sulphur Creek off Sulphur Lick Road

This site was accidently sampled for macroinvertebrates when trying to sample -022. However, it was observed to be of high quality, so a few more chemistry samples were collected during the spring of 2012 so that an Aquatic Life use assessment could be made.

PCR: Not enough data for a use attainment assessment.

WAH: The habitat scored a 160, which relates to full support, while the macroinvertebrates scored a 61.1, which relates to a good. Although a smaller water chemistry data set exists for this site, water chemistry was found to be good at this site, and there were no sediment issues present. Therefore, it is recommended that -026 be assessed as fully supporting its Aquatic Life use.

5.0 Watershed Pollution Reduction Loads

Pollutant loads, target loads and percent load reductions needed to achieve the water quality standard and pollutant yields were calculated for each site sampled (Table 15). Water quality goals include reducing the pollutant loads to meet Water Quality Standards (WQS). Kentucky has a Water Quality Standard for *E. coli* during the Primary Contact Recreation (PCR) which spans from May 1st –October 31st (401 KAR 10:031). *E. coli* shall not exceed 240 colonies per 100 mL in twenty percent or more of all samples taken during a thirty day period and/or shall not exceed 130 colonies per 100 mL as a geometric on not less than five (5) samples taken during a thirty day period (Table 12).

Table 14 – Kentucky Primary Contact Recreation Standard

Kentucky Primary Contact Recreation Standard (May 1 - Oct. 31)		
Bacteria	Geometric Mean (colonies/100 mL)	Maximum (colonies/100 mL)
E. coli	**130** (from 5 samples collected within 30 days)	**240** (number not to be exceeded in more than 20% of the samples)

Table 15 - Average Load Calculations 2012 Data Collection

EDAS #	Site Name	Average *E.coli* (CFU/100mL)	Average Flow (cfs)	Annual Load (CFU/year)	Target Annual Load (CFU/year)	Load Reduction Needed (CFU/year)	% Load Reduction Needed
CFD12023501	Cheese Lick	2662.00	4.7	1.12E+14	1.01E+13	1.02E+14	91%
DOW12023018	Cheese Lick	3470.60	2.2	6.78E+13	4.69E+12	6.31E+13	93%
DOW12023019	UT Cheese Lick	Not Enough Data	1.9				
DOW12023020	Log Lick	3308.00	2.1	6.07E+13	4.40E+12	5.63E+13	93%
DOW12023021	Brush Creek	2305.40	1.6	3.29E+13	3.42E+12	2.94E+13	90%
DOW12023022	UT Sulphur Creek	Not Enough Data					
DOW12023023	Sulphur Creek	4954.80	17.3	7.64E+14	3.70E+13	7.27E+14	95%
DOW12023024	Sulphur Creek	4056.80	22.6	8.16E+14	4.82E+13	7.67E+14	94%
DOW12023025	Sulphur Creek	3643.60	25.2	8.18E+14	5.36E+13	7.64E+14	93%
DOW12023026	UT to UT Sulphur Creek	Not Enough Data	1.9				

Table 16 -Geomean Load Calculations 2012 Data Collection

EDAS #	Site Name	Geomean (CFU/100mL)	Average Flow (cfs)	Annual Load (CFU/year)	Target Annual Load (CFU/year)	Load Reduction Needed (CFU/year)	% Load Reduction Needed
CFD12023501	Cheese Lick	440.42	4.7	1.86E+13	5.48E+12	1.31E+13	70%
DOW12023018	Cheese Lick	907.45	2.2	1.77E+13	2.54E+12	1.52E+13	86%
DOW12023019	UT Cheese Lick	Not Enough Data					
DOW12023020	Log Lick	567.90	2.1	1.04E+13	2.39E+12	8.04E+13	77%
DOW12023021	Brush Creek	608.92	1.6	8.68E+12	1.85E+12	6.83E+13	79%
DOW12023022	UT Sulphur Creek	Not Enough Data					
DOW12023023	Sulphur Creek	331.53	17.3	5.11E+13	2.00E+13	3.11E+13	61%
DOW12023024	Sulphur Creek	222.45	22.6	4.47E+13	2.61E+13	1.86E+13	42%
DOW12023025	Sulphur Creek	469.20	25.2	1.05E+14	2.91E+13	7.61E+13	72%
DOW12023026	UT to UT Sulphur Creek	Not Enough Data					

Table 17 - Average Load Calculation 2013 Data Collection

EDAS #	Site Name	Average *E.coli* (CFU/100mL)	Average Flow (cfs)	Annual Load (CFU/year)	Target Annual Load (CFU/year)	Load Reduction Needed (CFU/year)	% Load Reduction Needed
CFD12023501	Cheese Lick	266.20	2.2	5.12E+12	4.62E+12	5.04E+11	10%
DOW12023018	Cheese Lick	422.20	1.4	5.23E+12	2.97E+12	2.26E+12	43%
DOW12023019	UT Cheese Lick	5303.80	0.5	2.41E+13	1.09E+12	2.30E+13	95%
DOW12023020	Log Lick	177.20	1.4	2.16E+12	2.93E+12	0	0%
DOW12023021	Brush Creek	494.00	2.1	9.42E+12	4.58E+12	4.84E+12	51%
DOW12023022	UT Sulphur Creek	216.20	0.5	1.05E+12	1.16E+12	0	0%
DOW12023023	Sulphur Creek	256.20	8.7	1.99E+13	1.87E+13	1.26E+12	6%
DOW12023024	Sulphur Creek	192.40	19.8	3.40E+13	4.24E+13	0	0%
DOW12023025	Sulphur Creek	146.60	13.4	1.74E+13	2.86E+13	0	0%
DOW12023026	UT to UT Sulphur Creek	Not Enough Data					

Table 18 - Geomean Load Calculations 2013 Data Collection

EDAS #	Site Name	Average *E.coli* (CFU/100mL)	Average Flow (cfs)	Annual Load (CFU/year)	Target Annual Load (CFU/year)	Load Reduction Needed (CFU/year)	% Load Reduction Needed
CFD12023501	Cheese Lick	166.82	2.2	3.22E+12	2.51E+12	7.11E+11	22%
DOW12023018	Cheese Lick	343.92	1.4	4.27E+12	1.61E+12	2.66E+12	62%
DOW12023019	UT Cheese Lick	4755.29	0.5	2.16E+13	5.91E+11	2.10E+13	97%
DOW12023020	Log Lick	147.06	1.4	1.80E+12	1.59E+12	2.09E+11	12%
DOW12023021	Brush Creek	191.93	2.1	3.67E+12	2.49E+12	1.19E+12	32%
DOW12023022	UT Sulphur Creek	167.56	0.5	8.12E+11	6.30E+11	1.82E+11	22%
DOW12023023	Sulphur Creek	243.93	8.7	1.90E+13	1.01E+13	8.86E+12	47%
DOW12023024	Sulphur Creek	156.22	19.8	2.76E+13	2.30E+13	4.63E+12	17%
DOW12023025	Sulphur Creek	107.96	13.4	1.29E+13	1.55E+13	0	0%
DOW12023026	UT to UT Sulphur Creek	Not Enough Data					

EDAS #	**% of Samples 240 CFU/100mL during PCR season (2012 &2013)**	**% Reduction Needed based on 240 CFU/100mL (2012 data)**	**% Reduction Needed based on 130 CFU/100mL (2012 data)**	**% Reduction Needed based on 240 CFU/100mL (2013 data)**	**% Reduction Needed based on 130 CFU/100mL (2013 data)**
CFD12023501	45%	91%	70%	10%	22%
DOW12023018	73%	93%	86%	43%	62%
DOW12023019	89%	*	*	95%	97%
DOW12023020	55%	93%	77%	0%	12%
DOW12023021	45%	90%	79%	51%	32%
DOW12023022	40%	*	*	0%	22%
DOW12023023	54%	95%	61%	6%	47%
DOW12023024	38%	94%	42%	0%	17%
DOW12023025	46%	93%	72%	0%	0%
DOW12023026	***Not enough data**				

6.0 Best Management Practices

The United States Environmental Protection Agency (USEPA) defines BMPs in the Code of Federal Regulations (CFR), 40 CFR 122.2 as:

"...schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States". BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage."

BMPs are the practices implemented within the watershed to meet the established goals of the watershed plan. Thus the selection and location of BMPs is a critical component to the success of the watershed plan. In order to effectively implement BMPs the Mercer County Conservation District and the Mercer County Health Department were consulted.

For the Sulphur Creek Watershed these general characteristics exist:

1. Entire watershed is not sewered, relying on on-site wastewater systems. The soils in the area, predominately clayey, are not conducive to traditional septic treatment systems.

2. Land use in the watershed is primarily forest with agricultural production.

3. The watershed does not support primary contact recreation (PCR) due to *E.coli* loading from runoff related sources, both agricultural and on-site sewage treatment.

6.1 Summary of BMPs

Table 19 - Agriculture and On-site Sewage Treatment Best Management Practices for the Sulphur Creek Watershed

	Structural BMPs	Non-Structural BMPs
Agriculture	• Livestock exclusion fencing • Alternative water sources • Cross fencing • Pasture Renovation • Winter Feeding Area • Feeding and Heavy Use Area Management • Nutrient Management • Stream Crossings	• Workshops/training for developing nutrient management plans/Ag Water Quality Plans • Farm Field Day held in conjunction with Mercer Co Health Department • Technical Assistance for BMP Implemenation
On-site Sewage Treatment	• Pump-outs and maintenance • Replace or repair system if required	• Educational materials on proper maintenance • Field day held in conjunction with Mercer Co. Conservation District/NRCS

6.2 On-site sewage treatment BMPs

These BMPs are targeted to address the reduction of bacterial levels in the watershed in an effort to achieve safe primary contact recreation use. These BMPs include proposed inspection of on-site sewage treatment systems to identify potential problems, maintenance of system if necessary and replacement or installation as required. These BMPs are intended to reduce the *E. coli* and fecal coliform loading in the watershed. These BMPs are a high priority.

The Bacterial Indicator Tool is a model that estimates the bacteria contribution from multiple sources. Output from the tool is used as input to WinHSPF and the Hydrological Simulation Program Fortran (HSPF) water quality model in BASINS. The tool estimates the monthly

accumulation rate of fecal coliform bacteria on four land uses (cropland, forested, built-up, and pastureland), as well as the asymptotic limit for the accumulation should no washoff occur. The tool also estimates the direct input of fecal coliform bacteria to streams from grazing agricultural animals and failing septic systems (United States Environmental Protection Agency). This tool was utilized to determine the number of failing septic systems per subwatershed; the failure rate was estimated based on soil suitability and age of the homes in the watershed was 50%. The true extent of septic failure rates across the Commonwealth has not been quantified due to a lack of effective record-keeping that would allow for the analysis of failure issues. In order to produce an estimate that was of meaningful significance we examined septic failure rate data from other states, which often were limited due to the same constraints as the ones facing Kentucky. Since the values for septic failure rates vary so greatly, information from a watershed based plan for the Hanging Fork Watershed located in Boyle, Lincoln and Casey Counties, Kentucky was considered. The septic failure rate for the Hanging Fork Watershed was calculated using Microbial Source Tracking (MST), which for most subwatersheds in Hanging Fork revealed a 75 percent human and 25 percent cattle ratio. Since the Sulphur Creek Watershed and Hanging Fork Watershed are in close proximity and share similar landuse characteristics, those values are the most meaningful. Since we lack the MST data for Sulphur Creek, we assumed an equal proportion of loading contribution form human and cattle sources.

Based on Bacterial Indicator Tool, there are an estimated 207 septic systems in the watershed serving the 519 people who reside in the area. The average number of people served per septic is 2.507 people/septic. With the information from this model, we can assume the average FC concentration reaching the stream form septic overcharge is 100E+04 count/100mL and a typical septic overcharge flow rate of 70 gal/day/person (Horsley & Whitten, 1996).

Table 20 - Number of failing septics, total number of people served, septic flow rate and FC rate per subwatershed within the Sulphur Creek Watershed

Subwatershed	Total area (acres)	# failing septics	Tot. # people served	Septic flow (gal/day)	Septic flow2 (mL/hr)	FC rate (count/hr)	Septic flow3 (cfs)
Cheese Lick	4,464	31.2	78.2	5476	863,550	8.64E+07	8.49E-03
Cheese Lick	1,013	7.1	17.8	1243	195,954	1.96E+07	1.93E-03
Log Lick	2,119	14.8	37.1	2600	409,992	4.10E+07	4.03E-03
Sulphur Creek	4,920	34.4	86.2	6035	951,720	9.52E+07	9.35E-03
Brush Creek	2,293	16.0	40.2	2813	443,556	4.44E+07	4.36E-03

Based on the information provided, there are approximately 104 failing septics in the Sulphur Creek watershed. In the two priority subwatersheds, Brush Creek and Log Lick, there are 16.0 and 14.8 failing systems respectively. The elimination of these failing systems would remove 6.43E+11 CFU/year from the Brush Creek subwatershed and 5.92E+11 CFU/year from the Log Lick subwatershed.

Table 21-Quantity of Fecal Coliform removed from Sulphur Creek Watershed if failing septic systems were removed.

Subwatershed	FC Rate (count/hr)	Fecal Coliform Count Per Day	Fecal Coliform Count Per Year	Conversion to *E.coli*
Cheese Lick	8.64E+07	2.07E+09	7.57E+11	1.28E+12
Cheese Lick	1.96E+07	4.70E+08	1.72E+11	2.76E+11
Log Lick	4.10E+07	9.84E+08	3.59E+11	5.92E+11
Sulphur Creek	9.52E+07	2.28E+09	8.34E+11	1.41E+12
Brush Creek	4.44E+07	1.07E+09	3.89E+11	6.43E+11

*Regression equation used for Fecal Coliform translation to *E. coli* = 0.667(Fecal Coliform)^1.034

On January 27, 2015 a visual survey of the two priority subwatersheds was conducted by the Mercer County Health Department and the Kentucky Division of Water. The visual assessment was used as an additional evaluation tool to help identify potential problem areas within the priority watersheds. In addition to the visual survey, work has already been conducted by the Mercer County Health Department, establishing a list of all parcel numbers and land owners

located within the two priority subwatersheds. This information will be utilized to out ? to landowners not only for the onsite component but also for work in the agricultural community.

6.3 Agricultural BMPs

The agricultural BMPs selected are targeted to address the reduction of bacterial levels in the watershed in an effort to meet water quality standards for primary contact recreation. The BMPs identified that would have the greatest impact on achieving the water quality standard include exclusion fencing of riparian areas, cross fencing for rotational grazing, pipeline for alternative watering facility, watering facility, heavy use and feeding areas, pasture renovations and winter feeding areas. All of these BMPs are a high priority.

In Kentucky, pasture-based grazing systems mainly use water from streams, although other natural sources, such as rivers, lakes and springs are also used. The area immediately surrounding the waterbody, called the riparian area, is often denuded of vegetation, loses soil structure, accumulates urine and feces and alters the stream morphology (AEN105). This pasture-based grazing system is utilized throughout the Sulphur Creek Watershed; hence the need for limiting access to streams by fencing and creating alternative water systems. If the establishment of an alternative water source is not feasible then livestock will be excluded except at designated crossing areas and watering sites. Planned or rotational grazing systems also need to be established in the watershed. Planned grazing systems are a system in which two or more pastures are alternately rested and grazed in a planned sequence to maintain minimum grazing coverage. The maintenance of adequate amounts of cover will reduce the amount of animal manure and nutrients reaching streams will be reduced due to the filtering effects of the vegetation and by increased uptake of nutrients.

Table 22-Agricultural BMPs, Costs & Maintenance Period

BMP	NRCS Practice Code	*E. coli* Effectiveness	Design and Construction Costs	Required Maintenance Period
Fence (Cross Fence)	382		$2.67/linear foot	20 years
Livestock Pipeline	516		$5.07/Ft	20 years
Watering Facility(tanks)	614		$2,654.67 each	10 years
Feeding and Heavy Use Area Management	561	85%	$2.07/SqFt	10 years
Forage and Biomass Planting (Pasture Renovation)	512	70%	$196.66/Acre	5 years
Winter Feeding Area	998		$10,000	10 years
Stream Crossing	578	50%	$3.72/SqFt	20 years
Nutrient Management	KYNMP			Update plan as farming operation changes.

*Cost estimates taken from State Cost Share Estimated Payment Schedule 2014

**Required maintenance period for best management practices taken from 2014 KY State Cost Share Manual

The Best Management Practices outlined in the above table were recommended by the planning team as the most effective pratices to address bacteria loading. However, if the ability to install these identified BMPs in not feasible on a location, then we will consider other alternatives to reach the PCR water quality standard.

The daily fecal rate per head of cattle is 3.51 billion CFU *E. coli* (Metcalf and Eddy, 1991). In July and August, cattle are estimated to spend up to one third of their time in streams while they spend approximately one tenth of the time the rest of the year if accessible. This indicates that on a yearly basis, 0.137 trillion CFU *E.coli* beef cattle is the estimated direct deposition to streams. Using our cattle/per subwatershed data the approximate number of cattle restrictions required to meet PCR WQS were calculated in Table 23.

Table 23- Cattle restrictions required to meet PCR water quality standard

Subwatershed	Load Reduction to Meet WQS	% Cattle	Reduction of Cattle Loading to WQS	# of Cattle in watershed	Estimated % Cattle to be Restricted	Number of Cattle to be Restricted
Log Lick	2.09E+11	50	4.18E+11	605	7.74	47
Brush Creek	1.19E+12	50	2.38E+12	655	4.41	29

A 50% contribution of loading from cattle was assumed. Contribution rate was determined based on assumed rate of septic failure.

6.4 Education and Outreach BMPs

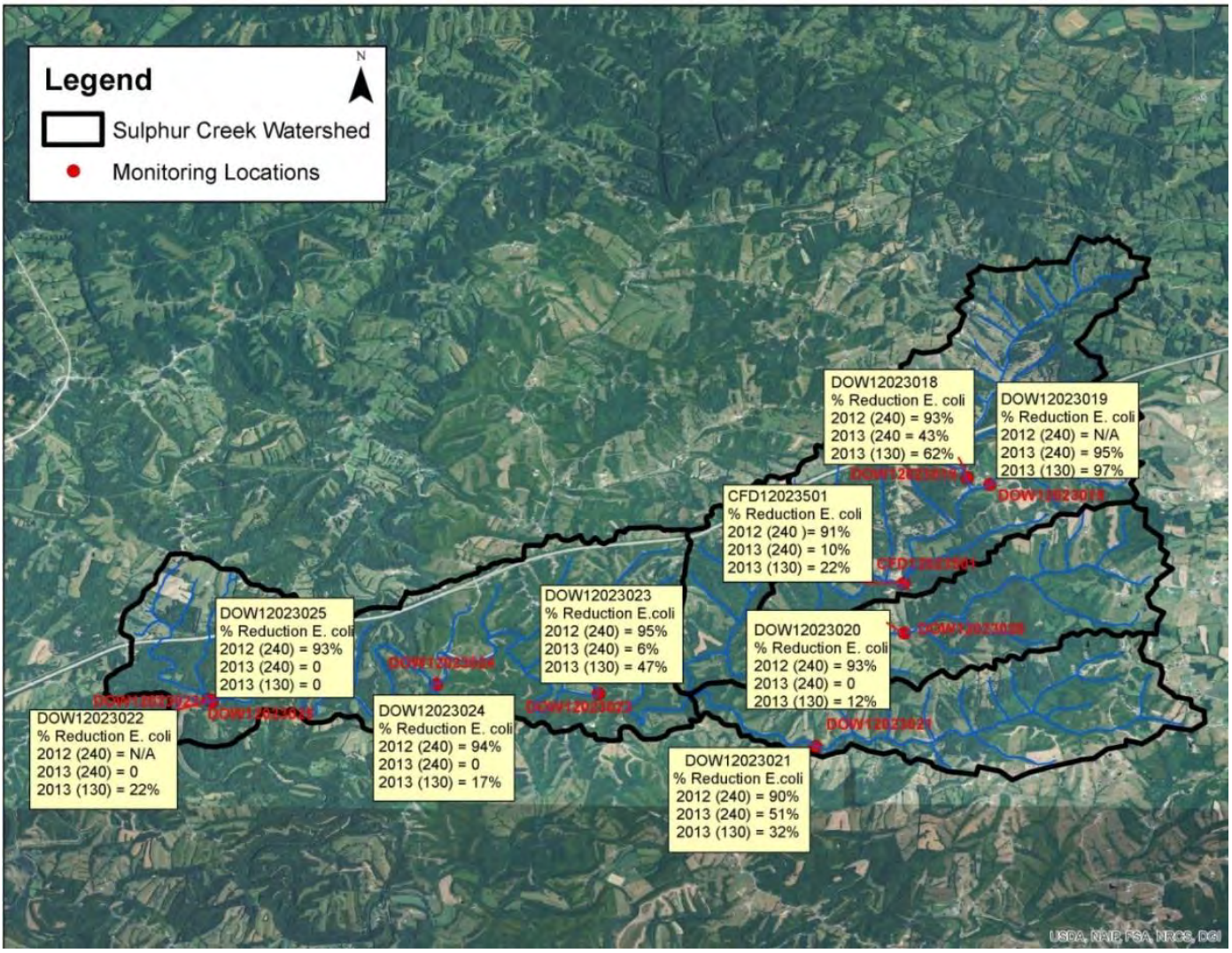
Several of the education components are the first steps towards the implementation component. These educational and outreach campaigns will be grouped according to the target audience. For example, in order to implement an effective on-site sewage treatment campaign we will first need to identify and reach out to landowners. Informational workshops will be conducted for landowners in the watershed with the opportunity to sign up for an inspection of their treatment system. Due to the suspected sources of the pollutant loading, the information and education component will focus on workshops/training for developing Nutrient Management Plans and Ag Water Quality Plans for agricultural producers within the watershed. Farm Field Days will also be used to demonstrate the BMPs installed.

7.0 Implementation Strategy

The Kentucky Division of Water will work closely with partners in the watershed to implement the BMPs that will achieve primary contact recreation standards in the watershed. That

strategy includes the watershed evaluation identifying areas to target, public outreach, project implementation and effectiveness monitoring.

Figure 12-Percent Load Reductions to meet Primary Contact Recreation Water Quality Standard at Each Monitoring Location



Through an analysis of the data collected in 2012 and 2013, along with local knowledge from partnering organizations, we determined that the Brush Creek and Log Lick subwatersheds would be the first priority area. The second priority would be the Cheese Lick subwatersheds and finally Sulphur Creek. Through a visual survey of the Brush Creek and Log Lick subwatersheds, performed by DOC and NRCS, it was determined that approximately 8 producers of the 38 in these two subwatersheds were in need of assistance with their agricultural practices. An additional visual survey of these two subwatersheds was conducted by the Mercer County Health Department and KDOW representatives. This survey found 31 homes in these two priority subwatersheds in need of assistance with their onsite sewage systems.

In order to ensure that landowner participation within the watershed will meet the primary contact recreation standard, landowners applying for funding will be ranked with the forms found in Appendix C. The Division of Water will work with partners and landowners to design and implement the project. The project partners will work to ensure the BMPs are implemented to ensure protection of surface waters.

8.0 Implementation Schedule and Milestones

8.1 Cost Predictions

The US EPA provides funding through Section 319 (h) of the Clean Water Act to the Kentucky Nonpoint Source Pollution (NPS) Control Program. These funds will be matched at the state level with Division of Conservation State Cost Share. The KDOW will direct contract with the Mercer County Health Department and the Mercer County Conservation District to implement this plan. These estimates are for the two priority subwatershed, Brush Creek and Log Lick.

Table 24-Estimated Cost of Onsite Sewage Disposal Systems Best Management Practices in Priority Subwatersheds

Subwatershed	# Failing Septic Systems	BMP 1: #Septic Repairs or Replacement	Total Cost
Brush Creek	**16.0**	**$4,000**	**$64,000**
Log Lick	**14.8**	**$4,000**	**$59,200**
Total Cost			**$135,520**

Table 25-Estimated Costs of Agricultural Best Management Practices in Sulphur Creek Priority Subwatersheds

Best Management Practice	Quantity	Cost Per BMP	Total Cost
4-Hole Waterer	2	2,376 each	4,752.00
Heavy use area associated with tank	25'x25'=625sqft x 2 tanks	2.07/sqft	2,587.50
Water pipeline	2,000lnft	3.87/ft	7,740.00
Creek fence (woven wire)	3,000lnft	2.67/ft	8,010.00
Cross fence (interior)	3,000lnft	1.80/ft	5,400.00
Pasture Renovation	50 ac	189/ac	9,450.00
Winter feeding area	1	10,000 each	10,000.00
Total for an individual farm			47,939.50
Total cost for Brush Creek and Log Lick			$287,637.00

Table 26-Objectives, BMPs and Action Items

Objective	BMP	Action Items
Reduce human fecal inputs from onsite sewage disposal	1. Address failing and improperly maintained septic systems and straight pipes.	1. Notify landowners within the watershed of an educational workshop regarding onsite sewage disposal systems. 2. Landowners will have the ability to sign-up for free maintenance inspection. 3.Upon inspection if the system is identified is in need of repair or replacement, the homeowner will complete the application for assistance. These applications will be ranked and systems will be repaired or replaced based on ranking. 4. Conduct field days with conservation district and NRCS.
Reduce Fecal Inputs form Livestock	1.Restrict grazing in the riparian area. 2. Create alternative water sources for cattle. 3. Create feeding areas and renovate pastures.	1. Since the landowners in the watershed needing assistance have been identified, we will reach out to these individuals and work with them to install selected BMPs on their property. The BMPs identified include NRCS Code: 382, 516, 614, 561, 512, 998, 578 and 590. 2. Coordinate with the local health department to offer farm field days educating other landowners on the potential for their property.

8.2 Public Information and Participation

Division of Water will work with partners in the watershed to provide landowners with pertinent information on water quality issues, appropriate BMPs and funding sources. The outreach will include landowner mailings, workshops, and site visits. Other mechanisms to deliver the information to the people who need it may develop through the course of the project. Division of Water staff will work with the Mercer County Health Department to conduct workshops for landowners in the watershed about proper on site sewage system maintenance. The workshops will provide more detailed information about the water quality issues in the watershed and the appropriate BMPs. During the workshop and through contact made by landowners to health department staff, landowners will have the opportunity to have their on-site system pumped and inspected free of charge.

The septic system maintenance and repair will be performed by a certified septic pumping company contracted by the local health department. If the septic system repair company determines that there is a problem or if the homeowner knows there is an issue with their system, they can apply for the repair program by submitting an application to the local health department. The application will include information on the location of the home, distance to stream, current wastewater situation and household income. Applications will be prioritized based on these factors; homes within the targeted subwatershed and with the closest proximity to the stream will be given the highest priority.

If the application is selected for assistance, the homeowner will be required to sign a commitment to pay for the required permit fees and site evaluation costs and to maintain the system with proper care and regular pump outs. If an in-sufficient number of homeowners within the targeted subwatershed are not identified, then we will move to the next prioritized subwatershed.

The Division of Water will partner with the Mercer County Conservation District and NRCS to produce landowner mailings. These mailings will give agricultural producers within the watershed a timeframe in which to contact the office. This voluntary contact will begin the process where producers can apply for funding to reduce their farm's impact on the primary contact water quality standard. The producers will be asked to complete an application and

the applications will be ranked according to greatest potential to positively impact water quality.

8.3 Evaluation of Implementation Progress

Effectiveness monitoring will be conducted to determine if the BMPs being implemented are working towards achieving the Primary Contact Recreation water quality standard. Since it has been determined that the BMP implementation will begin in the Brush Creek and Log Lick subwatersheds, sampling will be conducted at monitoring locations 21 and 20. A five and thirty *E. coli* sampling event will be conducted at both of these locations during the primary contact recreation (PCR) season of 2017, one year following the installation of BMPs, and continue into the PCR season of 2018. The monitoring plan will help evaluate the effectiveness of the WBP, by evaluating if the BMPs being implemented are addressing the bacteria pollutant loading. The data produced as a result of these sampling events will determine the future course of action. If after these two sampling events the Log Lick and Brush Creek subwatersheds are meeting the PCR water quality standard or showing improvements we can infer that the correct BMPs have been selected and installed to effectively address the bacteria loading. If however, we conclude that the installed BMPs are not allowing these subwatersheds to meet the designated goals then we will reassess and develop further BMP implementation if needed.

Responsible Parties	Estimated Cost	Funding Source	Technical Assistance Needed	Short-Term Milestone (0-5 Years)	Mid-Term Milestone (5-10 Years)	Long-Term Milestone (10-25 Years)
Mercer County Health Department	$154,000 maintenance, repair, replacement of onsite sewage treatment systems	319(h) /State Cost Share	Proper septic care information	Evaluate systems, maintenance or installation	Ongoing maintenance	Ongoing maintenance
Mercer County Conservation District/NRCS	$287,637 in best management practices	319(h) /State Cost Share	Need to work with Conservation District/NRCS to determine the most effective BMPs for the area and the impairment.	Installation	Maintenance as required by agreement	Repair/rehabilitation as required by agreement
KDOW/Health Department	$15,400.00 administrative cost of producing mail outs, facilitating workshops, etc.	319(h) /State Cost Share	Mercer Co. Health Department developing materials, Septic System Installers	Development of workshop materials	Send out maintenance reminders	Send out maintenance reminders
Mercer Co. Conservation District/NRCS	$79,250 administrative costs and hiring contractual watershed coordintor	319(h) /State Cost Share	Landowners consulting with NRCS/DOC on development of Ag Water Quality Plan, ranking applications, preparing mail outs	Development of Ag Water Quality Plans		Send out reminders to update plans if needed

Table 25-Milestone Worksheet

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Appendix A

2014 KY State Cost Share Manual

Vegetative Filter Strips

Stream Crossing

Integrated Pest Management

Conservation District Environmental Grant

Pesticide Containment Facilities

Cropland Erosion Control System

Sinkhole Protection

Pasture & Hayland Erosion Control

Heavy Use Area Protection

Streambank Stabilization

Rotational Grazing System

Agriculture Waste Control Facilities

Water Well Protection

Closure of Ag Waste Impoundment

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Forest Land Erosion Control System

On-Farm Fallen Animal Composting

Strip Intercropping System

Precision Nutrient Management Incentive

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Soil and Water Conservation Commission Administrative Regulations

416 KAR 1:010: Administration of Kentucky Soil Erosion and Water Quality Cost Share Fund.
RELATES TO: KRS 146.080-146.121, KRS Chapter 262, KRS 224.71-100 to 224.71-140.
STATUTORY AUTHORITY: KRS 146.110-146.121.
NECESSITY AND FUNCTION: KRS 146.110-146.121 authorize the Soil and Water Conservation Commission to promulgate administrative regulations governing administration of the Kentucky Soil Erosion and Water Quality Cost Share Fund. The fund provides cost share assistance to persons engaged in agricultural and silvicultural production for implementation of best management practices for such purposes as providing cleaner water through the reduction in the loading of sediment, nutrients, and pesticides in Kentucky streams, rivers, and lakes; and reducing the loss of topsoil vital to the sustained production of food and fiber; and preventing surface water and groundwater pollution. This administrative regulation establishes criteria for participation in that cost share program.

Eligibility Requirements

Producer Eligibility

(1) Eligible Persons- Persons conducting agricultural or silvicultural production are eligible to receive cost share assistance for best management practices if the following conditions are met:

(a) The person has prepared a conservation plan, a compliance plan, a forest management or forest stewardship plan, or an agriculture water quality plan.

(b) The person agrees to perform and to maintain best management practices for the period of time specified by the Commission.

(2) Tenant Farmers- Any tenant farmer should supply a copy of their Schedule F as well as written permission from the landowner in order to apply and install State Cost Share practices. The landowner must agree to continue the Best Management practices for the life span of the practice in the event that the tenant farmer cancels their land usage agreement.

(3) Ineligible Persons- A person engaged in agricultural or silvicultural production who has failed or refused to comply with agriculture water quality planning and has been deemed a "bad actor" under KRS 224.71-130 shall lose eligibility for further cost share assistance.

Best Management Practices Eligibility

(1) Purposes of Best Management Practices- The Kentucky Soil Erosion and Water Quality Cost Share Funds shall be used to provide cost share assistance for development and implementation of best management practices for the following purposes:

(a) Providing cleaner water through the reduction of sediment loading of Kentucky streams, rivers, and lakes.

(b) Reducing the loss of topsoil vital to sustain production of food and fiber.

(c) Preventing surface water and groundwater pollution.

(2) Approved Best Management Practices: Complete listings of eligible best management practices are contained in the document entitled Kentucky Soil Erosion and Water Quality Cost Share Manual.

(3) A district may request the Commission's approval of best management practices not included in the Commission's list of approved practices if those best management practices solve a problem unique to the requesting district and conform to one or more of the purposes listed above in subsection (1) Purposes of Best Management Practices. A request shall be filed in writing with the Commission in time for the Commission to review the request and to notify the district of its decision prior to the advertisement of the program for the next program year. Conservation practices may be included in a district's list of eligible practices offered for cost share assistance only if approved by the Commission in accordance with this subsection.

Application Procedures

Solicitation of Applications

The Commission shall establish, for each program year, a deadline for submittal of applications for cost share assistance. Each conservation district shall provide an opportunity for persons within the district to submit applications in time for the next program year by advertising the availability of cost share assistance in appropriate news media such as local newspapers, local radio stations, and any newsletters published by the district.

All applications shall be completed online. Once your applications are saved online they will be considered submitted to the KY Division of Conservation.

Contents of Applications

Contents of Application- In order to apply for cost share assistance, an applicant shall submit the current 2012 producer application located in Appendix C of this administrative manual to the conservation district in which the eligible land is located. The applicant shall append the following to the application:

(a) Any conservation plan, compliance plan, forest stewardship plan, or agriculture water quality plan in effect for the eligible land.

(b) If known to the applicant, or made in consultation with the appropriate technical agency, the anticipated total cost of the best management practice to be implemented and the percentage, if any, of the cost which the applicant proposes to bear, which percentage shall not be less than minimums established by the Commission for the particular best management practice.

Completion of Applications

An applicant who does not have a conservation plan, compliance plan, forest stewardship plan, or agriculture water quality plan in effect for the eligible land or who has not determined the anticipated total cost of the requested best management practice, may request technical assistance from the conservation district in developing a best management practices plan and determining costs. When the best management practices plan has been developed and the anticipated total cost determined, the application will be reviewed in accordance with the eligibility and prioritization criteria established by this administrative regulation.

Review of Applications

Each Conservation District shall review and determine the eligibility of all applications that are submitted by the established deadline. The board of supervisors for the district shall vote upon the eligibility at a meeting conducted in accordance with the Open Meetings Law, KRS 61.805 to 61.580, and record the outcome in the minutes for that meeting of the board of supervisors. A district supervisor who is also an applicant for cost share assistance shall not vote on eligibility. The

district shall forward the applications to the Commission within 15 days after determining eligibility. A district may submit both individual applications for eligible lands within the district and watershed-based applications for eligible lands within the district.

Approval Procedures

Prioritization of Applications

The Commission shall prioritize the applications of persons determined by the conservation districts to be eligible for cost share assistance and shall make the final award of cost share assistance.

(1) Classification of Priorities- Applications shall be prioritized based on the following criteria:

(a) Applicants conducting agricultural or silvicultural production needing animal waste management systems where animal waste has been identified by the Kentucky Energy and Environment Cabinet as a water pollution problem.

(b) Applicants who are members of DOC Certified Agricultural Districts.

(c) Applicants who have implemented a conservation plan, a compliance plan, an agriculture water quality plan, or a forest stewardship plan and are part of a watershed where the ecosystem-based assistance process in ongoing.

(2) Applications within each classification identified under the Classification of Priorities, shall be prioritized based on the following criteria:

(a) Presence of water pollution based on:

1. Notification by a local, state, or federal agency that the applicant's agricultural or silvicultural production has caused or contributed to water pollution.

2. Determination by the Kentucky Energy and Environment Cabinet that surface water affected by the applicant's agricultural or silvicultural production is not meeting its designated use.

3. Identification by the Kentucky Energy and Environment Cabinet of a water priority protection region encompassing the location of the applicant's agricultural or silvicultural production.

4. Other documentation of water pollution, such as a biological assessment.

5. Potential for development of water pollution from agricultural or silvicultural production in the watershed in which the applicant's agricultural or silvicultural production is being conducted.

(b) Types of water pollutants based on:
    1. Animal waste.
    2. Sediment run-off.
    3. Nutrient loading.
    4. Pesticide application, storage, and disposal.

(c) Proximity of pollutant to groundwater or surface water.

(d) Magnitude of water pollution.

(e) Location in designated water quality planning area based on the existence of one or more of the following:
    1. An ecosystem-based assistance process.
    2. A Federal Clean Water Act Section 319(h) watershed plan area.
    3. A wellhead protection area.
    4. An agriculture water quality protection region.

Allocation of Cost Share Assistance

(1) The available funds received by the Commission for the cost share program shall be allocated to the conservation districts based on requests from districts approved by the Commission prior to each program year. The districts shall receive a share of the Kentucky Soil Erosion and Water Quality Cost Share Fund based on the Commission's approval of a district's initial request based on the objectives and prioritization detailed under the section titled "Approval Procedures" in this administrative manual.

(2) The Commission shall retain ten percent (10%) of the available funds in a contingency fund to be allocated to assist persons engaged in agricultural or silvicultural productions and implementing the agriculture water quality program mandated by KRS 224.71.

Best Management Practices Designs

Once cost share assistance has been approved by the Commission, the conservation district shall designate a technician to develop final design and layout for the approved best management practices.

Funding Guidelines

Execution ofPerformance and Maintenance Agreements

After an applicant has been approved for cost share assistance and before the applicant receives payment of the cost share funds, the applicant and the conservation district shall execute a performance and maintenance agreement.

(1) Requirements of performance and maintenance agreements- The performance and maintenance agreement shall require the applicant to meet the following requirements:

(a) The applicant shall agree to perform those best management practices approved in accordance with this administrative regulation.

(b) The applicant shall agree to maintain approved best management practices for the expected life of each practice agreed upon in the performance and maintenance agreement.

(c) Upon completion of the approved best management practice, the applicant shall notify the district that the practice has been installed and shall provide to the district for its inspection all vouchers, bills, and receipts associated with the practice when required.

(d) The applicant shall agree that at the time of transfer of ownership of land where a best management practice has been applied using cost share assistance and the expected life assigned the practice has not expired, the applicant shall execute a contract with the transferee requiring continuation of those practices until completed.

(e) The applicant shall agree that if the applicant destroys the best management practice installed or voluntarily relinquishes control or title of the land on which the installed practice has been established, and the new owner, heir, or operator does not agree in writing to properly maintain the practice for the remainder of its specified life span, the applicant shall refund all or part of the cost share assistance as determined by the district.

(f) The applicant shall agree that if the applicant does not maintain the approved best management practices on the schedule provided in the plan, the applicant shall forfeit the cost share assistance and the Commission shall be authorized to recover the funds disbursed.

(2) Effect of Performance and Maintenance Agreement- Requirements for performance and maintenance of best management practices applied using cost share assistance shall be established in the performance and maintenance agreement and reviewed with the applicant at the time of application submittal and before completion of a certification of practices.

(3) Refund of Funds Disbursed- The district may require a refund of cost share when an approved best management practice has not been performed or maintained in compliance with approved

design standards and specifications for the practice during its expected life as agreed in the performance and maintenance agreement.

(4) Application for Future Cost Share Assistance- Best management practices that have been successfully completed and which later fail as the result of floods, drought, or other natural disasters, and not through any fault of the applicant, shall not prohibit the applicant from applying for additional cost share assistance to restore the practices to their original design standards and specifications.

(5) Certification- Upon notification by the applicant that the approved best management practice has been completed and before disbursement of funds from the district, the appropriate technical agency shall certify to the district that the practice has been installed in accordance with the document entitled Kentucky Soil Erosion and Water Quality Cost Share Manual incorporated by reference on page 10.

(6) Limitations on Awards- Cost share assistance to an applicant shall be limited to 75% or 60% (depending on the practice installed) of the actual cost, not to exceed the payment rate approved by the Commission, for each best management practice. These practices are governed by a maximum of seven thousand, five hundred dollars ($7,500) per program year to each applicant or operation for all practices except, KSW3, KSW12, KWP4, and KWP5, which have a maximum of twenty thousand dollars ($20,000) per program year to each applicant or operation.

Cost share assistance awarded to any one applicant or operation shall be limited to a maximum of twenty thousand dollars ($20,000) per program year. Applicant is defined by use of Social Security/Tax ID number, operation is defined by Farm number. Example: FSN # 1234 combined with SS Number 987-65-4321 would discontinue the eligibility for both the FSN & SS Number for additional funding.

Cost share will be provided only for components included in the minimum design needed to solve or prevent the resource concern. Cost share assistance shall not be awarded to best management practices in progress prior to cost share approval or practices previously installed by the applicant.

Funding Request from the KY Division of Conservation

After the applicant completes the approved practice, the conservation district will then be responsible for requesting the individual funds from the KY Division of Conservation. Payments will be certified on the 5th and 15th of the month. Please be sure to use the most current form available when submitting requests.

Administrative Guidelines

Reporting and Accounting

(1) District Reporting and Accounting- A district shall conduct the following reporting and accounting procedures:

(a) Submit a monthly report to the Commission indicating the obligated and unobligated balance of the practices of active years to the Commission.

(b) Submit an annual progress report to the Commission showing accomplishments "to date" for the current program year.

(c) Assemble case files for each approved application, filed by program year, to contain the following:

1. The approved application for allocated funds.
2. A copy of the estimated cost sheet detailed on the worksheet printed from the online program. (Page 3 KY State Cost Share Application)
3. Certification of practice completion.
4. Applicant's vouchers, bills, or receipts.
5. Final designs for best management practices.
6. The performance and maintenance agreement.
7. Any amendments to the performance and maintenance agreement.
8. A map locating the practices.

(2) Commission Reporting and Accounting- The Commission shall conduct the following reporting and accounting procedures:

(a) Receive and maintain reports from districts showing the obligated and unobligated balance of allocated and disbursed cost share funds as shown on each report.

(b) Submit consolidated quarterly reports based on the reports from districts on the obligated and unobligated balance of the Kentucky Soil Erosion and Water Quality Cost Share Fund.

(3) Closing out Individual Applications- After the cost share payment has been made to the approved landowner the Conservation District is responsible for forwarding pages 3, 4, 5 & 6 of the application in question to the KY Division of Conservation. These pages can be scanned and emailed, mailed hard copy, or faxed. Please be sure that all of the appropriate information is correct to the best knowledge of the District, and has been signed off on by the responsible parties. Please be sure to keep a copy of this information also in the individual landowners' case file.

(4) Tax Information- Each landowner who receives $600 or more shall be supplied an IRS form 1099 or equivalent tax accounting documentation. The Conservation District is responsible for distributing the necessary tax information.

Incorporation by Reference

The document entitled Kentucky Soil Erosion and Water Quality Cost Share Manual, dated March 1, 1995, is hereby incorporated by reference. It is available for public inspection and copying, subject to copyright law, at the office of the Kentucky Division of Conservation, 2 Hudson Hollow Road, Frankfort, Kentucky 40601, between the hours of 8:00 a.m. and 4:30 p.m., excluding state holidays.

Example News Release

Conservation District Cost Share Program Announced

The _____ County Conservation District will be accepting requests for cost share funding under the Kentucky Soil Erosion and Water Quality Cost Share Program beginning _____ and extending through _____.

The Kentucky Soil Erosion and Water Quality Cost Share Program was created to help agricultural operations protect the soil and water resources of Kentucky. This program is a result of House Bill 377 that was passed in the 1994 General Assembly. This bill established annual cost share funds to be administered by conservation districts with priority given to animal waste related problems and agricultural district participants where pollution problems have been identified. Initial funding for the program will be provided by the Kentucky Department of Agriculture.

Funding for practices will be approved by the Soil and Water Conservation Commission at the Kentucky Division of Conservation, located in Frankfort, as funds are available.

For more information stop by the conservation district office located at _____

_____.

Monday through Friday from _____ a.m. to _____ p.m. Phone:_____.

Note: A printed advertisement shall be prominently displayed in the county's newspaper. A copy of the advertisement shall be kept on file in the Conservation District office.

Guidance to Cost Share Program Procedures

1. Local conservation districts will advertise a program, then begin to screen interested applicants based on approved criteria established by the Commission. (Conservation district office completes Page 1 of Form SCP-245 with interested applicants.)

2. Appropriate technical agency and/or conservation district staff visits potential applicants to evaluate practices and complete cost share application. (Technical agency completes page 2 of Form SCP-245)

3. Applications are reviewed and approved or denied by local conservation district.

4. Locally approved applications are forwarded to the Kentucky Division of Conservation.

5. The Commission will evaluate applications based on established criteria and earmark funds for qualified applications as funds are available.

6. An approval or disapproval notice is sent back to the conservation district with appropriate funds to install approved practices.

7. Once practice is installed to specifications, the landowner and the conservation district will co-sign the installation form and payment will be made from district to the landowner. Final cost share payment can not be paid to the applicant/landowner until completed, inspected, and approved by the technical agency.

8. Funds not used from the installation of a practice will be reported as unobligated funds to the Kentucky Division of Conservation for redistribution. Approved applicants have one (1) year to complete the practice.

9. Extensions will be granted for intervals of six (6) months with a maximum of two (2) extensions per approved application. After two extensions have been granted and expired, the landowner forfeits the rights to the funds and the conservation district shall report any disbursed funds as unobligated funds to the Division of Conservation.

10. Contract modifications due to errors or omissions must be justified, in writing, to the Commission. Requests for contract modification that will increase cost share funding must be recommended to the commission by the local district board and the engineer/technician. The approval of the funding for the contract modifications will be decided on by the Commission and are subject to the practice being eligible to receive additional assistance and the availability of funds.

11. Approved and completed cost share practices are subject to inspection by members or designees of the local conservation district and/or the Soil and Water Conservation Commission.

12. Applicants shall agree to maintain approved, completed conservation practices according to the provisions as defined in the Performance and Maintenance Agreement and the defined life span of the specific practice according to the technical agency's standards.

13. Conservation practices that are approved and completed are subject to an engineering spot check by the technical agency for design standards and specifications.

Field Office Questions on State Cost Share

Q. In determining needs, is there a definition such as minimum number of animals, proximity to streams, etc.?

A. There is no definition in quantifiable terms. Technical determinations need to be made to assess the present or potential for effects of the operation on water quality. NRCS should base their decision in regard to whether or not the planned work solves the resource problem and if it is a practical solution to the resource concern.

Q. Animal Unit Calculations for Poultry: Whose figures do you use?

A. For purposes of filling out the state cost share application, use 250 birds per animal unit as listed in the State Cost Share Manual for program consistency and equity in applications. When designing the system and for land application purposes, use actual weights and management information to determine appropriately sized structures.

Q. If NRCS does not recommend a practice is needed and practical, do we sign the application?

A. To more clearly indicate what NRCS is certifying, the "NO" block would be checked on page 2 of the application, and NRCS would sign as an indication that the practice is not needed and practical.

Q. If a practice is needed and practical, but the landowner has requested a design that includes components which exceed the minimum needed to solve or prevent the conservation problem, will State Cost Share fund the practice?

A. State Cost Share will pay an amount equal the minimum cost needed to solve or prevent the conservation problem, not to exceed $7,500 or $20,000. Cost of additional materials or services, or the cost difference for materials that exceed the minimum design need, will be the landowner's responsibility.

Q. Is the landowner required to insure his State Cost Share practice?

A. No, but the landowner is responsible for the structure for its entire lifespan and will be required to fix or replace the structure if it is damaged or destroyed.

Q. If a practice is funded that was determined as not needed by NRCS, does NRCS furnish technical assistance in installation of the practice?

A. Yes, NRCS will provide technical assistance, which is consistent with our partnership relationships with districts. As a reminder, practices must meet FOTG requirements when NRCS provides assistance.

Q. Are applications driven by farm number and/or tract?

A. Yes, this information needs to be on the electronic application submittal. Remember that state cost share has a maximum or cap of $20,000 per individual or operation in any one program year. See page 9, #6 in the cost share manual.

Q. A related question to the one above – Can more than one participant make an application on the same operation? (Situation: A poultry operation has three buildings and an application is filed for a litter storage building that will cost $26,000. The operation is going to expand by two buildings. Can a second application be filed by another person (such as a family member) during the same sign-up for a litter storage building to support the other two houses on the same operation to get another $20,000?)

A. No. The Commission looks at applications that have not received funding in the past as a high priority. We need to close this problem to state that the maximum or cap is for each individual and/or farming operation in any given program year.

Q. Does the NRCS Waste Management Plan need to address the resource problem fully? Situation: A beef producer is operating a pasture feedlot that supports 500 animal units. The producer wants a covered feeding area w/stack pad to solve the resource concern. The producer wants to size the structure according to the state cost share limitation of $20,000.
A. NRCS should plan/design a system to effectively address the entire operation. If state cost share can provide some cost assistance, that's great. NRCS should not simply design a $26,000 system to address a $100,000 problem!

Litter Storage Buildings:
Q. What about previous designs based with posts on top of concrete?
A. If funds have already been approved, that's OK.

Q. What about non-NRCS designs such as Agri-Vision?
A. Non-NRCS designs are acceptable for state cost share as long as a non-NRCS engineer (PE) certifies that the structure meets the structural loading requirements as stated in the 313 standard.

Q. When cost estimate is over $20,000, is an as-built comparison still needed? Agri-vision may not separate costs of trusses, tin, 2 x 4's etc.
A. Yes, You can use the typical cost estimate that is on the on-line application.

Q. As far as tin on building sides, can state cost-share be paid if not on a NRCS design such as Agri-Vision?
A. Yes, most NRCS designs require siding to be placed to within 2' of girders to prevent rain blowing in on litter and increasing the fire hazard.

Q. In reference to the six types of litter storage buildings in Kentucky Bulletin 300-1-5, will NRCS provide designs and construction plans for Truss Arch w/wood Pony Wall-Quick Cover standard design buildings?
A. Yes, these have been approved and furnished to field engineers.

Q. If an operation has been cited for a water quality violation and the producer needs to cover a feeding area, loafing area, etc., will state cost share pay the fees for a professional engineer?
A. No.

Q. I have a landowner approved for the KSW3 in 2000. Included in his plan was a pipeline/tank. He has also applied for CRP and can get a pipeline and tank through that program. Can he still get the planned practices (incentive and pasture planning) through KSW3 and the pipeline and tank through CRP?
A. From the information given, I'm assuming the KSW3 practice covers a pasture field that joins a stream that is being fenced and a buffer practice between the fence and stream is under CRP. The pipeline/tank then would be eligible for cost share under state cost share or CRP. The critical thing is that the KSW3 acreage and the CRP buffer acreage CANNOT be the same.

In addition, for CRP purposes, the pipeline/tank installation should be limited to the original field(s) adjacent to the stream and should be limited to one pipeline/tank installation per field. If the original field is divided into sub-fields or paddocks under state cost share (KSW3), then the pipeline/tank systems serving those sub-fields should be cost shared under the state cost share program.

Instructions for Completing Cost Share Application (Hard Copy)

SCP-245 Page 1-

Application ID: To be Filled out by the Office Staff

In the spaces provided in the top right corner of the application, 1____- 2___-3 ____

1. Enter the calendar year in which the applicant is requesting cost share.
2. Enter the county number based on the following alphabetical number sequence:

1. Adair	31. Edmonson	61. Knox	91. Nicholas
2. Allen	32. Elliott	62. LaRue	92. Ohio
3. Anderson	33. Estill	63. Laurel	93. Oldham
4. Ballard	34. Fayette	64. Lawrence	94. Owen
5. Barren	35. Fleming	65. Lee	95. Owsley
6. Bath	36. Floyd	66. Leslie	96. Pendleton
7. Bell	37. Franklin	67. Letcher	97. Perry
8. Boone	38. Fulton	68. Lewis	98. Pike
9. Bourbon	39. Gallatin	69. Lincoln	99. Powell
10. Boyd	40. Garrard	70. Livingston	100. Pulaski
11. Boyle	41. Grant	71. Logan, N & S	101. Robertson
12. Bracken	42. Graves	72. Lyon	102. Rockcastle
13. Breathitt	43. Grayson	73. McCracken	103. Rowan
14. Breckinridge	44. Green	74. McCreary	104. Russell
15. Bullitt	45. Greenup	75. McLean	105. Scott
16. Butler	46. Hancock	76. Madison	106. Shelby
17. Caldwell	47. Hardin	77. Magoffin	107. Simpson
18. Calloway	48. Harlan	78. Marion	108. Spencer
19. Campbell	49. Harrison	79. Marshall	109. Taylor
20. Carlisle	50. Hart	80. Martin	110. Todd
21. Carroll	51. Henderson	81. Mason	111. Trigg
22. Carter	52. Henry	82. Meade	112. Trimble
23. Casey	53. Hickman	83. Menifee	113. Union
24. Christian	54. Hopkins	84. Mercer	114. Warren
25. Clark	55. Jackson	85. Metcalfe	115. Washington
26. Clay	56. Jefferson	86. Monroe	116. Wayne
27. Clinton	57. Jessamine	87. Montgomery	117. Webster
28. Crittenden	58. Johnson	88. Morgan	118. Whitley
29. Cumberland	59. Kenton	89. Muhlenburg	119. Wolfe
30. Daviess	60. Knott	90. Nelson	120. Woodford

3. Enter the application number generated on the electronic application.
   * See: Page 3 of State Cost Share Application to find this number.

Applicant Information- To be Filled out by the Applicant

1. Enter applicant's name, address, and phone number. (In the case of a Conservation District Environmental Grant, this would be the information of the appropriate conservation district. All Environmental Grants must be submitted in hard copy.)

   *Note: If the applicant is not the landowner, there must written documentation of permission to install the practice/practices binding the landowner to the cost share if the tenant no longer rents/leases the land. See Page 4 of this manual for more information.

2. Enter applicants' farm # and tract #, for the farm and tract the applicant wishes to install practices on. (If the practice covers multiple tracts, enter the tract most affected by the practices.)

3. Indicate whether or not project is within a Division of Conservation certified Agricultural District.

4. Indicate whether or not this applicant owns multiple farming operations.

5. Indicate whether or not this is a new farming operation.

6. Indicate whether or not this practice involves a partnership or joint venture with others.

7. Indicate whether or not applicant would be willing to allow cost shared practice to be part of a district field day or demonstrations.

8. Indicate whether or not applicant has a Conservation, Compliance, or Stewardship plan in effect.

9. Indicate whether or not applicant has an individual agriculture water quality plan on file in the conservation district office.

10. Has the landowner requested other cost share assistance for this practice?

11. Indicate whether or not applicant has requested any other federal, state, or local cost share assistance for this practice.

12. Indicate whether or not applicant has previously received State Cost Share funds for any practice. * If the applicant has previously been approved for cost share and cancelled or not completed the practice in the required time, the question should be answered "yes".

13. Indicate number of year's application has been filed and not received approved cost share. If applicant has been approved for cost share in some years but has applied and not been approved in other years, enter the number of years the applicant has not been approved since the last time the applicant was approved. For example, if the applicant was approved for cost share in 2009, but applied and was not approved in the years of 2010 and 2011, then for a 2012 application, the answer would be "2". If the applicant was approved in 2011, then the answer would be "0".

14. Indicate whether or not this practice request is for a corrective measures action or due to a Notice of Violation (NOV).

15. Indicate the type and quantity of animals on the operation. Note: See animal listing located in Appendix B. This information is required for all applicants regardless of resource concern.

16. Indicate the practice symbol and practice name that the applicant is seeking to correct resource concerns on the farm listed above.

SCP-245 Page 2- To be Filled out by the Technical representative Assigned to Application

1. Location

a. Enter the 14-digit watershed number, as identified by NRCS, where practice will be installed

If you do not know the HUC for the watershed, you can find that number on the Kentucky Watershed Viewer at http://gis.gapsky.org/watershed/.

1. Review licensing statement and click "Agree" if you wish to continue.
2. Click the "Find Address/Point" button on the top bar (2nd button from the left).
3. Enter the address of the location where practice will be installed and click "Locate".
4. Choose correct location from the Find Address results box.
5. Click "Zoom to" on the box including that address in the middle of the screen.
6. Click the "Identify" button on the top bar (1st button from the left).
7. Choose "Identify by point" (1st button from the left).
8. Click the aerial photo of the farm. A box will pop open with information about the point you chose on the map.
9. Record the HUC 14 from the pop-up box.

If you need to find out the Impairment Status of the stream, leave this window open while you continue to fill out the rest of the application.

- If practice is located on the boundary of two watersheds, enter the number of watershed most affected by practice.
- If multiple practices are requested please use the location information on the requested practice with the highest priority. See page 6.

b. Enter distance in feet from an open sinkhole.

c. Enter topographic quadrangle name on which practice will be located.

d. Enter the appropriate watershed or area special designation for practice location if it has received special designation as one of the following:

Watershed Plan	Outstanding State Resource Water
EQIP Watershed	AWQA Priority Protection Area
Sourcewater Protection	Local Project
Federal Wild River	Outstanding National Resource Water
State Wild River	Federal Scenic River
Federal Recreation River	USDA/EPA Unified Priority Watershed

A list of the State Wild Rivers, Outstanding National Resource Waters and other Exceptional Waters can be found at http://www.lrc.ky.gov/kar/401/010/030.htm
To find a list of Outstanding State Resource Waters, visit http://www.lrc.ky.gov/kar/401/010/026.htm.

e. Enter latitude and longitude from topographic map where practice will be located. (If practice covers an entire field or fields, then enter latitude and longitude of primary field.)

2. Problem

a. Enter one of the following codes to identify the type of water problem:

Code	Type of Problem
1	Sediment
2	Animal Waste
3	Nutrients (inorganic)
4	Pesticides/Toxins
5	Salinity
6	Other

b. Enter one of the following codes to identify the type of water body treated/protected:

Code	Type of Water Body
1	River, stream, or creek-perennial, flowing freshwater streams.
2	Lake, reservoir, or pond-inland bodies of water including lakes.
3	Wetland, swamp, or freshwater marshlands that have a predominance of hydric soils and that is inundated or saturated by surface or groundwater such that under normal circumstances it supports a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.
5	Groundwater (area)-the surface area that feeds an aquifer or other groundwater basin including an open sinkhole

c. Utilize the Kentucky Integrated Report to Congress on Water Quality found at http://water.ky.gov/waterquality/Pages/IntegratedReport.aspx to determine the pollution status of 14-digit watershed streams. Enter one of the following codes to indicate the severity of the pollution:

Code	Severity of Pollution
1	Designated use impaired-designated use is precluded (hindered or prevented) because of water pollution (Waters not supporting designated uses.)
2	Designated use threatened-currently meets designated uses, but data or assessment information indicate an existing or potential downward trend in quality that, in the absence of additional management, will lead to impairment of designated uses within the next five years, or based on professional judgment, will lead t degradation of significant pristine and fragile waters. (Waters partially supporting designated uses
3	Impairment not determined-condition unknown, no data available. (Unknown or not assessed.)
4	Designated use met-no impairment of designated use. (Waters supporting designated uses.)

To find this information on the Watershed Viewer, begin where you left the viewer on page 17.

1. Click the "Enhanced 305(b) Search" button on the bar(6th from the left).
2. In the pop-up box that appears, choose Aquatic Life in the Search Layer box.
3. Choose the Point Selection (second box) and Check the box "Add search tolerance to point selection".
4. Click the stream beside the area where you would like to apply the practice.
5. If the Box says "Features Selected:0" and the stream is Blue, then enter Code 3 Stream Condition Unknown.
6. If the Box pops up with the name of the stream and says Features Selected:1, scroll to the bottom of the box or to the right of the box at the bottom of the screen. Stop when you see WAH_CAH, PCR, SCR, FISH_CONSU,and DWS. Beside each of those acronyms will be a number code. Anything with a 5-PS should be entered as Code 2 in the Cost Share application. Anything with 5-NS, should be entered as Code 1 in the Cost Share application. 2-FS should be entered as Code 4 in the Cost Share application.

d. Enter the approximate distance in feet from the pollution problem to the water body protected as identified in 2.b.

3. Extent

Enter the practice symbol used to identify the requested practice. (Example: "KSW5" for Animal Waste Utilization. Enter the practice name that cost sharing is being requested to implement. (Example: "Animal Waste Utilization" for KSW5.)

a.1 Enter the name of the type of livestock pollution practice that will be addressed and enter the number of animal units that will be served by the practice. (Animal unit = 1,000 lbs. of live weight of livestock or poultry.) If poultry composting facility, estimate the animal units that will be composted annually. Example: beef, swine, dairy, poultry, etc.

a.2 Enter the number of months identified livestock or poultry are or will be confined annually. (Leave blank if applying for poultry composting facility.)

Note: For poultry, only the greatest number of birds present at any one time during the year should be used for calculating animal units.

b.1 Enter in whole numbers the sheet and rill erosion rate, estimated in tons per acre per year, before practice installation.

b.2 Enter in whole numbers the sheet and rill erosion rate, estimated in tons per acre per year, after planned practice installation.

b.3 Enter the acres to which sheet and rill erosion rate applies.

c.1 Enter in whole numbers any other erosion that may be occurring before practice installation. (Examples: gully, streambank, etc.)

c.2 Enter in whole numbers other erosion, estimated in tons per year, after planned practice installation.

c.3 Enter the total acres to which erosion rate applies.

d.1 Enter in whole numbers the units of N-Nitrogen, P-Phosphorus, and K-Potassium being applied per acre, per year before practice implementation. (Average the annual application of nutrients if various crops are being grown in a specific rotation.)

d.2 Enter in whole numbers the estimated units of N, P, and K applied after planned practice installation.

d.3 Enter the total acres to which nutrient rate apply.

d.4 Enter the estimated total nutrient savings for the acres affected to determine total nutrient savings. Multiply the estimated nutrient savings by the acres affected.

e.1 Enter the code for the predominant crop being grown:

1. Alfalfa
2. Corn
3. Soybeans
4. Wheat or Small Grain
5. Tobacco
6. Vegetable Crops
7. Ornamental Crops
8. Other

e.2 Enter the predominant tillage being used annually

1. Conventional (<30% cover)
2. Minimum (30%-90%)
3. No-Till (>90%)
4. Permanent cover

e.3 Enter the total acres to which pesticide is being applied.

e.4 Enter the current conditions of pesticide application:

Good: Applies according to label recommendations and little risk exists for groundwater or surface water contamination.

Fair: Applies according to label recommendations, but fields are located near surface water or in areas dependent on groundwater supply or with Karst features.

Poor: Application exceeds label recommendations and fields are located near surface water or in areas dependent on groundwater supply or with Karst features.

4. Enter whether livestock is present on the operation.

5. Is this practice needed and is it practical to solve the problem identified and can be installed according to NRCS conservation practice standards and specifications.

SCP-245 Page 3

Enter the information into the electronic application to determine the eligible maximum cost share amount. The figures are contained within the application, and according to the practices that are input, the maximum cost share amount is determined

- A signature is required from the NRCS representative.
- If the Conservation District Board approves the request, the Board's Chairman Signs, dates, and files within the applicants' case file.
- Application Rating will be determined by the Division of Conservation.

SCP-245 Page 4

A. Practice Approval Information

a. The Conservation District shall complete this section.
b. Fill in the appropriate amounts for the original funds requested, and the funds approved for the practice, also the estimated deadline for the practice to be installed.

B. Installation Information

1. Practice Components Installed: NRCS representative complete page 6 of the SPC 245 application that identifies the conservation practice, units applied, estimated payment, actual cost, and actual payment information. The estimated payment rate will be supplied from the online version of the State Cost Share application. This payment estimate is for comparison to the actual bills furnished to the district by the applicant for the practice.

2. PerformanceReport: Technical Agency enters "Yes" or "No" following a construction check that verifies if practice meets technical standards.

3. DatePerformed: Technical agency enters the date when practice was completed to technical standards

A NRCS representative must sign and date to signify the installation information and the determination made on page 2, question 5 of the producer application are correct to their knowledge.

4. TotalInstalledCost: Following the review of the applicant's receipts, the Conservation District enters the approved cost of installation.

5. CostSharePayment: Enter the approved payment submitted from conservation district to applicant.

6. CheckNumber: The conservation district should enter the check number with which payment was made to applicant.

7. Applicant's Social Security or Tax ID Number: Fill in applicant's social security number or Tax ID Number.

8. C.D. Payment Approval: The Chairman of the conservation district should sign and date here following the approval of cost share payment by the conservation district's Board.

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Certification and Maintenance

1. Enter "Yes" if applicant installed practice alone and paid all expenses. If "No" use space provided or attach sheet with other parties listed as explained.

2. Applicant should read maintenance requirements and sign and date prior to receiving payment from the conservation district. The years of required maintenance should be entered for the specific practice code as specified in the Cost Share Manual.

SCP-245 Page 6

Final Payment Information

This page should be filled out by the technical agency. List the applicant's individual bills, as presented to the Conservation District. Page 6 must be completed before applicant is eligible to receive cost share payment.

KSL12 - VEGETATIVE FILTER STRIPS

Purpose

The purpose of this practice is to control and retard soil erosion. Additionally, following this practice should reduce water, air or land pollution from agricultural non-point source.

Application

Apply this practice to cropland or other sensitive areas that are subject to erosion, soil, and nutrient or pesticide movements which constitute a pollution hazard.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
Establishment of permanent herbaceous vegetative barriers (selected perennial seed varieties need to attain sufficient height, thickness, and stiffness to retard erosion and filter runoff water)	To reduce soil erosion. To prevent water pollution.	√	
• Minerals • Seed • Seedbed preparation • Seeding/Fence	To establish/maintain filter strip.	√	

Requirements

1. Weeds shall be controlled within the vegetative strips by mowing or with chemicals the year that the filter strips are seeded.
2. At least 1 mowing or chemical application on filter strips shall be performed without cost sharing in each subsequent year.
3. Chemicals used must be federally, state, or locally registered and applied strictly according to authorized registered uses on the label and other federal and state policies and requirements.
4. Vegetated Filter Strips installed immediately below heavy use areas used for feeding or as a component of a Waste Management System Plan (CNMP) shall be designed according to the NRCS standard Vegetated Treatment Area (635), Filter Strip (393), Field Borders (386)

Environmental Concerns

Consideration shall be given to wildlife and environmental protection when designing this practice.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Fence (Permanent Only)	382	20 yrs.
Filter Strip	393	10 yrs.
Field Borders	386	10 yrs.
Grade Stabilization Structure	410	15 yrs.
Vegetated Treatment Area	635	10 yrs.

KSP53 - INTEGRATED CROP MANAGEMENT

Purpose

The purpose of this practice is to prevent water quality degradation by using nutrients and pesticides in an environmentally friendly manner.

Application

Applies to cropland where nutrients and pesticides are utilized for production.

Requirements

1. A 2013 NRCS CNMP or NMP, and NRCS IPM plan (if needed) must be in place before Nutrient Management (590) and Pest Management (595) can be applied.
2. The application of nutrients must follow the NRCS CNMP or NMP plan.
3. The application of pesticides will occur after a NRCS WINPST assessment has been used to analyze the pesticides used by the operation.
    - If pesticide risk does not need to be mitigated, then the requirements of NRCS Integrated Pest Management have been met.
    - If mitigation is needed then a NRCS IPM plan must be developed to determine application methods, rates, and or pesticide changes that will need to be made.

Cost Share Policy

If Component is:	Authorized	Not Authorized
Nutrient applications are according to a 2013 NRCS CNMP or NMP, and pesticide use is in accordance with NRCS Integrated Pest Management standard (595).	√	
Nutrient applications according to a pre-2013 NRCS CNMP or NMP, an older NMP plan, or no plan at all.		√
Pesticides utilized according to a crop management plan without assessing potential water quality impacts.		√
Pesticide assessment completed through WINPST and water quality impacts do not require mitigation of the pesticides used on the operation.		√

Cost Share Payments

Payment will be made to implement practice codes 590 and 595. A $15.00 per acre incentive payment for implementation of both 590 and 595.

Cost Share Rates and Limitations

The maximum cost share rate is 75% of expenditures, not to exceed $7,500 total, including incentive payments.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Practice components are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Nutrient Management: Nutrients applied according to NRCS CNMP or NMP: • Soil tests • Crop requirements • Manure tests • Nitrogen and Phosphorus risk assessments • Required setbacks • Other techniques mentioned in NRCS 590	590	1 yr.
Pest Management: Pesticides applied and: • NRCS WINPST determines mitigation is not needed (or) • Mitigation practices and/or techniques completed according to NRCS IPM plan.	595	1 yr.
Record keeping	991	No Cost Share

KSP55 - PESTICIDE CONTAINMENT FACILITIES

Purpose

The purpose of this practice is to reduce pollution of water, land and air by pesticides.

Application

Apply this practice where the current method of handling pesticides is polluting or potentially polluting the soil and water resources. The facility must use over 100 pounds of active ingredients per person or farm.

Practice Policies

1. Before issuing state practice specifications, approved state offices shall consult representatives of the State Water Quality Agency, NRCS, and CES. Approved state offices must obtain concurrence in writing from NRCS and the state water quality agency of their agreement with the practice specifications. If changes to the specifications are requested, the Commission must approve them before the practice can be offered in the state.
2. A producer must agree to allow USDA representatives access to the site to review and evaluate KSP55.
3. The producer must implement a crop management system that uses pesticides in the most efficient and environmentally sound manner that is economically practicable. The producer must also agree to comply with all federal, state and local environmental laws and secure all necessary permits before starting construction.
4. The structure shall be made of sealed concrete or other similar material that will provide an impervious surface to minimize the potential for leaching and will provide functional and structural integrity for the design life.
5. An operation and maintenance plan for the facility must be developed. The system must be maintained for the functional life of the practice.
6. Rinsate and spillage must be disposed of according to the pesticide labeling requirements.
7. Any pipe must be entirely visible for inspection. A pipe may not pass through the concrete or equivalent material structure.
8. The structure must be situated to minimize any potential contamination of surface or ground water.
9. The structure must meet all state and local prescribed isolation distances.
10. Back-flow preventers must be installed if a water supply is available.
11. The system must be designed to contain at least 125 percent of the volume of the largest chemical tank that will be placed on the structure.
12. Using the pad for mixing or storage and handling of fertilizers is prohibited unless the operation and maintenance of the system is specifically designed for these purposes.
13. Protective runoff measures prescribed for the area on which these facilities are constructed must be performed before or concurrently with the installation of the facility.

Cost Share Policy

If Component is:	Authorized	Not Authorized
• Diversions, channels, waterways, outlet structures • Fence • Formed concrete, rebar, and sealant • Land shaping, leveling and filling to permit installation • Liners, soil sealant, and bentonite • Permanent pumps, pipes, valves, and storage tanks • Seed and seeding on critical areas	√	
• Construction of walls • Disposal of rinsate or spillage • Remedial action to correct soil, water, or other resources affected by pesticide spillage		√

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Diversion	362	10 yrs.
Heavy Use Area Protection	561	10 yrs.
Agrichemical Handling Facility	309	20 yrs.
Roof Runoff Management	558	15 yrs.
Subsurface Drain	606	20 yrs.
Critical Area	342	10 yrs.

KSW1 - SINKHOLE PROTECTION

Purpose

The purpose of this practice is to reduce the direct pollution of groundwater from sediment, animal waste, pesticides, or other agricultural pollutants.

Application

Apply this practice in Karst areas where open sinkholes are causing or have potential to pollute groundwater supplies.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
◆ Prevention of sediment from entering groundwater supply through sinkholes. ◆ Stabilization of soil.	Stop or reduce erosion, which is actively occurring at greater than tolerable levels.	√	
	◆ Improve farm aesthetics. ◆ Improve wildlife habitat. ◆ Improve drainage in sinkhole basins. ◆ Prevent livestock or human injury.		√
Reduction of : ◆ Animal waste. ◆ Chemicals. ◆ Fertilizers. ◆ Other pollutants.	Stop pollutants from entering the groundwater supply through open sinkholes.	√	

Requirements

1. Landowners must agree to any changes in management necessary to improve effectiveness of the practice.
2. Landowners or operators have the responsibility of obtaining any applicable permits prior to the receipt of cost share funds.

ProgramDevelopment

Conservation districts shall provide conditions required for cost sharing. Technical specifications may be incorporated by reference.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, “Limitation on Awards” if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Critical Area Planting (with trees and shrubs) (1)	342A	15 yrs.
Critical Area Planting	342	10 yrs.
Diversion	362	10 yrs.
Fence	382	20 yrs.
Filter Strip	393	10 yrs.
Grassed Waterway	412	10 yrs.
Grade Stabilization Structure	410	15 yrs.
Obstruction Removal	500	10 yrs.
Tree Planting	612	15 yrs.
Vertical Drain (2)	630	10 yrs.

(1) Utilization of Trees/Shrubs with a Critical Area Treatment, refer to guidelines found in practice code 612.

(2) Vertical drain is classified as a Class V injection well and requires notification to the US Environmental Protection Agency, Region IV, Atlanta, Georgia. Notifications for inventory purposes only. Applicant must furnish Latitude and Longitude coordinates or a USGS 7.5' topographic map identifying the Quadrangle name and identifying mark of the Class V injection well site.

◆ Critical area. ◆ Diversions. ◆ Filter strip. ◆ Permanent fence.	To protect agricultural heavy use areas from overland surface flow; to provide a filter strip to trap nutrients/sediments.	√	
◆ Area thru gate openings	Maximum size: 600 Square feet A gate opening with a resource concern that needs to be addressed.	√	
◆ Heavy Use Area (HUA) under any existing or planned, roofed structure.			√
◆ Winter Feeding Area	The structure (40-foot X 40-foot, approximately) will be used for groups of 20-25 cow calf pairs or cows. (If the operation has 50 cows, then divide the herd in half. This will allow one structure to be utilized by two groups) It is <u>NOT</u> intended for a feeder calf operation.	√	

<u>Requirements</u>

State Cost Share funds will not be available for Heavy Use Areas (HUAs) installed in conjunction with KWP4 dry stack facilities.

Authorization of cost share is not approved for applicants who are resubmitting requests for the same location on behalf of the same person.

The applicant/landowner must comply with sitting requirements and agree to follow needed cultural or management practices that extend the life of the heavy use area protection practice as defined in the NRCS standard and specifications practice code (Heavy Use Area Protection 561).

Winter Feeding Area: These structures are intended to be small and placed in a strategic location based on a holistic plan to fully utilize the rotational grazing system. The Concept here is to promote rotational grazing and planning. A holistic approach to this structure should include the proximity or location of hay storage structures. Producers should also be encouraged to develop a fully integrated operation around this structure by incorporating handling facilities, creep feeding areas, and a lot of close or sick cows. There must be a minimum of four (4) fields used on the farm to qualify as a rotational grazing system. There should be at least two (2) fields adjacent to the structure. An NRCS Conservation Plan with a grazing management plan "Practice Standard (528) Prescribed Grazing" must be completed before "KSW2 Winter Feeding Area" practice installation. Location must meet the same requirements as animal waste facilities. The structure is NOT designed to be covered, it is intended for the cattle to eat and get back into the field. The idea is to keep it simple to avoid cost over runs. A water source should not be installed within the structure or within 100-feet (approximately) of the structure. Additional requirements may be deemed necessary at the discretion of the Conservation Planner; this

includes but is not limited to, the requirement of a Kentucky Nutrient Management Plan. Reference UK Publication ID-188.

Program Development

Conservation Districts shall provide conditions required for cost sharing.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Animal Trails and Walkways	575	10 yrs.
Critical Area Planting (with no trees or shrubs)	342	10 yrs.
Diversion	362	10 yrs.
Fence	382	20 yrs.
Filter Strip	393	10 yrs.
Heavy Use Area Protection	561	10 yrs.
Winter Feeding Area		10 yrs.

KSW3 - ROTATIONAL GRAZING SYSTEM ESTABLISHMENT

Purpose

The purpose of this practice is to protect grazing land, vegetative cover, and encourage plant diversity. It also makes practical use of the land for vegetative cover to control soil erosion and reduce water, air or land pollution from agriculture or silviculture non-point sources.

Application

Apply this practice where its adoption will achieve erosion control to meet tolerable soil loss levels through better distribution or proper rotation of grazing. Apply where it will result in better grassland management and protection of surface and/or groundwater from non-point source pollution.

Cost Share Policy

Measure	Measure's Purpose:	Authorized	Not Authorized
• Constructing wells • Deepening wells • Well casings (wells must have adequate pumping equipment)	To make the conversion to a rotational grazing system	√	
• Dry wells • Pipe installed in the well • Pumping equipment • Pumps	To make the conversion to a rotational grazing system		√
Develop: • Springs or seeps Utilizing: • Livestock ramps	Protect the development from pollution by livestock	√	
Fence	Property boundary		√
Dugouts: • Dams • Permanent Pipelines, tanks and fountains • Portable watering facilities • Pits • Ponds	To make the conversion to a rotational grazing system.	√	
Permanent Fence (for cross-fencing)	To convert to an approved rotational grazing system by permanently cross-	√	

	fencing paddocks that are ten (10) acres or larger. * A Minimum of Four (4) paddocks required		
Permanent Fence (for use exclusion)	To protect developed or existing water supplies from pollution by livestock	√	
Portable Fence	To convert to an approved rotational grazing system by expanding existing pastures to a minimum of five paddocks. Eligibility will be limited to no more than 1000 feet of temporary fence.	√	
Conservation Activity Plan - NMP	Nutrient Management Plan	√	

Requirements

1. Expand existing pastures to a minimum of four paddocks that are managed according to an approved rotational grazing plan. A NRCS grazing plan must be developed using the KY-Graze software.
2. Livestock numbers must be adequate to justify conversion to a rotational grazing system, based on the stocking rate as outlined in the NRCS rotational grazing plan.
3. Landowners or operators must not have adopted a rotational grazing system previously.*
   *If an existing rotational grazing system is in place, and only a livestock watering system is needed to provide an adequate water supply, the existing rotational grazing system must meet NRCS standards and specifications in order to be eligible, cost share will be available only for the necessary livestock watering system components.

Environmental Concerns

Consideration should be given to the need of wildlife and enhancing the appearance of the area.

ProgramDevelopment

1. Conservation districts shall provide local oversight of the cost share program in accordance with the Cost Share Manual.
2. Permanently installed tanks, troughs, fountains and pipelines shall follow USDA, NRCS Technical Practice Codes 614 and 516.
3. For portable watering facilities, eligibility will be limited to two (2) tanks and necessary conveyances (pipe, hose, valves, etc.)
4. If the applicant is receiving an incentive payment for the prescribed grazing practice in a current EQIP contract, then portable fence and portable watering facilities are not eligible components under the state cost share program.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $20,000 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Fence	382	20 yrs.
Pipeline	516	20 yrs.
Pond	378	20 yrs.
Spring Development	574	10 yrs.
Trough or Tank	614	10 yrs.
Water Well	642	20 yrs.
Streamcrossing	578	20 yrs.

KSW4 - WATER WELL PROTECTION

Purpose

The purpose of this practice is to protect the quality of groundwater and well water supplies from contamination by agricultural non-point source pollution.

Application

Apply this practice where active or abandoned water wells are being contaminated by agricultural non-point source pollution.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
◆ Diversion channels. ◆ Fence. ◆ Land shaping, leveling, filling. ◆ Seed and seeding on critical areas around active or abandoned wells. ◆ Waterways.	To protect areas around a well.	√	
◆ Water testing.	Evaluate conditions of an active well.	√	
◆ Formed concrete. ◆ Rebar. ◆ Sealant.	Prevention of contaminants from entering a well.	√	
◆ Construction of new wells. ◆ Casing, pumps, or pipelines. ◆ Well houses or other storage areas for pumps and equipment.			√
	Repetition of this measure which was approved for the same person on the same acreage.		√

Requirements

1. The producer must agree to comply with all federal, state, and local environmental laws.
2. The landowner must agree to follow needed cultural or management practices that extend the life of a water well protection practice.
3. When the water from the well is utilized for human consumption or dairy livestock watering, the requirements of the Kentucky State Health Department shall be met.
4. Each well shall be provided with a watertight cover to prevent contaminated water or other objectionable material from entering the well.

5. Before issuing state practice specifications, approved state offices shall consult representatives of the Kentucky State Health Department and CES.

Program Development

The conservation district shall provide conditions required for cost sharing.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Critical Area Planting (no trees or shrubs).	342	10 yrs.
Diversion.	362	10 yrs.
Fence.	382	20 yrs.
Filter Strip.	393	10 yrs.
Grassed Waterway.	412	10 yrs.
Subsurface Drain.	606	20 yrs.
Underground Outlet.	620	20 yrs.
Well Decommissioning.	351	20 yrs.
Well Water Testing.	990	1 yr.
Water Well	642	20 yrs.

KSW5- ANIMAL WASTE UTILIZATION

Purpose

The purpose of this practice is to safely use wastes as fertilization for crop, forage, or fiber production while improving or maintaining soil structure, preventing erosion, and safeguarding water resources.

Application

By applying this practice to soil and vegetation, it will utilize the waste as fertilizer; minimize pollution of ponds, streams, lakes, wells, and sinkholes; and reduce the use of chemical fertilizers.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
Completing soil tests and manure analysis.	Necessary to determine waste application rates.	√	

Cost Share Prerequisites

1. A KY NRCS approved CNMP or NMP must be developed prior to receiving technical or financial assistance.
2. An approved waste storage facility must be in place prior to disbursement of cost share funds for animal waste utilization.
3. Any applicable permits and appropriate renewals will be the responsibility of the landowner or operator prior to receiving cost share funds.
4. Authorization for cost share is not permitted for applicants who have been previously approved for the same parcel of land.
5. A Comprehensive Nutrient Management Plan must be developed, to achieve the level of nutrients required by the crop, balancing nutrients in the soil and from other sources applied in the form of fertilizer and animal manure. Incorporate technical references as required.

Cost Share Rate

The SWCC has established a maximum of $15 per acre as an incentive payment for conversion to an approved waste utilization program based on rates specified in the nutrient management plan.

Additional incentive payments are not to exceed $10 per acre, for two consecutive years following the initial year of adoption. Rates will be based on those specified in the nutrient management plan.

Rates will be based on the recommendations specified in the nutrient management plan. Manure analysis and soil testing, as recommended by the technical agency, will be cost shared at a maximum of 75% of actual cost. Total cost of practice, including incentive payments for all three years, cost of soil testing and manure testing shall not exceed $7,500.00.

ProgramDevelopment

The Conservation District shall provide the conditions for meeting Cost Share requirements. Technical specifications may be incorporated by reference.

Specifications

Specifications, plans, and construction must conform to the standards in the Technical Guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Table 1

Descriptive Title	Technical Practice Code	Life Span
Filter Strip.	393	No Cost Share
Nutrient Management Plan.	(2013) 590	1 year
Waste Utilization: ◆Manure Analysis. ◆Soil Testing. ◆Waste Application.	633	1 year
Vegetated Treatment Area	635	10 years

KSW6 - FOREST LAND EROSION CONTROL SYSTEM

Purpose

The purpose of this practice is to protect the resource base by reducing erosion and sedimentation while enhancing water quality on forestland where disturbances are caused by silviculture or other activities.

Application

This practice should be applied to forestland that is subject to any of the following:

- Erosion which is greater than soil loss tolerance
- Soil movement that constitutes a surface or groundwater pollution hazard
- Negatively impacted soil and water resources as a result of silvicultural practices.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
•Critical Area Protection. •Stream Crossing •Diversion. •Fence. •Filter Strip. •Grade Stabilization. •Water Bars.	Serves as a remedy to existing erosion caused by agricultural or silvicultural activities and to prevent erosion from silvicultural activities.	√	
Fence	Property boundary		√

Requirements

This practice may be used in conjunction with other federal, state, or local programs to address silvicultural activities. However, it will not duplicate or supply additional payments for components previously paid for by other cost share funds.

Practice Lifespan

The forestland erosion control system shall be maintained for at least 10 years after the calendar year of practice implementation.

ProgramDevelopment

- Conservation Districts shall provide conditions required for cost sharing. Any technical specification may be included or incorporated by reference.
- Development of an agricultural water quality plan, silvicultural activity section, and a timber harvesting plan is recommended. Landowners may use private consultants or contact the Kentucky Division of Forestry for assistance.
- The Conservation Commission has established a cost of components in the current average statewide cost list maintained by NRCS and Farm Service Agency. Practice may not exceed

$7,500 in total cost share funds per program year. Landowners may not receive more than 100% of the actual cost incurred.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to standards set in the technical guide on file in the office of the local NRCS District Conservationist or reference to the KY Division of Forestry, Kentucky Forest Practice Guidelines for Water Quality Management and refer to appropriate Best Management Practices. (1) Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Critical Area Planting (no trees or shrubs)	342	10 yrs.
Critical Area Planting (with trees and shrubs) (2)	342A	15 yrs.
Diversion	362	10 yrs.
Fence	382	20 yrs.
Filter Strip(3)	393	10 yrs.
Grade Stabilization Structure	410	15 yrs.
Road / Trail / Landing Closure & Treatment	654	
Forest Trails & Landings	655	
Tree and Shrub Establishment	612	15 yrs.
Stream Crossing	578	20 yrs.

(1) Division of Forestry BMPs are applicable, but they are non-cost shared items.

(2) Utilization of Trees/Shrubs refers to guidelines for Trees/Shrubs of Practice Code 612.

(3) Refer to Filter Strip KY NRCS Standard and Specification, Practice Code 393.

KSW7 - STRIP INTERCROPPING SYSTEM

Purpose

The purpose of this practice is to reduce water, air, or land pollution from agricultural non-point sources. It also should increase plant diversity in order to improve pest control, fertilizer efficiency, and better utilize solar energy to produce food.

Application

Apply this practice to cropland that is subject to either:

1. Erosion greater than soil loss tolerance.
2. Soil movement that constitutes a surface or groundwater pollution hazard.
3. Mono-culture crop productions that create pest and disease problems, resulting in excessive pesticide applications.

Cost Share Policy

Procedure Needed:	Procedure Purpose:	Authorized	Not Authorized
Establishment of contour or field strip intercropping system.	◆ To reduce soil erosion to "T" or below. ◆ Protect water from pesticides or sediment.	√	
	Repetition of this measure which was approved for the same person on the same acreage.		√

Requirements

For contour strip intercropping systems, cultural operations must be performed on the contour, as nearly as practical.

Practice Life Span

- The strip intercropping system shall be maintained for at least 5 years after the calendar year of implementation.
- If subsurface drains and obstruction removal are installed as the sole component according to cost share policy, the strip cropping system and subsurface drains shall be maintained for at least 10 years after the calendar year in which the drains were installed.

Program Development

Conservation districts shall provide minimum specifications upon which cost sharing is conditioned, such as strip width, spacing, qualifying crops, uses, and minimum quantity of different crops. Technical specifications may be incorporated by reference.

Cost Share Rate

The SWCC has established a maximum of $12 per acre as an incentive payment for conversion to the strip intercropping system. Additional incentive payments are not to exceed $8 per acre. These will be paid for two consecutive years following the initial year of establishment. The conservation district will receive these additional incentive payments at the time of approval. However, distribution of funds will occur at the end of each of the following two crop seasons.

For other approved practices, such as obstruction removal and subsurface drainage: The Commission has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Stripcropping (contour)	585	5 yrs.
Stripcropping (field)	586	5 yrs.

KSW8 - STREAM CROSSING

Purpose

To improve water quality by removing access to the stream except where livestock, people or equipment must cross the stream by providing a single, stable crossing.

Application

Apply this practice where livestock, people, or equipment must cross an intermittent or perennial watercourse.

Cost-sharing is restricted to the ford type crossings using geotextile and rock.

Cost Share Policy

Type of Component	Used For	Authorized	Not Authorized
◆ Excavation. ◆ Site Preparation.	To permit installation of entrance/exit ramps and trenching for geotextile.	√	
Fencing: Post, high tensile wire or other NRCS approved material. (1)	Exclusion of livestock from stream bank, upstream and downstream crossing. Practice code 382.	√	
Geotextile: (filter fabric) base and surfacing material (rock), anchoring pins.	Used for entrance and exit ramps, following NRCS standard and specifications Practice Code 578. (2)	√	
Seeding: fertilizer, seed, mulch. (3)	Disturbed areas impacted by installation of this practice. Practice Code 342.	√	
Fence	Property boundary		√

(1) Adhere to NRCS Fence Standard & Specification Practice Code 382.
(2) Adhere to NRCS Stream Crossing Standard & Specification Practice Code 578.
(3) Utilize NRCS Critical Area Standard & Specification Practice Code 342.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Practice and components must conform to NRCS standards and specifications in the technical guide on file in the local office of the NRCS District Conservationist. The landowner will be responsible for obtaining any applicable permits or certifications prior to construction. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Critical Area Planting	342	10 yrs.
Fence	382	20 yrs.
Stream Crossing (interim)	578	20 yrs.

KSW9 - CONSERVATION DISTRICT ENVIRONMENTAL GRANTS

Purpose

The purpose of this practice is to reduce agricultural non-point source pollution of surface or groundwater.

Application

This grant should be used for:

- Encouraging the adoption of new management techniques or measures that reduce the impact of agricultural pollutants on surface and groundwater.
- Educating the public about pollution problems while demonstrating effective alternatives to non-point source pollution practices.

Eligibility

- Any applicable permits and renewals will be the responsibility of the landowner or Conservation District prior to the receipt of cost share funds.
- Project funding must be requested with written documentation of community need, water quality or biological monitoring data to validate pollution problems.
- Projects should be submitted on a watershed or multi-watershed basis.
- Applications must identify pollutants that can be measured. Applicants should complete the cost share form to provide information about the project. If project pollutants are not addressed on this form, then a summary of pollutants and estimated quantities must be attached.
- Educational activities that support the proposed project should be addressed in the project application. The report should include targeted audience, material development, time schedules, etc.

Cost Share Policy

1. Cost sharing is authorized for components necessary to implement an approved project. If the project includes existing BMPs, then applicable standards, specifications, and identified components will be followed.

2. In most cases, cost sharing is not authorized for the purchase of equipment. Equipment necessary for project implementation may be obtained through other programs.

3. Cost sharing is not authorized for duplicating future projects within the same watershed or community.

4. Requests for cost share may only be partially funded at the discretion of the Commission.

5. Cost share recipients must sign performance and maintenance agreements prior to payment.

Environmental Concerns
Consideration shall be given to wildlife and environmental protection during project development.

Practice Life Span
Practices implemented under KSW9 shall be maintained for 10 years.

Program Development
The Conservation District shall provide conditions required for cost sharing.

Cost Share Rate
The SWCC has established a maximum of 75% cost share rate based on actual expense of project implementation, not to exceed $7,500 per program year.

Example Projects (These are examples, funding not limited to these projects only.)
- Dead animal disposal program
- Innovative resource protection programs
- Integrated crop management workshop
- Oil collection program
- Pesticide container recycling
- Rural household chemical recycling
- Rural septic installation workshop
- Constructed wetlands
- Composting demonstration, utilization

KSW10 – CROPLAND EROSION CONTROL SYSTEMS

Purpose

The application of this practice is for the planning and installation of erosion control practices on cropland only fields as identified in the conservation plan.

Application

This practice should be applied to cropland fields that were in crops the year prior to application for the purpose of controlling soil erosion, water disposal, and for excess surface water from natural concentrations within cropland fields without causing erosion. For the prevention/formation of gullies in crop fields, to reduce pollution potential, and for the enhancement of environmental quality benefits. Use of this practice is restricted only to cropland and is NOT TO BE UTILIZED ON PASTURELAND. Companion or supporting practices are included in the following list:

Cost Share Policy

Type of Component	Used For	Authorized	Not Authorized
Land shaping, leveling, filling, excavation, site preparation, tile or pipe installation.	Construction of one of the eligible listed practices in Table 1.	√	
Geotextile: (filter fabric), rock (only as designed for specific practice), CPDT (only for design of waterway), plastic PVC pipe (only for use as inlet or outlet in practice design).	Component identified in design standard for one of the eligible listed practices in Table 1.	√	

Type of Component	Used For	Authorized	Not Authorized
Seeding materials (seed, lime, fertilizer, mulch, netting)	Seeding required to vegetate disturbed area during construction and is necessary to control erosion of an eligible listed practices in Table 1	√	
Construction of any practice listed in Table 1 that is:	Installed on land that is devoted to permanent pasture or land that is devoted to hayland		√

Companion or supporting practices are included in the following list:

Table 1-KSW10

Practice Title	Practice Code	Lifespan
Diversion	362	10 Years
Fence	382	20 Years
Grade Stabilization Structure	410	15 Years
Grassed Waterway	412	10 years
Mulching	484	1 Year
Sediment Basin	350	20 Years
Subsurface Drain	606	20 Years
Terrace	600	10 Years
Water and Sediment Control Basin	638	10 Years
Lined Waterway or Outlet	468	

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Practice Eligibility Requirements

This practice is not to be used on pastureland, hayland or in other areas that are not cropland. Fields that are in need of treatment and may be rotated back to grassland are eligible if all of the following conditions are met:

1. The field was planted to a listed crop in the year previous to sign-up:(i.e.: tobacco, soybeans, corn [grain or silage], vegetables, wheat, canola, sunflowers, potatoes, barley, oats).

2. The field must be planned to a Resource Management System (RMS) level of treatment, meeting the quality criteria for soil erosion planned at "T" (soil loss tolerance level) or below using NRCS Revised Universal Soil Loss Equation "RUSLE".

3. For conservation treatment in fields that are eligible and will be rotated back to grassland the treatment area (i.e. Grassed Waterway, Diversion, Terrace, Water and Sediment Control Basin) must be protected from livestock by fencing, Cost Shared or Non-Cost Shared, until vegetation is established. Local Conservation District official and local NRCS District Conservationist shall verify livestock exclusion before cost share payment is received.

4. The formula to be utilized for calculation of gully erosion rates will be the same as EQIP Gully Erosion Worksheet.

   Top Width (TW) + Bottom Width (BW)/2 x Length (L) x Depth (D) x 100 lbs./2000 lbs. /1 year = Gully Erosion.
   If more than one gully exists in the treatment field, calculate erosion using the same formula and enter the total in the appropriate column in item C. Gully Erosion Sediment (Other Erosion) in the application form.
   Utilize the worksheet for gully erosion and file with applicant's copy.

   Specifications
   Specification, plans, and construction must conform to the standards set in Section IV of the FOTG of the local NRCS District Conservationist. The practice must be maintained for the lifespan as indicated by the appropriate Practice Code listed in Table 1, and is subject to periodic inspection by local Conservation District personnel and NRCS representatives.

2013 Kentucky Soil Erosion and Water Quality Cost Share Program

Gully Erosion Worksheet for KSW 10 Cropland Erosion Control Systems

Applicant: _____ Applicant Number: _____

County: _____ Prepared By: _____

Date: _____

Top Width (TW) + Bottom Width (BW) / 2 x Length (L) x Depth (D) x 100 lbs. / 2000 lbs. / 1 year = Tons

Gully No.

_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons
_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons
_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons
_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons
_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons
_____ TW_____ + BW_____ / 2 x L_____ x Depth_____ x 100 lbs. / 2000 lbs. / 1 = _____ tons

Total Tons: _____

Enter total on application in Section B, Item 3.C.4.-Gully Erosion (Other Erosion)

If additional space is needed for calculations, show work below:

KSW11 – PASTURE & HAYLAND FORAGE QUALITY/QUANTITY & EROSION CONTROL

Purpose

The application of this practice is for the planning and installation of erosion control practices on pasture and hayland and the improvement of forage quality/quantity on previously established pasture and hayland areas.

Application

This practice should be applied to pasture and hayland fields that were in that use the year prior to application for the purpose of controlling soil erosion, water disposal for excess surface water from natural concentrations within fields without causing erosion, and the improvement of forage quality/quantity. For the prevention/formation of gullies in pasture and hayland fields, to reduce pollution potential, for the enhancement of environmental quality benefits and forage improvement.

Cost Share Policy

Type of Component	Used For	Authorized	Not Authorized
Land shaping, leveling, filling, excavation, site preparation, tile or pipe installation.	Construction of one of the eligible listed practices in Table 1.	√	
Geotextile (filter fabric), rock (only as designed for specific practice), CPDT (only for design of waterway), plastic PVC pipe (only for use as inlet or outlet in practice design), riser inlet kits.	Component identified in design standard for one of the eligible listed practices in Table 1.	√	
Fencing material.	Property Boundary		√
Permanent Fence (for use exclusion)	Exclusion of livestock to areas needing grazing protection or to restrict access to areas by people or equipment or as needed to technically protect the practice.	√	

Type of Component	Used For	Authorized	Not Authorized
Seeding materials (seed, lime, fertilizer, mulch, netting)	Seeding required to vegetate disturbed area during construction and is necessary to control erosion or to improve forage quality/quantity.	√	
Seeding materials* (legume seed, lime and fertilizer)	Seeding required for renovating existing pasture and hayland. To improve forage quality/quantity.	√	
Construction of any practice listed in Table 1 that is:	Installed on land that is devoted to permanent cropland		√

Requirements:

Overseeding: Requires a soil test taken within the last 12 months, and legume seed must be certified to be eligible for cost share.

Specifications

Practice and components must conform to NRCS standards and specifications in the technical guide on file in the local office of the NRCS District Conservationist. The landowner will be responsible for obtaining any applicable permits or certifications prior to construction.

Table 1-KSW11

Practice Title	Practice Code	Lifespan
Critical Area Stabilization	342	10 Years
Fence	382	20 Years
Grade Stabilization Structure	410	15 Years
Grassed Waterway	412	10 Years
Mulching	484	1 Year
Subsurface Drain	606	20 Years
Forage and Biomass Planting – Overseeding Only	512*	5 Years
Lined Waterway or Outlet	468	

* Use Overseeding existing pasture(s) with legumes Job Sheet (O and M-512) – Date: April 2011

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

KSW12 – STREAMBANK STABILIZATION

Purpose

The application of this practice is for the planning and installation of erosion control, bioengineering practices, native material revetments, channel stability structures, and/or the restoration or management of riparian corridors up-gradient from streams, restoring the natural function of the stream corridor, and improving water quality.

Application

This practice should be applied to agriculture operations where the natural streambank has been severely damaged by livestock access, or other activities associated with agricultural operations.

* KSW12 is only authorized for streambank protection measures on streams with a drainage area of 390 square miles (250,000 acres) or less. In addition, all Streambank Protection (580) sites will require either a Filter Strip (393) or a Riparian Forested Buffer (391) be installed, or maintained, in conjunction with the installation of the streambank protection measures.
** If application is in conjunction with CP21 Filter Strip under the Conservation Reserve Program (CRP), please note in an email and send, along with the electronic application, to the Division of Conservation.

Cost Share Policy

Type of Component	Used For	Authorized	Not Authorized
Filter fabric, riprap, bioengineering components, gabion baskets	Construction of Streambank and Shoreline Protection (580) and any of the associated or component practices in Table 1	√	
Earthmoving (grading, shaping, site preparation)	Construction of Streambank and Shoreline Protection (580) and any of the associated or component practices in Table 1	√	
Clearing and Snagging.	To increase flow capacity of a channel by removing snags, drifts, or other obstructions.	√	
Fencing material.	Property Boundary		√
Permanent Fence (for use exclusion)	Exclusion of livestock to areas needing grazing protection or to restrict access to areas by people or equipment or as needed to technically protect the practice.	√	

Type of Component	Used For	Authorized	Not Authorized
Seeding materials (seed, lime, fertilizer, mulch, netting)	Seeding required to vegetate disturbed area during construction and is necessary to control erosion of any eligible listed practices in Table 1	√	

Specifications

Practice and components must conform to NRCS standard Streambank and Shoreline Protection (580) in the technical guide on file in the local office of the NRCS District Conservationist. The landowner will be responsible for obtaining any applicable permits or certifications prior to construction. Companion or supporting practices are included in the following list:

Table1

Practice Title	Practice Code	Lifespan
Clearing and Snagging*	326	5 Years
Critical Area Stabilization	342	10 Years
Fence	382	20 Years
Riparian Forested Buffer	391	15 Years
Filter Strip	393	10 Years
Grade Stabilization Structure	410	15 Years
Livestock Exclusion / Access Control	472	10 Years
Stream Crossing	578	20 Years
Tree Planting	612	15 Years
Mulching	484	1 Year
Streambank & Shoreline Protection	580	

* To be used as a component of a complete Streambank Stabilization practice.

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $20,000 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

ProgramDevelopment

- Conservation Districts shall provide local oversight of the cost share program in accordance with the Cost Share Manual.
- Planned practices require a contract with the Kentucky Division of Water for all proposed sites for a Water Quality Certification or other permit determinations.
- On livestock operations, fencing off the stream and installation of either a filter strip in accordance with the Kentucky Nutrient Management Plan.
- On cropland, installation of either a filter strip with a minimum width of 20 feet or a riparian forest buffer with a minimum width of 50 feet is mandatory.

KWP4 - AGRICULTURAL WASTE CONTROL FACILITIES

Purpose

The purpose of this practice is to reduce existing water, land, or air pollution caused by agricultural waste.

Application

Apply this practice to areas of farmland where agricultural waste from the farm constitutes a significant pollution hazard.

Cost Share Policy

Type of Component	Component used for:	Authorized	Not Authorized
Waste storage facilities such as: ◆Aerobic or anaerobic lagoons ◆Channels ◆Diversions ◆Dry stacks ◆Holding ponds ◆Land shaping ◆Liquid manure tanks ◆Outlet structures ◆Piping ◆Poultry composting facilities ◆Livestock waste composting facilities ◆Settling or Collection basins ◆Waterways	Part of a system to manage agricultural wastes which contributes significantly to maintaining or improving soil or water quality	√ *	
Permanently installed equipment for transportation of waste to storage structures. Ex: lift pumps for transferofliquid wastetothewastestorage facility.	Integral part of the system	√ *	
Electrical wire, electrical switches, control panels, micro-switches or labor for electrical contractor for wiring and installation	Transferring electrical current		√

◆Critical area planting ◆Fencing ◆Mulching	Protection of the facility	√	
◆Filling ◆Leveling	To permit installation of an effective system	√	
Waste storage facilities **	Storing, handling, or disposal of chemicals used in farming operations		√
Waste Storage Facility **	Newly converted livestock, poultry, or other operation	√ *	
◆Agricultural waste spreading ◆Buildings ◆Irrigation pipelines as distribution systems ◆Modification of buildings ◆Portable pumps and equipment	Primarily for prevention of air pollution with no soil and water conservation benefits		√
◆Travel lanes, trails or walkways	Provide movement for livestock through sensitive areas	√	
	Installations which are primarily for the operator's convenience		√
Conservation Activity Plan - CNMP		√	

*= Cost Share shall be limited to the minimum size needed to solve or prevent the conservation problem

** State Cost Share funds are no longer available for feeding areas. State cost share funds will, however, be available for dry stack facilities used in conjunction with existing roofed feeding facilities, or non cost shared newly constructed roofed feeding facilities. In order for the dry stack facilities to be eligible for State Cost Share funds, the construction of any new non cost shared feeding facility must be completed prior to or in conjunction with the completion of the cost shared dry stack facility. Roofing components of the cost shared structure may not be attached to the non cost shared structure(s).

Cost Share Rate

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $20,000 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

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Practice Lifespan

The practice shall be maintained according to the standards found in figure 1- KWP4.

Program Development

- Conservation Districts shall provide local oversight of the cost share program in accordance with the Cost Share Manual.
- Cost share will be allowed for travel lanes, trails, or walkways for the movement of beef and dairy livestock to minimize erosion and to protect sensitive areas.
- The operation that is applying for cost share must have livestock or poultry present at the time of application. (If poultry consult section below).
- All permitting procedure guidelines with Division of Water must be followed.
- Electrical wiring may be attached to the structure only after the practice has been certified by NRCS.
- No other structures may be attached to the cost-shared structure.
- The eligible cost share components necessary to fabricate the covered portion of the dry stack facility include: trusses, posts, purlins, nails, bracing and supports, roofing material consisting of the roof surfacing (metal or other approved material) and the sheeting attached to the trusses, guttering and downspouts, overhang fascia board, and guttering supports.
- An approved Waste Storage Facility must be in place prior to disbursement of cost share funds for animal waste utilization.
- A KY NRCS approved, Comprehensive Nutrient Management Plan (CNMP) is required BEFORE release of the design, or construction of any animal waste management structures
- Cost share assistance is available for construction of poultry litter storage sheds on a farm(s) or tract(s) with the following conditions:
  - All litter storage sheds are required to be maintained and used for the purpose of storing waste during periods identified in the Waste Management Plan in accordance with USDA NRCS standards and specifications and are to be maintained for the life span of the practice.
  - In order to receive state cost share funds, poultry litter storage sheds must be needed to store litter on a farm/tract where the applicant owns the poultry production facilities generating the poultry litter/waste, and the litter/waste must be utilized on that same farm/tract through a nutrient management plan.

Practice Maintenance

The practice must be maintained and used throughout its normal life span for the conservation purpose for which cost sharing was approved. This includes performing normal repairs, upkeep, and maintenance. Destruction of or substantial damage to the practice, discontinuing use of the practice before the lifespan expires, converting the practice to uses other than the conservation purpose, or any other use or misuse of the practice so that it fails to meet its conservation purpose shall be considered a violation of the Performance and Maintenance Agreement. An example of a violation would be using the practice to store farm equipment at any time period during the year or storing hay without an appropriate practice maintenance waiver on file (see Practice Maintenance Waiver section below).

Practice Maintenance Waiver

Local conservation district boards of supervisors have the authority to grant a "practice maintenance waiver" on an applicant's request to temporarily use a manure dry stack facility or an existing covered feeding structure to store hay. Note that this waiver only applies to the storage of hay. Also note that litter storage sheds are not eligible for practice maintenance waivers. A waiver would have to be in writing by the applicant to the local board of supervisors. This would consist of a waiver from the applicant requesting a temporary change in the cost share contract for a set period of time and if granted by the local board of supervisors, they would check applicant's sites to ensure that the waiver conditions had been adhered to and followed. It is the responsibility of the local board to police and enforce the waiver conditions they have granted and take appropriate actions to recover cost share funds if the applicant violates the conditions of the cost share contract and waiver. This waiver cannot be granted during periods when the structure is required to fulfill its intended purpose. For covered feeding structures, that period would be between November 1st and April 30th.

Specifications

Specifications, plans, and construction must conform to the standards set in the NRCS Field Office Technical Guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Figure 1 KWP-4

Descriptive Title	Technical Practice Code	Life - Span
Composting Facility	317	15 yrs.
Critical Area Planting	342	10 yrs.
Dike	356	20 yrs.
Diversion	362	10 yrs.
Fence	382	20 yrs.
Filter Strip	393	10 yrs.
Grassed Waterway	412	10 yrs.
Mulching	484	1 yr.
Pond Sealing or Lining	521	See applicable life span
Roof Runoff Management	558	15 yrs.
Animal Trails & Walkways	575	10 yrs.
Sediment Basin	350	20 yrs.
Underground Outlet	620	20 yrs.
Waste Storage Facility	313	15 yrs.
Waste Treatment Lagoon	359	15 yrs.
Conservation Activity Plan - CNMP	102	

2013 Performance and Maintenance Agreement for KWP4

Name: _____

County: _____

As an applicant for state cost share funds, it is understood that my receipt, retention and use of such funds is strictly conditioned upon acceptance of the following guidelines:

For Covered Stackpads:

1. The structure is to be used only for storing manure and must be utilized for this purpose at all times during the lifespan of the practice.
2. The structure may be used to store hay from May 1st through October 31st if the landowner has a Practice Maintenance Waiver on file in the local district office. Note that this waiver is only for the storage of hay, and, at no time, may equipment or other materials be stored in the structure.
3. The structure must be emptied periodically, in accordance with an approved nutrient management plan, to allow for the continued storage of waste.
4. The structure may not be altered in any fashion.
5. No structure may be attached to the cost-shared structure.
6. The integrity of the structure must be maintained so that the structure may be used for its intended purpose of storing manure during the lifespan of the practice.
7. For systems that include a holding pond, the holding pond must be emptied periodically, in accordance with an approved nutrient management plan, to allow for continued storage of waste.
8. The construction and NRCS certification of this practice must be completed by June 30, 2014 in order to receive funding. The conservation district may request up to two 6-month extensions for this practice. To be approved for additional time, the conservation district must request these extensions in writing before the original time period expires. Funding will not be available for this practice if it is not completed and certified by June 30, 2015.

I understand that failure to sign this agreement may result in the Commonwealth's refusal to award state cost share funds to the applicant. I also understand that the failure on the part of the applicant to comply with any of the criteria set forth above may result in the applicant's being obligated to return cost share funds received. It is further understood that the Commonwealth is authorized and empowered to file suit in the Franklin Circuit Court for recovery of said funds if necessary.

_____ _____

Applicant's Signature Date

_____ _____

NRCS District Conservationist's Signature Date

_____ _____

Conservation District Chairman's Signature Date

_____ _____

Kimberly Richardson, Director Date
Division of Conservation

2013 Performance and Maintenance Agreement for KWP4

Name: _____

County: _____

As an applicant for state cost share funds, it is understood that my receipt, retention and use of such funds is strictly conditioned upon acceptance of the following guidelines:

For Poultry Litter Storage Facilities:

1. The structure is to be used only for storing poultry litter and must be utilized for this purpose at all times during the lifespan of the practice.
2. There is no waiver for poultry litter storage facilities. The structure may not be used for the storage of hay, equipment, or other materials at any time.
3. The structure must be emptied periodically, in accordance with an approved nutrient management plan, to allow for the continued storage of waste.
4. The structure may not be altered in any fashion.
5. No structure may be attached to the cost-shared structure.
6. The integrity of the structure must be maintained so that the structure may be used for its intended purpose of storing poultry litter during the lifespan of the practice.
7. The construction and NRCS certification of this practice must be completed by June 30, 2014 in order to receive funding. The conservation district may request up to two 6-month extensions for this practice. To be approved for additional time, the conservation district must request these extensions in writing before the original time period expires. Funding will not be available for this practice if it is not completed and certified by June 30, 2015.

   I understand that failure to sign this agreement may result in the Commonwealth's refusal to award state cost share funds to the applicant. I also understand that the failure on the part of the applicant to comply with any of the criteria set forth above may result in the applicant's being obligated to return cost share funds received. It is further understood that the Commonwealth is authorized and empowered to file suit in the Franklin Circuit Court for recovery of said funds if necessary.

_____ _____

Applicant's Signature Date

_____ _____

NRCS District Conservationist's Signature Date

_____ _____

Conservation District Chairman's Signature Date

_____ _____

Kimberly Richardson, Director Date
Division of Conservation

2013 Practice Maintenance Waiver

Name:_____ County:_____

Address:_____ Cost Share ID Number:_____

_____

I request a practice maintenance waiver in order to use my covered stackpad, funded under KWP4 of the State Cost Share Program, to temporarily store hay from May 1st to October 31st. I understand that this waiver only applies to the storage of hay. I also understand that the installed practice must be used for its intended conservation purpose from November 1st to April 30th. I understand that any misuse of the practice during its lifespan is a violation of the Performance and Maintenance Agreement and, in such circumstances, the local board of supervisors and/or the Division of Conservation will attempt to recover cost share funds. I agree to allow representatives of the local conservation district on my property to inspect this facility, to ensure compliance with the waiver and the cost share agreement.

_____ _____

Applicant's signature Date

APPROVAL OF WAIVER:

_____ _____

Board Supervisor's signature Date

KWP5 – CLOSURE OF AGRICULTURAL WASTE IMPOUNDMENT

Purpose
The purpose of this practice is to protect water resources and eliminate a potential safety hazard.

Application
Apply this practice to areas of farmland where agricultural waste impoundments are no longer utilized as a part of a waste management system, are to be permanently closed or abandoned, and constitute a significant pollution and/or safety hazard.

Cost Share Policy

Type of Component	Component used for:	Authorized	Not Authorized
◆Critical area planting ◆Fencing ◆Mulching	Protection of the disturbed areas	√*	
◆Filling ◆Leveling	To permit effective closure of system	√*	
◆Agricultural waste spreading	Primarily for prevention of air pollution with no soil and water conservation benefits	√ *	
	Installations which are primarily for the operator's convenience		√

*= cost share shall be limited to the minimum needed to solve or prevent the conservation problem.

Cost Share Rate
The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.
Cost Share Limitation per program year: $20,000 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

** A KY NRCS approved Comprehensive Nutrient Management Plan (CNMP) or Nutrient Management Plan (NMP) may be required depending on the practice and specifications deemed necessary by NRCS.

Program Development
Conservation Districts shall provide local oversight of the cost share program in accordance with the Cost Share Manual.

Specifications

Specifications, plans, and construction must conform to the standards set in the USDA, NRCS Technical Guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life - Span
Critical Area Planting	342	10 yrs.
Land Application	633	1 yrs.
Diversion	362	10 yrs.
Closure of Waste Impoundment	360	10 yrs.
Filter Strip	393	10 yrs.
Grassed Waterway	412	10 yrs.
Mulching	484	1 yr.

Policies

1. Technical and financial assistance from this practice is appropriate to ensure water quality protection in situations where farmers are going out of business or where a landowner who was not an operator has an abandoned waste storage/treatment system on his/her property. All applicants who are closing an existing operation, one that has recently gone out of business or correcting water quality concerns on an abandoned operation must follow these guidelines:

    a. The cooperator/landowner did not receive any State Cost Share funds to install the system.

    b. The applicant demonstrates clearly in the application provided to the Division that the proposed facility or abandoned system is in a condition that is creating a water quality problem or presents a potential water quality problem if not corrected.

    c. Each application must contain the following information and must be received by the Division prior to approval:

        1. Length of time system has been abandoned.

        2. Indication of status with Division of Water (i.e. has farm received a Notice of Violation or operational permit.)

        3. Volume of system based on length, width, depth of liquid/sludge and slopes.

4. Describe the method that will be used to empty the waste and transfer the waste from the impoundment and when/where land application will occur. In situations where pumping is impractical because of consistency of sludge (i.e. solid), sludge may be excavated. Estimates should include information regarding how waste is to be removed (i.e. drag line, agitate and pump, etc.)

5. Surface acreage of the lagoon.

6. A profile of the dam and how it is to be breached, if applicable.

7. A statement signed by the applicant/landowner that he/she will not re-implement the system and that no confined animal operation will be started on that farm for five years.

d. Cost Share Program funds will be used for the removal of waste only (not for the removal of fill or foreign materials), and for stabilization of site. Removal of foreign materials will be at the landowner's expense and must be removed according to state and federal guidelines. Cost for closure is not to exceed a total of $20,000 per applicant. Receipts and a copy of the waste analysis report must accompany Request for Payments.

e. Breaching of any diked or dammed structures is optional; however all disturbed areas will be vegetated to permanent grass, trees, or wildlife plantings. NRCS Standards will apply to all vegetated areas.

KWP7 - RIPARIAN AREA PROTECTION

Purpose

The purpose of KWP7 is to remove nutrients, sediment, organic matter, and pesticides from surface runoff and subsurface flow by deposition, absorption, plant uptake, denitrification, and other processes. This results in reducing pollution and protecting surface and subsurface water quality while enhancing the ecosystem.

Application

Apply this practice to land adjacent to or surrounding: permanent or intermittent streams, lakes, ponds, and intermittent or permanently flooded wetland, sinkholes, Karst areas, and other groundwater recharge areas.

The adjacent contributing land must be one of the following: cropland, pastureland, hayland, or woodland.

Cost Share Policy

1. The practice must meet all federal, state, and local environmental laws.
2. The participant must agree to allow USDA personnel access to the site to review and evaluate the practice. The participant must also be implementing a conservation plan on the contributing area. Additionally, the participant must also secure all necessary permits before starting construction of practice.
3. The use of fertilizers and pesticides is only permitted if covered by an operations and maintenance plan developed for the practice by the designated technician.
4. Livestock crossing facilities that will prevent sedimentation and pollution. The installation of crossings is limited to small streams where flooding is not a serious problem. Refer to State KSW-8.

NOTE: The requirements for this practice, including eligible seed mixtures, nutrients and limestone must be specified in the practice specifications as developed by the designated technician.

Cost Share Rates

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Fence (non-boundary)	382	20 yrs.
Field Borders	386	10 yrs.
Pipeline	516	20 yrs.
Pond	378	20 yrs.
Riparian Forest Buffer	391A	15 yrs.
Spring Development	574	10 yrs.
Trough or Tank	614	10 yrs.

KWP8 – On-Farm Fallen Animal Composting

Purpose

The application of this practice is for the composting of fallen animals on an impervious surface. This practice is only for disposal of animal mortality that occurs on the applicant's farm.

Application

This practice should be applied to any animal operation as an alternative method for the disposal of animal mortalities.

Cost Share Policy

Type of Component	Used For	Authorized	Not Authorized
Land shaping, leveling, filling, excavation, site preparation.	Construction of one of the eligible listed practices in Table 1.	√	
Equipment Rental (vibratory roller, etc.)	Construction of one of the eligible listed practices in Table 1.	√	
Establishment of permanent herbaceous vegetative barriers (selected perennial seed varieties need to attain sufficient height, thickness, and stiffness to retard erosion and filter runoff water)	To reduce soil erosion. To prevent water pollution.		√
Seeding materials (seed, lime, fertilizer, mulch, netting)	Seeding required to vegetate disturbed area during construction and is necessary to control erosion of an eligible listed practices in Table 1		√
Cement	Construction of one of the eligible listed practices in Table 1.	√	

Specifications

Table 1-KWP8

Practice Title	Practice Code	Lifespan
Composting Facility	317	10 Years

Cost Share Rate

Small Operations ≤ 100 head – Estimated payment rate $2,500.
Medium Operations ≤ 200 head – Estimated payment rate $5,000
Large Operations ≤ 300 head – Estimated payment rate $7,500.

The SWCC has established a maximum of 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

*Notes
Bin Size – Should be a 15 feet wide to accommodate different size loading buckets and height of the compost bin should accommodate a maximum compost pile height of 6 feet depth.
Small operations could get by with a single bin, medium operations should use two bins, and large operations should use a 3 bin system.

Program Development

- Composting operations are required to submit a permit application to the Kentucky Department of Agriculture, Office of State Veterinarian (502-564-3956).

KWP 9 – SOIL HEALTH/QUALITY MANAGEMENT

Purpose
The purpose of this practice is to encourage the adoption of a soil quality cover crop system.

Application
A soil quality cover crop system is designed to obtain maximum soil cover that will improve soil's physical, biological and chemical properties, control weeds, limit soil erosion, limit runoff of fertilizers/chemicals, conserve moisture, cycle nutrients, etc.

Eligibility forCost Share

Type of Component	Used For	Authorized	Not Authorized
Management Incentive Payment	Incentive for continuing a soil quality cover crop system	√	

To be eligible for this management payment a producer must be currently approved under EQIP for the Soil Health Cover Crop option. EQIP payments must be paid prior to receiving SCS management payment.

Specifications
Practice and components must conform to NRCS standards and specifications in the technical guide on file in the local office of the NRCS District Conservationist.

Table1

Practice Title	Practice Code	Lifespan
Soil Health/Quality Management Payment	997	

Cost Share Rate

The SWCC has established a maximum of $15.00 per acre as an incentive payment for conversion to a soil quality cover crop system.

Additional incentive payments are also approved for two consecutive years following the initial year of adoption. Payments for year two are not to exceed $20.00 per acre, and year three not to exceed $25.00 per acre.

Cost Share Limitation: $7,500 for each applicant or operation. Please see page 9, "Limitation on Awards" if clarification is needed.

MRBI 1 - Precision Nutrient Management Incentive

Purpose

The precision farming incentive payment is to encourage the adoption of variable-rate application of nutrients and pesticides while also promoting the use of GPS-enables precision agricultural technology and equipment

Application

Application available to cropland producing annually planted crops and located within the Mississippi River Basin Healthy Watershed Initiative pre-selected 12 digit-HUC watersheds.

Cost Share Policy

Procedure Needed	Procedure Purpose	Authorized	Not Authorized
Soil test requirements	Used to determine the variable-rate application (VRA)	√	
Precision Nutrient Management Plan	To delineate and prescribe precision application of plant nutrients	√	
Documentation and records of actual applications made based on the Precision Nutrient Management Plan	To certify the adoption and use of Precision Nutrient Management on applicable acres	√	

Producer Eligibility

To be eligible for nutrient or pest management precision agriculture incentives, a producer will be in one of the following categories: 1) not currently applying these practices on cropland at the minimum levels as described; or 2) be willing to apply the practice(s) at a higher level as described.

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Table1

Practice Title	Practice Code	Lifespan
Nutrient Management	590	1 yr

Nutrient Management (590)

Practice Requirements

At least one variable-rate application (VRA) of nutrients has been made according to fertilizer recommendations based on grid soil samples representing areas no greater than 2.5 acres OR zone soil sampling representing areas of no greater than 20 acres. Zones must be based on soil survey data in addition to (a) yield data, (b) soil electrical conductivity data, and/or (c) aerial or satellite images.

Cost Share Rate

Practice requirements, plus VRA must be conducted using a vehicle equipped with a GPS-enabled guidance correction service. Incentive is $27.00/acre and total cost of practice shall not exceed $20,000 per operation. Approved applicant will be eligible for three consecutive year incentive payments and first payment will not be made until the bundle of require practices have been installed and certified by NRCS. Also, required is a copy of the previous year nutrient application records or self-certification by applicant of these rates.

Certification Requirements

1) Soil sampling maps with soil test recommendations (grid or zone) along with as-applied nutrient maps (map not required if no nutrients recommended) must be supplied to the NRCS District Conservationist for certification. Maps will include field boundaries, product applied, rate and date applied and a map legend.
2) Nutrient Management plan developed by NRCS or TSP that meets requirements set forth by NRCS Nutrient Management Standard.
3) Precision agriculture equipment for GPS-enabled navigation must be installed on Pre-dominate nutrient application equipment.
4) District Conservationist must certify application that producer has installed or has plans to install the required bundle/suite of best management practices to eligible for this practice incentive and receive payment.

MRBI 2 - Soil Health Cropping System

Purpose

The purpose of this practice is to develop and implement a soil health cropping system that works to stop existing soil degradation and improve the soil's physical, biological, and chemical properties. These cropping systems should result in substantial fertilizer and chemical savings to landowners and an improved environment for the soil, water, air, plants, animals, and humans.

Application

This practice applies to any and all cropland where:

1. Landowner is already implementing a complete no-till system on their cropland (landowner no longer uses cultivation or tillage as part of their cropping operation).
2. Landowner wishes to improve the physical, biological, and chemical properties of their soils.
3. Landowner wishes to reduce commercial inputs (fertilizer and chemical usage).

Cost Share Policy

Procedure Needed	Procedure Purpose	Authorized	Not Authorized
Soil Health Conservation Plan	-To reduce soil erosion to "T" or below. -To protect air, water, plants, animals, and humans from unneeded usage of fertilizers and chemicals.	√	
Exclusive No-Till Cropping System	-To stop degradation of existing physical, biological, and chemical soil properties. -To create a soil environment where soil properties can be improved.	√	
Maximize Organic Matter And Residues On And In The Soil Surface.	-Provide microbial food. -cycle nutrients -self microbial police -Keep soil surface covered. -Increase cation exchange capacity of soil to hold cycled nutrients. -Improve soil infiltration.	√	
Maximize Live Root At All Times.	-Home for microbes that rebuild soil aggregates/soil structure/ soil pore space (improve soil water holding capacity), increase infiltration and permeability, and soil gaseous exchange.	√	
Appropriate Animal Waste Applications (Nutrient Management Plan Or	-Animal waste additions create a synergetic effect among soil microbes causing them to	√	

Comprehensive Nutrient Management Plan).	perform at their optimum.		
Apply Plant Diversity In Cropping System- Cool Season Broadleafs, Cool Season Grasses, Warm Season Broadleafs, Warm Season Grasses.	-Heals/rebalances microbial food web by attracting beneficial diverse microbes. -Causes the soil microbial food web to cycle more nutrients and improve self microbial policing.	√	
Use Cover Crop Mixtures	-Use multi species cover crops. -Plant cover crops in a timely manner (earlier than usual). -Kill cover crops at appropriate time (later than usual).	√	
Roll Down Cover Crop Mixtures Before Planting Of Cash Crop.	- Cover crop mixtures will be rolled down in the spring before planting by using a cultipacker, stalk chopper, or roller crimper.	√	
Self Microbial Food Web Analysis	-tracks nitrogen availability, bacteria, fungi, protozoa, and nematodes in soil systems.	√	
Traditional Soil Test (UK).	-Needed during initial years of cropping system.	√	
Cultivation Of Any Kind.	-No conventional or minimum tillage practice of any kind will be allowed for life of practice.		√

Requirements

-Landowner must already be using a complete no-till system in his existing crop fields.
-Cover crop mixtures must be sown by; Sept 10th through 30th West of Interstate 65, and by Sept 1st through 15th East of Interstate 65. Landowner may be required to grow shorter growing season cash crops.

Practice LifeSpan

Practice life span is for one year with the option of signing up for this practice for 3 consecutive years in a row. It is highly suggested that after three years of practice implementation landowner continue using their soil health cropping system to maintain and improve their soil's physical, biological, and chemical properties.

ProgramDevelopment

Conservation districts shall provide minimum specifications upon which cost sharing is conditioned. Practice will be based on a mutually developed soil health plan. NRCS personnel will assist landowners (and if applicable- Conservation District Employees) in the development of individual soil health plans. Landowners MUST HAVE OWNERSHIP AND INVOLVEMENT IN ALL ASPECTS OF PLAN DEVELOPMENT.

Cost Share Rate

The SWCC has established a maximum of $30.00 per acre as an incentive payment for conversion to a soil health cover cropping system. This $30.00 per acre incentive payment is for: using a no-till drill, no-till planting of cover crop mixtures, ensure cover crops are planted on time, ensure cover crops are allowed to grow later in spring of year, and for the use of shorter growing season cash crops if needed. Additional incentive payments are not to exceed $30.00 per acre. These will be paid for two consecutive years following the initial year of establishment (for a maximum total of 3 years). The conservation district will receive these additional incentive payments at the time of approval. However, distribution of funds will occur in the Spring of the following year after roll down and no-till planting of cash crop into heavy residue has occurred.

For other approved practices, such as cover crop seed mixtures, soil microbial food web analysis testing , UK soil test, and roll down will receive a maximum of a 75% cost share rate based on actual expense not to exceed the estimated payment rate.

Cost Share Limitation per program year: $6,667 for each applicant or operation (for a total of $20,000 for 3 years).

Specifications

Specifications, plans, and construction must conform to the standards set in the technical guide on file in the office of the local NRCS District Conservationist. Companion or supporting practices are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Cover Crop	340	1 yr.
Nutrient Management Plan	104 / 590	1Yr.
Comprehensive Nutrient Mgmt. Plan	102	1 Yr.
No-till	329	1Yr.
Conservation Crop Rotation	328	

KCREP1 – CONSERVATION COVER

Purpose

To establish and maintain perennial vegetative cover to protect soil and water resources on land retired from agricultural production.

Application

The purpose of this practice is to reduce soil erosion and sedimentation, improve water quality, and create or enhance wildlife habitat.

Cost Share Policy

Eligible Components	CREP Practices	Authorized
Components as defined in the FSA National CRP Manual, 2-CRP, Exhibit 9 for respective practices.	CP1 – Introduced Grasses and Legumes CP2 – Native Grasses CP3 – Tree Planting (pines) CP3A – Hardwood Tree Planting	√

Requirements

1. Eligible lands are restricted to areas approved by USDA for participation in the Conservation Reserve Enhancement Program (CREP) using Farm Service Agency program guidelines.
2. Program participants must have a current CREP contract approved by the FSA county committee.
3. Program participants must be in compliance with CREP contract provisions as determined by FSA.
4. This practice is eligible under continuous sign-ups of the Green River CREP program.

Environmental Concerns

Consideration shall be given to wildlife and environmental protection when designing this practice.

Practice Development

Conservation Cover practices must be established in accordance with the NRCS Conservation Cover (327) or Tree Planting (612) Standard.

Cost Share Rate and Incentives

Cost share will be based on 25% of the eligible cost as determined by FSA according to the AD-245 used for CREP payments. Incentives will be based on 25% of practice installation cost. Cost share and incentive payments combined cannot exceed $7500 per practice.
Incentives will be based on 75% of the practice installation cost when enrolled into a permanent easement.

Specifications

Practices must meet the NRCS standard for Conservation Cover (327) or Tree/Shrub Establishment (612) as specified in the technical guide on file in the office of the local NRCS District Conservationist. The practice lifespan shall be consistent with USDA CREP Guidelines. Associate practices are included in the following list:

Descriptive Title	Technical Practice Code
CP-1 Introduced Grasses	327
CP-2 Native Grasses	327
CP-3 Pine Planting	612
CP-3A Hardwood Tree Planting	612

KCREP2 – CONSERVATION BUFFERS

Purpose

To provide wildlife habitat and to remove sediment and other pollutants from runoff by filtration, deposition, infiltration, adsorption, absorption, decomposition, and volatilization.

Application

Apply this practice to cropland, marginal pastureland, or other sensitive areas that are subject to erosion, soil and nutrient or pesticide movements that constitute a pollution hazard.

Cost Share Policy

Note: Fence is only eligible under KCREP4 (Fence)

Eligible Components:	CREP Practices	Authorized
Components as defined in the FSA National CRP Manual, 2-CRP, Exhibit 9 for respective practices.	CP8A – Grassed Waterways CP15A – Contour Grassed Strips CP21 – Filter Strips CP22 – Riparian Forest Buffers CP29 – Habitat Buffer (stream or sinkhole)	√

Requirements

5. Eligible lands are restricted to areas approved by USDA for participation in the Conservation Reserve Enhancement Program (CREP) using Farm Service Agency program guidelines.
6. Program participants must have a current CREP contract approved by the FSA county committee.
7. Program participants must be in compliance with CREP contract provisions as determined by FSA.
8. This practice is eligible under continuous sign-ups of the Green River CREP program.

Environmental Concerns

Consideration shall be given to wildlife and environmental protection when designing this practice.

Cost Share Rate and Incentives

Cost share will be based on 25% of the eligible cost as determined by FSA according to the AD-245 used for CREP payments. Incentives will be based on 25% of practice installation cost.
Cost share and incentive payments combined cannot exceed $7500 per practice.
Incentives will be based on 75% of the practice installation cost when enrolled into a permanent easement.

Specifications

Conservation buffer practices must be established in accordance with the following NRCS practice standards and any practice establishment guidelines specific to CREP.

Descriptive Title	Technical Practice Code
CP8A – Grassed Waterways	412/410
CP15A – Contour Grassed Strips	332
CP21 – Filter Strips	393
CP22 – Riparian Forest Buffers	391
CP-29 – Habitat Buffers	386

KCREP3 – LIVESTOCK WATERING SYSTEMS

Purpose

The purpose of this practice is to provide alternative water sources for livestock in situations where streams are accessed and pollution potential exists.

Application

Apply this practice as an alternative water supply when current livestock water has been displaced by the implementation of a conservation buffer.

Cost Share Policy

Note: Cost share on stream limited access points is restricted to the ford type crossings using geotextile and rock. Fence needed for Stream Limited Access is cost-shared under KCREP4 (Fence)

Eligible Components:	Procedure Needed:	Procedure Purpose	Authorized	Not Authorized
Components as defined in the FSA National CRP Manual, 2-CRP, Exhibit 9 for respective practices.	Install pipelines, tanks, or limited access points in streams.	Provide livestock water.	√	
	Ponds, wells, and spring developments	Provide livestock water source.	√	
	Pumps, electrical accessories	To pump water from wells, streams and other sources.		√

Requirements

9. Eligible lands are restricted to areas approved by USDA for participation in the Conservation Reserve Enhancement Program (CREP) using Farm Service Agency program guidelines.
10. Program participants must have a current CREP contract approved by the FSA county committee.
11. Program participants must be in compliance with CREP contract provisions as determined by FSA.
12. This practice is eligible under continuous sign-ups of the Green River CREP program.
13. This practice is only eligible in conjunction with a Conservation Buffer (CP-22, CP-21, or CP-29).

Environmental Concerns
Consideration shall be given to wildlife and environmental protection when designing this practice.

Cost Share Rate and Incentives
Cost share will be based on 25% of the eligible cost as determined by FSA according to the AD-245 used for CREP payments. Incentives will be based on 25% of practice installation cost.
Cost share and incentive payments combined cannot exceed $7500 per practice.
Incentives will be based on 75% of the practice installation cost when enrolled into a permanent easement.

Practice Development and Specifications
Watering facilities must be established in accordance NRCS standards and specifications.
Practice components are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Pipeline.	516	20 years
Trough or Tank.	614	10 years
Stream Crossing (Limited Access Points).	578	20 years

KCREP4 – FENCE

Purpose

The purpose of this practice is to exclude livestock from conservation buffers to improve water quality and wildlife habitat.

Application

Apply this practice when livestock need to be excluded from conservation buffers installed through the CREP.

Cost Share Policy

Note: KCREP4 should be used for all fencing used in conjunction with buffers, stream crossings, or stream limited access points.

Eligible Components:	Procedure Needed:	Procedure Purpose	Authorized	Not Authorized
Components as defined in the FSA National CRP Manual, 2-CRP, Exhibit 9 for respective practices.	Fence	Exclude livestock from stream or karst area to prevent erosion and improve water quality.	√	
	Fence	Exclude livestock from pond to improve water quality, or as a property boundary.		√

Requirements

14. Eligible lands are restricted to areas approved by USDA for participation in the Conservation Reserve Enhancement Program (CREP) using Farm Service Agency program guidelines.
15. Program participants must have a current CREP contract approved by the FSA county committee.
16. Program participants must be in compliance with CREP contract provisions as determined by FSA.
17. This practice is eligible under continuous sign-ups of the Green River CREP program.
18. This practice is only eligible in conjunction with a Conservation Buffer (CP-22, CP-21, or CP-29).

Environmental Concerns

Consideration shall be given to wildlife and environmental protection when designing this practice.

Cost Share Rate and Incentives

Cost share will be based on 25% of the eligible cost as determined by FSA according to the AD-245 used for CREP payments. Incentives will be based on 25% of practice installation cost.
Cost share and incentive payments combined cannot exceed $7500 per practice.
Incentives will be based on 75% of the practice installation cost when enrolled into a permanent easement.

Practice Development and Specifications

Permanent fence must be installed in accordance NRCS standards and specifications. Practice components are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Fence.	382	20 years

KCREP5 – STREAM CROSSING

Purpose
To improve water quality by removing access to the stream except where livestock, people or equipment must cross the stream by providing a single, stable crossing.

Application
Apply this practice where livestock must cross an intermittent or perennial watercourse.

Cost sharing is restricted to the ford type crossings using geotextile and rock.

Cost Share Policy:
Note: Fence associated with the Stream Crossing should be cost-shared under KCREP4.

Eligible Components:	Procedure Needed:	Procedure Purpose	Authorized
Components as defined in the FSA National CRP Manual, 2-CRP, Exhibit 9 for respective practices.	Install stream crossing for livestock.	Provide crossing for livestock to be moved from one side of the buffer to the other side for grazing.	√

Requirements
19. Eligible lands are restricted to areas approved by USDA for participation in the Conservation Reserve Enhancement Program (CREP) using Farm Service Agency program guidelines.
20. Program participants must have a current CREP contract approved by the FSA county committee.
21. Program participants must be in compliance with CREP contract provisions as determined by FSA.
22. This practice is eligible under continuous sign-ups of the Green River CREP program.
23. This practice is only eligible in conjunction with a Conservation Buffer (CP-22, CP-21, or CP-29).

Environmental Concerns
Consideration shall be given to wildlife and environmental protection when designing this practice.

Cost Share Rate and Incentives

Cost share will be based on 25% of the eligible cost as determined by FSA according to the AD-245 used for CREP payments. Incentives will be based on 25% of practice installation cost.
Cost share and incentive payments combined cannot exceed $7500 per practice.
Incentives will be based on 75% of the practice installation cost when enrolled into a permanent easement.

Practice Development and Specifications

Practice and components must conform to NRCS standards and specifications. The landowner will be responsible for obtaining any applicable permits or certifications prior to construction. Practice components are included in the following list:

Descriptive Title	Technical Practice Code	Life Span
Stream Crossing	578	20 years

Appendix A

Definitions

(1) Agricultural or Silvicultural Production: Any farm operation on a tract of land, including all income-producing improvements and farm dwellings, together with other farm buildings and structures incident to the operation and maintenance of the farm, used for the production of livestock, livestock products, poultry, poultry products, milk, milk products, or silviculture products or for the growing of crops such as, but not limited to tobacco, corn, soybeans, small grains, fruit and vegetables, or devoted to and meeting the requirements and qualifications for payments to agriculture programs under an agreement with the state or federal government.

(2) Agriculture Water Quality Plan: A document incorporating the conservation plan, compliance plan, or forest stewardship management plan as necessary to prevent ground water and surface water pollution from an agricultural or silvicultural production.

(3) Applicant: A person who applies for cost share assistance from the Kentucky Soil Erosion and Water Quality Cost Share Fund.

(4) Available Funds: Monies budgeted, unobligated, and approved by the Soil and Water Conservation Commission for cost share assistance.

(5) Best Management Practices: The most effective, practical, and economical means of reducing and preventing water pollution for agricultural or silvicultural production provided by the USDA Natural Resources Conservation Service and the Soil and Water Conservation Commission. Best management practices shall establish a minimum level of acceptable quality for planning, siting, designing, installing, operating, and maintaining these practices.

(6) Case File: The collection of materials that are assembled and maintained for each application for cost share assistance.

(7) Compliance Plan: A conservation plan containing best management practices developed for persons engaged in agricultural production by the USDA Natural Resources Conservation Service in conjunction with local conservation districts as required for eligibility under the Federal Food Security Act.

(8) Conservation District or district: A subdivision of state government organized pursuant to KRS 262 for the specific purpose of assisting persons engaged in agricultural or silvicultural production in solving soil and water resources problems, setting priorities for conservation work to be accomplished, and coordinating the federal, state, and local resources to carry out these programs.

(9) Conservation Plan: A plan describing best land management practices, including an installation schedule and maintenance program which, when completely implemented, will improve and maintain soil, water, and related plant and animal resources of the land in accordance with the USDA Natural Resources Conservation Service Technical Guide or developed by others in accordance with the Technical Guide and in cooperation with a conservation district.

(10) Cost Share Assistance- Cost share funds awarded by the Commission from the Kentucky Soil and Water Quality Cost Share Fund.

(11) District Supervisor: A member of a conservation district's governing board.

(12) Ecosystem-Based Assistance Process: A specific application of a planning process that considers the integration of ecological, economic, and social factors to maintain and to enhance the quality of the environment to best meet current and future needs, which may include the following components:

(a) Inclusion of private land and public land within the watershed.
(b) Identification of and suggested solutions for various resource problems within the watershed.
(c) Establishment of opportunities for public participation in plan development and implementation.
(d) Inclusion of mechanisms for developing a comprehensive resource plan for the watershed and for reporting conservation accomplishments within the watershed.
(e) Identification and prioritization of local resource concerns and inclusion of mechanisms to address these concerns within the watershed.
(f) Development within current conservation district boundaries with coordination of plans across county lines for protection of the watershed.

(13) Eligible Land: Land on which agricultural or silvicultural production is being conducted.

(14) Eligible Person: A person eligible to apply for cost share assistance.

(15) Eligible Practices: Those best management practices that have been approved by the Commission.

(16) Environmental Quality Incentive Program Piggyback (EQIP Piggyback): An incentive that is offered with an EQIP contract that is designed to promote faster installation of Best Management Practices. These funds are available to contracts that the Division of Conservation has deemed a Soil and/or Water quality issue that is of priority in being addressed. This funding is available for two years after the EQIP contract is signed. At the end of the two year period this incentive is no longer available to the applicant.

(17) Forest Stewardship Management Plan: A plan developed by the Kentucky Division of Forestry or other cooperating entities that establishes practices for a person engaged in an agricultural or silvicultural production to manage forestlands in accordance with sound silvicultural and natural resource principles.

(18) Groundwater: Subsurface water occurring in the zone of saturation beneath the water table and any perched water zones below the B soil horizon.

(19) Obligated Funds: These are funds that have been sent to the district for a particular applicant that are being held in the districts account as an incentive payment, or funds that will be used for that applicant following final approval of the practice for cost share assistance.

(20) Performance and Maintenance Agreement: A written agreement between an eligible person and the district in which the eligible person agrees to implement and to maintain the best management practices for which cost share assistance is being awarded.

(21) Program Year: The period of time from July 1 to June 30.

(22) Soil and Water Conservation Commission or Commission: The commission established by KRS 146.090.

(23) Surface Water: Those waters having well defined banks and beds, either constantly or intermittently flowing: lakes and impounded waters, marshes and wetlands, and any subterranean waters flowing in well defined channels and having a demonstrable hydrologic connection with the surface. Effluent ditches and lagoons used for waste treatment which are situated on property owned, leased, or under valid easement by a permitted discharger shall not be considered to be surface waters of the Commonwealth.

(24) Tenant Farmer: An applicant that signs up for State Cost Share who does not own the land in which the practices will be conducted.

(25) Unobligated Funds: These are funds that have been sent to the district for a particular applicant that will not be used for that applicant after final approval of the practice for cost share assistance.

(26) Water Priority Protection Region: An area specifically delineated where water pollution from agricultural or silvicultural production has been scientifically documented.

(27) Watershed: All the area from which all drainage passes a given point.

Appendix B

Please use this list to assist in filling out page 1 of the KY State Cost Share Application. Question 15.

Types of Animals	Weight (lbs)
Beef or Dairy Calf	250
Beef or Dairy weaned Calf	500
Beef Feeder	800
Beef Cow	1,000
Dairy Replacement Heifer	1,065
Dairy Cow	1,400
Layer	4
Pullet (< 3 Months Old)	2.2
Pullet (> 3 Months Old)	4
Broiler	2.2
Turkey Hen	20
Turkey on Feed	15
Swine – Wean - Feeder	30
Swine – Feeder - Finish	135
Swine – Farrow – Wean	433
Swine – Farrow - Feeder	522
Swine – Farrow – Finnish	1,417
Gilt Development	150
Boar/Stud	400
Bison	1,500
Horse	1,100

Appendix .

NORTHERN KENTUCKY
INDEPENDENT DISTRICT
HEALTH DEPARTMENT

Onsite Wastewater Incentive Grant Application

_____	_____	_____
Application No.	Date Received	County

Owner's Name (if different)_____

Occupant's Name _____

Location of Property _____

City _____ State _____ Zip Code_____ Phone No. _____

The following is optional information you may include to further qualify for this grant.

Number of people residing in home _____ Annual household income_____

Number of bedrooms in home _____ Number of people living in home _____

Existing System: Type of Tank _____ Size of Tank_____ gallons

Type of Leach Field _____ Amount of leach line _____ feet

Is there an overflow line on your present system? Yes _____ No _____ Unknown _____

Is existing system discharging into creek, road ditch, or drainage? Yes ___ No ___Unknown ___

TO BE COMPLETED BY LOCAL HEALTH DEPARTMENT

_____	_____
Received by	Date

NORTHERN KENTUCKY INDEPENDENT DISTRICT HEALTH DEPARTMENT
NKYHEALTH.ORG

Onsite Wastewater Incentive Grant

Application #_____

Name:_____

Address:_____

CRITERIA	RATING SCALE				SCORE
	8 7 6 5 4 3 2 1 0				
Probable existing system components	No tank or lateral field	Tank only Type:_____	Tank field with overflow pipe	Tank field with no overflow pipe Feet:_____	_____
Amount of discharge	Major surface discharge evidence	Significant surface discharge evidence	Minor surface discharge evidence	No discharge evidence	_____
Location of discharge	Discharging directly into creek, watershed or bodies of water	Discharge directly onto other lots and/or into drainages, ditches, gullies, etc…	Discharge crosses property lines	Discharge contained within lot	_____
Watershed/Health Impact	Major risk by direct exposure	Significant risk by direct or indirect exposure	Moderate risk	Minor or no impact	_____
Available repair area	Ample usable space for system repair	Moderate usable space for system repair	Very limited usable repair space but some repair possible	No usable repair space available	_____
Installation Feasibility	Excellent site conditions favorable with minimum enhancement	Good site conditions favorable with moderate enhancement	Fair site conditions can be upgraded by major enhancement	Poor site conditions not conducive to repair	_____
Household Income (if supplied on application)	<$25,000 annual	$25,000 - $40,000 annual	$40,000 - $75,000 annual	>$75,000 annual	_____
				TOTAL	_____

Appendix C

TMDL Study Plan - 2013

Total Maximum Daily Load Monitoring in Sulphur Creek (USGS HUC05140103110300)

Anderson, Mercer and Washington Counties

Effective Date: 3/1/2013

Revision Date: 1/25/2013

Prepared by:
TMDL Section
Division of Water
Kentucky Department for Environmental Protection

This document is approved for release

Amy Siewert 2/11/13

Amy Siewert, Supervisor
TMDL Section
Kentucky Division of Water

Date

Table of Contents

List of Tables and Figures

Overview of 2012 Sampling

In 2012, the TMDL section began monitoring in the Sulphur Creek watershed with the goal of completing a more intensive survey with reference conditions for the purpose of cause identification, TMDL development and BMP implement strategies. During the 2012 field season, it was determined that both the spring (Willow Creek) and summer (Beaver Creek) reference sites were not suitable as reference conditions and were therefore dropped from the sampling schedule. Additionally, UT to UT Sulphur Creek (DOW12023026) was sampled for biology in addition to UT Sulphur Creek (DOW12023022); both of these sites were of high quality and could potentially be used as reference conditions pending the macroinvertebrate community, which has yet to be identified. Due to the similarity between UT Sulphur Creek (DOW23023022) and UT to UT Sulphur Creek (DOW12023026), only UT Sulphur Creek (-022), which is located downstream of the confluence of UT to UT Sulphur Creek, was sampled during each visit to the Sulphur Creek watershed.

The 2012 study plan for Sulphur Creek specified that macroinvertebrate samples would be collected using the riffle kick methodology, processed using a 200 fixed-count subsampling method, and identified to the family-level according to the procedures found in Laboratory Procedures for Macroinvertebrate Processing, Taxonomic Identification and Reporting (KDOW2009c). However, in order to expand the usability of the macroinvertebrate data collected, it was decided to collect the macroinvertebrates using the riffle kick plus multi-habitat methodology, process them using a 300 fixed-count subsampling method, and identify them to the genus-level, still in accordance with the procedures found in Laboratory Procedures for Macroinvertebrate Processing, Taxonomic Identification and Reporting (KDOW2009c).

It is worth noting that 2012 was characterized by drought conditions in Kentucky and that many of the sites pooled or went dry by later May or early June. Therefore, sites characterized as wadeable (>5 mi^2) were not sampled for biology since the streams were not considered suitable for macroinvertebrate collection as outlined in Methods for Sampling Benthic Macroinvertebrate Communities in Wadeable Waters (KDOW 2011c).

Additionally, due to the drought that occurred during 2012, diurnal dissolved oxygen (DO) measurements were not collected despite being outlined in the 2012 Sulphur Creek study plan. However, based on the first year of data, it is hypothesized that DO may be a potential stressor in the

watershed since low DO levels were measured during the few high flow events that occurred in the early spring of 2012. This observation is counterintuitive and requires further investigation before conclusions can be made about these low DO levels and the potential impact they may be having on the biological community.

At the end of 2012, TMDL biologist had collected the type and number of samples outlined in Table 1. Water chemistry samples were analyzed for:

CBOD5	TOC
inorganic ions	ammonia
TSS	nitrate/nitrite
sulfate	total phosphorus
TDS	TKN
chlorides	ortho-phospate
turbidity	

In situ measurements consisted of:

temperature	% dissolved oxygen
specific conductivity	dissolved oxygen in mg/L
pH	discharge

Therefore, it has been determined that the following data gaps exist:

1) Water Chemistry: need 6 to 8 additional water chemistry samples to reach the original goal of 12 samples
2) Bacteria: need an additional spring geomean for E. coli plus monthly samples during the summer months until the original goal of 10 samples has been achieved
3) Biology: Macroinvertebrates, algae and habitat need to be collected along Sulphur Creek at DOW12023023, -024, and -025.
4) Diurnal dissolved oxygen measurements, if resources allow

Below the sampling strategy for 2013 monitoring is discussed with the goal of filling the identified data gaps. At the end of 2013 the data will be used for cause identification and TMDL development, and, if a watershed group is formed as a result of this study, the data will be sufficient to direct their BMP implementation efforts.

2013 Sampling Strategy

Water Chemistry and In Situ Measurements

A total of 9 locations (Figure 1) will be monitored for parameters listed in Table 2. Water chemistry monitoring will occur at least once per month between February and October 2013. An attempt will be made to achieve 8 sampling events, and the following seasonal and flow conditions will be targeted: 1) spring base flow, 2) spring storm flow, 3) summer low flow, 4) summer base flow and 5) summer storm flow. Since 2012 was characterized by a drought in Kentucky, storm flows in both spring and summer and summer base flow will be especially important samples to achieve in order to diversify the current data set from a flow and potential source perspective. Water chemistry sampling will follow the methods presented in Sampling Surface Water Quality in Lotic Systems (KDOW2011a). In situ water quality parameters and diurnal dissolved oxygen measurements will be collected following the procedures in In situ Water Quality Measurements and Meter Calibration (KDOW 2009a).

Bacteria Sampling

E. coli monitoring will occur at least twice per month during the 2013 recreation season (May through October) following the procedures found in Sampling Surface Water Quality in Lotic Systems (KDOW 2011a). An attempt will be made to achieve an additional 10 sampling events for E. coli including 5 samples that will be collected within a 30-day period in the spring in order to calculate a geometric mean. E. coli samples will be analyzed by TMDL staff in the KDOW's Water Quality Branch microbiology laboratory. The Frankfort TMDL staff will analyze E. coli following the procedures found in Enzyme Substrate Test for the Detection of Total Coliforms and Escherichia coli (KDOW 2011b).

Biological Sampling

In order to obtain baseline (pre-TMDL) data on biological conditions, macroinvertebrate and benthic algae samples will be collected from the 3 project locations during the summer of 2013 that were not completed during the 2012 sampling season. During this sampling the following parameters will also be collected: habitat assessments, in situ water quality parameters, stream discharge and water chemistry. Macroinvertebrate and algae sampling will follow the methods presented in Methods for Sampling Benthic Macroinvertebrate Communities in Wadeable Waters (KDOW 2011c) and Collection Methods for Benthic Algae in Wadeable Waters (KDOW 2009b). Habitat assessment methodology will follow the procedures outlined in Methods for Assessing Habitat in Wadeable Waters (KDOW 2011d).

The streams within the Outer Bluegrass ecoregion (71d) are characterized as high gradient streams; therefore, the collection methods for macroinvertebrates and habitat assessments will follow the high gradient procedures. An index period during which sampling will occur has been designated for each site based on the drainage area of the stream at that site. Those streams that are <5mi^2 are designated as headwater streams, while those that are >5mi^2 are designated as wadeable streams. Only sites classified as wadeable will be sampled during 2013, which are to be sampled between June and September (KDOW 2009b).

Macroinvertebrate Communities

Macroinvertebrates will be collected from the thalweg of at least two distinct riffles within a 100m sampling reach following the riffle sample protocol. Four 0.25m^2 quadrate kicknet samples will be allocated among the riffle habitat and the four samples will be composited to yield a 1m^2 semi-quantitative sample. Additionally, a qualitative mutli-habitat sample will be collected from habitats other than riffles, such as undercut banks, roots, and depositional areas, where unique organisms such as beetles, dragonflies, damselflies and burrowing mayflies may be found. This aspect of the macroinvertebrate sample is qualitative and kept separate from the riffle kick semi-quantitative sample. Large debris will be removed from the sample in the field and samples will be transported to the KDOW Water Quality Laboratory for processing. Samples will be processed using a 300 fixed-count subsampling method and individuals will be identified to the genus-level according to the procedures found in Laboratory Procedures for Macroinvertebrate Processing, Taxonomic Identification and Reporting (KDOW 2009c).

Benthic Algae

Benthic algae samples will be collected from the following microhabitats, as applicable, using natural scraping and disposable pipettes:

5 riffle rocks in a transect	2-3 pieces of wood
2 leaf packs	Sediment depositional areas
2 aquatic plants or roots	Sand depositional areas
2 pool rocks	Any additional microhabitat

Sample material from each microhabitat will be composited into one sampling container. A field assessment of the condition of benthic algae will be conducted at each site and the results recorded on a visual assessment form found in Field Assessments of Benthic Algae Condition in Wadeable Water (KDOW 2009d). Algae will be processed for identification and the Water Quality Branch phycologist will identify samples based on the procedures found in Diatom Taxonomic Identification and Enumeration (KDOW 2009e).

Habitat Assessments

Habitat assessments will be conducted in conjunction with biological sampling at every site in order to evaluate the quality of instream and riparian habitat. Assessment data will be recorded on High Gradient RBP Habitat Assessment sheets.

Data Management

The data acquired from this project will be housed within several databases. Refer to the FFY 2013 Water Quality Monitoring for TMDL Development (QAPP) for a comprehensive list of these databases as well as the procedures that will be followed when performing data entry, data management and data quality assurance.

Quality Control / Quality Assurance

QA/QC will be implemented for this project as described in the FFY 2013 QAPP, and all data collection, field activities, and sample analyses will follow methodologies set forth in the applicable Standard Operating Procedures, which are outlined in the FFY 2013 QAPP.

Table 1. The type and number of samples collected by TMDL biologists in the Sulphur Creek Watershed in 2012.

Site ID	Stream Name	Location	Water Chemistry	In Situ Measurements	E. coli	Macroinvertebrates	Algae	Habitat
DOW12023018	Cheese Lick	at Alford Rd. bridge	5	5	5	1	1	1
DOW12023019	UT Cheese Lick	at Alford Rd. bridge	4	4	3	1	1	1
CFD12023501	Cheese Lick	At Ballard-Dugansville Road crossing	5	5	5	1	1	1
DOW12023020	Log Lick	at Stratton Road bridge	5	5	5	1	1	1
DOW12023021	Brush Creek	at Henry Robinson Rd. bridge	5	5	5	1	1	1
DOW12023022	UT Sulphur Creek	at Sulphur Lick Rd. bridge	4	4	4	1	1	1
DOW12023023	Sulphur Creek	Where Hoophold Rd. turns into Drury Rd.	6	7	7	0	0	0
DOW12023024	Sulphur Creek	at Lawrenceburg Rd. bridge	6	7	7	0	0	0
DOW12023025	Sulphur Creek	at Sulphur Lick Rd. bridge	6	7	7	0	0	0
DOW12023026	UT to UT Sulphur Creek	off Sulphur Lick Rd.	2	2	2	1	1	1
DOW12023002*	Beaver Creek	off Leathers Rd. bridge	4	4	2	n/a	n/a	n/a
DOW12014014*	Willow Creek	Off Aaron Barnett Rd. bridge	1	1	0	n/a	n/a	n/a

* Deemed unsuitable as a reference site; dropped.

Table 2. Monitoring location details and parameters to be collected in the Sulphur Creek watershed in 2013.

EDAS#	Site #	Stream Name	Location	County	RM at UT	River Mile	Catchment Area (mi^2)	Parameters
DOW12023018	018	Cheese Lick	at Alford Rd. bridge	Anderson		5.3	2.97	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
DOW12023019	019	UT Cheese Lick	at Alford Rd. bridge	Mercer	5.2	0.2	1.14	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
CFD12023501	501	Cheese Lick	At Ballard-Dugansville Road crossing	Anderson		3.8	5.10	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
DOW12023020	020	Log Lick	at Stratton Road bridge	Mercer		1.4	2.53	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
DOW12023021	021	Brush Creek	at Henry Robinson Rd. bridge	Mercer		1.4	3.14	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
DOW12023022	022	UT Sulphur Creek	at Sulphur Lick Rd. bridge	Anderson	0.7	0.1	1.41	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe
DOW12023023	023	Sulphur Creek	Where Hoophold Rd. turns into Drury Rd.	Anderson		8.1	16.22	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe; biological samples
DOW12023024	024	Sulphur Creek	at Lawrenceburg Rd. bridge	Washington		4.9	19.31	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe; biological samples
DOW12023025	025	Sulphur Creek	at Sulphur Lick Rd. bridge, upstream UT	Anderson		0.8	21.55	E. coli, NO2/NO3; NH3-N; TKN; Total P; Ortho-P; TOC; BOD5; TSS; Turbidity; Discharge; Multiparameter Probe; biological samples

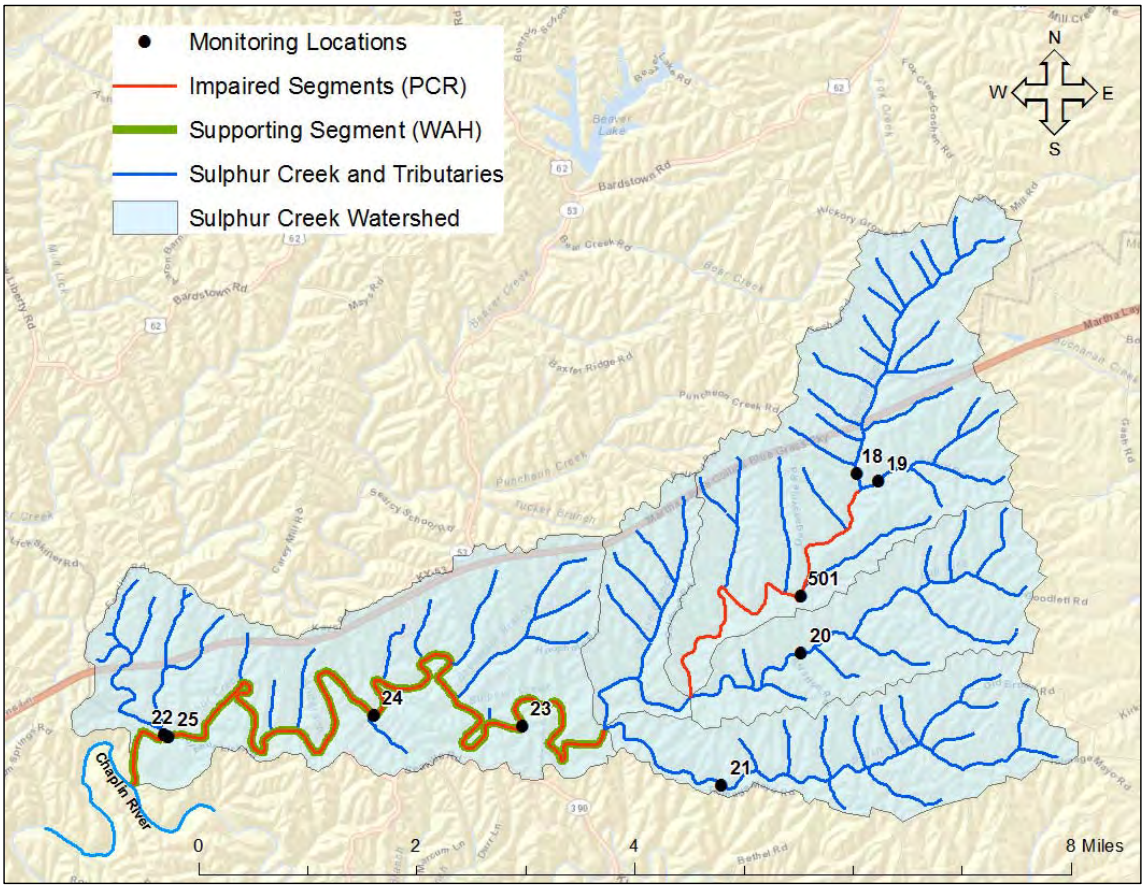

Figure 1. Updated Sulphur Creek project monitoring locations.

10

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---. 2009b. Collection Methods for Benthic Algae in Wadeable Waters. Revision 1.0. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.

---. 2009c. Laboratory Procedures for Macroinvertebrate Processing, Taxonomic Identification and Reporting. Revision 2. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.

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---. 2011b. Enzyme Substrate Test for the Detection of Total Coliforms and Escherichia coli.. Revision 1. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.

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---. 2011d. Methods for Assessing Habitat in Wadeable Waters. Revision 1. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.

Appendix D

United States Department of Agriculture

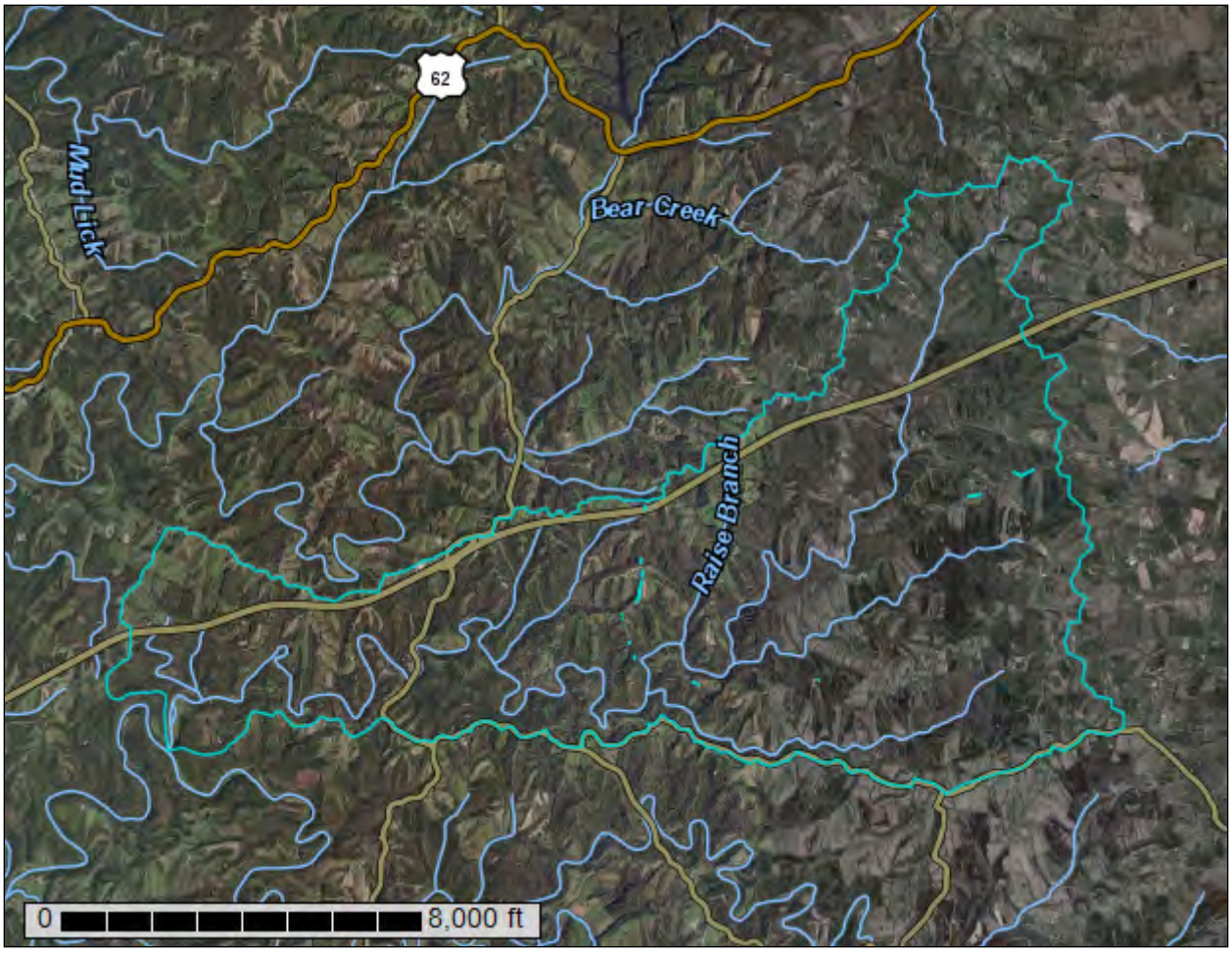
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Anderson and Franklin Counties, Kentucky, Boyle and Mercer Counties, Kentucky, and Washington County, Kentucky

Sulphur Creek Watershed



December 9, 2014

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

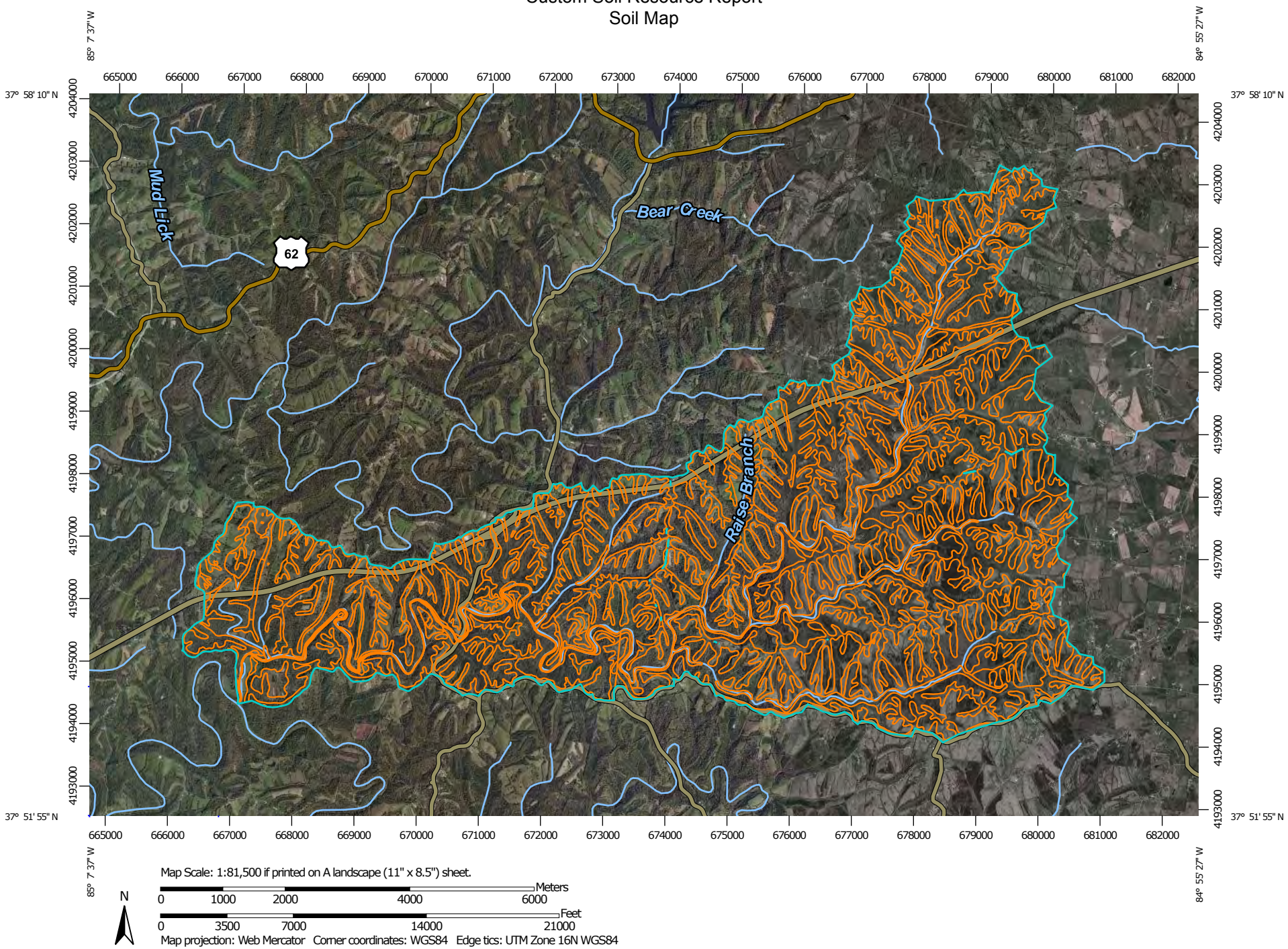
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Anderson and Franklin Counties, Kentucky
Survey Area Data: Version 12, Sep 17, 2014

Soil Survey Area: Boyle and Mercer Counties, Kentucky
Survey Area Data: Version 10, Sep 17, 2014

Soil Survey Area: Washington County, Kentucky
Survey Area Data: Version 11, Sep 17, 2014

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2010—Feb 20, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Anderson and Franklin Counties, Kentucky (KY601)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bo	Boonesboro silt loam, occasionally flooded	55.4	0.4%
EdC	Eden silty clay loam, 6 to 15 percent slopes	294.5	2.0%
EfE	Eden flaggy silty clay, 15 to 35 percent slopes	4,907.2	33.1%
ErB	Elk silt loam, 2 to 6 percent slopes, rarely flooded	39.3	0.3%
ErC	Elk silt loam, 6 to 12 percent slopes, rarely flooded	4.6	0.0%
FdC	Faywood silt loam, 6 to 12 percent slopes	968.6	6.5%
FdD	Faywood silt loam, 12 to 30 percent slopes	193.7	1.3%
Ld	Lindside silt loam, occasionally flooded	22.4	0.2%
LwB	Lowell silt loam, 2 to 6 percent slopes	49.0	0.3%
LwC	Lowell silt loam, 6 to 12 percent slopes	616.2	4.2%
Ne	Newark silt loam, 0 to 2 percent slopes, occasionally flooded	28.1	0.2%
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	72.7	0.5%
W	Water	62.3	0.4%
Subtotals for Soil Survey Area		**7,313.9**	**49.4%**
Totals for Area of Interest		**14,812.2**	**100.0%**

Boyle and Mercer Counties, Kentucky (KY606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
EdD	Eden silty clay loam, 6 to 20 percent slopes	1,995.5	13.5%
EeE3	Eden flaggy silty clay, 20 to 30 percent slopes, severely eroded	3,845.8	26.0%
LoB	Lowell silt loam, 2 to 6 percent slopes	16.0	0.1%
LoC	Lowell silt loam, 6 to 12 percent slopes	46.9	0.3%
Ne	Newark silt loam, 0 to 2 percent slopes, frequently flooded	3.6	0.0%
No	Nolin silt loam, 0 to 2 percent slopes, frequently flooded	296.8	2.0%

Boyle and Mercer Counties, Kentucky (KY606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	11.6	0.1%
Subtotals for Soil Survey Area		**6,216.2**	**42.0%**
Totals for Area of Interest		**14,812.2**	**100.0%**

Washington County, Kentucky (KY229)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bo	Boonesboro silt loam, occasionally flooded	2.1	0.0%
EdD2	Eden silty clay loam, 6 to 20 percent slopes, eroded	367.1	2.5%
EeE3	Eden flaggy silty clay, 20 to 30 percent slopes, severely eroded	814.0	5.5%
LoB	Lowell silt loam, 2 to 6 percent slopes	0.5	0.0%
LoC2	Lowell silt loam, 6 to 12 percent slopes, eroded	13.4	0.1%
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	56.7	0.4%
W	Water	28.2	0.2%
Subtotals for Soil Survey Area		**1,282.1**	**8.7%**
Totals for Area of Interest		**14,812.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally

are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Anderson and Franklin Counties, Kentucky

Bo—Boonesboro silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: lhzx
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Boonesboro, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boonesboro, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-loamy alluvium

Typical profile

H1 - 0 to 18 inches: silt loam
H2 - 18 to 28 inches: gravelly loam
R - 28 to 38 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Minor Components

Nolin

Percent of map unit: 4 percent

Huntington

Percent of map unit: 3 percent

Lindside

Percent of map unit: 3 percent

EdC—Eden silty clay loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: lhzz
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Eden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale and/or limestone and siltstone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 23 inches: flaggy silty clay
Cr - 23 to 67 inches: weathered bedrock

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D

Minor Components

Faywood
Percent of map unit: 5 percent

Fairmount
Percent of map unit: 5 percent

Lowell
Percent of map unit: 5 percent

EfE—Eden flaggy silty clay, 15 to 35 percent slopes

Map Unit Setting
National map unit symbol: lj00
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Eden and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from calcareous shale and/or limestone and siltstone

Typical profile
H1 - 0 to 5 inches: flaggy silty clay
H2 - 5 to 23 inches: flaggy silty clay
Cr - 23 to 67 inches: weathered bedrock

Properties and qualities
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D

Minor Components

Faywood
Percent of map unit: 9 percent

Fairmount
Percent of map unit: 8 percent

Boonesboro
Percent of map unit: 8 percent

ErB—Elk silt loam, 2 to 6 percent slopes, rarely flooded

Map Unit Setting
National map unit symbol: 2slf3
Elevation: 380 to 1,110 feet
Mean annual precipitation: 36 to 66 inches
Mean annual air temperature: 40 to 68 degrees F
Frost-free period: 135 to 218 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Elk, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elk, Rarely Flooded

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium over mixed loamy alluvium

Typical profile
Ap - 0 to 8 inches: silt loam
BA - 8 to 15 inches: silt loam
Bt - 15 to 46 inches: silty clay loam
2C - 46 to 80 inches: silty clay loam

Properties and qualities
Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: High (about 10.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Otwood, rarely flooded
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear

Lawrence, rarely flooded
Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear

Nolin, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear

ErC—Elk silt loam, 6 to 12 percent slopes, rarely flooded

Map Unit Setting
National map unit symbol: 2slf7
Elevation: 390 to 1,060 feet
Mean annual precipitation: 36 to 66 inches
Mean annual air temperature: 40 to 68 degrees F
Frost-free period: 135 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Elk, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elk, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Mixed fine-silty alluvium over mixed loamy alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
BA - 8 to 15 inches: silt loam
Bt - 15 to 46 inches: silty clay loam
2C - 46 to 80 inches: silty clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Minor Components

Otwood, rarely flooded

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear

Allegheny

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear

Nolin, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear

FdC—Faywood silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lj09
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Faywood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Faywood

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and shale

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 34 inches: silty clay
R - 34 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Minor Components

Lowell

Percent of map unit: 4 percent

Mcafee
Percent of map unit: 4 percent

Eden
Percent of map unit: 4 percent

Fairmount
Percent of map unit: 3 percent

FdD—Faywood silt loam, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: lj0b
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Faywood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Faywood

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and shale

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 34 inches: silty clay
R - 34 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C

Minor Components

Mcafee

Percent of map unit: 5 percent

Fairmount

Percent of map unit: 5 percent

Eden

Percent of map unit: 5 percent

Ld—Lindside silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: lj0g
Elevation: 300 to 1,500 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Lindside, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindside, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 41 inches: silt loam
H3 - 41 to 67 inches: stratified gravelly sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Minor Components

Boonesboro
Percent of map unit: 3 percent

Huntington
Percent of map unit: 3 percent

Nolin
Percent of map unit: 2 percent

Newark
Percent of map unit: 2 percent

LwB—Lowell silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: lj0h
Elevation: 500 to 1,400 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Lowell and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and/or calcareous shale and/or calcareous siltstone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 12 inches: silty clay loam
H3 - 12 to 57 inches: clay
R - 57 to 67 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Minor Components

Faywood

Percent of map unit: 4 percent

Nicholson

Percent of map unit: 3 percent

Maury

Percent of map unit: 3 percent

LwC—Lowell silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lj0j
Elevation: 500 to 1,400 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lowell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and/or calcareous shale and/or calcareous siltstone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 12 inches: silty clay loam
H3 - 12 to 57 inches: clay
R - 57 to 67 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Minor Components

Maury

Percent of map unit: 5 percent

Faywood

Percent of map unit: 5 percent

Nicholson

Percent of map unit: 5 percent

Ne—Newark silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2s2cm
Elevation: 440 to 1,150 feet

Mean annual precipitation: 36 to 54 inches
Mean annual air temperature: 40 to 66 degrees F
Frost-free period: 135 to 212 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Newark, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newark, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 42 inches: silt loam
Cg - 42 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 20 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Minor Components

Lindside, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)

Nolin, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)

Melvin, ocassionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation), Trees/Timber (Woody Vegetation)

No—Nolin silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2tm1s
Elevation: 390 to 1,200 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 172 to 204 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Nolin, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Occasionally Flooded

Setting
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
Ap - 0 to 10 inches: silt loam
Bw - 10 to 82 inches: silt loam
C - 82 to 101 inches: loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None

Available water storage in profile: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B

Minor Components

Lindside, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Elk, rarely flooded

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Newark, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear

Dunning, occasionally flooded

Percent of map unit: 1 percent
Landform: Flood plains, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

W—Water

Map Unit Setting

National map unit symbol: lj0y
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 42 to 66 degrees F
Frost-free period: 163 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Boyle and Mercer Counties, Kentucky

EdD—Eden silty clay loam, 6 to 20 percent slopes

Map Unit Setting

National map unit symbol: lhxd
Elevation: 480 to 1,360 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 44 to 66 degrees F
Frost-free period: 175 to 208 days
Farmland classification: Not prime farmland

Map Unit Composition

Eden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and shale and/or siltstone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 39 inches: flaggy clay
Cr - 39 to 64 inches: weathered bedrock

Properties and qualities

Slope: 6 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Minor Components

Faywood

Percent of map unit: 5 percent

Lowell
Percent of map unit: 4 percent

Nicholson
Percent of map unit: 3 percent

Newark
Percent of map unit: 1 percent

Boonesboro
Percent of map unit: 1 percent

Nolin
Percent of map unit: 1 percent

EeE3—Eden flaggy silty clay, 20 to 30 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lhxf
Elevation: 480 to 1,360 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 44 to 66 degrees F
Frost-free period: 175 to 208 days
Farmland classification: Not prime farmland

Map Unit Composition

Eden, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and shale and/or siltstone

Typical profile

H1 - 0 to 6 inches: flaggy silty clay
H2 - 6 to 21 inches: flaggy silty clay
Cr - 21 to 36 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D

Minor Components

Faywood
Percent of map unit: 5 percent

Lowell
Percent of map unit: 4 percent

Fairmount
Percent of map unit: 3 percent

Newark
Percent of map unit: 1 percent

Boonesboro
Percent of map unit: 1 percent

Nolin
Percent of map unit: 1 percent

LoB—Lowell silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: lhxr
Elevation: 480 to 1,360 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 44 to 66 degrees F
Frost-free period: 175 to 208 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Lowell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting
Landform: Ridges
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and shale and/or siltstone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 38 inches: clay
H3 - 38 to 62 inches: silty clay
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Minor Components

Faywood

Percent of map unit: 5 percent

Nicholson

Percent of map unit: 4 percent

Sandview

Percent of map unit: 3 percent

Fairmount

Percent of map unit: 1 percent

Eden

Percent of map unit: 1 percent

Woolper

Percent of map unit: 1 percent

LoC—Lowell silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lhxs
Elevation: 480 to 1,360 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 44 to 66 degrees F
Frost-free period: 175 to 208 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lowell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting

Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and shale and/or siltstone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 38 inches: clay
H3 - 38 to 62 inches: silty clay
R - 62 to 72 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Minor Components

Faywood
Percent of map unit: 4 percent

Eden
Percent of map unit: 3 percent

Sandview
Percent of map unit: 3 percent

Mod well drained soils
Percent of map unit: 3 percent

Fairmount
Percent of map unit: 1 percent

Woolper
Percent of map unit: 1 percent

Ne—Newark silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2s2cj
Elevation: 420 to 1,120 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 41 to 67 degrees F
Frost-free period: 142 to 218 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Newark, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newark, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 66 inches: silt loam
Cg - 66 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 20 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Minor Components

Lindside, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)

Nolin, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)

Boonesboro, frequently flooded

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)

Dunning, frequently flooded

Percent of map unit: 1 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Trees/Timber (Woody Vegetation)

No—Nolin silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2s2cw
Elevation: 380 to 1,120 feet
Mean annual precipitation: 36 to 66 inches
Mean annual air temperature: 41 to 68 degrees F
Frost-free period: 139 to 218 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Nolin, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 72 inches: silt loam
C - 72 to 85 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B

Minor Components

Elk, rarely flooded
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Newark, frequently flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear

Lindside, frequently flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Boonesboro, frequently flooded
Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Dunning, frequently flooded
Percent of map unit: 1 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

W—Water

Map Unit Setting
National map unit symbol: lhyh
Elevation: 480 to 1,360 feet
Mean annual precipitation: 40 to 53 inches
Mean annual air temperature: 44 to 66 degrees F
Frost-free period: 175 to 208 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Washington County, Kentucky

Bo—Boonesboro silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: lhvv
Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Boonesboro, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boonesboro, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-loamy alluvium

Typical profile

H1 - 0 to 17 inches: silt loam
H2 - 17 to 24 inches: gravelly silt loam
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Minor Components

Skidmore

Percent of map unit: 5 percent

Nolin

Percent of map unit: 5 percent

Newark

Percent of map unit: 3 percent

Dunning, frequently flooded
Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave

EdD2—Eden silty clay loam, 6 to 20 percent slopes, eroded

Map Unit Setting
National map unit symbol: lhvz
Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition
Eden and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and siltstone and/or shale

Typical profile
H1 - 0 to 9 inches: silty clay loam
H2 - 9 to 23 inches: flaggy silty clay
Cr - 23 to 33 inches: weathered bedrock

Properties and qualities
Slope: 6 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Minor Components

Faywood

Percent of map unit: 5 percent

Lowell

Percent of map unit: 4 percent

Culleoka

Percent of map unit: 3 percent

Fairmount

Percent of map unit: 2 percent

Nicholson

Percent of map unit: 1 percent

EeE3—Eden flaggy silty clay, 20 to 30 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lhw0
Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Eden, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eden, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and siltstone and/or shale

Typical profile

H1 - 0 to 4 inches: flaggy silty clay
H2 - 4 to 24 inches: flaggy clay
Cr - 24 to 34 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 14 percent
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D

Minor Components

Faywood

Percent of map unit: 5 percent

Fairmount

Percent of map unit: 4 percent

Culleoka

Percent of map unit: 4 percent

Lowell

Percent of map unit: 2 percent

LoB—Lowell silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: lhwd
Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lowell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting

Landform: Ridges

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and shale and/or clayey colluvium derived from limestone and shale

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 15 inches: silty clay
H3 - 15 to 60 inches: clay
R - 60 to 70 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Minor Components

Faywood

Percent of map unit: 4 percent

Elk

Percent of map unit: 3 percent
Landform: Stream terraces

Eden

Percent of map unit: 3 percent

Beasley

Percent of map unit: 3 percent

Shelbyville

Percent of map unit: 2 percent

LoC2—Lowell silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: lhwf

Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lowell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lowell

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and shale and/or clayey colluvium derived from limestone and shale

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 11 inches: silty clay
H3 - 11 to 55 inches: clay
R - 55 to 65 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Minor Components

Faywood

Percent of map unit: 4 percent

Shelbyville

Percent of map unit: 3 percent

Eden

Percent of map unit: 3 percent

Beasley
Percent of map unit: 3 percent

Elk
Percent of map unit: 2 percent
Landform: Stream terraces

No—Nolin silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2tm1s
Elevation: 390 to 1,200 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 172 to 204 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Nolin, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Occasionally Flooded

Setting
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
Ap - 0 to 10 inches: silt loam
Bw - 10 to 82 inches: silt loam
C - 82 to 101 inches: loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Very high (about 12.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

Minor Components

Elk, rarely flooded
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Lindside, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Newark, occasionally flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear

Dunning, occasionally flooded
Percent of map unit: 1 percent
Landform: Flood plains, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

W—Water

Map Unit Setting
National map unit symbol: lhwx
Elevation: 470 to 1,020 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 150 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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