

# **Stormwater Quality Management Plan**

**Submitted By:**

**Hardin County Fiscal Court**

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**KDOW Agency Interest Number: 75043**

**2010**

**Updated 2015**

**Updated 2018**

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## 1.0 Community Background

Hardin County is the fourth largest county in Kentucky, containing 629 square miles of total land area as shown on the **map on page 4**. Incorporated cities within the county include Elizabethtown, Radcliff, Vine Grove, West Point, Sonora and Upton. The Fort Knox Military Reservation occupies the northern extension of the county, just north and east of Radcliff. Excluding the incorporated city areas and Fort Knox, there remains approximately 560 square miles in unincorporated Hardin County.

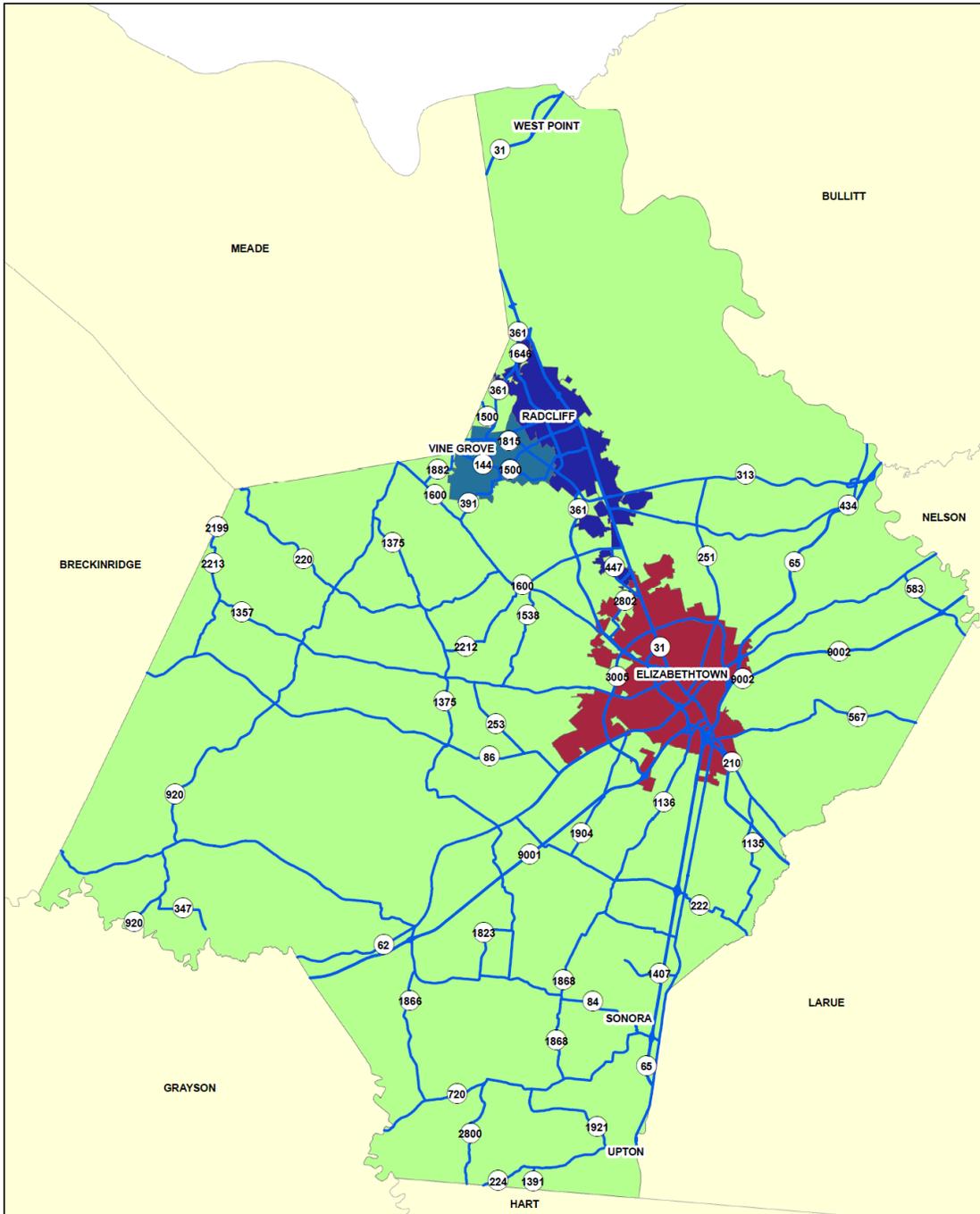
Hardin County Fiscal Court was issued a Small Municipal Separate Storm Sewer Systems (MS4) KPDES permit in 2003 and is currently operating under the 2018 permit. The area designated by the permit is the unincorporated areas of Hardin County within the urban boundary established by the 2010 census. As shown on the **map on page 5**, the areas of Hardin County included in the permit are areas outside the city limits of Radcliff, Elizabethtown, Vine Grove and Fort Knox. These non-contiguous areas comprise a total area of approximately 11.86 square miles. This area has almost doubled from the 2000 census urban area of 6.5 square miles. Elizabethtown, Radcliff, Vine Grove and West Point each have individual MS4 permits.

*It should be noted that although the stormwater ordinances required by the MS4 Permit are in effect county-wide, the limits of the jurisdiction of this permit are limited to the unincorporated areas within the urban boundaries as designated on the **map on page 5**.*

It should further be noted that since the 2010 census, the cities of Radcliff, Elizabethtown and Vine Grove continue to have a very active annexation process and some of the unincorporated area designated within the urban boundaries has been incorporated and is now within the city boundaries of Radcliff, Elizabethtown or Vine Grove. The result of these actions has reduced the Hardin County portion of the MS4 jurisdiction.

Hardin County is generally located in the center of the state. Elizabethtown, the county seat located approximately 45 miles south of Louisville, is the crossroads for I-65, the major north-south interstate and the Bluegrass Parkway which extends east toward Lexington and the Western Kentucky Parkway extending westward toward Paducah.

The landuse of Hardin County is predominately rural, residential areas. The areas within the MS4 permit boundary are within the urban growth area and are predominately residential/undeveloped. The density of development is illustrated on the “**Accumulated Percent Impervious**” **map shown on page 6**. Major employment areas lie within the cities of Elizabethtown and Radcliff as well as the Fort Knox Military Reservation.



**Legend**

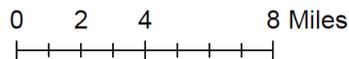
- Major\_Roads
- Corporate Boundary Polygons

**Corporate Limits**

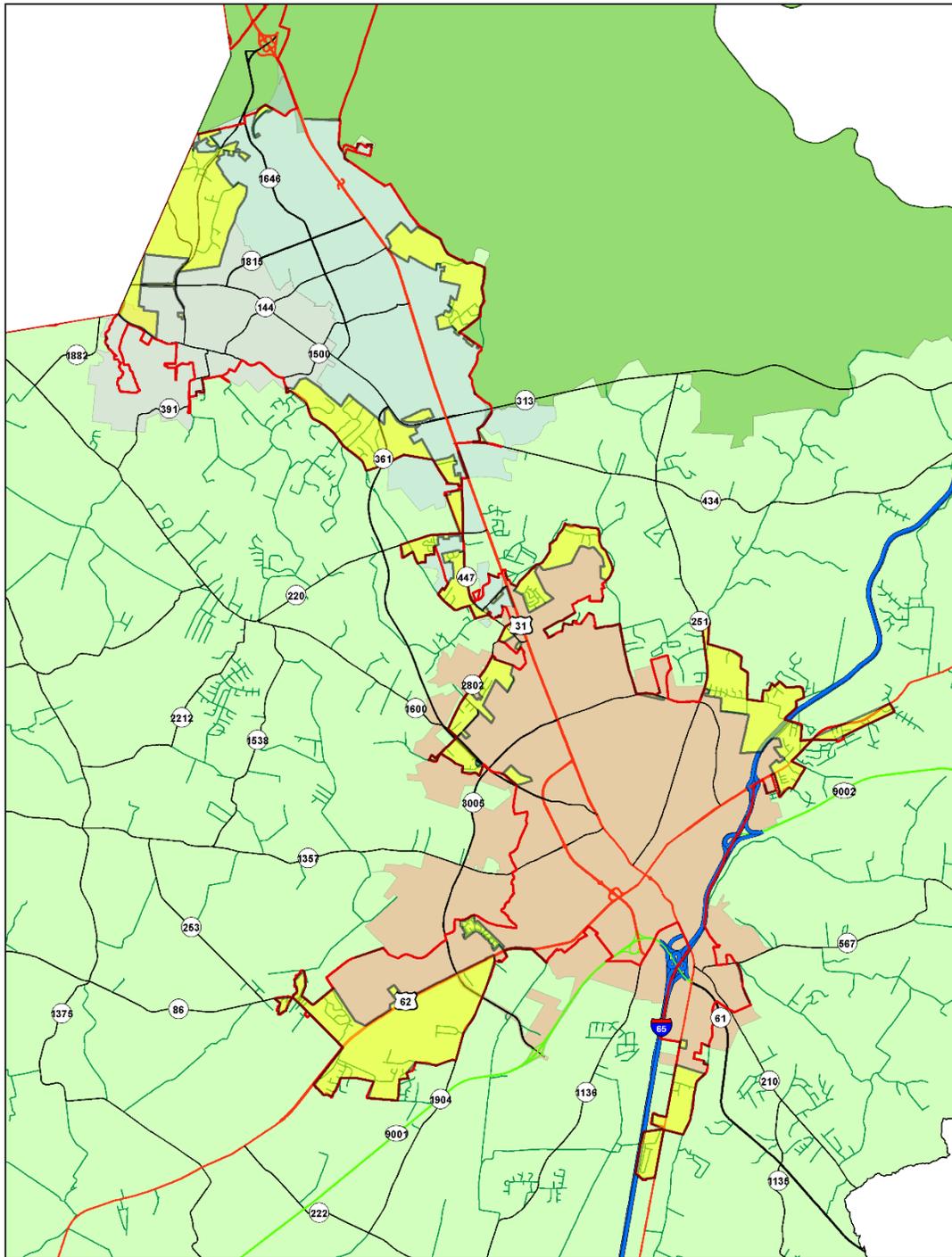
**MS4 Permittee**

- ELIZABETHTOWN
- RADCLIFF
- VINE GROVE
- County Boundary Polygon

## Hardin County, Kentucky



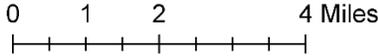
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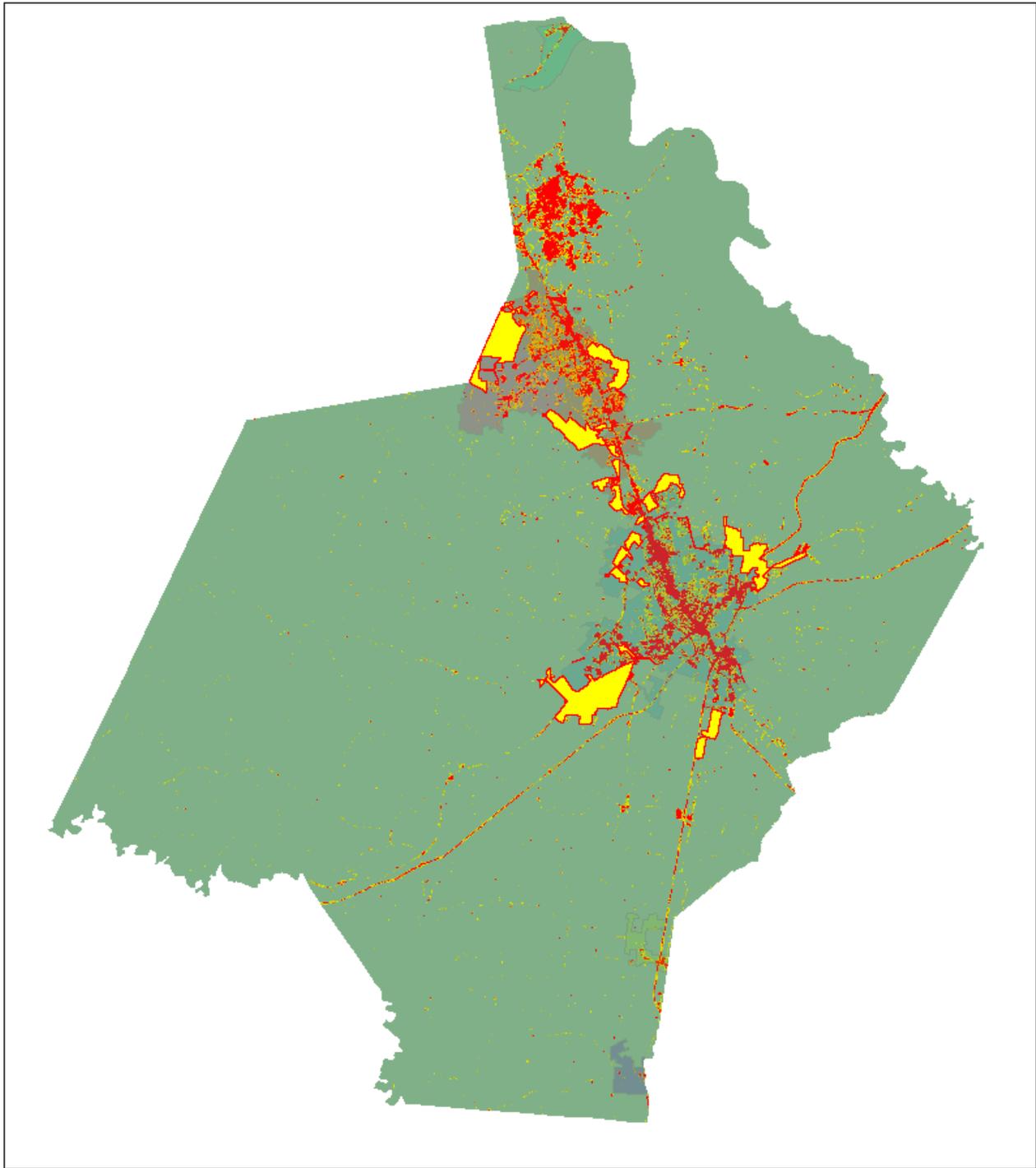
**Legend**

MS4 Boundary	County_Maintained Roads
Urban Boundary	Vine_Grove
Interstate	Radcliff
Parkways	Elizabethtown
State Roads	FtKnox
US Highways	Hardin County

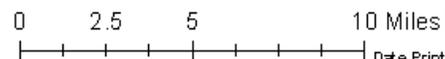
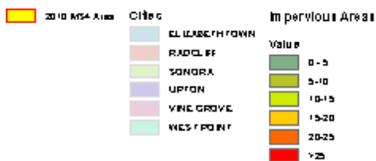
**Hardin County MS4 Areas**



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### Hardin County Impervious Areas



Date Printed: 10.30.2018

## 2.0 Local Water Resource

### 2.1 Overview of County Drainage Basins

As discussed in Section One, the jurisdiction of the MS4 permit is limited to small, non-contiguous unincorporated areas of Hardin County adjacent to the city limits of Elizabethtown, Radcliff and Vine Grove. Discussions of the topography and drainage areas focused solely on these small isolated areas would be somewhat difficult and would not provide a clear understanding of the watersheds within the County. *As such, the discussion contained in this introductory section will address the drainage of the whole county with the understanding that the areas targeted by the Hardin County MS4 permit are contained as small subareas within the overall drainage basins of the County.*

Hardin County's topography can be roughly described as a broad expansive plain of rolling hills through the center of the County bordered on the east and west by the knobs, characterized by steep hills, narrow ridgelines, and numerous stream valleys. The central plain generally slopes to the southwest, south of the cities of Radcliff and Vine Grove, and to the northwest, north of these two cities. The western portion of the plain is karst, characterized by numerous depressions or sinkholes created by the limestone substrata in the area. Sinkholes are also found in the southern portion of the plain because of extensive subsurface drainage throughout the Nolin River watershed. Drainage characteristics described in this section are illustrated on the **map on page 8**.

The highest concentration of karst topography in the county runs generally from the Meade/Hardin county line near Radcliff and Vine Grove through Franklin Cross Roads, White Mills and Sonora to the Hart County line. This area is characterized by a landscape dotted with sinkholes.<sup>1</sup>

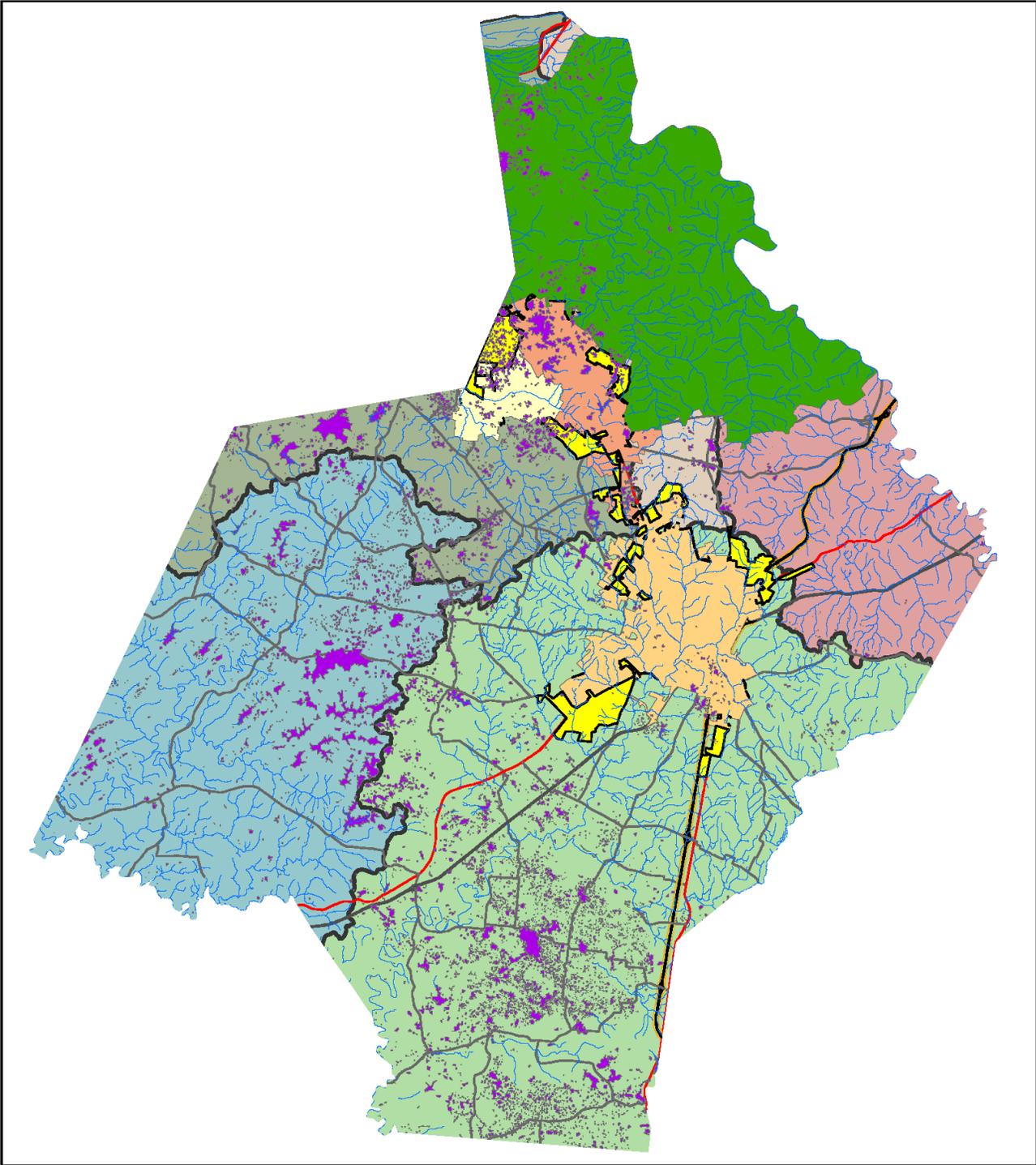
Hardin County is divided into 3 drainage basins - the Ohio, Salt, or Green Rivers basins. In addition to these three rivers, the county is also drained in karst areas by sinkholes. Storm water drained by subterranean sources always returns to the surface at lower elevations through springs. Springs commonly flow into rivers or their tributaries found throughout the county.

The lowest elevation in Hardin County is 382 feet above sea level which is the normal pool of the Ohio River at West Point.<sup>2</sup> The topography of this basin is predominately karst which is characterized by deeply entrenched streams with high ridges and narrow valleys that have steep valley walls. The Ohio River (Blue-Sinking) basin is the smallest drainage area of the

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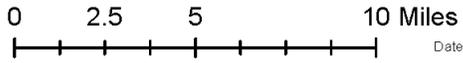
<sup>1</sup> Soil Survey of Hardin and Larue Counties, Kentucky, United States Department of Agriculture Soil Conservation Service, January 1979, pp. 2.

<sup>2</sup> Soil Survey of Hardin and Larue Counties, Kentucky, United States Department of Agriculture, Soil Conservation Service, January 1979, pp. 2.



- Streams
- Hardin County Sinkholes
- Hardin HUC8**
- Basin Name**
- Blue-Sinking. Kentucky, Indiana.
- Rolling Fork. Kentucky.
- Rough. Kentucky.
- Salt. Kentucky.
- Upper Green. Kentucky.
- 2010 MS4
- Ft Knox
- Vine Grove
- Elizabethtown
- Radcliff
- Bluegrass Pkwy
- Interstate
- State
- US Highway
- WK Pkwy

# Hardin County Drainage



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three river basins dividing the county, comprising only 72 square miles or 12 percent of the total land area. The Ohio River drains the City of West Point and Otter Creek with tributaries that include the Brushy Fork, Flippin Creek, and Pawley Creek.

The northern and eastern portion of the county is mostly drained by the Salt River and its tributaries.<sup>3</sup> The Salt River basin drains the second largest area at 146 square miles or 24 percent of the county. This river empties into the Ohio River as a tributary at West Point. The Rolling Fork River is also a member of this drainage basin which empties into the Salt River as a tributary a few miles south of West Point. The Salt and Rolling Fork Rivers collectively serve as a portion of the eastern boundary for the county. The streams in this area are typically deeply entrenched and the topography along the Salt and Rolling Fork Rivers is characterized by high ridges and narrow valleys that have steep valley walls. The tributaries to the Salt River include Mill Creek which flows through Fort Knox and empties directly into Salt River, and the Rolling Fork River with Clear Creek, Cedar Creek, and Youngers Creek as tributaries.

The Green River basin drains the largest area at 397 square miles or 64 percent of the county. The Green River actually does not flow through any portion of Hardin County, but is fed by the Nolin and Rough River sub-basins. For the purpose of this plan, these two sub-basins are discussed independently.

The Rough River sub-basin is located predominately in the western portion of the county. It covers approximately 153 square miles or 25 percent of the county. The topography for the area is karst with streams typically deeply entrenched characterized by high ridges and narrow valleys that have steep valley walls. The area is also inundated with sinkholes and springs. The tributaries to Rough River are Drakes Creek, Hoover Creek, Linders Creek, Little Meeting Creek, Meeting Creek, and Sutzer Creek.

The Nolin River sub-basin drains the single largest area of any river basin or sub-basin at 244 square miles or 39 percent of the county. The Nolin River sub-basin is strikingly different from all others found in the county in light of the fact that much of the drainage area is on a karst plain with a conspicuous lack of surface streams as tributaries. The streams in this area are entrenched to a moderate depth with narrow flood plains. The topography is dominantly undulating to rolling uplands.

The Nolin River sub-basin may be divided into two (2) separate areas, the first having the normal or slightly above average number of surface streams, and the second having no surface streams at all. The first area may be identified as the City of Elizabethtown to include the immediate surrounding area. Elizabethtown is located at the northern limit of this sub-basin. Here we find a few surface streams which include Billy Creek, Buffalo Creek, Freeman Creek, Shaw Creek and Valley Creek. As we travel just south of Elizabethtown, we find only two (2) additional streams, East Rhudes Creek and West Rhudes Creek. The path followed by each of the above mentioned streams takes them to a union with Valley Creek just south of Elizabethtown. Valley Creek then continues moving south until it meets with the Nolin River

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<sup>3</sup> Soil Survey of Hardin and Larue Counties, Kentucky, United States Department of Agriculture, Soil Conservation Service, January, 1979, pp. 2-3.

just east of Glendale. The balance of the sub-basin has no surface streams. This area may be described as a karst plain which includes everything south of the Western Kentucky Parkway. Instead of surface streams, we find the area inundated with springs which feed the river directly.

With that said, there is a strange phenomenon found within the "no surface stream" area of the Nolin sub-basin which may be considered an exception to the rule. "Sinking streams" are streams which flow for some distance on the surface and then disappear into a sinkhole or some other type of depression. Sandy Creek is a sinking stream located in the southern portion of the county which drains several hundred acres wandering just over a distance of six miles. This stream does not flow into a larger body of water but instead ends at a depression near Flint Hill.<sup>4</sup> This stream gives further example of the unusual geology of the southern portion of the county.

## **2.2 Kentucky Division Of Water Watershed Studies**

### **2.2.1 KDOW 2016 Integrated Report**

#### **2.2.1.1 Introduction**

Kentucky has issued the 2016 Integrated Report to Congress on the Condition of Water Resources in Kentucky, which reports on the quality of water in the streams, lakes, and reservoirs of all major river basins of the Commonwealth. The 2016 report provides a statewide update on water quality conditions of water bodies in all river basins. This report fulfills requirements of sections 303(d), 305(b), and 314 of the Federal Water Pollution Control Act (or Clean Water Act (CWA)) of 1972 (P.L. 92-500), as subsequently amended. Section 305(b) of the Act requires states to assess and report current water quality conditions to EPA every two years.

The 2016 Integrated Report provides the most current information on the current water quality condition of streams in Hardin County. This report provides information on stream designated uses and a review of the monitoring and assessment protocol. Unincorporated Hardin County has 25 stream / stream segments included in the 2016 Integrated Report. The results of the investigation are provided in **Appendix A**.

#### **2.2.1.5 Hardin County Assessment**

As discussed previously, this report will focus on the MS4 areas in Hardin County. Details from the Integrated Report that impact streams within the MS4 boundaries have been summarized and provided below.

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<sup>4</sup> Soil Survey of Hardin and Larue Counties, Kentucky, United States Department of Agriculture, Soil Conservation Service, January 1979, pp. 3.

### 2.2.2 Special Use Waters

Special Use Waters are rivers, streams and lakes listed in Kentucky Administrative Regulations that are worthy of additional protection. These special uses include cold water aquatic habitat, exceptional waters, reference reach waters, outstanding state resource waters, outstanding national resource waters, state wild rivers and federal wild and scenic rivers.

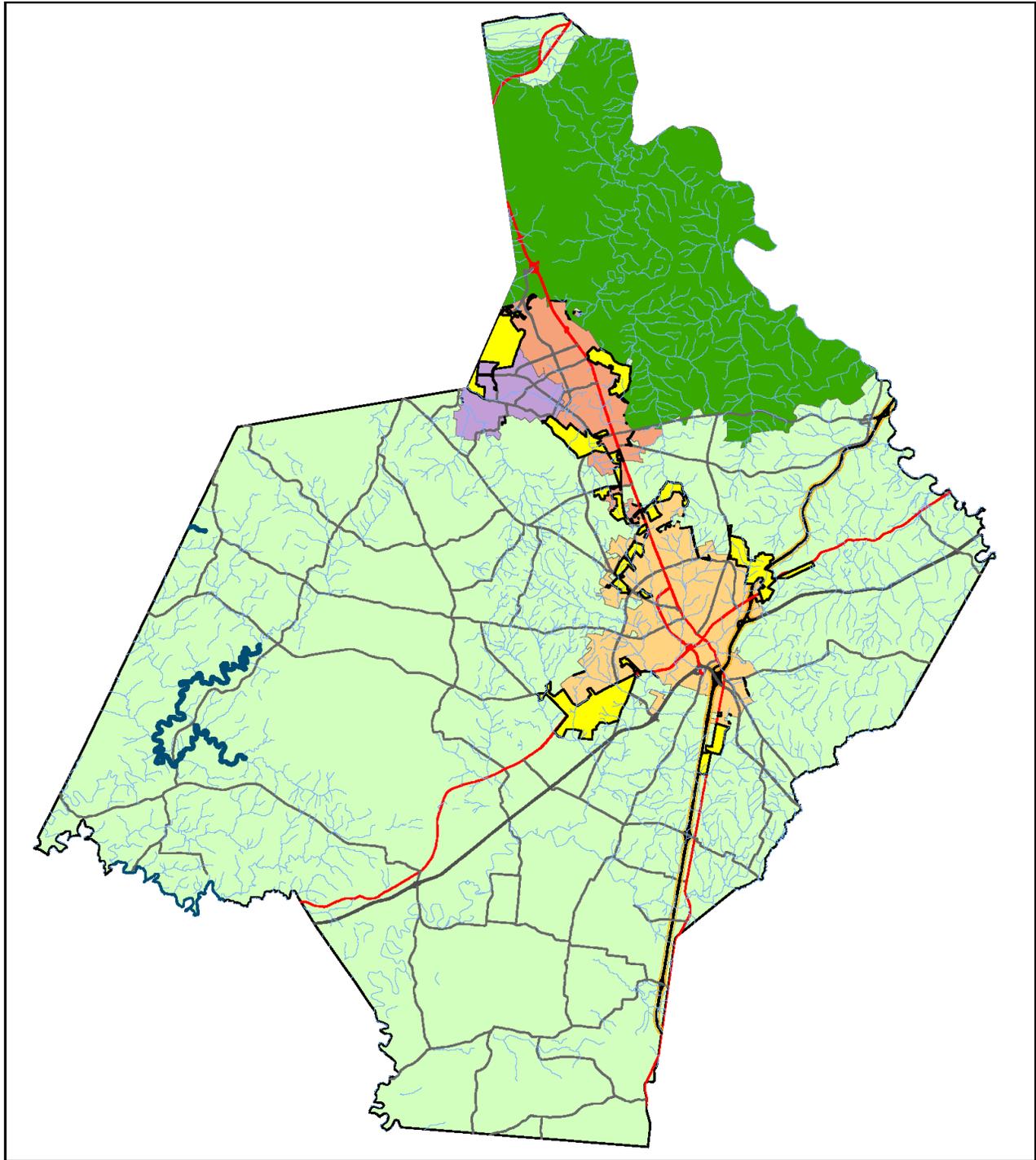
Hardin County has portions of a river and a stream that are classified as exceptional waters and reference reach waters. Exceptional Waters refer to certain waterbodies whose quality exceeds that necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water. Waters placed in this category are reference reach waters, Kentucky Wild Rivers, some outstanding state resource waters and waters with “excellent” fish or macroinvertebrate communities. (401 KAR 5:030 Section 1)

Reference Reach Waters are a representative subpopulation of the least-impacted streams within a bioregion. These streams serve as chemical, physical and biological models from which to determine the degree of impairment (physical, chemical, or biological) to similar stream systems in each representative bioregion. These are not necessarily pristine streams, but represent those least-disturbed conditions that are attainable in each region.

The following waters in Hardin County are designated as both Exceptional Waters and Reference Reach Waters, and are illustrated on the **map on page 12**.

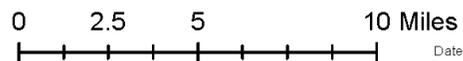
#### SPECIAL USE WATERS

Waterbody Name	Basin	Zone	UMP	DMP	Length
Linders Creek	Green	Mouth to Sutzer	7.7	0.0	7.7
Meeting Creek	Green	Little Meeting Creek to Petty Branch	13.8	5.2	8.3
Rough River	Green	Linders Creek to Vetrees Creek	147.8	136.9	10.9



### Hardin County Special Use Streams

- |                     |                |
|---------------------|----------------|
| Special Use Streams | Streams        |
| 2010_MS4            | Bluegrass Pkwy |
| Ft Knox             | Interstate     |
| Vine Grove          | State          |
| Elizabethtown       | US Highway     |
| Radcliff            | WK Pkwy        |



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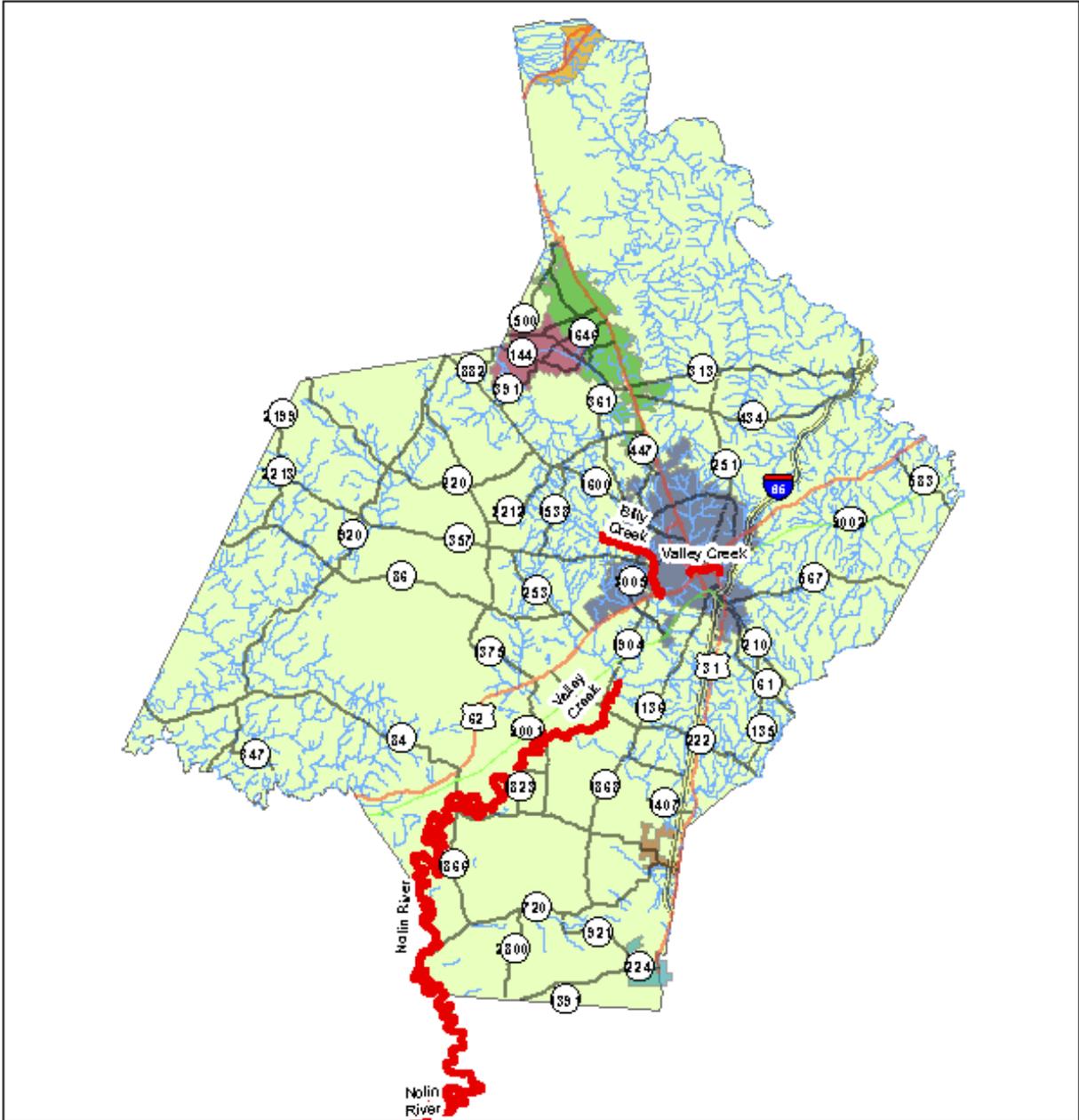
### 2.2.3 Approved Total Maximum Daily

Section 303(d) of the Clean Water Act requires each state to identify waters within their boundaries that have been assessed and are not currently meeting water quality standards (WQS) for their designated uses (warm or cold water aquatic habitat, primary or secondary contact recreation, domestic water supply and outstanding state resource water per 401 KAR 5:026 and 5:031). States are required to develop Total Maximum Daily Loads (TMDLs) for each waterbody that are not meeting WQS. The TMDL process identifies the allowable amount of pollutant a stream can naturally assimilate while meeting the WQS for the designated use, so states can identify water quality controls to reduce both point and nonpoint source pollution. The ultimate goal is the restoration and maintenance of water quality in the waterbody so that the designated uses are met.

Kentucky has a total of 63 approved Total Maximum Daily Load (TMDL) reports. A TMDL report provides a calculated pollutant load and outlines a basic implementation plan on how to achieve water quality standards with the goal of delisting the stream or lake from the 303(d) list.

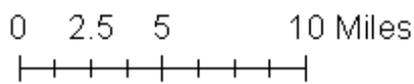
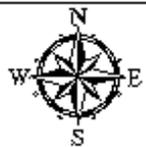
The Kentucky Division of Water (KDOW) identified fifteen (15) waterbodies on the 2004 303(d) Report (KDOW 2005) from the Upper Green River as impaired for primary contact recreation. Waterbodies were identified as first priority for TMDL development if one or more designated uses were identified as nonsupport and second priority if the waterbody partially supports the designated uses. The stream segments are impacted by excessive amounts of pathogens entering the stream from both point and nonpoint sources. Fecal coliform bacteria are used as an indicator of the presence of excessive pathogen pollution. Of the fifteen impaired waterbodies, the four listed in the following table are within Hardin County and are illustrated on the **map on page 14**.

Waterbody Name	Segment Length (miles)	Use Support Designation	Suspected Source	TMDL Priority
Billy Creek of Valley Creek RM 0.0-5.9	5.9	Nonsupport	Unknown	First
Nolin River of Green River RM 44.0-93.2	49.2	Nonsupport	Agriculture	First
Valley Creek of Nolin River RM 0.0-3.5	3.5	Nonsupport	Unknown	First
Valley Creek of Nolin River RM 10.3-11.8	1.5	Nonsupport	Unknown	First



### Hardin County Impaired Waters (TMDL)

- TMDL
- ~ Streams
- Parkway
- Interstate
- State
- US
- ELIZABETH TOWN
- RADCLIFF
- SONORA
- UPTON
- VINE GROVE
- WEST POINT



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In February, 2008, KDOW published the *Total Maximum Daily Load for 15 Fecal Coliform Impaired Stream Segments in the Upper Green River USGS Hydrologic Unit, 05110001, Final TMDL Report*. This lengthy document does not identify the source of the fecal coliform bacteria contamination found in Hardin County streams, but rather discusses the potential sources including rural land use with a large agricultural base, human waste disposal, and wildlife as potential sources and are highly suspected to be source(s) in Hardin County. The following information discussing the potential sources is taken directly from the *Final TMDL Report*.

*The Upper Green River has a large agricultural base, with forty percent of the land use in agricultural uses. Along with agriculture is the potential for pathogen loading from animal waste. Agricultural animals are both a direct and indirect source of fecal coliform loadings to streams. Cattle with access to streams can have a direct impact on water quality when feces are deposited on stream banks or directly in the stream. Cattle often loaf in or near the streams in search of shade or water to drink. Animals grazing in pasturelands will often deposit feces on the land and coliform that does not decay will runoff into the streams during wet weather events. Runoff from pastureland is an indirect source of coliform, as a rainfall event is required to transport the coliform to the stream.*

*Human waste disposal is of particular concern in rural areas. The majority of the Upper Green River is not serviced by a sewer system. Human waste in the unsewered area must be treated by an OSTDS (Onsite Sewage Treatment and Disposal Systems) or it receives no treatment at all. Onsite sewage treatment and disposal systems (OSTDS) including septic tanks are commonly used in areas where providing a centralized sewage collection and treatment system is not cost effective or practical. When properly sited, designed, constructed, maintained, and operated, septic systems are an effective means of disposing and treating domestic waste. The effluent from a well-functioning OSTDS is comparable to secondarily treated wastewater from a sewage treatment plant. When not functioning properly, they can be a source of nutrients (nitrogen and phosphorus), pathogens, and other pollutants to both ground water and surface water.*

*Wildlife undoubtedly contributes pathogens to the watershed, noting the high percentage of forest in all sub-watersheds. The estimated deer population and density in Hardin County was 6,478 with an estimated density of 14 deer per square mile as provided by the Kentucky Department of Fish and Wildlife Resources (David Yancy, Personal Communication, 2006). Estimates on numbers of other types of animals are not available. Although wildlife contributes pathogens to surface water, such contributions represent natural background conditions.*

Hardin County will pursue further investigation of these factors within the drainage basin of each TMDL stream segment.

### **2.2.3 Kentucky Water Health Portal**

Another water quality resource is the Kentucky Water Health Portal. This online resource at <http://watermaps.ky.gov/WaterHealthPortal/> provides a wealth of information of the streams throughout the Commonwealth, including Hardin County.

As reported in an online KDOW article (see **Appendix B**), the portal was developed in response to the 2013 House Bill 378, an act related to making the complex and technical data presented in the Integrated Report more transparent to the average citizen.

Assessment information for stream segments located in Hardin County are included in **Appendix B**.

## **3.0 Minimum Control Measures**

### **3.1 MCM 1: Public Education and Outreach**

The objective of the MCM 1 is to inform citizens about their roles and responsibilities in maintaining stormwater systems to improve and protect water quality. As citizens gain a greater understanding of why the program is necessary and how they fit in, their level of support and willingness to participate and comply with the program should increase.

Hardin County has an active public education program. We focus on activities / information that is appropriate for a more suburban / rural community such as lawn care, septic system management, proper disposal of dead farm animals, to name a few. Highlighting the program is the opportunity to make bi-monthly presentations to Hardin County Fiscal Court. Each meeting is open to the public. The presentation is videoed by Hardin County Educational and Community Television and aired 6 times for a total of 36 broadcasts. Presentations have covered topics ranging from overview and education about the MS4 permit; educational review of stormwater topics; upcoming training opportunities; current concerns, issues and new developments; program expansion and current activities in Hardin County. Information to elected officials is provided to keep them current on the details of the MS4 Program. These presentations are also an excellent opportunity to educate newly elected officials.

Additionally, *Issues and Insights*, an informational program aired by the Hardin County Educational and Community Television provides opportunity to present stormwater related information. The interview formatted program is available one to two times annually to highlight the activities of the Hardin County Engineering Department. Each program is generally televised nine times.

Various educational materials, such as the Kentucky Erosion Prevention and Sediment Control Field Guides, are distributed to local engineers, developers, contractors, builders, inspectors and others to educate them about EPSC measures and maintenance. Other publications include the "Get the Dirt Out" Field Guide Site Report Card. These pocket-sized report cards are convenient for quick reference and field use.

Hardin Co also purchased 5 pamphlets focused on stormwater. The customized, tri-folds addressed the following topics: Protect our Streams; Sink Holes; Oil and Water Don't Mix; The Car is Clean, but What About the Water?; and Working as a Contractor in a Phase II Community. These handouts are made available to the public at various county offices and are distributed to the public at all special events.

Television and radio media is an excellent opportunity to provide information to the public regarding stormwater. Through a joint agreement with the Cities of Elizabethtown and Radcliff and Hardin County, three video PSAs are being aired in the two movie theaters in Elizabethtown and Radcliff. The PSAs are shown before each showing of every movie. Additionally, a new theater, Crowne Pointe Theater, opened in the fall of 2018. We will work with them to extend our PSA broadcast.

Enjoying the success of the PSAs, Hardin County Engineering partnered with Hardin County Solid Waste to create PSAs with the combined message of keeping trash out of the water. This PSA was created in July 2016, and is also being shown in the movie cinemas in Elizabethtown and Radcliff, with the same number of screens and frequency as described above.

An additional important partner is the Kentucky Transportation Cabinet (KYTC). KYTC has a robust program of media, internet, and educational outreach. The KYTC Media Outreach Program (MOP), in conjunction with our partner MS4 communities (including Hardin County), contracted with the Kentucky Broadcasters Association (KBA) to air a video spot and six audio spots in 2017. The 30 second spots have been aired statewide as a public education initiative to inform the general population about stormwater issues. The ads messages were developed after the statewide survey conducted in 2008 identified that half of the population is unaware that storm drains discharge directly to waters of the Commonwealth without treatment. The ads can be viewed on [stormwater.ky.gov](http://stormwater.ky.gov). The TV and radio plays combined totaled 82,108 plays statewide in 2017 for a total value of \$2,055,906. Since the inception of the Media Outreach Program there have been 608,889 plays for a total value of \$11,935,227.

A new website URL was secured and a new website prepared to help launch the MOP and provide a statewide resource for the KYTC and partner MS4 communities to promote stormwater issues. The website was designed to address both the public and those involved with the MS4 program either as a permitted community, construction contractor or KYTC. It provides basic information regarding what is stormwater and stormwater pollution, who to contact if more information is needed or a concern needs to be reported, and technical information for MS4 communities and contractors.

Additionally, Kentucky has participated in the International Adopt-A-Highway Program since 1988. The Commonwealth has one Statewide Adopt-A-Highway Coordinator in central office, and 12 Adopt-A-Highway District Coordinators throughout the state. The Adopt-A-Highway program involves community groups to organize and pick up litter. The Transportation Cabinet participates in Adopt-A-Highway meetings as agreed upon by the Local Community and KYTC. There are 694 groups that manage 3,387 miles of roads throughout the state.

Information regarding Stormwater Management and Erosion Prevention and Sediment Control has been posted on the Hardin County Web page. This information may be found at [www.hcky.org](http://www.hcky.org) Information posted included the following:

- Hardin County Ordinance No 239 – An ordinance Relating to Erosion Prevention and Sediment Control in Hardin County, KY.
- Hardin County Ordinance No. 304, Series 2016 – An ordinance relating to Post-Construction Runoff Control in Hardin County, KY.
- Best Management Practices Handbook, 2005
- Hardin County Stormwater Manual

This webpage will be expanded/updated to include additional stormwater information /resources.

### **3.1.1 MCM1 - Narrative**

Activities planned for the next permit cycle include a continuation of public education and outreach methods that have been used during the previous cycle as described in the section above. Other activities may include the investigation of methods to support / increase partnership with the Cities of Elizabethtown and Radcliff.

### **3.1.2 MCM 1 - Best Management Practices**

The types of Best Management Practices identified may include the selection of public education materials from the Stormwater Education Tool Box and other sources in the following formats:

- Television broadcast material
- Television / Radio / Cinema PSAs
- Brochures / Flyers

Other appropriate materials will be selected to support the ongoing programs here in Hardin County.

### **3.1.3 MCM 1 - Measurable Goals**

The measurable goals for the MCM 1 will include the following:

- number of briefings provided to Fiscal Court (with number of television airings);
- number of times a television broadcast is aired;
- number of PSA broadcasts;
- number of hits on the web site; and
- number of brochures produced and distributed.

### 3.2 MCM 2: Public Involvement / Participation

Methods for Public Involvement / Participation are varied in the County. Updates are delivered to Hardin County Fiscal Court six times per year. Each meeting is open to the public and time is provided during each meeting for public comment. These updates are also televised on Hardin County Educational and Community Television and air six times for a total of 36 broadcasts. The public is welcome to call and provide comments on the presented materials.

Hardin County Field Inspector assists local developers, builders, and contractors to better understand the erosion prevention and sediment control devices through inhouse or onsite meetings to review the plans.

Other types of outreach/ services include different annual county events/programs such as:

- *Good Neighbor Day* sponsored by the Elizabethtown/Hardin County Chamber of Commerce. At this annual event there is often over 300 people to pass by our booth, and information and brochures are distributed. Those attendees that visit the Hardin County booth are eligible to enter a raffle for a Rain Barrel.
- *Hazardous Waste and Prescription Drug Collection Program* is another free service provided annually to provide for proper disposal of household hazardous waste and prescription drugs.
- *E-Scrap Collection Program* is a free service provided annually for the proper disposal / recycling of electronics.
- *Deceased Farm Animal Disposal Program* is a free service to the residents of Hardin County to pick up and properly dispose of fallen animals to keep the decay out of the water supply.
- *Free Dump Days* allows residents of Hardin County to dump garbage at Pearl Hollow Landfill free of charge. This event, typically held 3 to 4 times annually, helps to reduce/stop illegal dumping in the County which often occurs along stream banks or in sinkholes.
- Hardin County began the *Recycling Program* in the fall of 2007 and currently has consolidated to one central location serving the entire county. This un-manned drop-off location, open 24/7, accepts newspaper, cardboard, aluminum/metal cans and plastic. This program continues to be very popular with numerous inquiries of expanding the drop-off locations. This program has also helped to reduce illegal dumping along stream banks and in sink holes.
- *Hardin County Rinse and Return* - The Hardin County Judge Executive, Farm Bureau, and Cooperative Extension Service, and Kentucky Department of Agriculture offered the popular “Rinse and Return Plastic Pesticide Container Recycling Program” to residents of Hardin County. The recycled plastic pesticide containers are made into useful consumer products such as fence posts and new product containers. Recycling used plastic pesticide containers conserves landfill space and reduces the chance that pesticides will contaminate drinking water.

The County Engineer has also participated in creating statewide training/organizations to benefit and promote MS4 needed training. In 2009, the County Engineer was instrumental

in creating and serves as a Board member of the Kentucky Stormwater Association (KSA). KSA is a non-profit organization that supports collaboration, training and implementation with respect to stormwater permitting and solutions to improve the quality of Kentucky's waterways. Created from the evolution of the ad hoc Kentucky MS4 Workgroup, KSA provides forums for members to interact and learn about the latest MS4 stormwater news, resources and implementation strategies.

### **3.2.1 MCM 2 - Narrative**

Activities planned for the next permit cycle include a continuation of public education and outreach methods that have been used during the previous cycle as described in the section above. Other activities may include investigation / identification of other interested groups to provide information. Additionally Hardin County will seek to identify methods to support / increase partnership with the Cities of Elizabethtown and Radcliff.

### **3.2.2 MCM 2 - BMPs**

The types of Best Management Practices identified may include continued development of public outreach programs similar to the above discussions.

### **3.2.3 MCM 2 - Measurable Goals**

The measurable goals for the MCM 2 will include the following:

- number of briefings provided to Fiscal Court (with number of television airings);
- number of people attending meeting and special events
- topics discussed
- actions taken

### **3.3 MCM 3: Illicit Discharge Detection and Elimination**

The objective of MCM 3 is to have MS4s gain a thorough awareness of their storm sewer systems. This awareness allows the MS4 to determine the types and sources of illicit discharges entering their system, and establish legal, technical, and educational means needed to eliminate these discharges.

Hardin County is a growing rural county that does not own or maintain a municipal sewer treatment plant. As such, development in the county is limited to the following:

- Large lot size (40,000 sf minimum with average lot size approximately one acre) that must be sized to include onsite septic systems.
- On-site managed sewer systems
- Extension of sewer system from adjacent municipal areas

Until 2009, development in the unincorporated portions of Hardin County was limited to large lots with on-site septic systems. Development standards for this type of large lot development include rural roadway drainage systems consisting of open roadside swales with cross-culverts. Typically the more urbanized curb and gutter systems with the associated underground stormwater piping systems exist in only a few residential developments. This type of “green” development with overland and open swale drainage systems continues to be standard practice in Hardin County.

Additionally, due to the lack of municipal sewer system, commercial and industrial zoning is very limited. Historically, developments adjacent to existing city limits (Elizabethtown, Radcliff and/or Vine Grove) wanting higher residential density or commercial / industrial zoning are annexed into the city.

Septic systems have the potential to pollute groundwater and drinking water sources. Septic systems in Hardin County are regulated and maintained by the Hardin County Health Department. Courtesy inspections are conducted on problematic/failing septic systems and repaired as needed.

As a part of protecting water quality, Hardin County has identified sewage disposal alternatives for long-term and near-term time frames. Historically, treatment of all Hardin County sewage treatment outside the limits of Elizabethtown, Radcliff and Ft. Knox is provided by on-site septic systems. A Regional Wastewater Facilities Study was completed in 2008 to identify long-term sewage disposal opportunities through municipal treatment facilities, either expansion of existing City facilities, or through the construction of new plant(s) within the county. Hardin County Water District No. 2 has taken over management of the Waste Water Treatment Plant/system for Radcliff and Ft. Knox, and has the authority to extend the municipal sewer system outside the city limits into the County. However, due to cost, the expansion of this service may continue to be limited.

For a near-term solution, the County developed a program for On-Site Sewage Disposal System Alternatives. This program allows for the installation and maintenance of cluster/alternative septic systems to be used in Hardin County. Through this program, the

responsibilities of Hardin County Water Districts 1 and 2 were expanded to review, permit and maintain centralized sewer systems in Hardin County. Again, due to cost, this alternative has not been utilized in a new subdivision in Hardin County.

The County's Comprehensive Plan 2008 update included a land use element – Natural Resource Area, which includes guidelines to provide water protection. Non-structural BMPs include the Source Water Protection Overlay Zone, which limits lot size and development density in areas around well heads for drinking water. Also new zoning is in place to allow for cluster developments and de-centralized sewer systems.

Another program that is currently underway that helps to preserve water quality in the county is the Deceased Farm Animal Disposal Program, a free service to the residents of Hardin County to pick up and properly dispose of fallen animals. Given the rural farming nature of Hardin County, along with the extensive stream systems and karst topography, proper removal and disposal of dead livestock and other animals is very important. The plan for animal removal in Hardin County, KY includes services provided by a private rendering company, Hardin County Animal Control Department and Hardin County Sanitation Department, as well as participation by the Cities of Elizabethtown and Radcliff and the Kentucky Department of Highways. Through conversations with stakeholders in water quality, Water Districts, Conservation Officer, and small local producers, there is widespread support for this program. This program provides them an incentive to adopt best management practices when disposing of animals, and to help protect our water supply from contamination.

The MS4 Storm Sewer System Mapping and Illicit Discharge Screening Program was developed in 2012 and updated in 2015. This program located and mapped all major outfalls. All outfalls are mapped, photographed and inspected as outlined in the Program.

Efforts are currently underway to expand / create the GIS mapping of the storm drainage systems within the 2010 MS4 urbanized boundary of the County and illustrate potential illicit discharge locations. As discussed above, due to the rural nature of the unincorporated areas of Hardin County, only small isolated areas of commercial development exist and most residential development utilizes open ditches and cross-drains for storm drainage.

Should a problem area be identified / reported, protocol provided in the Illicit Discharge Detection and Elimination Plan, Updated September 2015, will be utilized.

### **3.3.1 MCM 3 - Narrative**

Activities planned for the next permit cycle include a continuation of the ongoing programs that have been used during the previous cycle as described in the section above. Other activities include an illicit discharge ordinance, expanded storm sewer map for the urbanized MS4 areas of the County, and other programs.

### **3.3.2 MCM 3 - BMPs**

The types of best management practices include the illicit discharge ordinance. The ordinance provides for legal prohibition and enforcement of illicit discharge within the county. As a part of this program, a storm sewer map for the MS4 urbanized portions of the county has been created and will be updated to include the expanded boundary area. A detection and elimination plan has been prepared. This plan identifies the methodology to 1) locate problem areas; 2) locate the source; 3) remove illicit connections discovered and 4) document action taken.

Other initiatives include the development / enhancement / monitoring of recycling / disposal programs such as recycling, oil drop off locations, free dump days, and the dead animal disposal program.

### **3.3.3 MCM 3 - Measurable Goals**

The measurable goals for the MCM 3 will include the following:

- The illicit discharge ordinance
- Creation/update of the expanded stormwater map and mapping 25% of the urbanized areas annually
- Number of outfalls screened
- Number of dry weather flows identified
- Number of illicit discharges identified
- Number of illicit discharges removed
- Quantity of recycled / hazardous / collected materials
- Number of citizen participating in programs
- Number of materials distributed

### **3.4 MCM 4: Construction Site Runoff Controls**

Through the adoption of Hardin Co Ordinance #239 in December 2005, Erosion Prevention and Sediment Control measures have been required on all site development disturbing one acre or more. Plans are reviewed by the County Engineer using the guidelines provided in Hardin County Best Management Practices Handbook, 2005.

Field inspection procedures are based on the measures set forth in the Hardin County Best Management Practices Handbook, 2005 and the Kentucky Erosion Prevention and Sediment Control Field Guide. In addition to the County Engineer, an Engineering Technician is trained to conduct onsite inspection of the EPSC measures and report back to the County Engineer. The County Engineer reviews the information on the EPSC Plans for the site prior to the site visit. Field visits are conducted during the construction phase.

Enforcement measures are also being implemented in Hardin County. Sites found in non-compliance to the EPSC Plan are issued a Notice of Violation (NOV). A follow up inspection is then performed, and if necessary, a second NOV is issued. Non-response to two NOVs results in a Stop Work Order being issued for the site.

Public complaints/concerns are directed to the County Engineer or Engineering Tech. These complaints, generally via phone conversation, are investigated, either by the County Engineer or Engineering Tech. Coordination with the developer is conducted to address the issues. A follow-up phone call is directed back to the homeowner. These calls include drainage issues with new construction as well as established residential areas. Pertinent information about all inquiries are logged in the Citizen's Concerns data base and tracked through closure of the concern.

Information regarding Erosion Prevention and Sediment Control has been posted on the Hardin County Web page. This information may be found at [www.hcky.org](http://www.hcky.org) Information posted included the following:

- Hardin County Ordinance No 239 – An Ordinance Relating to Erosion Prevention and Sediment Control in Hardin County, KY.
- Best Management Practices Handbook, 2005

Kentucky Erosion Prevention and Sediment Control Field Guides are distributed to local engineers, developers, contractors, builders, inspectors and others to educate them about EPSC measures and maintenance.

The County Engineer assisted in the scope of work, preparation of the powerpoint and testing procedure for the KEPSC Qualified Inspector Training Course. Staff members have taken both the UK Technology Transfer EPSC class as well as the City of Bowling Green EPSC training.

### **3.4.1 MCM 4 - Narrative**

Activities planned for the next permit cycle include a continuation of the ongoing programs that have been used during the previous cycle as described in the section above. Other activities may include the development of additional design standards.

### **3.4.2 MCM 4 - BMPs**

The types of Best Management Practices identified may include continued development of review and enforcement procedures similar to the above discussions.

### **3.4.3 MCM 4 - Measurable Goals**

The measurable goals for the MCM 4 will include the following:

- Number of permits issued
- Number of acres permitted
- Number of violations cited
- Number of BMP detail handouts distributed
- Improvements to the plans review process
- Enhancement of field review and documentation procedures
- Number of sites inspected
- Number of public concerns / observations and followup actions taken

### **3.5 MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment**

Through the adoption of Hardin Co Ordinance, No 304 Series 2016 (update), Post Construction Runoff Control (Stormwater Management, (SWM)) measures have been required on all site development disturbing one acre or more. The County Engineer using the guidelines provided in the Hardin County Stormwater Manual reviews the plans.

Periodic reviews are conducted during construction. Upon completion of the stormwater management devices, an “as-built” survey is required to confirm proper field installation.

Information regarding Stormwater Management has been posted on the Hardin County Web page. This information may be found at [www.hcky.org](http://www.hcky.org) Information posted included the following:

- Hardin County Ordinance No. 304 Series 2016– An ordinance relating to Post-Construction Runoff Control in Hardin County, KY.
- Hardin County Stormwater Manual

Additionally, the County’s Comprehensive Plan 2008 update allows for zoning to provide water protection. Non-structural BMPs include the creation of a Source Water Protection Overlay Zone which limits lot size and density in areas around drinking water well heads. Also zoning allows for cluster developments and de-centralized sewer systems.

#### **3.5.1 MCM 5 - Narrative**

Activities planned for the next permit cycle include a continuation of the ongoing programs that have been used during the previous cycle as described in the section above. Additionally, the following activities will be conducted:

- Develop a requirement that all new development or redevelopment establish and enter into a long term maintenance agreement with inspections.
- Review and evaluate municipal policies related to building codes, or other local regulations, with the goal of identifying regulatory and policy impediments to the installation of green infrastructure.

Additional activities include the development of design standards applicable to the potential changes in the County’s Comprehensive Plan regarding water protection, as well as other design standard details as needed.

#### **3.5.2 MCM 5 - BMPs**

The types of Best Management Practices identified may include continued development of review procedures, development and implementation of the above listed activities, and additional standard details to be used in Hardin County.

### **3.5.3 MCM 5 - Measurable Goals**

The measurable goals for MCM 5 will include the following:

- Number of plans reviewed
- Improvement to plan review procedures
- Number of sites reviewed
- Number of BMPs constructed using the manual
- Total area of land draining to the new BMPs
- Potential non-structural design standards for development

## **3.6 MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations**

Pollution Prevention / Good Housekeeping operations were developed in 2005 for the Hardin County Road Department. A new salt shed was constructed at the Road Department to cover the stored salt and prevent runoff during rain events. The staff was trained to ensure proper disposal of chemical and other potentially hazardous materials. Oil socks were installed around the drains in the shop area.

This program was formalized by the Municipal Facilities / Operations Pollution Prevention / Good Housekeeping Program in 2015. This program identifies BMPs to be utilized, employee training, and inspection and record keeping requirements.

Maintenance of the good housekeeping operations continue to be implemented, including the oil socks around drains in shop areas, the maintenance of the salt shed, and training with staff to ensure proper disposal of chemicals and other potentially hazardous materials.

### **3.6.1 MCM 6 – Narrative**

Activities planned for the next permit cycle include a continuation of the ongoing programs that have been used during the previous cycle as described in the section above.

Other activities may include the identification and presentation of additional training videos.

### **3.6.2 MCM 6 – BMPs**

The types of Best Management Practices identified may include continued development of an operation and maintenance program for County operations.

### **3.6.3 MCM 6 – Measurable Goals**

The measurable goals for MCM 6 will include the following:

- Number of new topics/ videos identified and presented
- Number of employees trained
- Continued maintenance of good housekeeping devices
- Number of maintenance projects completed
- Amount of waste collected.

## **4.0 MS4 Monitoring Program**

### **4.1 Introduction**

The current Phase II Permit includes a requirement for the permittees to develop an appropriate monitoring program that evaluates the effectiveness of the MS4 program. Specifically, Section 2.5, Implementation of a small MS4 Program Monitoring Plan, states:

"The permittee shall develop an appropriate monitoring program that evaluates the effectiveness of the MS4 program and provides feedback for the permittee to change or improve the stormwater quality management program appropriately. The small MS4 program monitoring plan, as approved by the Division of Water, shall be implemented during the current permit period."

The following provides a summary of the proposed monitoring plan for Hardin County, Kentucky.

### **4.2 Monitoring Plan Objectives**

The objectives of the monitoring plan are to:

- Develop baseline characterization data
- Document potential water quality changes over time based on visual screening
- Provide visual screening for potential water quality problems
- Determine through observation if land use activity such as forestry or farming are impacting the stream
- Provide information to educate the local community or stream users to encourage pollution prevention and environmental stewardship
- Showing public officials and local citizens about the condition and management of their water resources

The data collected will be used by the local officials to identify potential water quality impacts and to determine if additional actions are required to address the issues.

### **4.3 Monitoring Locations**

As discussed herein, the jurisdiction of the MS4 permit is limited to small, non-contiguous unincorporated areas of Hardin County adjacent to the city limits of Elizabethtown, Radcliff and Vine Grove. The current MS4 Permit implemented the use of the 2010 Urban Boundary as designated by the 2010 census. This change significantly expanded the MS4 areas in unincorporated Hardin County. As stated in Section 1, these non-contiguous areas

expanded from 23 areas comprising a total area of approximately 6.5 square miles to 34 areas comprising 11.86 square miles. The Hardin County MS4 area is almost doubled from the 2000 census urban area. Hardin County is currently reviewing GIS mapping data as well as conducting field visits to evaluate each of the new MS4 areas. We will continue to use the protocol established for the 2000 MS4 areas.

*The following information has not been updated to reflect the 2010 expansion but is included below and in **Appendix C** to illustrate the basis of the program and protocol that will be utilized.*

*To aid in the tracking of the activities, each MS4 area has been assigned an MS4 Code number. The maps in **Appendix C** illustrate the location and code for each area in 2000. There are a total of 23 areas, ranging in size from 1.39 acres to 609.05 acres. **Table 1 on page 32** provides the area contained in each MS4 area. Codes and data will be gathered for the 2010 MS4 areas.*

*For the previous permit, each MS4 area was evaluated to determine a potential monitoring location. MS4 areas discharging into perennial or intermittent streams were selected. Utilizing the 2000 data, four (4) locations were identified as potential monitoring sites. These four locations covered eight (8) of the 23 MS4 areas, for a total area of 1,377 acres. The remaining areas were deemed non-viable as monitoring locations based on the following criteria. The same approach will be utilized for the 2010 update.*

<b><i>Drainage Characteristics</i></b>	<b><i>No of MS4 Areas</i></b>	<b><i>Area (Acres)</i></b>	<b><i>Area (Square Miles)</i></b>
<i>Sinkholes / Ephemeral Blueline Stream</i>	8	1787	2.79
<i>Too Small / No Blueline Stream</i>	7	136	0.21

*Below is a description of each of the four selected 2000 MS4 monitor locations. Maps of each of the locations are in **Appendix C**.*

**ML-EE1** - Monitor location ML-EE1 is in Mill Creek. This site is located between Elizabethtown and Radcliff on the east side of US31W at the end of Mt Zion Road. The Mill Creek drainage area at this point is 4.91 square miles and is a perennial stream. The MS4 area draining to this location is 0.647 square miles or 13% of the drainage area. Mill Creek is not listed in the 2012 KDOW 303(d) List of Surface Waters.

**ML-EE3** - Monitor location ML-EE3 is in Buffalo Creek. This site is located on the east side of Elizabethtown where Buffalo Creek passes under Tunnel Hill Road. The Buffalo Creek drainage area at this point is 0.43 square miles and is an intermittent stream. The drainage area lies within the MS4 area. Buffalo Creek is not listed in the 2012 KDOW 303(d) List of Surface Waters. Buffalo Creek discharges into Valley Creek, which has a TMDL for Fecal Coliform. Additionally, Valley Creek is designated Partially/ Non-Supporting for Warm Water Aquatic Habitat. It should be noted that the Valley Creek

**TABLE 1**

MS4 Areas			Monitoring Location Evaluation / Information				
MS4 Code	Area		Area/Discharge Location(s) Description	Monitoring Location Identifier	Discharge	Drainage Area	Nearest Roadway
	Sq Miles	Acres				Sq mi	
EE1	0.647	414.21	Perennial Stream	ML-EE1	Mill Creek	4.91	Mt Zion
EE2	0.015	9.63	No Blue Line Stream, DAs Too Small	NA			
EE3	0.593	379.63	Intermittent Stream	ML-EE3	Buffalo Creek	0.43	Tunnel Hill
EW1	0.064	41.14	No Blue Line Stream, DAs Too Small	NA			
EW2	0.006	3.85	No Blue Line Stream, DAs Too Small	NA			
EW3-N	0.428	171.19	Ephemeral Blue Line Stream	NA			
EW3-S		<b>103.00</b>	Intermittent Stream	ML-EW5	Un-named tributary into Billy Creek	3.46	Ring Road
EW4	<b>0.179</b>	<b>114.59</b>					
EW5	<b>0.079</b>	<b>50.26</b>					
EW6	0.107	68.77	4 small DAs	NA			
RE1	0.952	609.05	Ephemeral Blueline/sinkholes	NA			
RE2	0.011	6.91	Sinkholes	NA			
RW1	0.042	27.05	Sinkholes	NA			
RW2	0.004	25.43	Sinkholes	NA			
RW3	0.125	79.84	Perennial Stream	ML-RW3	Brushy Fork	1.88	KY220
RW4	0.006	3.85					
RW5	0.003	1.68					
RW6	0.359	229.84					
RW7	0.004	2.35	No Blue Line Stream, DAs Too Small	NA			
RW8	0.004	2.47	No Blue Line Stream, DAs Too Small	NA			
RW9	0.012	7.49	No Blue Line Stream, DAs Too Small	NA			
VN1	1.467	938.6	Sinkholes	NA			
VN2	0.002	1.39	Sinkholes	NA			
VS2	0.011	6.86	Sinkholes	NA			
<b>TOTAL</b>	<b>5.12</b>	<b>3299.08</b>				<b>10.68</b>	

*Drainage area at the impaired stream segment is 20.7 square miles of which only 0.593 square miles or 2.9% is within the MS4 area.*

**ML-EW5** - *Monitor location ML-EW5 is in an un-named tributary into Billy Creek. This site is located on the west side of Elizabethtown, west of and adjacent to Ring Road. The tributary drainage area at this point is 3.46 square miles and is an intermittent stream. The area of the MS4 areas (EW4 and EW5) draining to this location is 0.258 square miles or 7.5% of the drainage area. Billy Creek has a TMDL for Fecal Coliform for use Primary Contact Recreation. Additionally, Billy Creek is designated Partially/Non-Supporting for Warm Water Aquatic Habitat. It should be noted that the Billy Creek Drainage area at the impaired stream segment is 13.50 square miles of which only 0.526 square miles or 3.9% is within the MS4 area.*

**ML-RW3** - *Monitor location ML-RW3 is in Brushy Fork. This site is located between Elizabethtown and Radcliff on KY220. The Brushy Fork drainage area at this point is 1.88 square miles and is a perennial stream. The area of the MS4 areas (RW3-RW6) draining to this location is 0.493 square miles or 26.2% of the drainage area. Bushy Fork is not listed in the 2012 KDOW 303(d) List of Surface Waters.*

## **4.4 Monitoring Plan**

The monitoring plan will consist of two parts - watershed inventory and field data collection.

### ***Section 4.4.1 - Watershed Inventory***

A watershed inventory is a comprehensive survey of the geography, land and water uses, potential and actual pollution sources, and history of the stream and its watershed. Research and review of available data including current and historic aerials, county records, photos and oral histories of the area will be conducted. Using GIS mapping additional pertinent information will be gathered and mapped such as land use, topography, watersheds and watershed sub-basins, soils types, etc. Windshield surveys of the watersheds will also be conducted. This data will be used to screen for pollution problems as well as identifying potential sources of pollution. Windshield surveys will be conducted on an annual basis to identify any changes in landuse within the watershed.

### ***Section 4.4.2- Field Monitoring Data***

In addition to the watershed inventory, field data will be collected at each of the monitoring locations. The monitor parameters will include those items included in the Field Monitoring Data Sheet (see **Appendix C**). The information included in the data sheet include general site description, atmospheric conditions, field water measurements (conductivity, pH, temperature, and TDS), runoff characteristics, outfall description, adjacent landuse including wildlife and surrounding area observations.

Field monitoring data will be collected three (3) times annually after a period of 0.5 inches of rain or greater.

Protocol for completing the Field Monitoring Data Sheet will be as described below. Note - All office information will be completed by the sampler in the office prior to field activities as part of the field monitoring preparation.

- General Site Description - All information other than Date/Time will be completed by the sampler in the office.
- Atmospheric Conditions - This information to be gathered in the field. Last Rain data will be determined in the office utilizing the Kentucky Mesonet at [www.kymesonet.org](http://www.kymesonet.org)
- Field Water Measurements - Field water measurements for conductivity, pH, temperature, and TDS will be collected using a Hanna Instruments Model HI9811-5 portable meter or equivalent. The meter will be calibrated per the manufacturer's instructions. Sampling protocol will be conducted per the field sampling methodology outlined in US EPA *Volunteer Stream Monitoring: A Methods Manual* and KDOW standards.
- Runoff Characteristics - To be completed in the field based on observations.
- Outfall Description - To be completed in the office based on construction plans and field verified.
- Adjacent Land Use - To be completed in the office utilizing recent aerials. Any changes in landuse should be noted. Indication of wildlife and/or farm animals in the area should also be noted.

#### **4.5 - Data Management**

The monitoring data will be entered into an electronic data base to store and manipulate the data as needed. All photos will be properly labeled and stored. The data base will be organized to be compatible with GIS mapping.

The data will be analyzed on an annual basis. The results will be included in the MS4 Annual Report.

## **5.0 Measurable Goals Tables**

## 5.0 SWQMP Measurable Goals Table

Task	BMP- Activity Description	Measurable Goal/ Quantifiable Products	Targets/ Measures of Success	Responsible  Parties	Year 1 PY 18- 19	Year 2 PY 19- 20	Year 3 PY 20- 21	Year 4 PY 21- 22	Year 5 PY 22- 23
<b>1. MCM1 PUBLIC EDUCATION AND OUTREACH</b>									
A. Local MS4 Activities									
1.A.1	Briefings to Fiscal Court with television airings	Develop presentations; Track number of presentations	Better understanding of the program	County	x	x	x	x	x
1.A.2	Stormwater public education campaign for radio, television, and/or cinema	Select program from available resources	Number of airings	County	x	x	x	x	x
1.A.3	Stormwater website	Develop/enhance website; Track number of hits to website	Increased number of hits	County	x	x	x	x	x
1.A.4	Stormwater “hot-line”	Track number of phone calls	Respond to calls within 48 hours	County	x	x	x	x	x
1.A.5	Presentations to elected officials	Develop presentations; Track number of presentations	Continued support of program	County	x	x	x	x	x
1.A.6	Presentations to homebuilders association, etc.	Track number of presentations	Better field installation and maintenance	County	x	x	x	x	x
B. Cooperative Efforts with KYTC									
1.B.1	Stormwater public education through PSAs	Airing of PSA on Local Radio and Television	Number of airings	County/State	x	x	x	x	x
<b>2. MCM2 PUBLIC INVOLVEMENT/PARTICIPATION</b>									
A. Local MS4 Activities									
2.A.1	Briefings to Fiscal Court with television airings – open to the public	Develop presentations; Track number of presentations	Better understanding and support of the program	County	x	x	x	x	x

2.A.2	Recycling program	Expansion of program to other areas of the County	Increased pickup locations and quantity of material collected	County	x	x	x	x	x
2.A.3	Household / Hazardous materials recycling program	Enhance program, Track amount of waste collected	Increase in quantity of waste collected	County	x	x	x	x	x
2.A.4	Deceased Farm Animal Disposal Program	Track program, increase usage	Amount of users, amount of animals collected	County	x	x	x	x	X
2.A.5	E-scrap Collection Program	Enhance program, Track amount of waste collected	Increase in quantity of electronic waste collected	County	x	x	x	x	x
2.A.6	Free Dump Days	Enhance program, Track amount of waste collected	Reduction in illegal dump locations	County	x	x	x	x	x
2.A.7	Presentations to groups, participation in special events	Track number of presentations, attendance	Better understanding of the program	County	x	x	x	x	x
<b>B. Cooperative Efforts with KYTC</b>									
<b>3. MCM3 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)</b>									
<b>A. Local MS4 Activities</b>									
3.A.1	Map storm sewer in the 2010 MS4 area	Develop expanded GIS base map layer, map 25% of storm sewers annually	Number of storm sewers mapped	County	x	x	x	x	x
3.A.2	Detection and Elimination plan	Identify / remove illicit discharges in 25% mapped annually	Confirmation of no illicit discharges, Number of illicit	County	x	x	x	x	x

			discharges eliminated						
3.A.3	Public Reporting of Spills	Set up procedure, monitor	Number of reports, spills eliminated	County	x	x	x	x	x
3.A.4	Develop / enhance special programs	Enhance recycling program	Increase in materials collected	County		x	x	x	x
3.A.5	Septic Tanks, On-site Sewage Disposal Systems Alternatives	Through Health Department monitor septic tank problems, on-site systems installed	Installation of alternative systems; repair to septic systems	County	x	x	x	x	x
3.A.6	Dead Animal Disposal Program	Track number of animals properly disposed	Continued usage/ increase in usage of program	County	x	x	x	x	x
<b>B. Cooperative Efforts with KYTC</b>									
3.B.1	Assist in mapping KYTC outfalls in MS4 area	Map 25% of storm sewers annually	Number of storm sewers mapped	County/State	x	x	x	x	x
<b>4. MCM4 CONSTRUCTION SITE STORM WATER RUNOFF CONTROL</b>									
<b>A. Local MS4 Activities</b>									
4.A.1	Review development plans for compliance with erosion prevention and sediment control measures	Track review process	Number of permits issued; number of acres permitted	County	x	x	x	x	x
4.A.2	Conduct site investigations of construction sites	Enhance site review process	Number of investigations conducted; number of violations issued	County	x	x	x	x	x
4.A.3	Public concerns response	Respond in 48 hours	Number of calls responded to; observations documented; followup actions	County	x	x	x	x	x

4.A.4	Distribute EPSC materials /educate on EPSC techniques with developers / builders	Track number of meetings/ visits	Better field installation and maintenance	County	x	x	x	x	x
<b>B. Cooperative Efforts with KYTC</b>									
<b>5. MCM5 POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT</b>									
<b>A. Local MS4 Activities</b>									
5.A.1	Review development plans for stormwater management measures	Track /enhance review process	Number of plans reviewed; number of acres permitted	County	x	x	x	x	x
5.A.2	Conduct site investigations of construction sites	Enhance site review process	Number of investigations conducted; number of proper as-built plans submitted	County	x	x	x	x	x
5.A.3	On-site stormwater runoff quality treatment standard	Monitor application	Number of site implementing standard	County	x	x	x	x	x
5.A.4	Enhanced water protection non-structural standards for potential changes in County's Comprehensive Plan	Develop / enhance standards; implement standards	Number of sites in water protection areas; number of acres protected	County	x	x	x	x	x
5.A.6	Review Building Code/ Planning Requirements to include green infrastructure	Identify regulatory and policy impediments; modify and adopt green policies as applicable	Review of existing policies; addition of green policies	County	x	x	x	x	x
5.A.7	Develop requirements for long term maintenance agreements	Develop and adopt policy	Number of facilities covered by long term	County	x	x	x	x	x

			maintenance agreements							
<b>B. Cooperative Efforts with KYTC</b>										
<b>A. Local MS4 Activities</b>										
6.A.1	Training Program for Good Housekeeping	Identify topics of concern; provide training	Number of new topics identified and presented; number of employees trained	County	x	x	x	x	X	
6.A.2	Refresher Training Program for Good Housekeeping	Provide continued update and review of current programs	Number of refresher courses conducted; number of employees trained	County	x	x	x	x	x	
<b>B. Cooperative Efforts with KYTC</b>										

**APPENDIX A**  
**2016 Integrated Report**

# KDOW 2016 Integrated Report

## A.1 Introduction

Kentucky has issued the 2016 Integrated Report to Congress on the Condition of Water Resources in Kentucky, which reports on the quality of water in the streams, lakes, and reservoirs of all major river basins of the Commonwealth. The 2016 report provides a statewide update on water quality conditions of water bodies in all river basins. This report fulfills requirements of sections 303(d), 305(b), and 314 of the Federal Water Pollution Control Act (or Clean Water Act (CWA)) of 1972 (P.L. 92-500), as subsequently amended. Section 305(b) of the Act requires states to assess and report current water quality conditions to EPA every two years.

Information in this report provides the most current information on the current water quality condition of streams in Hardin County. The following text (direct except from the 2016 IR) provides information on designated uses and a review of the monitoring and assessment protocol.

## A.2 Designated Uses

All waterbodies in Kentucky have assigned certain designated uses for the management and goal of attaining a minimum level of water quality. DUs are promulgated in [401 KAR 10:026](#) and the implementing (enabling) criteria are in [401 KAR 10:031](#). The following are applicable designated uses:

- warm water aquatic habitat (WAH)
- cold water aquatic habitat (CAH)
- primary contact recreation (PCR)
- secondary contact recreation (SCR)
- domestic water supply (DWS)
- outstanding state resource water (OSRW)
- fish consumption<sup>4</sup>

With the exception of CAH and OSRW, the remaining designated uses apply by default to all waterbodies. OSRW is a state-defined designated use for waterbodies that support federally listed threatened or endangered aquatic species or may support an excellent biological community (e.g., waters that are in the exceptional/reference reach categories in [401 KAR 10:030](#)). Below is a description of each designated use.

### Cold Water Aquatic Habitat (CAH)

As defined in [401 KAR 10:001](#), CAH is designated for waterbodies that support a self-sustaining or reproducing trout population on an annual basis. All waterbodies that support the CAH are listed in regulation ([401 KAR 10:026](#)). There are implementing criteria specific to CAHs; however, where

there are no specific criteria to CAH, those criteria promulgated for WAH apply.

#### Warm Water Aquatic Habitat (WAH)

WAH applies to the majority of waterbodies in the Commonwealth – those not designated as CAH (with a few exceptions that are designated as both CAH and WAH). The applicable definition of WAH is aquatic habitat capable of supporting indigenous warm water life.

Collectively, CAH and WAH are commonly referred to as the aquatic life designated use, and are referenced as such throughout this IR. Usually, a waterbody is either WAH or CAH, but a few waterbodies have been designated as both CAH and WAH.

#### Primary Contact Recreation (PCR)

PCR is the designated use for waterbodies in the Commonwealth with the implementing criteria to manage water quality for the protection of human health against primarily pathogenic-induced gastrointestinal illnesses during the recreation season of May 1 through October 31. The bacterium *Escherichia coli* (*E. coli*) is a commonly used indicator organism to monitor water quality for safe swimming conditions. *E. coli* are bacteria found in the guts of warm-blooded organisms, including humans. The presence of *E. coli* indicate there is likely waste from warm-blooded organisms present in the waterbody and with it the expectation of various pathogenic viruses, parasites and pathogenic strains of bacteria, including *E. coli*. A criterion for pH applies to this designated use during the recreation season. This criterion provides protection to the bather from extremes of both acidic and basic conditions.

#### Secondary Contact Recreation (SCR)

SCR is the designated use for waterbodies in the Commonwealth with the implementing criteria to manage water quality for the protection of human health against primarily pathogenic gastrointestinal illnesses and maintain a safe range for pH; these criteria apply to this designated use year-round. Fecal coliforms are bacteria found in the guts of warm-blooded organisms and are the indicator used to monitor the water quality for safe boating and wading, or any form of recreation that does not include full-body immersion. The pH criterion protects against extremes of water quality with regard to acidic and basic conditions. Additional criteria exist to protect the beneficial designated use from such conditions including nuisance algal blooms and nuisance aquatic macrophytes that may result from eutrophication and floating scum.

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<sup>4</sup> Fish consumption is not a designated use, but is assessed as such and therefore included in this list.

### Domestic Water Supply (DWS)

This designated use applies to all waters in the Commonwealth; however, the enabling criteria that implement this designated use are only applied at the point of withdrawal by a public treatment facility. Public water systems are defined as those systems that have at least 15 service connections or regularly serve an average of 25 or more individuals (40 CFR 141.2). The human health criteria that apply are found in 401 KAR 10:031 (Section 6). These criteria were developed to protect water quality for human consumption.

### Outstanding State Resource Water (OSRW)

This designated use provides additional measures for maintenance of habitat quality, including water quality, for the protection of federally threatened or endangered species that inhabit the OSRW. Additionally, select waterbodies that have water quality and habitat that support a diverse fish or macroinvertebrate community and rate excellent on either the fish (Compton et al. 2003) or macroinvertebrate (Pond et al. 2003) biological community multimetric index may be proposed for designation as an OSRW. Other qualities or attributes that qualify a waterbody for OSRW designation are found in WQS, 401 KAR 10:031 Section 8. In addition to the listing of special waters in regulation, a webpage was created to facilitate access to all special waters; this webpage is organized into 12 river basins and by designation. However, final authority for determination of whether a waterbody has a special designated use or category is through WQS procedures that encompass a formal promulgation of any given waterbody with an exception of certain OSRWs. Waters that are determined to support a federal threatened or endangered species are typically afforded OSRW protection through enabling language found in 401 KAR 10:031 Section 8(1)(a)3. Both designated and candidate OSRW are published on the DOW's special waters webpage, so this is often the most up-to-date source of OSRW listings that include candidate waterbodies or segments.

### Fish Consumption

The quality of fish flesh needed for human consumption is a desired goal set forth in WQS. While fish consumption is not a designated use it is strongly implied in WQS, particularly 401 KAR 10:031 Sections 2 and 6. As such, the U.S. EPA agrees and requires the assessment results of fish tissue residue monitoring be reported in Section 305(b) of the CWA under the fish consumption use.

### **A.3 Monitoring and Assessment**

DOW uses information collected by biologists and scientists to perform assessments on waterbodies to determine if that waterbody is meeting water quality standards (WQS) and therefore supporting its designated use(s). The DOW operates its primary monitoring programs under a five-year rotating watershed management approach implemented in 1998. This IR represents monitoring efforts from the Big Sandy, Little Sandy, and Tygarts Rivers BMU sampled in April 2012 – March 2013 and the Kentucky River BMU sampled in April 2013 – March 2014. This report also incorporates assessment data and results from monitoring that occurred during this reporting cycle outside of the BMUs of focus by programs such as the TMDL and NPS programs. Therefore, results are presented in a few different ways. If a program samples under a five-year rotating watershed management approach, then the results from this IR are presented and compared to the two previous integrated reporting years where that BMU was the BMU of focus (2006 and 2010 for the Big Sandy, Little Sandy, Tygarts and Kentucky BMUs). If a program does not sample under a five-year rotating watershed management approach, then the cumulative results of that program are presented, where some of the assessment units may have been updated with new data, while other assessment units may have been carried forward from the previous IR.

When sampling occurs, specific information is gathered for each designated use. For example, bacteria levels are examined when determining if the PCR and SCR designated uses are being supported, while water chemistry, habitat, and biological communities are examined when determining if aquatic life is being supported. For more detailed information about Kentucky's assessment and listing methodology, refer to the Consolidated and Listing Methodology (CALM): Surface Water Quality Assessment in Kentucky, the Integrated Report (Kentucky Division of Water 2015).

#### **A.3.1 Kentucky's Categories**

The 305(b) list is a list of all waterbodies that have been assessed for one or more designated uses. Waterbodies on the 305(b) are put into different categories depending upon the assessment decision made for that waterbody (See Table). The two most common categories are category 2, where assessed designated use(s) is/are fully supporting, but not all designated uses have been assessed, and categories 5, where assessed designated use(s) are not fully supporting, the cause of impairment is identified as a pollutant, and therefore a TMDL is required. If a waterbody has not been assessed, it is considered to fully support each applicable designated use for regulatory purposes, such as permitting and antidegradation.

Table - Definition of each category found in the Integrated Report.

<b>Category</b>	<b>Definition</b>
1	All designated uses for waterbody are Fully Supporting.
2	Assessed designated use(s) is/are Fully Supporting, but not all designated uses assessed.
2B	Segment currently supporting use(s), but 303(d) listed & proposed to EPA for delisting.
2C	Segment with an EPA approved or established TMDL for the following use(s) now attaining Full Support.
3	Designated use(s) has/have not been assessed (insufficient or no data).
4A	Segment with an EPA approved or established TMDL for the following listed use(s) not attaining Full Support.
4B	Nonsupport segment with an approved alternative pollution control plan (e.g., BMP) stringent enough to meet full support level of all uses within a specified time.
4C	Segment is not meeting Full Support of assessed use(s), but this is not attributable to a pollutant or combination of pollutants.
5	Segment does not support designated use(s) and is impaired by a pollutant or a combination of pollutants. A TMDL is required.
5B	Segment does not support designated uses based on evaluated data, but based on Kentucky listing methodology, insufficient data are available to make a listing determination. No TMDL needed

Impaired waters are those waters found to partially support or not support one or more of its designated uses due to either a pollution or a pollutant. This includes waterbodies that are in category 4A, where a TMDL has been written for the pollutant identified as causing the impairment, category 4B, where an approved alternative pollution control plan is in place for the pollutant identified as causing the impairment, category 4C, where the cause of impairment is a pollution, and category 5. The 303(d) list, which is a subset of the 305(b), is only those waters in category 5, where a TMDL is required.

Category 5B is where a segment does not support designated uses based on evaluated data, but based on Kentucky listing methodology, insufficient data are available to make a listing determination, and therefore no TMDL is required. Waterbodies that are in category 5B are not

included in the overall discussion of impaired waters since evaluated data refers to data from Discharge Monitoring Reports (DMR) and therefore no instream data has been collected to confirm the impairment. For this 2016 IR, no new assessments that utilized category 5B were completed. However, some older assessments that included category 5B were updated.

2016 Integrated Report - 305b List - Hardin County

Watershed	TotalSize	ID305b	WaterType	ReachStream	Watershed	Basin	HUC3	County	WAHCAH	PCR	SCR	FishCons	DWS	OSRW	AssessDate	Designates	AssessCat	Causes	Sources
Billy Creek 0.0 to 4.8	4.8 4.8 miles	KY487317_01	River	Valley Creek (00505940)	Green/Tradewat	Green River	05110001	Hardin	5-PS	4A-NS	3	2-FS	3	3	3/1/2003 - 10/30/2007	WAH, FC, PCR, SCR	5	371, 400, 448, 463	62, 72, 73, 122, 125, 140, 143, 144, 156, 169, 177
Clear Creek 0.0 to 4.4	4.4 4.4 miles	KY489613_01	River	Rolling Fork (00502293)	Salt/Licking	Salt River	05140103	Hardin	5-NS	3	3	3	3	3	4/6/2001	WAH, FC, PCR, SCR	5	463	140
Cox Run 0.0 to 3.4	3.4 3.4 miles	KY490231_01	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	5-PS	3	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	5	344, 371, 448, 150, 344,	49, 107, 125, 344, 371, 448, 150, 344,
Dorsey Run 2.1 to 3.9	1.8 1.8 miles	KY491020_01	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	5-NS	3	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	5	371, 448	72, 73, 107
Head of Frough River Spring 154.85 to 155.8	0.95 0.95 miles	KY90001011_00	Spring	Green River (00493284)	Green/Tradewat	Green River	05110004	Hardin	5-PS	5-NS	3	3	3	3	3/25/2008	WAH, FC, PCR, SCR	5	217, 448	140
Linders Creek 0.0 to 7.95	7.95 7.95 miles	KY496567_01	River	Rough River (00502390)	Green/Tradewat	Green River	05110004	Hardin	2-FS	3	3	3	3	2-FS	10/11/2013	OSRW	2		
Little Meeting Creek 0.0 to 3.1	3.1 3.1 miles	KY496797_01	River	Meeting Creek (00498030)	Green/Tradewat	Green River	05110004	Hardin	2-FS	3	3	3	3	3	10/11/2013	WAH, FC, PCR, SCR	2		
Meeting Creek 5.25 to 14.0	8.75 8.75 miles	KY498030_01	River	Rough River (00502390)	Green/Tradewat	Green River	05110004	Hardin	5-PS	3	3	3	3	5-PS	12/6/2007	OSRW	5	371, 448	144, 156
Mill Creek 12.4 to 24.8	12.4 12.4 miles	KY498262_03	River	Salt River (00502830)	Salt/Licking	Salt River	05140102	Hardin	2-FS	3	3	3	3	3	2/6/2001	WAH, FC, PCR, SCR	2		
Mill Creek 6.4 to 7.6	1.2 1.2 miles	KY498262_01	River	Salt River (00502830)	Salt/Licking	Salt River	05140102	Hardin	3	3	3	5B-NS	3	3	2/6/2001	WAH, FC, PCR, SCR	5B	288	85
Mill Creek 7.6 to 12.4	4.8 4.8 miles	KY498262_02	River	Salt River (00502830)	Salt/Licking	Salt River	05140102	Hardin	2-FS	3	3	3	3	3	2/6/2001	WAH, FC, PCR, SCR	2		
Mill Creek Branch 0.0 to 0.7	0.7 0.7 miles	KY498269_01	River	Mill Creek (00498262)	Salt/Licking	Salt River	05140102	Hardin	5-PS	3	3	3	3	3	2/6/2001	WAH, FC, PCR, SCR	5	91, 448, 449	99
Nolin River 49.6 to 88.2	38.6 38.6 miles	KY499512_02	River	Green River (00493284)	Green/Tradewat	Green River	05110001	Hardin	2-FS	2C-FS	3	2-FS	3	3	10/15/2013	WAH, FC, PCR, SCR	2C	217	140
Nolin River 88.2 to 98.5	10.3 10.3 miles	KY499512_03	River	Green River (00493284)	Green/Tradewat	Green River	05110001	Hardin	2-FS	3	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	2		
Pawley Creek 0.0 to 1.0	1.1 miles	KY500281_01	River	Otter Creek (00500026)	Salt/Licking	Ohio River	05140104	Hardin	2-FS	3	3	3	3	3	2/24/2011	WAH, FC, PCR, SCR	2		
Rolling Fork 0.0 to 37.75	37.75 37.75 miles	KY502293_01	River	Salt River (00502830)	Salt/Licking	Salt River	05140103	Hardin	2-FS	5-NS	2-FS	3	3	3	3/1/2011	WAH, FC, PCR, SCR	5	217	140
Rough River 125.2 to 149.45	24.25 24.25 miles	KY502390_06	River	Green River (00493284)	Green/Tradewat	Green River	05110004	Hardin	2-FS	5-PS	3	3	3	2-FS	11/27/2013	OSRW	5	400	140
UT of Dorsey Run 0.0 to 1.0	1.1 miles	KY491020-2.6_01	River	Dorsey Run (00491020)	Green/Tradewat	Green River	05110001	Hardin	5B-NS	3	3	3	3	3	11/14/2007	WAH, FC, PCR, SCR	5B	403	99
UT of Mays Run 0.0 to 0.4	0.4 0.4 miles	KY497751-2.0_01	River	Mays Run (00497751)	Green/Tradewat	Green River	05110004	Hardin	2-FS	3	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	2		
UT of Nolin River 0.15 to 0.9	0.75 0.75 miles	KY499512-91.3_01	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	5B-NS	3	3	3	3	3	12/7/2007	WAH, FC, PCR, SCR	5B	308, 403	99
Valley Creek 0.0 to 3.55	3.55 3.55 miles	KY505940_01	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	5-PS	4A-NS	3	3	3	3	3/23/2008	WAH, FC, PCR, SCR	5	400, 463	85, 140, 156
Valley Creek 10.8 to 12.6	1.8 1.8 miles	KY505940_04	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	3	4A-NS	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	4A	400	140
Valley Creek 3.55 to 8.4	4.85 4.85 miles	KY505940_02	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	2-FS	3	3	3	3	3	1/8/2014	WAH, FC, PCR, SCR	2		
Valley Creek 8.4 to 10.8	2.4 2.4 miles	KY505940_03	River	Nolin River (00499512)	Green/Tradewat	Green River	05110001	Hardin	5-NS	3	3	3	3	3	3/1/2003	WAH, FC, PCR, SCR	5	319, 344, 371, 448, 463	49, 62, 72, 125, 371, 448, 463, 143, 144
Younger Creek 0.0 to 4.5	4.5 4.5 miles	KY507254_01	River	Rolling Fork (00502293)	Salt/Licking	Salt River	05140103	Hardin	5-PS	3	3	3	3	3	10/17/2005	WAH, FC, PCR, SCR	5	371, 448	20, 72, 143, 166

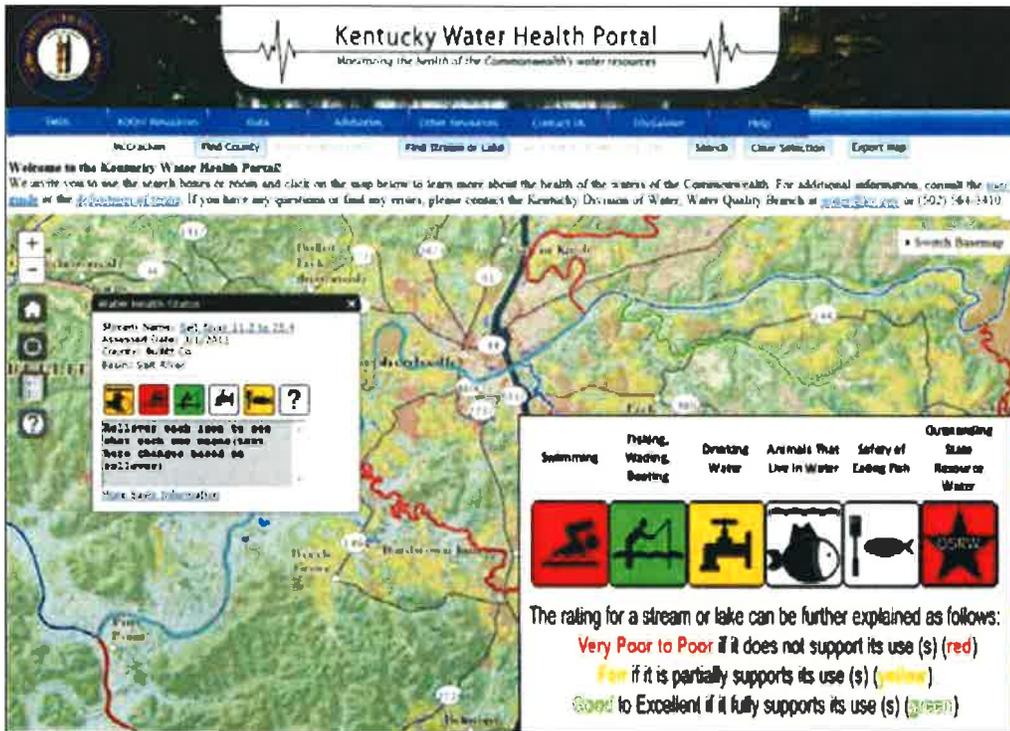
# **APPENDIX B**

## **Kentucky Water Health Portal**

# Kentucky Water Health Portal

*DOW monitors health of the state's water resources; information now available at your fingertips*

By John Webb and Emily Hogue  
Division of Water



## Browser Information

*The portal is best viewed in Google Chrome, Mozilla Firefox or Apple Safari.*

**W**e all need to visit the doctor for a regular checkup to ensure that our bodies are healthy. We know the drill—blood pressure readings, temperature readings, blood work and other standard markers of health are assessed during the normal office visit. Just as our bodies need to be assessed, the Commonwealth's waters also need to be evaluated for their health.

A team of environmental scientists in the Kentucky Division of Water (DOW) is tasked with studying the complex systems that comprise water health. Their results are now available online using the new Kentucky Water Health Portal.

The portal was developed in response to the 2013 House Bill 378, an act related to making the complex and technical data presented in the Integrated Report more transparent to the average citizen. The report, submitted to Congress every two years, includes information based on the health and physical properties of the Commonwealth's waterbodies and assessments of fish and bugs that call the waters home.

"The Division of Water, in an effort to make this information more accessible and easier to understand, worked with a diverse group of stakeholders to incorporate their feedback as the Kentucky Water Health Portal was developed," said

DOW Director Peter Goodman. "The portal is a high-quality communications tool that, we believe, will quickly become a valuable asset to Kentuckians who want to stay informed about their waterways."

## How does the portal work?

Think about your favorite place on Kentucky's waters—that spot where you caught the biggest fish or maybe a quiet stream bank where you go to relax. With that spot in mind, visit the Kentucky Water Health Portal at <http://watermaps.ky.gov/WaterHealthPortal/> and type in the area that interests you.

With a few clicks of the mouse, you can learn if your favorite spot is safe to swim in or if the fish are healthy enough for your family to eat. The information is presented through a series of color-coded icons.

If your favorite stream is impaired, you can find ways to help in the efforts to improve water quality by clicking on "more basin information" that provides the basin coordinator's name and any upcoming basin events.

The DOW has had its finger on the pulse of Kentucky's waters since the inception of the Clean Water Act in 1972. Its dedicated environmental scientists have worked tirelessly collecting, studying and interpreting the data. Now with the creation of the Kentucky Water Health Portal, every citizen can have their finger on the pulse of one of Kentucky's most precious resources.

## Assessment Summary

Rough River 125.2 to 149.45 KY502390_06	 <p>This part of the stream fully supports aquatic life, partially supports swimming (Primary Contact Recreation), fully supports the OSRW designated use.</p>
Lake Backwaters to Vertrees Creek	
Hardin County, Green River Basin	
HUC 05110004	
Assessment Date: 11/27/2013	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Biological Monitoring, Physical/Chemical Monitoring
 (5-PS)	Fecal Coliform	Source Unknown	Concentrations exceeded the water quality standard	Pathogen Monitoring
 (2-FS)				Biological Monitoring, Physical/Chemical Monitoring

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDOW AWQ

<sup>3</sup> Data Collection Date(s): 6/21/2011 - 2/16/2012

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## Assessment Summary

<b>Rough River Reservoir</b> KY502393_00	 <p>This part of the stream fully supports aquatic life, fully supports swimming (Primary Contact Recreation), fully supports fishing/wading/boating (Secondary Contact Recreation), partially supports Fish Consumption, fully supports drinking water (Domestic Water Supply).</p>
<b>Entire Reservoir</b>	
<b>Breckinridge, Grayson Counties, Green River Basin</b>	
<b>HUC 05110004</b>	
<b>Assessment Date: 10/23/2007</b>	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Physical/Chemical Monitoring
 (2-FS)				Monitoring Data Collected by Other Agencies or Organizations, Pathogen Monitoring
 (2-FS)				Monitoring Data Collected by Other Agencies or Organizations, Occurrence of conditions judged not causing impairment
 (5-PS)	Mercury in Fish Tissue	Source Unknown	Concentrations exceeded the water quality standard	Fish Tissue Analysis

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): PWS, USACE-LV

<sup>3</sup>Data Collection Date(s): 10/5/2005 - 9/25/2006

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(2-FS)

Drinking Water Monitoring  
(Finished Water), Monitoring  
Data Collected by Other Agencies  
or Organizations

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): PWS, USACE-LV

<sup>3</sup> Data Collection Date(s): 10/5/2005 - 9/25/2006

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## Assessment Summary

Linders Creek 0.0 to 7.95 KY496567_01	 <p>This part of the stream fully supports aquatic life, fully supports the OSRW designated use.</p>
Mouth to Sutzler Creek	
Hardin County, Green River Basin	
HUC 05110004	
Assessment Date: 10/11/2013	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-F5)				Biological Monitoring, Habitat Assessment
 (2-F5)				Biological Monitoring, Habitat Assessment

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW IS, KDOW RR

<sup>3</sup>Data Collection Date(s): 8/20/2008

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## Assessment Summary

Little Meeting Creek 0.0 to 3.1 KY496797_01				
Mouth to Loss of riparian buffer (near UT)		This part of the stream fully supports aquatic life.		
Hardin County, Green River Basin				
HUC 05110004				
Assessment Date: 10/11/2013				
Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Biological Monitoring, Habitat Assessment

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW IS

<sup>3</sup>Data Collection Date(s): 8/20/2008

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## Assessment Summary

<b>Meeting Creek 5.25 to 14.0</b> KY498030_01	 <p>This part of the stream partially supports aquatic life, partially supports the OSRW designated use.</p>
<b>Little Meeting Creek to Petty Branch</b>	
<b>Hardin County, Green River Basin</b>	
<b>HUC 05110004</b>	
<b>Assessment Date: 12/6/2007</b>	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (5-PS)	Nutrient/Eutrophication Biological Indicators	Agriculture, Crop Production (Crop Land or Dry Land)	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Habitat Assessment
 (5-PS)	Sedimentation/Siltation	Agriculture	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Habitat Assessment
 (5-PS)	Nutrient/Eutrophication Biological Indicators	Agriculture, Crop Production (Crop Land or Dry Land)	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Habitat Assessment
 (5-PS)	Sedimentation/Siltation	Agriculture	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Habitat Assessment

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW PROB

<sup>3</sup>Data Collection Date(s): 7/24/2006

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## Assessment Summary

Clear Creek 0.0 to 4.4 KY489613_01	 <p>This part of the stream does not support aquatic life.</p>
Sample MP 0.5	
Hardin County, Salt River Basin	
HUC 05140103	
Assessment Date: 4/6/2001	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (5-NS)	Cause Unknown	Source Unknown	The cause of impairment could not be determined	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): EKU

<sup>3</sup>Data Collection Date(s): 6/8/1999

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# Assessment Summary

Rolling Fork 0.0 to 37.75 KY502293_01	 <p>This part of the stream fully supports aquatic life, does not support swimming (Primary Contact Recreation), fully supports fishing/wading/boating (Secondary Contact Recreation).</p>
Mouth to UT to New Haven	
Hardin County, Salt River Basin	
HUC 05140103	
Assessment Date: 3/1/2011	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Physical/Chemical Monitoring
 (5-NS)	Escherichia coli	Source Unknown	Concentrations exceeded the water quality standard	Pathogen Monitoring
 (2-FS)				Monitoring data more than 5 years old, Pathogen Monitoring

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDOW AWQ, KDOW BACT

<sup>3</sup> Data Collection Date(s): 4/13/2005 - 12/8/2009

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## Assessment Summary

Valley Creek 3.55 to 8.4 KY505940_02				
East Rhodes Creek to Billy Creek		This part of the stream fully supports aquatic life.		
Hardin County, Green River Basin				
HUC 05110001				
Assessment Date: 1/8/2014				
Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Biological Monitoring, Habitat Assessment

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW PROB

<sup>3</sup>Data Collection Date(s): 6/16/2011

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## Assessment Summary

<b>Valley Creek 8.4 to 10.8</b> <b>KY505940_03</b>	 <p>This part of the stream does not support aquatic life.</p>
<b>Billy Creek to Freeman Creek</b>	
<b>Hardin County, Green River Basin</b>	
<b>HUC 05110001</b>	
<b>Assessment Date: 3/1/2003</b>	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (5-NS)	Cause Unknown	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Livestock (Grazing or Feeding Operations), Loss of Riparian Habitat.	The cause of impairment could not be determined	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old
 (5-NS)	Nutrient/Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land), Industrial Point Source Discharge, Livestock (Grazing or Feeding Operations)	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old
 (4C-NS)	Other flow regime alterations	Highway/Road/Bridge Runoff (Non-construction Related), Industrial Point Source Discharge, Loss of Riparian Habitat, Streambank Modifications/destabilization	Man-made or man-induced alteration of the chemical, physical (e.g. habitat), biological, and radiological integrity of water	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old
 (4C-NS)	Physical substrate habitat alterations	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Livestock (Grazing or Feeding Operations), Loss of Riparian Habitat.	Man-made or man-induced alteration of the chemical, physical (e.g. habitat), biological, and radiological integrity of water	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDFWR

<sup>3</sup>Data Collection Date(s): 7/24/2001

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 (5-NS)	Sedimentation/Siltation	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Industrial Point Source Discharge, Livestock (Grazing or Feeding Operations).	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old
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<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDFWR

<sup>3</sup> Data Collection Date(s): 7/24/2001

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## Assessment Summary

Valley Creek 10.8 to 12.6 KY505940_04				
Freeman Creek to UT		<p>This part of the stream does not support swimming (Primary Contact Recreation).</p>		
Hardin County, Green River Basin				
HUC 05110001				
Assessment Date: 3/1/2003				
Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (4A-NS)	Fecal Coliform (TMDL exists for this cause)	Source Unknown	Concentrations exceeded the water quality standard	Monitoring data more than 5 years old, Pathogen Monitoring

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW BACT, WKU

<sup>3</sup>Data Collection Date(s): 6/1/2001 - 10/31/2001

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## Assessment Summary

<b>Cox Run 0.0 to 3.4</b> KY490231_01	 <p>This part of the stream partially supports aquatic life.</p>
<b>Mouth to UT</b>	
<b>Hardin County, Green River Basin</b>	
<b>HUC 05110001</b>	
<b>Assessment Date: 3/1/2003</b>	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (5-PS)	Nutrient/Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land), Livestock (Grazing or Feeding Operations)	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Monitoring data more than 5 years old
 (4C-PS)	Physical substrate habitat alterations	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Livestock (Grazing or Feeding Operations), Post-development Erosion	Man-made or man-induced alteration of the chemical, physical (e.g. habitat), biological, and radiological integrity of water	Biological Monitoring, Monitoring data more than 5 years old
 (5-PS)	Sedimentation/Siltation	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Livestock (Grazing or Feeding Operations), Post-development Erosion	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Monitoring data more than 5 years old

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDFWR

<sup>3</sup>Data Collection Date(s): 7/13/2001

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## Assessment Summary

Dorsey Run 2.1 to 3.9 KY491020_01	 <p>This part of the stream does not support aquatic life.</p>
Above UT to 0.7 miles East of I-65	
Hardin County, Green River Basin	
HUC 05110001	
Assessment Date: 3/1/2003	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (4C-NS)	Chlorophyll-a	Loss of Riparian Habitat, Managed Pasture Grazing	Man-made or man-induced alteration of the chemical, physical (e.g. habitat), biological, and radiological integrity of water	Biological Monitoring, Monitoring data more than 5 years old
 (5-NS)	Nutrient/Eutrophication Biological Indicators	Managed Pasture Grazing	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Monitoring data more than 5 years old
 (4C-NS)	Physical substrate habitat alterations	Loss of Riparian Habitat, Managed Pasture Grazing, Post-development Erosion and Sedimentation	Man-made or man-induced alteration of the chemical, physical (e.g. habitat), biological, and radiological integrity of water	Biological Monitoring, Monitoring data more than 5 years old
 (5-NS)	Sedimentation/Siltation	Loss of Riparian Habitat, Managed Pasture Grazing, Post-development Erosion and Sedimentation	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Monitoring data more than 5 years old

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup>Data Source(s): KDOW PROB

<sup>3</sup>Data Collection Date(s): 6/29/2001

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## Assessment Summary

Nolin River 49.6 to 88.2 KY499512_02	 <p>This part of the stream fully supports aquatic life, fully supports swimming (Primary Contact Recreation), fully supports Fish Consumption.</p>
Reservoir Backwaters to Valley Creek	
Hardin County, Green River Basin	
HUC 05110001	
Assessment Date: 10/15/2013	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Biological Monitoring, Physical/Chemical Monitoring
 (2C-FS)	Escherichia coli (cause not associated with impairment, but TMDL exists for this cause)	Source Unknown	Concentrations exceeded the water quality standard	Pathogen Monitoring
 (2-FS)				Fish Tissue Analysis, Monitoring data more than 5 years old

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDOW AWQ, KDOW BACT, KDOW FISH, KDOW WBM

<sup>3</sup> Data Collection Date(s): 4/11/2007 - 12/16/2012

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## Assessment Summary

Nolin River 88.2 to 98.5 KY499512_03				
Valley Creek to Middle Creek		This part of the stream fully supports aquatic life.		
Hardin County, Green River Basin				
HUC 05110001				
Assessment Date: 3/1/2003				
Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (2-FS)				Biological Monitoring, Habitat Assessment, Monitoring data more than 5 years old

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDOW PROB, KDOW WBM

<sup>3</sup> Data Collection Date(s): 6/15/2001 - 8/23/2001

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## Assessment Summary

<b>Billy Creek 0.0 to 4.8</b> KY487317_01	 <p>This part of the stream partially supports aquatic life, does not support swimming (Primary Contact Recreation), fully supports Fish Consumption.</p>
<b>Mouth to Confluence of two Uts</b>	
<b>Hardin County, Green River Basin</b>	
<b>HUC 05110001</b>	
<b>Assessment Date: 10/30/2007</b>	

Use	Cause of Impairment	Suspected Source(s) of Impairment	Basis for Listing	Data Collection and Analysis Methods <sup>1,2,3</sup>
 (5-PS)	Cause Unknown	Source Unknown	The cause of impairment could not be determined	Biological Monitoring, Habitat Assessment
 (5-PS)	Nutrient/Eutrophication Biological Indicators	Agriculture, Industrial Point Source Discharge, Loss of Riparian Habitat, Site Clearance (Land Development or Redevelopment), Urban Runoff/Storm Sewers	Problems associated with nutrient enrichment are evident in water quality conditions and/or the aquatic community	Biological Monitoring, Habitat Assessment
 (5-PS)	Sedimentation/Siltation	Agriculture, Crop Production (Crop Land or Dry Land), Managed Pasture Grazing, Streambank Modifications/destabilization, Urban Runoff/Storm Sewers	Sediment deposition is negatively affecting the aquatic community (e.g. habitat smothering) and/or recreation	Biological Monitoring, Habitat Assessment
 (4A-NS)	Fecal Coliform (TMDL exists for this cause)	Livestock (Grazing or Feeding Operations), Unspecified Urban Stormwater	Concentrations exceeded the water quality standard	Monitoring Data Collected by Other Agencies or Organizations, Monitoring data more than 5 years old, Pathogen Monitoring

<sup>1</sup> Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

<sup>2</sup> Data Source(s): KDFWR, KDOW PROB, WKU

<sup>3</sup> Data Collection Date(s): 7/6/2006

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(2-FS)

Fish Tissue Analysis, Monitoring  
data more than 5 years old

<sup>1</sup>Data locations: Physical/chemical monitoring data and pathogen data can be found on the EPA Water Quality Portal; chemical monitoring data for regulated facilities (e.g. wastewater and drinking water) can be found in the EPA ECHO database (online); biological monitoring summary scores and habitat assessment scores can be found in the EPA STORET database (online); and raw community species data and fish tissue analysis data are available on request through KDOW Open Records (expected in STORET 2015).

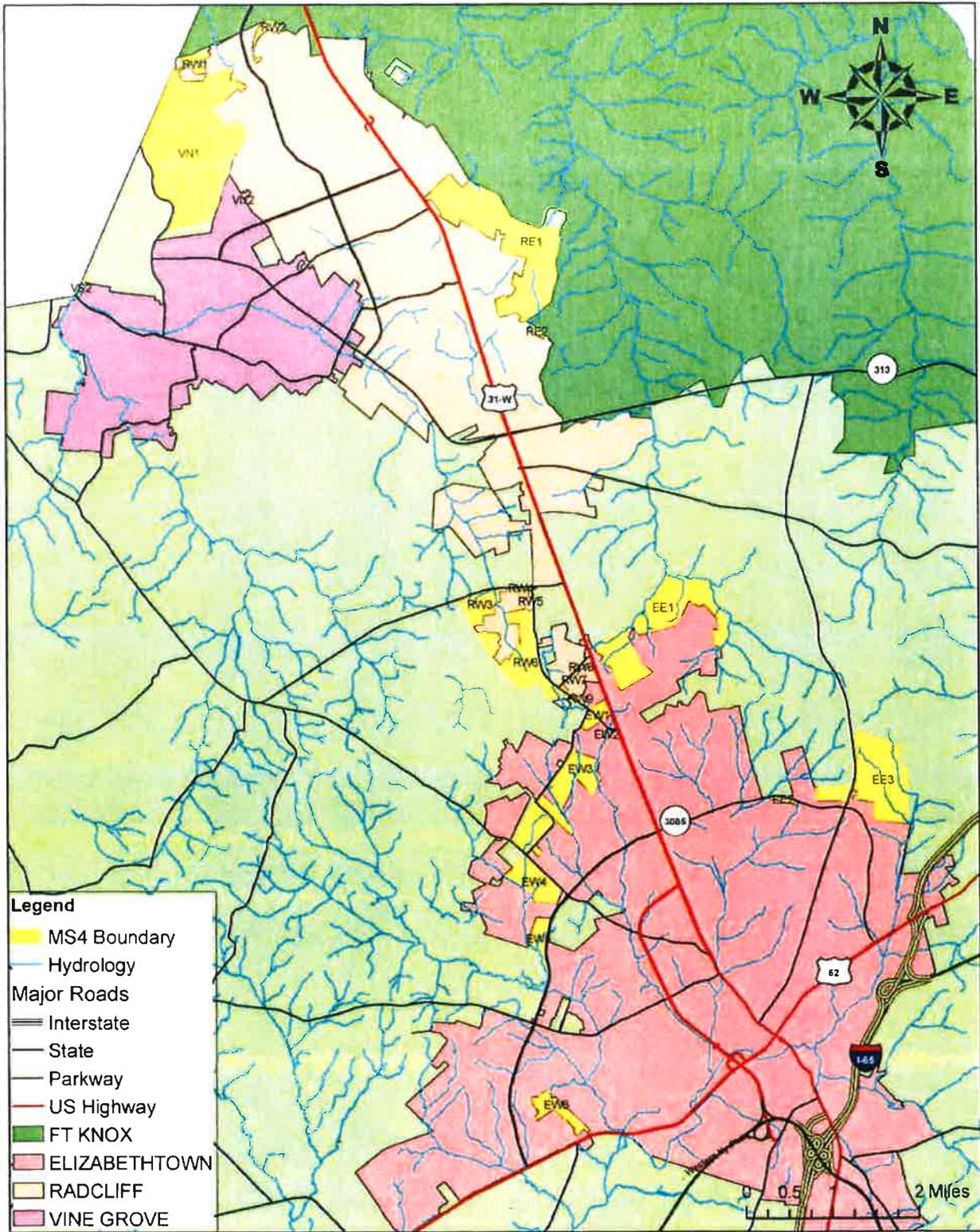
<sup>2</sup>Data Source(s): KDFWR, KDOW PROB, WKU

<sup>3</sup>Data Collection Date(s): 7/6/2006

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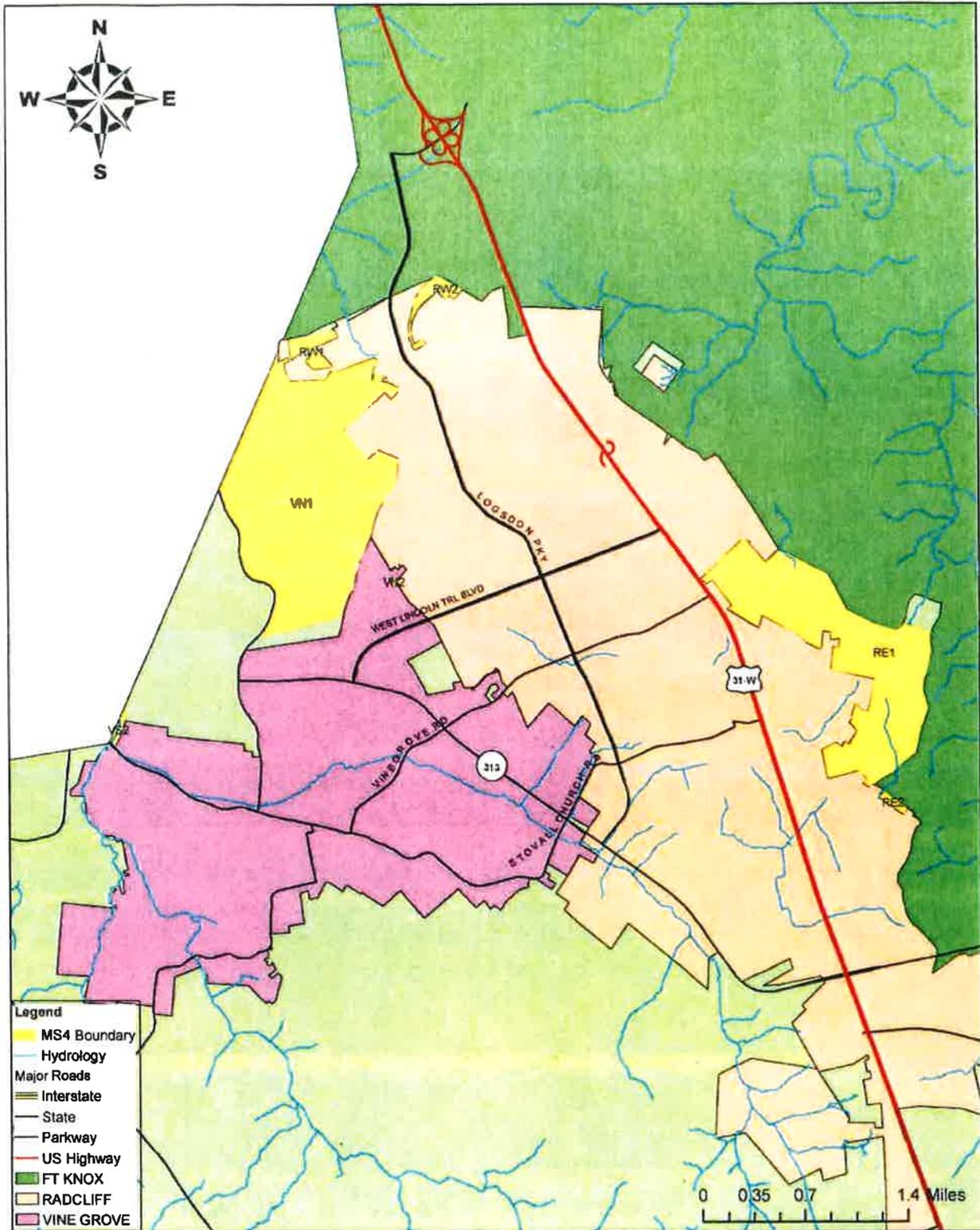
KDOW cannot ensure that this information is accurate, current, or complete. The information provided in this document is for informational purposes only, is subject to revision or correction at anytime and cannot be relied upon for regulatory or other purposes. This is not an official document. For questions or comments contact KDOW at [water@ky.gov](mailto:water@ky.gov) or 502-564-3410

**APPENDIX C**  
**MS4 Monitoring Plan Locations**  
**Monitoring Location Maps**  
**Data Sheets**



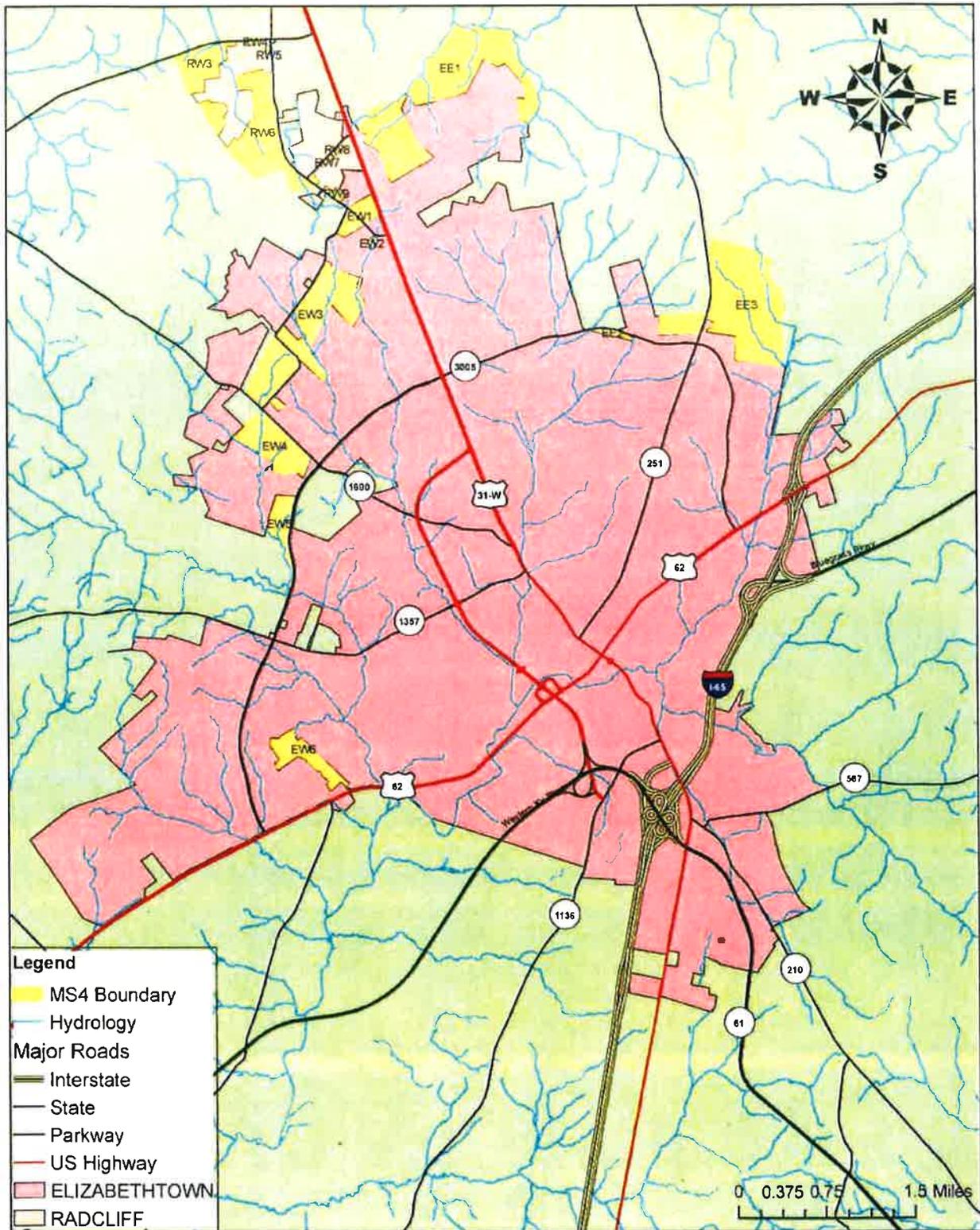
**Hardin County MS4 Boundary**

**A1**



**Hardin County MS4 Boundary  
Northern Portion**

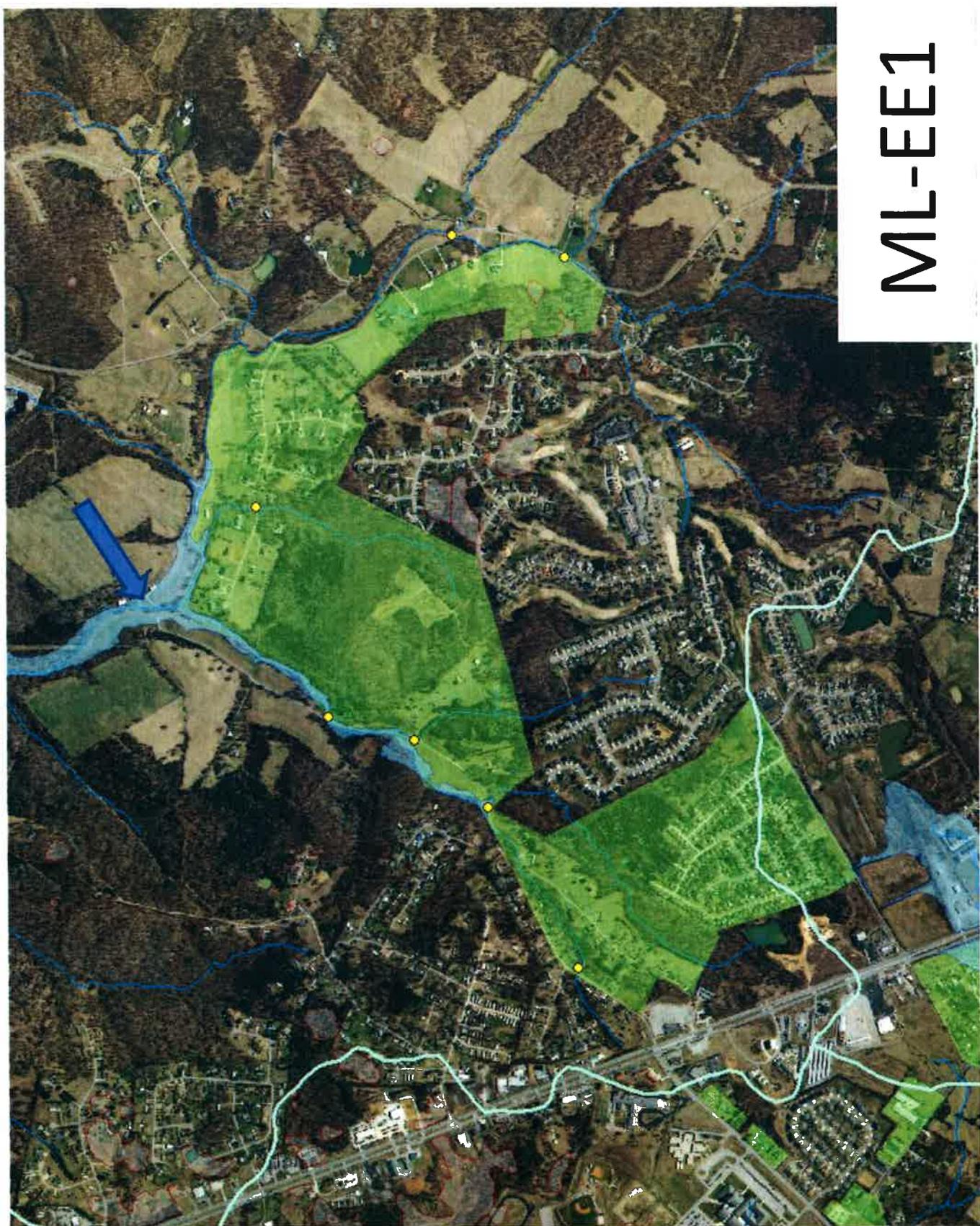
**A2**

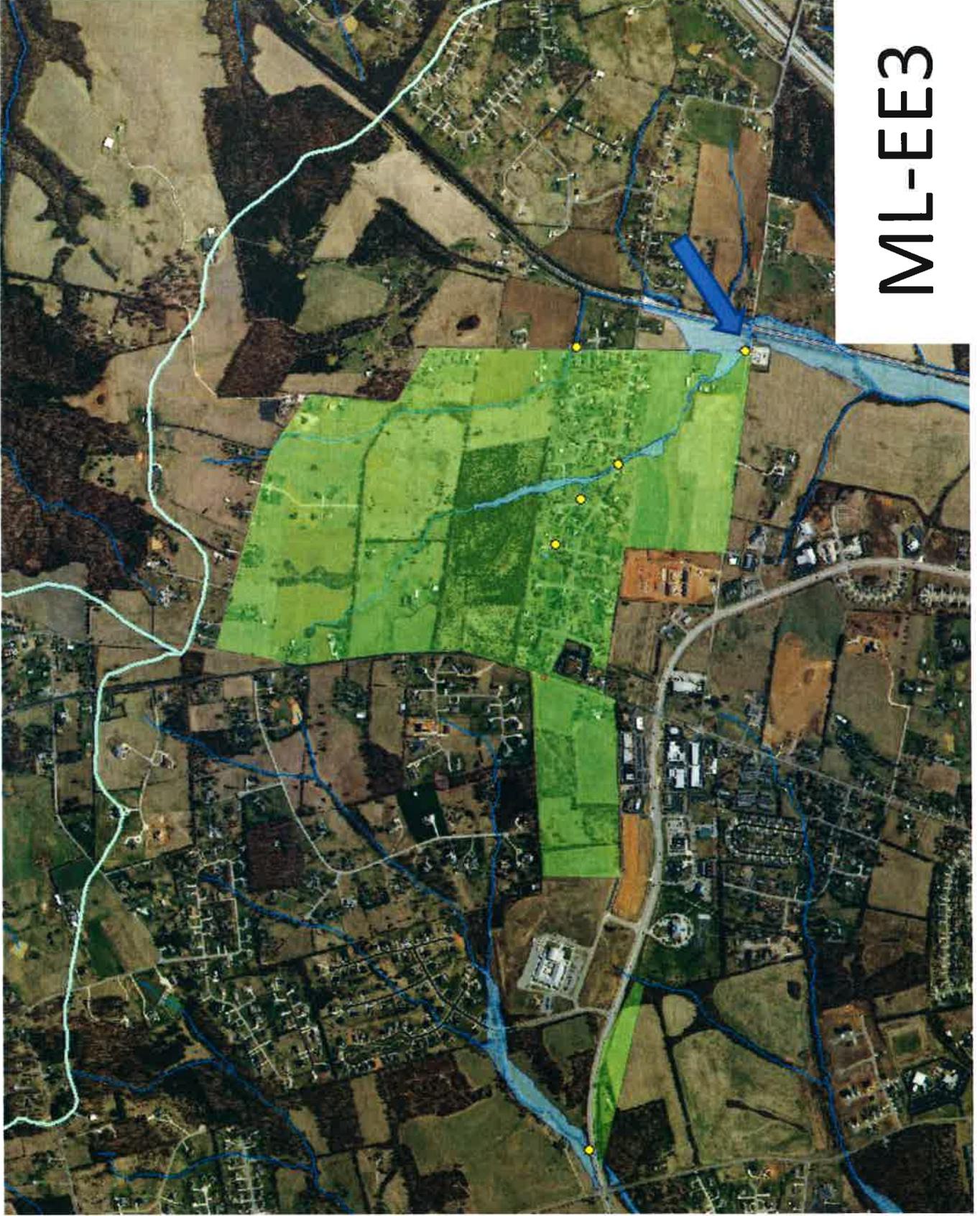


## Hardin County MS4 Boundary Southern Portion

**A3**

ML-EE1





ML-EE3



ML-EW5



**ML-RW3**



# HARDIN COUNTY ENGINEERING DEPARTMENT

P.O. Box 568  
Elizabethtown, Kentucky 42702

Office: 270.765.2350  
Fax: 270.737.5590

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## FIELD MONITORING DATA SHEET

### GENERAL SITE DESCRIPTION

Site ID: \_\_\_\_\_ Latitude: \_\_\_\_\_  
Location: \_\_\_\_\_ Longitude: \_\_\_\_\_  
Date/Time: \_\_\_\_\_ Sampler: \_\_\_\_\_  
Watershed: \_\_\_\_\_ Stream Name: \_\_\_\_\_

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### ATMOSPHERIC CONDITIONS

Temperature: \_\_\_\_\_  
Weather: Sunny\_\_\_ Partly Cloudy\_\_\_ Overcast\_\_\_  
Precipitation: None\_\_\_ Misty\_\_\_ Foggy\_\_\_ Drizzle\_\_\_ Rain\_\_\_ Snow\_\_\_  
Wind: Calm\_\_\_ Breezy\_\_\_ Windy\_\_\_  
Rainfall in past 24 hrs: Yes\_\_\_ No\_\_\_ Rainfall Amount: \_\_\_\_\_ Date: \_\_\_\_\_  
Photo Taken: Yes\_\_\_ No\_\_\_ Picture # \_\_\_\_\_

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### FIELD WATER MEASUREMENTS

Instrument(s) used:  
Hanna Water Meter \_\_\_\_\_ Hanna Phosphate Checker \_\_\_\_\_ LaMotte Detergent Test Kit \_\_\_\_\_  
LaMotte Detergent Test Kit Results-  
Detergent Presence:  
Colored (none) \_\_\_\_\_ Some Color (some detergent) \_\_\_\_\_ Colorless (high detergent) \_\_\_\_\_  
Detergent Amount:  
Lighter than Reference (less than 0.1 ppm) \_\_\_\_\_ Same as Reference (1.0 ppm) \_\_\_\_\_  
Darker than Reference (more than 1.0 ppm) \_\_\_\_\_  
Hanna Phosphate Checker Results-  
Phosphate Amount (ppm): \_\_\_\_\_

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## RUNOFF CHARACTERISTICS

Odor: None\_\_\_ Musty\_\_\_ Rotten Eggs\_\_\_ Chemical\_\_\_ Sewage\_\_\_ Other\_\_\_\_\_  
Faint\_\_\_ Easily Detected\_\_\_ Noticeable From a Distance\_\_\_

Color: None\_\_\_ Yellow\_\_\_ Brown\_\_\_ White\_\_\_ Gray\_\_\_ Other\_\_\_\_\_  
Faint Color in Sample\_\_\_ Clearly Visible in Sample\_\_\_ Clearly Visible in Outfall\_\_\_

Clarity: Clear\_\_\_ Slightly Cloudy\_\_\_ Opaque\_\_\_ Other\_\_\_\_\_  
Floatables: None\_\_\_ Trash\_\_\_ Bubbles/Foam\_\_\_ Sheen\_\_\_ Fecal Matter\_\_\_ Other\_\_\_\_\_  
Deposits: None\_\_\_ Sediment/Gravel\_\_\_ Fine Particulates\_\_\_ Stains\_\_\_ Oily Deposits\_\_\_  
Other\_\_\_\_\_

Flow: Very Low\_\_\_ Low\_\_\_ Medium\_\_\_ High\_\_\_ Very High\_\_\_

Presence: Algae\_\_\_ Water Plants\_\_\_ Leaf Litter\_\_\_ Other\_\_\_\_\_

Bottom Appearance: Silt\_\_\_ Sand\_\_\_ Rocky\_\_\_ Vegetation\_\_\_ Cannot See Bottom\_\_\_

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## OUTFALL DESCRIPTION

Pipe Type: RCP (reinforced concrete pipe)\_\_\_ PVC\_\_\_ Steel\_\_\_ CMP (corrugated metal pipe)\_\_\_  
HDPE\_\_\_ Bridge\_\_\_ Other\_\_\_\_\_

Pipe Shape: Circular\_\_\_ Elliptical\_\_\_ Box\_\_\_ Other\_\_\_ No. of Pipes\_\_\_ %Submerged\_\_\_  
%Blocked\_\_\_

Open Drainage: Concrete\_\_\_ Earthen\_\_\_ Rip-Rap\_\_\_ Other\_\_\_\_\_

Channel Dimensions: Depth\_\_\_\_ Top Width\_\_\_\_ Bottom Width\_\_\_\_\_

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## ADJACENT LAND USE

Industrial\_\_\_ Residential\_\_\_ Commercial\_\_\_ Open Space\_\_\_ Institutional\_\_\_  
Livestock Agricultural\_\_\_ Crop Agricultural\_\_\_ Other\_\_\_\_\_

Wildlife Observations:

Surrounding Area Observations:

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## COMMENTS: