

Final Closeout Report

Hinkston Creek Watershed Planning and BMP Implementation Project

Grant 08-09 C9994861-11

MOA # 1200000911

January 1, 2012 to December 31, 2014



Submitted to: Kentucky Division of Conservation and Division of Water

Submitted by: Barry Tanning, Tetra Tech

December 10, 2014

A. Title Page

Grant Number: C9994861-11
Title: Hinkston Creek Watershed Plan & BMP Implementation Project
Application #: 08-09
Grant / MOA #: 1200000911
Project Period: January 1, 2013 to December 31, 2014
Submitted By: Barry Toning, Project Manager



Stabilized livestock stream crossing and stream exclusion fencing installed via project cost share funding at the Erin Perdue farm in Bourbon County, Kentucky.

Statement Regarding This Project

The Environmental and Public Protection Cabinet (EPPC) and Tetra Tech do not discriminate on the basis of race, color, national origin, sex, age, religion, or disability.

The EPPC and Tetra Tech will provide, on request, reasonable accommodations including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs and activities.

To request materials in an alternative format, contact the Kentucky Division of Water, 14 Reilly Road, Frankfort, KY 40601 or call (502) 564-3410, or contact Tetra Tech at (703) 385-6000 or email barry.toning@tetrattech.com.

Funding for this project was provided in part by a grant from the U.S. Environmental Protection Agency (USEPA) through the Kentucky Division of Water, Nonpoint Source Section and the Kentucky Division of Conservation to Tetra Tech as authorized by the Clean Water Act Amendments of 1987, §319(h) Nonpoint Source Implementation Grant # C9994861-11. Mention of trade names or commercial products, if any, does not constitute endorsement.

This document was printed on recycled paper. It is also available electronically.

B. Acknowledgments

This project, which was funded by the Kentucky Division of Conservation and Division of Water, provided support for the partial implementation of a watershed-based plan and outreach to increase awareness and knowledge regarding polluted runoff control measures needed for Hinkston Creek in east-central Kentucky. The project would not have been possible without the cooperation and support of the Montgomery, Bourbon, and Nicholas County Conservation District Supervisors and their lead staff members, Faye Ferrell (retired) and Whitney Ginter from Montgomery County, Valerie Tipton in Bourbon County, and Tara Duncan in Nicholas County.

In addition, project staff recognize the technical and other support provided by Jimmy Lyons and Gary McFarland of NRCS, Mt. Sterling Mayor Gary Williamson, Montgomery County Judge Executive B.D. Wilson, Steve Lane of the Mt. Sterling Department of Public Works, Troy Wilson of the Montgomery County Road Department, Jamie Vinson of the Mt. Sterling Advocate newspaper, Dr. Brian Reeder of Morehead State University, and retired NRCS staffer Don Crabtree of Mt. Sterling. The US



Environmental Protection Agency is also recognized for providing funding for the Hinkston Creek Project through Section 319(h) of the Clean Water Act.

Finally, project staff would like to recognize the efforts of those in the agricultural community who installed new management practices or improved existing ones, including those who participated in the cost share program. Their willingness to implement measures to reduce polluted runoff and protect drainage systems and the stream network are absolutely essential to improving water quality.

Also, the cooperation and support of the people in the Hinkston Creek watershed must be acknowledged and appreciated. We thank them for their interest and involvement in this project, and wish them all the best in the future.

C. Table of Contents

A.	Title Page.....	3
B.	Acknowledgments.....	3
C.	Table of Contents.....	5
D.	Executive Summary.....	6
E.	Introduction & Background	7
F.	Materials & Methods.....	9
G.	Results & Discussion	15
H.	Conclusions	27
I.	Literature Cited	29
J.	Appendices.....	29
	Appendix A. Financial and Administrative Closeout	30
	Appendix B. QAPP for Water Quality Monitoring.....	37
	Appendix C. Best Management Practices Implementation Plan	38
	Appendix D. Hinkston Creek Watershed-Based Plan	39
	Appendix E. Stream Visual Assessment Protocol, Adapted for KY.....	40
	Appendix F. Montgomery County BMP Installation Details	41



Morehead State University student lab worker analyzing water quality samples from one of the two special studies on the Hinkston Creek mainstem.



Lajuanda Haight-Maybriar (KY Division of Water), Wanda Crouch, and Angie Wingfield (KY Division of Conservation) standing by new livestock watering tank on at the Crouch farm in Bourbon County.

D. Executive Summary

Hinkston Creek drains 260 square miles of rolling pasture land in the Outer Bluegrass region of Kentucky northeast of Lexington. Hinkston Creek originates in the southern and western portions of Montgomery County, flows through the city of Mt. Sterling, and then proceeds northward between Bourbon, Bath, and Nicholas counties. The then creek flows through Millersburg and eventually joins with Stoner Creek to form the South Fork of the Licking River in the Ohio River Basin. The watershed is predominantly agricultural, with only four small towns and a combined population of fewer than 20,000.

Hinkston Creek has been listed as impaired for many years due to poor biological conditions and elevated levels of fecal coliform bacteria, sedimentation, and nutrients linked to low dissolved oxygen and organic enrichment. The Hinkston Creek Project was developed to identify, characterize, and address water quality problems in the watershed by analyzing pollutants and sources, assessing land use/cover and management practices, calculating and apportioning pollutant loads, developing a watershed plan, and implementing portions of the plan based on available resources.

The first phase of the project was implemented during 2008 – 2011 with support from the Kentucky Division of Conservation, Division of Water, and other sponsors (Tetra Tech, 2012). That first phase involved development of a Quality Assurance Project Plan (QAPP), a monitoring program, the Hinkston Creek Watershed Assessment and Management Plan (Tetra Tech, 2011), an education and outreach program (i.e., web site, billboards, watershed signs, newspaper articles/columns, farm field day and other presentations), and a cost share program for installation of on-farm best management practices (BMPs), such as livestock stream exclusion fencing, alternative water source development, stabilized stream crossings, heavy use area protection, and other practices.

The second phase of the project, 2012 – 2014, is the subject of this report. Project activities during 2012 – 2014 included mostly BMP implementation, as outlined by the Hinkston Creek Watershed Plan. It should be noted that the installation of farm conservation practices or BMPs was initiated on a somewhat limited scale during 2008 – 2011, but was expanded significantly during 2012 – 2014. Project staff worked closely with the county conservation district boards of supervisors in Montgomery, Bourbon, and Nicholas counties in providing direct cost share support for a wide range of farm BMPs.

During the period covered by this report, the project directly funded or otherwise supported approximately three-fourths of the costs of water quality improvements (i.e., agricultural and other BMPs) on 13 Montgomery County farms, 9 in Bourbon County, and 19 in Nicholas County. The practices installed included a full range of mostly agricultural conservation practices – such as pasture renovation, stream fencing, stream crossings, and alternative water source development – as well as five septic system replacements and one streambank stabilization project. Approximately 75% of total project funds were spent directly on farm BMPs during the three-year project period, with the remainder devoted to soil testing, special monitoring studies, outreach and education, and project management.

in directory
cover
Executive
Summary
Topics

Results
Conclusions

E. Introduction & Background

Introduction

The Hinkston Creek watershed encompasses 260 square miles of rolling pasture land in the Outer Bluegrass region of Kentucky, located in east-central Kentucky, northeast of Lexington (Tetra Tech, 2011). Hinkston Creek originates in the southern and western portions of Montgomery County, flows through the city of Mt. Sterling, and then proceeds northward along the Bourbon-Nicholas-Bath county lines to join with Stoner Creek to form the headwaters of the South Fork of the Licking River. The South Fork Licking River then flows generally northward toward Covington, KY to drain into the Licking River, which discharges shortly thereafter into the Ohio River.

The 2010 Integrated Report to Congress (KDOW, 2010) on the *Condition of Water Resources in Kentucky* identified several stream reaches within the Hinkston Creek watershed as impaired to some degree for fecal coliform, sedimentation/siltation, and/or nutrient/eutrophication biological indicators. Water bodies designated as impaired are not meeting their designated uses for activities such as fishing, wading, swimming, or use as a domestic water supply.

Project Purpose

In an effort to proactively address the identified waterway impairments and improve water quality, Tetra Tech – with support from the Kentucky Division of Conservation, the Kentucky Division of Water, and other partners – developed and implemented a project during 2008 – 2011 to improve outreach and education regarding water quality, produce a *Hinkston Creek Watershed Assessment and Management Plan* (Tetra Tech, 2011), and provide cost share funding to implement BMPs specified by the plan. Tetra Tech selected this project for a variety of reasons: staff working in the watershed were aware of its condition and expressed interest in addressing identified problems; staff have been working with watershed protection and restoration efforts in nearby counties and were encouraged by their progress; Tetra Tech has considerable experience in conducting watershed assessments and developing management plans; the need for basic outreach, awareness, and education services – another area of expertise – was deemed to be critical to success; and the climate for identifying needed management practices and encouraging their implementation was judged as favorable.

Project Objectives and Goals

Data collected in the past in the Hinkston Creek (Licking River Watershed Watch, undated) watershed indicated that it was likely impacted by agriculture, unregulated urban runoff from Mt. Sterling, construction site runoff, improper waste disposal, habitat modification, and other uncharacterized nonpoint pollution sources (Gateway District Health Department, 1998; KDOW, 2008). In its *Integrated Report on Water Quality*, the Kentucky Division of Water (2010) listed a segment of Hinkston Creek in Montgomery County (river miles 51.5 to 65.9) as impaired due to poor habitat conditions for warm water aquatic species. Other Hinkston Creek segments in Bourbon and Bath counties (river miles 0 to 12.4; 20.8 to 31.0; 41.8 to 49.1) were also listed as impaired, as well as several minor Hinkston Creek tributaries

(e.g., Black's Creek, Grassy Lick Creek, Boone Creek). The causes of impairment included siltation, organic enrichment, and nutrients, among other causes.

Given the impairments, the overall project goal ^{was} has always been to meet water quality standards. This second phase of the project supported that goal by focusing on 1) building additional for the Hinkston Creek Watershed Plan (Tetra Tech, 2011); 2) implementation of BMPs specified by the plan; and 3) continuation of the outreach and education efforts begun during 2008 – 2012. Specific objectives and activities included:

✓ Objective 1: Maintain and refine the watershed plan and solicit support for implementation.

- Activity 1: Meet quarterly with the County Conservation District Boards.
- Activity 2: Coordinate program activities and cost share funding support.
- Activity 3: Complete visual assessments via NRCS protocol on mainstem and tributaries.
- Activity 4: Conduct further study on bank erosion vs. upland sediment sources.
- Activity 5: Update water quality assessments via monitoring under the existing QAPP.

✓ Objective 2: Secure cost share funding to implement Watershed Plan BMPs.

- Activity 1: Develop and submit BMP Implementation Plan to KDOC for review/approval.
- Activity 2: Install livestock exclusion fencing along streams, address alternate water needs.
- Activity 3: Secure cost share support for streambank stabilization and revegetation.
- Activity 4: Implement improved pasture management, including stabilized stream crossings.
- Activity 5: Renovate pasture land to improve infiltration and reduce runoff.
- Activity 6: Install grassed waterways to address pasture and cropland gullying.
- Activity 7: Implement urban controls in Mt. Sterling to reduce polluted runoff.
- Activity 8: Submit annual report to KDOC with load reduction calculations.

✓ Objective 3: Implement awareness, education, and outreach activities

- Activity 1: Publish newspaper materials that increase knowledge of water quality measures.
- Activity 2: Use signage to promote awareness of Hinkston Creek and watershed BMPs.
- Activity 3: Provide technical and other training for land managers and other key partners.
- Activity 4: Conduct outreach presentations to producer, civic, school, and other groups.
- Activity 5: Submit educational material to KDOC for review and approval.

Other Pertinent Work in the Area

The work conducted in the Hinkston Creek watershed was informed by similar watershed assessment, planning, and management activities conducted by the Strodes Creek Conservancy in Clark County, the Dry Fork Watershed Project in Rowan County, and various projects conducted by the University of Kentucky, the Kentucky Division of Water, Kentucky Division of Conservation, and Tetra Tech. Staff drew on these and other examples in crafting the approach for developing project activities, such as the education/outreach, watershed assessment and management plan, and the BMP cost share program.

F. Materials & Methods

Description of Project Area

The watershed lies northeast of Lexington KY, straddling the Outer Bluegrass physiographic region. Approximately 70 percent of the Hinkston Creek watershed is covered with pasture, hay, and fallow fields and 2 percent is cultivated crops (i.e., 72 percent of the watershed is devoted to agricultural uses). Low intensity development comprises 7 percent of the watershed, while higher intensity development makes up only 0.5 percent of the watershed and is limited to areas in Mount Sterling, Carlisle, Millersburg, and Sharpsburg. Forested land and areas covered by shrubs make up approximately 20 percent of the watershed. Approximately 21,000 people live in the Hinkston Creek watershed. The population is generally located in developed areas and is sparse throughout the remainder of the watershed. Among the permitted dischargers in the watershed are four municipal sewage treatment plants (STP), three are permitted at less than 1 MGD and one, the Mt. Sterling STP, is permitted for over 1 MGD of discharge.

Hinkston Creek is about 70 miles long. In general, the stream network in the watershed consists of a classical dendritic drainage pattern, with primary mainstem tributaries measuring about five miles in length, with secondary tributaries one mile in length. Average land slope lengths range from 500 to around 1,500 feet. Water quality impacts are mostly linked to agricultural practices, with localized heavy impacts on stream reaches in Mt. Sterling, Carlisle, and Millersburg. Tobacco production in the watershed peaked during 1998 – 2002, and has fallen by approximately two-thirds since then, a fairly significant development with ramifications involving sediment runoff from row crop land (probably less), livestock impacts to waterways (probably greater), and regional agricultural economic output (probably less, but partially offset by greater cattle production).

The 2010 Integrated Report to Congress on the Condition of Water Resources in Kentucky identified several lengths of waterways within the Hinkston Creek watershed as impaired to some degree for fecal coliform, sedimentation/siltation, and/or nutrient/eutrophication biological indicators (KDOW, 2010a). Additional information on Hinkston Creek has been collected by other organizations. A survey and mapping program undertaken by the Gateway District Health Department as part of a five-county nonpoint program found widespread erosion along the banks of feeder streams and the creeks themselves, little riparian cover or buffers along waterways, relatively unrestricted cattle access to sensitive bank areas, confined animal feeding operations adjacent to streams, row cropping on erodible lands and riparian areas along waterways, and poor manure management on farms throughout the Hinkston Creek watershed. Macro invertebrate sampling conducted by Gateway District Health Department staff at sites in Hinkston Creek found that sites were mostly devoid of both moderate and high quality organisms (GDHD, 1994, 1995).

In developing the Hinkston Creek Watershed Plan (Tetra Tech, 2011), the drainage area was divided into six major subwatersheds, in order to facilitate a finer level of analysis. The watershed and six subwatersheds are shown in Figure 1. Figure 2 shows the impaired waterways.

Figure 1. The Hinkston Creek watershed and major subwatersheds.

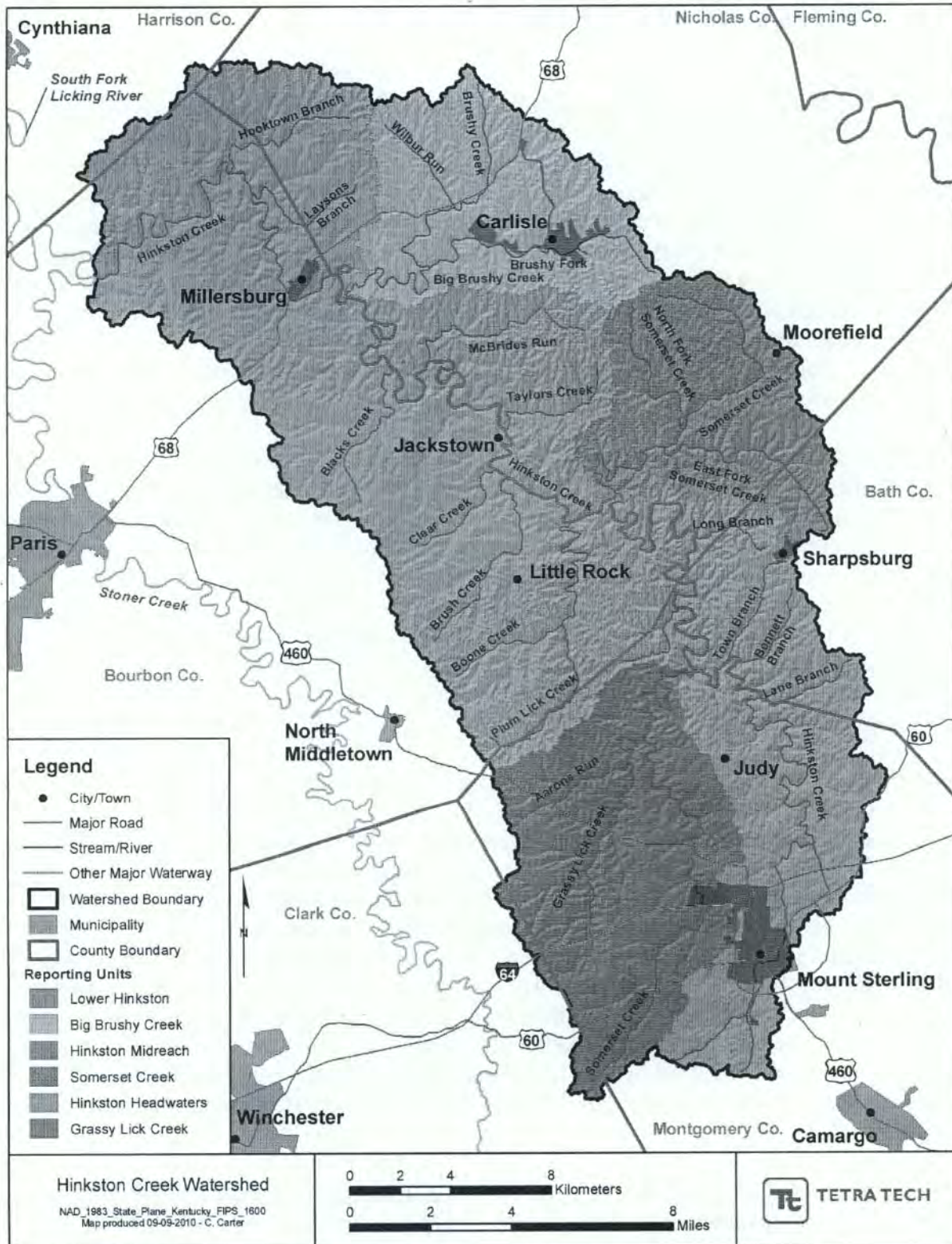


Figure 2. Impaired waterbody segments in the Hinkston Creek watershed.



Description of Methods Used to Obtain Results

Tetra Tech developed the *Hinkston Creek Watershed Assessment and Management Plan* in 2011 as part of the first phase of the overall Hinkston Creek Project. The watershed plan provided guidance on a wide range of activities undertaken during the second phase of the project, which occurred in 2012 – 2014, the subject of this report. Specifically, the watershed plan:

- Analyzed and summarized water quality and other monitoring data
- Assessed and quantified pollutants and their sources in the watershed
- Identified appropriate BMPs needed to address specific pollutants and sources
- Discussed potential funding sources for BMP implementation
- Listed indicators that could be monitored to determine overall success
- Laid out a general schedule/timeline for implementing BMPs
- Characterized the type of outreach and education needed for plan support
- Provided a list of stakeholders and project supporters

The watershed plan identified pasture and livestock management as the overwhelming focus of water quality improvement efforts. As noted in the preceding section, the watershed is 70 percent pasture and 20 percent forested, with no regulated MS4s or large wastewater treatment plants.

The primary and biggest “bang for the buck” BMPs listed in the watershed plan were pasture renovation, livestock exclusion from stream channel areas, riparian buffer restoration, and grassed waterways. Other activities identified as benefitting water quality were targeted septic system replacement/repair – especially for direct “straight pipe” discharges; outreach and education – to improve awareness of water quality issues and build support for BMP implementation; and additional monitoring – to better characterize problems.

This project directly supported implementation of the BMPs and execution of the other activities listed above.

Approximately 75% of project funds were spent directly on BMP implementation, with about 15% devoted to outreach and education, 3% on monitoring studies, and the remainder for project management and other tasks. Outreach and education activities included farm field day and other

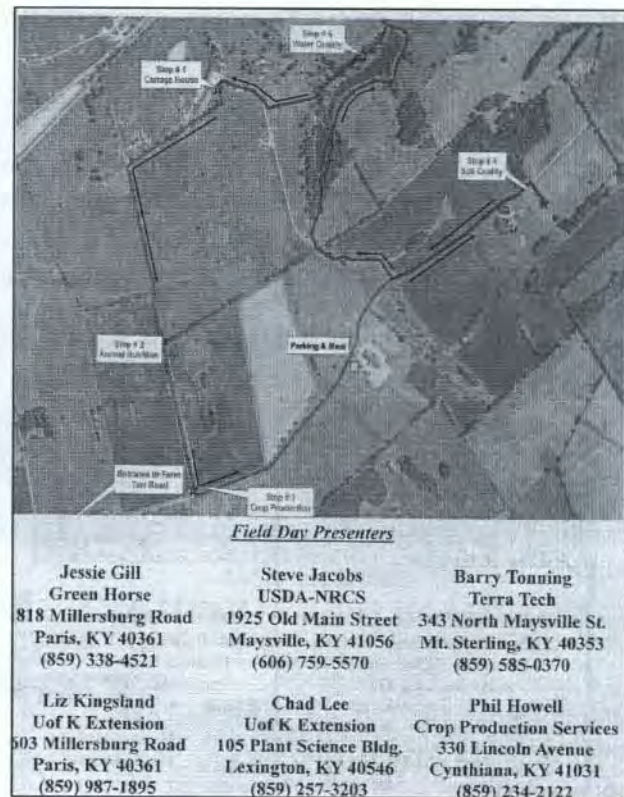
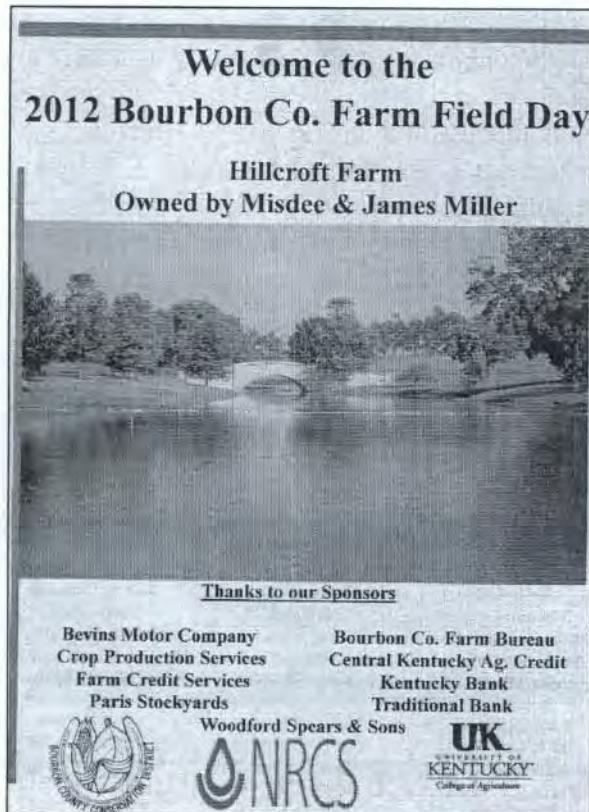
Mt. Sterling Advocate • June 23, 2012 • Page A5

Funding available for farm conservation practices

Funding is now available for farm conservation practices in the Hinkston, Aaron's Run, Somerset and Grassy Lick drainage areas. High priority conservation practices include fencing to keep cattle out of local creeks, development of alternate stock water supplies to keep cattle away from creek banks, grading and revegetation of badly eroded stream banks, pasture renovation, stabilization of gullies and other practices that address soil erosion and manure runoff. The Montgomery County Conservation District is now accepting requests for cost-share funding under the Hinkston Creek Project, which is sponsored by the Kentucky Division of Conservation and Division of Water. The project is similar to the Kentucky Soil Erosion and Water Quality Cost Share Program. Design and construction for approved practices will generally follow the U.S. Dept. of Agriculture NRCS Field Office Technical Guide. Cost Share amounts will vary and may fund up to 100 percent of some fencing projects that keep cattle from streams. Livestock watering facilities may be approved for projects that include livestock exclusion fencing. Applications for funding will be available at the Montgomery County Conservation District office, located on the south side of Mt. Sterling at 509 Wilkin Way behind Dairy Queen, from July 2 through July 13. The office will be open from 7:30 a.m. to 4 p.m. For more information, call Faye Fennell at 498-5654, ext. 3. Funds will be targeted to maximize the reduction of streambank and pasture erosion, manure runoff and overall water pollution in Hinkston Creek and its tributaries, including Aaron's Run, Somerset Creek and Grassy Lick.

Newspaper coverage of the Hinkston Creek project and availability of cost share funding for agricultural best management practices. Newspapers in all three watershed counties published articles throughout the project period.

presentations, newspaper coverage of the project and BMP implementation, and meetings with stakeholder and other groups. The monitoring studies, conducted by Morehead State University, focused on the impact of moderate-to-high rainfall events on water quality, and illustrated the challenges posed by excessive pollutant buildup on the land, compacted pasture soils with little effective infiltration capacity, and periodic heavy rains in a region averaging nearly 50 inches of precipitation annually.



Brochure from the Bourbon County Farm Field Day event on September 18, 2012. The Hinkston Creek Project presentation included distribution of macroinvertebrates encased in acrylic boxes with built-in magnifiers, discussion of the macroinvertebrates via laminated "bug card" insect keys, information on water quality in Hinkston Creek, and a review of the five most-needed BMPs.

As noted previously, the methods used to obtain project results built upon the success of the first phase of the Hinkston Creek Project. Outreach and education activities (e.g., presentations, meetings, newspaper articles, radio programs, etc.) built awareness of the project, water quality issues in the watershed, needed BMPs, and the availability of cost share funding to implement the practices. Solicitation of cooperators to implement BMPs on their farms was facilitated by the three county conservation district boards and staff, because:

- They know the producers in the watershed area
- They are viewed as credible and supportive by the producers
- They have experience with farm conservation practices
- They have excellent relationships with NRCS technical staff
- They could provide administrative and other support for BMP implementation

Why they solicitation worked

County conservation district supervisors, staff, and stakeholders solicited involvement by producers, who would apply for cost share funding consideration at the county conservation district offices. It should be noted that the Hinkston Creek project was the first high-profile effort to focus on stream impairments in this part of the state, and was met initially with reactions ranging from indifference to mild resistance – i.e., producers were not convinced that water quality problems existed, and were uncertain regarding links between agricultural land management and other practices and stream impairments. As a result, sign-ups for BMP cost share funding were slow at first.

However, after a significant push with outreach and education efforts during 2012 – which included newspaper coverage, radio interviews, farm field day presentations, and other activities – the signups increased. By 2013, BMP implementation hit full stride, with dozens of projects underway throughout the upper half of the watershed. All three county conservation districts were busy from mid 2012 until late 2013 processing cost share applications, providing technical

and other assistance for project implementation, and assisting with processing payments. The benefit of involving the county conservation districts was evident throughout this process – they had experience with distributing small and infrequent amounts of funding for various conservation programs, and were able to ramp up their capacity to deal with multiple conservation practices fairly quickly. Conservation district staff would take the applications, the county boards would review and approve them, and the district would reimburse the producers with project funds provided through the CWA Section 319 grant. This approach worked extremely well, and allowed producers to interact with an entity they knew and trusted.

WMST
1150 AM X 106.9 FM
Timeless Favorites

Home News Center **Schedule** Shows Our Staff Lounge Contact Us

Program Schedule

* CBS Radio News at the top of every hour
* KHN News at the bottom of every hour (Mon-Fri 6a-9p, Sun 12-7p) ***Schedule subject to change without notice

Last Update: 03-28-2010

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12:00 AM							
01:00 AM							
02:00 AM	America's Best Music	America's Best Music	America's Best Music	America's Best Music	America's Best Music	America's Best Music	
03:00 AM							
04:00 AM							
05:00 AM							America's Best Music
06:00 AM	The Hentley Valley Gathering The Kentucky Forum Show	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	
07:00 AM	CBH WakePoint Gist Howell (7-30) Willard Johnson (7-45)	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	Gateway Regional News Mornings on Main	
08:00 AM	Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News Capeell Phawitt Realty Showcase Sports-Ultra Live from Jerry's Sports-Ultra Live from Jerry's
09:00 AM	Sunday Mornings on Main w/Becky Black	Mid-Mornings on Main	Mid-Mornings on Main	Mid-Mornings on Main	Mid-Mornings on Main	Mid-Mornings on Main	
10:00 AM		Music	Music	Music	Music	Music	
11:00 AM		America's Best Music	America's Best Music	America's Best Music	America's Best Music	America's Best Music	
12:00 PM		Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News	Gateway Regional News	

Local radio station schedule, showing the “Mid-Mornings on Main” time slot, which featured Hinkston Creek project staff on three occasions discussing water quality issues and the availability of cost share funding for farm conservation practices.

G. Results & Discussion

This section of the Final Report provides county-level lists of BMPs implemented by the project, as well as a discussion of relevant BMP implementation issues. As noted previously, the BMPs installed are those recommended in the *Hinkston Creek Watershed Assessment and Management Plan* (Tetra Tech, 2011) and the *Implementation Plan for selected Best Management Practices in the Upper Hinkston Creek Watershed* (Tetra Tech, 2011). Tables summarizing the projects appear below. Note that table formats are slightly different, due to variability in administration methods used by each of the three conservation districts. A table summarizing all project objectives and activities appears after the three county tables, along with a brief discussion of project results beyond BMP implementation.

Table 1. Best management practices installed in Montgomery County.

BMP Locations	NRCS BMP Type	Project Total	Actual Cost share
Ed Stepanchuk Farm	Livestock Exclusion Fence Stock Tanks	9,186.15	\$6,889.62
Donaldson Farm	Ditch Stabilization Slope Stabilization	14,000.00	11,309.36
Craycraft Farm	Spring Development Livestock Exclusion Fence	4,298.17	3,223.63
Amburgey Farm	Stock Tank, Waterline Livestock Exclusion Fence	6,379.44	4,784.58
Long Farm	Stock Tank, Waterline	7,437.82	5,578.37
Circle K Farm	Stock Tank, Waterline	5,086.03	3,814.53
Mark Farm	Feed Area Heavy Use Pad	3,308.69	2,481.52
King Farm	Stock Tank, Waterline	7,022.00	5,266.50
Walters Farm	Stock Tank, Waterline	3,258.00	2,443.50
Judy Farm	Stock Tank, Waterline	10,287.35	7,715.51
Burden Farm	Stock Tank, Waterline	11,561.87	8,671.41
Prewitt Farm	Feed Area Heavy Use Pad Stock Tank, Waterline	8,612.36	6,459.27
Johnson Farm	Alternative Water Source, Waterline, Stock Tank	14,700.00	11,000.000
Total	All Practices	90,437.88	\$79,637.80

* Wish they all could be same format

Table 2. Best management practices installed in Bourbon County.

WATER-SHED	PLANNED LIVESTOCK EXCLUSION	EXISTING LIVESTOCK EXCLUSION	FEET OF STREAM IMPACTED	LAND-OWNER	PRACTICES	Planned # OF UNITS	\$ PER UNIT	HINKSTON CREEK PROJECT (ACTUAL COSTS TO PROGRAM)
BLACKS	YES	NO	9000	DAVID DE MARCUS	382-FENCE STREAM	16,000	1.9725	
					516-PIPELINE	300	2.26	
					516-PIPELINE ROCK	2700	5.31	
					578-CROSSING (6 FT)	2	1732	
					614-TANK	4	1543	
							TOTAL	\$37,995.90
BOONE	YES	NO	6500	TERRY CROUCH	382-FENCE STREAM	11,000	1.9725	
					382-FENCE POND	500	1.9725	
					516-PIPELINE	5000	2.26	
					516-PIPELINE ROCK	700	5.31	
					578-CROSSING (6 FT)	1	1732	
					578-CROSSING (10 FT)	1	2504	
					614-TANK	6	1543	
							TOTAL	\$27,777.25
BOONE	YES	NO	4500	ERIN PERDUE	382-FENCE STREAM	5500	1.97	
					516-PIPELINE	1000	2.26	
					516-PIPELINE ROCK	500	5.31	
					578-CROSSING (6 FT)	1	1732	
					614-TANK	4	1543	

WATER-SHED	PLANNED LIVESTOCK EXCLUSION	EXISTING LIVESTOCK EXCLUSION	FEET OF STREAM IMPACTED	LAND-OWNER	PRACTICES	Planned # OF UNITS	\$ PER UNIT	HINKSTON CREEK PROJECT (ACTUAL COSTS TO PROGRAM)
							TOTAL	\$31,041.64
HINKSTON	YES	NO	2600	LEE SULLIVAN	382-FENCE STREAM	4200	1.9725	
					516-PIPELINE	700	2.26	
					614-TANK	1	1543	
							TOTAL	\$17,094.37
HINKSTON	YES	NO	900	ROSEMARY LOTZ	382-FENCE STREAM	1950	1.9725	
					561-HEAVY USE AREA	2000	0.9825	
					500-OBSTR. REMOVAL	1666.67	1.2	
							TOTAL	\$7,815.38
HINKSTON	YES	NO	1300	SILAS CLEAVER	382-FENCE STREAM	2600	1.9725	
					516-PIPELINE	100	2.26	
					578-CROSSING (6 FT)	1	1732	
					614-TANK	1	1543	
							TOTAL	\$9,727.34
HINKSTON	NO	YES	0	PATRICIA ANN SMITH	561-HEAVY USE AREA	2400	0.9825	
							TOTAL	\$2,358.00
HINKSTON				BILL WRIGHT	SEPTIC SYSTEM 75%			\$4,455.00
HINKSTON				CHARLOTTE BOX	SEPTIC SYSTEM 75%			\$4,057.50
TOTAL								\$142,322.38

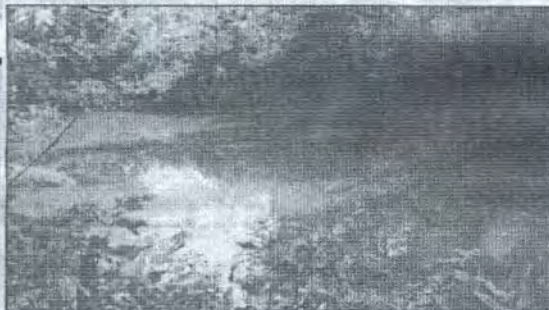
Table 3. Best management practices installed in Nicholas County.

Landowner	BMP Location	Practices Installed	Total Cost of Practices	Total Cost to Hinkston Creek Project
Pete Szak	1040 Hick Hardy Road	Seeding	\$1,646.06	
				\$1,234.55
Tammy Warner	2717 Ratliff Road	Seeding	\$8,751.00	
				\$6,000.00
Patsy Smith	3714 Upper Jackstown Rd	Fence	\$5,859.28	
				\$4,394.46
Phil Ecton	591 E Headquarters	1 waterer	\$2,527.94	
		Concrete pad		
		280 ft pipe		
		Rock		
				\$1,895.96
Autry Farm, LLC	1802 Carpenter Road	2 waterers	\$6,280.00	
		Rock, filter fabric		
				\$4,710.00
Catherine Wells	Maysville Road	Stream Crossing	\$5,063.21	
				\$3,797.41
Allie Vice	East Union Road	Fence	\$998.25	
		Seeding	\$4,716.11	
				\$4,285.77
Stephen D. Vice	Ratliff Road	Pipeline/Tank	\$3,174.22	
		Seeding	\$1,868.11	
		Fence	\$874.25	
				\$4,437.44
Clarence Terrell	786 Miller Station Road	Heavy Use Area	\$5,330.28	
				\$3,997.71
Keith Fryman	887 Walnut Grove Rd	Seeding	\$7,980.46	
				\$5,985.35
Si Cleaver II		Fence	\$6,334.43	
		Pipeline/Tank	\$2,994.01	
				\$6,000.00
Si Cleaver III	2020 Maysville Road	Pipeline/Tank	\$13,714.92	
		Fence	\$5,464.10	
				\$6,000.00
B&S Cattle & Land	Sharpsburg	Seeding	\$11,406.50	
				\$6,000.00
Bob Berrisford	4005 Pleasant Springs	Fence	\$3,918.50	

		Pipeline/Tank	\$2,343.01	
				\$4,952.04
Paul Allen		Seeding	\$6,575.70	
				\$4,931.78
Pat McCarty	3850 Upper Jackstown	Pipeline/Tank		
		Heavy Use Area	\$6,445.13	
				\$4,414.50
Jimmy Sadler	784 Whetstone Rd.	Seeding	\$7,654.96	
				\$5,741.22
Septic Systems	Whetstone Rd.	Septic System		
	Whetstone Rd.	Septic System		
	Whetstone Rd.	Septic System		
				12,90.00
Total				\$91,678.19

PAGE TWO

The Bourbon County Citizen - Wednesday, July 25, 2012



Shown above (left) is Hinkston Creek on Bill Wright's farm, and (right) a tributary to Brush Creek, which flows into Hinkston Creek, on Kent Mile's Farm.

Funding Available For Farm Conservation

Funding is now available in Bourbon County for farm conservation practices in the Hinkston Creek Watershed, including Blacks Creek and Boone Creek. High-priority conservation practices include fencing to keep cattle out of local creeks, development of alternate stock water supplies to keep cattle away from creek banks, stabilizing badly eroded stream banks, stabilization of gullies, and other practices that address soil erosion and manure runoff.

The Bourbon County Conservation District is now accepting requests for cost-share funding under the Hinkston

Creek Project, which is sponsored by the Kentucky Division of Conservation and Division of Water. The project is similar to the Kentucky Soil Erosion and Water Quality Cost Share Program.

Design and construction for approved practices will generally follow the US Department of Agriculture NRCS Field Of-

fice Technical Guide. Cost share amounts will be based on a 75/25 cost share rate. Livestock watering facilities may be approved for projects that include livestock exclusion fencing.

Applications for funding are available at the Bourbon County Conservation District office, located on the north side of Paris at 605 Millersburg Road, from

July 17 through August 17. The office will be open from 8:00 to 4:30, Monday through Friday. For more information, call 987-2311 extension 3.

Funds will be targeted to maximize the reduction of stream bank and pasture erosion, manure runoff, and overall water pollution in Hinkston Creek and its tributaries.

Article from the *Bourbon County Citizen* newspaper informing producers of the availability of cost share funding and targeted best management practices (i.e., reduction of stream bank and pasture erosion, manure runoff management, pollutant discharges to Hinkston Creek and its tributaries).

Besides direct support for BMP implementation, the project also supported soil testing for producers in Nicholas County, outreach and education activities, and storm event studies. A summary of those activities, which involved approximately 20% of project funds, is included below.

Soil testing

The Hinkston Creek Project promoted and paid for 75% of the cost of soil sampling and analysis for 418 sites in Nicholas County, 98 percent of which were for pasture land. Project staff and county conservation district personnel elected to promote and support soil sampling in the county for a variety of reasons:

- Pastures in the county are steeper and soils appear to be more compacted than other areas of the watershed in Bourbon and Montgomery counties.
- Application of commercial fertilizer and manure were predicted to run off the land faster and in greater quantities, due to the steeper slopes and more compacted soils.
- Soil testing would provide information that could be used to more carefully tailor nutrient applications to pasture and other lands in the county.
- Targeted and accurate nutrient inputs would reduce over-application of fertilizer and manure and resultant runoff to Hinkston Creek and its tributaries.

Soil sample collection was informed and coordinated by county conservation district and University of Kentucky Extension Service staff. Samples were delivered to the county conservation district office, and sent to the University of Kentucky soil laboratory for analysis. Results were provided to producers by the conservation district.

Outreach and education

The project supported a wide range of outreach and education activities. These ranged from farm field day events and other presentations to continuation of the billboard and watershed sign program initiated during Phase I (2008 – 2011) of the Hinkston Creek Project. A summary of the outreach and education activities includes:

- Three farm field day events in Bourbon and Nicholas counties, two in 2012 and one in 2014; both focused on links between agricultural practices and stream water quality.
- Newspaper coverage of Hinkston Creek Project activities, especially the availability of cost share funding for implementing agricultural BMPs. Seven articles were published.
- Two radio program talk show interviews on Hinkston Creek Project activities, in 2012 and 2013, by local Mt. Sterling radio station WMST.
- Maintenance of the Hinkston Creek Project web site, which features information on the watershed assessment, management plan, needed BMPs, and other information.
- Monitoring and maintenance of 14 “stream crossing” and 11 “entering watershed” signs in Bourbon, Nicholas, and Montgomery counties, as required by the KY DOT permit.
- Installation of 24 additional “No Dumping – Drains to Waterway” curb markers in the city of Mount Sterling by Eagle Scout candidates from a local Boy Scout troop.

- Continuation of three “Thank A Farmer” billboards in the three watershed counties, with messages promoting vegetated stream buffers, grassed waterways, and NPS control.
- Production and display of a poster on Hinkston Creek Project watershed assessment methods for the National Hypoxia Task Force Meeting in Kentucky during 2013, and the National Water Quality Monitoring Conference in 2014.
- Quarterly meetings and presentations to the Montgomery, Nicholas, and Bourbon County Conservation Districts during 2012 and the first half of 2013.

Storm event studies

In 2013, project staff partnered with Morehead State University (MSU) to conduct special water quality studies to better understand Hinkston Creek pollutant loading processes during infrequent but intense storm events. Through the partnership, MSU provided water quality monitoring,

laboratory analysis, results reporting, and quality assurance for assessing surface water quality in the Hinkston Creek watershed during two significant storm events, 1.92 inches and 2.15 inches of rainfall, respectively, occurring after at least 2 weeks of no little or no precipitation. MSU graduate students involved in the studies took samples at 2 to 4 hour intervals during the storm events. The samples were collected in accordance with the *Quality Assurance Project Plan for the Hinkston Creek Watershed* (Tetra Tech, 2009), and analyzed for



A Morehead State University graduate student collects a midstream water quality sample from Hinkston Creek during the early stages of a storm event on November 6, 2013.

bacteria (estimated as *E. coli* concentrations), sediment (estimated as total suspended solids or TSS concentrations), total phosphorus (TP), iron, alkalinity, and nitrate.

E. coli and TSS concentrations were virtually identical at both sites for each of the storm events sampled. Levels for both rose with increased storm induced stream flows, and receded dramatically after the peak stream discharge period. The same pattern was observed generally with TP and iron; nitrate concentrations increased slowly at one site, and increased more rapidly at the other site. For alkalinity, the relationship between flow and the parameter was reversed, with alkalinity declining as flows increased. This phenomenon is likely due to higher alkalinity associated with groundwater induced dissolution of limestone bedrock during low flows, with dilution occurring during precipitation induced higher flows. For more information on these studies, please see figures on following page, and *Changes in Nutrients and E. coli During Two Storm Events in Hinkston Creek, KY* (Hunter and Reeder, 2013).

Figure 1. Bacteria concentration vs stream discharge results for county line (CL) and Hinkston Creek Jackstown (HC) sites during two storm events (SE) in 2013.

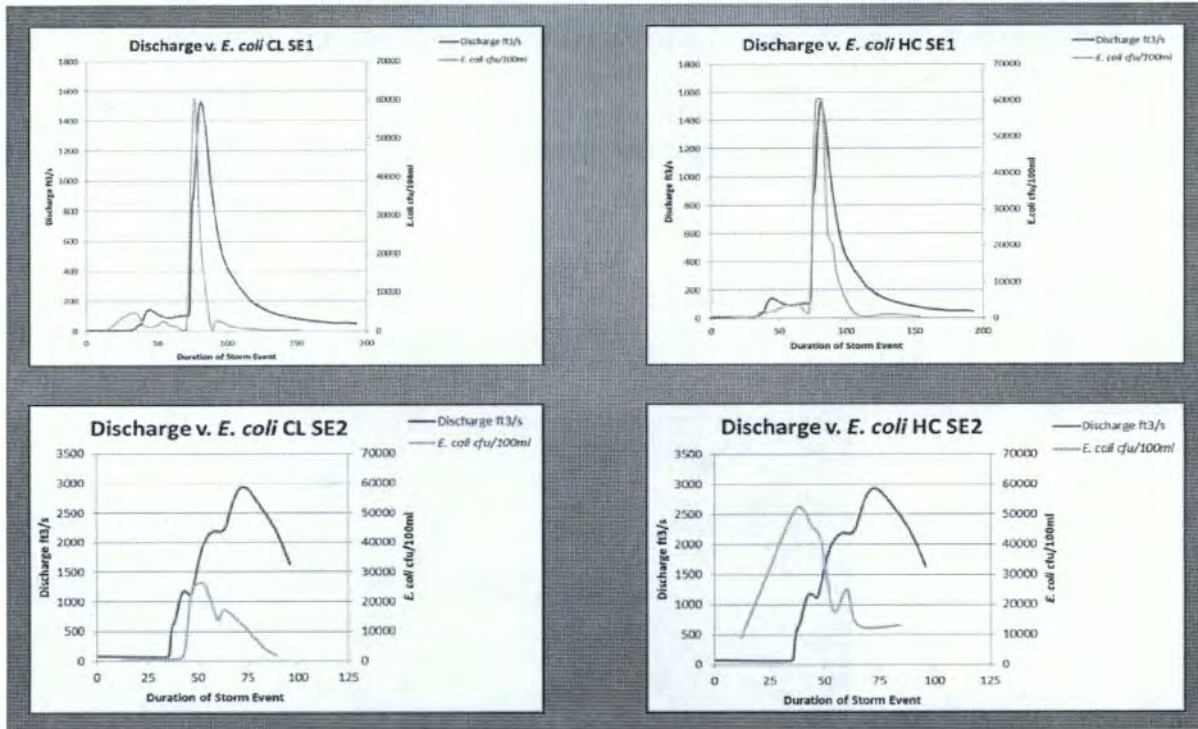


Figure 2. Total suspended solids (TSS) vs stream discharge results for county line (CL) and Hinkston Creek Jackstown (HC) sites during two storm events (SE) in 2013.

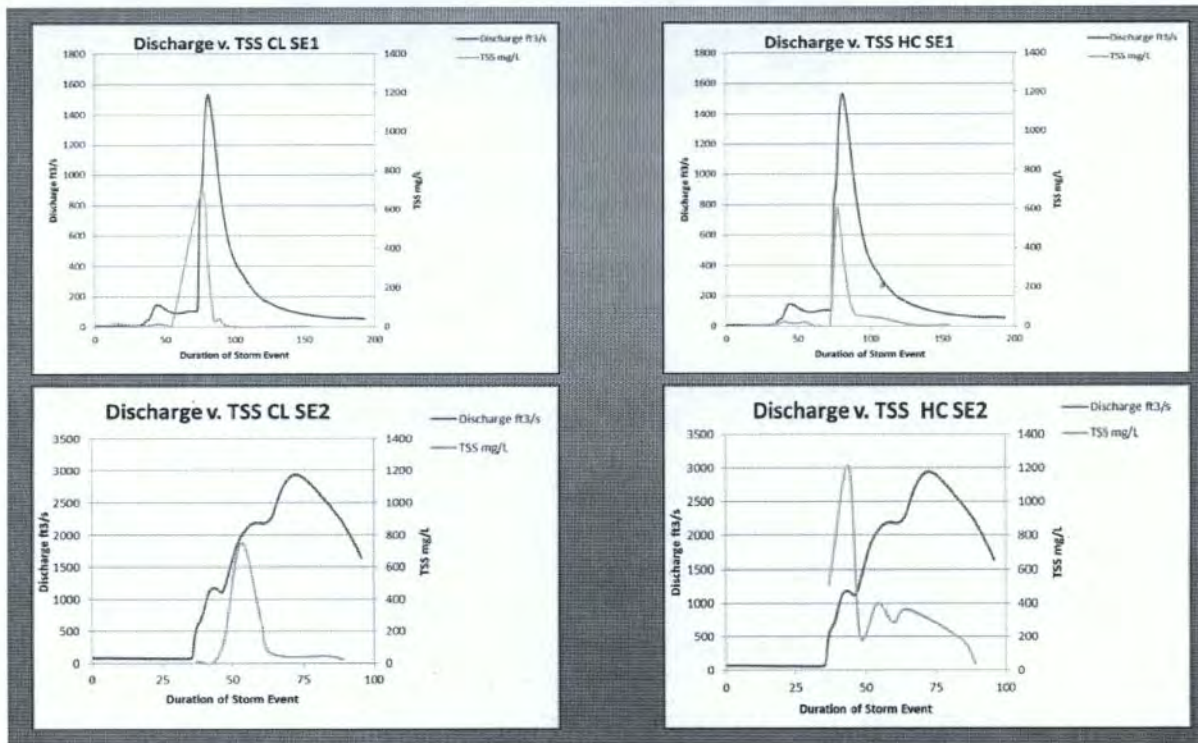


Figure 3. Alkalinity vs stream discharge results for county line (CL) and Hinkston Creek Jackstown (HC) sites during two storm events (SE) in 2013.

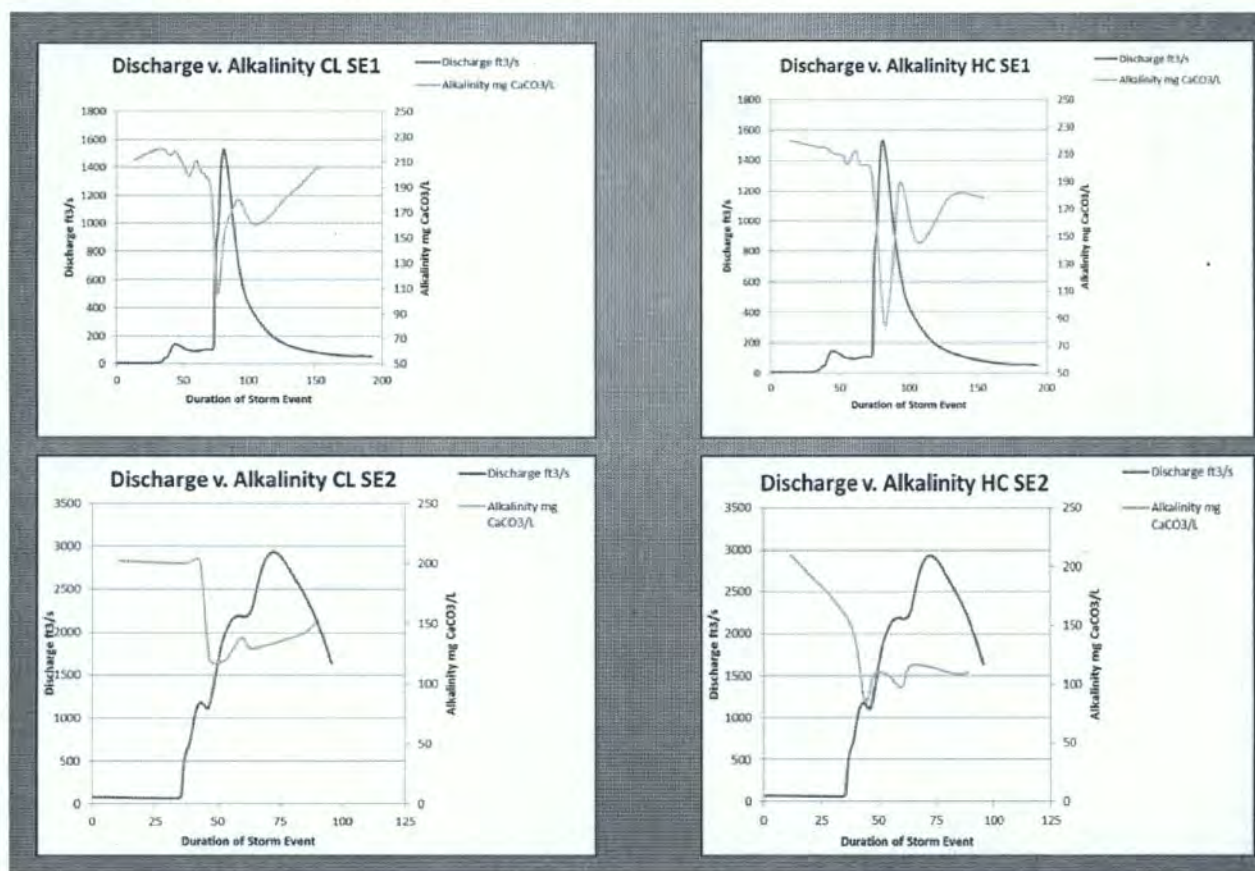


Table 4. Mean concentrations for selected parameters for county line (CL) and Hinkston Creek Jackstown (HC) sites during two storm events (SE) in 2013.

Storm Event	TSS (mg/L)	Alkalinity (mg CaCO ₃ /L)	NH ₃ -N (µg/L)	SRP (µg/L)	Sulfate (mg/L)	Iron (µg/L)	Nitrate (µg/L)	Total P conc. (mg/L)	Total N conc. (mg/L)
SE 1	81	184	270	508	34	304	268	0.99	2.82
SE 2	490	139	376	668	27	534	1399	1.69	4.26

Summary of project activity status

A table summarizing the overall status of all project activities appears in the following table. Note that activities not fully completed are discussed in the section after the table.

Table 5. Status of project objectives and activities during 2012 – 2014.

Project objectives and activities	Addressed	Percent complete
<i>Objective 1: Maintain and refine the watershed plan and solicit support for implementation.</i>		
Activity 1: Meet quarterly with the County Conservation District Boards.	Yes	100%
Activity 2: Coordinate program activities and cost share funding support.	Yes	100%
Activity 3: Complete visual assessments via NRCS protocol on mainstem and tributaries.	No	0%
Activity 4: Conduct further study on bank erosion vs. upland sediment sources.	Partially*	10%
Activity 5: Update water quality assessments via monitoring under the existing QAPP.	Partially*	50%
<i>Objective 2: Secure cost share funding to implement Watershed Plan BMPs.</i>		
Activity 1: Develop and submit BMP Implementation Plan to KDOC for review/approval.	Yes	100%
Activity 2: Install livestock exclusion fencing along streams, address alternate water needs.	Yes	100%
Activity 3: Secure cost share support for streambank stabilization and revegetation.	Yes	100%
Activity 4: Implement improved pasture management, including stabilized stream crossings.	Yes	100%
Activity 5: Renovate pasture land to improve infiltration and reduce runoff.	Yes	100%
Activity 6: Install grassed waterways to address pasture and cropland gullyng.	Partially*	10%
Activity 7: Implement urban controls in Mt. Sterling to reduce polluted runoff.	Partially*	10%
Activity 8: Submit annual report to KDOC with load reduction calculations.	Yes	100%
<i>Objective 3: Implement awareness, education, and outreach activities</i>		
Activity 1: Publish newspaper materials that increase knowledge of water quality measures.	Yes	100%
Activity 2: Use signage to promote awareness of Hinkston Creek and watershed BMPs.	Yes	100%
Activity 3: Provide technical and other training for land managers and other key partners.	Yes	100%
Activity 4: Conduct outreach presentations to producer, civic, school, and other groups.	Yes	100%
Activity 5: Submit educational material to KDOC for review and approval.	Yes	100%

* See following section for discussion of activities not fully completed.

The table on the preceding page summarizes overall progress on project activities during 2012 – 2014. As noted on the table, not all project activities were fully addressed or completed. Below is a brief discussion of the incomplete activities, which are indicated by an asterisk (*) in the table:

Complete visual assessments via NRCS protocol on mainstem and tributaries.

No work on this activity was undertaken. During the final months of Phase I of the Hinkston Creek Project, staff refined a method for identifying high risk mainstem and tributary reaches through the use of remote sensing. The methodology for this procedure is described in Carter et al (2012), but basically involves aerial photography and other analyses that considers 1) waterbody use attainment/impairment; 2) riparian vegetative cover; 3) land use intensity near streams; and 4) bare areas near streams where cattle may congregate.

Conduct further study on bank erosion vs. upland sediment sources.

No work on this activity was undertaken beyond the MSU studies. Bank erosion studies were raised as a potential activity in the original proposal as a method for determining sediment source proportionality, i.e., channel vs upland erosion. However, the cost of conducting extensive bank erosion studies was later determined to be somewhat at odds with the overriding purpose of Phase II of the Hinkston Creek Project, which was to build support for and demonstrate the implementation of agricultural conservation practices in the watershed.

Update water quality assessments via monitoring under the existing QAPP.

Water quality monitoring in the Hinkston Creek watershed occurred during 2012 – 2014, through the efforts of Morehead State University’s special studies (see preceding subsection) and the Licking River Watershed Watch organization.

Install grassed waterways to address pasture and cropland gullying.

This proposed activity was minimal during the project period, due to a general lack of cost share proposals to address grassed waterway installation. Project staff observed what appeared to be an increased number of grassed waterways during driving surveys of the watershed, but these were installed by producers who did not request project funding.

Implement urban controls in Mt. Sterling to reduce polluted runoff.

A Boy Scout troop in Mt. Sterling installed 24 additional “No Dumping – Drains to Waterway” medallions at unmarked storm drains in the city during 2012. This was the second phase of a project



Storm drain markers being installed in Mt. Sterling, as part of an Eagle Scout project. Shown is Eagle Scout candidate Luke Williams, who was awarded the honor late in 2012.

started in 2010 by the same troop – that effort resulted in one of the scouts attaining the rank of Eagle Scout. Implementation of structural urban BMPs in the city was deferred in favor of devoting the maximum amount of project funds to the installation of agricultural BMPs.

The city of Mt. Sterling is a source of some polluted runoff, but better urban housekeeping (e.g., street sweeping, public works operations), creek cleanups, and more outreach regarding erosion, materials storage/management, ditch stabilization, and spill cleanup was the primary focus for the project, rather than structural BMPs.



The project supported a variety of podium, poster, and other presentations. The photo above was taken at the National Water Quality Monitoring Conference, where a presentation was conducted regarding assessment methods used in the development of the Hinkston Creek Watershed Plan.



Left – letter from the chairman of the Bourbon County Conservation District regarding the presentation made at the 2014 farm field day held at Color Point in September.



Above – Montgomery County cattle producer Jim Banks, next to a recently installed livestock waterer on his Plum Lick farm near the Bourbon County line in early December 2014.

H. Conclusions

This section presents general conclusions and recommendations and the status of the project's success measures, as listed in the original memorandum of agreement. The project achieved nearly all of its objectives, with a decided emphasis on direct implementation of BMPs specified in the watershed management plan (i.e., 75% of project funds were spent on BMP implementation). See Table 6 below and Section J, Appendix 1 for a summary table of the BMPs installed via the cost share program supported by the Hinkston Creek Project.

Table 6. Progress as indicated by project success measures.

Objective 1: Maintain and refine the watershed plan and solicit support for implementation.	
Activity 1: Meet quarterly with the Montgomery & Bourbon Conservation District Boards.	
<i>Activity Measure: Number of meetings attended, topics discussed.</i>	10 meetings
Activity 2: Coordinate program activities and cost share funding support with S&WCBs.	
<i>Activity Measure: Coordination meetings, discussions held.</i>	Completed
Activity 3: Complete visual assessments via NRCS protocol on mainstem and tributaries.	
<i>Activity Measure: Miles of mainstem & tributaries assessed and mapped.</i>	None
Activity 4: Conduct further study on bank erosion vs. upland sediment sources.	
<i>Activity Measure: Bank erosion quantification research, field studies.</i>	2 MSU studies done
Activity 5: Update water quality assessments via monitoring under the existing QAPP.	
<i>Activity Measure: Sites monitored, assessments updated.</i>	4 sites monitored
Objective 2: Secure cost share funding to implement Hinkston Creek Watershed Plan BMPs.	
Activity 1: Develop and submit BMP Implementation Plan to KDOC for review/approval.	
<i>Activity Measure: Approval from KDOC to move forward with the plan.</i>	Completed
Activity 2: Install livestock exclusion fencing along streams, address alternate water needs.	
<i>Activity Measure: Miles of stream fenced, number of watering stations.</i>	55k ft fence, 39 tanks
Activity 3: Secure cost share support for streambank stabilization and revegetation.	
<i>Activity Measure: Miles of streambank stabilized and revegetated.</i>	10 miles w/ fence
Activity 4: Implement improved pasture management, including stabilized creek crossings.	
<i>Activity Measure: Acres under management, stream crossings installed.</i>	149 ac; 7 crossings
Activity 5: Renovate pasture land to improve infiltration and reduce runoff.	
<i>Activity Measure: Acres of watershed pasture land renovated.</i>	149 ac. seeded
Activity 6: Install grassed waterways to address pasture and cropland gullying.	
<i>Activity Measure: Linear feet of grassed waterways installed.</i>	NA – no applications
Activity 7: Implement urban controls in Mt. Sterling to reduce polluted runoff.	
<i>Activity Measure: Type and number of controls installed.</i>	24 drain markers
Activity 8: Submit annual report to KDOC with load reduction calculations.	
<i>Activity Measure: Report with load reduction calculations documented.</i>	Submitted annually
Objective 3: Implement awareness, education, and outreach activities (field days, workshops)	
Activity 1: Publish newspaper materials that increase knowledge of water quality.	
<i>Activity Measure: Number and type of articles, columns, etc. published.</i>	6 articles published
Activity 2: Use signage to promote awareness of Hinkston Creek and watershed BMPs.	
<i>Activity Measure: Number and type of signs installed.</i>	3 billboards
Activity 3: Provide technical and other training for land managers and other key partners.	
<i>Activity Measure: Number and type of training events held.</i>	None w/ grant funds
Activity 4: Conduct outreach presentations to producer, civic, school, and other groups.	
<i>Activity Measure: Number and type of presentations conducted.</i>	6 presentations
Activity 5: Submit educational material to KDOC for review and approval.	
<i>Activity Measure: Submittal of materials to KDOW.</i>	Completed

The bullets below summarize conclusions from the second phase of the Hinkston Creek Project. Some of these conclusions were reached in the first phase (i.e., during the 2008 – 2011 project, and some are presented for the first time.

- Targeting BMPs to the most significant pollutant sources is the optimal approach to addressing water quality impairments. However, there are two considerations that must be noted: 1) targeting can be difficult, due to uncertain (i.e., old, incomplete, inconsistent) data, and sometimes the problems are numerous, moderate, and widely scattered – rather than few, significant, and concentrated – which can substantially negate the benefits of targeting; 2) trying to put a specific BMP at a specific site can sometimes be impossible without preliminary work in building general water quality awareness, knowledge of the problems, and demonstration of the needed BMPs with a subset of willing cooperators.
- In agricultural watersheds with threatened or impaired streams, BMP targeting can be facilitated through aerial photography analyses that 1) identifies stream channels with little or no riparian vegetation, 2) detects bare soil areas near channels where livestock may congregate, and 3) notes relative grass density through color observations.
- More incentives are needed to convince producers and other land managers to establish appropriate vegetated riparian buffers. A property tax abatement incentive, such as “filter strip” program in Illinois – which taxes vegetated buffers at 1/6 the land value – would help to popularize riparian buffers in Kentucky.
- When working in watersheds with fairly obvious problems that can be addressed by a relatively small group of landowners, land managers, or other target audiences, it’s more efficient to work with them directly and discreetly than to engage lots of other parties that may not bring much to the table in terms of BMP implementation. Hinkston Creek Project staff worked through the three watershed county conservation districts in implementing BMPs, and found them to be extremely interested, competent, and helpful.
- BMP implementation through cost share programs can be handled efficiently and effectively by existing organizations with the staff and administrative capacity to collect and process applications, conduct application reviews, issue approvals, and generate cost reimbursements. The local conservation district has past experience in dealing with on-farm cost share expenditure through the Kentucky Soil Erosion and Water Quality Cost Share Program, which provides funding for implementation of farm water quality plans.
- Because of US Army Corps of Engineers requirements (e.g., mandatory 75 ft buffers on each side of restored streams, laborious permit and documentation policies) the Kentucky Stream and Wetland Mitigation Program seems to be difficult to access for restoration projects. Some small streams in flat bottomland may only need a 25 or 30 ft buffer.
- Public education and outreach programs that link history to area waterbodies can create interest in the waterbody as a historical, cultural, and economic resource. The “Thank A Farmer” billboards used by the project over four years created a positive conservation message and helped to built support for and interest in the project.

I. Literature Cited

Carter, Catherine; Peter Cada, Gregory D. Sousa, and Barry Tinning. 2012. *Using Remote Sensing Tools to Target Stream Protection and Wastewater Treatment BMPs in Rural Kentucky*. Presentation at the 2012 Kentucky Water Resources Research Institute Annual Conference in Lexington, KY. Paper available from Tetra Tech, Research Triangle Park, NC, and at: http://www.uky.edu/WaterResources/new/assets/docs/pdf/2012_symp_proceedings.pdf.

Gateway District Health Department. 1998 (Unpublished). Description of conditions in the Hinkston Creek Watershed in Montgomery and Bath Counties, KY.

Hunter, Tiffany L., and Brian Reeder, Phd. 2013. *Changes in Nutrients and E. coli During Two Storm Events in Hinkston Creek, KY*. Report on storm event water quality sampling on Hinkston Creek, conducted by Morehead State University. Presented at the Kentucky Water Resources Regional Institute Conference on March 10, 2014. Proceedings posted at <http://www.uky.edu/WaterResources/assets/docs/pdf/2014%20Proceedings%20Document.pdf>.

KDOW. 2008. 2008 Integrated Report to Congress on Water Quality in Kentucky: Kentucky Environmental and Public Protection Cabinet, Division of Water, 167p.

KDOW. 2010a. 2010 Integrated Report to Congress on the Condition of Water Resources in Kentucky. Kentucky Division of Water, Frankfort, KY.

KDOW. 2010b. Water Withdrawal Permitting. Kentucky Division of Water. Accessed October 2010. <http://water.ky.gov/permitting/Pages/WaterWithdrawalPermitting.aspx>.

Licking River Watershed Watch. Undated. Volunteer water quality sampling results reported at www.lrww.org.

Tetra Tech. 2009. Quality Assurance Project Plan for the Hinkston Creek Watershed Project, East Central Kentucky.

Tetra Tech. 2011. Hinkston Creek Watershed Assessment and Management Plan. July 29, 2011. Tetra Tech Water Resources Center; Fairfax VA.

Tetra Tech. 2011. Implementation Plan for selected Best Management Practices in the Hinkston Creek Watershed. February 11, 2011. Tetra Tech. Fairfax VA.

Tetra Tech, 2012. Final Closeout Report: Hinkston Creek Watershed Planning and BMP Implementation Project. Final report for Kentucky Division of Conservation Grant 08-09, C9994861-08, MOA # 0800021058. Project term: November 1, 2008 to September 30, 2011.

USDA-NRCS. 2008. South Fork of the Licking River Rapid Watershed Assessment. Lexington, Kentucky.

J. Appendices

Appendix A. Financial and Administrative Closeout

1. Application Outputs

This section summarizes project outputs during 2012 – 2014. Since most project funding (i.e., approximately 75%) was devoted to BMP implementation, most of the outputs include structural conservation practices. Table 7 lists the various BMPs installed with project cost share funding by county. The bullets below contain information on other project outputs. Table 8 summarizes the status of the project milestones.

Table 7. Summary of BMPs implemented during 2012 – 2014 by the Hinkston Creek Project.

BMP Category	Counties Where BMPs Were Installed			Project Totals
	Montgomery	Bourbon	Nicholas	
Pasture Renovation (acres)	0	0	149	149
Livestock Exclusion Fencing (ft)	2,100	41,750	11,680	55,530
Waterline (ft)	16,375	7,100	7,195	30,670
Livestock Water Tanks	15	16	8	39
Heavy Use Area Protection	15	17	5	37
Ditch/Bank Stabilization (ft)	1,325	0	0	1,325
Spring/Pond Cleanout for Water	3	0	0	3
Stream Crossings	0	6	1	7
Creekside Dump Cleanups	0	1	0	1
Septic Systems	0	2	3	5

Note: the totals in the table above include only the BMPs installed with direct project funding support; they do not include BMPs installed as matching support (e.g., stream fencing installed by producers at no cost to the project).

- Soil sampling and analysis for 418 sites in Nicholas County, 98 percent of which were for pasture land, for the purpose of better targeting nutrient applications.
- Ten outreach presentations and meetings with county conservation district boards of supervisors, to discuss water quality issues and needed BMPs.
- Six newspaper articles on the Hinkston Creek Project, including general water quality issues, needed BMPs, the availability of cost share funding, and other issues.
- Maintenance of the HinkstonCreek.org web site, with information on the watershed, monitoring data, the watershed management plan, historical information on the area related to the creek, top 5 BMPs, technical and other information on BMP types/costs/etc., and project related information (November 2010).

- Three “Thank A Farmer” billboards, with positive messages promoting agricultural best management practices, installed in the watershed (September 2012).
- Two farm field day presentations, to discuss the project, water quality issues, BMPs, and water quality monitoring approaches.
- Podium, poster, and other presentations to the annual Kentucky Water Resources Research Institute conference (2012, 2013), Kentucky River Watershed Watch (2012), Licking River Watershed Watch (2012, 2013), the National Water Quality Monitoring Conference, and the Mississippi River Gulf Hypoxia Task Force (2013).

Table 8. Final milestones and schedule report for the Hinkston Creek Watershed Project


Milestone	Date	
	Begin Date	Actual Completion
<i>Objective 0: General and administrative project activities conducted throughout the project period</i>		
Activity 1: Meet with 319 program staff to discuss additional watershed monitoring under the existing QAPP	1/1/12	10/31/12
Activity 2: Meet with 319 program staff to discuss streambank erosion bank pin / cross section analysis under a QAPP amendment	1/1/12	12/31/12
Activity 3: Submit advance written notice of all educational events, field days, training presentations, workshops, etc.	45 days prior	30 days prior
Activity 4: Submit draft materials to NPS program staff for approval	45 days prior	30 days prior
Activity 5: Submit quarterly invoices and project status reports, including expenditures from the KY Fish and Wildlife In-Lieu Fee project in the Salt Lick stream.	Quarterly	Quarterly
Activity 6: Upon request of the Division of Conservation, submit an Annual Report that will include any load reductions for the KY Fish and Wildlife In-Lieu Fee project Salt Lick stream and/or participate in the Cabinet sponsored biennial NPS Conference	Annually	Annually
Activity 7: Submit project closeout report	12/31/14	12/15/14

<i>Objective 1: Maintain and refine the watershed plan and seek support for its implementation.</i>		
Activity 1: Meet quarterly with Montgomery/Bourbon Conservation District Boards.	1/1/12	12/31/14
Activity 2: Coordinate program activities and cost share funding support with both conservation district boards.	3/1/12	12/31/14
Activity 3: Complete visual assessments via NRCS protocol on mainstem and tributaries.	6/1/12	NA
Activity 4: Conduct further study on bank erosion vs. upland sediment sources.	TBD	TBD
Activity 5: Update water quality assessments via monitoring under the existing QAPP.	1/1/12	12/31/14

<i>Objective 2: Provide cost share funding to implement Hinkston Creek Watershed-Based Plan BMPs.</i>		
Activity 1: Develop and submit BMP Implementation Plan to KDOC for review and approval.	3/1/12	3/1/12
Activity 2: Install livestock exclusion fencing along streams, address alternate water needs.	3/1/12	12/15/14
Activity 3: Identify and secure cost share support for streambank stabilization and revegetation.	8/1/12	11/15/14
Activity 4: Implement improved pasture management, including stabilized stream crossings.	3/1/12	11/15/14
Activity 5: Renovate pasture land to improve infiltration and reduce runoff.	3/1/12	11/15/14
Activity 6: Install grassed waterways to address pasture/cropland gullyng.	6/1/12	11/15/14
Activity 7: Implement urban controls in Mt. Sterling to reduce polluted runoff.	6/1/12	NA
Activity 8: Submit annual report to KDOC with load reduction calculations.	Annually	Annually

Objective 3: Implement awareness, education, and outreach activities (field days, workshops)		
Activity 1: Publish newspaper materials that increase knowledge of water quality measures.	4/1/12	11/1/14
Activity 2: Use signage to promote awareness of Hinkston Creek and watershed BMPs.	7/1/12	10/15/12
Activity 3: Provide technical and other training for land managers and other key partners.	8/1/12	7/31/14
Activity 4: Conduct outreach presentations to producer, civic, school, and other groups.	3/1/12	9/30/14
Activity 5: Submit educational materials to KDOC for review and approval.	45 days prior	As needed


Hinkston Creek, KY Watershed Project



Hinkston Creek drains 260 square miles of the Outer Bluegrass Region in east-central Kentucky, joining with Stoner Creek at Rucelle's Mill to form the South Fork of the Licking River. The watershed is home to 21,000 people, mostly living in and around the towns of Mount Sterling, Millersburg, Carlisle, and Sharpburg. Approximately 70 percent of the watershed is pasture land, with forest covering 20 percent, development on 8 percent, and row crops – mostly tobacco – on 2 percent. Carlisle and Millersburg draw their drinking water from surface sources in the watershed.

The 2010 Kentucky Division of Water Integrated Report to Congress identified several segments of the mainstem and tributaries as impaired due to bacterial contamination, sedimentation/siltation, nutrient enrichment, and poor habitat. A Tetra Tech watershed assessment – based on sampling conducted by Morehead State University students, data from the all-volunteer Licking River Watershed Watch, and other information – identified the major problem sources as tree cattle access to stream channels, overgrazing, removal of vegetation along channel banks, channels and upland erosion, and stormwater management.


Project partners (see below) leveraged a \$454,000 Clean Water Act Section 319 grant and matching support from farmers and other sources to address the water quality problems. The project included three major components: a watershed assessment and management plan, outreach and education, and cost-share funding for agricultural best management practices. Using the assessment results and watershed plan guidance, project sponsors launched an outreach program that included creek crossing sign "restoring the watershed" signs, cost-share reimbursement to farmers for agricultural producers, weekly newspaper columns, and an informational web site with water quality, BMP and other information (www.hinkstonscreek.org). More than \$200,000 in cost share funding has been distributed so far, with most going toward livestock exclusion fencing along streams, alternative water sources, and pasture management. Follow-up monitoring planned for 2013 and 2014 will document improvements in water quality.



Watershed Assessment & Plan

Although most of the watershed is composed of pasture land, the watershed assessment identified the impacts of tree cattle and other wildlife on stream banks, agricultural practices, and additional areas affected through erosion and sedimentation. The assessment also identified a "tree cattle" problem.

Watershed assessment results identified the major problem sources as tree cattle access to stream channels, overgrazing, removal of vegetation along channel banks, channels and upland erosion, and stormwater management.

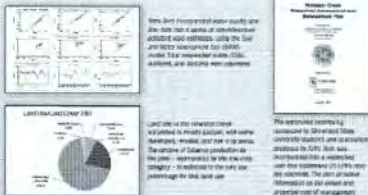


Farm Cost-Share Funds

Cost-share funding for livestock exclusion fencing, alternative water sources, and pasture management practices. The project included three major components: a watershed assessment and management plan, outreach and education, and cost-share funding for agricultural best management practices.

Outreach and Education


A series of weekly newspaper columns in Hinkston Creek and its towns in Eastern KY provided important information to the watershed community. The columns included information on water quality, best management practices, and other information. The project also included a series of weekly newspaper columns, and an informational web site with water quality, BMP and other information (www.hinkstonscreek.org). More than \$200,000 in cost share funding has been distributed so far, with most going toward livestock exclusion fencing along streams, alternative water sources, and pasture management. Follow-up monitoring planned for 2013 and 2014 will document improvements in water quality.



Signage and educational materials distributed to the watershed community. The project included three major components: a watershed assessment and management plan, outreach and education, and cost-share funding for agricultural best management practices.

Thanks To Our Project Partners!

- Kentucky Division of Conservation
- Kentucky Division of State
- Kentucky Transportation Cabinet
- Montgomery County Conservation District
- Madison County Conservation District
- Nicholas County Conservation District
- Morehead State University
- University of Kentucky Extension Service
- US Environmental Protection Agency
- USDA Natural Resources Conservation Service
- City of Mount Sterling
- Montgomery County Fiscal Court
- Mount Sterling Advocate Newspaper



2. Budget Summary

This section lists and discusses all fiscal aspects of the Hinkston Creek Watershed Plan Implementation Project. Below is the original detailed budget, from the project application, along with the actual project costs incurred during 2012 – 2014.

Table 9. Original and actual Hinkston Creek Project budgets for 2012 – 2014.

Cost Category	BMP Implementation	Project Mgmt	Education, Training, Outreach	Monitoring	Technical Assistance	Other	Original Budget Estimate	Actual Project Costs
Personnel	85,000	45,000	27,400	18,000	29,800	0	205,200	112,227.48
Supplies	300	200	1,250	750	0	0	2,500	190.52
Equipment	0	0	0	0	0	0	0	0.00
Travel	2,250	1,700	1,340	610	0	0	5,900	767.59
Contractual	12,400	0	22,400	1,200	0	0	36,000	22,914.89
Operating Costs	16,900	11,100	8,100	1,800	3,200	0	41,100	30,812.60
Other	442,000	0	703	0	20,000	0	462,703	586,489.92
TOTAL	558,850	58,000	61,193	22,360	53,000	0	753,403	753,403.00

Notes:

Tetra Tech has submitted invoices for reimbursement for \$452,042 in CWA Section 319 funds.

All dollars were spent; there were no excess project funds to reallocate.

This project generated \$62,682 in overmatch provided by project supporters.

This overmatch was not posted to the Grant, and does not appear in the table above.

Discussion of the Budget Summary

Personnel

Personnel costs covered by the CWA Section 319 grant were approximately 15% of the total grant expenses. Personnel costs were far less than the original budget projections due to administrative efficiencies associated with partnering with the county conservation districts in the BMP cost share program.

Combined CWA Section 319 and matching support personnel costs include all project staff, both staff paid under the grant and staff paid by separate non-federal match sources that supported project activities. All personnel support and related costs (e.g., benefits, taxes, administration, etc.) are included under the personnel line item. Personnel costs were focused mostly on outreach/education, technical assistance, and project administration. All of the 319(h) funded expenditures for personnel consisted of staff salary support for Tetra Tech personnel that worked directly on the project.

Non-CWA Section 319 personnel contributions to the project were largely matching support from the county conservation districts, those engaging in the education and outreach programs, and professional services related to the “fee in lieu of” mitigation (FILO) project, which included geomorphological and biological assessments, channel design, flow studies, and other professional services supporting the Salt Lick Creek restoration effort. Other personnel contributions included in-kind monitoring support from Morehead State University, and other miscellaneous in-kind personnel support.

Matching support for the project was limited to \$301,361.00, as reported in the table on the preceding page. The project generated additional overmatch, in the amount of \$62,682.00, mostly in the personnel category. This overmatch is not reported in the table, but is noted here as supplemental project information.

Supplies

Supplies included miscellaneous office or other supplies. Total supplies were less than \$200 for the three year project period, or more than 90% below the budget projections.

Equipment

Equipment costs were not included in the budget, and no equipment was purchased using grant or other funds.

Travel

This category included miscellaneous travel to various locations within the watershed, such as to stressor source and BMP sites and travel to pick up or access project materials, information, or other travel incidental to the project. Budget-supported travel expenditures were held to less than \$800.

Contractual

Contractual services included 1) collection and analyses of water quality monitoring samples and data for two storm event studies during 2013 and 2014 along the Hinkston Creek mainstem, conducted by Morehead State University professors and students; and 2) payment for the three “Thank A Farmer” for conservation practices billboards that were placed in each of the three watershed counties. About half of the total \$22,914 contractual budget was devoted to each of those two activities.

Operating costs

Operating costs were approximately 5% of the total project budget, and included costs for phone access, long distance calls, internet service, utilities, use of office space, fees, use of office equipment (i.e., projector, expenses related to presentations, and other expenses incidental to project operation. There was no matching support under this category.

Other

This category, the largest line item for the overall project, included professional, labor, and other services related to the following tasks:

- Work performed by the Montgomery, Bourbon, and Nicholas County Conservation Districts to solicit BMP cost share operators and to select, approve, and share costs of project-related BMPs
- Work performed by the BMP cost share cooperators to install and maintain project-related agricultural BMPs during 2012 – 2014. Note that BMP implementation consumed approximately 75% of the CWA Section 319 grant funds.
- Installation of five septic systems, two in Bourbon County and three in Nicholas County.
- Professional services related to assessment and design work for the FILO project

It should be noted that this category of expenditures exceeded the initial budget estimate by more than \$120,000 due to savings from the other categories, which were overestimated; i.e., money saved in the other line items was devoted to farm BMPs.

3. Equipment Summary

There was no equipment purchased with grant funds.

4. Special Grant Conditions

There were no special grant conditions associated with this project.

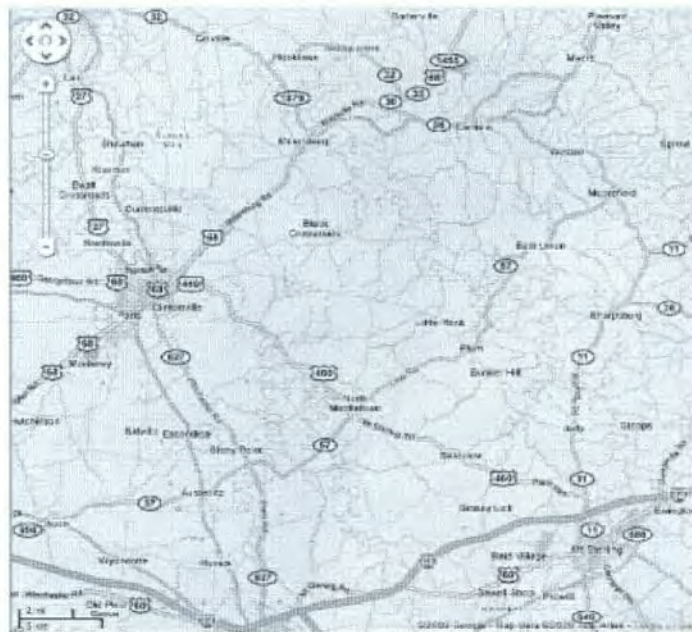
Appendix B. QAPP for Water Quality Monitoring

Quality Assurance Project Plan

for the

Hinkston Creek Watershed Project

East Central Kentucky



April 14, 2010 Final Amended Version

Submitted by:

Barry Tinning, Project Manager

Tetra Tech

Quality Assurance Project Plan available at KDOW and KDOI; incorporated by reference.

Appendix C. Best Management Practices Implementation Plan

Implementation Plan

for selected

Best Management Practices

in the

Upper Hinkston Creek Watershed in Montgomery County, Kentucky



Hinkston Creek Watershed Project

February 11, 2011

Relevant elements of the BMP Implementation Plan were incorporated into the Watershed Plan. The stand-alone document is on file with KDOW and KDO, and is incorporated by reference.

Appendix D. Hinkston Creek Watershed-Based Plan

Hinkston Creek Watershed Assessment and Management Plan

Prepared for:

Kentucky Energy and Environment Cabinet
Department for Natural Resources
Division of Conservation
Frankfort, Kentucky



Prepared by:



TETRA TECH

3200 Chapel Hill-Nelson Hwy, Ste 105
PO Box 14409
Research Triangle Park, NC 27709

June 29, 2011

Watershed-based plan is available at KDOW and KDOC, and is incorporated by reference

Appendix E. Stream Visual Assessment Protocol, Adapted for KY

Rapid Assessment Method for

Hinkston Creek Mainstem and Tributaries

Adapted by Tetra Tech From The

Stream Visual Assessment Protocol

USDA NRCS, 1998

Summary

This assessment method is proposed for use in the upper portion of the Hinkston Creek watershed, which lies along the eastern edge of the Outer Bluegrass Region in Kentucky. The method described in this document is a rapid screening procedure composed of three basic protocols, intended to identify stream channels and corridors with 1) significant bank erosion, 2) little or no riparian vegetation, and 3) impacts from heavy livestock use. Assessment information gathered under the method described below will be used to better target funding and other support for the implementation of best management practices that reduce nutrient, sediment, and bacteria inputs to Hinkston Creek.

Background

Parameters for characterizing these three channel/corridor conditions were developed by the U.S. Department of Agriculture's Natural Resources Conservation Service in 1998, as part of the *Stream Visual Assessment Protocol*. (USDA NRCS, 1998). The *Stream Visual Assessment Protocol* (SVAP) includes a total of 15 parameters, and provides a basic level of stream health evaluation. It has been successfully applied by conservationists with little biological or hydrological training. It is intended to be conducted with landowners, and incorporates talking points for the field assessor to use during the assessment.

SVAP is the first level in a four-part hierarchy of assessment protocols, which also includes the NRCS *Water Quality Indicators Guide*, the NRCS *Stream Ecological Assessment Field Handbook*, and an intensive bioassessment protocol used by state agencies. The SVAP provides an assessment based primarily on physical conditions within the assessment area, and may not detect some resource problems caused by factors located beyond the area being assessed. The use of higher tier methods is required to more fully assess the ecological condition and to detect problems originating elsewhere in the watershed.

For the most part, SVAP was created to help landowners and resource managers evaluate basic conditions related to stream health. Streams are complex ecosystems in which several biological, physical, and chemical processes interact. The SVAP protocol notes that changes in any one characteristic or process have cascading effects throughout the system and result in changes to many aspects of the system. Often several factors can combine to cause profound changes. For example, increased nutrient loads alone might not cause a change to a forested stream. But when combined with tree removal and channel widening, the result is to shift the energy dynamics from an aquatic biological community based on leaf litter inputs to one based on algae and macrophytes. The resulting chemical changes caused by algal photosynthesis and respiration and elevated temperatures may further contribute to a completely different biological community.

On file with KDOC and KDOW; incorporated by reference.

Appendix F. Montgomery County BMP Installation Details

HINKSTON CREEK WATERSHED PROJECT FARM CONSERVATION PRACTICES FOR MONTGOMERY COUNTY APPROVED COST SHARE PROJECTS

Applicant : Ed Stepanchuk Farm
Location: Chiles Highway, Mt. Sterling KY
Practice(s) Approved: Up to 800 ft of livestock exclusion fencing along creek, and up to 575 ft of waterline and 2 four-hole stock tanks. Also included are heavy use area protection pads around both stock tanks.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$7,500 (project-funded portion; equal to not more than 75% of total)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Install stock tanks at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tanks.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Areas within fencing not to be grazed.
Applicant is responsible for long-term operation and maintenance.

Applicant : Ronnie and Earl Clay Donaldson Farm
Location: KY 11 Maysville Road, Mt. Sterling KY
Practice(s) Approved: Repair approximately 1200 ft of drainage ditch erosion in pasture adjacent to KY 11; repair approximately 125 ft of erosion along pasture adjacent to Rodgers Mill Road.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Project Funding Limit: \$6,500 (project-funded portion; equal to not more than 75% of total cost)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Work should be conducted during dry weather if possible.
Control erosion during construction, stabilize as soon as possible.
Applicant is responsible for long-term maintenance.

Applicant : Byron Craycraft Farm
Location: Prewitt-Grassy Lick Road, Mt. Sterling KY
Practice(s) Approved: Approximately 300 ft water line and one 4-hole stock tank to move cattle away from farm drainage ditch and spring. Up to 300 ft of livestock exclusion fencing for spring and drainage ditch leading from spring is also included, along with removal of sediment in bottom of spring subject to the restriction on vegetation removal below.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$3,500 (project-funded portion; equal to not more than 75% of total cost)

Stipulations: Copies of all receipts must be turned in to the Conservation District.
Remove sediment from bottom of spring area only; do not disturb banks.
Do not remove vegetation from around spring area – leave as buffer.
Install stock tank well away from drainage ditch.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Areas within fencing not to be grazed.
Applicant is responsible for long-term operation and maintenance.

Applicant : Art Amburgey Farm
Location: US 460 Paris Pike, Mt. Sterling KY
Practice(s) Approved: Approximately 300 ft water line and one 4-hole stock tank to move cattle away from farm drainage ditches and pond. Up to 1000 ft of livestock exclusion fencing around pond is also included, along with heavy use area protection pad around stock tank. Also approved is one approximately 80 ft x 120 ft heavy use area protection pad, with filter fabric and rock and necessary grading.

Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$5,500 (project-funded portion; equal to not more than 75% of total cost)
Stipulations:

Copies of all receipts must be turned in to the Conservation District.
Remove sediment from bottom of spring area only; do not disturb banks.
Do not remove vegetation from around spring area – leave as buffer.
Install stock tank well away from drainage ditch.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Areas within fencing not to be grazed.
Applicant is responsible for long-term operation and maintenance.

Applicant : Jerry Long Farm
Location: US 460 Paris Pike, Mt. Sterling KY
Practice(s) Approved: Up to 3500 ft of water line and two 4-hole stock tanks to move cattle away from farm drainage ditches/channels and up onto ridgeline areas.
Livestock exclusion fencing for drainage areas installed previously at producer expense.

Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$5,500 (project-funded portion; equal to not more than 75% of total project)
Stipulations:

Copies of all receipts must be turned in to the Conservation District.
Install stock tanks at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tanks.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Areas within fencing (if used) not to be grazed.
Applicant is responsible for long-term operation and maintenance.

Applicant : Circle K Farm
Location: Chiles Highway, Mt. Sterling KY
Practice(s) Approved: Up to 1500 ft of water line and one 4-hole stock tanks to move cattle away from farm drainage ditches/channels and up onto ridgeline areas. Livestock exclusion fencing for drainage areas installed previously at producer expense.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$4,000 (project-funded portion; equal to not more than 75% of total cost)
Stipulations: Copies of all receipts must be turned in to the Conservation District. Install stock tanks at or near top of hill or ridge, away from drainage ways. Work should be conducted during dry weather if possible. Control erosion during construction, and seed/mulch as soon as possible. Areas within fencing (if used) not to be grazed. Applicant is responsible for long-term operation and maintenance.

Applicant : Berkley Mark Farm
Location: US 460 Paris Pike, Mt. Sterling KY
Practice(s) Approved: Heavy use pad for cattle feeding area. Livestock exclusion fencing for drainage areas installed previously at producer expense.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$2,000 (project-funded portion; equal to not more than 75% of total cost)
Stipulations: Copies of all receipts must be turned in to the Conservation District. Install heavy use feed pad at or near top of hill or ridge, away from drainage. Work should be conducted during dry weather if possible. Control erosion during construction, stabilize as soon as possible. Areas within fencing (if used) not to be grazed. Applicant is responsible for long-term operation and maintenance.

Applicant : Doyle King Farm
Location: King Lane, Mt. Sterling KY
Practice(s) Approved: Up to 2600 ft of water line and one 4-hole stock tank to move cattle away from farm drainage ditches/channels and up onto ridgeline area. Livestock exclusion fencing for drainage areas installed previously at producer expense. Also included is one heavy use area pad, with filter fabric and rock and necessary grading.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$6,500 (project-funded portion; equal to not more than 75% of total project)
Stipulations: Copies of all receipts must be turned in to the Conservation District. Install stock tank at or near top of hill or ridge, away from drainage ways. Install heavy use area pad with filter fabric and rock around stock tanks. Work should be conducted during dry weather if possible. Control erosion during construction, and seed/mulch as soon as possible. Areas within fencing (if used) not to be grazed. Applicant is responsible for long-term operation and maintenance.

Applicant : Virgie Walters Farm
Location: Owingsville Road, Mt. Sterling KY
Practice(s) Approved: Up to 600 ft of water line and one 4-hole stock tank to move cattle away from farm drainage ditches/channels and up onto ridgeline area. Livestock exclusion fencing for drainage areas installed previously at producer expense. Also included is one heavy use area pad for stock tank area, with filter fabric and rock and any necessary grading.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$2,500 (project-funded portion; equal to not more than 75% of total)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Install stock tank at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tanks.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Applicant is responsible for long-term operation and maintenance.

Applicant : John D. Judy Farm
Location: Ironworks Road, Mt. Sterling KY
Practice(s) Approved: Up to 1500 ft of water line and one 4-hole stock tank to move cattle away from farm drainage ditches/channels and up onto ridgeline area. Livestock exclusion fencing for drainage areas installed previously at producer expense. Also included is one heavy use area pad for stock tank area, with filter fabric and rock and any necessary grading.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$4,500 (project-funded portion; equal to not more than 75% of total project)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Install stock tank at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tank.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Applicant is responsible for long-term operation and maintenance.

Applicant : Edwin Burden Farm
Location: US 460 Paris Pike, Mt. Sterling KY
Practice(s) Approved: Up to 3500 ft of water line and two 4-hole stock tanks to move cattle away from farm drainage ditches/channels and up onto ridgeline area. Livestock exclusion fencing for drainage areas installed previously at producer expense. Also included are heavy use area pads for stock tank areas, with filter fabric and rock and any necessary grading.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$7,500 (project-funded portion; equal to not more than 75% of total)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Install stock tanks at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tanks.
Work during dry weather , control erosion, seed/mulch ASAP.
Applicant is responsible for long-term operation and maintenance.

Applicant : Allen J. Prewitt Farm
Location: Aarons Run Road, Mt. Sterling KY
Practice(s) Approved: Up to 1500 ft of water line and one 4-hole stock tank to move cattle away from farm drainage ditches/channels and up onto ridgeline area. Livestock exclusion fencing for drainage areas installed previously at producer expense. Also included are a heavy use area pad for the stock tank area, and two additional heavy use pads for feeding areas, with filter fabric and rock and any necessary grading.
Cost Share Required: Project pays 75%; applicant responsible for 25% (labor and/or cash)
Funding Limit: \$5,000 (project-funded portion; equal to not more than 75% of total project)
Stipulations: Copies of all receipts must be turned in to the Conservation District.
Install stock tanks at or near top of hill or ridge, away from drainage ways.
Install heavy use area pad with filter fabric and rock around stock tanks.
Work should be conducted during dry weather if possible.
Control erosion during construction, and seed/mulch as soon as possible.
Applicant is responsible for long-term operation and maintenance.

Applicant: Charles Johnson Farm
Location: Plum Lick Road, Mt. Sterling KY
Practice(s) Approved: Alternative water source development – pond cleanout, piping, waterers, livestock exclusion fencing,
Cost share Required: Project pays 75% of total up to \$11,000
Funding Limit: \$11,000 from Hinkston Creek Project.
Stipulations: The Hinkston Creek Project will provide up to \$11,000 to clean out two ponds and construct 1,200 ft of fencing, gravity flow water lines, and purchase stock tanks for the Johnson-Banks Farm on Plum Lick Road, with the understanding that the farm owners will apply for and pursue NRCS funding in 2015 to fence approximately 3400 ft of Plum Lick Creek, install two or more creek crossings, and pursue other conservation and farm improvements, such as well development, water lines, waterers, pasture renovation, and so on. Funding provided by the Hinkston Creek Project is limited to a maximum limit of \$11,000, and will be processed through the Montgomery County Conservation District, which has handled all Hinkston Creek Project expenses in the past. Pond cleanout and other alternative livestock water development expenses covered by the Hinkston Creek Project will be paid after submittal of original receipts for all materials and labor, and a summary of all in-kind expenses and labor provided by Johnson-Banks Farm personnel. The Hinkston Creek Project will pay 75% of the total amount listed in the materials, equipment use, labor, and other invoices for the items noted above, up to a maximum of \$11,000. All work covered by the Hinkston Creek Project must be completed by December 15, 2014. No work performed after that date will be reimbursed. Applicant is responsible for long-term operation and maintenance.