

2016

Nonpoint Source Pollution Annual Report



Table of Contents:

Nonpoint Source Management in Kentucky	1
Watershed Planning and Implementation	2
Kentucky Watershed Planning Areas	3
Success Story: Yellowbank Creek.....	5
319 Funded Program Highlights	
Wild Rivers.....	9
Basin Coordinators.....	10
Priority Watersheds.....	10
Education and Outreach.....	13
Project WET.....	15
Educational Resources.....	16
Envirothon.....	16
Watershed Watch.....	17
Load Reductions.....	19
Featured Project FFY 2016.....	21
Funded Projects FFY 2016.....	28
Completed Projects FFY 2016.....	30
FFY 2016 NPS Goals and Objectives.....	31
FFY 2016 NPS Program Comments to EPA.....	63
Appendix A: Hinkston Creek.....	68

Contact:
Kentucky Division of Water
Watershed Management Branch
300 Sower Blvd.
Frankfort, KY 40601
(502) 564-3410
water@ky.gov
water.ky.gov



Nonpoint Source Management in Kentucky

Kentucky's Nonpoint Source Program mission is to protect surface and groundwater from nonpoint source pollution, to abate pollution threats and to restore degraded waters so water quality standards are met and beneficial uses are supported. Management of nonpoint source pollution in KY requires partnering with a wide variety of organizations to develop, coordinate and implement the Kentucky NPS Management Plan. The program works with federal, state, local and private partners to promote complementary, regulatory and non-regulatory pollution control initiatives at both statewide and watershed levels.

The Nonpoint Source Program administers and implements the DOW's 319(h) federal grant program. EPA awards the Kentucky Division of Water (DOW) with grant funds, each year, for the purpose of addressing problems associated with nonpoint source pollution. A 40 percent non-federal match is required on all projects that receive funding. During the ranking period, priority is given to projects involving watershed-based plan development and implementation in impaired waters, as well as protection of Special Use Waters with identified threats.

In FFY 2016 the DOW received \$2.661 million from Clean Water Act Section 319(h) funding to operate the Nonpoint Source Management Program. This year, communities and organizations shared \$1.688 million in federal grants to develop watershed plans and implement nonpoint source pollution controls. DOW awarded those funds to implement three (3) watershed plans and complete development of one additional watershed plan, conduct nutrient management training for Dairy Producers, and fund the Watershed Center for Excellence to conduct watershed training and coordination.

This report features accomplishments aligned with the
1 program's goals that occurred during the Federal





Fiscal Year (FFY) 2016 (October 1, 2015 – September 30, 2016).

Watershed Planning and Implementation

DOW staff provided technical assistance to watershed groups for the development of watershed plans by conducting reviews of five draft watershed plans during FFY 2016 (July 1, 2015 – June 30, 2016). All five watershed plans have been accepted by KDOW for implementation, and 3 of those were accepted by the EPA Region 4 for Implementation as well. The Darby Creek and Woolper Creek watershed plans in Oldham and Boone Counties respectively are currently being reviewed by EPA Region 4 staff.

Watershed plan reviews continue to be coordinated through the Kentucky Inter-branch Watershed Implementation Workgroup, which provides the opportunity for all DOW branches to comment on or offer constructive feedback on watershed plans prior to acceptance. Currently, 25 watershed plans have been accepted for full or partial implementation with Clean Water Act Section 319(h) funding. An additional 7 watershed plans are currently under development.

There are 16 watershed plans currently being implemented through one or more nonpoint source pollution (319h) grant contracts per plan. Implementation is primarily centered on the employment of watershed coordinators to conduct education and outreach in the watersheds. The watershed coordinators also manage the implementation of on-the-ground best management practices to reduce of nonpoint source pollution coming from urban stormwater, failing on-site wastewater systems, agriculture, and the loss of riparian zones around water bodies.

Kentucky Watershed Planning Areas

Legend

- Watershed Planning Areas
- Four Rivers
- Green
- Salt
- Kentucky
- Licking
- Upper Cumberland
- Big Sandy

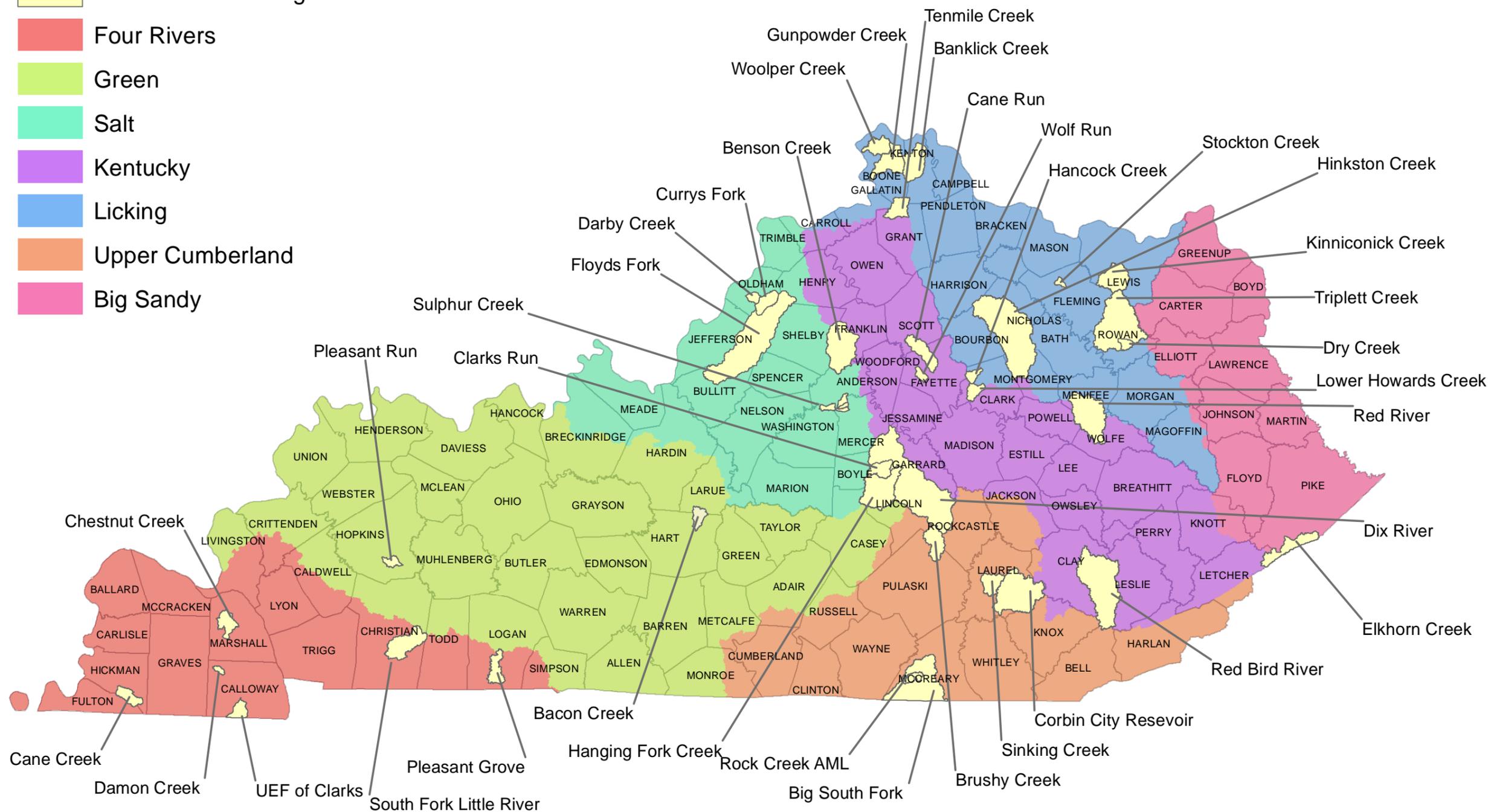


Figure 1. Kentucky watershed planning areas, FFY 2016.

Success Story

Watershed Projects and Stakeholders' Involvement Improve Water Quality in Yellowbank Creek

Waterbody Improved

Yellowbank Creek's impairments of the warmwater aquatic habitat (WAH) designated use were caused by channel erosion activities from upstream sources, animal feeding operations and livestock grazing. Indicators for the impairments are related to elevated nutrient and eutrophication factors and high loads of sediment and siltation. In 2006 the Kentucky Division of Water (KDOW) added the 10.5-mile segment of Yellowbank Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters. Education and outreach activities through a 319(h)

grant occurred in 2005, 2006 and 2007 that aimed at increasing public knowledge and awareness of nutrient and fertilizer applications that may be contributing to the stream's impairment. Project partners also implemented numerous "working lands" Best Management Practices (BMPs) targeting livestock grazing practices and erosion control from crop fields, which led to improvements in stream water quality runoff. Due in part to the educational programs and also from implemented BMPs, the 10.5 mile length of Yellowbank Creek was delisted for nutrients and sediment in 2012.

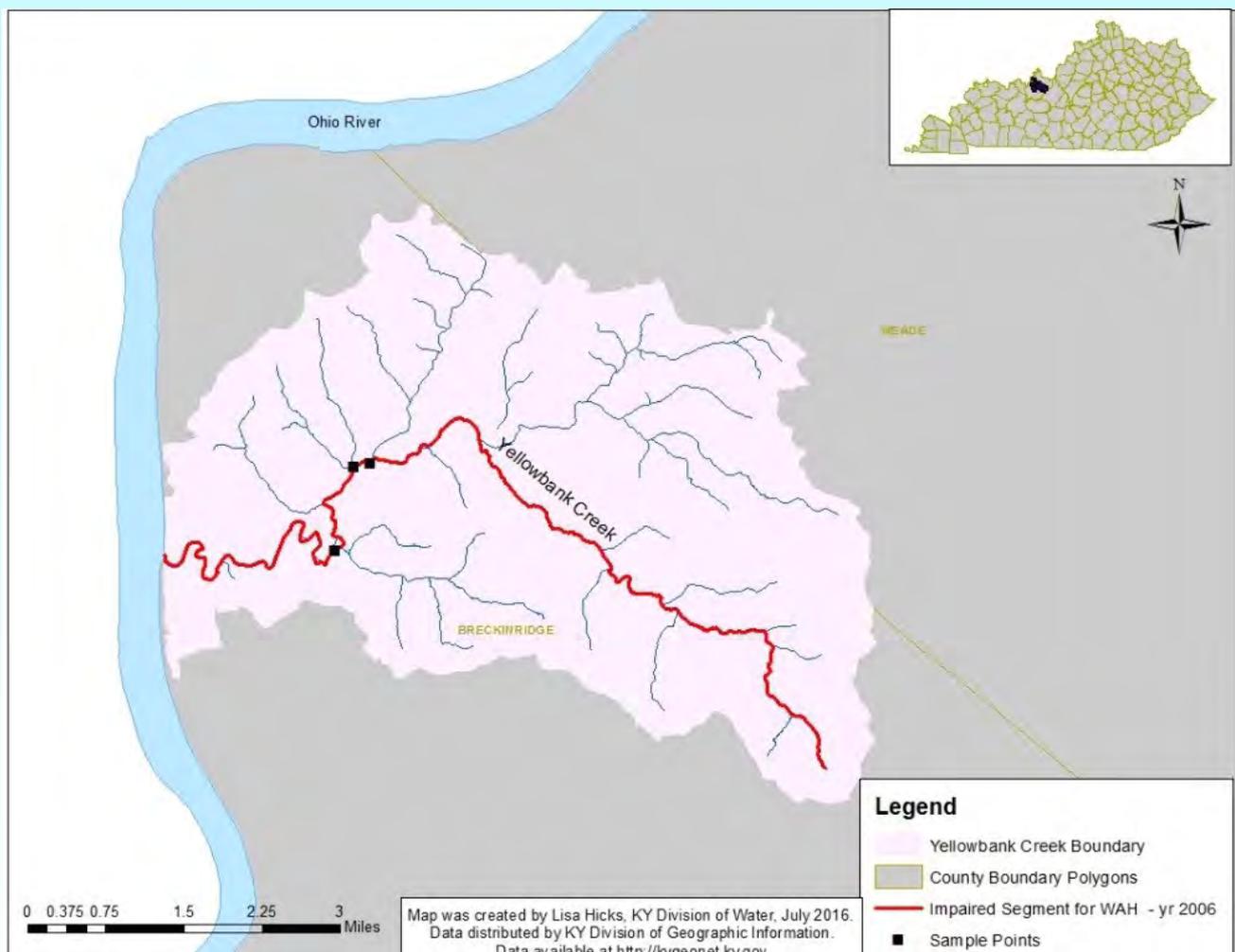


Figure 2. Yellowbank Creek Watershed.



Figure 3. Field days in Breckinridge Co. demonstrating BMPs for agriculture.

Problem

Yellowbank Creek, located in Breckinridge Co., is a tributary of the Ohio River in the northwestern corner of the Salt River basin (Figure 2). The Yellowbank Creek watershed is 23.5 square miles, and is designated as HUC12 051401041402. It includes 48 miles of streams. Land use in the watershed is composed of approximately 57% forest, 32% agriculture, 5% grassland and 3% developed land.

Yellowbank Creek was primarily impacted by NPS pollution. According to the National Land Cover database (NLCD 2011), agricultural activities (pasture/hay and cultivated crops) cover 32% of the watershed. Common land use practices of agriculture operations include the land application of fertilizers and pesticides. Excessive application rates and inadequate stream buffers can cause runoff from farm fields into adjacent streams, causing the impairments related to high nutrients, high sediment loads and chemical concentrations to be above the assimilative stream capacity.

Monitoring benthic macroinvertebrates and their associated habitats in 2004 indicated a low diversity in macroinvertebrates and a low quality habitat score using the KDOW

Macroinvertebrate Biological Index (MBI) tool. The designated use of warmwater aquatic habitat was not meeting the narrative criteria for nutrients and sediment of Kentucky's water quality standards. As a result, KDOW added the 10.5 mile length of Yellowbank Creek to the CWA section 303(d) list of impaired waters in 2006 for nutrients/eutrophication and sediment/siltation.

Project Highlights

Many project partners and cooperators worked together to identify sources and causes of the NPS pollution, and worked towards implementing Best Management Practices (BMPs) to address agricultural sources of nonpoint source pollution in the Yellowbank watershed, as well as in adjacent watersheds also experiencing similar issues.

The Kentucky Department of Agriculture was awarded an FFY 2004, 319(h) Nonpoint Source pollution control grant to build a cooperative group of agriculture professionals to work on NPS pollution issues in Breckenridge County. This project included three (3) educational field days targeting local farmers and landowners in the watershed (Figure 3). Farmers were trained how to interpret pesticide labelling, methods to accurately calibrate

pesticide application equipment, proper stream buffer and setback requirements and the safe disposal of used pesticide containers.

Field days included a classroom portion where farmers received educational materials and training on pesticide applications, including proper rates and amounts for the appropriate size and type of crop. Demonstration farms were established to show specific BMPs including rotational grazing systems alternative water systems, stream fencing, and pesticide application setbacks and stream buffers. Approximately 221 people attended the 3 field days.

Results

Water quality has improved in Yellowbank Creek since its listing in 2006. Technical and financial assistance for the installation of on-the-ground BMPs that landowners had learned about during the demonstration field days continued to be provided by partners well after the 319(h) project concluded.

The NRCS annually reports its implemented farm practices by HUC12, and since 2005 have included 87 of the following BMPs in the Yellowbank watershed:

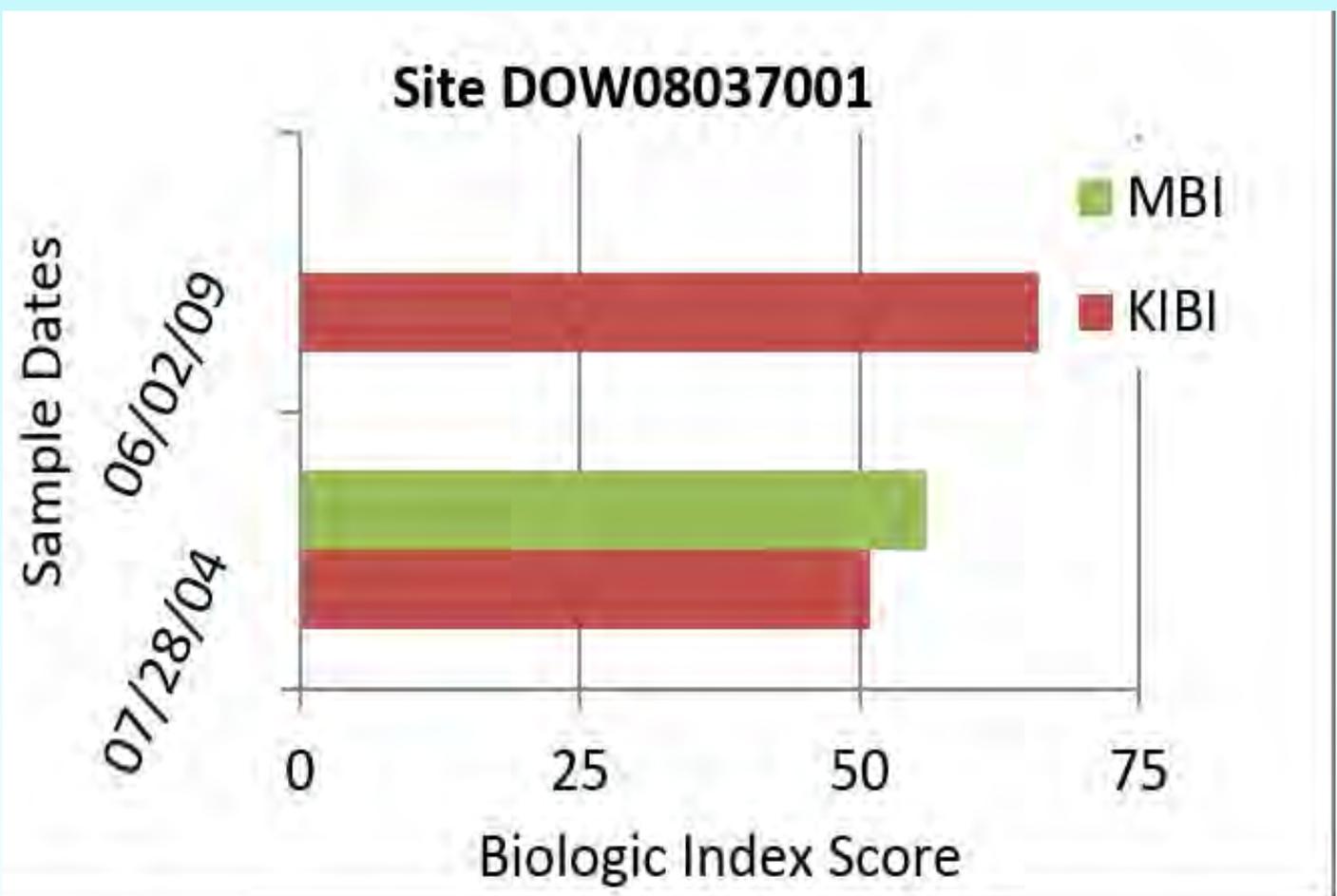


Figure 4. Macroinvertebrate Biologic Index (MBI) and KIBI biological scores pre and post BMP implementation.

Success Story

- Comprehensive nutrient management planning
- Conservation cover
- Fencing
- Forage harvest management
- Heavy use protection
- Integrated pest Management
- Livestock Pipeline
- Prescribed Grazing
- Watering Facility
- Conservation Crop Rotation
- Contour Farming
- Access Control
- Upland Wildlife Habitat Management
- Grassed Waterway

Biological monitoring in 2009 on the 10.3 mile segment of Yellowbank Creek indicated that the warmwater aquatic habitat was now meeting its use, and achieved a Kentucky Index of Biologic Integrity (KIBI) fish community score rated as good (Figure 4). The stream was de-listed for WAH in 2012. (Note: In the 2010 water quality assessment, KDOW adjusted the Yellow Creek segment length to reflect the National Hydrography Data Set (NHD). The final segment as of 2014 was 10.3 miles).

Partners and Funding

Many partners were involved in the farmer education and outreach programs as well as the continued on-the-ground BMP implementation efforts including:

- Kentucky Department of Agriculture
- United State Geological Survey – Kentucky Water Science Center
- Natural Resources Conservation Service
- University of Kentucky Cooperative

Extension Service

- Breckinridge County Cooperative Extension Service
- Breckinridge County Conservation District
- Meade County Conservation District
- Kentucky Division of Forestry
- Kentucky Department of Fish & Wildlife Resources
- Kentucky Corn Growers Association
- Kentucky Division of Conservation

These partners contributed much time, energy, expertise and technical assistance in developing and presenting the educational materials to farmers, coordinating and conducting farm field days, installing BMPs for field day demonstration, and the sustained BMP implementation effort since the project.

Since 2004 the awarded 319(h) grant (#C99486104) to the Kentucky Department of Agriculture was \$535,000 total dollars. This amount was allocated for education and outreach materials development, monitoring watershed locations and for planning and conducting 3 farm field days.

For more information, please contact:

Lisa Hicks
Kentucky Division of Water
502-564-3410
lisa.hicks@ky.gov

Wild Rivers Program

Portions of nine rivers and streams of exceptional quality and aesthetic character have been designated as Kentucky Wild Rivers in accordance with KRS 146:200-360. The protected segments include portions of the Cumberland River, Red River, Rockcastle River, Green River, Big South Fork of the Cumberland River, Little South Fork of the Cumberland River, Martin's Fork of the Cumberland River, Rock Creek and Bad Branch of Poor Fork of the Cumberland River.

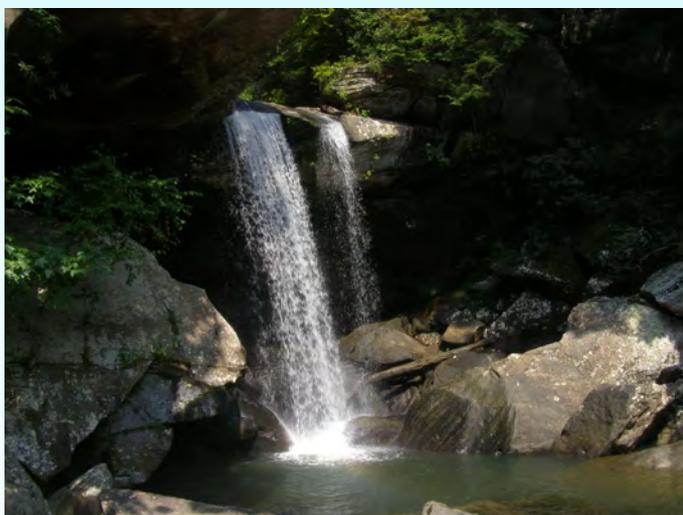
Each Wild River is actually a linear corridor encompassing all visible land on each side of the river up to a distance of 2,000 feet. Management activities also include quarterly water quality monitoring in each Wild River corridor, periodic monitoring of high traffic areas and an annual aerial land use survey.

DOW management of the nearly 5,000 acre Wild Rivers inventory includes eradication of

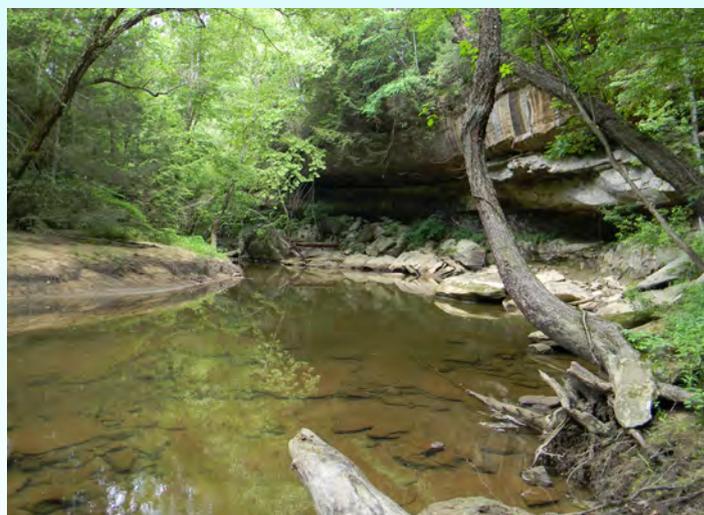
invasive species, monitoring of illegal activities and maintenance of property boundaries. In 2015, the Wild Rivers Program acquired an additional ~230 acres in the Wild Little South Fork of the Cumberland River watershed adjacent to the John and Karen Burnett Wildlife and Watershed Conservation Area. We expect to acquire, through purchase or donation, an additional 2,100 acres in 2016.

Kentucky's Wild Rivers gained notoriety when crews with Kentucky Educational Television filmed a segment of 'Kentucky Life' at Martins Fork State Natural Area (<http://video.ket.org/video/2365650271/>).

The Kentucky Wild Rivers Act of 1972 designated segments of nine rivers, including a portion of Rockcastle River, as Wild Rivers. This designation allows the stream segments to retain many of their natural attributes and it protects them from unwise use and development.



Cumberland River.



Red River.

Basin Coordinators

The Kentucky Division of Water and partners maintained Basin Coordinators in six of Kentucky's seven Major River Basin Management Units for the majority of FFY 2016; the Green, Four Rivers, Kentucky, Licking, Salt River, and Upper Cumberland. The presence of Basin Coordinators serves as a catalyst for program development and support. Basin Coordinators enhance communication with stakeholders via regular newsletter releases and Basin Team Meetings in addition to additional program facilitation and general Education and Outreach.

During FFY 2016 Basin Coordinators issued (13) newsletters. In addition they hosted (7) Basin Team Meetings reaching and coordinating with over (108) key stakeholders. During the Basin Team Meetings program information was provided, projects were discussed and potential opportunities were investigated in a collaborative environment.

Priority Watersheds

Basin Team Meetings were utilized to assist in establishing priority watersheds. Priority watersheds are selected based on factors such as the degree of water quality impairment and potential for recovery through implementation of Best Management Practices. The purpose of selecting these areas is to focus limited resources on areas where positive change is reasonably attainable. A priority watershed should ideally have a completed watershed plan in process of implementation or an ongoing watershed planning effort and a potential for strong community support for implementation of recommended watershed projects.

The Basin Team's knowledge and input is valuable to helping the Basin Coordinators and DOW make the watershed selections with the most current and localized knowledge. From all the identified

watersheds, three priority watershed were selected for each major river basin in Kentucky, taking into consideration Basin Team input. These watersheds will be considered for focused funding and technical support in state agency programs, including USEPA 319 (Nonpoint Source) Grant Program funding, state revolving funds for water and wastewater infrastructure, and state agricultural cost-share programs.

Priority watersheds will be reevaluated on a regular basis to ensure that limited resources are being directed most optimally. The Basin Team's knowledge and input is valuable to helping the Basin Coordinators and DOW make the watershed selections with the most current and localized knowledge.

Kentucky Priority Watersheds

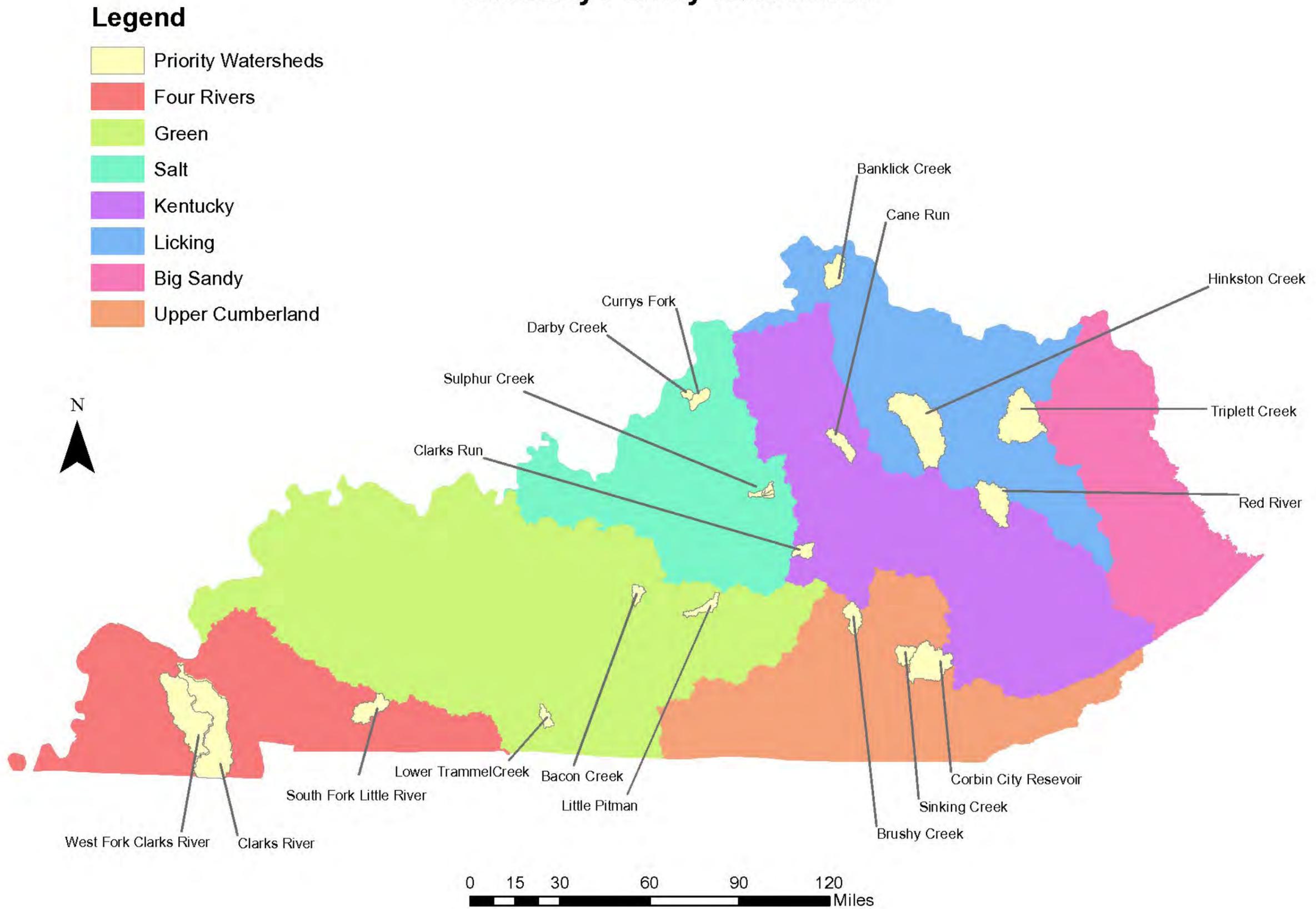


Figure 5. Priority watersheds.

Education and Outreach

DOW provides nonpoint source pollution education and outreach activities across the Commonwealth in addition to what is offered by 319(h) sub-grantees. The Basin Coordinators in the Nonpoint Source and Basin Team Section strive to reach a diverse audience, providing outreach and educational resources to the citizens of the Commonwealth in order to create a more informed population and improve Kentucky's Water Health.

In total, the Basin Coordinators and technical advisors of the Nonpoint and Basin Team section reached an estimated 19,488 stakeholders through outreach activities in FFY 2016. Roughly 5,300 of those were school age students reached through educators, festivals and other forms of outreach. Tables 1 and 2 detail the educational programming accomplished in FFY 2016.

Table 1. Education and Outreach activities in FFY 2016.

Type	Description	Community Reached
Presentation	<p>Conducted presentations at various conferences and meetings throughout the State to educate the public about:</p> <ul style="list-style-type: none"> • Basin Coordinators and how we can help with projects • Watershed Watch • Nonpoint Source Pollution and the 319 program • Clean Water Act 101 & TMDLs • Water Health Portal 	Conducted 12 formal presentations reaching over 500 people
k-12 Environmental Education	<p>Conducted various water related activities using Project WET at partners events:</p> <ul style="list-style-type: none"> • Louisville Water Company • U.S. Fish and Wildlife • Warren County/Bowling Green Stormwater • University of Kentucky Cooperative Extension Services • Kentucky State University • Kentucky Waterways Alliance 	Conducted 39 Environmental Education programs reaching over 3,500
Workshops (Hosted)	<p>Conducted 4 Workshops:</p> <ul style="list-style-type: none"> • Project Wet Workshop • Project Underground Workshop • Two (2) Watershed Coordinator Meetings 	At the 4 workshops held throughout the State, 120 Educators were taught by the Division of Water
Workshops attended	<p>The Basin Coordinators Attended 3 Trainings for Professional Development:</p> <ul style="list-style-type: none"> • Hands-on Soil Workshop • Project Wild • Project Aquatic Wild 	
Community Meetings Attended	<p>As Basin Coordinators, we are responsible for engaging with the general public about water quality issues. Community Meetings included:</p> <ul style="list-style-type: none"> • Watershed Council Meetings • Stormwater Association Meetings • Agriculture and Water Quality Meetings • Cumberland River Compact Meetings • Area Development District Meetings • Watershed Watch Board Meetings 	The Basin Coordinators Attended 37 Community Meetings reaching 669 community members

Table 2. Education and Outreach action items in FFY 2016.

Action Items	Accomplishments
<p>Action Item 1.1: Create Effective messaging for the Division of Water, including the delivery of this message</p>	<ul style="list-style-type: none"> ● I Love KY Water Facebook Page was created. To date, 332 Likes. ● Basin’s & NP Newsletters have been updated to have the same look using MailChimp.
<p>Action Item 1.2: Partner with organizations on environmental education and outreach opportunities</p>	<p>Partnered with the following organizations:</p> <ul style="list-style-type: none"> ● UK Extension ● Kentucky State University ● Louisville Water Company ● Kentucky Environmental Education Council ● Kentucky Waterways Alliance ● Bowling Green/Warren County Stormwater programs ● Kentucky Fish & Wildlife ● Kentucky Association for Environmental Education
<p>Action Item 1.3: Develop content for social media, basin newsletters, and other print and non-print outlets</p>	<p>Social Media:</p> <ul style="list-style-type: none"> ● Each Basin (Salt, Licking, Cumberland & Green) has sent out quarterly newsletters. Each newsletter was posted to the FB Page and on the Basin webpages ● Each Basin Coordinator provides content for the Facebook Page on a certain day of the week. ● Social Media Campaigns have been created to promote various aspects of water, including: <ul style="list-style-type: none"> ○ #WorldWetlandDay ○ SepticSmart Week ○ #ValueWater ○ #MacroinvertebrateMonday
<p>Action 1.4: Coordinate and conduct public events and/or exhibits</p>	<p>DOW has participated in 10 different tabling events throughout the state, including:</p> <ul style="list-style-type: none"> ● Somerset Community College Earth Day Celebration ● Ashbourne Farm Field Day for Harrods Creek Watershed ● Energy & Environmental Cabinet Earth Day Celebration ● Kentucky State University’s Earth Day Celebration ● Kentucky Association of Government Communicators Conference ● Kentucky Association for Environmental Education Annual Symposium ● Kentucky Stormwater Association Annual Conference ● Governor’s Conference on Energy and the Environmental ● Kentucky Associations for Environmental Education Annual Conference ● Kentucky Association of Conservation Districts Annual Conference <p>DOW reach over 2000 people at these events.</p>

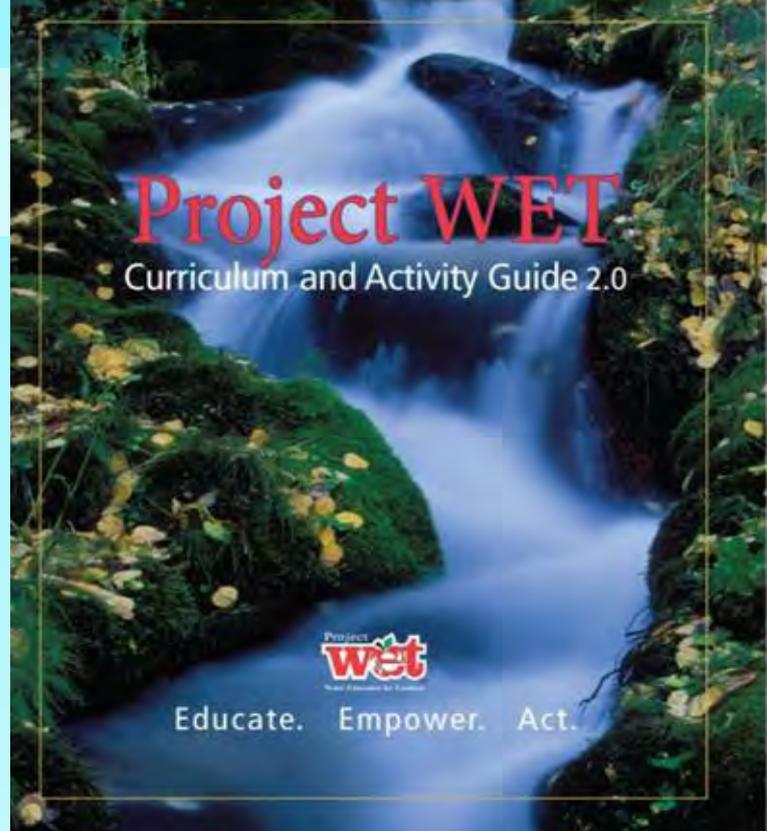
Project WET

KDOW is a host institution for Project WET in Kentucky. The Project WET Foundation (PWF) is an international not-for-profit water resources education program. Project WET's goal is to provide scientifically accurate and educationally sound water resources education materials, training courses and networking services to citizens, organizations, governments, and corporations. The KY Project WET Coordinator has multiple roles: training facilitators and educators across the Commonwealth, ensuring certified facilitators have all required forms to support their workshops, managing activity guide orders, developing and maintaining a database of certified facilitators and educators in Kentucky, and providing an annual report to PWF detailing Project WET workshops in Kentucky. KDOW has formed a partnership with the Kentucky Association for Environmental Education (KAEE) to coordinate project trainings and further promote water education in Kentucky.

During 2016 KAEE's Project WET program conducted 2 Facilitator workshops and 9 Educator workshops. Educator training reached 131 educators including in-service (K-12) educators, university educators, pre-service educators and non-formal educators.

Educational Resources

KDOW has a large supply of environmental educational equipment. The equipment is available for checkout, allowing teachers and





other professionals to use various pieces of equipment for educational events in their regions. The equipment can be viewed and checked out on their website at water.ky.gov/ww/Pages/EnvironmentalEquipment. Forty equipment checkout requests were made for FFY 2016. Formal teachers love the website because it allows them to check out the equipment to accompany their lessons. Many non-formal environmental educators use the equipment as well.

Ollie Otter, KDOW's Mascot has also been in high demand. He attended 22 events across the state in 2016, including the 2016 Earth Day Celebrations in Frankfort, Stakeholder meetings, and school programs. His Facebook page has many followers and he is always a popular addition to any environmental gathering.

Envirothon

KDOW devotes effort annually to the Canon Envirothon, the premier environmental education competition for schools across the North America. Each year, the Commonwealth holds its own Kentucky Envirothon Competition to select the brightest team to represent the Commonwealth at the national level. KDOW staff team up with other state agencies to train students and teachers in preparation for the competitions and are involved in test writing and judging for both regional and state level testing.

Watershed Watch

Watershed Watch in Kentucky (WWKY) is a nonprofit organization that promotes volunteer water monitoring that the KDOW has been working with since 1997. The state is divided into eight basins that cover the state of Kentucky and there are a few samplers that fall into the headwaters of Tennessee, Virginia and West Virginia. In January 2012 they introduced their newly updated sampling protocols and materials to volunteers. The first year, there were 367 volunteers trained in the new protocols. During 2016, 131 new volunteers were trained on how to take grab samples and collect field chemistry and 141 volunteers were recertified. Some volunteers attended additional training that prepares them to conduct habitat assessments and biological monitoring. As a part of their training, volunteers are loaned equipment to use in the field, including DO and pH kits, conductivity meters, thermometers, D-frame nets, forceps, reel lines and white pans. In addition to other materials received, trained volunteers are also given color flip booklets with laminated pages that volunteers can take to the stream; the flip books are step-by-step summaries of the new protocols as well as a benthic macroinvertebrate key. The new materials have been a huge success with existing volunteers. The revised protocols have improved sampling collection. WWKY has also begun creating short instructional videos that are posted on their website <http://www.wwky.org/>. They currently have a video that demonstrates how to calibrate their conductivity meter. Other instructional videos will be posted as they become available.



Water chemistry training



Stream sampling

In 2001 the Kentucky Geological Survey (KGS) created an online database which housed all of the WWKY sampling data. In 2012 they began re-creating the online database for volunteers to see all of their sampling data at one time. In December 2014 the online data portal was announced to all the volunteers. The data portal <http://kgs.uky.edu/wwky/> has many features to assist the volunteers with not only viewing their sampling results but also provides the ability to create reports showing their results. They have access to site maps that have topographic or imagery options like Google Earth. The data portal also has information that explains the various parameters that are collected such as dissolved oxygen, pH, *E. coli*, etc. Volunteers can create comparative charts using their field data and sampling data. WWKY and KGS have been working together to incorporate the historic data collected from the basins. Currently only the Salt and Big Sandy basins still need to enter their historic data. WWKY is hopeful that in the future this portal will also have the habitat and biological assessment data with site photos included.

WWKY volunteers collect samples that are analysed by professional labs three times a year, May, July and September. During this period there were 1365 water samples collected and analysed for atrazine, triazines, *E. coli*, heavy metals and nutrients.

Environmental education makes a difference in the way individuals interact with their watersheds. With continued funding, KDOW looks forward to expanding environmental education and outreach efforts in the future.



KY Snubnosed Darter

Load Reductions

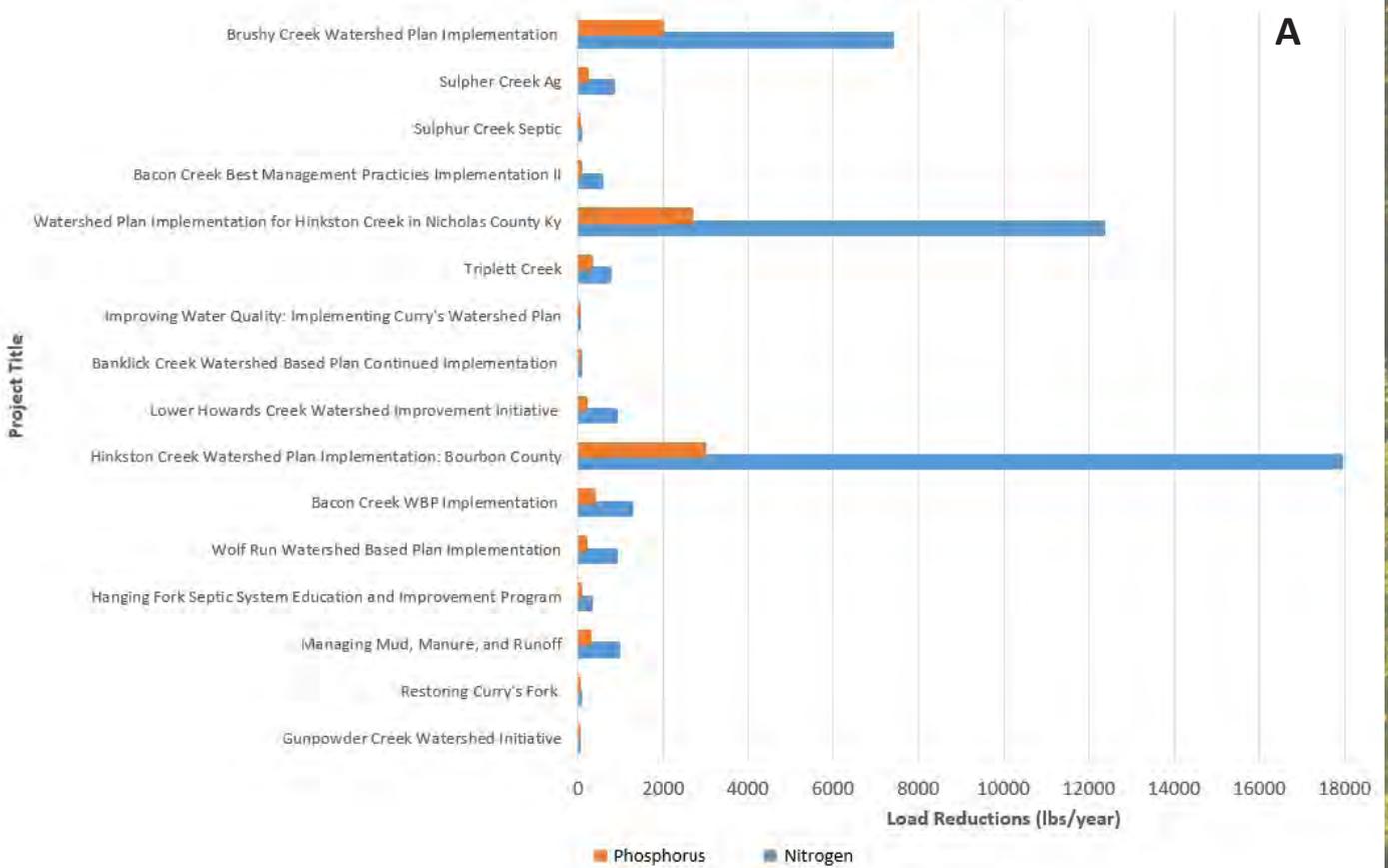
Table 3 contains a compilation of load reduction estimates from Best Management Practices (BMPs) that were implemented during FFY 2016 (October 1, 2015 – September 30, 2016). Load reductions were derived by direct calculation or by utilizing STEP-L BMP Modelling, and then entered into the EPA's Grant Reporting and Tracking (GRTS) database prior to the February 15, 2016 deadline.

Table 3. Load reductions for projects from FFY 2016.

State Project Number	Project Title	Load Reductions		
		Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
09 - 10.	Gunpowder Creek Watershed Initiative	2.2	1	1
10 - 15.	Restoring Curry's Fork	38.7	7.7	0
12 - 03.	Managing Mud, Manure, and Runoff	932.4	270	202.1
12 - 04.	Hanging Fork Septic System Education and Improvement Program	290.3	58.1	0
12 - 05.	Wolf Run Watershed Based Plan Implementation	893.9	171.1	96.9
12 - 06.	Bacon Creek WBP Implementation	1269	354	252
12 - 07.	Hinkston Creek Watershed Plan Implementation: Bourbon County	17913.3	2985.7	1655.4
13 - 02.	Lower Howards Creek Watershed Improvement Initiative	868	185	45
13 - 03.	Banklick Creek Watershed Based Plan Continued Implementation	32	36.3	13.5
13 - 05.	Improving Water Quality: Implementing Curry's Watershed Plan	1	1	1
13 - 06.	Triplett Creek	732.4	282	538
13 - 07.	Watershed Plan Implementation for Hinkston Creek in Nicholas County Ky	12330	2649.4	1738.5
13 - 08.	Bacon Creek Best Management Practices Implementation II	546	62	21
15 - 09.	Sulphur Creek Septic	37	8	0
15 - 10.	Sulphur Creek Ag	819	211	151
15 - 12.	Brushy Creek Watershed Plan Implementation	7385.7	1980.4	1372.4

Kentucky Division of Water 2016 NPS Project Load Reductions

FFY 2016 Load Reductions for Phosphorus and Nitrogen



FFY 2016 Load Reductions for Sediment

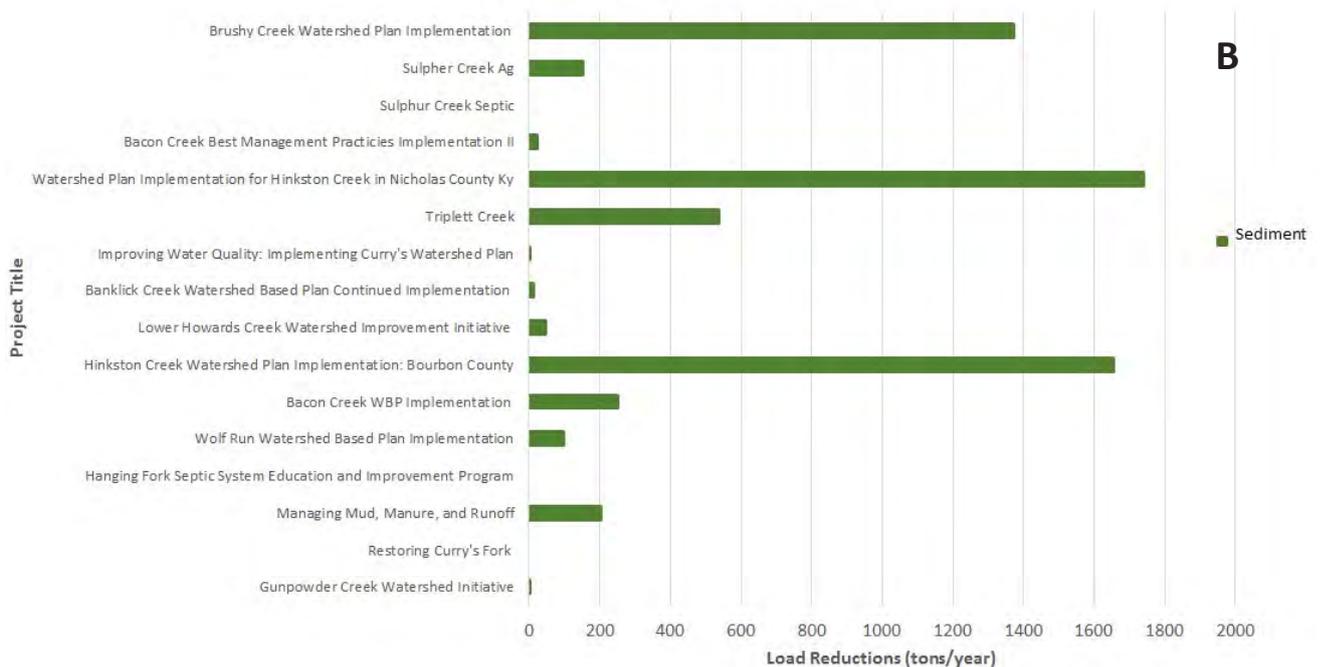


Figure 6. Load reductions for projects from FFY 2016. A) Nutrients; B.) Sediment.

Featured Projects FFY 2016

Project #'s 09-11: Wolf Run Creek Watershed Based Plan and 12-05: Wolf Run Creek Watershed Based Plan Implementation



Figure 7. Big Elm Tributary and Sinkhole before remediation and design.

Wolf Run Creek, Lexington, Kentucky is a tributary of Town Branch, which flows into South Elkhorn Creek before emptying into the Kentucky River. The Wolf Run Creek Watershed encompasses 6,514 acres and is 41% impervious with mixed land uses including industrial, commercial, residential, and pastures. The main stem of Wolf Run Creek was first listed on the 2004 Integrated Report (303d and 305b) as partially supporting the Warm Water Aquatic Habitat designated use and non-supporting the Primary Contact Recreation designated use (KDOW, 2004), and has been listed on every successive Integrated report. As of the 2010 cycle, Wolf Run was additionally listed as non-supporting for the Secondary Contact Recreation designated use. In addition a TMDL for pathogens has been developed and approved for the South Elkhorn Creek Watershed (which includes Wolf Run Creek).

Because of the significant amount of existing data and public interest in this watershed, Lexington-Fayette Urban County Government, Division of Environmental Services, applied for and was awarded a 319(h) grant to create a KDOW and EPA approved watershed based plan for the Wolf Run Watershed. One of the key stewardship groups in this area, Friends of Wolf Run (FOWR) which is a 501(c)3 Nonprofit volunteer organization that has played a key role in the public involvement and volunteer efforts of this plan. This effort

21 to create an approved 319(h) Wolf Run Watershed Based Plan (March 1, 2013) took

approximately 2.5 years, \$270,600, and hundreds of hours of volunteer time. The Wolf Run Watershed Based Plan ultimately identified 128 Best Management Practices (BMPs) of which 61 were designated as high-priority projects, to improve water quality and habitat within this small (10.18 square miles) urban watershed.

Through remaining funds from the FFY 2009 project, and additional awarded funds through the FFY 2012 project (Wolf Run Creek Watershed Based Plan Implementation project) LFUCG was able to proceed with designing and implementing many of the Best Management Practices identified in the watershed based plan.

Two high priority best management practices (BMPs) identified in the watershed plan were along Vaughn's Branch and Big Elm Tributary, in the LFUCG owned/operated Picadome Golf Course. Four specific goals were identified to ensure a successful project: (1) reduce streambank erosion, (2) sinkhole remediation, (3) improve water quality and (4) involve and educate the public.

The Vaughn's Branch Design took a 1700 linear foot section of the stream running through the middle of the Picadome Golf Course and designed a series of riffle/pool areas, J-hooks, step boulders, a low flow channel and floodplain reconnections. This area was challenging to design due to the constraints of the golf course playable area, utilities, cart path and bridges. In addition, wetland filtration areas were designed at the end of two stormwater outfalls.

The Big Elm Tributary drains over 500 acres of urban runoff into a sinkhole that feeds the underground karst system flowing into McConnell Springs, a historic area in Lexington, KY. Similar design challenges to Vaughn's Branch were seen throughout this project; however, the Big Elm Tributary flow channel was in a more severe state of degradation and had a large trash and debris issue.

Both Vaughn's Branch and Big Elm Tributary project (Figure 7) had full construction designs completed; however, there was only enough funding available for the construction of the Big Elm Tributary Stream Stabilization and Sinkhole Remediation project.

The construction of the Big Elm Tributary Stream Stabilization and Sinkhole project was a success in both implementation and public education. Being in the center of a golf course, many employees and players were hesitant about the project. After the completion of this project, they have become supportive to completing the Vaughn's Branch section.

In addition to the projects at the Picadome Gold Course, another high priority BMP identified in the watershed plan was the Retrofit of the Cross Keys Park Retention Basin (BMP No. 106). Two specific goals were identified for this project: (1) improve warm water aquatic habitat and (2) reduce nonpoint source pollution entering the Gardenside Tributary, Cardinal Run, and ultimately Wolf Run through a retrofit of the pond at Cross Keys Park.

This 4-acre pond at Cross Keys Park (Figure 8) receives run-off from 280 acres of highly urbanized development, and has degraded to become a shallow silted pond. Water

quality and aquatic habitat have been improved through a series of BMPs including: (1) upstream trash rack to capture floatables; (2) J-hooks and riffle to slow down and oxygenate the water before entering the pond; (3) forbay to settle out sediment before entering the wetland system; (4) shallow wetlands and island features to filter out nutrients and create aquatic habitat; (5) bubbler to increase oxygen in the pond; (6) invasive species removal along the shoreline, including honeysuckle and ground cover; and (7) native planting and buffer within the wetland, and along the pond to increase filtration and improve wildlife habitat. Furthermore, the public can now more easily interact with the pond and improved habitat with a step boulder platform, walkable peninsula into the wetland area, and a new walking path running the length of the pond and the native plant buffer.



Figure 8. Cross Keys Park Pond retrofit designs.

With the remaining funds of the FFY 2012 project, three high-priority riparian stream buffers were installed. The first buffer was at Wolf Run Park and included riparian planting and invasive species removal along approximately 1,600 feet of stream. The second buffer was at the Roanoke Greenway and included riparian planting and invasive species removal on about 1,400 feet of stream. The third was at Pine Meadows Park and included riparian planting and invasive species removal along about 800 feet of stream. The improvements made to these areas have been well received by the community and will be utilized for passive recreation and wildlife observation.

Both the FFY 2009 and FFY 2012 projects closed out at the end of FFY 2016, and between the two projects, a total of \$794,390.80 319(h) dollars were utilized to create the Wolf Run Creek Watershed Based Plan and for designing and implementing many of the large-scale, high-priority BMPs identified in the plan. While there is still much work to be done in this 23 watershed considering the magnitude of the impacts imposed upon Wolf Run Creek, both of these projects are considered a success.

Table 4. Load reductions for Project # 12-05.

Award Year	State Project Number	Project Title	Load Reductions		
			Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
2012	12-05	Wolf Run Creek Watershed Based Plan Implementation	893.9	171.1	96.9



Big Elm sinkhole

Project #'s 09-09: Red River Gorge Restoration and Watershed Plan

The Red River flows for over 97 miles through the Appalachian Mountains of Eastern Kentucky on its way to the Kentucky River. The Red River Gorge is a scenic natural area within the Daniel Boone National Forest that is known for its free-flowing streams, abundant natural stone arches, unusual rock formations, and spectacular sandstone cliffs. Because of its outstanding beauty and accessibility, it draws an estimated half million visitors from around the world each year. This high level of visitor use puts a heavy burden on the natural resources. The US Forest Service maintains a network of trails but users have added almost 200 miles of unauthorized trail. Users have also created hundreds of campsites, vistas, and rock climbing routes. Since these user developed features are not maintained by the Forest Service, they are very susceptible to erosion, contributing to high sediment loads in the streams.

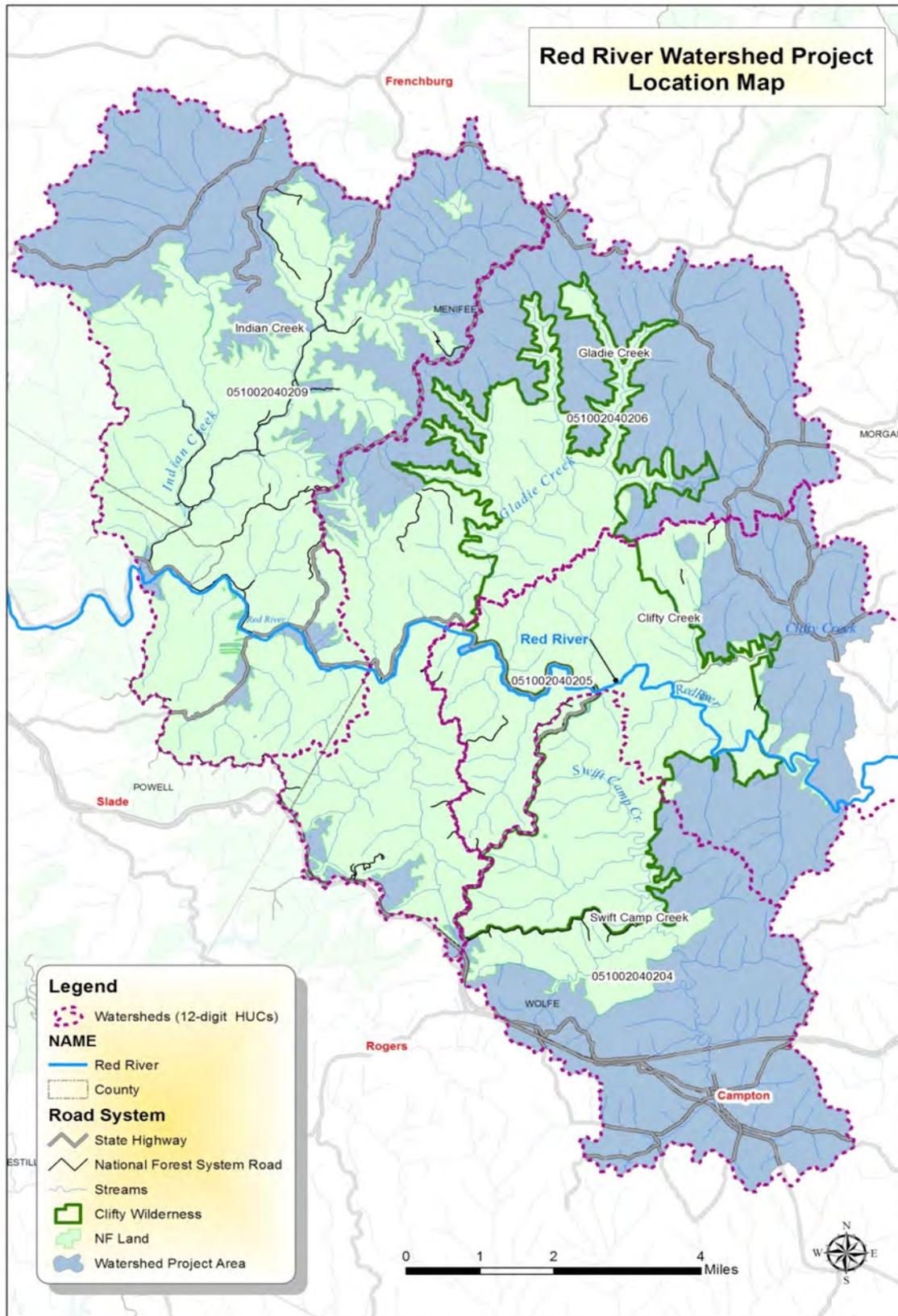
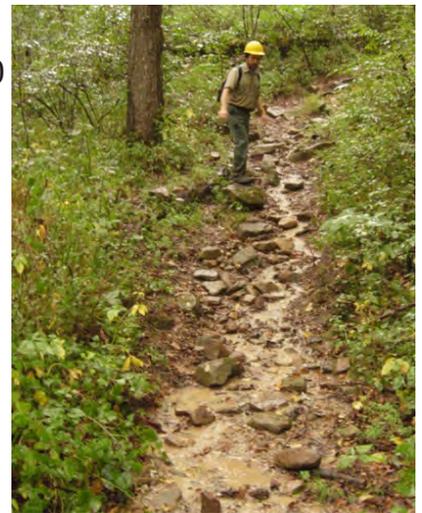


Fig. 9. Red River Watershed.

While the Red River Gorge is in the capable hands of the USFS, it is downstream of privately owned land, small towns, and farms (Figure 9). Streams in these headwater areas are threatened by illegal dumps; loss of streamside vegetation; and runoff from towns, agriculture, and rock quarries. Pathogens in several creeks threaten public health, and with such high visitor traffic to the Gorge, the number of people with possible exposure

is disproportionately high. Swift Camp Creek and one of its unnamed tributaries are listed as impaired in the Kentucky 2010 Integrated Report to Congress (KDOW, 2010) for sedimentation, loss of riparian, sewage disposal, and other unknown causes.

The US Forest Service sought help from Kentucky Division of Water (KDOW) to improve the quality of this valuable state resource. The USFS set out to create a combined watershed plan that was to be created in two phases to address the two different areas of the Red River Watershed. The first phase was to develop a Plan for the Lower watershed covering the lands that lie within the USFS Daniel Boone National Forest; this was to be developed first so that implementation within the National Forest could begin quickly. The second phase was to develop a Plan for the Upper watershed covering the private lands and small communities outside the National Forest boundaries.



Trail runoff.

To help with the watershed planning process, the USFS created strong partnerships with Environmental Protection organizations such as Kentucky Division of Water, Kentucky Department of Fish and Wildlife Resources, and Kentucky Waterways Alliance; conservation entities and outdoor enthusiasts such as Friends of the Red River, Student Conservation Association, Red River Gorge Trail Volunteers, and RRG Climbers Coalition; and local agencies and citizen groups such as the Wolfe County Solid Waste Coordinator, the Campton Catholic Church, and Friends of the Red River. The USFS led the field investigative and writing efforts and KWA led the public outreach efforts. These interested parties formed the Red River Watershed Team and were instrumental in helping with Red River Gorge cleanup efforts.



Eroding user developed campsite.

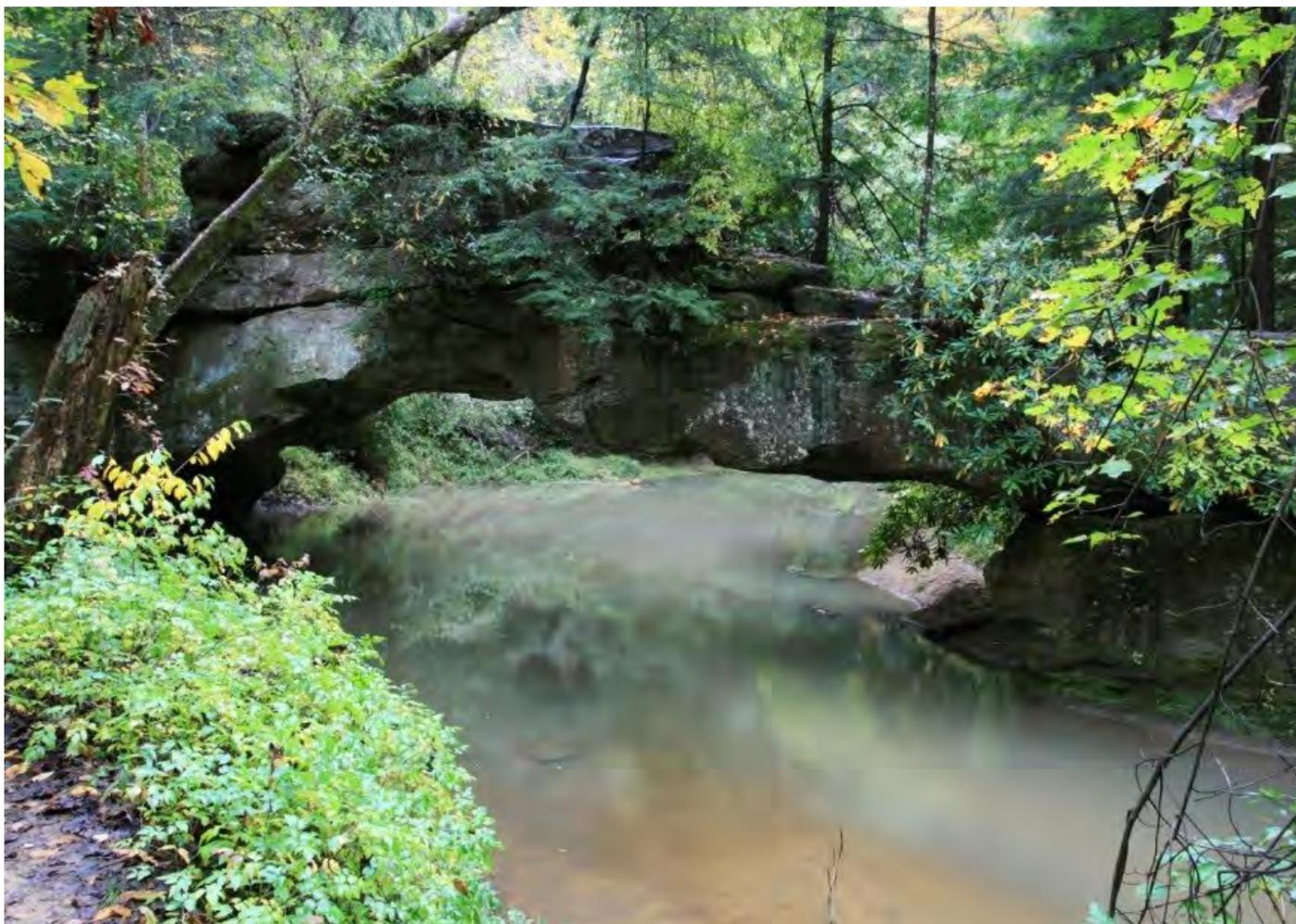


After restoration.

The Red River Watershed Plan focused on four headwater streams that were tributaries to the Red River; each originates and runs through private land before entering the Red River Gorge. The Watershed Planning process revealed that the primary problems

were pathogens, phosphorus and sediment. Once the Lower WSP was completed, education and implementation of BMPs began within the Lower WS, and WS Planning focus shifted to the Upper WS. Within the Red River Gorge area, USFS staff began to address erosion issues by reclaiming and replanting user-developed campsites and trails and placing materials to deter further use, installing water bars and lead-off ditches on trails to slow runoff flow, and removing garbage within the streams. Their work resulted in the rehabilitation of 157 user-developed campsites, reducing erosion on over 32 miles of trail, eliminating 416 tons of stream sedimentation per year, and cleaning trash from over 75 miles of stream.

The WSP process for the Upper portion revealed that pathogens primarily from absent or failing septic systems were prominent, particularly in the Swift Camp Creek watershed. Sediment and nutrients were issues as well, from various recreation activities and minor agricultural practices. Once both watershed plans were completed, 319 funds were granted for education activities, erosion control work and trash pickup to continue in the National Forest, and for education, trash pickup, and implementation of septic BMPs such as system repair or new system installation to begin in the Upper Watershed with the overall goal of reducing sediment, phosphorous and pathogens throughout the watershed.



The natural beauty of Red River Gorge.

Funded Projects FFY 2016

Project #16-03: Kentucky Dairy Compliance Project

Summary: The Kentucky Dairy Development Council (KDDC) will be conducting direct education, outreach, and technical assistance to Dairy Producers regarding KY Agriculture Water Quality Plans, nutrient management planning, and record keeping to maintain compliance with their KY No Discharge Operational Permits. KDDC staff will also lead local educational meetings will be held for Dairy Producers where KDOW Inspectors, NRCS, and University of Kentucky Cooperative Extension staff can talk directly to producers about. KDDC will provide technical assistance to Producers in completing KY Nutrient Management Plans or direct them to NRCS to receive prioritized financial assistance through the EQIP Program and a list of Technical Service Providers who can develop plans.

Project #16-04: Watershed Plan Development for Crafts Colly, Sand Lick, and Dry Fork

Summary: This watershed planning project seeks to develop a KDOW and EPA approved watershed plan for the Crafts Colly, Sand Lick, and Dry Fork watersheds near Whitesburg, Kentucky. These watersheds are suspected to be heavily impacted by nonpoint source pollution due to man-made disturbances associated with

development, improper or unmaintained onsite wastewater treatment and disposal, and by historical mining and logging activities. Furthermore, this planning effort project will include a robust water quality education and outreach campaign to facilitate the development of a community that places a higher value on the importance of clean water, and is therefore more willing to implement solutions that will improve water quality.

Project #16-05: Kentucky Watershed Center of Excellence

Summary: The University of Kentucky Water Resources Research Institute (KWRRRI) will be taking a leadership role in planning and conducting semi-annual training events for local watershed coordinators and watershed groups who are actively working to develop and implement nine-key element watershed plans. Additionally, Kentucky Watershed Leadership Academy training modules will be developed as educational tools to be used to train new watershed coordinators, watershed groups, and River Basin Coordinators, and other Nonpoint Source Program staff. KWRRRI will also serve as the lead agency for coordinating the revisions of the Watershed Steering Committee outreach effort and implementing a new outreach program for KY Division of Water partner agencies.

Funded Projects FFY 2016

Project #16-06: Curry's Fork WBP On-site Wastewater Implementation

Summary: The bulk effort of this watershed plan implementation project will be to implement an Onsite Wastewater System Education, Operation, Maintenance, and Repair Program in the Curry's Fork watershed, with a targeted emphasis on areas that were identified as High Priority Pathogen Restoration Areas in the watershed plan. Additionally, this project will include the development of detailed conceptual designs for selected stream restoration sites as identified in the watershed plan, and provide continued coordination and oversight for the implementation of the watershed plan through continued funding for the Curry's Fork Watershed Coordinator

Project #16-07: WSP Implementation for the Dix River and Hinkston Creek

Summary: The scope of this project is continued implementation of three Watershed Plans - Clarks Run and Hanging Fork within the Dix River Watershed, and Hinkston Creek. A Watershed Coordinator will be funded to provide comprehensive septic system, riparian buffer, and stormwater runoff education in each of five counties. Education

and outreach will be achieved through workshops, watershed festivals, K-12 education, using the local newspaper and other media outlets, and other outreach opportunities. Septic system pumpouts will be offered to workshop attendees, as well as an assistance program for those needing septic repair, maintenance, or new system installation. Riparian workshops will offer a program for assistance with riparian planting. Urban runoff workshops will offer assistance with establishing rain gardens.

Project #16-08: Wolsing Woods Wetland Construction - Banklick Creek WBP Implementation

Summary: This implementation of a watershed plan project involves the construction of a wetland in Wolsing Woods adjacent to the main stem of the Banklick Creek, two filter berms, rock armoring and toe protection along bank of creek, two stone riffles crossing the stream, and educational signage. This project will provide water quality benefits by passing stormwater runoff through the wetlands, as well as bank protection, and reduction of in-stream hydromodification by reducing the magnitude and frequency of Q-critical flows in the stream.

Completed Projects FFY 2016

Table 5. Completed projects.

State Project Number	Project Title	Date Completed
08-11	Increasing Rain Garden Construction in the Bluegrass	12/14/2015
09-11	Wold Run Watershed Based Plan	9/30/2016
09-12	Radcliff Green Parking Lot BMP	9/30/2016
09-13	Watershed Planning in Chestnut Creek	4/30/2016
09-14	Green Infrastructure for Stormwater Management at the Marshall Co. Children's Art Center	4/30/2016
10-07	Four Rivers Basin Coordinator	6/30/2016
11-03	Best Management Practices Implementation on Timber Harvests in KY	10/1/2015
11-05	Franklin Co. Judicial Green Streets Demo Project	7/15/2016
11-09	Lost River Cave, Wetland, and Valley Project	6/1/2016
11-11	Little Laurel River Watershed- Watershed Plan Implementation	7/1/2016
11-13	Watershed Watch in KY	7/29/2016
12-02	Division of Conservation Nonpoint Source Support Staff	9/30/2016
12-05	Wolf Run Watershed Plan Implementation	9/30/2016
12-07	Hinkston Creek Watershed Plan Implementation : Bourbon Co.	9/30/2016

FFY 2016 NPS Goals and Objectives

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 1:	Prioritize waters based on an assessment of restoration potential	2014	2015	2016	2017	2018	
Action 1:	Utilize EPA Recovery Potential Screening Tool to select watersheds for implementation, within existing watershed planning areas						
	Tracking Measure: Number and list of watersheds identified as recoverable within areas of watershed plans		X	X	X	X	During FFY 2015 and 2016 KDOW developed state specific metrics at the 24K level in order to accurately match KY's NHD data set. This work will be completed in early 2017, which will allow KDOW to use the RPT in watershed prioritization across multiple programs.
	Tracking Measure: Number and list of recoverable watersheds receiving targeted implementation		X	X	X	X	
Action 2:	Utilize EPA Recovery Potential Screening Tool to identify 303(d) listed impaired watersheds that have a high potential of showing measurable water quality improvement after targeting implementation						
	Tracking Measure: Number of watersheds identified as recoverable for pathogens		X	X	X	X	During FFY 2015 and 2016 KDOW developed state specific metrics at the 24K level in order to accurately match KY's NHD data set. This work will be completed in early 2017, which will allow KDOW to use the RPT in watershed prioritization across multiple programs.
	Tracking Measure: Number of recoverable watersheds receiving targeted implementation				X	X	
Action 3:	Work to develop local capacity and implement actions necessary to address the pollution in prioritized watersheds.						
	Tracking Measure: Number of new watershed groups formed	X	X	X	X	X	During FFY 2016 KDOW documented fifty six (56) active watershed groups in the state each with multiple supporting organizations. The River Basin Coordination Program is actively working to support these existing watershed groups as well as increase the number of watershed groups working on water quality issues.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 1:	Prioritize waters based on an assessment of restoration potential	2014	2015	2016	2017	2018	
Action 3 Cont'd:	Work to develop local capacity and implement actions necessary to address the pollution in prioritized watersheds.						
	Tracking Measure: Number of watershed plans implemented	X	X	X	X	X	KDOW has provided funding and technical assistance for the implementation of twenty-five (25) watershed plans statewide.
	Tracking Measure: Number of straight to implementation plans developed			X	X	X	As of the end of FFY 2016, KDOW funded the development and implementation of four (4) Straight to Implementation Watershed Plans. *Sulphur Creek *Tenmile Creek of Eagle Creek *Pleasant Run *Rock Creek Abandoned Mine Lands
	Tracking Measure: Number of straight to implementation plans implemented				X	X	KDOW is currently implementing two (2) phases of one (1) STI watershed Plan in Sulphur Creek. The other three (3) STI watershed plans were completed several years ago.
Objective 2:	Monitor and assess Kentucky's waters	2014	2015	2016	2017	2018	
Action 1:	Conduct monitoring and perform assessments of Kentucky's waters in conjunction with the watershed framework						
	Tracking Measure: Number of stream miles assessed	X	X	X	X	X	As of the 2014 Integrated Report, 12,020 stream miles have been monitored and assessed by KDOW programs. The 2016 IR numbers were not finalized at the time of this report.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 2:	Monitor and assess Kentucky's waters	2014	2015	2016	2017	2018	
Action 1 Cont'd:	Conduct monitoring and perform assessments of Kentucky's waters in conjunction with the watershed framework						
	Tracking Measure: Number of stream miles impaired by NPS pollution	X	X	X	X	X	As of the 2014 Integrated Report, 855 stream miles in KY are known to be impaired by Nonpoint Source Pollution causes and sources. The 2016 IR numbers were not finalized at the time of this report.
	Tracking Measure: Number of pollutant/waterbody combinations impaired by NPS pollution	X	X	X	X	X	As of the 2014 Integrated Report, 245 pollutant/waterbody combinations in KY are known to be impaired by Nonpoint Source Pollution causes and sources. The 2016 IR numbers were not finalized at the time of this report.
Action 2:	Conduct monitoring and perform assessments of targeted watersheds for the development of new watershed plans or to revise existing plans						
	Tracking measure: Number of stream miles with assessments completed in preparation for watershed plan development or improvement	X	X	X	X	X	Assessment documents were completed for all watershed plan development baseline water quality data collection. Additional assessments and data is being sent to the KDOW 303(d) and TMDL programs as it is completed.
	Tracking measure: Number of streams with monitoring being conducted in preparation for watershed plan development or improvement	X	X	X	X	X	During FFY 2016 KDOW staff or contractors were conducting water quality monitoring on approximately eight (8) watersheds in preparation for Watershed Plan development. *Damson Creek *Little Pitman Creek *Cypress Creek *Strodes Creek *Sinking Creek *Cane Run Creek *Kinniconick Creek *Martis Branch of Bacon Creek

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 2:	Monitor and assess Kentucky's waters	2014	2015	2016	2017	2018	
Action 3:	Conduct monitoring and perform assessments of watersheds targeted through the Division of Water's Success Monitoring Program						
	Tracking measure: Number and list of streams prioritized through the Division's Success Monitoring program with completed assessments	X	X	X	X	X	During FFY 2016 KDOW staff conducted water quality monitoring on five (5) watersheds for the KDOW Success Monitoring Program. *Rock Creek *Pleasant Run *Hinkston Creek *Martis Branch of Bacon Creek *Little Pitman Creek
	Tracking measure: Number and list of streams that have a documented change in use support awaiting EPA approval	X	X	X	X	X	Assessments were not completed for these five watersheds by the end of FFY 2016. Quality Assurance on the water quality data collected, assessment analysis, and documentation of any changes in use support found will be processed during FFY 2017.
	Tracking measure: Number and list of streams that have a documented change in use support approved by EPA	X	X	X	X	X	Documented changes in use support for these five streams were not submitted to EPA for review and approval by the end of FFY 2016.
Action 4:	Develop and implement a Division level watershed success monitoring program						
	Tracking measure: Develop a tracking tool for areas in need of future success monitoring	X					Spreadsheets of on the ground BMP implementation information have been gathered from multiple state and federal agencies. Comparative analysis of that information is ongoing as well as GIS coverage development.
	Tracking measure: Number of watersheds identified as needing success monitoring	X	X	X	X	X	Success Monitoring selection for FFY 2017 will be based upon preliminary BMP implementation information in addition to staff technical knowledge. Strategic development of a success monitoring schedule is ongoing and will consider implementation concentrations, BMP effectiveness or potential impact, and comparative analysis of other pollutant sources within a watershed.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 2:	Monitor and assess Kentucky's waters	2014	2015	2016	2017	2018	
Action 4 Cont'd:	Develop and implement a Division level watershed success monitoring program						
	Tracking measure: Conduct annual meeting to coordinate locations appropriate for success monitoring within the watershed framework		X	X	X	X	KDOW staff is actively conducting meetings with NRCS, KY Division of Conservation, and the Division of Abandoned Mine Lands to gather information about on the ground BMP implementation as well as coordinating locations for program effectiveness or success monitoring. Additionally, internal KDOW meetings are regularly being held to develop success monitoring program annual monitoring targeted watersheds.
Action 5:	Conduct post-BMP implementation Water Quality Monitoring for National Water Quality Initiative (NWQI) watersheds						
	Tracking measure: Design NWQI success monitoring plan and develop QAPP	X	X				To date the Headwaters of Hinkston Creek NWQI watershed was extensively monitored by KDOW Biologists to establish baseline water quality conditions. Due to a lack of interest in farm bill conservation programs, NRCS elected to drop the Headwaters Hinkston Creek as an NWQI watershed after FFY 2015. KDOW is in the process of considering collecting additional baseline water quality data in one of more of the new NWQI watersheds.
	Tracking measure: Implement NWQI success monitoring plan	X	X	X	X	X	The Headwaters of Hinkston Creek NWQI watershed was extensively sampled for one calendar year during 2014-2015.
	Tracking measure: Compile water quality data for trend analysis in NWQI watersheds			X		X	The Hinkston Creek monitoring report is attached to this annual report in Appendix A.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 3:	Implement the Nonpoint Source component of Approved TMDLs of restoration strategies in prioritized impaired watersheds	2014	2015	2016	2017	2018	
Action 1:	Coordinate with the Division's TMDL Program in order to prioritize development of Nine-Key Element Watershed or "Alternative" plans for watersheds with approved or under development TMDL documents						
	Tracking measure: Number and list of TMDL watersheds prioritized		X	X	X	X	KDOW's Nonpoint Source and TMDL Programs have been coordinating efforts since 2005. Twenty-four (24) of KDOW's watershed planning areas also have TMDL documents either existing or being developed.
Action 2:	Develop Nine-Key Element Watershed or "Alternative" Plans for prioritized TMDL watersheds						
	Tracking measure: Number and list of TMDL watersheds with a watershed or alternative plan under development		X	X	X	X	Currently seven (7) watershed plans are being developed in TMDL watersheds. One (1) of those plans is actively being developed into a TMDL alternative, and two (2) additional watersheds are being considered for TMDL alternative. *Strodes Creek *Damon Creek *Cypress Creek *Bacon Creek *Gunpowder Creek *South Fork Little River *Cane Run
	Tracking measure: Number and list of TMDL watersheds with an approved/completed watershed or alternative plan	X	X	X	X	X	Currently seventeen (17) TMDL watersheds are being implemented by approved watershed plans. To date no TMDL Alternative watershed plans have been completed. *Chestnut Creek *Sulphur Creek *Clark's Run *Curry's Fork *Tenmile Creek *Banklick Creek *Cane Run *Wolf Run *Stockton Creek *Hinkston Creek *Triplett Creek *Dry Creek *Lower Howards Creek *Hanging Fork Creek *Bacon Creek

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting																								
Objective 4:	Implement restoration strategies for prioritized impaired watersheds that will result in measurable water quality improvements	2014	2015	2016	2017	2018																									
Action 1:	Continue development and implementation of accepted watershed plans developed under the existing prioritization strategy																														
	<p>Tracking measure: Number and list of watershed plans currently accepted for implementation</p>						<p>At the end of FFY 2016 KDOW had accepted twenty five (25) Watershed plans for implementation and eleven (11) of those plans were approved by EPA R4 for implementation with 2014 funding . KDOW:</p> <table border="0"> <tr> <td>*Chestnut Creek</td> <td>*Pleasant Run</td> </tr> <tr> <td>*Clarks Run</td> <td>*Sulphur Creek</td> </tr> <tr> <td>*Darby Creek</td> <td>*Currys Fork</td> </tr> <tr> <td>*Gunpowder Creek</td> <td>*Woolper Creek</td> </tr> <tr> <td>*Tenmile Creek</td> <td>*Banklick Creek</td> </tr> <tr> <td>*Cane Run</td> <td>*Wolf Run</td> </tr> <tr> <td>*Hancock Creek</td> <td>*Stockton Creek</td> </tr> <tr> <td>*Hinkston Creek</td> <td>*Triplett Creek</td> </tr> <tr> <td>*Dry Creek</td> <td>*Lower Howards Creek</td> </tr> <tr> <td>*Red River</td> <td>*Red Bird River</td> </tr> <tr> <td>*Corbin City Reservoir</td> <td>*Rock Creek AML</td> </tr> <tr> <td>*Hanging Fork Creek</td> <td>*Bacon Creek.</td> </tr> </table> <p>EPA: can be found in the GRTS Watershed Plan Tracker</p>	*Chestnut Creek	*Pleasant Run	*Clarks Run	*Sulphur Creek	*Darby Creek	*Currys Fork	*Gunpowder Creek	*Woolper Creek	*Tenmile Creek	*Banklick Creek	*Cane Run	*Wolf Run	*Hancock Creek	*Stockton Creek	*Hinkston Creek	*Triplett Creek	*Dry Creek	*Lower Howards Creek	*Red River	*Red Bird River	*Corbin City Reservoir	*Rock Creek AML	*Hanging Fork Creek	*Bacon Creek.
*Chestnut Creek	*Pleasant Run																														
*Clarks Run	*Sulphur Creek																														
*Darby Creek	*Currys Fork																														
*Gunpowder Creek	*Woolper Creek																														
*Tenmile Creek	*Banklick Creek																														
*Cane Run	*Wolf Run																														
*Hancock Creek	*Stockton Creek																														
*Hinkston Creek	*Triplett Creek																														
*Dry Creek	*Lower Howards Creek																														
*Red River	*Red Bird River																														
*Corbin City Reservoir	*Rock Creek AML																														
*Hanging Fork Creek	*Bacon Creek.																														
	<p>Tracking measure: Number and list of watershed plans currently implementing an accepted watershed plan</p>						<p>During FFY 2016 KDOW had twenty five (25) 319(h) funded watershed plan implementation projects implementing fifteen (15) watershed plans from the 2008 - 2015 grant years.</p> <table border="0"> <tr> <td>*Chestnut Creek</td> <td>*Gunpowder Creek</td> <td>*Dry Creek</td> </tr> <tr> <td>*Sulphur Creek</td> <td>*Banklick Creek</td> <td>*Lower Howards</td> </tr> <tr> <td>*Darby Creek</td> <td>* Corbin City Reservoir</td> <td>*Red River</td> </tr> <tr> <td>*Currys Fork</td> <td>*Hinkston Creek</td> <td>*Wolf Run</td> </tr> <tr> <td>*Woolper Creek</td> <td>*Triplett Creek</td> <td>*Bacon Creek</td> </tr> </table>	*Chestnut Creek	*Gunpowder Creek	*Dry Creek	*Sulphur Creek	*Banklick Creek	*Lower Howards	*Darby Creek	* Corbin City Reservoir	*Red River	*Currys Fork	*Hinkston Creek	*Wolf Run	*Woolper Creek	*Triplett Creek	*Bacon Creek									
*Chestnut Creek	*Gunpowder Creek	*Dry Creek																													
*Sulphur Creek	*Banklick Creek	*Lower Howards																													
*Darby Creek	* Corbin City Reservoir	*Red River																													
*Currys Fork	*Hinkston Creek	*Wolf Run																													
*Woolper Creek	*Triplett Creek	*Bacon Creek																													

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 4:	Implement restoration strategies for prioritized impaired watersheds that will result in measurable water quality improvements.	2014	2015	2016	2017	2018	
Action 1 Cont'd:	Continue development and implementation of accepted watershed plans developed under the existing prioritization strategy						
	Tracking measure: Number and list of watershed plans under development	X	X	X	X	X	At the end of FFY 2016 KDOW was working with contractors toward development of ten (10) additional watershed plans. *Woolper Creek *Strodes Creek *Cane Run *North Fork KY River *Kinniconick Creek *Brushy Creek *Red Bird River *Bacon Creek *Sinking Creek *Damon Creek
Action 2:	Actively plan, engage project partners, and manage multiple implementation strategies and functional areas for each prioritized impaired watershed.						
	Tracking measure: Number and list of priority impaired watersheds where active management planning has been completed	X	X	X	X	X	At the end of FFY 2016 ten (10) Basin Team selected Priority Watersheds had completed watershed plans that were being implemented. *Clarks Run *Cane Run *Sulphur Creek *Hinkston Creek *Darby Creek *Triplett Creek *Curry's Fork *Red River *Banklick Creek *Corbin City Resevior
	Tracking measure: Number and list of priority impaired watersheds where active management planning is being developed	X	X	X	X	X	At the end of FFY 2016 eight (8) Basin Team selected Priority Watersheds had watershed plans that were under development *Clark's River *West Fork Clark's River *Bacon Creek *South Fork Little River *Brushy Creek *Lower Trammel Creek *Sinking Creek *Little Pitman Creek

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 5:	Decrease input of pollutants from agricultural sources	2014	2015	2016	2017	2018	
Action 1:	Support projects that educate the agricultural community						
	Tracking measure: Number of projects with an agricultural BMP demonstration event.	X	X	X	X	X	Agricultural BMP demonstration events were held in at least ten (10) watershed planning or project areas during FFY 2016.
	Tracking measure: Provide financial and technical support to educate producers about the Agriculture Water Quality Act. Participate in at least one event per year.	X	X	X	X	X	KDOW staff updated the AWQA Minimum BMP descriptions for the "Streams and Other Waters" BMPs to bring them into compliance with current CWA 401/404 Program regulations, and presented the revisions to the KY Ag Water Quality Authority. KDOW staff attended all four (4) Ag Water Quality Authority meetings held during FFY 2016. KDOW's NPS Program continued to fund the Water Quality Liaison position with the University of Kentucky Cooperative Extension Service as well as provided funding for an additional position to coordinate and conduct training on Nutrient Management Planning.
Action 2:	Support projects that install Best Management Practices to control NPS pollution from agricultural sources						
	Tracking measure: Number of agricultural BMPs installed through implementation of a watershed plan	X	X	X	X	X	During FFY 2016 KDOW's Nonpoint Source Program funded the implementation of forty-five (45) on the ground agricultural conservation practices installed through a total of eight (8) projects in six (6) different watershed planning areas. *Bacon Creek (2 BMPs, 12-06) *Lower Howards Creek (1 BMP, 13-02) *Bacon Creek (3, 13-08) *Sulphur Creek (2, 15-10) *Brushy Creek (7, 15-12) *Hinkston Creek (12, 12-07) *Hinkston Creek (15, 13-07) *KY Livestock BMP Demo (3, 12-03)

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 5:	Decrease input of pollutants from agricultural sources	2014	2015	2016	2017	2018	
Action 2 Cont'd:	Support projects that install Best Management Practices to control NPS pollution from agricultural sources						
	Tracking measure: Amount of funding for state cost share practices spent in priority watersheds	X	X	X	X	X	KDOW is currently working on an agreement with the KY Division of Conservation to provide annual State Cost Share BMP implementation information including the practice installed and GPS Coordinates of those practices. This work is ongoing.
	Tracking measure: Coordinate with NRCS to fund BMPs in priority watersheds	X	X	X	X	X	KDOW maintains a cooperative working relationship with NRCS through NRCS State Technical Committee and EQIP sub-committee. As a result of this working relationship, NRCS gives priority points through the EQIP ranking process to KDOW priority and impaired watersheds.
Action 3:	Participate in state wide meetings and conferences that have a focus on Agriculture and Water Quality						
	Tracking measure: Attend two (2) USDA NRCS State Technical meetings per year. Track number attended	X	X	X	X	X	KDOW participated in one (1) NRCS State Technical Committee meeting and one (1) EQIP Sub-committee meeting during FFY 2016. This was in addition to several local conservation district/NRCS meetings and facilitating the EPA Region 4 annual site visit meeting with NRCS regarding NWQI.
	Tracking measure: Participate in the four (4) quarterly Kentucky Agriculture Water Quality Authority Meetings per year	X	X	X	X	X	KDOW participated in all four (4) Agriculture Water Quality meetings during FFY 2016. Additionally the four Streams and Other Waters BMPs were revised and presented to the Authority for review and approval.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 5:	Decrease input of pollutants from agricultural sources	2014	2015	2016	2017	2018	
Action 3 Cont'd:	Participate in state wide meetings and conferences that have a focus on Agriculture and Water Quality						
	Tracking measure: Participate in the Kentucky Agriculture Science and Monitoring Committee meetings	X	X	X	X	X	KDOW participated in three (3) KASMC meetings during FFY 2016 including the Annual Executive Level Meeting that occurred in December 2015.
	Tracking measure: Number of staff attending agriculture related technical training	X	X	X	X	X	All KDOW NPS Program staff received training on agricultural sources of NPS pollution during FFY 2016 through attendance at numerous events.
	Tracking measure: Present information or a booth at one agriculture related event each year.	X	X	X	X	X	KDOW staff set up a water quality display and conducted outreach at the KY Association of Conservation Districts Annual Conference. KDOW staff conducts numerous water quality educational events with agricultural producers on an annual basis.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 6:	Decrease input of pollutants from developed lands	2014	2015	2016	2017	2018	
Action 1:	Support projects that demonstrate green infrastructure (GI) and good stormwater management						
	Tracking measure: Number of GI BMPs installed	X	X	X	X	X	Five (5) subgrantee projects actively implemented GI BMPs in FFY 2016. *Lower Howards (13-02) *Gunpowder (09-10) *Triplett Creek (13-06) *Banklick (13-03) *Wolf Run (12-05)
	Tracking measure: Have a staff member complete one training course each year on stormwater management or GI to increase technical capacity	X	X	X	X	X	Two (2) NPS staff attended the Kentucky Stormwater Association Annual Conference in FFY 2016. This conference serves as a forum for information and technology transfer with regards to GI practices, general stormwater management strategies, and MS4 program implementation.
Action 2:	Provide technical assistance for Urban/LID/Stormwater/Smart Growth efforts throughout the Commonwealth						
	Tracking measure: Participate in at least one training event per year for local officials, contractors or the public about the benefits of GI and stormwater management	X	X	X	X	X	NPS staff participated in the FFY 2016 Kentucky Stormwater Association Annual Conference through general attendance and by giving a presentation detailing ways in which the NPS Program can assist MS4 communities with education and outreach efforts, and general education and outreach strategies with regards to stormwater management. Furthermore, NPS staff hosted or presented information specifically detailing stormwater management strategies, including GI, at ten (10) events directed towards the general public or to local government officials.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 6:	Decrease input of pollutants from developed lands	2014	2015	2016	2017	2018	
Action 3:	Continue partnership with Stormwater/Urban lands groups locally, regionally and statewide						
	<p>Tracking measure: Attend one (1) Kentucky Stormwater Association meeting per year</p>	X	X	X	X	X	All four (4) Kentucky Stormwater Association quarterly meetings held in FFY 2016 were attended by at least one (1) NPS staff member. Additionally, two (2) NPS staff attended the Kentucky Stormwater Association Annual Conference in FFY 2016.
	<p>Tracking measure: Provide financial and technical support to educate MS4 and other communities about developing stormwater monitoring programs</p>	X	X	X	X	X	NPS staff hosted a Kentucky Stormwater Association Board Meeting to discuss a statewide education and outreach effort for MS4 communities. KDOW's NPS Program staff is actively working with the KSA Board to develop a strategic plan for using 319(h) funding to increase the effectiveness of local stormwater programs on a statewide basis.
Action 4:	Participate in Division of Water development of the revised Construction General and Phase II MS4 permits						
	<p>Tracking measure: Provide technical support for the development of the SWQMP guidance</p>		X				For FFY 2016, the Division of Water's Surface Waters Permit Branch developed the SWQMP guidance independently, and did not request the assistance of NPS staff with developing this guidance.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 7:	Decrease NPS Pollution impacts from forestry activities	2014	2015	2016	2017	2018	
Action 1:	Support statewide and regional projects that focus on sustainable forestry management with water quality being the primary concern.						
	Tracking measure: Number of forestry BMPs installed through watershed plans	X	X	X	X	X	No forestry BMPs were directly installed using Section 319(h) funding as a component of watershed plan development during FFY 2016. However, NPS Program staff are actively working with the KY Division of Forestry, the KY Forest Conservation Act BMP Board, and UK Cooperative Extension Forestry to support the adoption and improvement of forestry BMPs for all timber harvesting operations in the state.
Action 2:	Partner with the KY Division of Forestry (KDF) and USFS to reduce NPS pollution.						
	Tracking measure: Attend and participate in at least one (1) Forest Conservation Act BMP Board meeting per year	X	X	X	X	X	KDOW staff attended the two (2) KFCA BMP Board meetings held during FFY 2016. Additionally, KDOW staff developed a smart phone application that provides important stream designation information to timber industry professionals and KY Division of Forestry Rangers so that proper timber harvesting practices can be followed to minimize negative impacts.
	Tracking measure: Provide sub-grantee funding to the KDF for the purpose of regularly conducting an assessment of Forest Conservation Act BMP Compliance	X				X	The KY Division of Forestry completed the last BMP Compliance study during FFY 2015. KDF's effort during 2016 was centered around improved training for their Ranger staff, and improvements to the Master Logger training.
	Tracking measure: Provide sub-grantee funding and technical assistance for the development and distribution of the Forest Conservation Act Education and Outreach materials			X	X	X	FFY 2014 Programmatic funding was provided to the University of Kentucky Forestry Extension for the printing distribution, and training on an updated KY Forestry BMP Field Guide.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 8:	Protect and Assess Kentucky's Groundwater	2014	2015	2016	2017	2018	
Action 1:	Provide administrative, financial, and technical support for the assessment of groundwater impacts from Nonpoint Source Pollution.						
	Tracking measure: Number of springs assessed	X	X	X	X	X	In FFY 2016, there were 39 springs assessed, 36 of these were sampled.
	Tracking measure: Number of groundwater samples with positive pathogen readings	X	X	X	X	X	Ten groundwater samples included testing for pathogens; these were collected from water wells. Five were positive for total coliform, and four were positive for <i>E. coli</i> .
	Tracking measure: Number of groundwater samples with positive pesticide readings	X	X	X	X	X	Of the 167 groundwater samples collected in FFY 2016, 80 of these had at least one pesticide detection.
Action 2:	Provide technical assistance regarding groundwater protection						
	Tracking measure: Number of BMPs installed for protection of groundwater sources	X	X	X	X	X	For FFY 2016, the Groundwater Protection Program conducted 57 field reviews of groundwater protection measures at facilities, and approved of 37 new Groundwater Protection Plans. The Source Water Protection / Wellhead Protection Program staff provided technical assistance directly to PWSs relative to SWP/WHP plan development and implementation of management strategies.
Action 3:	Support the use of Best Management Practices that protect groundwater and promote groundwater recharge						
	Tracking measure: Number of BMPs installed promoting infiltration in karst prone areas	X	X	X	X	X	In FFY 2016, the Source Water Protection / Wellhead Protection Program providing funding for PWSs to implement projects including installation of a rain garden, plugging unused water supply wells, and monitoring a spring to characterize water quality and discharge within in designated source water protection areas.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 9:	Decrease human sewage in Kentucky's water bodies	2014	2015	2016	2017	2018	
Action 1:	Provide financial and technical support to projects that decrease the negative impacts on water quality from sewage						
	Tracking measure: Number of sub-grantee projects that implement the on-site wastewater components of an accepted watershed plan	X	X	X	X	X	In FFY 2016 six (6) projects actively implemented on-site wastewater BMPs. *Curry's Fork (10-05) *Bacon Creek (13-08) *Hanging Fork Septic (12-04) *Lower Howards (13-02) *Bacon Creek (12-06) *Sulphur Septic (15-09)
	Tracking measure: Coordinate efforts with the Division's Clean Water SRF to abate failing on-site wastewater systems			X	X	X	This action was not implemented during FFY 2016.
Action 2:	Develop working partnerships with the Kentucky Department for Public Health, local health departments, KY Onsite Wastewater Association, Eastern KY PRIDE, and Bluegrass Greensource						
	Tracking measure: Number of partner meetings attended	X	X	X	X	X	In FFY 2016, six (6) projects actively implemented on-site wastewater BMPs, in which some of the subgrantees were specifically Bluegrass Greensource and local health departments. Additionally, the NPS Program has developed partnerships with the local health departments in projects where said entity was not the subgrantee to ensure that on-site wastewater implementation efforts were successful. *Curry's Fork (10-05) *Lower Howards (13-02) *Bacon Creek (12-06) *Sulphur Septic (15-09) *Bacon Creek (13-08) *Hanging Fork Septic (12-04)

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 9:	Decrease human sewage in Kentucky's water bodies	2014	2015	2016	2017	2018	
Action 2 Cont'd:	Develop working partnerships with the Kentucky Department for Public Health, local health departments, KY Onsite Wastewater Association, Eastern KY PRIDE, and Bluegrass Greensource						
	Tracking measure: Number of targeted watersheds with pathogen education performed	X	X	X	X	X	In FFY 2016, six (6) projects, actively implemented on-site wastewater BMPs. All six projects included an on-site wastewater system maintenance and nonpoint source pollution education and outreach campaign. Curry's Fork (10-05), Hanging Fork Septic (12-04), Bacon Creek (12-06), Bacon Creek (13-08), Lower Howards (13-02), and Sulphur Septic (15-09)
Objective 10:	Protect and restore waters at risk from recreational impacts	2014	2015	2016	2017	2018	
Action 1:	Support projects that protect Outstanding State Resource Waters and other Special Use Waters with known recreational impacts						
	Tracking measure: Number of BMPs installed in areas of Special Use Waters	X	X	X	X	X	In FFY 2016 three (3) subgrantee projects actively implemented BMPs in areas of Special Use Waters. Sulphur Septic (15-09), Sulphur Ag (15-10), and Brushy Creek Ag (15-12)
Action 2:	Promote green infrastructure with dual use as recreation areas						
	Tracking measure: Number of green infrastructure areas also utilized for recreation	X	X	X	X	X	During FFY 2016, two (2) projects implemented GI BMPs at locations utilized for public recreation. Specifically, BMPs were implemented at two parks and one golf course. Wolf Run (12-05) and Banklick (13-03)
Action 3:	Provide technical assistance for CWSRF funded projects addressing Nonpoint Source impacts from marinas						
	Tracking measure: Number of marina applications					X	This action was not implemented during FFY 2016.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 11:	Decrease Nonpoint Source Pollution from resource extraction	2014	2015	2016	2017	2018	
Action 1:	Support and provide technical assistance for projects in areas of brownfields, acid mine drainage, abandoned mine lands and other resource extraction activities						
	<p>Tracking measure: Number of projects implementing BMPs in previously mined areas</p>	X	X	X	X	X	<p>Additional on the ground implementation of AMD projects in the Pleasant Run watershed was garnered through the KDOW Success Monitoring Program's efforts to coordinate water quality monitoring at Abandoned Mine Lands project sites. KDOW Staff is actively coordinating with the KY Division of Abandoned Mine Lands to target implementation of AMD sites on a statewide basis and within watershed planning areas.</p>
Objective 12:	Decrease the negative impacts of excessive sedimentation in Kentucky's Streams	2014	2015	2016	2017	2018	
Action 1:	Provide financial and technical support for education on the subject of stream restoration and stream bank stabilization techniques						
	<p>Tracking measure: Provide funding to maintain the Natural Channel Design Working Group and participate in meetings. 1 per year.</p>	X	X	X	X	X	<p>Funding was provided to a project that was to facilitate the Natural Channel Design Working Group (NCDWG). No meetings were held in FFY 2016, but the NCDWG group was called upon to review a final draft of a document on reducing sediment by restoring KY headwater streams: Design Principles for Restoration of Headwater Stream-Wetland Complexes.</p> <p>*KY Stream Restoration Manual (11-06)</p>

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 12:	Decrease the negative impacts of excessive sedimentation in Kentucky's Streams	2014	2015	2016	2017	2018	
Action 2:	Provide financial support for projects that assess in-stream sediment impairments, and generate implementation strategies through watershed plan development						
	Tracking measure: Number of projects monitoring for sediment impairments	X	X	X	X	X	Two projects conducted water quality monitoring for sediment impairments. *Cane Run (15-04) *Kinniconick Creek (11-12)
Action 3:	Target additional sources of funding for stream restoration projects that will positively address sediment impaired streams						
	Tracking measure: Coordinate efforts with the USDA Natural Resources Conservation Service to help target conservation program funding toward priority watersheds and the implementation of accepted Watershed Plans.	X	X	X	X	X	There are two primary methods that the NPS Program targets NRCS Farm Bill funding toward the implementation of watershed plans. The first is direct programmatic coordination between KDOW and NRCS by requesting that priority and impaired watersheds receive priority funding through NRCS programs. This work was completed during FFY 2016 through attendance and coordination at the State Technical Committee and EQIP sub-committee meetings. The second method is to coordinate on-the-ground implementation efforts with County Conservation Districts and local NRCS staff. The goal of both methods is that CWA Section 319(h) funding be used to augment the Farm Bill funding being provided to agricultural producers by paying for companion practices or paying for nonstandard BMPs to address water quality problems on farming operations. This coordination is done by getting out of the office and meeting with local NRCS, Conservation District, and Division of Conservation staff.
	Tracking measure: Coordinate stream restoration efforts with the KY Department of Fish and Wildlife Resources and Northern KY University to help target Fees in Lieu of Mitigation (FILO) funding toward priority watersheds and the implementation of accepted Watershed Plans.	X	X	X	X	X	KDOW has not coordinated Stream Restoration efforts as of the end of FFY 2016. The work will be attempted in future years.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 13:	Support education and outreach	2014	2015	2016	2017	2018	
Action 1:	Support education and outreach programs across Kentucky						
	Tracking measure: Number of student contacts per year. Goal of 500.	X	X	X	X	X	In total, the Basin Coordinators and technical advisors of the Nonpoint and Basin Team section reached an estimated 19,488 stakeholders through outreach activities in FFY 2016. Roughly 5,300 of those were school age students reached through educators, festivals and other forms of outreach.
	Tracking measure: Conduct at least one Project WET educator training each year	X	X	X	X	X	9 Project WET Educator workshops conducted in 2016.
	Tracking measure: Number of teachers trained in Project WET	X	X	X	X	X	131 educators were trained in Project WET in 2016.
Action 2:	Revise nonpoint source website and continue social media development						
	Tracking measure: Number of Likes on Ollie Otter's Facebook page	X	X	X	X	X	The KDOW migrated away from the Ollie Otter Facebook page as a primary social media point of contact for water related education and outreach activities during FFY 2016. The new I Love KY Water Facebook initiative began and quickly achieved approximately 300 likes during the reporting period.
	Tracking measure: Annually update information on DOW NPS website	X	X	X	X	X	The KDOW Nonpoint Source Program web pages are updated annually at a minimum. The NPS grant web pages are updated once per year.

Long Term Goal #1: Restore Nonpoint Source Impaired Waters		Targeted Completion					Annual Reporting
Objective 13:	Support education and outreach	2014	2015	2016	2017	2018	
Action 3:	Develop a watershed planning education and outreach fact sheet						
	Tracking measure: Development of fact sheet			X	X	X	Educational Fact Sheets for Lawn Fertilizer, Managing Pet Waste, Nonpoint Source Pollution, Rain Gardens, and Stormwater Pollution were updated and posted to the KDOW website. A general watershed planning education and outreach fact sheet was not developed during FFY 2016.
	Tracking measure: Number of fact sheets distributed. Target 50 each year.				X	X	To be completed in future years.
Action 4:	Support the Watershed Watch program in Kentucky						
	Tracking measure: Number of active volunteers	X	X	X	X	X	There are currently 972 Active Watershed Watch Volunteers statewide who collected water quality samples during the three (3) annually scheduled sampling events.
	Tracking measure: Number of volunteers receiving trainings	X	X	X	X	X	During FFY 2016 Watershed Watch in Kentucky trained 131 new volunteers and recertified 141 existing volunteer samplers.
	Tracking measure: Number of sites sampled	X	X	X	X	X	Watershed Watch volunteers collected 1,365 individual water quality samples during the Spring, Summer, and Fall sampling events in addition to collecting field parameters and for each sampling site. Habitat and Biological assessments were also conducted at forty-eight (48) of those sites.

Long Term Goal #2: Protect waters currently meeting designated uses		Targeted Completion					Annual Reporting
Objective 1:	Promote the identification and protection of healthy watersheds throughout Kentucky.	2014	2015	2016	2017	2018	
Action 1:	Provide technical and financial support for the KY Wild Rivers Program						
	Tracking measure: Develop a comprehensive Land Management Plan for each new Wild Rivers Program land acquisition		X	X	X	X	Development of Comprehensive Land Management Plans for recently acquired properties is underway, but not completed. This process takes multiple years for each property, and there is only one staff member assigned to the Wild Rivers program.
	Tracking measure: Utilize a combination of 319(h) Programmatic and HLCF funding for implementation of land management plans for Wild Rivers			X	X	X	No 319(h) funding was utilized to implement Wild Rivers land management plans during FFY 2016.
	Tracking measure: Coordinate the use of Heritage Land Conservation Funding as non-federal match for Nonpoint Source Program sub-grantee projects.		X	X	X	X	Heritage Land Conservation Funds were utilized as the primary source of non-federal match for the Sinking Creek Watershed Assessment project that closed out December 2016. No other NPS projects are currently utilizing those funds as non-federal match at this time.
Action 2:	Provide technical and financial support for Nonpoint Source Program projects that protect Special Use Waters						
	Tracking measure: Number of watershed protection plans currently accepted for implementation	X	X	X	X	X	There have been four (4) watershed plans developed with protection of a Special Use Water as their primary focus. However all thirty-five (35) watershed plans that have been developed contain a protection component for either Special Use Waters or drinking water resources. *Red River Gorge *Brushy Creek *Sinking Creek *Kinniconick Creek

Long Term Goal #2: Protect waters currently meeting designated uses		Targeted Completion					Annual Reporting
Objective 1:	Promote the identification and protection of healthy watersheds throughout Kentucky	2014	2015	2016	2017	2018	
Action 2 Cont'd:	Provide technical and financial support for Nonpoint Source Program projects that protect Special Use Waters						
	Tracking measure: Number of watershed plans currently implementing an accepted watershed protection plan	X	X	X	X	X	There are approximately sixteen (16) watershed plans currently being implemented that contain a protection component either for Special Use Waters or Drinking Water sources.
	Tracking measure: Number of watershed protection plans under development	X	X	X	X	X	There are currently three (3) watershed plans under development with the primary focus of protecting Special Use Waters.
Action 3:	Utilize the EPA Recovery Potential Tool to identify priority watersheds for protection and/or restoration						
	Tracking measure: Number and list of current priority Healthy Watersheds	X	X	X	X	X	During FFY 2015 and 2016 KDOW developed state specific metrics at the 24K level in order to accurately match KY's NHD data set. This work will be completed in early 2017, which will allow KDOW to use the RPT in watershed prioritization across multiple programs.
	Tracking measure: Number and list of new priority Healthy Watersheds			X	X	X	

Long Term Goal #2: Protect waters currently meeting designated uses		Targeted Completion					Annual Reporting																																				
Objective 2:	Prioritize Source Water and Wellhead Protection areas for protection from nonpoint sources of pollution	2014	2015	2016	2017	2018																																					
Action 1:	Coordinate with EPA's Nonpoint Source Program in order to ascertain the minimum requirements for the development of Nine-Key Element "Alternative" watershed plan to protect and/or restore Source Water and Wellhead Protection areas																																										
	Tracking measure: Finalized NPS Program strategy for the development of acceptable alternative plans to protect Source Water and Wellheads		X	X	X	X	KDOW has not completed developing a finalized NPS Program strategy for the development of Source Water and Wellhead Protection Plans that contain the nine-key elements of a watershed plan.																																				
	Tracking measure: Number and list of Source Water and Wellhead Protection Areas prioritized			X	X	X	<p>KDOW's NPS and Source Water Protection programs have worked cooperatively during FFY 2015 and 2016 on Greenbriar Reservoir in Montgomery County. There are thirty-six (36) Source Water Protection Areas that fall within the NPS Program's Watershed Planning Areas and Priority Watersheds.</p> <p>Source Water Protection Areas:</p> <table border="0"> <tr> <td>*Corbin Utilities Commission</td> <td>*Mountain Water District</td> </tr> <tr> <td>*Campbellsville Mun. Water System</td> <td>*Beech Fork Water Commission</td> </tr> <tr> <td>*Millersburg Mun. Water Works</td> <td>*Wilmore Water Works.</td> </tr> <tr> <td>*Louisville Water Company</td> <td>*Greensburg Water Works</td> </tr> <tr> <td>*Northern KY Water District</td> <td>*Adairville Water Works</td> </tr> <tr> <td>*Mt Sterling Water Works</td> <td>*Paris Water Works</td> </tr> <tr> <td>*Hopkinsville Water Env. Auth.</td> <td>*Bowling Green Mun. Utilities</td> </tr> <tr> <td>*Morehead State University</td> <td>*Cynthiana Mun. Water Works</td> </tr> <tr> <td>*Laurel County Water Dist. #2</td> <td>*Harrodsburg Mun. Water Dept.</td> </tr> <tr> <td>*Carlisle Water Department</td> <td>*Georgetown Mun. Water Service</td> </tr> <tr> <td>*Natural Bridge State Park</td> <td>*Beattyville Water Works</td> </tr> <tr> <td>*Morehead Utility Plant Board</td> <td>*Pikeville Water Department</td> </tr> <tr> <td>*Campton Water Plant</td> <td>*Western Fleming Water District</td> </tr> <tr> <td>*Wood Creek Water District</td> <td>*Owingsville Water Works</td> </tr> <tr> <td>*Paducah Water Works</td> <td>*Grand Rivers Water System</td> </tr> <tr> <td>*US Enrichment Corp</td> <td>*Flemingsburg Utility System</td> </tr> <tr> <td>*North Point Training Center</td> <td>*Olive Hill Mun. Water Works</td> </tr> <tr> <td>*Danville City Water Works</td> <td>*Green River Valley Water</td> </tr> </table>	*Corbin Utilities Commission	*Mountain Water District	*Campbellsville Mun. Water System	*Beech Fork Water Commission	*Millersburg Mun. Water Works	*Wilmore Water Works.	*Louisville Water Company	*Greensburg Water Works	*Northern KY Water District	*Adairville Water Works	*Mt Sterling Water Works	*Paris Water Works	*Hopkinsville Water Env. Auth.	*Bowling Green Mun. Utilities	*Morehead State University	*Cynthiana Mun. Water Works	*Laurel County Water Dist. #2	*Harrodsburg Mun. Water Dept.	*Carlisle Water Department	*Georgetown Mun. Water Service	*Natural Bridge State Park	*Beattyville Water Works	*Morehead Utility Plant Board	*Pikeville Water Department	*Campton Water Plant	*Western Fleming Water District	*Wood Creek Water District	*Owingsville Water Works	*Paducah Water Works	*Grand Rivers Water System	*US Enrichment Corp	*Flemingsburg Utility System	*North Point Training Center	*Olive Hill Mun. Water Works	*Danville City Water Works	*Green River Valley Water
*Corbin Utilities Commission	*Mountain Water District																																										
*Campbellsville Mun. Water System	*Beech Fork Water Commission																																										
*Millersburg Mun. Water Works	*Wilmore Water Works.																																										
*Louisville Water Company	*Greensburg Water Works																																										
*Northern KY Water District	*Adairville Water Works																																										
*Mt Sterling Water Works	*Paris Water Works																																										
*Hopkinsville Water Env. Auth.	*Bowling Green Mun. Utilities																																										
*Morehead State University	*Cynthiana Mun. Water Works																																										
*Laurel County Water Dist. #2	*Harrodsburg Mun. Water Dept.																																										
*Carlisle Water Department	*Georgetown Mun. Water Service																																										
*Natural Bridge State Park	*Beattyville Water Works																																										
*Morehead Utility Plant Board	*Pikeville Water Department																																										
*Campton Water Plant	*Western Fleming Water District																																										
*Wood Creek Water District	*Owingsville Water Works																																										
*Paducah Water Works	*Grand Rivers Water System																																										
*US Enrichment Corp	*Flemingsburg Utility System																																										
*North Point Training Center	*Olive Hill Mun. Water Works																																										
*Danville City Water Works	*Green River Valley Water																																										

Long Term Goal #2: Protect waters currently meeting designated uses		Targeted Completion					Annual Reporting
Objective 2:	Prioritize Source Water and Wellhead Protection areas for protection from nonpoint sources of pollution	2014	2015	2016	2017	2018	
				X	X	X	Source water protection areas cont'd.: *Manchester Water Works *West Liberty Water Company *Oak Grove Water Department *Rattlesnake Ridge Water Dist. Wellhead Protection Areas: *Benton *Stella Trailer Park *Symsonia *Bendefield *Hardeman *Green River Valley *Murray *Georgetown Municipal
Action 2:	Provide technical assistance for projects protecting source water and promoting groundwater recharge						
	Tracking measure: Staff attend at least one technical event per year on protection of drinking water sources				X	X	KDOW staff regularly attend Area Development District Water Management Council meeting as well as meetings with the Source Water and Wellhead Protection Programs.
Action 3:	Develop Nine-Key Element "Alternative" Watershed Plans for prioritized Source Water and Wellhead Protection Areas.						
	Tracking measure: Number and list of Source Water Protection Areas with an alternative watershed plan under development		X	X	X	X	During FFY 2016 KDOW NPS and Source Water Protection Programs coordinated with one (1) Drinking Water system to develop a watershed plan for the protection of their source water. This is in addition to the thirty-six (36) drinking water source watersheds being worked on through existing NPS Program watershed plans or through watershed prioritization.
	Tracking measure: Number and list of Source Water Protection Areas with an accepted alternative watershed plan			X	X	X	During 2016, there were no finalized and accepted alternative nine-key element watershed plans developed specifically for Source Water Protection.
	Tracking measure: Number and list of Wellhead Protection Areas with an alternative watershed plan under development			X	X	X	During 2016, there were no work actively being done toward the development of a Wellhead Protection alternative nine-key element watershed plan.
	Tracking measure: Number and list of Wellhead Protection Areas with an accepted alternative watershed plan				X	X	During 2016, there were no finalized and accepted alternative nine-key element watershed plans developed specifically for Wellhead Protection.

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Objective 1:	Develop NPS program components to increase program effectiveness and maintain current program staff	2014	2015	2016	2017	2018	
Action 1:	Develop tools for increased efficiency						
	Tracking measure: Complete development of a tracking spreadsheet for Watershed Based Plans	X	X				The Watershed Plan tracking spreadsheet was developed during FFY 2014. Watershed Plan summary documents are under development for all "Accepted" watershed plans.
	Tracking measure: Develop electronic storage system for 319(h) program	X	X				Revisions to the electronic file storage system were made during FFY 2015, but there is additional organisational work necessary to make the system highly functional.
	Tracking measure: Develop electronic project management for 319(h) projects				X	X	During FFY 2016 all existing NPS sub-grantee project files were scanned into the Department's TEMPO database. Additional work needs to be done in the upcoming year to develop operational components so that all project files can be managed electronically.
Action 2:	Maintain staffing for effective NPS program coordination and on the ground implementation						
	Tracking measure: Number of DOW NPS Program technical staff	X	X	X	X	X	KDOW maintains twenty (20) full time staff members working on Nonpoint Source Pollution Control issues on a statewide and targeted watershed basis. Of those staff members, approximately sixteen (16) function as technical staff in their respective program capacities.
	Tracking measure: Number of River Basin Coordinators	X	X	X	X	X	KDOW maintains six (6) full-time River Basin Coordinators to cover seven (7) major River Basin Management Units.
	Tracking measure: Number of watershed coordinators in grants	X	X	X	X	X	KDOW maintains eighteen (18) watershed coordinators who implement twenty (20) accepted watershed plans.

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Objective 2:	Meet Federal Requirements	2014	2015	2016	2017	2018	
Action 1:	Reduce KY's NPS Program Unliquidated Funding Obligation to less than 20%, and maintain that level throughout the Federal Fiscal Year.						
	Tracking measure: Drawdown percentage in comparison to ULO goal of 20%	X	X	X	X	X	KDOW has not been receiving the ULO Reports from EPA Region 4 in order to evaluate NPS Program performance at meeting this measure.
	Tracking measure: Continue to manage KY's NPS sub-grantee projects with the goal of completing work in a 3 year contract time frame.	X	X	X	X	X	KDOW's NPS Program strives to maintain a three year maximum project term, to contract projects in a timely manner, and to provide pro-active technical assistance to sub-grantee project contractors. These efforts in combination produce the result of maintaining a Unliquidated Obligation below 20%.
Action 2:	Complete EPA required Grants Reporting and Tracking (GRTS) information updates.						
	Tracking measure: Enter new projects into GRTS within ninety (90) days after grant award.	X	X	X	X	X	All of the new projects selected for FFY 2016 funding have been entered into GRTS.
	Tracking measure: Complete biannual project status updates in March 30 and September 30 of each year.	X	X	X	X	X	Biannual project status updates were completed during the months of March (no later than March 30th) and September (no later than September 30th) in FFY 2016.
	Tracking measure: Conduct biannual maintenance on EPA Mandated Elements.	X	X	X	X	X	Maintenance of the EPA Mandated Elements information was performed in GRTS to any/all applicable projects.
	Tracking measure: Enter calculated project load reductions by February 15th of each year.	X	X	X	X	X	All load reductions generated during the FFY 2016 time period were calculated and entered into GRTS by the deadline.

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Objective 2:	Meet Federal Requirements	2014	2015	2016	2017	2018	
Action 3:	Submit Kentucky's Nonpoint Source Annual Report to EPA Region 4 by December 31st of each year						
	Tracking measure: Submission of Annual Report	X	X	X	X	X	The FFY 2016 NPS Program Annual Report will be submitted to EPA Region 4 in March 2017.
Action 4:	Submit at least one (1) Nonpoint Source Success Story to fulfil the requirements of WQ-10 by August 1st of each year.						
	Tracking measure: Number of watersheds delisted and possible for WQ-10 development	X	X	X	X	X	One (1) waterbody delisted in KY's 2014 Integrated Report was attributable to NPS Program efforts. Efforts are being made by staff to conduct targeted water quality success monitoring in an attempt to increase the number of impaired waterbodies being delisted through NPS Program implementation efforts.
	Tracking measure: Number of success stories submitted to EPA Region 4 this year	X	X	X	X	X	One (1) Nonpoint Source Success Story was submitted to EPA meeting this requirement. The Yellowbank Creek WQ-10 report was submitted in July and finalized prior to the September 30, 2016 deadline.
	Tracking measure: Number of Kentucky Success stories on EPA web page	X	X	X	X	X	EPA has posted six (6) Nonpoint Source Success Stories on their web page.

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Action 5:	Review and approve all Nonpoint Source Sub-grantee Quality Assurance Project Plans (QAPP) prior to monitoring activities						
	<p>Tracking measure: Number of approved sub-grantee QAPPs</p>	X	X	X	X	X	<p>Quality Assurance Project Plans are developed, approved, and implemented for all KDOW Nonpoint Source Program water quality data collection efforts conducted by KDOW staff and contractors. Monitoring contractor QAPPs are approved by KDOW Quality Assurance staff prior to data collection, and the contractor is contractually obligated to follow additional QA procedures during the data collection process. KDOW submits QAPPs to EPA Region 4 annually for all monitoring programs and develops specific monitoring plans for each project. During 2016 KDOW conducted water quality monitoring under four (4) individual monitoring plans. Monitoring contractors conducted monitoring under four (4) approved QAPPs.</p>
	<p>Tracking measure: Number of data packages reviewed</p>	X	X	X	X	X	<p>KDOW Quality Assurance Staff reviewed and approved a total of six (6) data packages from NPS Program water quality monitoring projects.</p>

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Objective 3:	Provide technical assistance and support to the division regarding watershed impacts and the watershed perspective	2014	2015	2016	2017	2018	
Action 1:	Participate in DOW projects requiring technical experience from NPS staff						
	Tracking measure: Provide information for the Kentucky Nutrient Reduction Strategy draft	X					Information from the current Nonpoint Source Management Plan was used in the construction of KY's Nutrient Reduction Strategy draft. KDOW's Nonpoint Source Program will be directly involved in the implementation and reporting components of the Nutrient Reduction Strategy.
	Tracking measure: Provide information for Integrated Report and TMDL implementation narratives	X	X	X	X	X	All water quality data collected through the NPS Program, whether collected as pre-watershed plan development baseline or post-watershed plan implementation success monitoring is submitted to the KDOW Water Quality Branch to be used in the assessment of watersheds for the Integrated Report and TMDL development if applicable.
	Tracking measure: Number of SPEARs reviewed	X	X	X	X	X	The Nonpoint Source Program is not a primary reviewer of SPEAR documents for KDOW. During FFY 2016 the NPS Program conducted one (1) SPEAR review for a wastewater collection line extension to be installed within a watershed planning area.

Long Term Goal #3: Efficient and effective implementation of Kentucky's Nonpoint Source Program		Targeted Completion					Annual Reporting
Objective 3:	Provide technical assistance and support to the division regarding watershed impacts and the watershed perspective	2014	2015	2016	2017	2018	
Action 2:	Update the Watershed Framework						
	<p>Tracking measure: Update of Basin Status Report template</p>	X	X				<p>The Basin Status Report template was replaced with a combination of education and outreach materials. The Kentucky Water Health Portal and Kentucky Water Health Guide serve as the primary resources to communicate the information previously contained within the Basin Status Reports. In addition Basin status updates are regularly provided via quarterly newsletters.</p>
	<p>Tracking measure: Update priority areas in the Basins with Basin Coordinators</p>		X	X	X	X	<p>During FFY 2016 KDOW established an updated prioritization strategy centered around programmatic capacity to complete on the ground water quality projects. Factors such as existence of a local watershed group, having an accepted nine-key element watershed plan, and extensive opportunities to implement those plans were all decision factors. The River Basin Coordinators completed a reprioritization effort with each of their respective River Basin Teams which resulted in three (3) Priority Watersheds being selected in each of the seven (7) basin management units. Many of the new priority watersheds were already being worked on, but additional focused effort is being established to more completely implement those existing watershed plans.</p>

FFY 2016 KY Nonpoint Source Program Commitments to EPA Region 4 (From the annual workplan):

General Program Management and Oversight:	
Provide Administrative, Financial, and Technical Oversight for FFY 2016 NPS Program sub-grantee projects.	The KY Division of Water's Nonpoint Source Program provides Administrative, Financial, and Technical support for approximately 50 sub-grantee projects at any given point in time. This work is in addition to providing the same type assistance to watershed groups, Health Departments, and Conservation Districts for the development of future projects. Coordination with local, state, and federal government agencies is also done on a regular basis to create synergistic on-the-ground watershed plan implementation efforts.
Obligate all grant funding within one year of grant award date.	Obligation of FFY 2016 Grant funds is ongoing with an expected completion of June 2017.
Submit 2008 Grant closeout package to EPA Region 4.	The FFY 2008 Grant closeout package was submitted to EPA Region 4 in February 2016. The FFY 2012 was submitted in November 2016.
Maintain NPS Program web pages – including NPS Management Plan, Watershed Plans, and Watershed Plan Map	Kentucky's Nonpoint Source Program web pages are updated regularly. The NPS Management Plan, web links to accepted watershed plans, and the Watershed Plan Maps are all current.
Attend EPA Region 4 Biennial Nonpoint Source Program Conference	The KY Division of Water, Watershed Management Branch Manager and Nonpoint Source & Basin Team Section Supervisor attended the EPA Region 4 NPS Conference in Atlanta April 2016.
Attend EPA National Biennial Nonpoint Source Program Conference	The KY Division of Water, Watershed Management Branch Manager and Nonpoint Source Program Technical Advisor for Urban Stormwater attended the National Nonpoint Source Conference in Boston October 31st through November 3rd.

National Water Quality Initiative:	
Analyze and interpret water quality data and submit assessment sheets to 303(d)/305(b) Programs for inclusion in the Integrated Report to Congress.	Quality assurance, analysis, and interpretation of the water quality data collected in the Headwaters Hinkston Creek National Water Quality Initiative watershed was completed. The KDOW Biologist in charge prepared a final report of the monitoring study's findings (See Appendix A) and completed assessment sheets for the 303(d)/305(b) program's consideration. Additional listings will appear in KY's 2018 Integrated Report to Congress on Water Quality.
Contract a Hinkston Creek Watershed Coordinator that will work toward increased implementation of the Hinkston Creek Watershed Plan.	A Hinkston Creek Watershed Coordinator position is being funded through the FFY 2016 sub-grantee project with Bluegrass Greensource. See project workplan for more information.

Watershed Success Monitoring Program:	
Continue development of Success Monitoring Program by compiling watershed scale implementation data.	Nonpoint Source Program continue to gather implementation data from several other state and federal programs. Compilation of this data into a format that is usable and comparative like GIS continues to be a significant hurdle in making management decisions for the Division's Success Monitoring Program. To date implementation information has been acquired from the NRCS, KY Division of Abandoned Mine Lands, KDOW Nonpoint Source Program, State Revolving Fund, and the Division of Conservations Agriculture Water Quality State Cost Share Program.
Conduct baseline water quality monitoring prior to watershed plan development.	Kentucky's watershed planning efforts are built on the foundation of good quality in-stream water quality data. Water quality data is analyzed and interpreted to identify the cause and source of pollution issues in every watershed plan. Additionally, pre-implementation water quality data sets a baseline for which post-implementation data can be compared to assess implementation effectiveness.

Watershed Success Monitoring Program Cont'd:	
	<p>Baseline water quality monitoring was conducted on the following streams during FFY 2016:</p> <ul style="list-style-type: none"> • Little Pitman Creek of Green River – Taylor County • Martis Branch of Bacon Creek – Hart County • Damon Creek of Clark's River – Calloway County • Cypress Creek of Tennessee River – Marshall County • Big Spring of Eddy Creek – Caldwell County
<p>Conduct watershed success monitoring for watershed plan implementation projects.</p>	<p>Kentucky Division of Water Biologists monitored water quality parameters and biology in both Rock Creek and Pleasant Run during FFY 2016. Data quality assurance and analysis will be completed during FFY 2017. Subsequent changes in impairment status will be reflected in future Integrated Reports.</p>

Grant Reporting and Tracking System:	
<p>Enter FFY 2015 Load Reductions into GRTS.</p>	<p>FFY 2015 Load Reductions for Nitrogen, Phosphorous, and Sediment were calculated for all projects that implemented on-the-ground Best Management Practices (BMP). Those load reductions were entered into the GRTS database by the February 15, 2016 deadline along with specific BMP description information.</p>
<p>Attend National GRTS Conference.</p>	<p>The National GRTS Conference was not held during FFY 2016.</p>

Grant Reporting and Tracking System Cont'd:	
Complete GRTS project status updates.	NPS sub-grantee project status updates were completed twice per year by March 30th and September 30 for all active projects. In addition to status updates, all project mandated elements were updated during the same time frame.
Enter FFY 2016 Sub-grantee projects into GRTS.	Sub-grantee projects were entered into GRTS during February 2017.

EPA Required Reporting:	
Submit Annual Nonpoint Source Program Workplan to EPA R4.	Kentucky's FFY 2016 Nonpoint Source Program Workplan was submitted to EPA Region 4 prior to the September 30, 2015 deadline. The workplan has subsequently been revised to include the list of sub-grantee projects being funded through the 2016 319(h) funding allocation.
Submit Annual Report to EPA R4.	Kentucky's Nonpoint Source Program Annual Report was completed and submitted to EPA Region 4 in March 2017.

EPA Required Reporting Cont'd:	
<p>Submit WQ-10 Nonpoint Source Success Story to EPA R4.</p>	<p>Kentucky's WQ-10 Nonpoint Source Success Story for Yellowbank Creek in Breckinridge County was submitted to EPA prior to the July 30, 2016 deadline. The report was revised based upon EPA Headquarters and Region 4 comments, and was finalized by the September 30, 2016 deadline.</p>
<p>Submit Watershed Plans to EPA R4 for review and comment</p>	<p>During FFY 2016 Kentucky submitted six (6) watershed plans for EPA review and approval. These plans were all developed under the direction of local watershed groups using the Watershed Planning Guidebook for KY Communities as a template. KDOW's Nonpoint Source Program now has twenty five watershed plans accepted for implementation using Clean Water Act 319(h) funding.</p> <ol style="list-style-type: none"> 1. Triplett Creek Watershed Plan, developed by Morehead State University under NPS Project 2008-07 2. Red River Gorge Watershed Plan, developed by the Daniel Boone National Forest under NPS Project 2009-09 3. Redbird River Watershed Plan, developed by the Daniel Boone National Forest with funds provided by the US Forest Service 4. Chestnut Creek Watershed Plan, developed by the Friends of Clark's River National Wildlife Refuge under NPS Project 2009-13 5. Darby Creek Watershed Plan, developed by Kentucky Waterways Alliance under NPS Project 2013-04 6. Woolper Creek Watershed Plan, developed by the Boone County Conservation District under NPS Project 2010-12

Appendix A:

Final Report: 2014 Hinkston Creek Headwaters Watershed National Water Quality Initiative

Jacob Culp, Environmental Biologist Consultant
Energy and Environmental Cabinet
Department for Environmental Protection

Final Report: 2014 Hinkston Creek Headwaters Watershed National Water Quality Initiative

Jacob Culp, Environmental Biologist Consultant
Energy and Environmental Cabinet
Department for Environmental Protection
Division of Water
Water Quality Branch
200 Fair Oaks Lane
Frankfort, KY 40601

Introduction

Program Summary

In 2013, 165 small watersheds throughout the U.S. were selected for targeted financial assistance from the Natural Resources Conservation Service through the National Water Quality Initiative (NWQI). These watersheds had critical water quality concerns that could be improved through on-farm conservation investments. Financial assistance through the Environmental Quality Incentives Program for best management practices (BMPs) such as fencing cows out of streams, providing alternative water sources for grazing animals, and creating riparian buffers is aimed at reducing nutrient, sediment, and pathogen contributions from agricultural land into streams.

The Hinkston Creek Headwaters (HUC12 051001020302), along with Bennettstown-Little River (051302050505) and Clarks Run (051002050505) were selected for the NWQI in Kentucky. Of these three HUC12s, the Hinkston Creek Headwaters was selected for more focused monitoring to identify any improvements in water quality resulting from the NWQI. Both biological and water chemistry sampling was done in 2014-2015. The goal of the study was to collect pre-BMP or early BMP baseline data to compare to data in future years to evaluate the effectiveness of BMP implementation in improving water quality.

The Hinkston Creek Headwaters Watershed

The Headwaters of Hinkston Creek Watershed is located in the Bluegrass bioregion of Kentucky, in the Licking River Basin, in the counties of Montgomery and Bath (Figure 1). Hinkston Creek originates in Montgomery County and flows northward out of the Hinkston Headwaters to join with Stoner Creek and form the South Fork Licking River. Approximately 65% of the total land cover in the Hinkston Creek Headwaters Watershed is devoted to pasture and hay, with 19% of the watershed developed, and 15% forested (Figure 2).

Three stream segments within the watershed have been assessed for the aquatic life designated use. The upper headwaters of Hinkston Creek (river miles 68.0-71.5) and the tributary, Town Branch, were assessed as fully supporting, while Hinkston Creek from river miles 65.9 to 51.5 were assessed as not supporting aquatic life.

The KY Division of Water's Total Maximum Daily Load Section sampled the watershed monthly from March 2004 through February 2005 for such parameters as nutrients, dissolved oxygen, total suspended solids (TSS), alkalinity, flow, macroinvertebrates, and habitat.

Morehead State University sampled monthly for nutrients, TSS, flow, and pathogens during November 2009 through October 2010. These data were used in the development of the Hinkston Creek Watershed Assessment and Management Plan by TetraTech (2011).

Methods

Site Selection

As information on the locations of BMPs to be funded by NRCS and the KY DOW was limited or unavailable to aid in selecting sites, the sampling strategy for 2014 was focused on facilitating 305(b) stream assessments in the watershed and collecting baseline data for the tributaries of Hinkston Creek that had catchment areas of approximately 1.5 square miles or greater. Smaller catchment areas were considered, but this increased the number of sample sites beyond what could be feasibly sampled and created issues with attempting to find easy access to the smaller tributaries for sampling.

Additional considerations in determining sample sites included a focus on stream segments flowing through agricultural land as opposed to more urban stream segments around Mount Sterling. Since this study is focused on identifying improvements of BMPs on agricultural land, few sites were chosen downstream of urban areas. However, a few sites were included to help differentiate the effects of urban versus agricultural land use on the overall water quality of the watershed. These sites (e.g. DOW05016013, DOW05016025, DOW05016026, and DOW05016028) were also included to aid in identifying sources for 305(b) assessments and any future TMDL work in the watershed.

Other considerations were that sample sites located on the tributaries of Hinkston Creek may be more likely to show identifiable water quality improvements due to their smaller drainage areas. Identifying improvements in water quality for Hinkston Creek may be challenging due to the many inputs all along the numerous tributaries draining into the main stem. Lastly, focus was placed on downstream portions of tributaries to maximize the area upstream where BMPs could occur and have the water quality effects captured.

Sampling locations from 2014 are shown in Table 1, Figure 3. Any deviations from the original site list in the study plan will be discussed in the results section of this report.

Water Chemistry, Discharge, and In Situ Measurements

Beginning in April 2014, water chemistry monitoring, discharge, and *in situ* measurements were taken once per month through March 2015. Only 2 sampling months were missed (Nov 2014, Feb 2015) and the following seasonal and flow conditions were targeted: 1) spring base flow, 2) spring storm flow, 3) summer low flow, 4) summer base flow and 5) summer storm flow. Water samples were analyzed for the following parameters:

Bulk: CBOD5, Inorganic Ions, TSS, Sulfate, TDS, Chlorides, Turbidity

Nutrients: TOC, Ammonia, Nitrate/Nitrite, Total P, TKN

Alkalinity

ortho-p

Water chemistry sampling followed methods in *Sampling Surface Water Quality in Lotic Systems* (KDOW2011b), while *In situ* water quality parameters were collected following procedures in *In situ Water Quality Measurements and Meter Calibration* (KDOW 2009b). Discharge was measured by following the procedures outlined in *Measuring Stream Discharge* (2010b).

Bacteria Sampling

E. coli monitoring was comprised of 9 sampling events at most sites during the 2014 recreation season (May through October) following the procedures found in *Sampling Surface Water Quality in Lotic Systems* (KDOW 2011b). Sampling included 5 samples that were collected within a 30-day period in the spring (May and June) in order to calculate a geometric mean. A geometric mean was calculated at every site with the exception of DOW05016044, an unnamed tributary to Hinkston Creek. *E. coli* samples were analyzed by KDOW staff following the procedures found in *Enzyme Substrate Test for the Detection of Total Coliforms and Escherichia coli* (KDOW 2011c).

Biological Sampling

In order to obtain updated, baseline data on biological conditions, macroinvertebrate samples were collected at 9 Hinkston Creek Headwater sites during spring/summer of 2014. Priority for biological sampling was focused on tributaries that had not been sampled for biology in the past and those in which additional sampling may affect the use support assessment.

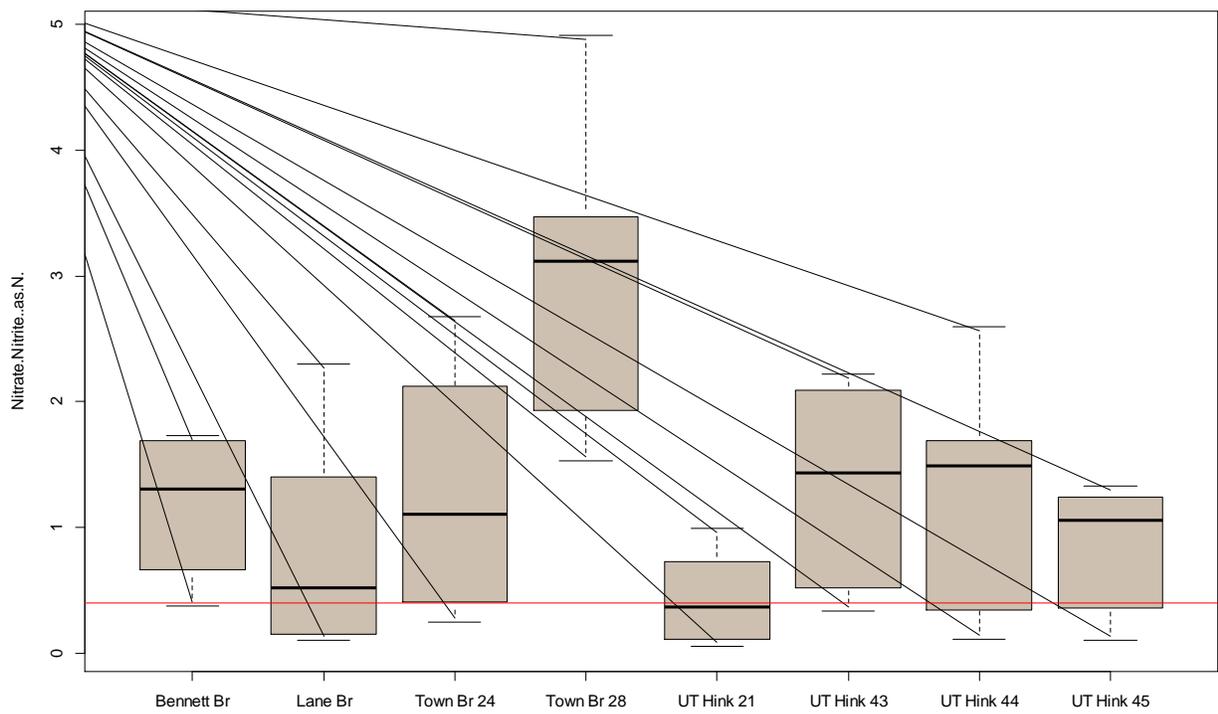
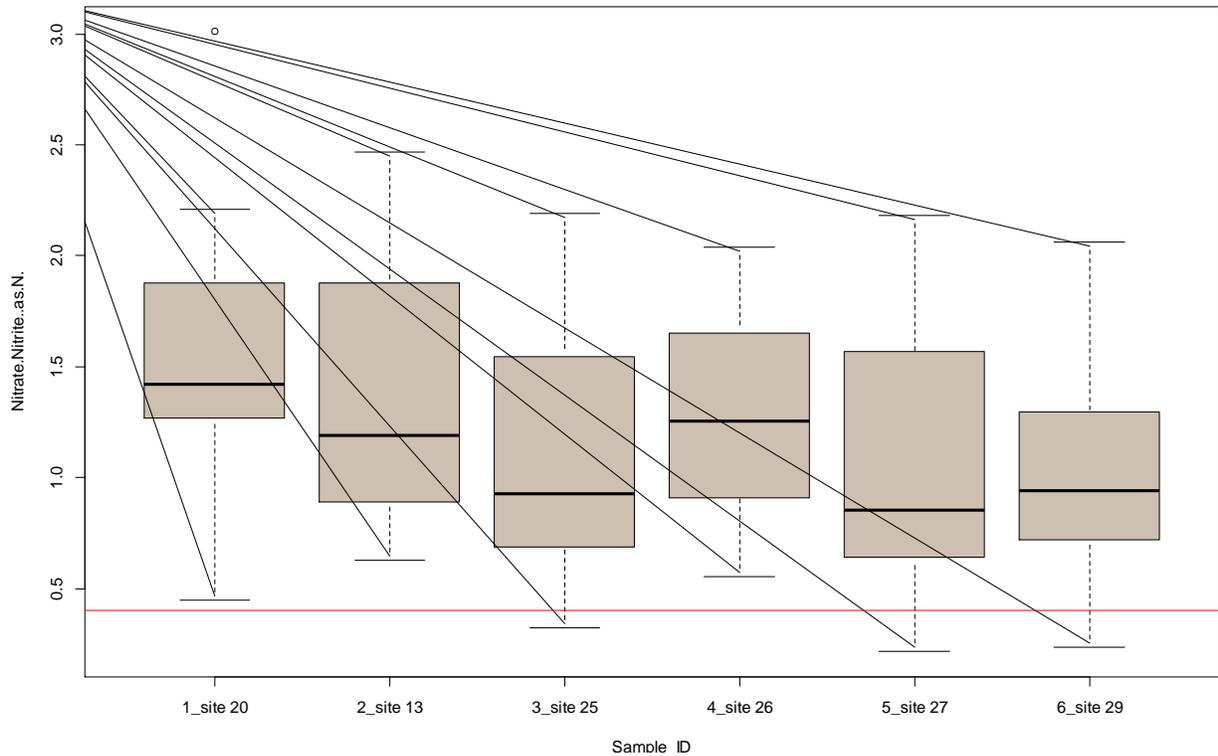
During this sampling the following parameters were also be collected: habitat assessments, *in situ* water quality parameters, stream discharge, and water chemistry. Macroinvertebrate sampling followed the methods presented in *Methods for Sampling Benthic Macroinvertebrate Communities in Wadeable Waters* (KDOW 2011a). Habitat assessment methodology followed the procedures outlined in *Methods for Assessing Habitat in Wadeable Waters* (KDOW 2011d).

Results Summary

Water Chemistry, Discharge, and In Situ Measurements

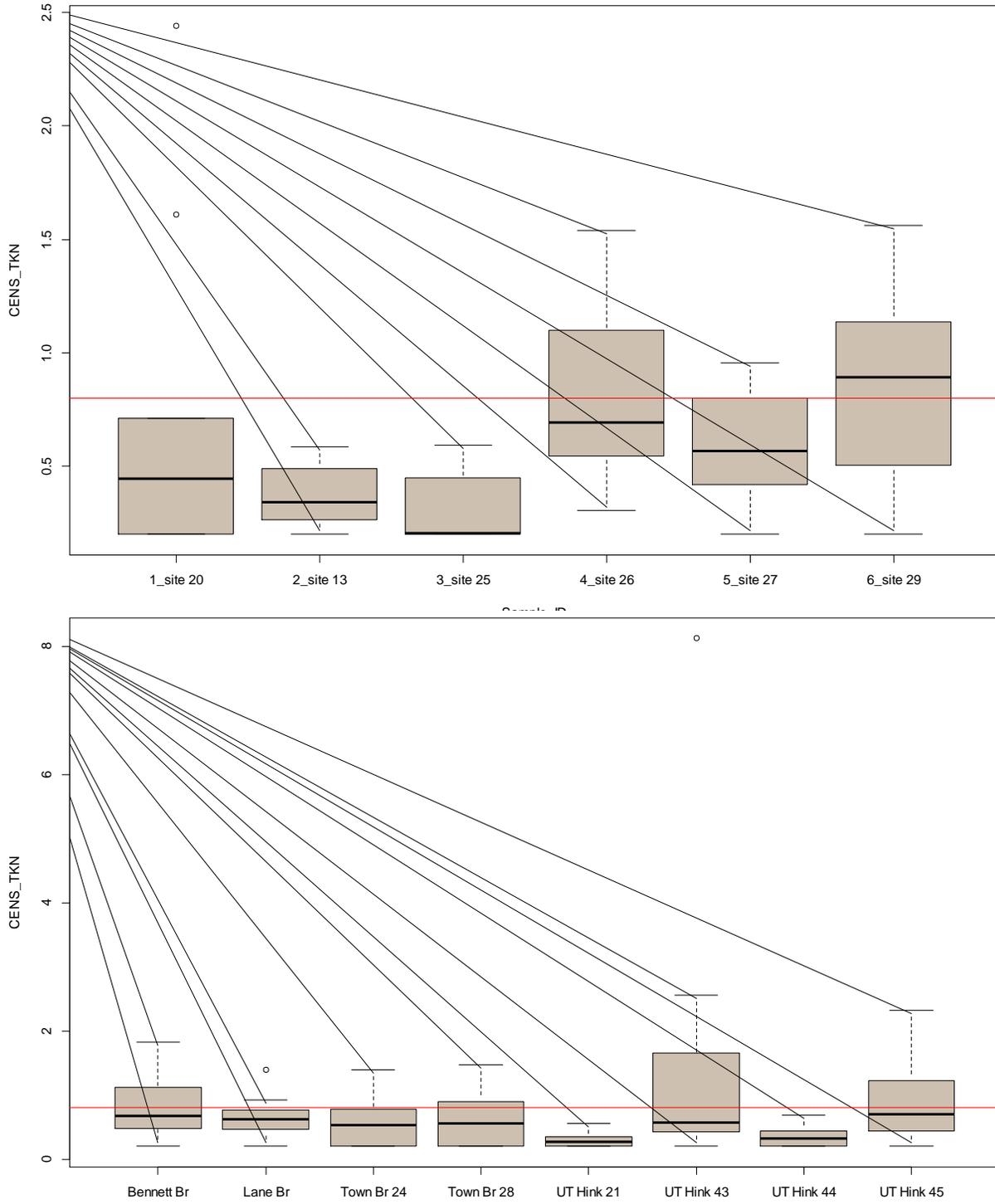
Complete water chemistry, discharge, and *in situ* measurement data can be found in EDAS. For the purposes of this report, nutrient parameters from water chemistry samples were compared to numerical criteria indicating nutrient enrichment for the Outer Bluegrass Ecoregion used internally by KDOW.

-Nitrate/nitrite levels were rarely below 0.400 mg/L at any site. All main stem Hinkston Creek sites had levels greater than 0.400 on every sampling occasion. Only 1 site (DOW05016021) had more than 50% of sample results less than 0.400 mg/L. Site 28 (Town Branch below Sharpsburg wastewater treatment plant) had significantly higher nitrate levels compared to any other tributaries (Figs 4 &5).



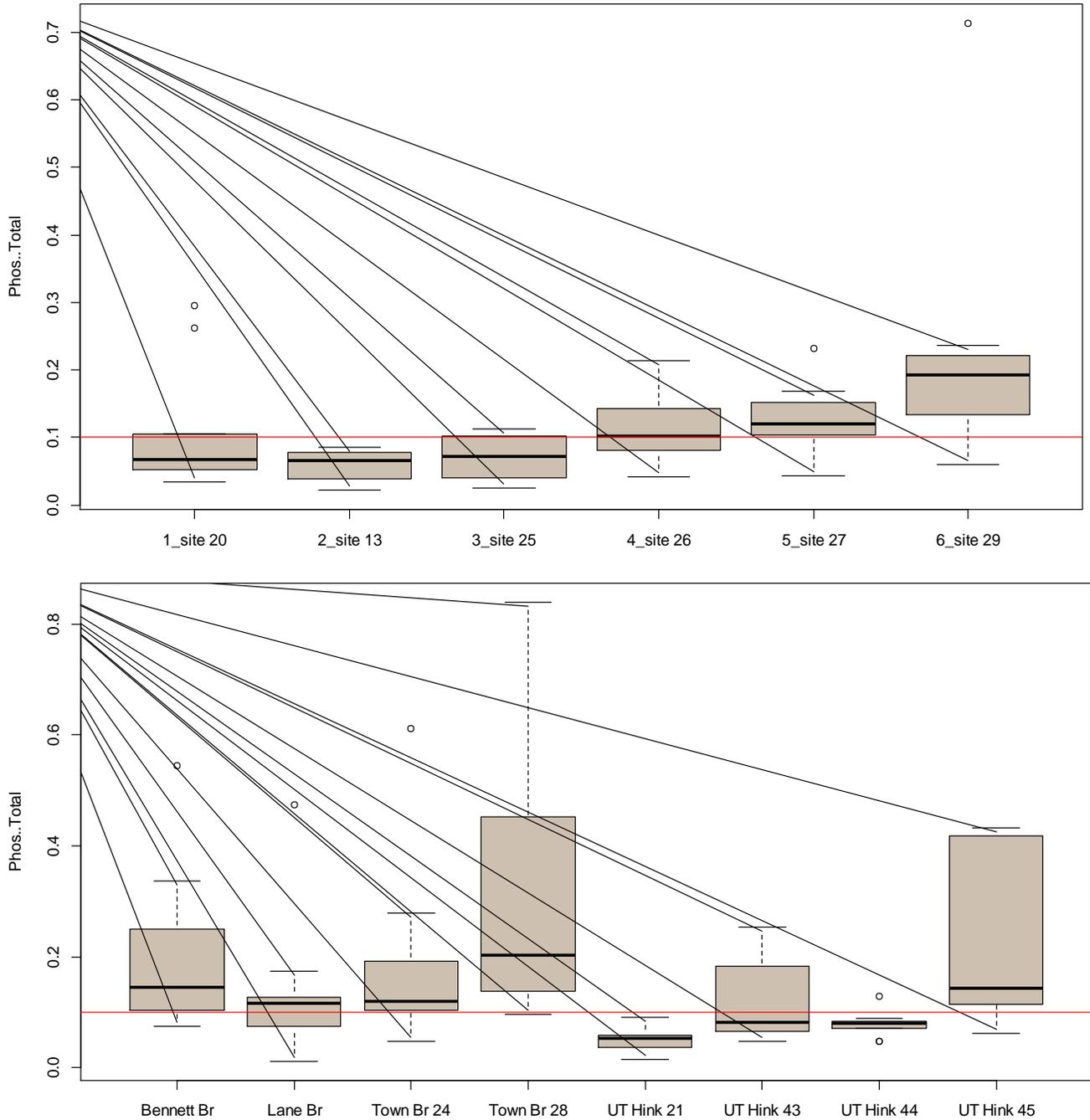
Figs 4 & 5: Boxplots of nitrate levels for 10 water chemistry samples. Top figure show main stem Hinkston Creek from most upstream to most downstream site, bottom figure shows tributaries. Red line indicates Nitrate level of 0.400 mg/L.

-TKN levels were generally below 0.800 mg/L, except for the most downstream Hinkston Creek site (DOW05016029), which had greater than 50% of sample results above 0.8 mg/L (Figs 6 & 7).



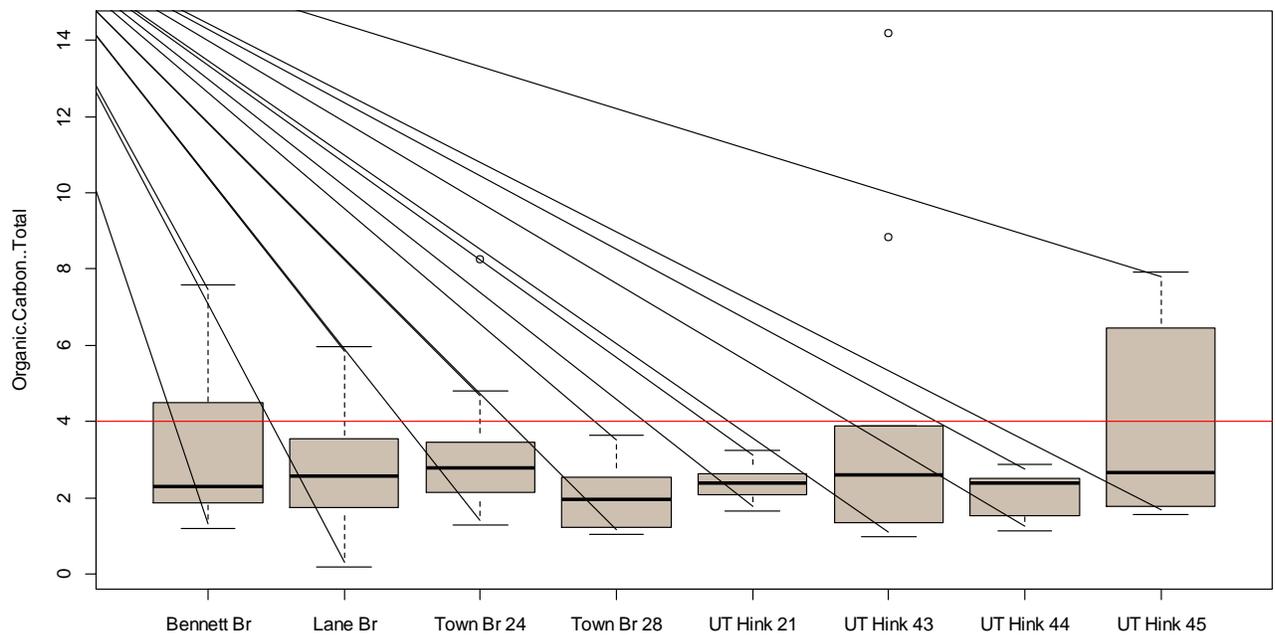
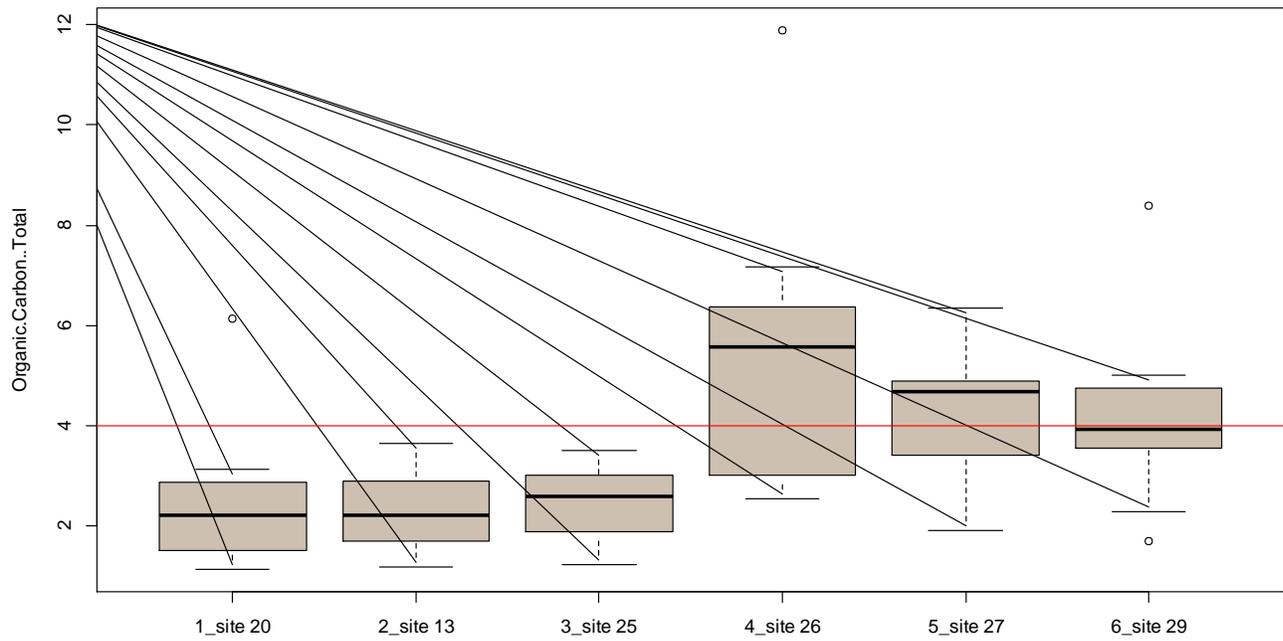
Figs 6 & 7: Boxplots of TKN for 10 water chemistry samples. Red line indicates TKN level of 0.800 mg/L.

-Total Phosphorus levels exceeded 0.100 mg/L greater than 50% of the time in all but 3 tributaries, and in 3 of the most downstream main stem Hinkston Creek sites (Figs 8 & 9).



Figs 8 & 9: Boxplots of Total Phosphorus for 10 water chemistry samples. Red line indicates Total P level of 0.100 mg/L.

-TOC was generally low throughout the watershed, with median levels in all tributaries lower than 4 mg/L. Only 2 sites (026 and 027) had more than 50% of sample results above 4 mg/L (Figs 9 & 10).



Figs 9 & 10: Boxplots of TOC for 10 water chemistry samples. Red line indicates TOC levels of 4 mg/L.

Bacteria Sampling

According to KY water quality standards for Primary Contact Recreation (PCR), *E. coli* cannot exceed 130 colony forming units (CFU)/100 ml as a geometric mean on a minimum of 5 samples taken during a 30 day period, nor can *E. coli* content exceed 240 CFU/100 ml in 20 % or more of all samples. In the Hinkston Creek headwaters HUC 12, *E. coli* exceeded 130 CFU/100 ml at all sites that had a geometric mean calculated and exceeded 240 CFU/100 ml at all sites (Table 2).

Site	Stream	Geomean	% Exceedance
DOW05016013	Hinkston Creek	3430.08	100
DOW05016020	Hinkston Creek	14749.77	100
DOW05016021	Hinkston Creek UT	2044.10	75
DOW05016022	Lane Branch	499.26	80
DOW05016023	Bennett Branch	5911.12	87.5
DOW05016024	Town Branch	3063.78	88.89
DOW05016025	Hinkston Creek	2384.41	88.89
DOW05016026	Hinkston Creek	3662.00	100.00
DOW05016027	Hinkston Creek	2690.27	100.00
DOW05016028	Town Branch	1736.40	100.00
DOW05016029	Hinkston Creek	784.98	88.89
DOW05016043	Hinkston Creek UT	14660.34	100.00
DOW05016044	Hinkston Creek UT	*	100.00
DOW05016045	Hinkston Creek UT	4929.87	100.00

Table 2: Geometric mean of *E. coli* (CFU/100 ml) based on 5 and 30, and % exceedance based on all samples. * indicates only site with less than 5 samples needed for a geometric mean.

Biological Sampling

Hinkston Creek headwaters generally did not support aquatic life based on benthic macroinvertebrate sampling in 2014, with the majority of sites scoring within the Poor-Fair range in narrative rating. Only one site (Lane Branch) had a MBI score high enough to warrant a “Good” narrative rating (Table 3). Site 24 on Town Branch had an MBI score of 44.41, with a narrative rating of “Fair”. Town Branch had previously been listed as Fully Supporting for Aquatic Life and this most recent macroinvertebrate sample may warrant a change in Aquatic Life Use.

StationID	StreamName	CollDate	MBI score	Narr. Rating	Use
DOW05016013	Hinkston Creek	7/3/2014	50.54	Fair	Non-support
DOW05016020	Hinkston Creek	4/22/2014	36.50	Poor	Non-support
DOW05016021	Hinkston Creek UT	5/14/2014	35.02	Poor	Non-support
DOW05016022	Lane Branch	5/14/2014	53.01	Good	Support

DOW05016023	Bennett Branch	5/22/2014	46.50	Fair	Non-support
DOW05016024	Town Branch	4/23/2014	44.41	Fair	Non-support
DOW05016043	Hinkston Creek UT	4/22/2014	35.38	Poor	Non-support
DOW05016044	Hinkston Creek UT	5/14/2014	43.90	Fair	Non-support
DOW05016045	Hinkston Creek UT	4/23/2014	47.05	Fair	Non-support

Table 3: Sites where macroinvertebrate sampling occurred, MBI scores, and rating.

QA/QC Results

Following the 2014 Intensive Surveys for Monitoring and Assessment QAPP, 10% of all entered data was checked for accuracy. Data entry passed quality assurance standards with less than 5% of data needing to be corrected in EDAS.

Explanation of Deviations from Study Plan

Deviations from the original Hinkston Creek NWQI study plan were few, but were made up of; removal of one sampling site, only sampling 10 times instead of 12, and missing a 5 and 30 *E.coli* sample at one site. The site removal occurred due to access denial by landowner. Sampling was only done during 10 of the 12 months due to extremely high water in November and dangerously cold temperatures in February. Last, collecting the fifth and final *E. coli* sample from DOW05016044 was not possible due to dry, no flow conditions.

Additional Figures

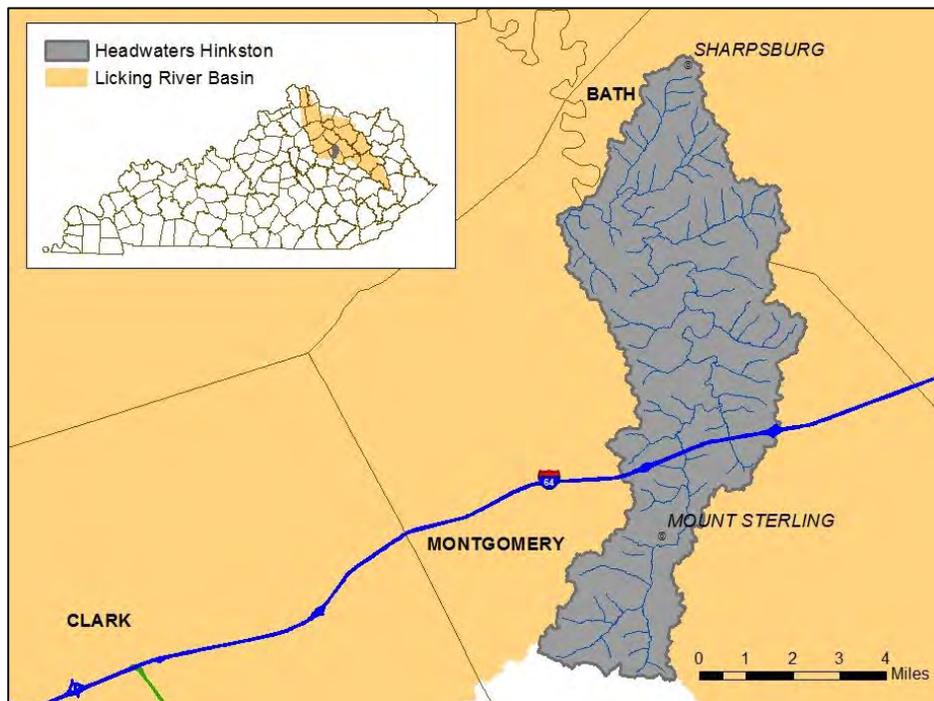


Figure 1: Location of the Hinkston Creek Headwaters Watershed

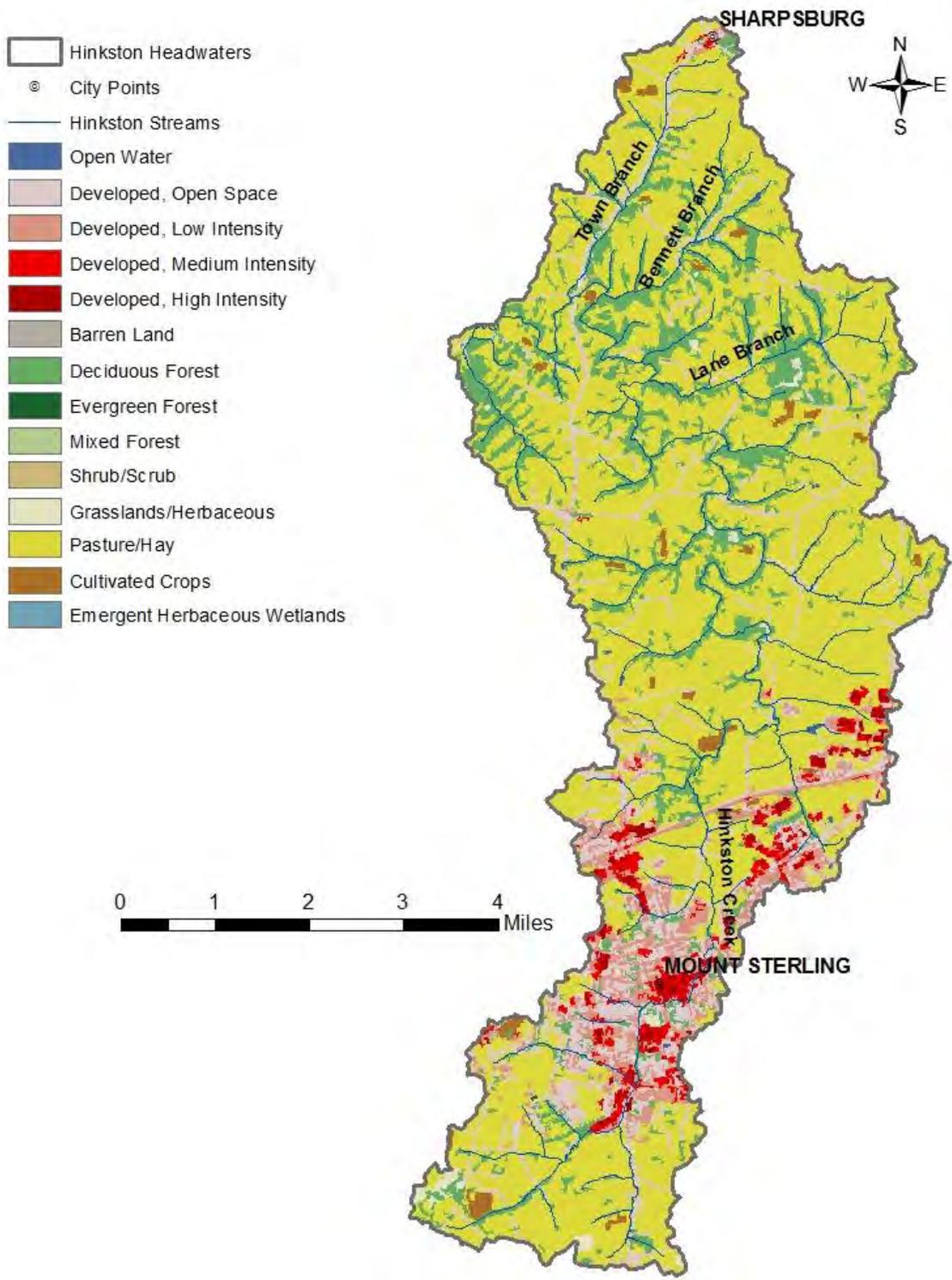


Figure 2: Land cover of the Hinkston Creek Headwaters Watershed (Fry et al. 2011)

Map #	Site	Stream Name	Location	CA	RM	UT RM	County	Latitude	Longitude
1	DOW05016013	Hinkston Creek	at KY 1991 bridge, downstream of city	8.97	65.4		Montgomery	38.076099	-83.934196
2	DOW05016020	Hinkston Creek	off Hobart Industry Road bridge, off SR11	2.69	69.15		Montgomery	38.034801	-83.952301
3	DOW05016021	UT Hinkston	off of SR1991, below industrial park	2.15	62.92	0.04	Montgomery	38.095409	-83.919479
4	DOW05016022	Lane Branch	private drive at end of Tipton RD	2.95	54.22	0.55	Bath	38.147202	-83.935699
5	DOW05016023	Bennett Branch	road off SR11	2.52	52.25	0.05	Bath	38.162601	-83.9506
6	DOW05016024	Town Branch	near county line, past SR 11 Bridge at private drive	2.57	51.72	0.3	Bath	38.1656	-83.956001
7	DOW05016025	Hinkston Creek	off SR1991	12.28	63.05		Montgomery	38.095901	-83.921402
8	DOW05016026	Hinkston Creek	off private drive, below Mt Sterling WWTP	14.9	61.75		Montgomery	38.107201	-83.922897
9	DOW05016027	Hinkston Creek	at Tipton RD bridge	23.62	56.45		Montgomery	38.141102	-83.929703
10	DOW05016028	Town Branch	off of SR11, below Sharpsburg WWTP	0.29	51.72	2.95	Bath	38.197701	-83.934898
11	DOW05016029	Hinkston Creek	off SR11 or Roger Mills RD	35.06	51.7		Montgomery	38.1614	-83.959099
12	DOW05016043	UT Hinkston	off Calk Lane	1.6	69.1	0.07	Montgomery	38.034104	-83.95137
13	DOW05016044	UT Hinkston	off private drive, off SR 1991	1.8	58.9	0.03	Montgomery	38.121208	-83.921306
14	DOW05016045	UT Hinkston	off Cecil Road, below trib	1.5	49.93	0.2	Montgomery	38.156942	-83.977378

Table 1: Sites sampled for water chemistry and E. coli in the Hinkston Creek Headwater from April 2014-May 2015. All tributaries in addition site DOW05016013 were sampled for biology (macroinverts) as well.

References

- Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J. 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States. PE&RS. Vol. 77(9):858-864.
- Kentucky Division of Environmental Program Support (KDEPS). 2012. Environmental Services Branch Laboratory Operations and Quality Assurance Manual. Revision 8. Department for Environmental Protection, Frankfort, KY.
- Kentucky Division of Water. 2009a. EDAS data entry and biological data management, Version 0.0. Kentucky Department for Environmental Protection, Division of Water, Water Quality Branch, Frankfort, KY.
- . 2009b. *In situ* Water Quality Measurements and Meter Calibration. Revision 1.0. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.
- . 2009c. Laboratory Procedures for Fish Processing and Taxonomic Identification. Kentucky Department for Environmental Protection, Division of Water, Frankfort, Kentucky.
- . 2009d. Laboratory Procedures for Macroinvertebrate Processing Taxonomic Identification and Reporting. Environmental and Energy Cabinet, Department for Environmental Protection, Division of Water. Frankfort, KY.
- . 2010a. Collection Methods for Fish in Wadeable Streams. Kentucky Department for Environmental Protection, Division of Water, Frankfort, Kentucky.
- . 2010b. Measuring Stream Discharge. Revision 0.0. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.
- . 2011a. Collection Methods for Benthic Macroinvertebrates in Wadeable Waters. Kentucky Department for Environmental Protection, Division of Water, Frankfort, KY.
- . 2011b. Sampling the Surface Water Quality in Lotic Systems. Kentucky Department for Environmental Protection, Division of Water, Frankfort, Kentucky.
- . 2011c. Enzyme Substrate Test for the Detection of Total Coliforms and *Escherichia coli*. Revision 1. Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Water, Water Quality Branch. Frankfort, KY.
- . 2011d. Methods for Assessing Habitat in Wadeable Waters. Kentucky Department for Environmental Protection, Division of Water, Frankfort, Kentucky.

----. 2014. Intensive Surveys for Monitoring and Assessment Quality Assurance Project Plan (QAPP) Kentucky Department for Environmental Protection, Division of Water, Frankfort, Kentucky.

TetraTech. 2011. Hinkston Creek Watershed Assessment and Management Plan. TetraTech. Research Triangle Park, NC.



Steer Fork, Jackson County, KY

Authorization to use or reproduce any original material contained in this publication, not obtained from other sources, is freely granted. The Kentucky Division of Water Nonpoint Source and Basin Team Section would appreciate acknowledgment

Copies of this publication are available for use through the KDOW NPS website:
www.water.ky.gov/nsp/Pages/default.aspx

Published and distributed by the Kentucky Division of Water



